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All drawings of pottery and small finds, as well as plans, sections and elevations,

must bear scales in metric units. All illustrations must be presented as Figures including photographs (see *ADAJ* 38 and 39) .

All Figure references must be included in the text and in brackets, e.g. (Fig.1), at the appropriate place, and numbered in proper sequence as they should occur as illustrative material in the text.

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9. *Footnotes*: **Lengthy footnotes are to be avoided** and where at all necessary kept at a minimum (**below 20**). They should be listed separately at the end of the manuscript and not inserted in the text. Bibliographical references are to be included in brackets in the text, e.g. (Brown 1989:32).
10. *Bibliography*: should appear at the end of the article in alphabetical order. (for bibliographical references in the text the following format should be utilized:
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Do not abbreviate archaeological terms. Do not abbreviate archaeological time periods when they stand alone, e.g. Late Bronze Age.

12. *Chronology of Jordan*: for Chronology of Jordan, see. D Homès-Fredericq and J.B Hennessy: *Archaeology of Jordan, I. Bibliography*. Akkadica supplementum III. 1986: 10. Peeters, Leuven.

Citations of radiocarbon dates should follow the convention of **lower-case letters** for uncalibrated measurements, e.g. **bp**, and **upper-case letters** for measurements calibrated into dates in calendar years, e.g. **BP, BC, AD**, the latter without full-stops.

13. *Notes and News*: submissions to the archaeological Notes and News section are encouraged. The text should not exceed 500 words and may have an illustration.

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If the volume is already full the authors will be informed of the delay in issuing their contribution; preference is given by the order of the date of submission (first come-first serve principle).

16. Any paper submitted, in which the author ignores above instructions, editors of *ADAJ* reserve the right to delay publication of the contribution.

System of Transliteration from Arabic

Consonents

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

Long Vowels

اى	ā
و	ū
ي	i

Short Vowels

َ	a
ُ	u
ِ	i

Common Nouns

تل	Tall	دير	Dayr
جبل	Jabal	عين	'Ayn
خربة	Khirbat	وادي	Wādi

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**IN MEMORIAM
ANTONI OSTRASZ (1929-1996)**

Antoni Ostrasz, who died at midnight on the ninth to tenth October 1996, gave the last 14 years of his life to a meticulous study of the monuments of Jarash. He will be remembered particularly for the long and fruitful work conducted on the hippodrome.

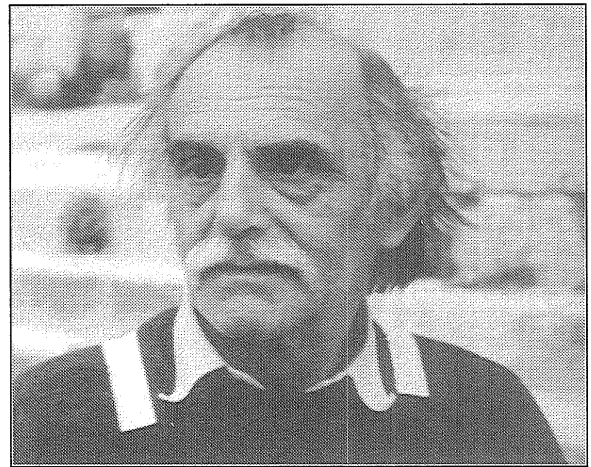
Antoni Ostrasz was born on 23rd June 1929 in Kalwaria, Poland and received his higher education at the Faculty of Architecture of the Warsaw Polytechnical University. After graduating in 1954 with the degree of B.Eng., he was made a junior assistant professor in the Department of History of Architecture and Art at Warsaw University and was upgraded to senior assistant professor after receiving his M.Eng. in 1958.

Two years later he left for Egypt, where he was appointed research architect at the Warsaw University's Centre for Mediterranean Archaeology in Cairo. So began the work on the ancient monuments of the Middle East, which was to last for the rest of his life.

He remained in Egypt from 1960 to 1967 at both the Centre for Mediterranean Archaeology and the Egyptian Centre for Documentation in Cairo, for which he made the architectural drawings of the site of Dakka in Egyptian Nubia in 1961. He was the architect on the Polish Archaeological Missions at Tell Athrib, Tafeh and Dabod in Egyptian Nubia (1960) and at Faras and Old Dongola in Sudanese Nubia (1961-1966).

However, he also worked with Polish expeditions to Alexandria, Palmyra and Nea Paphos in Cyprus in the same period.

In 1967, he returned to the University of Warsaw to prepare his Ph.D. thesis "Le développement urbanistique de Palmyre antique", receiving his doctorate in 1976. By this time, he had been appointed senior lecturer at the Institute of Geography of the Developing Countries of Warsaw University, a post which he held for ten years taking on the



additional position of director of Post-graduate African Studies, in 1977.

During the period in 1967-1980 he also worked as the architect on excavations at Fustat undertaken by the American Research Centre in Egypt, where he worked closely with Profs. George Scanlon and Vladek Kubiak who became his closest life-long friends.

However, in 1982 he obtained leave of absence from his posts in Warsaw and moved to Jarash as architect of the Polish Archaeological Mission in the International Jarash Project. In the first 18 months he and Prof. Michael Gawlikowski excavated the Church of Bishop Marianos and the Umayyad House, both of which Antoni then consolidated and restored. It was during this period that he met and married Ina Kehrberg, then archaeologist on the Australian team at Jarash, and their son Mark was born in 1984.

In the same year he began work, as expert for the Department of Antiquities, on the hippodrome, by far the largest building at Jarash and the study of which was to absorb him for the rest of his life. The study and the meticulous restoration of the building will remain a monument to this extraordinarily talented archaeologist and architect.

Antoni also found time to carry out studies and then the restoration of the Ayyubid

civic complex at Pella in 1993, funded by the Australian government, and the Ayyubid tower on the Amman Citadel, a USAID project in collaboration with ACOR, which was completed in August 1996.

He was working on the hippodrome right up to the day of his sudden death. However, his work on the final publication was far advanced and Ina will make sure that both the architecture and the archaeology of the site will be published as soon as possible. The Department of Antiquities will complete the last remaining sections of restoration, which Antoni had already planned and prepared.

Antoni was a loved and highly regarded member of the international archaeological community of scholars in the Middle East. He was always ready to support and find the time for those who sought his help and advice. Antoni will be greatly missed for his unfailing generosity, integrity and friendship, and by none greater than his wife Ina and his young son Mark

Michael Macdonald
Alison McQuitty
Anne Goguel

Publications

- 1966 The First Campaign of the Polish Excavation at Old Dongola. *Meander*.
- 1966 Etudes sur la restauration du Grand Tétrapyle. *Studia Palmyrenskie*.
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- 1993 The Hippodrome of Gerasa/Jerash. In Pierre Bikai and B.de Vries (eds) *Archaeology in Jordan. AJA* 97/3.
- 1994 The Hippodrome of Gerasa/Jerash. In Patricia Bikai and D. Kooring (eds) *Archaeology in Jordan. AJA* 98/3.
- 1995 The Hippodrome of Gerasa/Jerash. In Patricia Bikai and D. Kooring (eds) *Archaeology in Jordan. AJA* 99/3.
- 1995 The Hippodrome of Gerasa : A Case of the Dichotomy of Art and Building Technology. Pp.183-192 in *SHAJ V*. Amman : Department of Antiquities.
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- 1997 From Cemetery to Racecourse to Industrial Suburb : 600 years of changes at the site of the Gerasa hippodrome. In *SHAJ VI*. Amman : Department of Antiquities (in the press ; I. Kehrberg and A. Ostrasz).

THE 1995 SEASON AT 'AYN GHAZĀL: PRELIMINARY REPORT

by

Gary O. Rollefson and Zeidan Kafafi

Introduction

In previous excavation seasons at 'Ayn Ghazāl it was clear that the Late Pre-Pottery Neolithic B (LPPNB, 6,500-6,000 bc, uncalibrated) was consistently under-represented in the Central and South Fields (Rollefson, Simmons and Kafafi 1992), although probes in the North Field in 1989 and 1993-94 suggested that this part of the site held considerable promise for undisturbed LPPNB deposits. Work in 1993 in the North Field revealed a large LPPNB building that in 1994 was shown to have had two stories, although it was not possible to completely expose the floor plan of this complex structure (Rollefson and Kafafi 1994; Kafafi and Rollefson 1995). Furthermore, the North Field LPPNB deposits lay under a considerable amount of complex PPNC stratigraphy, so that the LPPNB architecture remained isolated from surrounding courtyards and other contemporaneous structures. One of the principal aims of the 1995 season, then, was to complete the excavation of the two-story house and to investigate the distribution of LPPNB features and buildings in the immediate vicinity. To these ends, an area of ca. 180 m² was excavated to varying depths.

A second principal aim of the 1995 season concerned the East Field, a 2-3 hectare expanse across the az-Zarqā' River from the main settlement at 'Ayn Ghazāl. Two small test probes in 1984 provided a brief glimpse at multi-phased PPNB architecture at the northern end of the East Field, and one C-14 date (6620 ±180 bc, uncalibrated, as are all other dates mentioned in this report) indicated a MPPNB/LPPNB age for part of this sequence (Rollefson, Simmons and Kafafi 1992: 444 and Table 1). But what remained

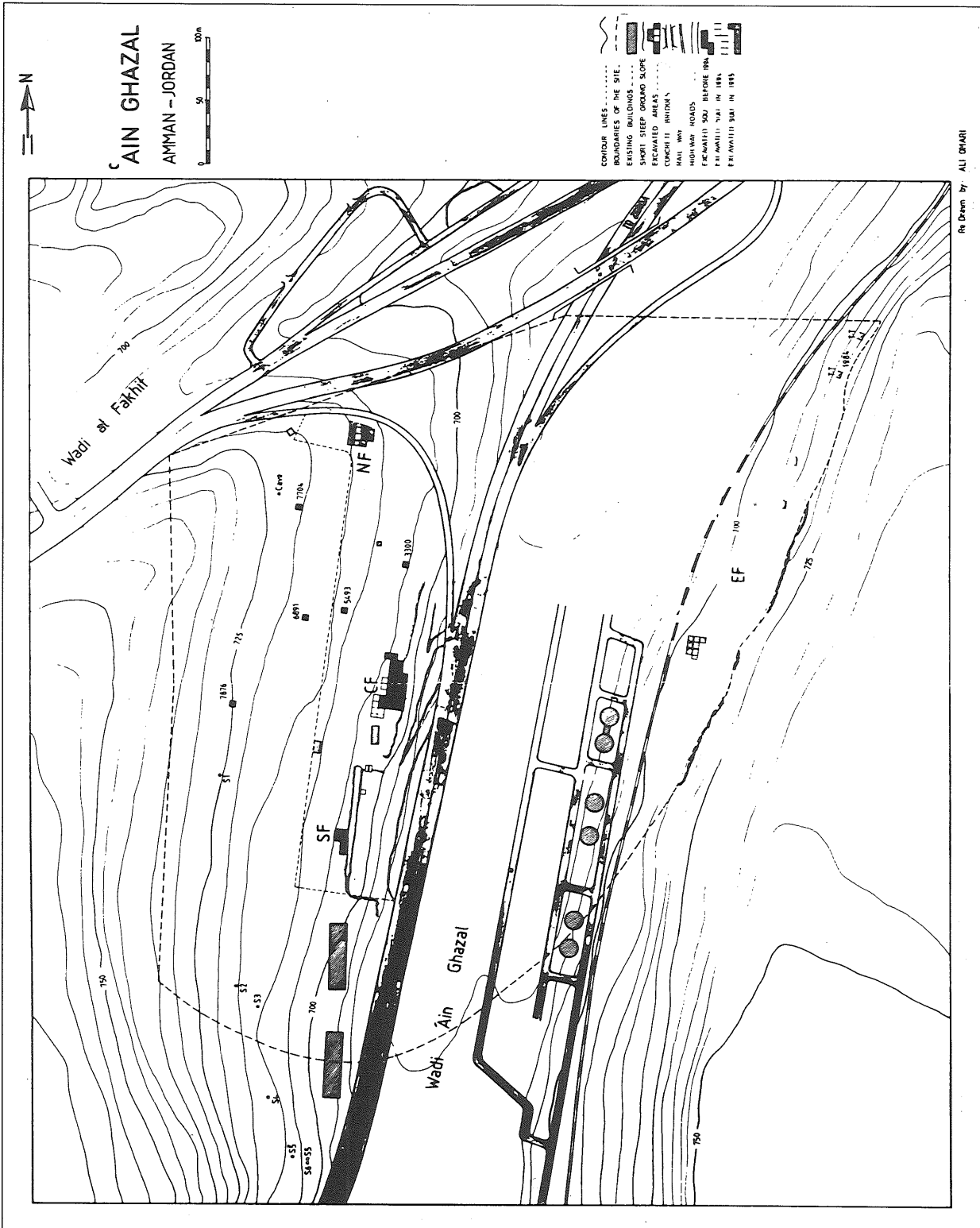
unclear was when the occupation in the East Field first began, how long it lasted, and to what degree the sociocultural elements of this part of the settlement resembled the sequence in the areas across the river. During the 1994 season, a remapping of the East Field revealed several stone alignments, including a 15 m long wall at the southern end of the area. An area of 190 m² was opened above and downslope from this wall (Fig. 1).

One aspect of the sequence in the East Field now seems clear: the absence of Yarmoukian pottery in any of the layers (including surface collections) demonstrates that this section of 'Ayn Ghazāl was not a housing area of the settlement during the Pottery Neolithic period. However, the rest of the stratigraphic succession remains somewhat obscure in the sense that it has not yet been possible to segregate the sequence into clear and unmistakable phases of MPPNB, LPPNB, and PPNC (if the latter exists in the East Field at all). Since radiocarbon dates from the 1995 season will not be available for at least a year, stratigraphic phase assignments must rely mostly on lithic seriation.

ARCHITECTURE

North Field, LPPNB

The Large Terraced House. The layout of the large LPPNB building is shown in Figs. 2 and 3. Entry to the house was via two shallow steps at the southwest corner. Along the southern wall are four rooms, numbered 1-4 from east to west, with Room 1 being almost completely destroyed by erosion sometime after the end of the LPPNB. A doorway led from Room 4 north into Room 5 along the western wall, and doorways also connected



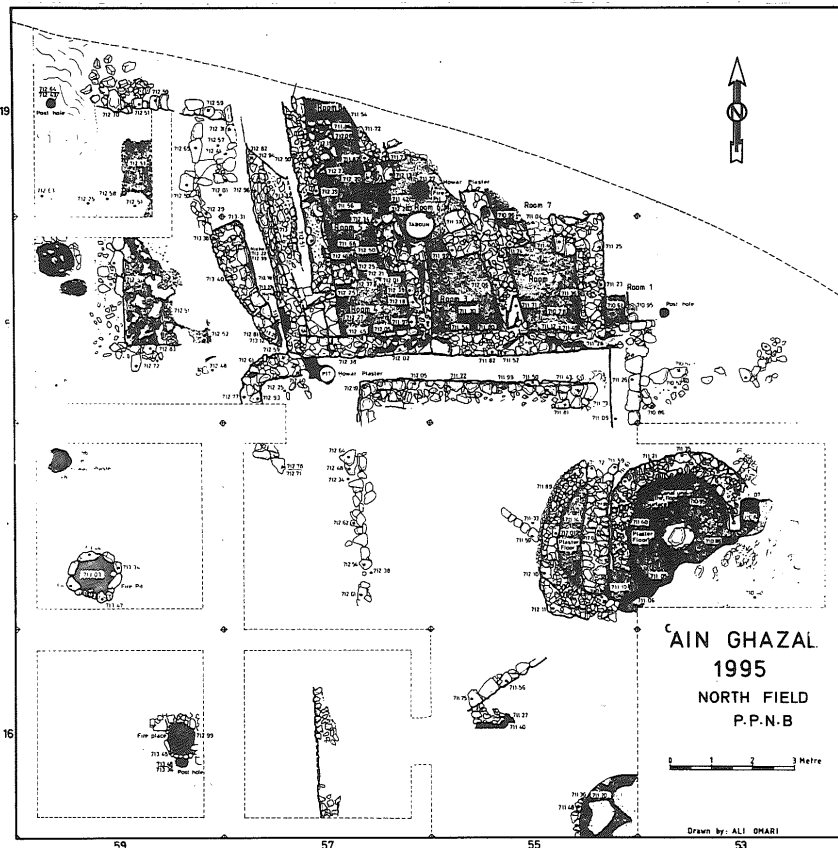
1. 'Ayn Ghazal site map showing the locations of the 1995 excavation trenches in the North and East Fields (Drawing: Ali Omari).



2. The large LPPNB building in the North Field, view to NW. (Photo: Yousef Zoubi).

north from Room 3 into Room 6 and from Room 2 into Room 7; presumably there was also access from Room 1 into a room that once existed to the east of Room 7, unless Room 7 itself continued to the former eastern wall of the house. Room 5 had two other doorways besides the one to adjacent Room 4: one of them faced eastwards into Room 6 across a low plaster curb, directly opposite a small (ca. 34 cm in diameter) circular floor hearth, while the other opened northwards into Room 8, all but destroyed by bulldozer activity.

Room 5 appears to have been at one end of an axis of symmetry of the house, and if the floor plan is folded along the line formed by the Room 5-6 doorway and hearth, much of the original floorplan of the house can be conjectured. In effect, Room 8 would have been the westernmost of a group of four small rooms along the northern wall of the house, mirroring the arrangement of Rooms 1 - 4. The ground floor would have had a minimum of 11 (if Room 7 extended to the eastern wall) or 12 rooms, and the dimensions



3. Floor plan of the large LPPNB building in the North Field (Drawing: A. Omari).

would have been approximately 7.4 m (N-S) by 9.5 m (E-W). All of the rooms had well-made lime plaster flooring painted red.

The fill in Rooms 3, 4, 5, 6, and, to a lesser extent 8 contained dense amounts of charred pulses¹ intermingled with fist-sized stones, burned clay slabs with beam impressions, and thick segments of red painted lime plaster flooring that could only have come from a second story above these rooms. It is clear that the western half of the structure was two-storied, but it is not certain if the eastern half had more than a single floor.

The house had a long and complex history. Once the small passageway was cleared between the southern wall and a ruined building just to the south, it became evident that originally the house consisted only of the western half; that is Rooms 3, 4, 5, 6, 8 and presumably a ninth room. Later, Rooms 1,2 and 7 were added on, as is clearly shown by the use of smaller stones in the southern wall. The alignment of the wall between Rooms 3 and 2 also parallels the western wall of the house more closely than the wall between Rooms 2 and 1, which is aligned more directly to the north. A doorway once penetrated the wall between Rooms 3 and 2, but this was later blocked, although it cannot be determined if this was when the new rooms were added or sometime later. An interesting aspect of the construction is the relative elevation of the floors: in Room 4 the floor is 20 cm higher than in Room 3, which in turn is 52 cm higher than in Room 2, which is 17 cm higher than the floor in Room 1. Altogether, the floor in Room 1 is 88 cm below the floor in Room 4, a reflection of the slope of the hill and a terracing of the rooms to accommodate it.

Outside the southwest corner of the house was a lime plaster surface that sloped towards a ca. 40 cm in diameter circular lime plaster feature about half a meter deep. It is unclear what the function of this feature was (Fig.4).



4. Lime plaster surface and cylindrical basin at the SW corner of the large terraced LPPNB house (Photo: Y. Zoubi).

After the house was destroyed by fire, the same building was used for a new structure that incorporated the southern wall as a foundation for a new one, although the new western wall was placed about 1.0 m west of the original wall. An entry wall with a pronounced arc was built that led to the southwest corner of the building where the previous door existed. This curving wall had two small niches built into it, each about 35 x 40 cm at roughly waist height. The rubble inside the burned rooms was leveled off and a new red-painted lime plaster floor was laid. This building apparently did not have a very long life, for the new western wall began to tilt threateningly towards the interior of the house. In an attempt to prop up the faulty wall, a long buttress was built inside the house, but this was inadequate to counter the stresses, and the house had to be abandoned.

The Southern Building. Immediately to the south was the wall of another LPPNB structure that was constructed sometime after the large house but was at least in partly contemporaneous use. A narrow (ca. 60 cm) passageway separated the two buildings. Little more can be said of this structure, since much of the eastern and southern areas was destroyed by the construction of the four-phase cult building (cf. Rollefson and Kafafi 1994),

1. The paleobotanical material is currently being studied by Reinder Neef, German Archaeological Institute, Berlin.

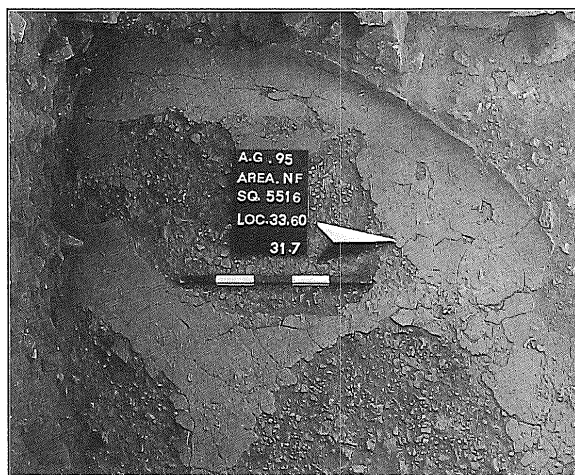
and those areas not razed remain hidden beneath substantial PPNC deposits.

The Apse Building. In the closing two weeks of the season, a plaster floor with a pronounced apse was partially exposed in the extreme SE corner of Sq. 5516 (see Fig. 3, lower right corner and Fig. 5). The northern wall was completely robbed out, and only a few stones of the western end remained in place. The building was constructed immediately against a two-phase, N-S terrace wall that had a combined thickness of ca. 70 cm.

The floor is curious in that it consists of two applications of almost pure lime plaster but with no foundation layer. (It was normal in domestic buildings for a thick basal layer of gravel mixed with lime plaster to serve as a foundation for the final application of a thin coat of plaster with few additives). Clearly the floor could not have withstood normal domestic traffic, and the circumstances indicate that this room, if not the entire building, served a special purpose. Since it is located only four meters south of the four-phase cult building, it is tempting to suggest that it played an analogous role, particularly since Phase 2 of that structure had an apse at the west end. However, it is wisest to reserve judgment in view of the fact that probably 90% of the building still awaits excavation.

The Western Plaster Floor. To the west of the large house are the remains of the lime plaster floor of a large room with a N-S dimension of 5.0 m (see Fig 3, upper left). The width of this room is not known since the eastern part was destroyed, perhaps in connection with the construction of the large house. The floor was also painted red, although prolonged exposure after abandonment had bleached the color considerably. Built on redeposited terra rosa just a few centimeters above bedrock, the floor is situated almost a meter higher than the floor in Room 4 of the large house.

It is difficult at the present time to assign



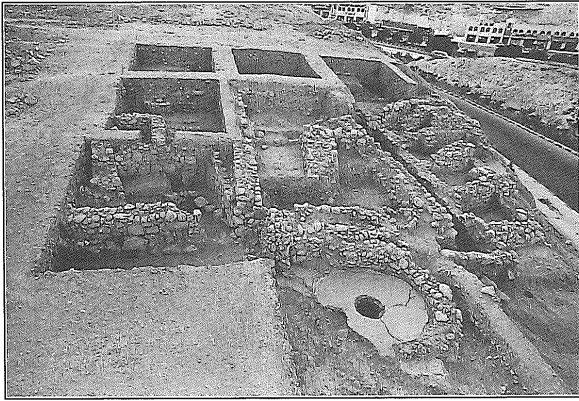
5. LPPNB apse-shaped lime plaster floor, North Field (Photo: Y. Zoubi).

an age to this architectural remnant, although the large size is reminiscent of MPPNB structures from the Central Field. On the other hand, we still do not have a clear idea of the architectural variability during the LPPNB, so no conclusions can be offered. A large circular firepit just to the west of the plaster floor has produced radiocarbon samples that can provide a *terminus post quem* for the floor.

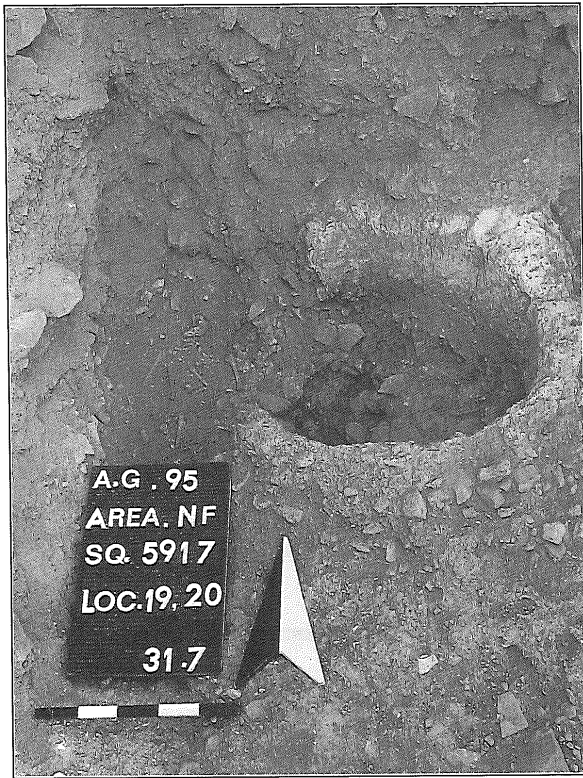
LPPNB Courtyards. Several large firepits and some faint stone alignments occur in open areas west and southwest of the large house. Unfortunately, so much damage was inflicted by later PPNC inhabitants of the site that there is little integrity of the original courtyard arrangements. Notably, we found no evidence of chipping floors, which is in sharp contrast with the courtyard areas of the East Field (see below).

North Field, PPNC

Fig. 6 shows a composite illustration of PPNC architecture exposed in the North Field during the 1993-1995 seasons of excavations. The thick-walled complex in the northern half of the area is characterized by large and small firepits and courtyard and compound walls. There are several walls that are probably associated with domestic structures, such as the rectangular room at the



7. General view, looking west, of the North Field excavations. The large terraced LPPNB house is at right, the LPPNB cult building at lower center, and various LPPNB/PPNC and PPNC walls at center and left (Photo: Y.Zoubi).



8. PPNC *huwwār* cylindrical basin in Sq. 5917 (Photo: Y. Zoubi).

corner of the large LPPNB house described above.

While it is probable that there were common domestic structures in this area at times during the PPNC, it is also clear that at other times much of this part of the settlement was given over to some “industrial” use in view of the density of fireplaces in the outdoor areas. What the nature of this industrial activity

was remains obscure.

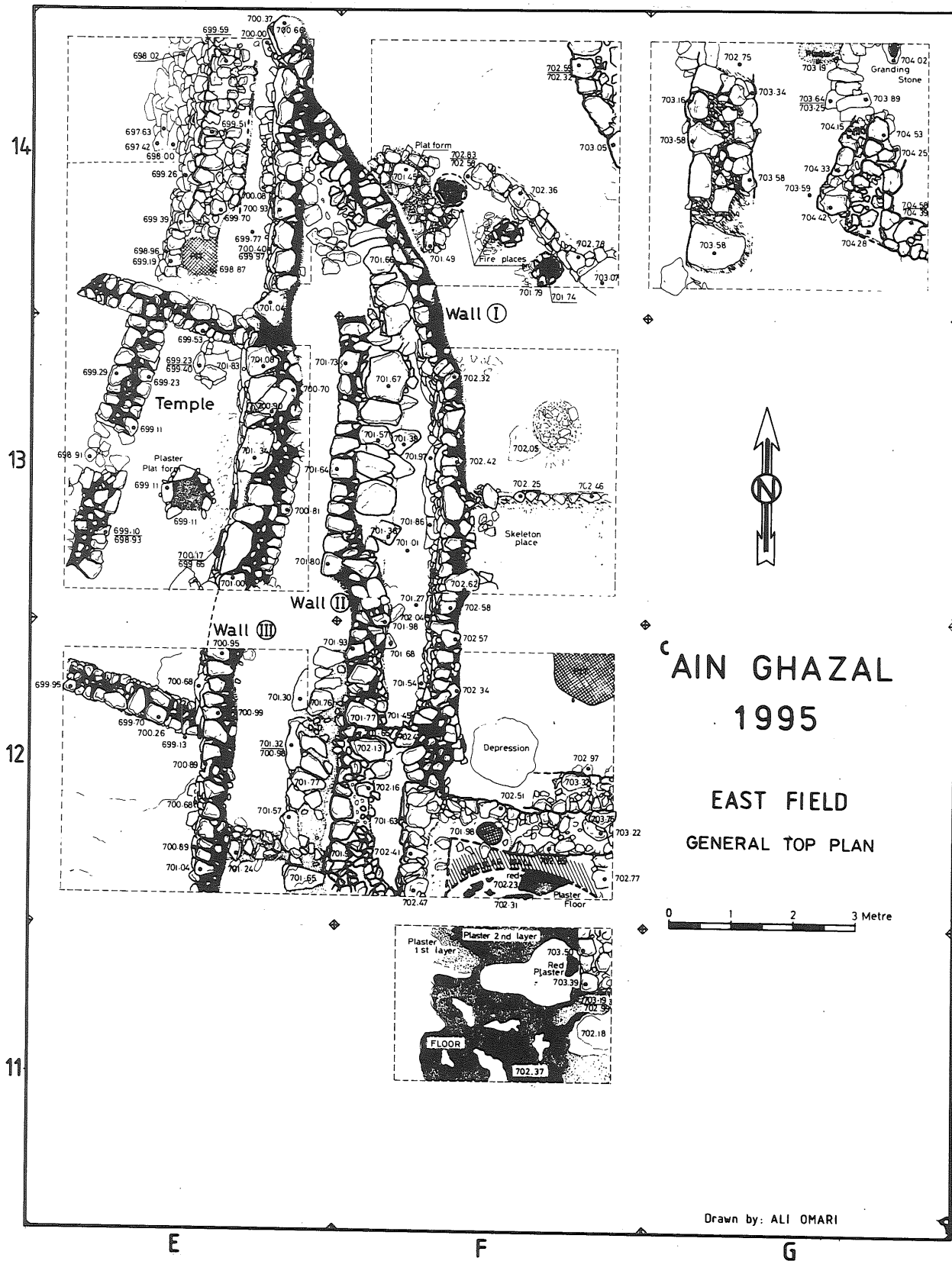
East Field PPNB

Terrace Walls. It is not surprising that as a consequence of the steepness of the East Field slope (35%), terrace walls played an important role in the use of this part of ‘Ayn Ghazāl. Fig. 9 reflects how dominating these walls were. At the center of Fig. 9 is Wall I, a curving feature a single stone thick (ca. 40 cm) that extends 15 m from its northern end until it disappears into the section at the south. The wall was built on sterile basal clay and is preserved to a height of 2.4 m (Fig. 10).

Wall II was built just 50 cm to the west of Wall I and is nearly as long. Much thicker (ca. 1.10 m) than Wall I, this terrace wall incorporated enormous blocks of stone, some nearly a meter in maximum dimension. Wall II was partially dismantled, but the bottom was not reached during the 1995 season; probably, it stood approximately 2 m high at the time we began the excavation. Wall III is at the left of the three-wall complex and is also at least 15 m long. Also using immense stone blocks, the wall increases in thickness from top (a single stone wide) to bottom (two or more stones wide).

There is a clear chronological relationship among the three terrace walls. Wall I is the earliest, Wall II somewhat later, and Wall III the latest of the trio. As is described more fully below, Wall I and the temple or sanctuary to the left of Fig.9 are probably contemporaneous. All but the uppermost deposits to the east of Wall I are earlier than this sequence, since Wall I truncated these earlier layers.

Another terrace Wall IV was sampled in the far NW corner of the excavation area (see Fig. 9, upper left and Fig.10, lower left). Wall IV is at least two stones thick at the top, but it increases markedly in thickness with depth to an “apparent” thickness of ca. 1.8 m; “apparent”, in that the wall may cover a sloping earth foundation much like a glacis wall. The battered angle was so great that Wall IV



9. Plan of the terrace walls and various structures in the East Field. The temple or sanctuary is located at the left side of the plan. Terrace Wall I is in the center of the plan, Wall II just to the left, and Wall III still farther to the left (Drawing: A. Omari).

eventually filled the probe trench, and after reaching a depth of 2.7 m beneath the top of the wall, the base still had not been reached (Fig.11). The stratigraphic relationship of this terrace wall to the others is not clear, although Wall IV is probably older than the temple and thus antedates Wall I. It is also likely that the layers that accumulated against the wall after it was built are also older than



10. View to east of the East Field excavations. Terrace Wall I is in the center and Wall III near the bottom. At lower left is the battered terrace Wall IV (Photo: Y.Zoubi).



11. The probe in front of East Field terrace Wall IV reached 2.7 m without finding its base (Photo: Y. Zoubi).

the Wall I - temple sequence. How Wall IV and the deposits in front of and behind it relate temporally to the cultural deposits behind Wall I is specifically uncertain at the present stage of analysis.

One more probable terrace wall was encountered in the excavation area, although we were not able to determine much of its nature. Located in Sq. G 14 at the NE corner of the excavation area, this wall was ca. 1.20 m thick and more than 4 m long, disappearing into both the north and south sections of the trench. The depth of this wall is still unknown, as is its stratigraphic relationship with the other terrace components in the East Field.

The LPPNB Apse Building. In the SE corner of the East Field excavations (Sqs. F 11 and F 12), a series of heavily damaged lime plaster floors was encountered that may represent multiple reflooring episodes of a single building. At the northern end an *in situ* 50 cm long fragment of the earliest phase remained intact, and it was of high quality burnished plaster with a red border about 8 cm wide painted along the join of the floor and the wall. (The stones of the wall were completely robbed out, but the characteristic bath-tub coving indicated where the wall was formerly). Despite the small size of the floor fragment, there is a clear E-W curvature of the wall join, indicating that it had an apse-like shape at the northern end of the building. Although the floor series to the south of the apse is badly deteriorated (probably at least partly as a result of the steep slope), one can project that the room size was at least 3 m wide E-W and minimally 3.5-4.0 m long N-S. No indications of other walls were found, although the eastern and southern edges of the room remain under unexcavated sediments, and the western side was severely eroded.²

2. It is interesting to note that a PPNB building excavated and used by the Yarmoukians in the Central Field (Rollefson, Kafafi and Simmons 1990:

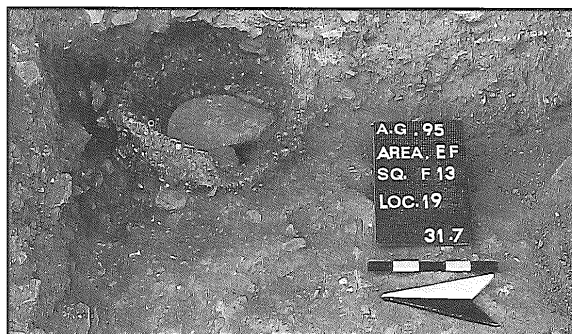
110-111, Fig. 12) has a room with an apse at the south end, and that the floor area of the apse room is ca. 2.5 x 3.5 m (E-W x N-S).

Later flooring episodes also bore red paint, but since the floor(s) were evidently exposed for some time, weathering has made any possible patterns difficult to identify. Near the eastern edge, however, once the area may have been decorated in a check-board fashion, with red squares approximately 8 x 8 cm on a white background.

The Plastered Pavement Floor. At the northern end of the excavation area, one or more flooring episodes bearing patchy evidence of red paint were found over a pavement of rounded river cobbles. The floor was truncated on the west by terrace Wall I, and the northern, eastern and southern extensions were thoroughly eroded; there is no way to estimate either the former size or the shape of this structure.

LPPNB Courtyard Areas. Intensive outdoor activities were conducted throughout the area to the east of terrace Wall I and north of the apse building. Some areas were set off from others by flimsy walls a single stone thick, including one such wall preserved to a height of 65 cm that could have served as a wind-break for several associated small, stone-lined and slab-based firepits in Square F 14. In Square F 13 a fragmentary outdoor lime plaster surface led to a bowl-shaped basin 40 cm in diameter and ca. 25 cm deep (Fig.12). The walls of the basin were made of a mixture of mud, fine gravels, and fragments of lime plaster, and perhaps crushed soft limestone (see Fig. 12). While not *ḥuwwār* in the classical sense, the basin's raw material may be a forerunner of cheaper construction of such features.³

Exposures of features in Square G 14, in the northeast corner of the 1995 East Field excavation area, are included here with "Courtyards", although it is not certain if this



12. Stone-based basin of mud, gravel, and fragments of lime plaster in Square F 13 in the East Field. Just above the sign is a thin lime plaster surface that leads to the opening of the basin (Photo: Y. Zoubi).

trench actually represents a courtyard. A broad wall (Locus 005), preserved to a height of seven courses, runs in a NE-SW direction to the east of the terrace wall. (A narrower NW-SE wall (Locus 007) at the southern end of Wall 005 is evidently not associated with the principal use of Wall 005). The area between the terrace wall and Wall 005 contained 10 grinding stones, and four others were noted in nearby contexts. A flat surface paved with yellow clay plaster was in direct association with several grinding stones, and it is clear that this was a special activity area for processing food.

The Temple or Sanctuary. As mentioned above, the western part of the excavation area was truncated for the construction of Terrace Wall I, which was founded on sterile basal clay. This was a massive undertaking in view of the depth and length of the terrace wall, and the reason for so much effort must have been compelling. It appears that religion played a significant role in this enterprise, for a rectangular structure just to the west of Terrace Wall I is clearly associated with ritual.

The structure has not been completely excavated due to the enormous stones of Terrace Walls II and III, but enough has been ex-

3. This example of a subterranean basin is the fifth found at 'Ayn Ghazāl, including the other two found this season in the North Field (see above), an LPPNB or LPPNB/PPNC basin in the South Field

(Rollefson 1990: 42-43, Fig. 7), and a basin made of yellow clay attributed to the Yarmoukian period in the Central Field (Rollefson and Simmons 1987: 105).

posed to predict its size and layout. Two parallel NW-SE walls are joined by a wall on the west and form a partial rectangle with a N-S dimension of 7.5 m (interior dimension 5.65 m). The distance from the NW corner to Terrace Wall I is just over 5 m, which yields a maximum possible E-W dimension for the room. Due to features of symmetry of the structure (see below), the exterior E-W dimension is probably ca. 4.75 m, with an interior room dimension of ca. 3.2 m. There is a possible second room at the western side of the structure, for the northern wall extends westward for just over a meter, where it was truncated by bulldozer activity associated with the laying of a sewer line.

The floor of the principal room is made of clayey mud, in contrast to the normal use of lime plaster in LPPNB buildings. Near the center of the room is a low pentagonal lime plaster surface with a maximum width of 65 cm, surrounded by flat limestone slabs (Figs. 9 and 13); the surface of the plaster bore clear signs of burning, and it is likely that it served as an altar.

Just to the SE of this plaster feature, and directly below Terrace Wall III, are three large rectangular stones standing on end and aligned in a N-S direction. The northern and southern stones are about 50 cm high and 20 cm thick; the center stone is approximately 30 cm tall. A one meter wide pavement of rel-



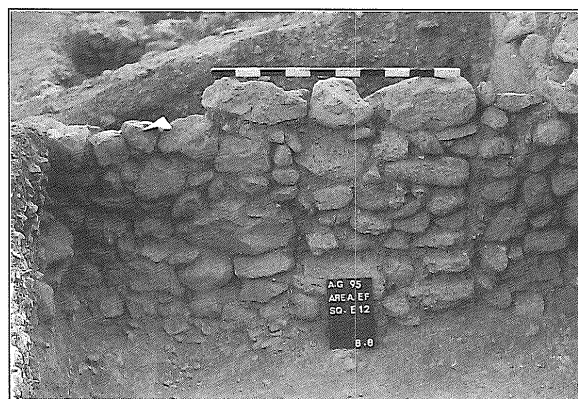
13. The three “standing stones” (erected on a thin pavement of river cobbles) and the lime plaster altar in the center, and the stone “cubicle” at the left. Terrace Wall III is built directly atop the standing stones. View towards the east (Photo: Y. Zoubi).

atively thin river cobbles served as a foundation for the standing stones. This pavement (placed directly atop sterile basal clay) extends towards the west under the plaster feature, and it was also found under the threshold of the doorway in the western wall. A stone “cubicle” was built against the northern wall, although excavation showed this feature to be empty (Fig. 14).

There was at one time an entrance 65 cm wide near the center of the southern wall, but this doorway was later blocked with stones (Fig. 15). A doorway just under a meter wide was opened in the western wall at this time to provide access to the room, and it is possible that this was when the western room was add-



14. View towards the northeast of the temple or sanctuary at 'Ayn Ghazāl showing the plaster altar and standing stones (lower right), the stone “cubicle” adjacent to the northern wall (center), the western extension of the northern wall (upper left), and the earlier Terrace Wall IV (upper left, behind the northern wall). Terrace Wall III is above the standing stones (far right) (Photo: Y. Zoubi).



15. Former doorway in southern temple wall blocked with stones, probably when the entrance in the western wall was opened (Photo: Y. Zoubi).

ed to the structure. The doorways, the cubicle, and the space between the plaster altar and the middle standing stone form two axes of symmetry: the eastern doorway to the cubicle and the western doorway to the central standing stone.

Human Burials

Seven human burials were recovered during the season, including three from the East Field and four from the North Field.

East Field

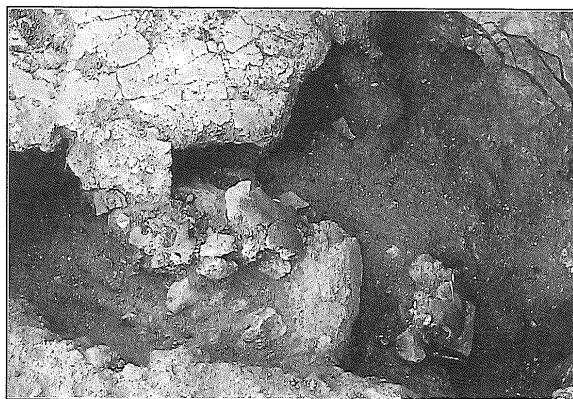
All three in the East Field were adults, and all appear to be “trash burials” common during the PPNB period. One of the burial pits had actually cut through the floor of the LPPNB apse building, but this clearly occurred after the building had already been abandoned; the floor had not been repaired. This burial was badly disturbed, and only the left side and the skull were present; the skull fragments were scattered over an area ca. 50 cm in diameter. The second burial, found in a trash pit in a courtyard, was also badly disturbed, with only most of the long bones, a vertebra, and pieces of the skull present in the pit. The mandible had lost many teeth, and those that remained were very heavily worn.

The third LPPNB burial in the East Field was of an adult male who evidently had suffered a violent death. Also found in a trash pit, the skeleton was articulated from the skull to the clavicle and upper two ribs; this part of the body rested in a vertical position, and the skull had slipped over the upper vertebrae, so that they were inside the brain case. The rest of the body was heavily disturbed, and many elements were missing; notably most of the bones that were present were broken, although it is not clear if this resulted post-depositionally. But what was striking about this person was the apparent cause of death: a thin flint blade fragment (snapped off at both ends) was imbedded in

the left side of the skull, and the weapon had penetrated with sufficient force to drive a ca. 3 cm diameter piece of the interior of the skull into the brain (Figs. 16 and 17).⁴

North Field

All four burials in the North Field were adults and all were disturbed in various degrees. The earliest burial is loosely associated with the plaster floor uphill and to the west of the large terraced house and likely dates to the LPPNB period. It was placed in a poorly defined pit to the north of the floor, and many elements (including the skull) were missing. Two other burials came from the same trench (Sq. 5916) from LB/PPNC layers. One of



16. Exterior surface of human skull with a flint blade penetrating the left side. (Note: the skull surface includes dirt and debris adhering to the bone preservative) (Photo: H.-D. Bienert).



17. Interior surface of the left side of the skull showing the penetration of the flint blade; note the concavity in the bone around the blade (Photo: H.-D. Bienert).

4. This is the first case of violent death noted at ‘Ayn Ghazāl and one of two known in the entire Levant

(cf. Roehrer-Ertl *et al.* 1988).

them consisted only of leg bones (both tibiae and fibulae and one femur) and was probably a secondary burial disturbed at a later time; the second comprised only four ribs and two arm bones.

The fourth burial was the most complete and dates to the PPNC period. It lay in a flexed position in a stone-ringed pit. It was articulated and the skull was present, but no vertebrae were found and most of the phalanges were missing, as were the right arm and many of the teeth. Found in the pit was a partial pig mandible, a form of "grave offering" noted frequently in PPNC burials in the South Field (Rollefson and Köhler-Rollefson 1993: 38). A later pit disturbed the lower part of the skeleton, but it seems that many of the missing elements of the rest of the body may be due to loss during transport from the location of death to 'Ayn Ghazāl for (secondary) burial.

Lithic Analysis

The density of chipped stone artifacts was very high this season, particularly in courtyard contexts in the East Field, where several chipping floors were exposed. Samples of

chipped stone were selected from both the North and East Fields, and the results of the analyses are provided in Tables 1-3.

Table 1 shows the distribution of debitage classes for the various phases. (Note: the column headings in Table 1 have the subscripts "e" and "n" to distinguish the samples from the East and North Fields). Of principal importance in this table are the comparisons at the bottom of blades (BL + bl) and flakes, on the one hand, and of naviform and ordinary blades, on the other. In the North Field the blade:flake ratio for the LPPNBn (27.8 to 72.2) is lower than for the PPNC sample, a result that contradicts the trends of blade:flake ratios in other parts of the site, where this ratio appeared to decline consistently from the MPPNB through the Yarmoukian phases (Rollefson, Simmons and Kafafi 1992: Table 3). We agree now that the blade:flake ratio is not a reliable seriation factor, as has been suggested by other researchers (e.g. Goring-Morris 1991: 96 and Table 1; 1994: Table 1), since the relative abundance of either debitage class is highly dependent on specific activities undertaken at any particular area or a site, and that the apparent trend seen in ear-

Table 1. Absolute and relative frequencies of debitage classes in the analyzed samples from the 1995 season at 'Ayn Ghazāl. Abbreviations: C.T.E = core trimming elements, BL = blades, bl = bladelets, FL = flakes, Navi. = naviform, and ord. = ordinary.

Class	M/LPPNBe	LB/PPNCe	LPPNBn	LB/PPNCn	PPNC	M/LPPNBe	LB/PPNCe	LPPNBn	LB/PPNCn	PPNC
	n	n	n	n	n	%	%	%	%	%
Blades	1884	374	322	393	238	26.4	22.1	18.2	22.6	20.8
Bladelets	140	41	27	42	29	2.0	2.4	1.5	2.4	2.5
Flakes	3115	787	906	792	598	43.7	46.4	51.4	45.5	52.3
C.T.E.	164	13	29	17	12	2.3	0.8	1.6	1.0	1.0
Burin Spalls	63	17	14	10	5	0.9	1.0	0.8	0.6	0.4
Microflakes	841	207	206	213	101	11.8	12.2	11.7	12.2	8.8
Debris	780	233	227	225	131	10.9	13.7	12.9	12.9	11.5
Other	42	12	14	21	10	0.6	0.7	0.8	1.2	0.9
Cores	103	12	19	27	19	1.4	0.7	1.1	1.6	1.7
(Tools)	(703)	(175)	(157)	(133)	(114)	(9.9)	(10.3)	(8.9)	(7.6)	(10.)
TOTALS	7132	1696	1764	1740	1143	100.0	100.0	100.0	100.0	100.0
BL+bl	2024	415	349	435	267	39.4	34.5	27.8	35.4	30.9
FL	3115	787	906	792	598	60.6	65.5	72.2	64.6	69.1
Navi. BL	1404	107	123	124	40	86.0	40.7	51.7	40.7	27.6
Ord. BL	228	156	115	181	105	14.0	59.3	48.3	59.3	72.4

lier 'Ayn Ghazāl samples was simply a coincidence.

But the ratio of naviform to ordinary blades is a better indicator of temporal change, for it reflects the relative importance of the kind of blade technologies that were being used.

In a preliminary study of the cores from 'Ayn Ghazāl, Quintero noted that of the blade cores, 90% were naviform in the MPPNB, 45% in the PPNC, and only 24% in the Yarmoukian phase (personal communication; Rollefson, Forstadt and Beck 1994: 454). With this ratio, the naviform:ordinary blade ratio for the 1995 PPNC sample falls to the low end of the spectrum, as is to be expected. It is also instructive to note the relationship of the ratios for the other samples, which indicate that the North Field LPPNB is probably later than the East Field M/LPPNB, and that the two LB/PPNC samples are virtually identical in their values and thus are roughly contemporary.

The results of the chipped stone tool sorting is given in Table 2. Projectile points vary considerably in relative frequency, possibly reflecting different activity foci in the courtyards through time and from the North Field to the East Field. The points in the East Field M/LPPNB sample are dominated by large Byblos and Amuq variants, with some exquisite typical examples of both. In particular, there is a plurality of a variation on the Jericho point where the barbs form a right angle with the base rather than the more typical swept-back style commonly associated with this point type; they resemble examples from Nahal Hemar (Bar-Yosef and Alon 1988: Fig. 5, nos. 1 and especially 4-5; Gopher 1994: Fig. 5:33, no. 3).

The distribution of other tool types also argues for considerable activity variation among the samples. Perhaps the most remarkable example is in the knife class, where the East Field M/LPPNB sample was dominated by knives (24.7%). Sickles were notably rare, although sampling error may have

played a big role in this respect. Two sickles from the East Field were particularly interesting. In Sq. F 11, a typical Yarmoukian sickle blade (bi-truncated, bifacially backed, with bifacial macrodenticulation) came from relatively high up in the deposits, an area that included rodent disturbance; perhaps this particular example is intrusive. But the other example is from an undisturbed M/LPPNB context, and still it shares a few design elements with Yarmoukian sickle blades (bifacial macrodenticulation and truncation on one end, at least, although the other end is broken off). What sets this example apart is that it is made on a naviform blade, is not backed, and is 7.2 cm long (i.e., about twice the length of typical Yarmoukian specimens).

Burins were also important elements of all the samples, although the absolute numbers were low in three of them. Table 3 compares the burins from the East Field with a recent study that suggested a potential seriation aspect for burin analysis (Rollefson 1995). Overall, the East Field M/LPPNB sample fits the general trends, although the LB/PPNC sample is too small for reliability.

Faunal Remains

Animal bones were relatively abundant in 1995, as they have been since the beginning of the excavations in 1982. Due to restricted budgets for the 1993 and 1994 seasons, little faunal analysis was conducted. But in 1995 the staff was joined by A. von den Driesch, and all of the material from 1993-1995 was inventoried by her. Von den Driesch is writing a separate report for publication.

Other Finds

Bone tools are tabulated in Table 4, and they require little comment except to note that many more bone tools are expected to be identified during faunal analysis. The "rasps" noted in Table 4 are ribs with notches or incisions regularly made along the edges. Similar examples were found in the 1988 and

Table 2. Absolute and relative frequencies of tool classes in the analyzed samples from the 1995 season at 'Ayn Ghazāl. Abbreviations: M/LBe = M/LPPNB, East Field; LB/Ce = LB/PPNC, East Field; LBn = LPPNB, North Field; LB/Cn = LB/PPNC, North Field; PPNC = North Field samples.

Class	M/LBe	LB/Ce	LBn	LB/Cn	PPNC	M/LBe	LB/Ce	LBn	LB/Cn	PPNC
	n	n	n	n	n	%	%	%	%	%
Spear pt.	39	2	-	2	1	7.8	2.0	2.11		1.3
Arrowhead	2	2	-	2	2	0.4	2.0	2.11		2.7
Sickle	17	-	-	-	-	3.4				
Burin	102	23	16	19	11	20.3	22.8	16.0	20.0	14.7
Truncation	12	1	3	4	5	2.4	1.0	3.0	4.2	6.7
Scraper	43	17	20	13	14	8.5	16.8	20.0	13.7	18.7
Denticulate	473	16	14	14	12	8.5	15.8	14.0	14.7	16.0
Notch	56	17	22	14	12	11.1	16.8	22.0	14.7	16.0
Borer	24	9	13	11	10	4.8	8.9	13.0	11.6	13.3
Biface	2	-	1	1	-	0.4		1.0	1.0	
Ax/Adz	4	1		12	3	0.8	1.0	1.0	2.11	4.0
Pick	1	-	-	1	--	0.2			1.0	
Chisel	2	-	1	-	-	0.4		1.0		
Chopper	3	1	-	1	-	0.6	1.0		1.0	
Wedge	10	2	3	1	-	2.0	2.0	3.0	1.0	
Knife	124	8	6	7	5	24.7	7.9	6.0	7.4	6.7
Backed BL	-	1	-	1	-		1.0		1.0	
Tanged BL	15	-	-	-	-	3.0				
Other	4	1	-	2	-	0.8	1.0		2.1	
Subtotal	503	101	100	95	75	100.1	100.0	100.0	100.0	100.0
Ret. BL	89	36	16	14	5	(12.0)	(20.6)	(10.2)	(10.7)	(4.4)
Ret. FL	59	21	20	7	11	(8.0)	(12.0)	(12.7)	(5.3)	(9.7)
Util. BL	45	8	7	4	9	(6.1)	(4.6)	(4.5)	(3.0)	(8.0)
Util. FL	7	2	5	2	5	(0.9)	(1.1)	(3.2)	(1.5)	(4.4)
Indet.	40	7	9	9	8	(5.4)	(4.0)	(5.7)	(6.9)	(7.1)

Table 3. Comparison of 1995 season burin group indices from the East Field (M/LBe, LB/Ce) with previously analyzed samples from 'Ayn Ghazāl (cf. Rollefson 1995: 517). Abbreviations: trans. = transverse; dihedral; trnc. = truncation.

Burin Group	MPPNB (n = 527)	LPPNB (n = 78)	M/LBe (n = 94)	LB/Ce (n = 22)	PPNC (n = 184)	Yarmouk. (n = 395)
I = Simple	10.9	20.5	27.7	36.4	29.9	18.7
II = Trans.	74.9	34.6	30.9	13.6	14.7	11.5
III = Dihed.	12.5	25.6	33.0	13.6	28.8	20.5
IV = Trnc.	1.6	11.5	8.5	36.4	26.6	49.0

1989 seasons (cf. Rollefson, Kafafi and Simmons 1990: Table 7; 1993: Table 5).

Worked stone objects are presented in Table 5. The "linguaforms" are small ax-shaped pieces of soft limestone of unknown function. Three examples were found in 1994 and another in 1988. Attention is drawn to the recovery of a smoky gray obsidian blade fragment and a small (ca. 5 cm in diameter) stone cup with a short stalk-like handle, both from LPPNB deposits in the North Field.

Ornaments of stone, bone and shell are listed in Table 6. The popularity of stone "bracelets" in the East Field is another indication that the artifacts in the M/LPPNB layers are likely to be from the LPPNB, for such objects were very rare from MPPNB deposits in the main settlement west of the az-Zarqā' River; the same argument applies

to the presence of mother-of-pearl. For the beads, the raw material in the North Field is diverse, including one malachite bead, one animal tooth (?), one bird-bone bead, and one burned specimen of indeterminate material. In the East Field, one bead was of malachite and three of "red stone" that superficially resembles coral. The restriction of *Cerithium* (?), small coiled marine shells, to the East Field is curious; this is the first time this species has been recovered from 'Ayn Ghazāl. The prevalence of fossil shark teeth (possibly used as pendants, although none were drilled) in the East Field may be related to the specific age of the exposed limestone formations on the eastern and western sides of the wadi. Table 7 shows the fired clay objects excavated in the 1995 season.

Table 4. Bone tools from the 1995 season at 'Ayn Ghazāl. "P.B.F." = polished bone fragment; "P.R.F." = polished rib fragment.

Class	M/LBe	LB/PPNCe	LPPNBn	LB/PPNCn	PPNCn
Awl	20	10	12	14	15
Spatula	14	1	2	7	4
Needle	3	-	-	-	-
"Rasp"	2	-	1	-	1
P.B.F	8	2	2	2	2
P.R.F.	16	-	2	3	-

Table 5. Worked stone objects from the 1995 season at 'Ayn Ghazāl.

a - globular shape; b - elliptical shape, one perforated; c - 1 smoky gray obsidian blade, one small stone cup with stalk handle.

Class	M/Le	LB/PPNCe	LPPNBn	LB/PPNCn	PPNCn
"Linguaform"	1	-	-	4	3
Macehead	-	-	1	-	-
Cone	-	-	-	1	-
Perf. stone disc	2	-	2	4	4
Stone ring wgt.	2	4	1	3	-
Perf. stone wgt.	6	-	1	2	-
"Sling stone"	1	-	-	-	-
Incised stone	1	-	-	-	-
Other	1a	2b	2c	-	-

Table 6. Ornaments from the 1995 season at 'Ayn Ghazāl. (M.o.P. = Mother-of-Pearl)

Class	M/LBe	LB/PPNCe	LPPNBn	LB/PPNCn	PPNCn
Stone "bracelets"	18	17	1	16	45
Beads	4	-	2	1	1
M.o.P.	3	1	-	3	6
"Sweet clam" shell	3	2	2	5	5
"Cardium" shell	-	-	-	-	1
Cerithium? shell	5	2	-	-	-
Unident. shell	-	-	1	-	1
Fossil shark teeth	12	1	2	1	1
Bone finger ring	-	-	-	-	4

Table 7. Fired clay objects from the 1995 season at 'Ayn Ghazāl. ("impr" = impressions).

Class	MB/Le	LB/PPNCe	LPPNBn	LB/PPNCn	PPNCn
"Stalk" figurine?	-	-	-	1	-
Animal figurine	1	-	-	-	2
Animal fig. horn	-	-	1	-	-
Clay sphere	1	-	1	-	-
Clay cylinder	-	-	1	-	-
Clay, beam impr	-	-	many	-	-

'Ayn Ghazāl's Future

'Ayn Ghazāl has suffered severely from damage since the 'Ammān az-Zarqā' highway was constructed in the 1970s, and since the late 1980s it has been under threat of outright destruction by commercial and residential construction. After a tour of the excavations in 1995, representatives of the Municipality of 'Ammān and the Ministry of Tourism and Antiquities agreed on the need to preserve at least the "core" of 'Ayn Ghazāl as an open-air museum to promote educational, touristic, and research benefits. Discussions are currently underway to set this objective on its way to fruition.

Acknowledgments

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Gary Rollefson
Peabody Museum
Harvard University
U.S.A.

Zeidan Kafafi
Institute of Archaeology
and Anthropology
Yarmouk University
Irbid - Jordan

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THE 1992 SEASON OF EXCAVATIONS IN WĀDĪ ZIQLĀB, JORDAN

by

E. B. Banning, D. Rahimi, J. Siggers and H. Ta'ani

Abstract

From May to July 1992 the Wādī Ziqlāb Project undertook excavations of Kebaran and Late Neolithic deposits at two sites in the central basin of Wādī Ziqlāb as well as continuing subsurface survey and geological survey of the wadi. The excavations have revealed that there were more Neolithic structures at Ṭabaqat al-Būma (WZ 200) than expected, and have helped to clarify the chronology and distribution of the lithics and ceramics of the Late Neolithic at Ṭabaqat al-Būma and WZ 310. Toward the end of the Late Neolithic these two sites, along with two other sites the project recorded in 1992, may have formed part of a dispersed community stretched along the wadi.

Introduction

The fifth field season of the Wādī Ziqlāb Project took place from early May to early July of 1992. Following on a brief season of surface survey in 1981, small test excavations of selected sites in 1986 and 1987, subsurface survey of wadi terraces from 1986 to 1990, and, in 1990, more substantial excavations of a Late Neolithic site that the subsurface survey discovered in 1987 (Banning and Fawcett 1983; Banning, Dods *et al.* 1989; Banning, Dods *et al.* 1992), the 1992 fieldwork again concentrated on site WZ 200, Ṭabaqat al-Būma. In addition, we continued the subsurface survey of wadi terraces and carried out more substantial excavation at locality WZ 310, which had been the target of two test probes in 1990, to enlarge our sample of pottery and lithics and to try to identify architecture there.

EXCAVATIONS AT WZ 200, ṬABAQAT AL-BŪMA

While removing backfill from most of the excavation areas of 1990, we opened a number of new excavation areas to enlarge our exposure of the Late Neolithic deposits on the site and began intensive excavation of

underlying deposits in areas E34 and F34, where we hoped to find primary deposits of Kebaran material (Fig. 1). Previously most of our sample of Kebaran artifacts came from later Neolithic deposits or from small, deep probes in Areas B and E34. These indicated that the most likely area of concentration for the Kebaran material lay in or near Area F34. New excavation areas at WZ 200 included D31, D32, E32, E33, F33, G33, H33, G35, and H35, as well as small test pits C, D and 2R. Excavation continued in areas E34, F34, G34, and H34, and there were minor excavation activities in areas E35, E36 and J33 (formerly Area A) in attempts to clarify stratigraphic issues remaining from the 1990 season.

The major occupational episodes on the site belong to the Kebaran, Late Neolithic, Late Roman-Byzantine and Recent periods.

The Kebaran Deposits

A team of three people spent almost seven weeks excavating in Areas E34 and F34, below the backfill of the 1990 season, to try and expose undisturbed deposits of Kebaran age and map the distribution of artifacts in detail.

After removing and recording some remaining Neolithic deposits in Area F34, they



1. Map of the southern Levant, showing Wādī Ziqḻāb in northern Jordan and the locations of some other sites with deposits of PPNB or Late Neolithic date (E. Banning).

began to remove the extremely compact, cemented deposits that lay below in 5 cm spits in an attempt to understand the depositional processes of this very hard colluvium and to identify any stratification. They encountered Kebaran artifacts in low densities throughout, but with random orientations and distributions that suggested that they were not in their original discard locations, but had been transported from another part of the site along with the colluvium that formed their matrix. Moreover, sporadic Late Neolithic artifacts were found together with the Kebaran lithics in the colluvial deposits. The presence of these Neolithic artifacts would further suggest that the deposits were mixed. Data from the analysis of the soil from a profile failed to yield any concrete information regarding the nature and number of episodes which the colluvial deposits represent.

While removing compact soil bearing Kebaran artifacts in the eastern portion of Area F34, however, immediately south of Neolithic wall F34.027, they encountered a large feature constructed of stone slabs and most likely dating to the Neolithic period. This feature, locus F34.026, will be described in the next section.

The Late Neolithic Stratigraphy and Architecture

Our work on the Late Neolithic components of site WZ 200 had four main goals. We wanted to enlarge our exposure of the site to see if we had already detected all of the structures that had existed on the site during the Late Neolithic. Our 1990 work suggested that the site was a small farmstead, and that the total occupation area was not much larger than the area we had exposed. We wanted to clarify the stratigraphic phasing of our materials, to clarify the stratigraphic relationships of the three structures found in 1990, and to learn more about underlying structures only slightly exposed. We also wanted to clarify the histories of the

structures themselves, some of which appeared to incorporate several phases of rebuilding or renovation. Finally, we wanted to improve our meagre sample of botanical and faunal evidence from the site, and to look for spatial patterning in the distribution of microdebitage, pottery and bone chips, and plant remains on surfaces and floors.

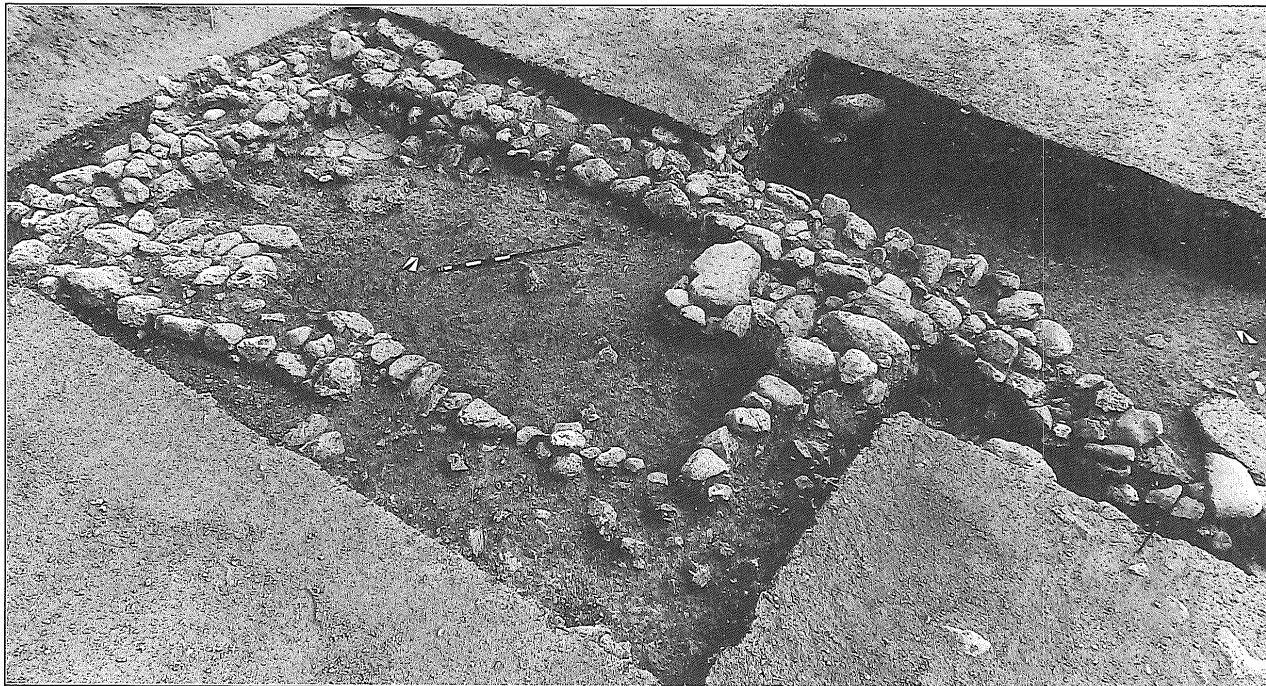
One of the important accomplishments of the 1992 season was the discovery of a large structure in Areas E33 and F33 in clear stratigraphic superposition above the structures that the 1990 excavations had uncovered in whole or in part in Areas D35, E35, E36 and G34 (Fig. 2a). When combined with the indications for the still earlier Late Neolithic walls constructed of massive limestone blocks and underlying those two structures, we have at least three Late Neolithic strata on the site.

The structure in Areas E33 and F33 consists of a long, rectangular room (Fig. 2b) with double-leaf stone walls. It had a cobbled floor (locus E33.006) in its latest phase of use. Near the centre of the room was a large, irregularly shaped stone mortar (locus E33.007, Fig. 3) that was probably used for pounding an as yet unidentified material. Given the large size of this mortar, it is likely that the pestle was a large wooden shaft.

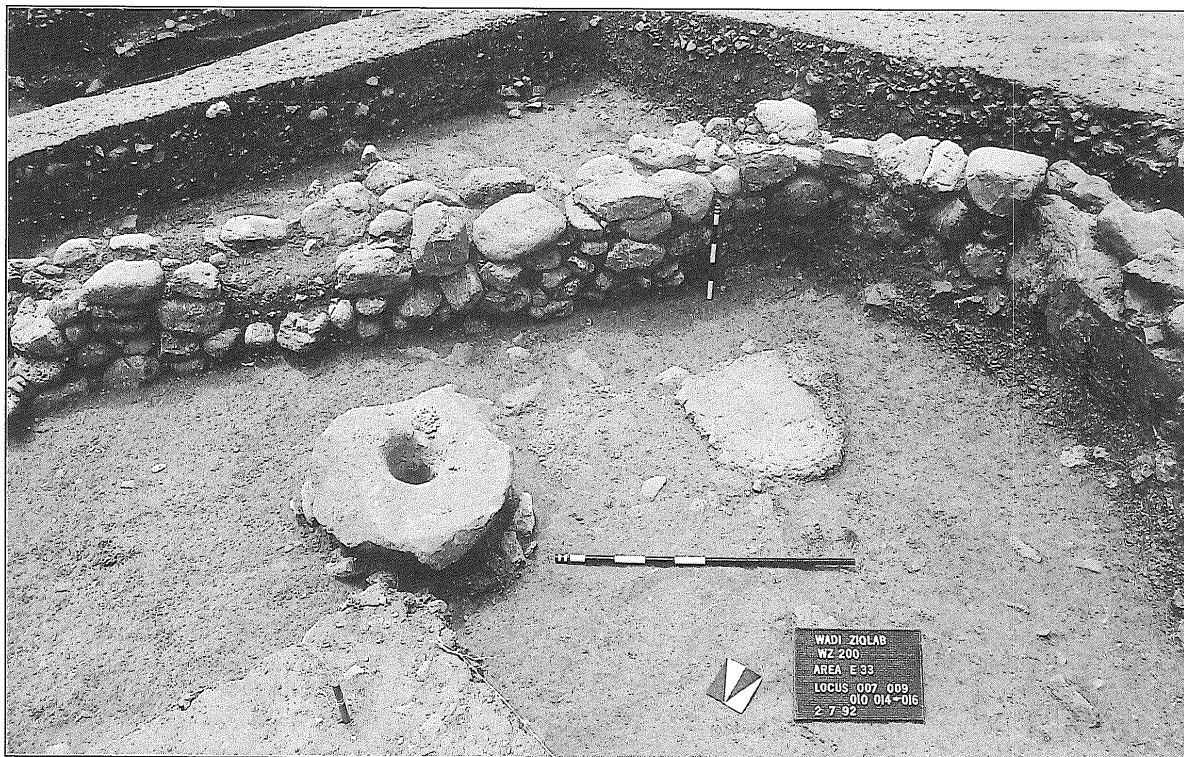
Beneath the cobble flooring at the southern end of this room, we detected part of a white plaster floor (locus E33.016) and a flat, U-shaped plaster feature (locus E33.015). The straight edge along the southeast side of the plaster is consistent with this floor having been associated with an earlier wall that was demolished prior to construction of the double-leaf wall running the length of Areas E33 and F33, and it is likely that the feature is a raised hearth. The curving south wall of this room is founded at a much higher level than the east wall, and represents a rebuild. It is also interesting to note that the inner leaf of the east wall is founded to a much greater depth than the outer one, indicating that this part of the room, at least, was semi-



2a. Map of Ṭabaqat al-Būma (WZ 200) showing architecture from all Neolithic phases that had been exposed by 1992 (M. Campbell and M. Kersel).



2b. Overview of the structure occupying Areas D31, D32 and E32, immediately west of the E33-F33 structure. Note the features in the corners (photo: T. Dabney).



3. View of part of the elongated structure in Areas E33 and F33 at site WZ 200. Note the large mortar left of the metre-stick and U-shaped plastered feature, probably a hearth belonging to an earlier building at this location that had been demolished (photo: T. Dabney).

subterranean.

Excavation of Area E32 to the west of E33 to uncover the rest of the terminal Neolithic

room surprised us by revealing, immediately beneath the surface, the corner of yet another structure lying upslope and to the west of the

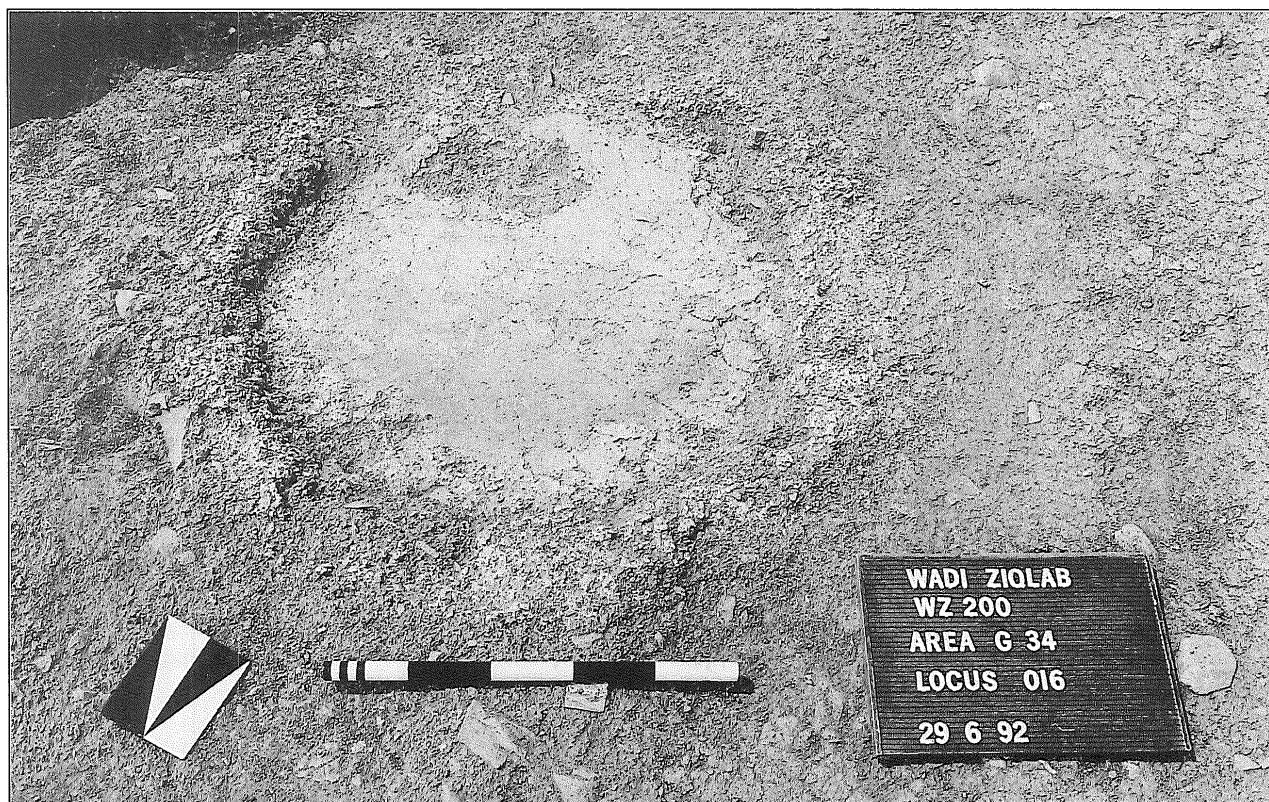
bulk of the site (Fig. 3). Stratigraphically it is later than the E33-F33 building, but the finds suggest that both were used in about the same period. We excavated small adjoining portions of Areas D32, D31 and E31 (recorded as part of D31) to uncover the rest of this room. It turned out to have a stone bin or platform in its northeast corner, another in its southwest corner, a possible blocked niche in its west wall, and a very interesting paved feature in the north-west corner that incorporated a basalt grinding slab. Like the somewhat lower structure in adjoining Areas E33 and F33, its pottery belongs to a very late phase of the Neolithic, and some of it is harder and better made than in most of the more easterly structures on the site. The room's shallow fill also contained two pierced ceramic disks and some sickle blades.

The 1990 excavation of Area G34 and a portion of H34 had revealed only a portion of a large, well preserved Neolithic structure, and we were only approaching the floor within the structure when excavation was ter-

minated. This season we revealed the rest of the structure by broadening excavation to neighbouring Areas G35 and H35 and gridded and excavated the whole floor of the structure rather than only its southwest corner.

Clearing backfill from G34 and cleaning the underlying deposit very quickly revealed the outlines of a large, circular, plastered feature (locus G34.016, Fig. 4) that appeared to be the central hearth of the structure. We delayed excavation of this feature until after Area G35 could be brought down to the same surface. The feature turned out to have a flat, smoothly plastered bottom and a rim raised about 5 cm that contained ash deposits. Ash and charcoal fragments from this hearth yielded a radiocarbon determination of 6380 ± 70 bp (or cal 5413-5239 BC, Table 1).

Area G35, where the eastern wall of the G34 room lay, turned out to be much more complex than we had anticipated. There was also a parallel wall (locus G35.008) farther east built of massive limestone boulders in



4. View of the plastered hearth (locus 016) in Area G34 (photo: T. Dabney).

Table 1. Radiocarbon dates from Ṭabaqat al-Būma, Wādī Ziqlāb. The calibrated date ranges are the 68.3% confidence intervals, some with multiple solutions. The lower five dates are associated with Kebaran artifacts deep in the site, and the upper three with pre-Islamic camps. Determinations were by the Isotracer laboratory, University of Toronto, and usually represent the average of two targets.

Area	Locus	Sample	Material	Uncalibrated Date bp	Calibrated Date BC (AD)
F33	004	TO-4276	Charcoal	1460 ± 60	(550-656)
F33	011	TO-4575	Charcoal	1580 ± 80	(410-596)
G34	002	TO-2117	Charcoal	1680 ± 60	(254-299) (322-421)
A	005	TO-1086	Bone	5740 ± 110	4775-4467
E33	009	TO-3408	Charcoal	6190 ± 70	5236-5193 5184-5060
E33	014	TO-3410	Charcoal	6350 ± 70	5356-5235
G34	018	TO-3412	Ash, charcoal	6380 ± 70	5413-5239
D35	016	TO-2114	Charcoal	6590 ± 70	5562-5475
E34	009	TO-2115	Charcoal	6630 ± 80	5628-5480
F34	017	TO-3411	Charcoal	6670 ± 60	5634-5490
E33	009	TO-3409	Charcoal	6900 ± 70	5831-5649
A	005	TO-1407	Bone	7800 ± 70	6689-6558 6540-6485
B	007	TO-987	Bone	11,170 ± 100	
E34	015	TO-2116	Bone	12,660 ± 430	
F34	030	TO-4592	Charcoal	12,810 ± 480	13955-12465
B	007	TO-989	Bone	13,110 ± 130	
B	007	TO-991	Bone	14,850 ± 160	

two leaves. Both walls had been robbed out over much of their lengths and later walls partially incorporated them. The ruins of the G34 room were also later used as a burial site. A cist-burial (locus G35.003, Fig. 5) of a child about five years of age occupied a place near the middle of the area where boulders had probably been removed from the massive wall G35.008. The poorly preserved remains included little more than a tibia, femur, first permanent maxillary molar, and a few skull fragments. The 1990 excavations had similarly uncovered an intrusive burial (locus G34.009) in the south-west corner of this room, although without a stone cist. This season we discovered yet another burial in the south-east corner (locus G35.018). Like the one in the south-west corner in 1990, the burial appeared to lie directly on clay accumulated on the most recent surface within the room, and was covered with cobbles, probably robbed out of the adjoining walls after the building fell out of use. This one, however, contained two individuals curled up together, one at least 15 years of age and the other about 13 years, and both in a flexed position facing the east wall of the room with their heads to the south. One had its skull

resting on its hands as though in sleep. Although there were no associated remains to help us date these burials, it is likely that they are associated with the final Neolithic occupation of the site in the structure in Areas E33 and F33. Radiocarbon determinations on bone collagen will help us test this hypothesis. To the east of wall G35.008, which is more than a metre thick, were two superimposed cobbled floors which may be associated with a rebuilding of a robbed out portion of wall G35.008. Finally, portions of earlier walls were incorporated into the curving wall G35.005 that is founded on sediments that overlie the cobbled surface (locus G35.024).

Renewed excavations in Areas F34 and F35 helped to clarify fragments of structures in Area F35 that had been cut by later construction activity on the site and also revealed a large cist-grave, similar to the one excavated in Area A (J33) in 1987. A low terrace wall that lay immediately south of the south wall of the G34 structure turned out to be built over, at its eastern end, the remnant of a rectangular structure some 3.5m in width and apparently roughly contemporary with the corner of a building that underlies



5. Excavation of a small cist-burial (G35.003) in Area G35 (photo: T. Dabney).

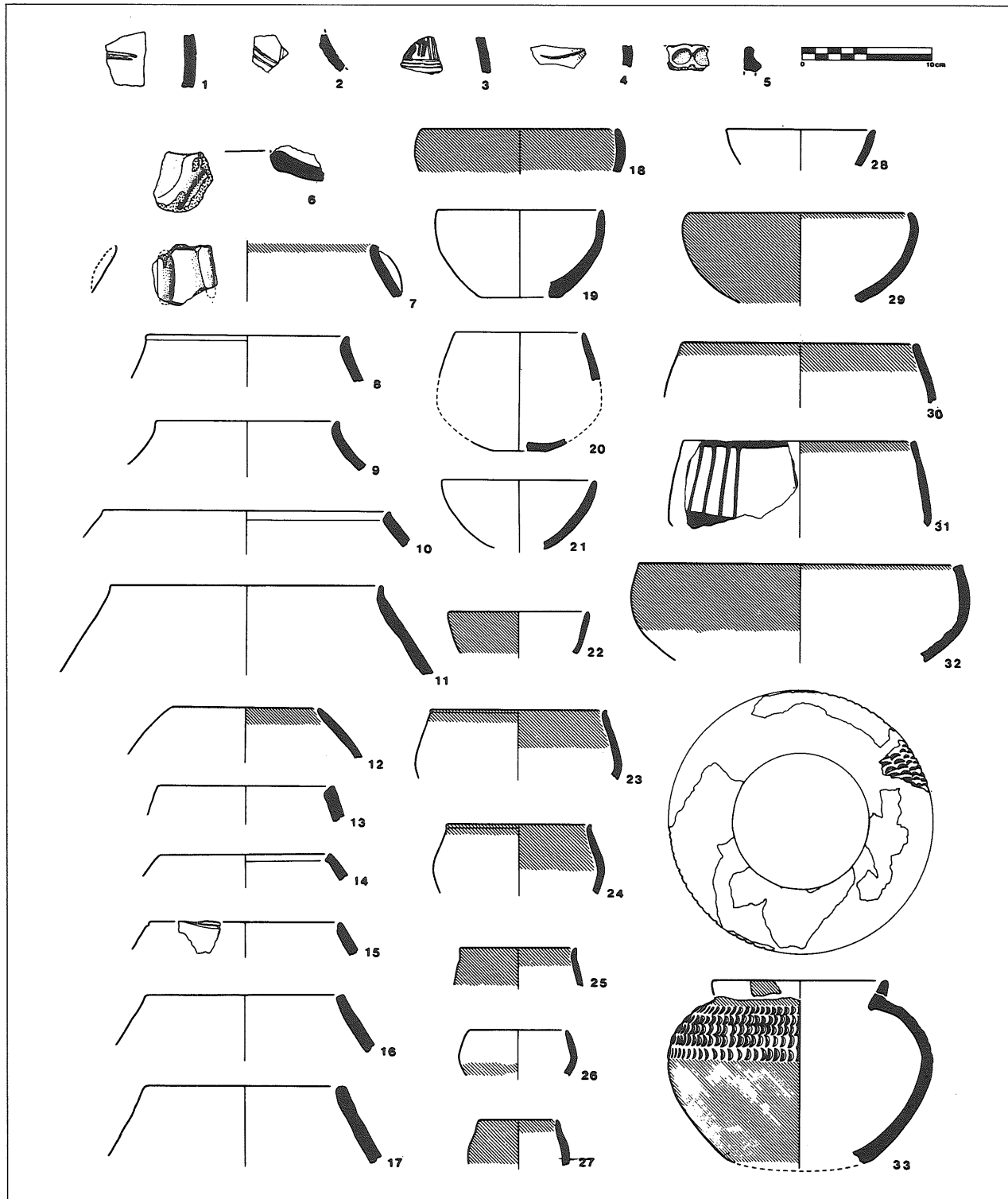
the D35-E35 building to the south-east. This structure, like the last-mentioned one, apparently was semi-subterranean at least on its southern (upslope) end. The foundation for this southern wall cut into a hard-packed, pottery-free deposit extending into Area F34 that at first seemed to date to the Kebaran period on the basis of the lithics it contained. Removal of the deposit, however, revealed a slab-covered feature of similar size and design to the cist-grave in Area A. Removal of the slabs and excavation of the soft, loamy soil beneath confirmed that the feature was the grave for two individuals, one aged about 16 years and the other, wearing a dentalium-shell necklace, about six months. It is tempting to speculate that the skeletons are the remains of a mother and her child. Pathology of the sub-adult's tibiae and fibulae, which showed enlargement and deformation, is currently under investigation. It appears that when the pit for the cist-grave was dug, the soil removed contained Kebaran artifacts exclusively. After the grave's construction and closing by the slabs, the same bladelet-bearing soil was mounded on top and packed down to create a low tumulus. While we as yet have no date for this double-burial, on the basis of construction technique it seems likely that it, like the 1987 cist-grave, is Late Neolithic, but stratigraphically it can be shown that it would have to be among the earliest Neolithic features on the site. So far our attempts to obtain radiocarbon dates on bone collagen from the grave have been unsuccessful, while a fragment of charcoal from immediately below the skeleton yields a radiocarbon date of $12,810 \pm 480$ and presumably derives from the Kebaran deposits into which the grave pit was cut (Table 1).

The Late Neolithic Pottery and Lithics Ceramics (Fig. 6)

Our sample of pottery from Ṭabaqat al-Būma was increased by some 10,000 sherds in 1992, including more than 600 that were diagnostic in some way. As in the previous

season, most of the sherds in almost all deposits on the site that post-date the Kebaran are very coarse, soft, poorly fired and friable, most commonly with inclusions of sub-rounded grit or coarse sand consisting of limestone, chert and crystalline quartz, or of silty calcareous clay. Others have coarse grains of limestone, accompanied by many foraminifera and fine silt quartz, while a rarer fabric, possibly representing pottery imported from a more northern source, contains coarse sand consisting of rounded basalt fragments. The wares are predominantly salmon-pink or pale yellow, and some of them show signs of an unusual construction technique that may partially account for the poor preservation of most of the sherds. Distinct layering in cross section indicates that some of the vessel walls, and sometimes bases too, were thickened by addition of more paste, almost with the character of a very thick slip, and that this was left to dry in place before addition of the final, generally red, slip that is the almost exclusive surface treatment on the earlier vessels on the site. This added layer has a tendency to crack and spall off, often robbing us of information about the original surface appearance of a vessel, while vessel fragments that do retain this layer generally require immediate attention from our conservator. Most of the sherds for which the exterior surface is preserved, however, are plain wares; the remainder often show a red slip over all or a portion of the vessel.

Our excavations during 1992 uncovered a much better sample of pottery from the terminal Neolithic phases of the site than we had in 1990. Some contexts, especially inside and outside the structure in Areas E33 and F33, contain much finer, harder, thoroughly fired wares in small proportions, most of the assemblage continuing to consist of the friable plain wares. Some of these are bowls with a black or grey burnished surface or, more rarely, burnished red grading into black. There are also well fired holemouth



6. A selection of pottery from the 1992 excavations at Ṭabaqat al-Būma, Wādī Ziqlāb (J. Pfaff). It includes incised/combed body sherds G35.67.22, F34.46.18, F34.77.1 and G35.67.27 (nos. 1-4); finger-indented rim F34.76.4 (no. 5); applied decoration on F33.24.6 and F33.5.3 (nos. 6 and 7); jar rims E33.10.13, F33.4.4, E33.3.42, E33.32.1, E33.9.10, E33.4.6, F33.12.46, F34.33.15, E33.22.8, F33.4.1 (nos. 8-17); bowls and cups E33.8.2, G35.74.8, E34.66.3 + E33.11.17, F33.6.1, F33.12.5, F34.34.2, F34.34.1, F33.6.4, F34.32.4, F34.36.16, F34.17.2, E33.31.4, F34.17.5, G35.54.3, F33.12.1 (nos. 18-32); and the squat jar with 'thumb nail' impression, G35.67.24 (no. 33). Diagonal hatching represents red slip except for F34.31.16, E33.31.4 and G35.67.24 (all burnished black slip).

jars with a squared or bevelled rim in a yellowish ware, sometimes with blackened interior surface, and usually with limestone and chert inclusions very similar to those in the more poorly fired, early wares. Both these classes of material can be paralleled by almost exactly the same sherds at nearby site WZ 310.

Other differences between these two phases of the Late Neolithic appear in the decoration of the pottery. Decoration is extremely rare in the earlier contexts. Rarely there is a band of red-brown paint or slip along the rim or, even more exceptionally, zones of diagonal painted lines extending from this band (e.g. G35.54.3). In the uppermost Neolithic phase of the site we have combed and incised decoration both on hard black and on somewhat softer buff wares. Usually this consists of short strokes of the comb with alternating diagonal orientations, the same as many we found in Areas I33 and I34 during the 1990 season. We have one example with a more complicated combination of combing and wavy incision in zones (F34.77.1). One largely restorable vessel (G35.67.24) is a squat jar with almost no neck and 'thumbnail' impression over most of the upper two-thirds of its exterior surface. Two sherds (F33.5.3 and F33.24.6) have applied rounded bands that may represent applied decoration similar to that found at 'Ayn al-Jarba (Kaplan 1969), and a single sherd (F34.76.4) found not far from the top of the slab-covered grave in Area F34 appears to be a fragment of "pie-crust" applied and indented decoration.

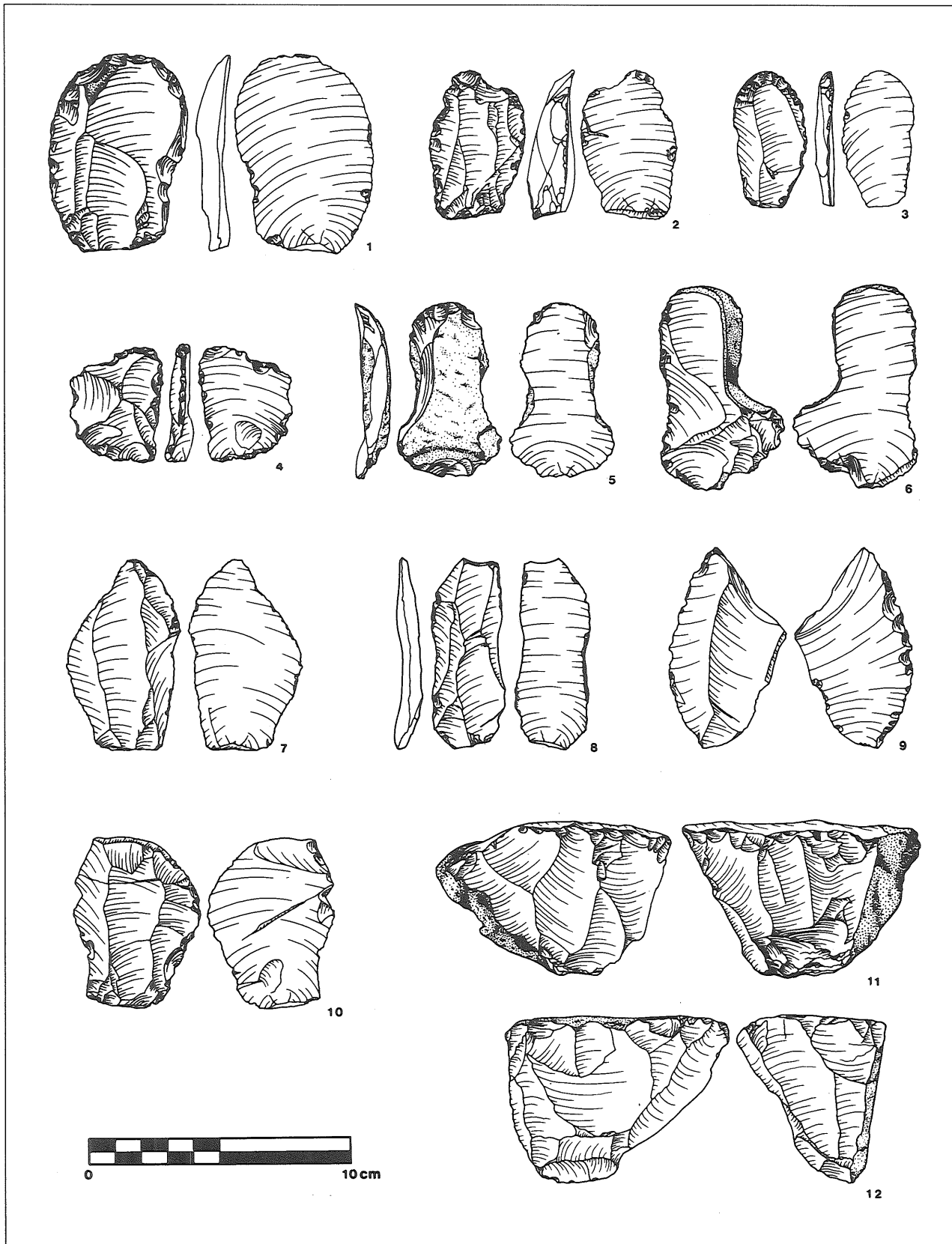
Lithics (Figs. 7-9)

Almost 10,000 lithics from the 1992 season of excavations of the Neolithic levels at Ṭabaqat al-Būma add greatly to our understanding of the predominantly 'expedient' lithic technology there. These tools are simple flakes produced by a hard-hammer percussor and have no or only minimal retouch (Fig. 7). 'Expedient' tools are made to un-

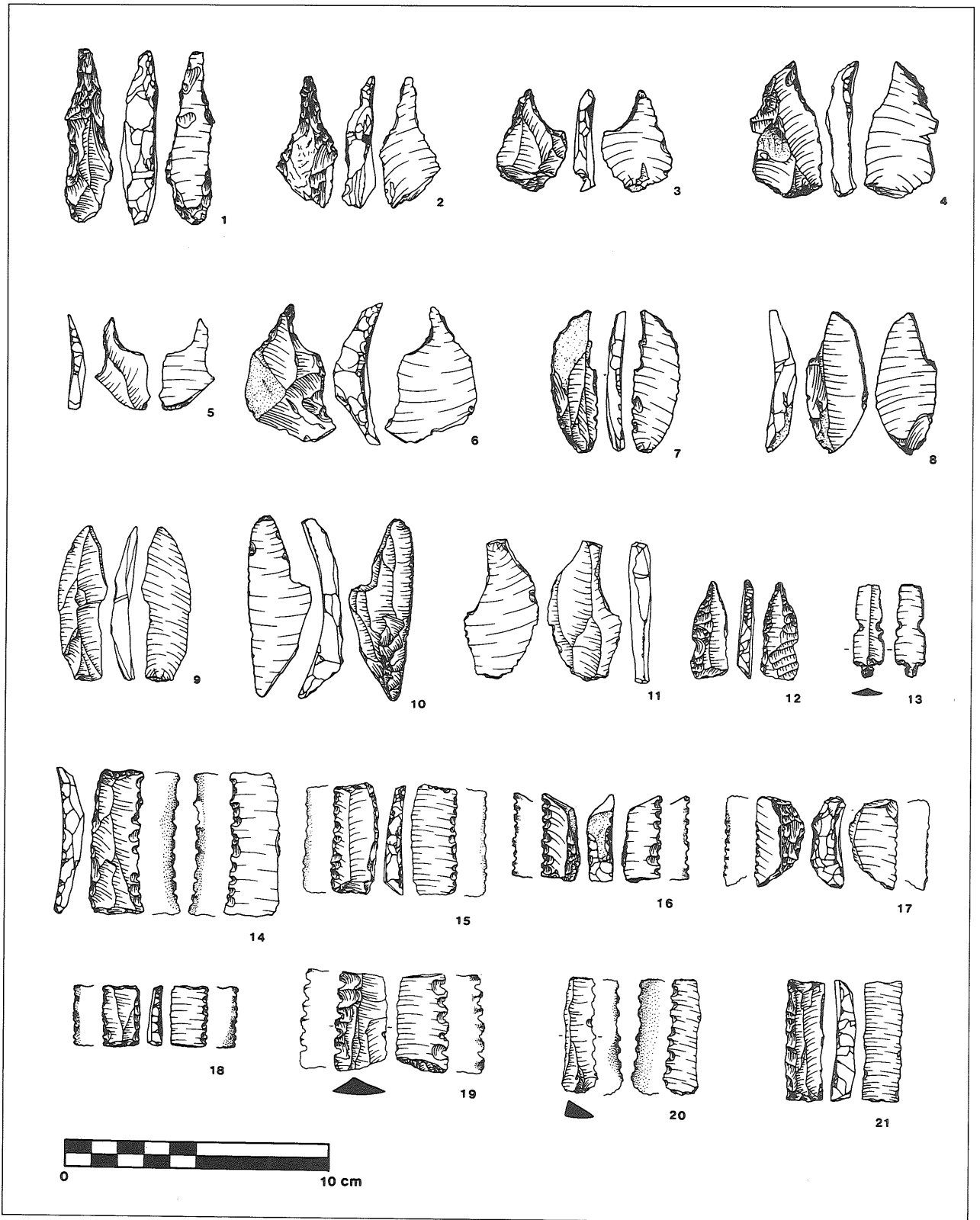
dertake a wide variety of tasks, and are made immediately prior to their use. Ethnographic analogies suggest that these tools are usually associated with single use-incidents. The Late Neolithic tools from WZ 200 are presently being used to investigate the adaptive rationale behind predominantly destandardised flake assemblages, such as those found in the Levantine Late Neolithic and among many other Holocene sedentary populations. Factors whose interaction can prompt the adoption of "basic" flake technology include subsistence economy, sedentism, social interaction and, most importantly, the implications of the potential failure of tool design (Torrence 1989; Siggers 1992). Our approach to the lithic analysis proceeds by contrasting the design features of formed tools with the lesser degree of design in utilised flake tools. Levels of design investment are then compared with our inferences of tool use, based on use-wear, to investigate the interaction of tool design with the nature and degree of risk which the task for which these tools were intended entails. In brief, the greater the degree of risk which a task involves, the more elements of design are built into the tool to undertake it.

The formed tools, representing the portion of the assemblage with the greatest design investment, are limited to very few classes, of which sickle blades predominate (Fig. 8). The sickle blades, more than 150 of which occur in our 1992 sample, exhibit considerable variability. The majority of them have a denticulated working edge with either abrupt or semi-abrupt backing. Approximately 90% exhibit sickle polish. This portion of the assemblage is similar to that from the site of Jabal Abū Thawwāb, while parallels among individual sickle blades in the published portions of other Late Neolithic sites suggests that their assemblages may also be similar.

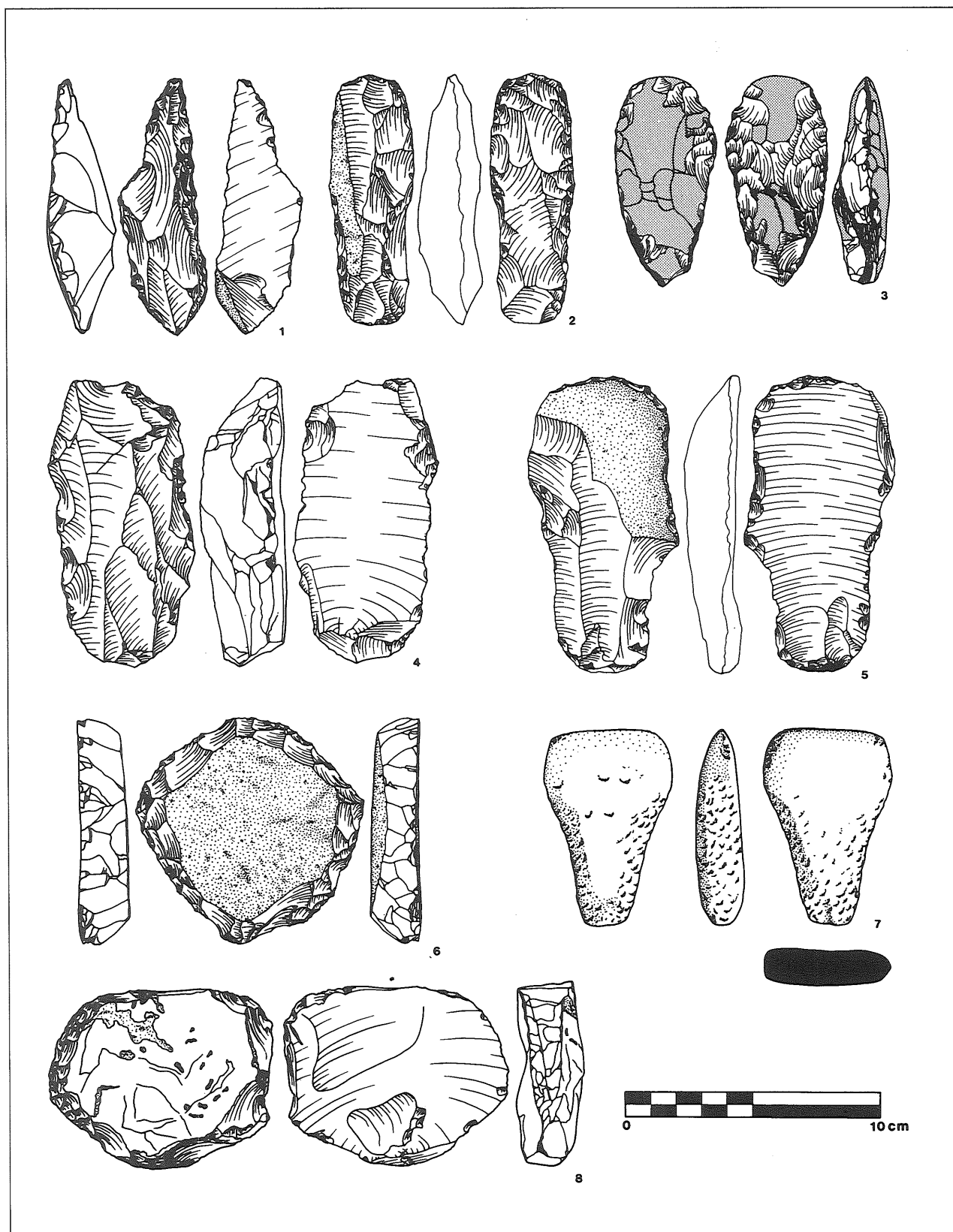
Other formed tools include three adzes, one of which had a polished working edge (Fig. 9), awls, borers, burins, scrapers and retouched and unretouched blades (Fig. 8).



7. Examples of some typical flake and blade technology from Ṭabaqat al-Būma, Wādī Ziqlāb (J. Pfaff). Unifacially retouched flakes (nos. 1, 2, 6, 9, 10), bifacially retouched flake (no. 4), endscrapers (nos. 3 and 5), partially retouched blade (no. 8), unretouched, used flake (no. 7), and flake cores (nos. 11 and 12).



8. A selection of formed tools from excavations at Ṭabaqat al-Būma, Wādī Ziqlāb, Stippling on the sickle blades indicates the extent of sheen (J. Pfaff).
 Awls/borers (nos. 1-6), burins (nos. 7-11), a single projectile point (no. 13), and a sample of sickle blades to illustrate the variety present on the site: backed and denticulated (nos. 14-18), denticulated (nos. 19 and 20), and backed and partially retouched (no. 21).



9. A selection of larger formed tools from Ṭabaqat al-Būma, Wādī Ziqlāb (J. Pfaff).

No. 1: pick (E33.8.20), 2: adze (G34.12.7), 3: partially polished adze (E33.15.56), 4-5: unifacial adzes (F34.30.32 and E36.17.83), 6: tabular scraper (G34.10.3), 7: ground stone implement, possibly a hoe (G33.74.10), and 8: unifacial scraper (G35.48.43).

Retouched blade forms include endscrapers, burins and backed pieces. Unfortunately no complete temporally diagnostic projectile points have, as yet, been found. In fact, it is odd that our large sample from two major seasons of excavation contains only a single identifiable, broken point (Fig. 8). The majority of the formed tools were made on chert of high to medium quality, whereas the 'expedient' flakes were made on material of medium to poor quality. Poor and medium grades of chert are available in the immediate vicinity of the site. Higher grades of lithic raw material can be collected 500 m west of the site, where we now have some evidence for prehistoric use of this source.

Most of the lithic assemblages of the Late Neolithic on the site, of both the earlier and the later phases, indicate an 'expedient' flake tool technology. The earlier phase, however, has a significant blade tool component and, to a lesser degree, a bladelet component. Further technological and use-wear analysis of these assemblages will provide information to help delineate the two tool traditions and associate the various technological lithic components with the tasks in which they may have been used during the Late Neolithic.

Ground Stone

The ground-stone repertoire from the 1992 excavations is fairly small. In 1990 we had some large querns, handstones and small mortars. In 1992 we added some small mortar fragments, one very large limestone mortar or pounder, some basalt pestle fragments and a complete small pestle, several incomplete handstones, and a single pecked basalt adze (G35.74.10). One of the project paleoethnobotanists is sampling the surfaces of some of these ground stone artifacts in the hope of recovering phytoliths from plants that may have been processed with them. We also have small limestone objects that are likely capstones for bow-drills (E33.19.9 and G33.8.1).

Bone Tools

The repertoire of bone tools recovered from the site is very small. In addition to several polished bone fragments that have been recognized to date, there are large parts of several bone awls.

Evidence for the Economy of Late Neolithic Ṭabaqat al-Būma

In addition to evidence from the lithics, pottery and ground stone, animal bones and plant remains from the site will contribute to our understanding of its inhabitants' economy. To date analysis of these materials from the 1992 season is not complete, but we hope that preservation of plant remains from our 1992 soil samples will be better than it was in 1990. The animal bones we have analysed from the 1990 season indicate that sheep or goats, cattle and domesticated pigs were important contributors to subsistence, but there were also significant contributions by red and fallow deer, wild boar and possibly wild cattle (*Bos primegenius*). These suggest, not only that hunting may still have been an important aspect of the economy, but also, in conjunction with fragments of conifer (including pine) charcoal at the site, that some of the area not far from the site was forested. Interestingly, we have not identified very many of the tools at the site as weapons. There is a single broken projectile point and it is conceivable that some of the small blade fragments we have may be portions of others. In addition to the more direct evidence from the bones, a number of bone tools, probable stone weights and pierced ceramic disks that could be small weights or spindle whorls may well be part of the tool kit for spinning wool and weaving on looms.

Post-Neolithic Occupation of Ṭabaqat al-Būma

Site WZ 200 appears to have been abandoned almost completely from about 5000 BC (7000 bp) through to the third century AD. From that time onward, we have some

evidence for two periods of occupation on the site. Pottery, glass and crude arrangements of stones pulled from the Late Neolithic rubble appear to be associated with camping activity, probably by pastoral nomads, on the site sometime between the late third and early fifth centuries AD. A radiocarbon date of 1680 ± 60 bp on charcoal from a context bearing Late Roman pottery from our 1990 excavations unfortunately has more than one likely solution when calibrated, but still fits rather tightly within this period: cal 254-299 AD and cal 322-421 AD (68.3% confidence intervals). Two dates from Area F33, one from the bottom of a bread-making hearth and one from the surface below it, yielded dates of 1460 ± 60 and 1580 ± 80 bp (cal 550-656 and 410-596 AD). In addition, there is abundant evidence for recent occupation of the site by tent dwellers, although we cannot say when this first began. One of the more distinctive features of the recent occupation is the superposition of several thin but distinct layers of packed dung and ash that cap most of the site's deposits. In addition, like the late pre-Islamic occupants of the site, its recent inhabitants have made liberal use of large cobbles that probably were once parts of Neolithic walls in order to construct low terraces or to border their tents. In some cases these are constructed on the tops of ruined Neolithic walls which in effect served as foundations. There is also a recent robber pit centred on the baulk between Areas F33 and G33 that probably was dug in August 1987 after our excavations were terminated on the site that year.

One of the more interesting features we uncovered during the 1992 excavations that pertains to the late pre-Islamic period is a mud-plastered, pebble-filled hearth that was probably used as a bread-oven or *tābūn* (locus F33.007). If we are correct in our interpretation of this feature, its users would have heated the pebbles with a dung fire, dusted off the ash once the pebbles were hot, then thrown bread dough onto the pebbles to bake

it, much as people still do in some parts of Jordan today. The feature is associated with Byzantine pottery and it is sealed by dung-floor layers of recent occupation on the site. As we have seen, radiocarbon dates on associated materials date it to the sixth or seventh century AD.

EXCAVATIONS AT WZ 310

During the 1987 field survey, Ian Kuijt observed a few sherds of possible Neolithic date eroding from a road cut about 600 m northwest of Ṭabaqat al-Būma, and the terrace immediately above this cut was one of the localities for subsurface survey in 1990. The two 1990 test probes revealed tantalizing material that appeared to date very near the conventional boundary between the Late Neolithic and Early Chalcolithic in the southern Levant, including grey or black burnished ware and denticulated sickle blades, but our sample was quite small and the probes were too small for us to identify any architecture. During the 1992 season, consequently, we enlarged our sample of the site by excavating an area of 4.5 x 3.5 m.

Stratigraphy and Architecture

Although isolated "grain-wash" body sherds that occur as surface finds on the south side of the road, opposite locality WZ 310, suggested that there may be an EBIB component on some part of the site, continued excavation revealed that Chalcolithic and probable Early Bronze Age material also underlay fairly thick deposits of Late Neolithic material in our excavation of Area A (which includes probe A from 1990). At first Area A appeared to have no occupation later than the terminal Neolithic. The upper 30 or 50 cm consist of grey, marly slopewash with very few diagnostic artifacts, that overlies a surface (locus A.008) with flat-lying sherds that are probably mid-fifth millennium (uncalibrated) in date as well as stone tumble (locus A.007) that seemed to be from col-

lapsed architecture. Beneath the surface was an ashy lens (locus A.010) over a browner fill (loci A.011 and A.012).

Deposits in and below this fill, however, and in pits (loci A.016, A.017 and A.018) below the ashy layer, began to show large numbers of clearly later artifacts, some belonging to the Early Bronze Age. Among these were two large Canaanean blades. The most likely explanation is that all of the Late Neolithic material in Area A has been redeposited, probably from upslope, even though we did not detect any mixture of more recent material among it. Some of the material is stratigraphically later than a white, marly, laminated layer that the project geologist identifies as the result of ponding, perhaps behind a wall or other obstruction, and this ponding itself seals the late pits. We hope that deposits a little way up the hill may still preserve some relatively undisturbed Neolithic material, although inspection of the surface and small gullies suggests that they do not.

Apart from the pits that contained post-Neolithic material, Area A architecture was limited to only the small remnant of the corner of a building (locus A.013) most of which had been lost in the road cut, and a possible terrace wall or field clearance (locus A.020), poorly constructed from large stones, that may have been the barrier that collected slopewash and Late Neolithic material behind it.

Pottery and Lithics

The most interesting material from WZ 310 pertains to the very end of the Neolithic, but the site also yields artifacts as late as the Early Bronze Age.

From the surface (A.008) down to locus A.012 there were large numbers of artifacts, especially in the north-east corner of the excavation area, that belong to the end of the Neolithic. Principal among these are the grey and black burnished sherds, some showing a gradation from black to red on their external

surfaces, and either black or tan sherds with coarsely combed decoration (e.g. A.47.14, A.49.20, A.51.14, A.63.36). In addition there are rare instances of punctate decoration (A.54.6, A.43.3) and red-brown painted decoration. In many instances these closely parallel sherds found in the latest Neolithic deposits at Ṭabaqat al-Būma as well as in Late Neolithic components at Batashi, Jericho, Munhatta and Wādī Rabah (Kaplan 1955; 1958a; 1958b; Perrot 1964; Kaplan 1972; Kenyon and Holland 1983). An unusual ledge handle (A.68.4) in the hard, black-burnished ware, has an almost rectangular plan with slightly concave sides, and may have broken from a large platter-like vessel.

Here there are also sherds with Wadi Rabah parallels that do not occur in our large sample from site WZ 200. Among these are heavy triangular rims (e.g. A.54.1, A.54.2) and well fired, greenish buff, holemouth rims with an angular interior thickening (e.g. A.47.19, A.53.4).

The lithics also point predominantly to a date late in the Late Neolithic. As at Ṭabaqat al-Būma, throughout the Late Neolithic, the bulk of the lithic assemblage represents an expedient technology, with virtually the only "formed tools" being bifacial adzes, chisels, retouched flakes, blade tools, and sickle blades. The sickle blades, in particular, share many similarities with those recovered from WZ 200. Both assemblages are made up of predominantly denticulated and abruptly backed pieces, quite unlike the sickle blades typical of Chalcolithic assemblages. Lithic tools from both sites are made from a similar variety of local cherts. And also as at Ṭabaqat al-Būma, we have as yet identified only one projectile point in the assemblage. As this point is only a fragment, it has limited value as a temporal marker. Two Canaanean blades occurred in the deepest horizons of the site (locus A.019). Closer examination of the nature of the tools from this locus and ones above it will help clarify

to what extent any of the superimposed deposits may have mixed material.

Subsurface Survey in Wādī Ziqḷāb

Because the Neolithic occupation of site WZ 200 turned out to be more extensive than we had anticipated, we only conducted subsurface soundings at three locations along 'Ayūn Ziqḷāb as well as three more on the peripheries of site WZ 200 itself. As in 1990, off-site soundings were numbered in the 300-series to make them easily distinguishable from sites where cultural material was known to occur, and those that are not clearly sites of ancient human occupation or activity are termed "localities."

The first of these, WZ 311, was placed on a scarp near the road about 100 m north-west of WZ 200, where the project geologist had noticed some possibly Upper Paleolithic artifacts in an old colluvium. Although the locality did produce some lithics, this sounding was closed after a few days when it became clear that the artifacts had probably been transported from some place farther upslope.

Locality WZ 312 was placed in a terrace opposite site WZ 310. Even on the surface here we were able to find quite a few chert cores, and the sounding indeed yielded 116 sherds, most probably of Roman or Byzantine age, as well as fairly large numbers of lithics, particularly cores. Although at least some of the pottery seemed to represent camping activity on or near the locality, it was fairly clear that the lithics had been transported from upslope – indeed we would expect cores to roll downhill more easily than would flakes – and we sought a source for this material by placing an additional sounding much farther upslope.

We departed from our planned program of soundings by placing a probe, locality WZ 313, well above WZ 312 in an attempt to discover the source of the lithics that we had been finding in the latter locality. It did not turn out to be an undisturbed, primary de-

posit of prehistoric material culture either. Although there were many lithics here, they were mixed with 19 sherds, again mainly of Byzantine age.

An unexpected bonus of the work at locality 313, however, was the discovery of a likely source for most of the lithic raw material used at site WZ 200. A breccia that occurs just uphill from (south of) the locality is rich in flint nodules, many of which have the same colour and texture as flint used at Ṭabaqat al-Būma during the Neolithic. It is likely that this wealth of flint of relatively high quality is not only responsible for the abundance of cores downslope from the breccia, but that this was a source of raw material that WZ 200's Neolithic inhabitants knew well. We are now attempting to characterize or "fingerprint" these flints by their trace elements and microfossils to see if they are indeed the ones most likely used at WZ 200.

At the same time our excavations of Kebaran deposits at site Ṭabaqat al-Būma were indicating that the artifacts were oriented randomly within a colluvium and had probably been transported there along with the soil. Consequently, we also placed some test trenches on the slope above the site, where there were small terraces, to see if we could find the source of this material.

Area C was the first of these trenches above site WZ 200. It was located on the top of a prominent knoll in the slope, where the surface was flat enough to be a possible habitation place. It produced almost no cultural material and we hit bedrock only a few centimetres below the modern surface.

Area D was located farther downslope, where a shelf in the bedrock provided an opportunity for soil to collect and where there seemed to be some possibility of a rock-shelter. It also produced very little cultural material and bedrock appeared only a short distance below the surface, in spite of the organic-rich soil found here that seemed likely to be cultural in origin.

We were forced to conclude that the orig-

inal resting place of the Kebaran materials had been eroded away prior to Late Neolithic occupation of the site. This would be consistent with the geological results that indicate a period of erosion some time prior to the mid-eighth millennium bp (Banning *et al.* 1992; Field 1993).

Around site WZ 200, we also cut back a natural scarp north of the site below the rock-shelter (Area 2R) where the project geologist had noted some mud brick and a possible hearth. The depth of the mud brick below the modern surface suggested the possibility that it was ancient, but work in Area 2R soon indicated that it was modern, although its deposits still proved interesting. Barbed wire was found next to the section through a low mud brick wall, and this wall soon proved to be the western boundary of a large trench that had been filled with silt during several episodes of flooding. Informants from Tibna told us that this large trench, along with a whole camp, had been destroyed and buried during a major flood of 1975. Some 2 m of deposit above the trench had apparently slumped down in a landslide during this flood, burying this part of the camp quite deeply in a very short time. Although these events are very recent, they are instructive in that they indicate one way in which some of the ancient and prehistoric sites in the valley bottom could have been buried well beyond the reach of most archaeological surveys. The possible hearth or pit filled with stone and ash occurred in a location that is stratigraphically well below the mud brick and the buried trench, and it is indeed possible that it is prehistoric. Since we found no artifacts associated with it in the very small volume of soil we removed in cleaning back the scarp, we are unable to date it at present, but we hope to have a radiocarbon date for it in future.

Geological and Botanical Work in Wādī Ziqlāb

The project geologist, John Field (West-

ern Washington University), spent a good deal of his research time this season studying the landslides that occurred in connection with the previous winter's unusually large snowfall and rainfall, and interviewing local residents about earlier landslides in Wādī Ziqlāb's catchment. More than 150 major landslides, excluding ones that may have been triggered by human activity, had occurred in the central part of the basin during this bad winter, one of which was large enough to dam Wādī Ziqlāb's stream. The magnitude of earth movement during wet winters has important implications for the visibility and spatial integrity of archaeological sites in some stretches of the valley bottom, as we have seen in the case of Area 2R at site WZ 200. A full report on this aspect of our work will appear elsewhere.

In addition, the geological work included describing and explaining soils and other deposits within the excavation areas.

The botanical survey in 1992 was limited to the collection of off-site samples to serve as controls for the phytolith analyses being carried out on excavated contexts. Anita Buehrle (1992) has so far completed analysis of one soil column from the baulk between Areas F33 and F34 (former Area B).

Some of the results of our environmental surveys have been reported elsewhere (Banning 1993; Field 1993).

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E. B. Banning
Julian Siggers
Department of Anthropology
University of Toronto
Toronto, Canada M5S 1A1

Dan Rahimi
Royal Ontario Museum
Toronto, Ontario
Canada

Hikmat Ta'ani
Department of Antiquities
Irbid, Jordan

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A SALVAGE OPERATION AT BĀB ADH-DHRĀ‘

by

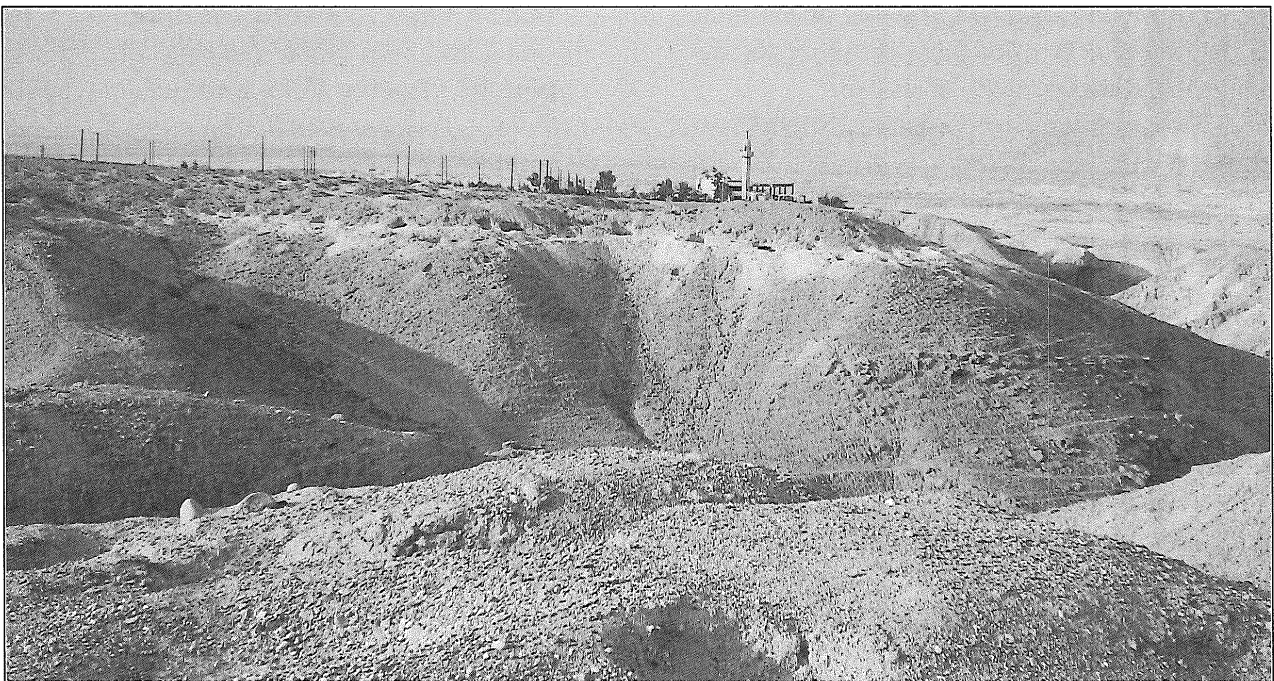
David W. McCreery

Background

Illicit excavations at Bāb adh-Dhrā‘ have been conducted for at least the past 70 years. The first documented occurrence of this activity comes from the 1924 expedition of W.F. Albright (1924) and A. Mallon (1924) who found the site on the last day of their survey and identified recently robbed Early Bronze Age tombs. In the mid-1960’s P.W. Lapp’s attention was drawn to the site by thousands of Early Bronze Age pots that flooded the antiquities market in Jerusalem and ‘Ammān (Lapp 1966; 1975:104-110). Over the past decade the tomb robbing activity has intensified. As one traverses the cemetery today, opened tombs or abandoned robber trenches are encountered approximately every meter. Given this situation, some have concluded that little remains to be

found *in situ* at the Bāb adh-Dhrā‘ cemetery.

During a visit to the site in mid-October 1995, the author noted recent illicit excavations south of Cemetery A (Figs. 1 and 2). Upon investigation, it was found that 39 new EBIA shaft tombs had been uncovered. Since this is a previously unexplored section of the cemetery (see Fröhlich and Ortner 1982:251, Fig. 2), containing a number of well preserved chambers and grave goods, a four day salvage project was mounted to map the site and collect representative pottery and bone samples.¹ No new excavation was initiated although the likely location of a number of unexcavated chambers was noted. The primary goals of the project were to: 1) map the locations of the looted chambers, 2) recover bones, pottery, and other artifacts from the tombs for further analysis, 3) de-



1. > S at Bāb adh-Dhrā‘ Cemmtery “X”, from Cemetery A.

1. The project staff consisted of the author, Fulbright Fellow David Vila, Linda McCreery, and Krista McCreery.



2. > SW at Bāb adh-Dhrā' Cemetery "X", from Cemetery A.

termine the chronological relationship of this new area with previously excavated sections of the cemetery, and 4) formulate an estimate of the lateral extent of this portion of the cemetery and the intensity of its use.

This new sector of the Bāb adh-Dhrā' cemetery was designated Cemetery "X" for convenience sake. This is viewed as a temporary label which might be changed if, for example, Cemetery X proves to be simply a southern extension of Cemetery A.

Location of the Recent Excavations

Time and financial restrictions precluded making a detailed topographic map of the site. Using ACOR's Trimble GPS System with a Pathfinder Basic+ Rover Unit, it was possible to establish the location and elevations of a number of points, making it possible to position this new burial area in relationship to previously excavated areas.

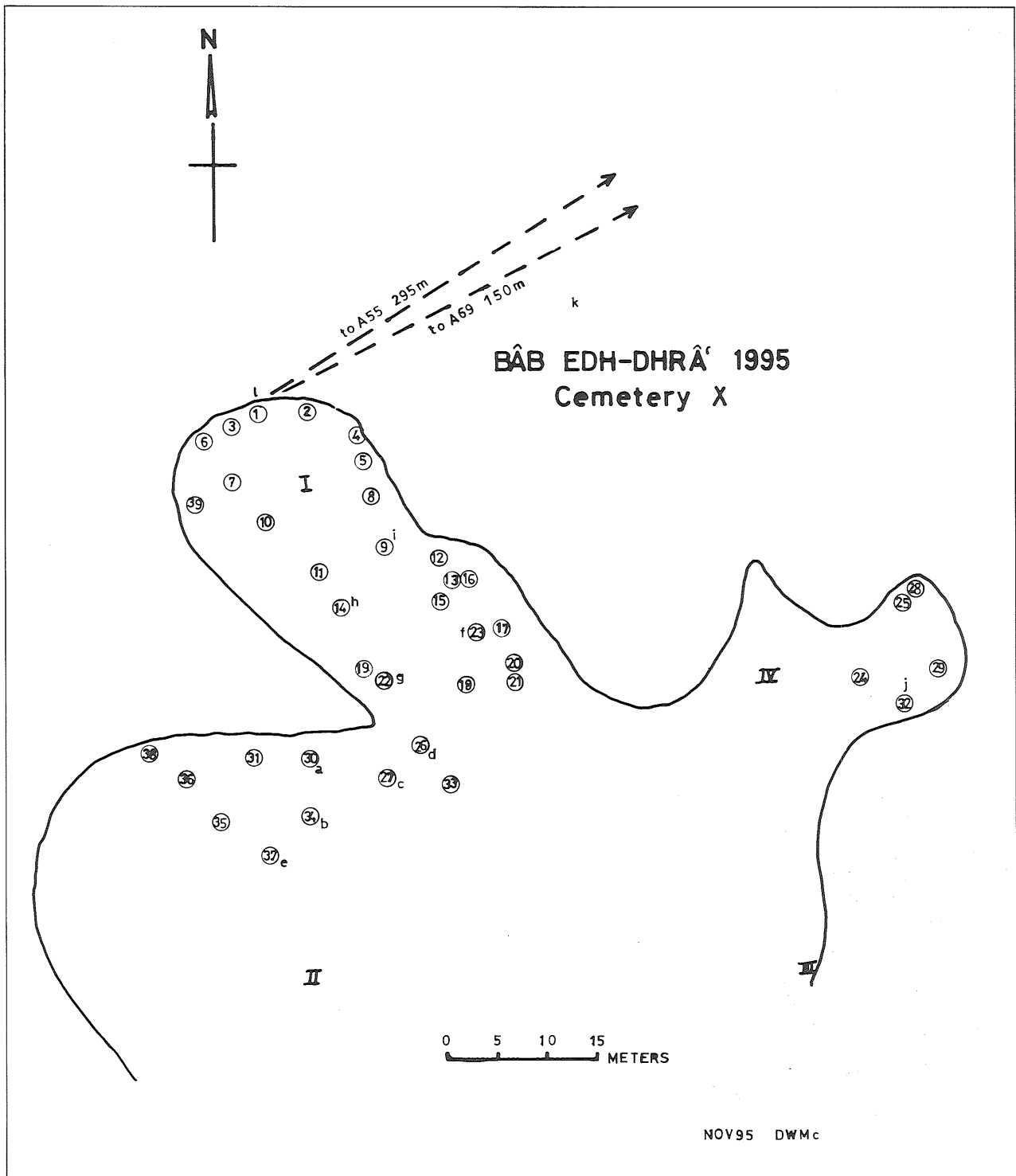
Four points (I-IV), were established to facilitate mapping the site (see Fig. 3). Point I

was located 50m directly N of point II and point III as established 50m E of point II. Point IV was set 50m ESE (bearing of 113°) of point I and 30m NNW (bearing of 353°) of point III. Twelve GPS locations/elevations (points a-l) were taken in Cemetery X and one (point m) in Cemetery A. Points "I" and "m" were used to spatially relate Cemeteries X and A. As is indicated in Fig. 3 and Table 1, point "m" (NE corner of A55), lies 295m ENE of point "I" (near X1S), at a bearing of 58° .

From published maps (Schaub and Rast 1989:23-24), it was also possible to determine that A69 lies 150m ENE of point "I" at a bearing of 63° . Cemetery A and X are separated by a 10-15m deep wadi that runs roughly E/W between them (see Figs.1 and 2; note point "k" in Tables 1 and 2 for the location and elevation of the wadi bed).

Description of the Tomb Chambers

The damage caused by looters places severe limitations on attempts to accurately de-



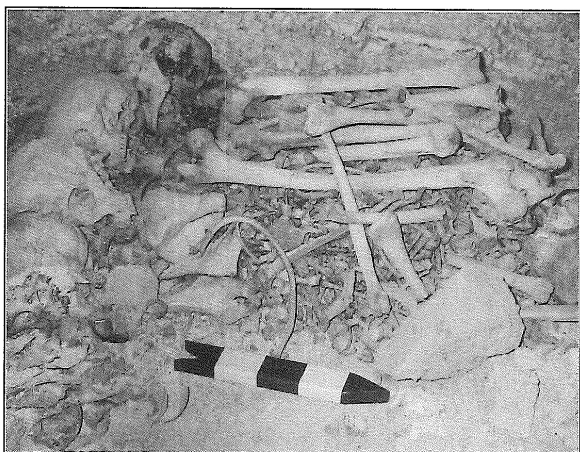
3. Bâb adh-Dhrâ' 1995 Cemetery "X" Plan.

scribe the orientation and original condition of the various tomb chambers. In some cases, the robbers came down through the roof or sides of chambers and did not expose the shaft and other chambers that might be associated with it. As Table 2 indicates, the il-

licit excavations exposed, at least partially, a total of 20 silted and 44 unsilted chambers. The state of preservation of some of the unsilted chambers is extraordinary with well preserved – although very friable – bones, reed mats, and pieces of wood (Figs. 4 and



4. X27SE, note wooden object in lower left corner of photo.



5. X23W, skulls and bone pile.

5). Unfortunately, most of the unsilted chambers contain a fair amount of backfill from the looting activity which often covers part or all of the bone pile (Figs. 6 and 7). The absence of pottery from well preserved chambers like X23W is probably due to the fact that all of the grave goods in this cham-

ber were found intact and therefore removed. Pottery which had been broken by ancient roof collapse or carelessness on the part of the tomb robbers was found in the chambers or scattered around the mouth of the shafts (Fig. 7). A red burnished bowl with a few missing rim chips found in chamber X27SW (Fig. 8) suggests, that the looters were only interested in keeping pots found in pristine condition.

As far as could be determined, 22 tombs had only 1 chamber, 8 tombs had 2 chambers, and 9 tombs had 3 chambers. These counts are tentative and careful excavation is needed to confirm them. It seems quite likely, in fact, that the looters failed to identify a number of chambers. Tombs X18, X21, X32, X33, X34, and X37 for example probably have 3 chambers rather than the one or two that are documented. Likewise, tombs X11 and X35 may have had four chambers

Table 1. Bāb adh-Dhrā' 1995 – Cemetery X Reference Points (as determined by differentially corrected Trimble Pathfinder GPS readings).

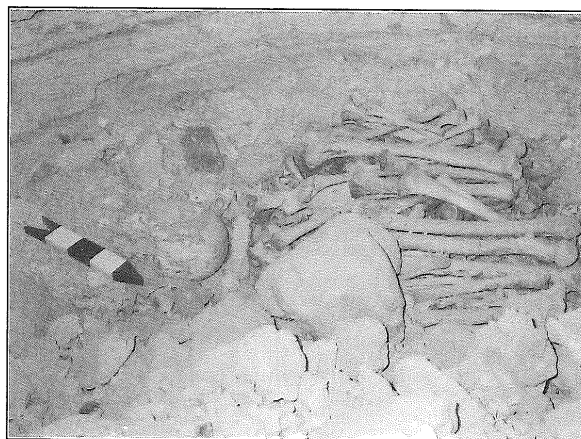
<u>Point</u>	<u>Description</u>	<u>UTM (WGS-84) Coordinates</u>	<u>Geodetic (WGS-84) Coordinates</u>	<u>Elevation (MSL)</u>
I	Mapping reference point	3459864.361N 740683.324E	31° 14' 53.531"N 35° 31' 38.386"E	-269.820 m
II	Mapping reference point	3459814.037N 740688.132E	31° 14' 51.894"N 35° 31' 38.524"E	-268.071 m
III	Mapping reference point	3459815.669N 740725.502E	31° 14' 51.919"N 35° 31' 39.937"E	-267.529 m
IV	Mapping reference point	3459846.240N 740730.494E	31° 14' 52.908"N 35° 31' 40.152"E	-266.774 m
a	Top of X30 shaft	3459833.259N 740685.431E	31° 14' 52.520"N 35° 31' 38.439"E	-269.341 m
b	Top of X34 shaft	3459828.717N 740687.974E	31° 14' 52.371"N 35° 31' 38.531"E	-268.211 m
c	Top of X27 shaft	3459836.260N 740694.480E	31° 14' 52.611"N 35° 31' 38.783"E	-269.934 m
d	Top of X26 shaft	3459838.977N 740699.222E	31° 14' 52.695"N 35° 31' 38.965"E	-267.931 m
e	Top of X37 shaft	3459830.547N 740683.917E	31° 14' 52.433"N 35° 31' 38.379"E	-267.088 m
f	Top of X23 shaft	3459848.240N 740698.416E	31° 14' 52.996"N 35° 31' 38.942"E	-267.575 m
g	Top of X22 shaft	3459846.707N 740692.535E	31° 14' 52.951"N 35° 31' 38.719"E	-270.589 m
h	Top of X14 shaft	3459855.105N 740688.810E	31° 14' 53.226"N 35° 31' 38.585"E	-269.460 m
i	.5m above X9NW & X9SW entrances	3459861.563N 740693.570E	31° 14' 53.432"N 35° 31' 38.771"E	-271.052 m
j	Top of X32 shaft	3459840.743N 740741.717E	31° 14' 52.721"N 35° 31' 40.571"E	-267.312 m
k	Wadi bed between A Cemetery and X Cemetery	3459888.977N 740709.367E	31° 14' 54.310"N 35° 31' 39.391"E	-283.810 m
l	3m N & .5m above X1 entrance	3459873.857N 740679.583E	31° 14' 53.842"N 35° 31' 38.253"E	-273.916 m
m	NE corner of Charnel House A55	3460031.115N 740878.398E	31° 14' 58.797"N 35° 31' 45.899"E	-262.291 m

-- distance from point l to point m = 295m at a bearing of 58° NE

-- distance from point l to A69 = 150m at a bearing of 63° NE

Table 2. Orientation, Condition, and Contents of Cemetery X Tomb Chambers.

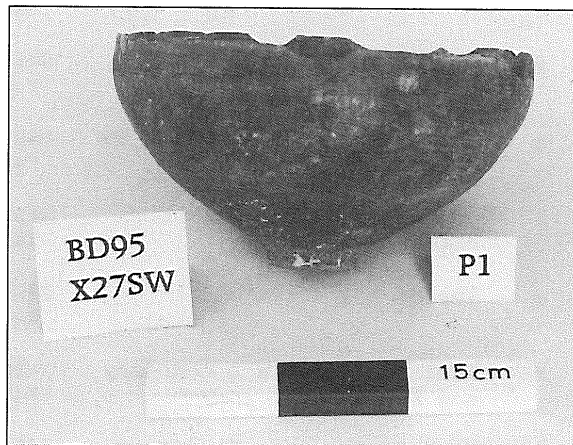
Tomb No	Chamber	Silted	Ceramics	Wood
X1	S	No	No	No
X2	W	Yes	No	No
X3	S	No	Yes	No
X4	SW	No	No	No
X5	SW	Yes	No	No
X6	S	No	No	No
X7	S	No	Yes	No
	NE	No	No	No
	NW	No	No	No
X8	SW	Yes	No	No
X9	NW	No	Yes	No
	SW	No	Yes	No
X10	E	No	No	No
	NW	No	No	No
X11	NE	No	Yes	No
	NW	No	Yes	No
	SW	No	No	No
X12	S	Yes	No	No
X13	W	Yes	No	No
X14	S	No	Yes	No
	NE	No	Yes	No
	NW	No	Yes	No
X15	N	Yes	No	No
	S	Yes	No	No
	E	Yes	No	No
X16	SE	Yes	No	No
X17	W?	Yes	No	No
X18	SE	No	Yes	No
	NE	No	No	No
X19	SE	Yes	Yes	No
X20	W	No	No	No
X21	N	Yes	No	No
X22	SE	No	Yes	No
	NW	No	Yes	No
X23	N	No	No	No
	W	No	No	Yes
	S	No	No	Yes
X24	W	Yes	No	No
X25	SE	Yes	No	No
X26	W	No	No	Yes
	E	No	Yes	Yes
	S	No	No	Yes
X27	N	No	No	No
	SE	No	No	Yes
	SW	No	Yes	Yes
X28	S	Yes	No	No
X29	N?	?	No	No
X30	N	Yes	No	No
	SW	No	No	No
	SE	No	Yes	Yes
X31	W	Yes	No	No
	SE	Yes	No	No
x32	E	No	No	No
X33	NE	No	Yes	Yes
X34	N	No	Yes	Yes
	SE	No	No	Yes
X35	SE	No	Yes	No
	N	No	No	No
X36	NE	No	No	No
	W	No	No	No
	SE	No	No	No
X37	SW	No	Yes	No
	SE	No	Yes	No
X38	S?	Yes	No	No
X39	E?	Yes	No	No



6. Bone pile and backfill in X27SW.



7. >SW at backfill and pottery in X9SW.



8. Tomb X27SW, from ceramic assemblage.

each.²

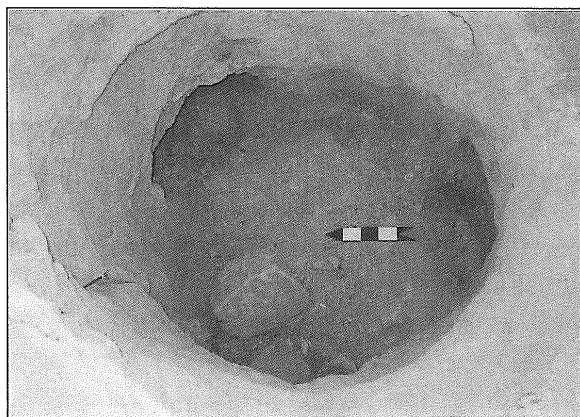
The single chamber tombs tend to have shallow shafts (1.5m or less), and are concentrated around the outer periphery of the slope at lower elevations (e.g. X1S, X2W, X3S, X4SW, X5SW, X6S, and X8SW, see Fig.3). These chambers are usually less than

2. Suspected unexcavated chambers include X11SE, X18NW, X19N, X21SE, X21SW, X32N, X32W,

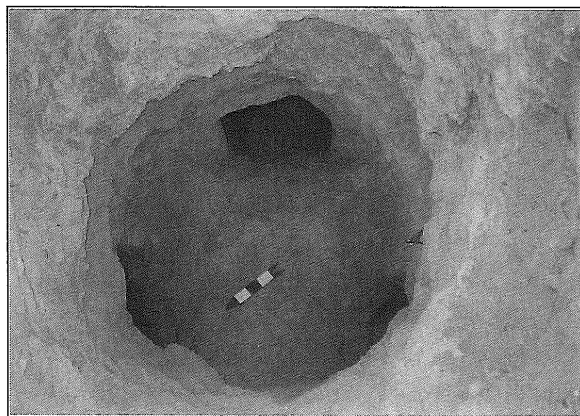
X33NW, X33S, X34SW, X35S, X35W, and X37NW.

one meter below the modern surface and are prone to roof collapse. Tombs with multiple chambers were placed at higher elevations (-270.50m MSL and higher), had deeper shafts (1.7-2.7m; see Figs. 9 and 10), and tend to be better preserved than the single chamber burials. The placement and distribution of tombs is very similar to that of Cemetery A suggesting that Cemetery X was exploited as intensely as was Cemetery A. Honeycombing of chambers noted in X22NW and X27N further attests to the extensive use of the cemetery. Considering the density of tombs in the small area examined, it seems highly probable that Cemetery X extends further to the south and west.

Silting and extensive backfilling made it impossible to measure many tombs but a sample of the best preserved chambers and



9. Tomb X14 shaft.



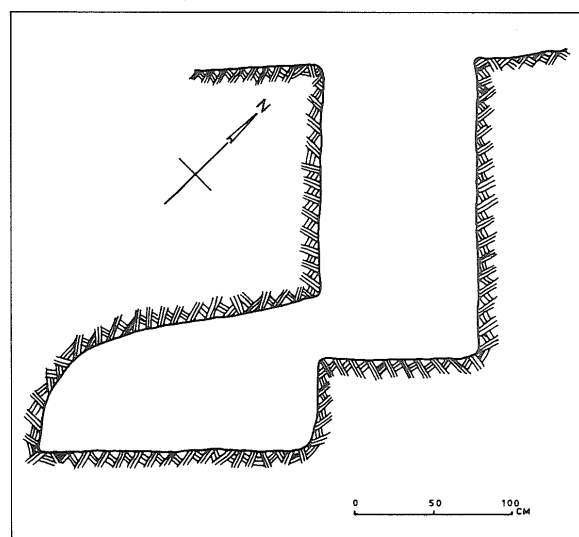
10. Tomb X27 shaft.

3. The length and width measurements for the chambers is based on a sample of 38. It was possible to determine the maximum height of only 24 chambers. The diameter of 22 shafts was measured but

shafts yielded the following results.³ The shafts range from 0.90-1.40 m in diameter with an average of 1.07 m. The depth of the shafts range from 1.13-2.70m with an average depth of 1.95m. The maximum chamber length, width, and height range from 1.26-2.15m, 1.17-1.95m, and 0.70-1.00m respectively with an average length, width, and height of 1.82m x 1.68m x 0.85m. The chamber floors were found to range from 0.25-0.70 m below the bottom of the entrance with an average of 0.53m. Most chambers have a slightly oval plan although some are almost circular. Chambers X23W and X37SW are unusual in that they have a rectangular plan with an off-center entrance providing access to the chamber near the south wall. In some chambers, the roof slopes up gradually toward the entrance (e.g. X27SW, Fig.11) while others are more dome-shaped in section with the maximum height near the center of the chamber (e.g. X23W, Fig. 12).

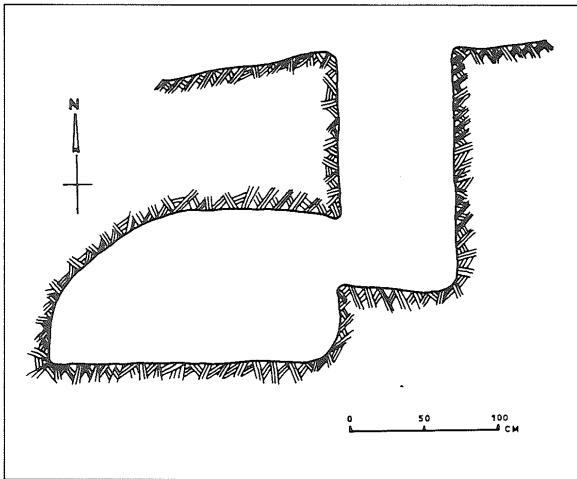
Description of Burials and Grave Goods

Those responsible for the most recent episode of looting at the Bāb adh-Dhrā‘ cemetery clearly have no interest in the bones



11. Section of Tomb X27SW.

the depth of only 11 shafts could be ascertained with a high degree of confidence. The size of the step from the bottom of the entrance to the chamber floor was measured in 16 cases.



12. Section of Tomb X23W.

and leave the burials themselves undisturbed as they collect the grave goods. Unfortunately, many of the burials were disturbed or destroyed when dirt from other chambers and shafts was thrown into the robbed-out chambers. Bones from some of the best preserved burials (i.e. X23W, X23S, X26S, X26E, X27SE, X27SW, X30SE, and X37SE; see Figs. 4, 5 and 6), were removed and are currently being analyzed by Mahmoud al-Najjar and Abdel Halim Al-Shiyab at the Institute of Archaeology and Anthropology, Yarmouk University.

Virtually all the burials examined were disarticulated with the exception of one articulated adult in X37SW.⁴ In this case, the articulated skeleton was against the back wall of the chamber with a bone pile containing the remains of 3 to 4 sub-adults situated in the center of the chamber. Bone piles are typically found in the center of the chambers with skulls to the left of the entrance and bone piles (Figs. 4, 5, and 6). All appear to be multiple burials with a minimum of two adults or one adult and one or more sub-adults. Most chambers contain 3 to 5 skulls. X37SE which appears to contain the remains of 2 adults and 5 children was the largest interment observed.

Although the ceramics remaining in the

tombs had been scattered it appears that most pottery had been placed to the right of the entrance extending about half way around the perimeter of the chamber. Remains of reed mats upon which the bone piles were placed were found in several chambers (e.g. X23W, X26S, X26W, X27SW, and X27SE) as were well preserved mat impressions (e.g. X27N) identical to those found in A85 (Schaub and Rast 1989:173, 531-532) and other EBIA, Cemetery A burials.

As noted in Table 2, uncarbonized wood fragments were found in 10 chambers. The most commonly represented wooden objects are staffs approximately 3cm in diameter but the remains of a wooden bowl (in X23W) and thick, flat, wooden 'pallets' are also represented (in X23S, X27SE, X34N, and X34SE; see Fig. 4). The 'pallets' or 'boards' range in thickness from 1.25–6.00 cm, and in two cases are perforated. The 1.25 cm thick fragment from X23S is perforated by a round hole, 1.5 cm in diameter. The best preserved example was found in X34SE and is 52cm long x 17cm wide x 5–6 cm thick. Two 2.5 cm x 3.0 cm rectangular holes 8 cm from the end and 3 cm from the side of the 'pallet' are well preserved and it appears likely that originally there were four such holes. The pallet is slightly bowed and worn on the edges, rough on the convex side and smooth on the concave side, giving it the appearance of a miniature threshing sled. Wooden objects were found both to the right and left of the chamber entrances as well as along the sides and at the back of the chambers. Additional organic material including what appears to be the remains of textiles, basketry, and leather was noted in chambers X23W, X30SE, and X37SW.

The total absence of basalt vases, mace-heads, figurines, beads, bracelets, and metal objects is noteworthy. If such artifacts were found in the unsilted chambers the tomb rob-

4. X30SE may also contain one articulated skeleton along with a disarticulated bone pile. Disturbance

and backfill from tomb robbers makes it difficult to reconstruct the original condition of the chamber.

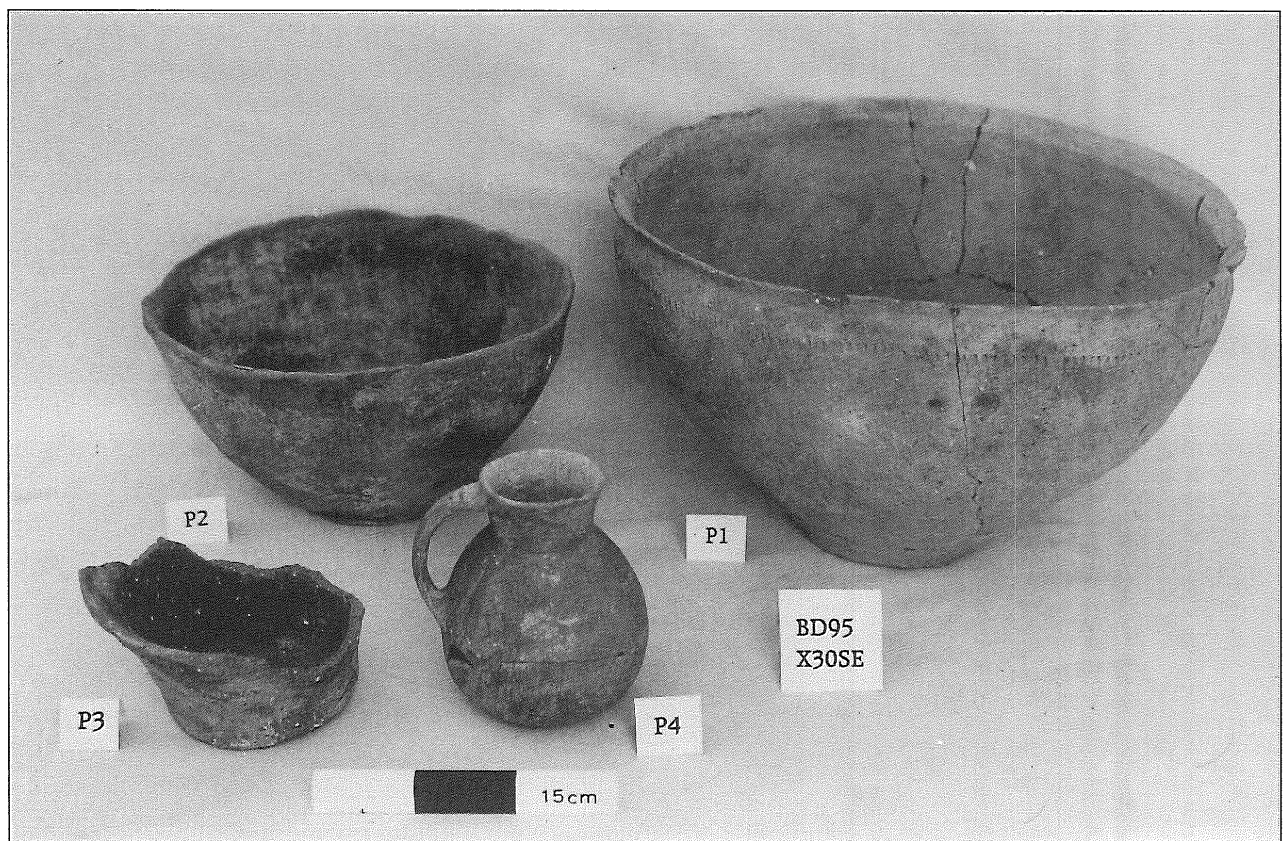
bers would almost certainly have removed them. Clearance of the partially excavated silted chambers would probably yield some of these objects. The shattered remains of one basalt vase was found north and down-slope from tombs X25 and X28 and probably came from one of these tombs.

A total of 54 whole and 7 partial pottery forms were recovered from 14 tombs and 21 chambers (see Table 2). The distribution of the sherds from broken pots suggests that most ceramic objects were left where they were found. A few sherds from the surface outside the tombs were found to join with sherds inside the chambers indicating that broken pottery was being thrown around carelessly during the looting operation. Occasional joins from sherds found in different chambers served by a common shaft lends further support to this conclusion.

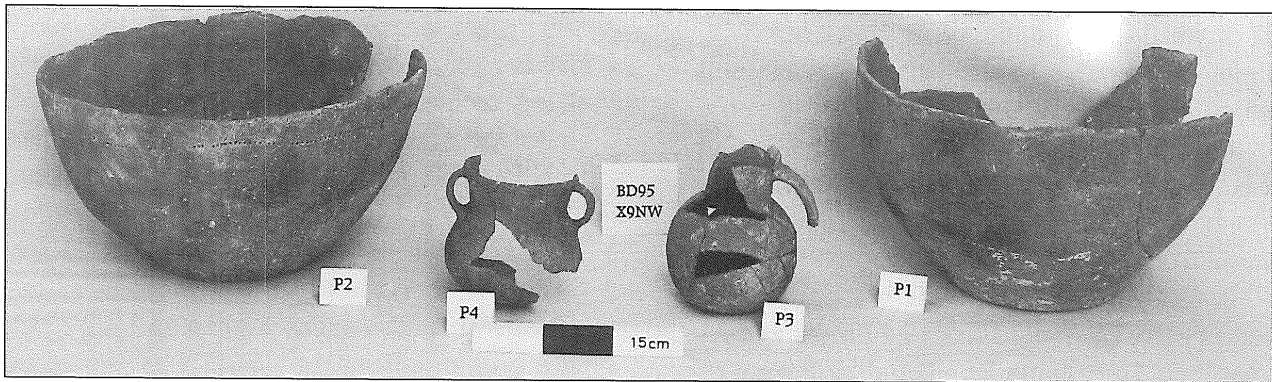
A number of ancient breaks caused by silting and roof collapse were observed but the vast majority of breaks were modern. It

seems reasonable to conclude that the tomb robbers were discarding most of the damaged material during their excavation and their rough treatment of the damaged goods resulted in additional breakage. Pot 1 from X30SE (Fig.13), provides one example of an ancient repair. The fact that there are only two mend holes in this large bowl indicates that it was cracked in antiquity but not broken before the vessel was placed in the chamber.

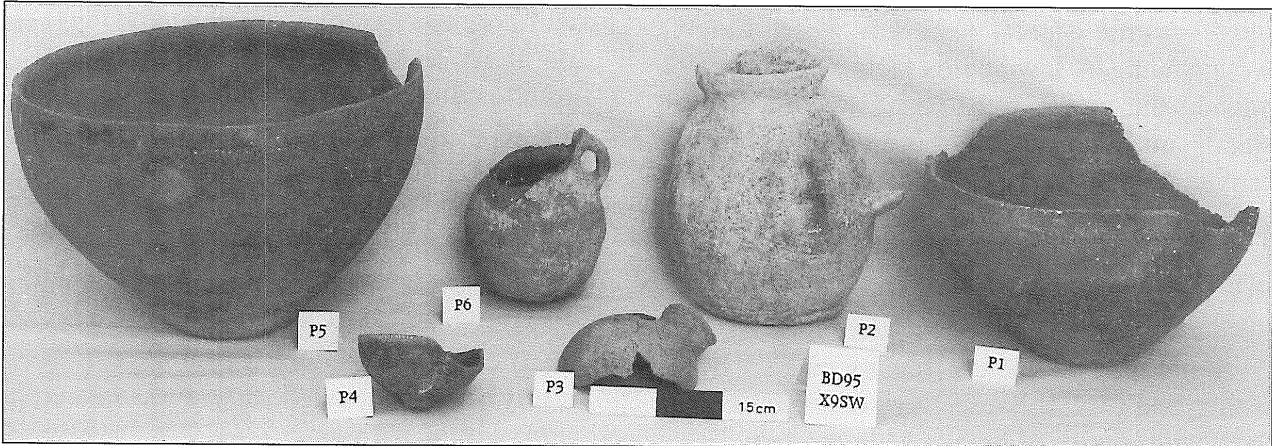
Large and medium "V" shaped bowls are the most common forms but medium jars, small bowls, and juglets are also well represented (see Figs. 8, and 13-19). A cursory analysis of the pottery assemblage indicates that it closely resembles the assemblages of early to middle EBIA tombs from Cemetery A at Bāb adh-Dhrā' (Lapp 1968; Schaub 1981a; Schaub and Rast 1989). A detailed analysis of the pottery assemblage is currently being conducted and should appear in print within one year.



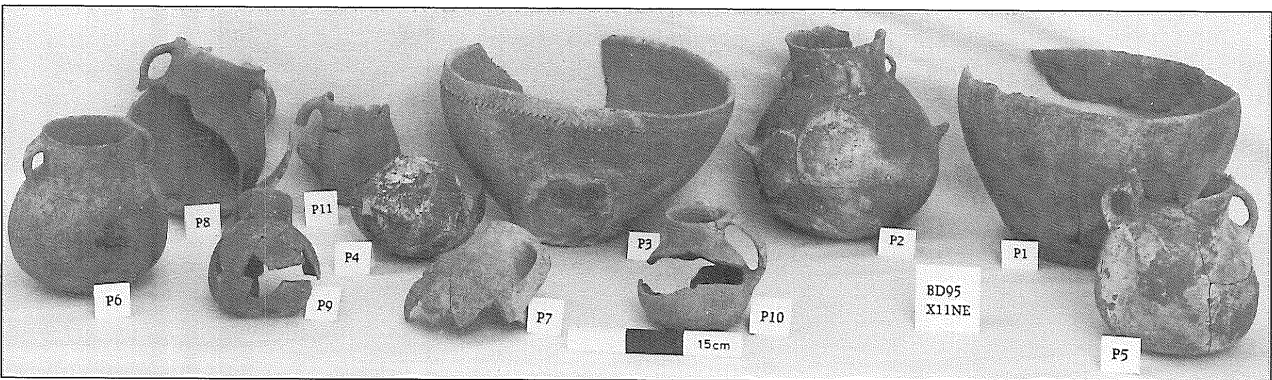
13. Tomb X30SE, ceramic assemblage.



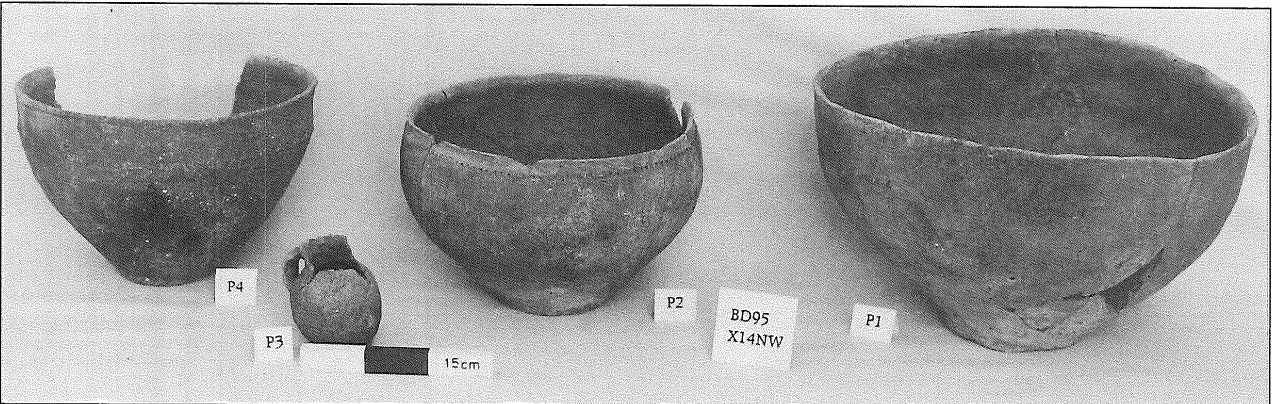
14. Tomb X9NW, ceramic assemblage.



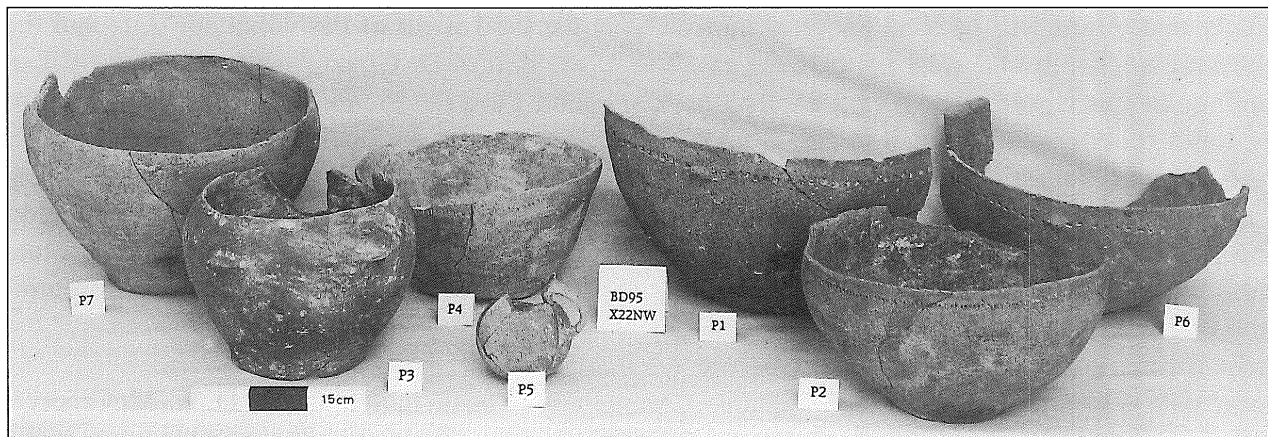
15. Tomb X9SW, ceramic assemblage.



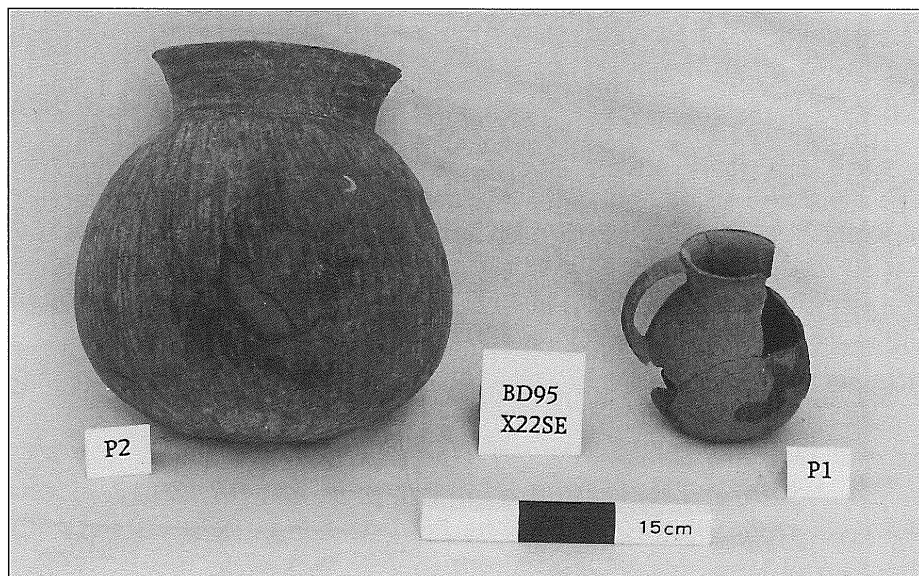
16. Tomb X11NE, ceramic assemblage.



17. Tomb X14NW, ceramic assemblage.



18. Tomb X22NW, ceramic assemblage.



19. Tomb X22SE, ceramic assemblage.

Conclusions

It is dangerous to claim definitive conclusions from the results of a salvage operation, especially one that relies strictly on observations of robbing activity as in this case. Nevertheless, a number of relatively secure conclusions can be deduced at this point.

- 1) The shaft tomb and burial typologies, as well as grave good assemblages, date these burials to the EBIA Period (see Schaub 1981b; Fröhlich and Ortner 1982).
- 2) The ceramic typology suggests that Cemetery X is contemporary with, and a southern extension of, the early to middle EBIA burials of Cemetery A (Lapp 1968; Rast and Schaub 1980:32-34; Schaub 1981a; Schaub and Rast 1989).

- 3) The placement and distribution of tombs indicate that Cemetery X was used as intensively as was Cemetery A and that several hundred to several thousand unexcavated tombs lie to the S, SW, and W of the area described in this report.
- 4) Although the Bāb adh-Dhrā' cemetery has sustained an alarming amount of damage in recent years, claims that nothing remains *in situ* in the cemetery are exaggerated.

It is quite clear from this brief field operation that very early, well preserved EBIA burials are to be found S and SW of the Bāb adh-Dhrā' A Cemetery. Although it seems doubtful that the cemetery extends all the way to the Arab Potash City, it does seem

likely that tombs will be found several hundred meters south and west of the area examined in this report. The recent explosion of tomb robbing activity at Bāb adh-Dhrā', aṣ-Ṣafi, and Feifeh coupled with the ambitious development plans for this region in the postpeace era, presents a compelling argument for intensified efforts to protect the antiquities of the Southern Ghawr and conduct further scientific investigations before more data is lost.

Acknowledgements

The salvage project was made possible by

the hard work of the volunteer staff and the support of Dr Ghazi Bisheh, Dr Pierre Bikai, and Glen Peterman. A word of thanks is also due to the Fulbright Commission and Dr Zeidan Kafafi and his staff for undertaking further study of the material and placing it on display at the Yarmouk University's Institute of Archaeology and Anthropology Museum.

D. W. McCreery
549 Hansen Ave.
Salem, OR 97302
U.S.A.

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MĀDABĀ PLAINS PROJECT 1994: EXCAVATIONS AT TALL AL-‘UMAYRĪ, TALL JALŪL AND VICINITY

by
Larry G. Herr, Lawrence T. Geraty
Øystein S. LaBianca, Randall W. Younker and Douglas R. Clark

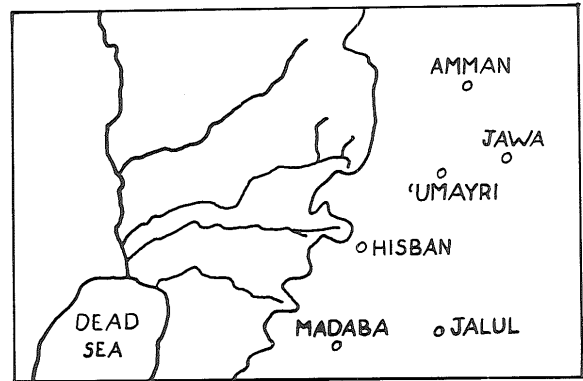
Introduction

A fifth season of excavation and survey by the Mādabā Plains Project occurred between June 17 and July 31, 1994. It was again sponsored by Andrews University in consortium with Canadian Union College, La Sierra University, Walla Walla College, with help from the Levant Foundation, Poland and Cincinnati Bible Seminary. Full reports have already been published for the first season of 1984 (Geraty *et al.* 1989) and the second season of 1987 (Herr *et al.* 1991a). Preliminary reports have also been published (Geraty 1985; Geraty *et al.* 1986-1990; Younker *et al.* 1990 and 1993; Herr *et al.* 1991b and 1994; LaBianca *et al.* 1995).

This season, a team of about 110 persons took part at various times in the interdisciplinary project, which included excavations at Tall al-‘Umayrī, surveys and soundings within a 5 km radius of ‘Umayrī, excavations at Tall Jalūl, and a survey within a 5 km radius of Jalūl (Fig. 1).

Once again the theoretical objectives of the project focused on cycles of intensification and abatement in settlement and land use in this frontier region between the desert and the sown, especially the involvement of the ancient Ammonites during the Iron Age. Central to this focus was the study of the food systems employed by the inhabitants through time (for a full discussion of this theoretical framework, its history, and previous work done in the region see Geraty *et al.* 1986: 117-119).

The implementation of these objectives were refined during the 1994 season by enlarging the regional survey to six teams, each with its own primary objective; by

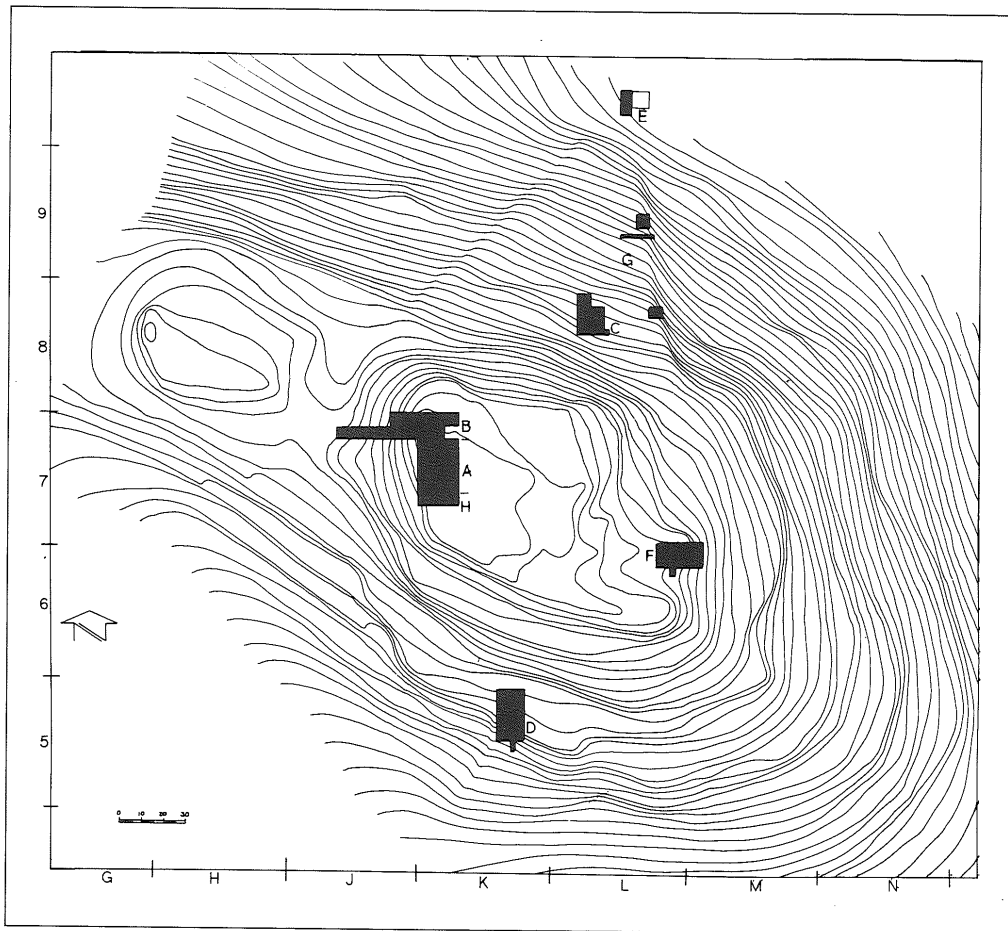


1. Map of the Mādabā Plains region.

probing deeper in the fields of excavation at Tall al-‘Umayrī; and by expanding excavations at Tall Jalūl, the central site of the eastern Mādabā Plain during the Bronze and Iron Ages.

STRATIGRAPHIC EXCAVATIONS AT TALL AL-‘UMAYRĪ

In 1984 four fields of excavation were opened (Fields A, B, C, and D) (Fig. 2). In 1987 three of the four were expanded (Fields A, B, and D), one was completed (Field C), and two new fields were opened (Fields E and F). In 1989 one was expanded (Field A), three reopened old squares and expanded slightly (Fields B, D, and F), another reduced excavation from two squares to one (Field E), and another field was opened on the north slope (Field G). In 1992 three fields deepened previously opened squares (Fields A, D, and F), one deepened existing squares while expanding by one square (Field B), and two fields were discontinued (Fields E and G). This season, excavations went deeper in Field A, expanded and deepened in Field B, and added Field H south of Field A.



2. Tall al- 'Umayri:
Topographic map
with fields of ex-
cavation.

Field A: The Ammonite Administrative Complex (John I. Lawlor)

Previous excavation on the western rim of the site has produced a significant administrative complex of buildings from the end of the Iron Age and the Persian period. Small hints of Iron I and early Iron II material were found in four squares. This season, the three squares farthest north were deepened to reach Iron I remains in order to connect with the architecture of that period in Field B. These included 7K70 at the northwest corner of the field, 7K71 immediately to the east, and 7K72 at the northeast corner of the field. There is now evidence for thirteen phases stretching from the Late Bronze Age to Ottoman times. However, this season, excavations did not deal with the earliest phases. Because of inability to connect the phasing of the major administrative buildings in the southern part of the field

with that to the north, the stratigraphy for the northern portion of the field has been re-numbered with a capital "N" following the phase number.

Field Phase 9N (FP 10 in the 1992 reports). The top of the bricky destruction debris of the early Iron I settlement made up this phase. No floors were reached. The southward sloping of the top of the destruction debris suggests that it came from a building to the north in Field B.

Field Phase 8N (FP 9 in the 1992 reports). On top of the sloping destruction layers of Phase 9 the plaster surfaces of this phase were laid. No walls were uncovered to go with the surfaces, but they contained Iron I pottery.

Field Phase 7N. After layers of fill were added to level the sloping surfaces of Phase 8N,

the eastern portion of a building apparently dating to Iron I was found. So little was in our excavated area, however, that neither its size nor function could be clearly determined. A stone bench may have been constructed on the exterior of the building.

Field Phase 6N (FP 8 in the 1992 reports). After a period of abandonment, a new surface was laid in the building found in Phase 7N. It may have been connected with part of a storeroom found immediately to the northwest in Field B in 1984 (for a plan see Herr *et al.* 1991: 62). East of the building was a rectilinear stone line that may have been a border for a small lane next to the building. Farther east were several wall fragments, probably of domestic buildings. The pottery dated to the early Iron II period.

Field Phase 5N (FP 6B in the 1992 reports). This is the first phase of the late Iron II to Persian administrative complex and associated domestic buildings (for a plan see LaBianca *et al.* 1995: 105). To it belongs a large room in the northeastern part of the domestic building immediately adjacent to the public buildings. Only an exterior exposure surface was found in use with the walls.

Field Phase 4N (FP 5 in the 1992 reports). The room of Phase 5N was sub-divided by a wall (already in the plan in LaBianca *et al.* 1995: 105), probably to support a roof or second story, and a plaster surface was laid. On this surface was found a corpus of typical Ammonite pottery vessels, including seven cups, five triangular-shaped bowls, two hemispherical bowls, and four lamps (Fig. 3). The cups and bowls all had simple rims with a ridge below the rim exterior, typical of one strand of Ammonite bowls. Moreover, all seven cups were made by the same potter so they would neatly nest inside one another. The same was true of the triangular bowls and the hemispherical bowls. The lamps were virtually identical in shape,

typical of the Iron II–Persian transition.

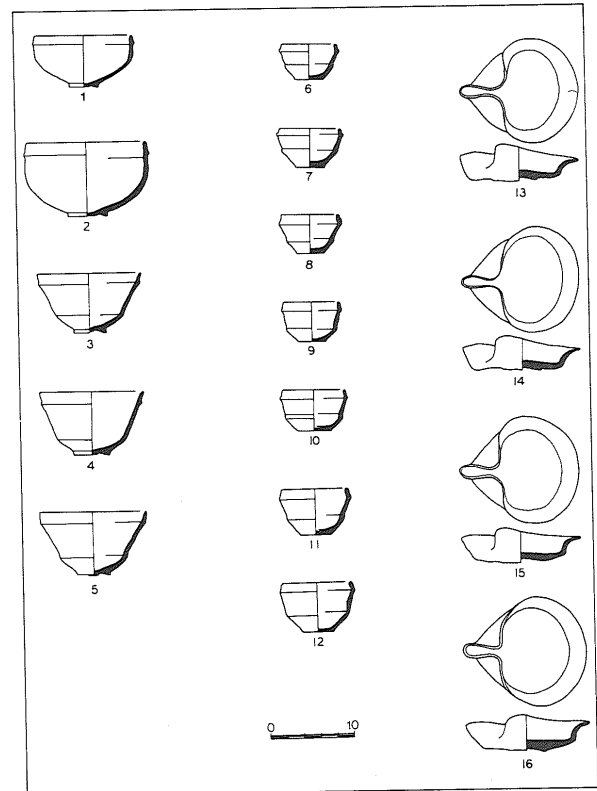
Field Phase 3N (FP 4 in the 1992 reports). Several minor adjustments were made to the architecture of the domestic complex of the preceding phases. Finds on the associated floors confirmed the domestic interpretation of the rooms and the Early Persian date.

Field Phase 2N (FP 2 in the 1992 reports). The ritual pool (see Herr *et al.* 1991: 38-40 for photographs) was dismantled this season. Among the stones in the foundation was a fragment from a Late Hellenistic fish plate, confirming its post-Persian date (most likely Early Roman).

Field Phase 1N. This phase included a pit dug into the area following the 1987 season.

Field B: The Western Defenses and NW Domestic Quarter (Douglas R. Clark)

Work centered on two goals in Field B



3. Cache of Ammonite pottery from floor in Field A.

this season. Outside the fortification wall at the top of the western slope a section was cut through the rampart to determine its construction and the date of its retaining wall. This work attained bedrock in the complete section except for the debris beneath the retaining wall. The second goal was to expose more of the extremely well-preserved transitional LB/Iron I city in the northwest corner of the site to help suggest a city plan and to collect more evidence of material culture and perhaps make suggestions regarding the massive destruction of the site.

Field Phase 12. Late in the Middle Bronze II period a massive rampart system was constructed on the western side of the site, if not around the complete site (Fig. 4). Moreover, because the bedrock topography of the hill upon which the original EB town was built was only slightly higher than that immediately outside the town to the west, the rampart builders increased the apparent height of the rampart by digging a dry moat almost 5 m deep through the bedrock ridge which connected the site to the hills to the west (Fig.4:no.15). By lowering the point at which the rampart began to ascend, it could be steeper and higher (Fig.4:no.10). The bottom of the moat was flat and cleanly cut, but the sides were apparently not. No sign of a retaining wall was found for the rampart and it would seem that the rampart began its slope from the eastern edge of the dry moat bottom.

The rampart itself was only clearly defined near the top. The western, lower segments were destroyed when bedrock collapsed during an earthquake dated to about 1200 BC. Subsequent erosion destroyed virtually all of it except in pockets. The top of this rampart was discovered in a sounding beneath a later casemate room (Fig. 4: no. 6). The latest pottery from the rampart belonged to the very end of the Middle Bronze Age and included Chocolate-on-white ware.

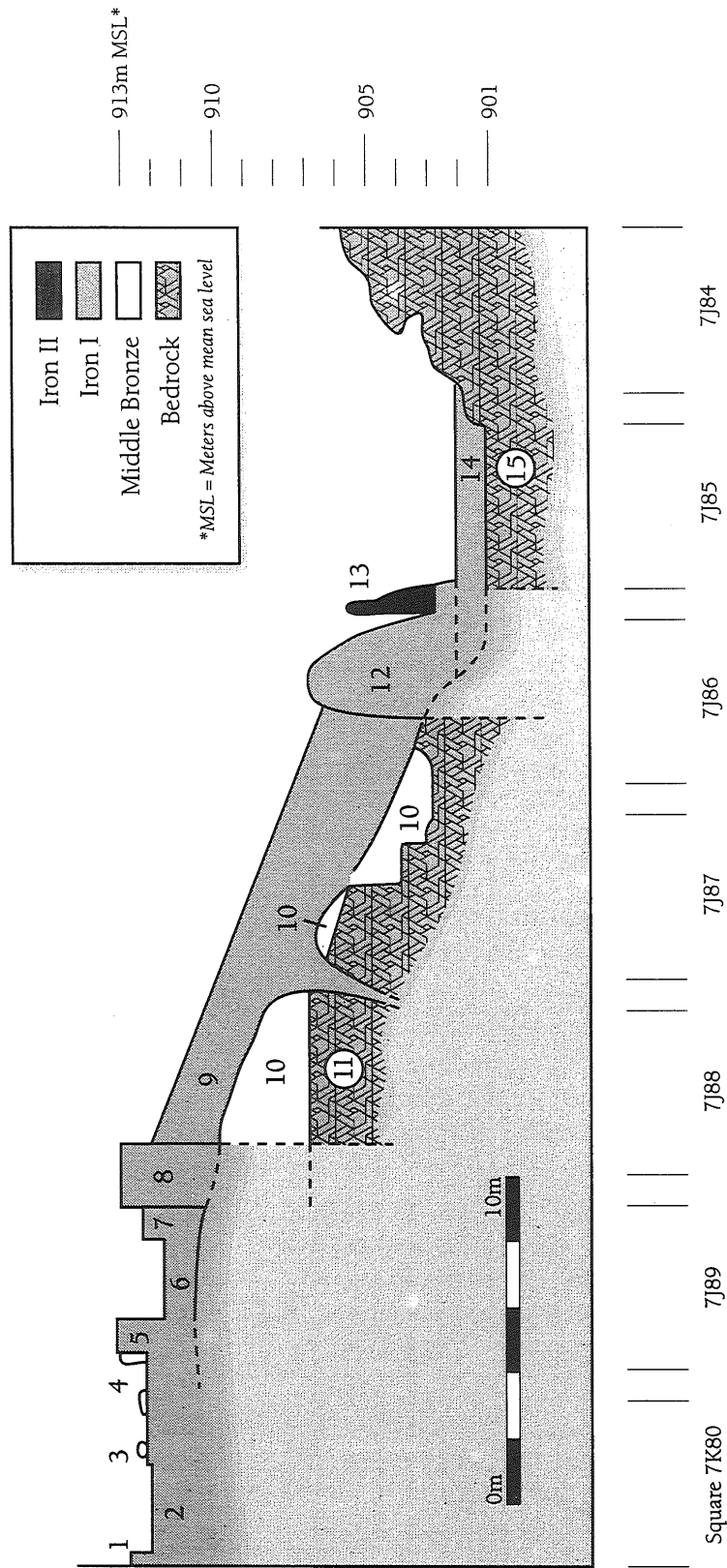
Field Phase 11B. This phase is inferred from later rampart deposits. That is, when the LB/Iron I rampart was built on top of the MB IIC rampart, it included LB/Iron I pottery from a settlement that must have been present prior to the construction of the rampart and the city that went with it (Phase 11A). Phase 11B was destroyed by an earthquake which caused the erosion of the MB IIC rampart by the collapsing bedrock beneath it.

Field Phase 11A. The earthquake which brought about the end of Phase 11B forced the construction of a completely new fortification system and city within it. Most of the moat was re-excavated, leaving about one meter of MB IIC debris in the bottom (Fig.4:no.14). A brand new rampart (Fig. 4: no. 9) was supported by a retaining wall at the bottom (Fig.4:no.12); it filled the bedrock fissures opened by the earthquake. The rampart ran up to the outer wall of a casemate fortification system (Fig. 4: no. 8). One of the casemate rooms had been excavated in previous seasons (Fig.5: Room A3). This season, a second casemate room was excavated (Fig.5: Room B4). The southern third of the room was paved with flagstones and two stones, which may have supported wooden posts that held curtains at one time, separated the stone pavement from a dirt floor in the northern part. The room was lined with ca. 20 collared pithoi. If these two rooms constitute a true casemate wall system, it is the earliest one so far known from Palestine.

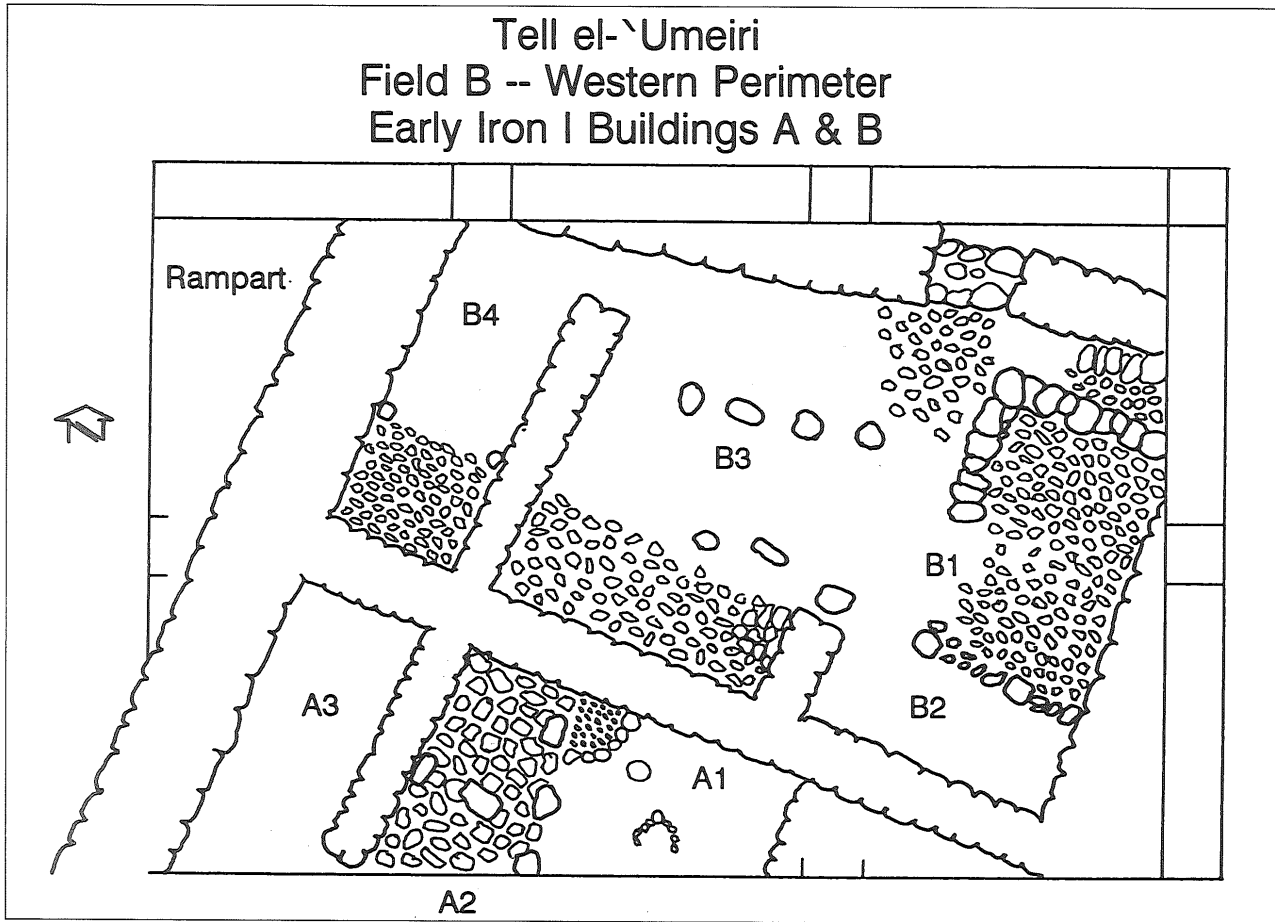
The casemate rooms were actually parts of houses lining the periphery of the site. Building A (made up of Rooms A1, A2, and A3 on Fig. 5) was excavated in previous seasons. This time, Building B was uncovered in a four-room house plan (Fig. 5: Rooms B3 and B4). Room B3 was actually made up of three rooms separated by wooden posts for which we have found the stone bases. The side rooms of Room B3 were paved with flagstones but very few artifacts were found

Tell el-'Umeiri

Section of Western Defense System-Field B



4. Section sketch of the fortification system at the western slope of Tall al-'Umayri.



5. Sketch plan of the LB/Iron I buildings in Field B at Tall al- 'Umayri.

on the floors. It is unclear at present where the eastern end of Building B is to be located. The well constructed doorway in the northern wall of the building suggests yet another building to the north (to be excavated next season). If so, this is an exterior doorway. It may be suggested tentatively that Rooms B1 and B2 actually comprised a courtyard with access to two houses, one to the west (Rooms B3 and B4) and one to the north. The ephemeral walls in Room B1/B2 may have been animal pens, but, again, very few finds were made on the floor. An alternative suggestion for the threshold leading out of Room B1/B2 is that it was the main door to Building B from a street immediately north of our excavation.

The destruction of this city was violent and immediate. In some places over two meters of destruction debris covered the floors. The lowest levels of the destruction con-

tained scores of burned wooden beams, piles of seeds, and discolored bricks from the upper portions of the walls (the second story—the stone portions of the walls are already preserved over two meters high in places). Many objects tumbled into casemate Room B4 from the second story. Approximately 20 more collared pithoi covered those already lining the edges of the room; four bronze weapons were found in the debris, as was an alabaster vessel and the burned, scattered bones of at least two individuals caught and burned in the destruction. The pottery from the destruction is virtually identical to that found in the rampart and dates to the very end of the Late Bronze Age and the very beginning of Iron I.

Who built this city and who destroyed it? It is possible from the literary sources to suggest several alternatives. The most obvious choice for the builders would be the emerg-

ing Ammonites who were clearly in this territory by Iron II, but were probably already present in Iron I. An important alternative would be the Israelite tribe of Reuben as suggested by Cross (1988). Other possibilities include the Amorites connected with the kingdom of Sihon as mentioned in *Numbers 21*. The ceramic finds cannot be used to suggest ethnicity, but it should be remarked that they fit the assemblages of other highland sites rather than those of coastal and valley sites. The destroyers could have been Ammonites, Israelites, Midianites, or even the Egyptians under Merneptah.

Field Phase 8. A phase of pits dug into the Phase 11 destruction and filled with Late Iron II debris had been discovered in 1984 (Geraty *et al.* 1989: 254, plan). Two more pits were excavated this season, widening the area in which pits were found to about 4.5 m east-west by 3.0 m north-south. The pits were not all contemporary because some of them were dug into each other. Most likely they were garbage pits dug by the early founders of the administrative complex in Fields A and H.

Field Phase 7. In 1984 a stone-lined silo was assigned to this phase (Phase 2 in 1984; Geraty *et al.* 1989: 254-255). This season several architectural fragments were tentatively ascribed to the phase, but, because of their fragmentary nature and the lack of surfaces, no coherent picture could be gained. The walls were found primarily in one square on the easternmost fringes of the field. The pottery found in two associated earth layers was Late Iron II to Early Persian.

Field Phase 6. Previous excavation uncovered fragmentary walls and surfaces to which more wall fragments were added this season. The resulting picture includes a possible alley between two rooms. The presence of domestic objects on the floors suggests that function for the rooms. The pottery was

typical of the Late Iron II to Early Persian horizon at al-'Umayri.

Field Phase 5. Above one Phase 6 wall was another that we tentatively identify with Phase 5, another Early Persian phase. However, no other evidence can confirm this date.

Field Phase 3. The ritual pool dismantled in field A (Phase 2N) also extended into field B. Its height from the top of the surviving plaster step to the bottom of the stone foundation was almost two meters.

Field Phase 2. In earlier seasons a large trench pit surrounding the ritual pool was excavated. It contained many significant artifacts (Clark 1991: 72-72, Phase 1). This season, three earth layers were associated with this phase, though they were found north of the trench-pit. Objects were, however, relatively rich, including a figurine fragment, a seal impression (object no. 5080), and a spindle whorl.

Field Phase 1. Topsoil included two ephemeral wall lines that were probably related to nomadic camps or agricultural fields. One of the walls was at least 10 m long. The latest pottery in topsoil was Byzantine.

Field H: The Southwestern Administrative Complex (Lloyd A Willis)

In 1989 and 1992, ground penetrating radar examined the unexcavated area to the south of Field A. The results suggested more walls of similar size and orientation to those already discovered in Field A. Thus, a new field was laid out with the ultimate purpose of connecting Field A to the southern edge of the site and exposing more of the thick-walled administrative buildings that seemed to extend south of Field A. Three squares were opened immediately south of Field A: 7K30 in the west, 7K31 in the middle and 7K32 in the east. All squares found significant re-

mains of late Iron II and Persian architecture.

Field Phase 8. This included a very thick wall (almost 2 m wide) that may be the western wall of the administrative compound or perhaps served a double purpose duty as a site fortification wall, as well. No surfaces were reached, but the pottery in the fills around the wall was late Iron II-Persian.

Field Phase 7. Additional walls were added to the large Phase 8 wall, but the excavated area was too small to make a coherent plan and ascribe a function. Still no surfaces were found. The pottery again dates best to the late Iron II and Early Persian period.

Field Phase 6. Walls from this phase were found throughout Field H and probably represent a major building of the administrative complex. However, the remains can not yet be related securely to the phasing of Field A. It may be that they represent the second of the major periods of the complex. Pottery again dates to the late Iron II and Early Persian periods.

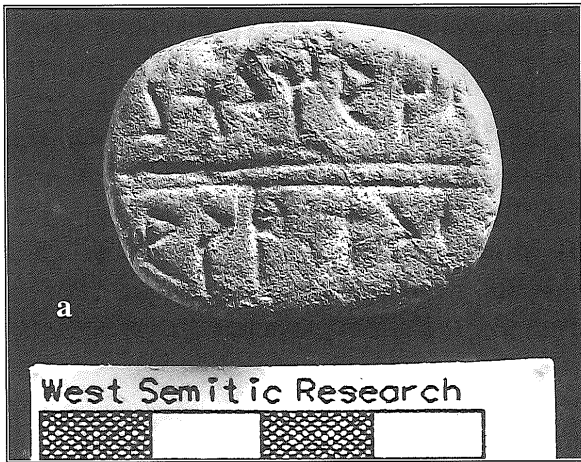
Field Phase 5. This phase included minor adjustments to the walls of Phase 6 and some robbing of walls.

Field Phase 4B. Two large parallel walls stretched across the field from east to west and were probably part of a new administrative structure. One of the floors may have been paved with flagstones. For the first time, one of these buildings extends east of our excavated area. Future excavation to the south will undoubtedly expose an impressive structure. A possible tower was erected at the western edge of this structure at the perimeter of the site. Pottery was consistently Early Persian in date. Small additions to the walls were labeled as Phase 4A.

Field Phase 3. Modifications to the walls of Phase 4 comprised Phase 3.

Field Phase 2. Again, the major walls of the two preceding phases were reused, but with an entirely different function. Apparently, the administrative functions had ceased. Instead, a bin, suggesting domestic occupation, was added to one of the rooms. Also a small building seems to have been built west of the main structures. This reuse of the administrative area by residences confirms similar observations from Field A. The pottery was still Early Persian, however.

Field Phase 1. After the site was abandoned long enough for all walls to be destroyed, the top of the tall was converted to an agricultural field by constructing a terrace wall and clearing the field of small stones. These stones were thrown over the side of the mound and covered the ancient walls in the western part of the field. Among the broken pottery and stones thrown over the walls were large amounts of artifacts, including 14 grindstones, nine figurine fragments (especially objects no.5029: horse's head with painted bridle; no.5030: lion's head; no.5055 and no.5081: anthropomorphic fragments) and one coin. Objects from other locations in topsoil included a pair of silver earrings (object no.5120); an anthropomorphic figurine of a male rider (object no.5126); and a bull's head figurine (object no.5127); 11 grindstones or fragments of mortars; a jar handle with a seal impression (object no.5154); several jewelry items (beads, bead fragments and bracelet fragments); a needle fragment (object. no.5109); two scaraboid seals (object no.5009 [with an inscription reading *l'ln bn brk'l*: Figs. 6 a and b] and no.5167; the latter depicted a Mesopotamian figure); a trilobate arrowhead (object no.5018); fragmentary figurines included several anthropoid ones (one was a man with a sash: object no.5046); a life-size human nose, (object no.5039); an LB female plaque (object no.5216), and several zoomorphic figurines (objects no. 5042, no.5043, and no. 5045).



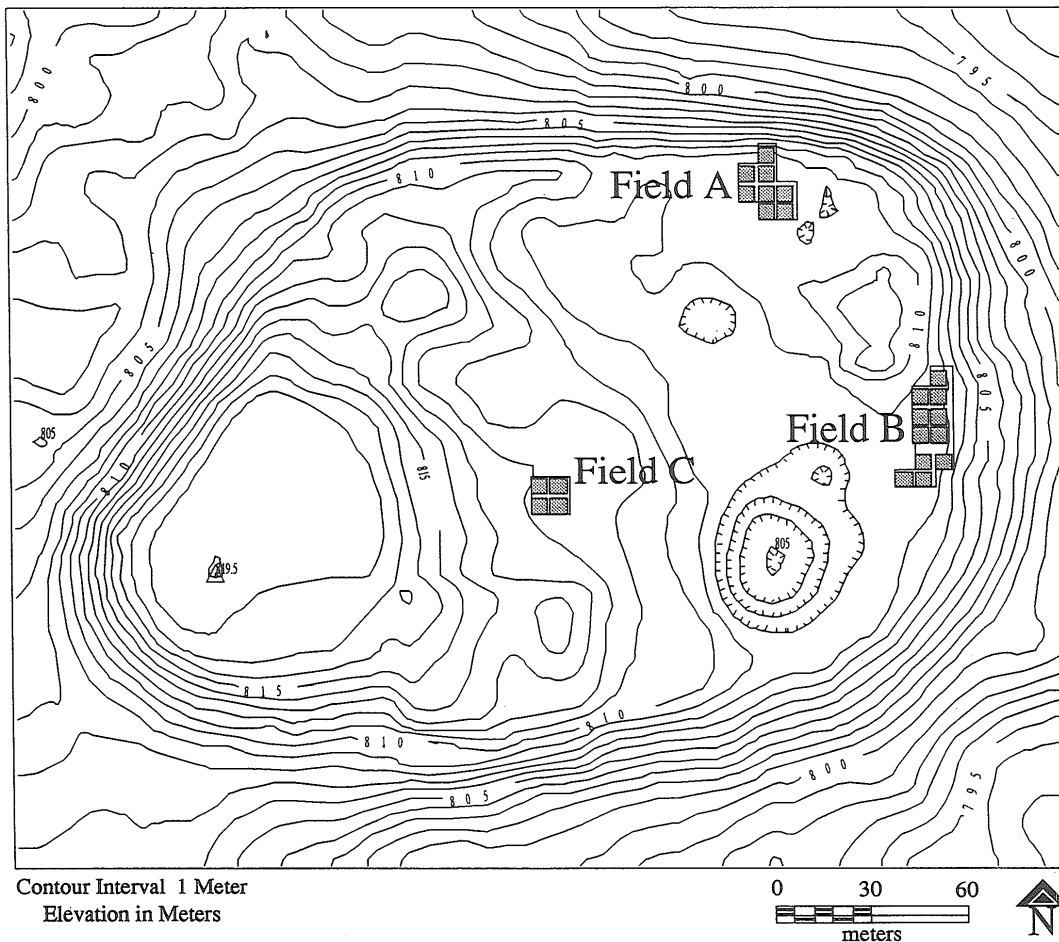
6a and b. Inscribed seal from Field H. (Photos by B. Zuckerman).

TALL JALŪL

In 1994 excavations at Tall Jalūl (directed by R. Younker and D. Merling) were continued in both Fields A (north side of the tall) and B (east side of the tall), while a new field, Field C, was opened in the center of the tall, just below and east of the acropolis (Fig. 7).

Field A: Northern Buildings
(Zeljko Gregor)

Field Phase 14. As in the 1992 season, the earliest phase was represented by a series of wind-blown (?) ashy lenses containing a significant number of Iron I pottery including carinated bowls and collared-rim store jars.



7. Topographic map of Tall Jalul with fields of excavation.

Field Phase 13. The earliest architectural phase included a small domestic (?) building with three partially preserved walls of roughly-hewn stones located in the western part of the Field. A portion of a plastered floor sealed against one of the walls. Ceramics under the walls and floor date this room to about the ninth century BC.

Field Phase 12. The next phase was a period of abandonment represented by a layer of debris accumulation on the surface of the plastered floor of Phase 13.

Field Phase 11. The room of Phase 13 was rebuilt; portions of three well constructed limestone walls survived from this architectural phase which is dated by pottery to about the eighth century BC.

Field Phase 10. Another period of abandonment occurred during which some of the stones from the walls of the building of Phase 11 were robbed.

Field Phase 9. What appears to be a tripartite pillared (or four-room) building was excavated in the two eastern most squares of field A (Fig. 8). While some of the monolithic stone pillars had fallen over toward the northeast (earthquake activity?), four of them were still *in situ*. The central room had a floor of hard-beaten earth, while the side

rooms, which paralleled the central room, were paved with flagstones. The western wall of this building (which was the most exposed) was 12 m long. Pottery under the flagstones included well-known seventh century BC Assyrian bowls. Figurines (Fig. 9a-d) from this phase included: a head of a crowned male similar to the statues and figurines in the Amman region; the upper portion of a typical female figurine; a lion figurine; and fragments of a couple of 'horse and rider' figurines.

Field Phase 8. This is an abandonment phase represented by accumulated debris found below the Iron II/Persian period pavement of Phase 7.

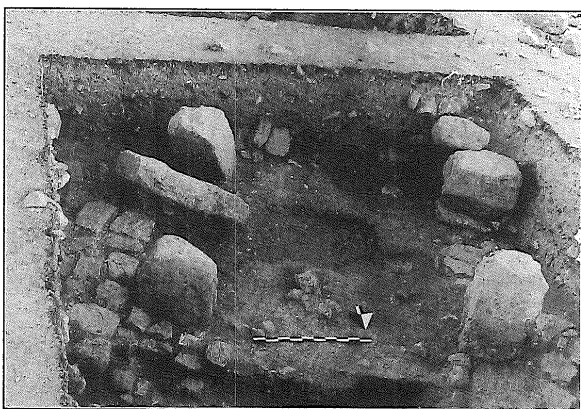
Field Phase 7. This phase was made up of a pavement west of the pillared building of Phase 9. Pottery under the pavement dated it to the late Iron II/Persian period.

Field Phase 6. A destruction/abandonment phase consisting of rock tumble and ashy layers succeeded the pavement of Phase 7.

Field Phase 5. In the western portion of Field A was uncovered a poorly built, semi-circular wall of uncertain purpose. To the north of it and running in an east west direction was a well built wall of an apparently separate building. Both of these structures dated to the Persian Period (fifth- fourth centuries BC).

Field B: The Gate Complex (James Fisher)

Field Phase 7. A paved approach ramp from the early Iron II (tenth/ninth century BC) was discovered during the 1992 season. This year we continued to trace it south west up the slope to the crest of the tall to the threshold of what appears to be an outer gatehouse of the city gate (Fig. 10). Three of four piers still survive. The stones of the main city gate, itself, appear to have been robbed out, probably during Phase 5 (below). One east west



8. Monolithic pillars of the tripartite pillared building at Jalül.



9a-d. Figurines from Tall Jalul, Field A: a) crowned figurine playing flute; b) female figurine; c) lion figurine; d) horse's head from "Horse and Rider" figurine.

line of large stones located immediately south of the outer gatehouse, may have been part of the main gate, although the stratigraphic position of this wall line remained uncertain at season's end.

Field Phase 6. This phase comprised a destruction/abandonment phase of nearly a meter of debris which accumulated over the architectural remains of Phase 7. The pottery from these layers dated to early Iron II



10. Early Iron II paved entry and outer gatehouse in Field B at Tall Jalūl.

(ninth/eighth centuries BC).

Field Phase 5. In addition to parts of the paving stones of the approach ramp and its associated retaining wall on the west side (discovered during the 1992 season), it appears that much, if not most of the city gate of Phase 7 was robbed.

The remaining phases correspond to those reported in 1992; there are no significant details to add to last season's report.

Field C (Penny Clifford and Richard Dorsett)

Field Phase 10. The earliest architectural phase was found in Square C4 where a short segment of a well-built wall running in a north-south direction was uncovered. Although it was not possible to date the wall this season, its position directly under an Iron II wall and the occurrence of mudbrick collapse with Iron I (and earlier pottery) immediately to the west suggests it could date to Iron Age I.

Field Phase 9. Collapsed mudbrick in Squares C3 and C4 containing Iron I sherds (and earlier forms) suggests the destruction of an Iron Age I building. The stone wall line of Phase 10 found in C4 may represent part of the foundation for this building. Objects within the debris included a number of stone, glass, and frit beads from a necklace, a couple of oil lamps, and the base of a chalice.

Field Phase 8. A short stretch of a stone wall dating from Iron Age II was found in Square C4 immediately above (although slightly to the west) and in the same orientation as the Phase 10 stone wall. The wall was approximately 0.75 m in width.

Field Phase 7. This phase represents the destruction of the Phase 8 wall.

Field Phase 6. A well-built stone wall which ran in a north-south direction across the entire length of Square C2 (5 m) and halfway through Square C4 was founded in the destruction of Phase 7. It was oriented in the same north-south line as the Iron I (?) and Iron II walls in Square C4. It appears to represent the first architectural phase of the eastern wall of a Persian period building of uncertain purpose. In Square C2, on the well-beaten earthen floor of this building, was found a stone roof roller. A small, approximately 10 cm square limestone altar was found within the debris of Square C1 (Fig. 11).

Field Phase 5. A second architectural phase of the Phase 6 building appears to consist of a small stretch of wall in Square C4 which abutted the southern end of the Phase 6 wall,



11. Side view of a small stone altar from the Persian period at Tall Jalūl.

and then formed a corner which turned to the west in Square C4. Part of this westward running wall appeared in the northeast corner of Square C3.

Field Phase 4. Debris from the destruction and abandonment which followed Phase 5 comprised this phase.

Field Phase 3. The bottom-most course of a poorly constructed wall, which ran across Square C2 in the same orientation as the Iron I (?), Iron II, and Persian walls, was dated to the Late Persian period.

Field Phase 2. This phase included a fairly long period of abandonment after the ephemeral structure of Phase 3 went out of use.

Field Phase 1. This phase included the recent accumulation of topsoil and subsurface debris.

HINTERLAND INVESTIGATIONS

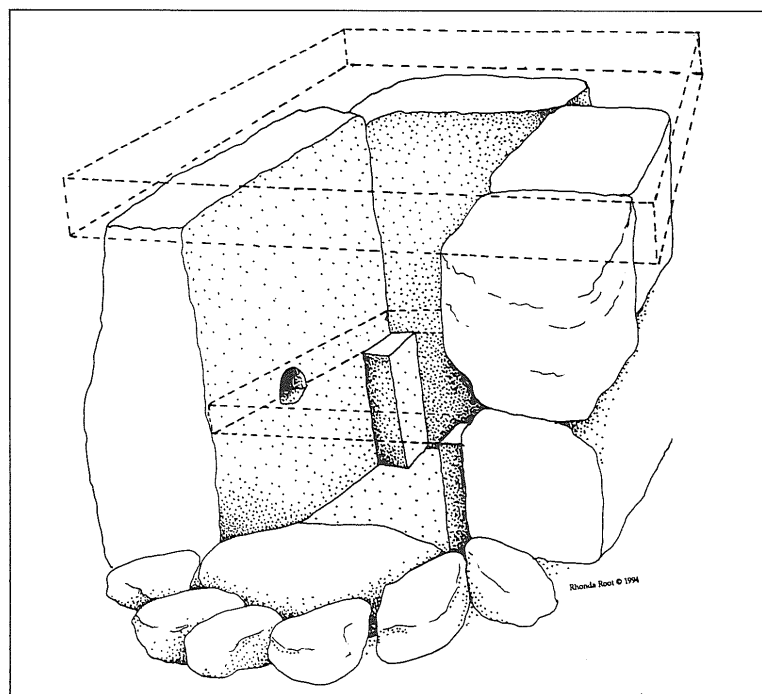
Seven hinterland teams investigated separate archaeological problems in the al-'Umayri region. They included dramatic tomb finds from the Bronze Age on the

southern slope of Tall al-'Umayri; a very well-preserved rural agricultural site ca. 2 km south of al-'Umayri; the determination that the Khirbat Rufeis cave inscription dates to the Early Islamic Age; two detailed surface surveys of both al-'Umayri East and al-'Umayri North; a random squares survey of the Tall Jalul region; and an ethnographic survey which included the reconstruction of ancient cisterns for modern use.

Funerary Sites near Tall al-'Umayri (Bogdan Dabrowski)

Three funerary sites were investigated, two on the southeast slope of Tall al-'Umayri and one across the highway in the valley southeast of the site. All were from the Bronze Age.

Megalithic Tomb. The most remarkable funerary find was a U-shaped structure constructed of very large hewn stones, similar to a dolmen (Fig. 12). Indeed, the only factor causing us to be somewhat hesitant in classifying it as a dolmen is the lack of the top stone. However, a large stone that could have been from a dolmen is located on top of the site, standing on edge. The *in situ* struc-



12. Architectural plan and section of the megalithic tomb from Tall al-'Umayri.

ture measured 3.2 m long, 2.7 m wide, and 1.8 m high, while the interior measured 1.9 x 1.0 x 1.8 m respectively. The interior seems to have been divided into two chambers, one on top of the other, probably by means of wooden beams. The eastern side of the structure, now open, was at least partially built over, creating a kind of porthole.

The interior contained an impacted bone heap, with some traces of articulation, comprising twenty individuals based on the number of skulls. Among them were 20 complete ceramic vessels, including nine medium large-necked jars (some with ledge handles and columned spouts), two juglets, and nine small cups. A few contained line-painting. While the vessels were concentrated in two deposits which seemed to correspond to the two chambers in the tomb, the bones seemed to be limited to the upper chamber. All the pottery dated to EB IB. Additional finds included flint tools, two rows of beads, and three spindle whorls.

The exterior context of the tomb was difficult to determine owing to limited excavation. However, irregularly placed boulders were piled against the structure, suggesting its original form was possibly a cairn. A plastered surface may have surrounded the structure as well. No other remains of dolmens or other megalithic structures are visible at the site. The reason for the preservation of the tomb was its location on the lower slopes of an actively settled contemporary site; occupational debris eroded down the slope and covered the tomb, preserving its form and contents.

EB IV-MB IIA Cemetery. In a large shaft-tomb cemetery discovered by construction activities in 1992 and partially excavated by Waheeb and Palumbo (1993) our team surveyed the area of the cemetery extending ca 500 m north south and 400 m east west. Five shaft tombs were excavated. One contained a four-spouted lamp, the others a four-spouted lamp and a jug; a bronze dagger; two lamps

and a spindle whorl; and the last two lamps. Some of the tombs had MB IIA vessels, as well. Two cistern-like structures were also excavated. These contained large pottery fragments from EB IV to MB IIA and significant quantities of flint debitage. They thus seem to be contemporary with the shaft tombs and may indicate a settled population nearby (Waheeb and Palumbo 1993: 153). Another suggestion, based on the location of the tombs and cisterns in the same area, sees the cemetery itself serving as the settlement, that is, a seasonal campsite for pastoralists (Zohar 1992: 55). This is supported by the survey which found twice the number of cistern-shaped features than of tombs, indicating that to call the site exclusively a cemetery is improper.

MB IIC Cave Tomb. For the first time we have found a tomb related to a period when the site was occupied toward the very end of MB IIC when a rampart secured the city. The burial cave was entered by a stepped gangway. Inside the cave were 15 articulated skeletons, including one in a niche and four of children. Several intact vessels were found, including one platter, one carinated bowl, two round-bottomed jugs, one Chocolate-on-white jug, three dipper juglets, four jars, and one lamp; one dipper juglet was found inside a jar. One of the juglets had such a shortened form that it could suggest the tomb was used into the very beginning of LB I.

Sixth-Century BC Rural Complex (David C. Hopkins)

Earlier seasons of survey work in the al-'Umayri region have located scores of rural agricultural sites consisting of stone structures surrounded by food production and processing installations. One of these, surprisingly well-preserved, was fully excavated this season. Erected on bedrock and nearly 10 x 10 m square, it was constructed of large stones in a plan with five rooms

(Fig. 13). The occupants used a wide variety of ceramic vessels, including cooking pots, jars, jugs, and bowls. Scores of food processing implements included handgrinders, pounders, pestles, and a cylindrical installation hewn into the bedrock floor. Jewelry finds comprised bangles and beads. The building was tied into the larger production and distribution network of the region, probably organized by the contemporary administrative complex in Fields A and H at al-'Umayri. Two stamp seals and one scaraboid with an abedary inscription in Ammonite script suggest this was part of an Ammonite economic enterprise. One of the seals depicted a standing male figure dressed in a toga.

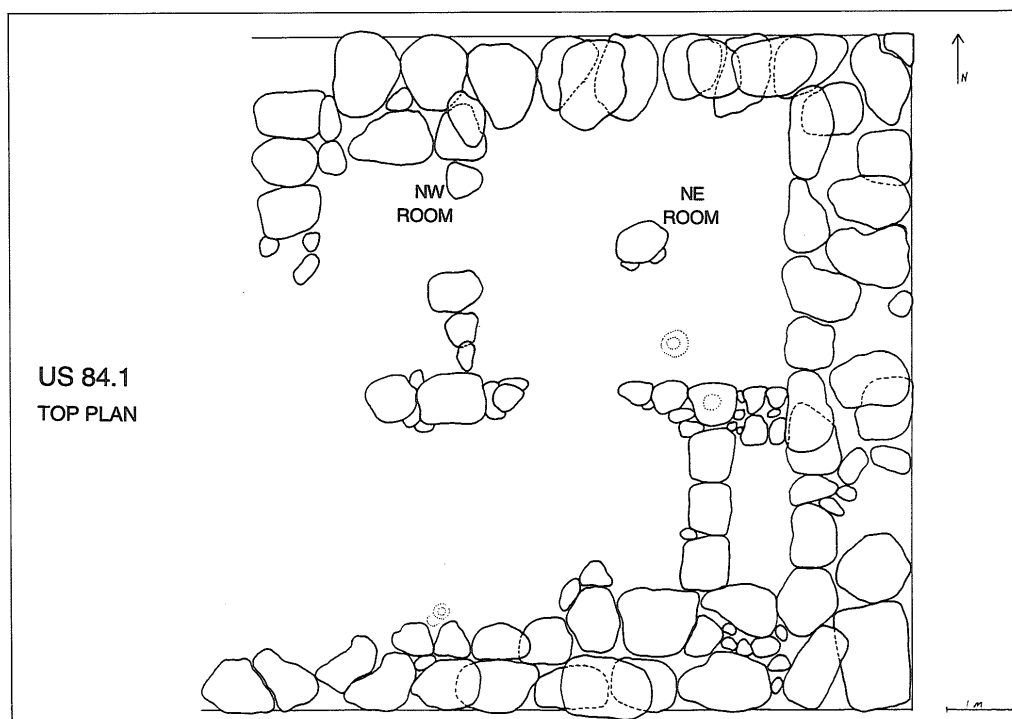
The building sat at the midpoint of a gentle but high slope with a good, but not strategic view of the broadening wadi bottom. Grapes were processed at the slope's rock-cut wine presses. The extent of the farmstead, the number of pressing and other installations, and the material culture of its central building join together to suggest a wine production complex established by or with the support of the administrative governors of the region, probably at al-'Umayri.

The building served as a manufacturing and managerial complex, an extension of urban investment in the rural zone.

The occupation of the site was terminated catastrophically: the fall from two internal walls demonstrated the collapse, crushing pottery *in situ*. Three occupants were apparently also trapped in the rubble. Partial skeletal remains of one infant, one young child, and one young-middle aged adult male came to light in the earth locus directly above the bedrock floor. There was no evidence of fire nor any indication for the cause of the collapse.

Khirbat Rufeis Inscription Cave (Paul Ray)

In the 1992 season a large inscription was discovered by our survey team in an easily accessible cave at Khirbat Rufeis south of Tall Jāwā. Several hundred large characters were clearly visible, etched into the hard plaster coating the walls of the cave which had apparently been used at one time as a cistern. The plaster was painted with a broad black band and then signs and symbols were



13. Plan of the sixth century rural site near Tall al-'Umayri.

etched into the plaster.

The cave is part of the Amman Silicified Limestone Formation, which consists of undulating layers of autobrecciated chert alternating with chalk and limestone. A rim sherd of Early Islamic date was found in the plaster bottom of the cave. Sometime later, probably during the Abbasid period, an earthquake caused the north side of the cistern to collapse and to be abandoned. An Abbasid coin was found just a few centimeters above the floor of the structure. The resulting open cave was reused by pastoralists for a seasonal habitation. It was during this time that the black paint was added to the wall of the former cistern and the scores of short inscriptions were added. There is now a tentative scholarly consensus that these are *wu-sum* (camel brands or tribal markings) from the late Early Islamic Age on, though a few may reflect earlier Safaitic/Thamudic signs.

Survey of al-‘Umayri East and North (Bogdan Dabrowski)

With the threat of development looming, an intensive survey was carried out to document as many archaeological features as were clearly visible on the surface of al-‘Umayri East, the ‘Classical Age’ site just east of a present airport Highway. A total of 43 features were recorded. The most outstanding include a northsouth wall ca. 94 m long straddling the hill abutted by an eastwest wall ca. 62 m long. Both walls appear to be of recent origin. Other features include 11 cisterns, 22 caves, and 10 quarries. Portions of a mosaic floor sealed against one of the cistern openings. A stone with a Byzantine cross engraved on it was found, as well. Thirteen coins were recovered using a metal detector. These included two Early Umayyad, seven Late Umayyad, and one Late Ottoman coins.

The survey of al-‘Umayri north was limited to a metal detector survey to relate the coins to cave features in the area. It yielded a total of 10 coins from the Roman, Umayyad,

Ayyubid, Mamluk, and Ottoman periods.

Random Square Survey of the Jalul Hinterland (Gary L. Christopherson)

An intensive surface survey of the hinterland of Tall Jalul covered the area within a 5 km radius of the site. The survey used the same methodology as was used in previous seasons in the random survey of Tall al-‘Umayri. A total of 50 randomly chosen 200 x 200 m squares were surveyed. Although a significant amount of pottery was collected by the survey team, no signs of ancient farmsteads, villages, or towns were found within the survey area. The survey findings contrast strikingly with the findings of the ‘Umayri survey, which produced about 50 archaeological sites within a comparably sized region.

Project Rainkeep (Dorothy Irvin)

Project Rainkeep seeks to heighten public awareness in Jordan of the continued viability of cisterns as a means to deal with the worsening water crisis. To this end, the Madaba Plains Project, in cooperation with the Adventist Development and Relief Agency and the Ministry of Social Development, has assisted residents with cleaning and restoring several ancient cisterns. Follow-up work in future seasons will determine the viability of the program.

Acknowledgments

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The land owner of Tall al-‘Umayri, Dr Raouf Abujaber, was again generous in fa-

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Thanks are also due each member of the

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Al-'Umayrī field Supervisors included John Lawlor (Field A), Douglas Clark (Field B), Lloyd Willis (Field H); for Jalūl they included David Merling, Zeljko Gregor (Field A), James Fisher (Field B), and Penny Clifford and Richard Dorsett (Field C). Survey personnel will be acknowledged in the next report. Roughly 90 supervisors of the squares, volunteers, specialists, and camp staff made up the remainder of the personnel.

L. G. Herr
 Canadian Union College
 Canada
 L.T.Geraty
 Atlantic Union College
 Ø.S. LaBianca
 R.W. Younker
 Andrews University
 D. R. Clark
 Walla Walla College
 U.S.A.

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THE FIFTH SEASON OF EXCAVATIONS AT TALL JĀWĀ (1994) A PRELIMINARY REPORT

by

P. M. Michèle Daviau

Introduction

The fifth season of excavations at Tall Jāwā, south of 'Ammān, took place from June 4 - July 24, 1994. As in preceding seasons, the excavations were sponsored by Wilfrid Laurier University and funded by a grant from the Social Sciences and Humanities Research Council of Canada.¹ The American Center of Oriental Research in Amman provided housing and invaluable research and logistical support during the season. Additional support and facilities were provided by the British Institute at Amman for Archaeology and History. Forty-one participants from Canada, the United States, Belgium and Jordan served as field and camp staff,² along with fifteen Jordanian workers who assisted with the field excavations. Dr Safwan Tell, then Director-General of the Department of Antiquities of Jordan, provided support and encouragement, while Nazmieh Rida Tawfiq³ served as representative of the Department. As in previous seasons, she greatly facilitated

our operations and made a significant contribution in helping us to achieve our research and excavation goals.

RESEARCH STRATEGY

Three distinct occupation phases were currently under excavation; the middle Iron Age II in Fields A-B and E, the late Iron Age II in Field C, and the Late Byzantine-Early Islamic period in Field D (Daviau 1994: Fig. 1). The focus of this season's excavation was first, to expose sufficient Iron Age remains to be able to classify, according to type, complete buildings in Fields A, C and E and to determine the characteristics of an Ammonite walled town. The particular strategy employed was to recover and document all artifacts and ceramic vessels from living surfaces in order to undertake a distribution study of finds that would facilitate the functional classification of activity sets within individual rooms, thereby contributing to an

1. A three-year grant was awarded for the period April 1992-1995 to investigate the Iron Age architectural traditions and town planning at Tall Jāwā. Additional funding was provided by Wilfrid Laurier University and by a generous gift from P. E. Dion.

2. The author was responsible for the overall research design and excavation strategy. In this, she was assisted by field supervisors R. DeFonzo (Field A-B), R. Hutson and S. Klassen (Field E), S. Thompson (Field C), and A. Tempest (Field D). J. R. Battenfield, Director of Survey and Documentation, undertook special projects (Tomb T1 and Drain B24:24). Square supervisors were M. Beckmann, L. Broadhurst, R. Chadwick, L. Cowell, T. Epp, L. Knuttilla, L. Manktelow, H. Mansur, M. Semple., S. Thibodeau, and S. Wakefield; D. Elder was square supervisor in training. K. Kane was pottery registrar; D. Beal registered artifacts; L. Cowell was in charge of ceramic technology and S.

Thompson registered samples. P.E. Dion was project epigrapher. K. Gerlach and T. Hellum were responsible for photography. R. Hutson served as administrative assistant and T. Cowell as camp manager.

3. Our deepest appreciation to Nazmieh Rida Tawfiq who generously contributed to the instruction of new team members, shared her expertise at pottery reading, and helped to make available earthmoving equipment to remove soil dumps from previous seasons.

Through the intervention of Dr Safwan Tell, then Director-General of the Department of Antiquities, the site was made safer for excavation with the removal of a mortar shell from Cistern D15:2 by the Jordanian Army Bomb Squad. Special thanks go to the owner of Tall Jāwā, Mr H. Talafiyeh, for his hospitality and support in arranging for local workers.

understanding of how those rooms functioned and, ultimately, how each building functioned as a whole.⁴ Secondly, new Squares in Field C-east were opened to investigate a heavily walled structure that dates to the end of Iron Age II and third, excavation in Field D was continued in view of the discovery (in 1993) that Building 600 was a two-storey Islamic house with a mosaic floor in the central court (Daviau 1994: Figs. 14 and 18).

Survey around the tall was limited due to increased construction of new houses. Salvage excavation of a Roman period tomb in Jāwā village was begun this season and will be completed in 1995.⁵

The Iron Age: Field A-B

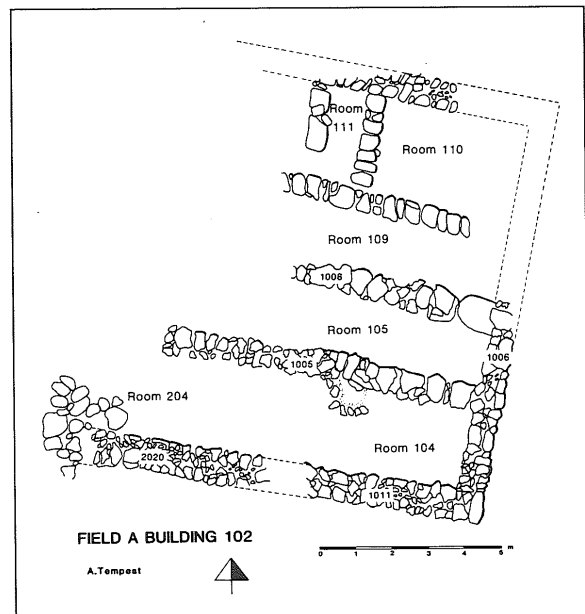
Excavation Strategy

The specific excavation strategy for the 1994 season in Fields A-B was to complete excavation of middle Iron Age II structures (Buildings 102⁶ and the casemate wall; Daviau 1994: Fig. 2) exposed in previous seasons (1989-1993). Special attention was given to the plan of long-roomed Building 102 in order to determine its function and its association with other structures adjacent to the wall system in this area. Secondly, with the discovery in 1993 of Drain B24:24 at the south-west corner of the site, an attempt will be made to delimit the outlet of the drain through the town wall (Daviau, 1994: Figs. 2, 4) and determine its total length. This may prove unsuccessful due to the construction of a modern path in this area which destroyed much of the outer wall (W2023) and damaged the drainage system. In addition, excavation was planned to determine the or-

igin of the drain within the town and the types of structures located adjacent to it (B34-35). Squares B45, 55, and 65 were opened to establish the connection of this area of the town with the large cooking complex further east in B63 (Daviau 1992: Pl. I.1).

Results

Excavation continued in Building 102 with expansion to the north in Squares A5 and B65 (Fig. 1). To date, a series of parallel units (Rooms 104, 204, 105, 109, 110 and 111) have been exposed that ran north-west with a possible doorway in Room 109 on the east. The plan of this building is different from all other Iron Age II buildings uncovered so far at Tall Jāwā. Finds from Building 102 this season were minimal, con-



1. Field A, Building 102. Room 110 with North Wall 1024, South Wall 1022, West Wall 1023. Room 111 with Partition Wall 1025.

4. Nicholas employed a similar strategy in the excavations at Tall e-Malyan in Iran (1980). Good documentation and further analysis of artifact distribution and surface contents enabled Ciolek-Torrello to revise the interpretation of room function at Grasshopper Pueblo in Arizona (1984). In a similar vein, Voight studied the artifact assemblages and waste products at Hajji Firuz Tepe that produced evidence for various behavioral pat-

terns, such as food processing, storage, disposal, secondary deposition and manufacturing (1983: 295-321).

5. Excavation of Tomb T1 was supervised by J.R. Battenfield. The report and final plan of Tomb T1 will appear in a preliminary report of the 1995 season.

6. Building 102 was originally numbered Building 101 (Daviau 1994: 178).

sisting primarily of pithos sherds in Room 111 and a few handmade painted ceramic fragments, possibly from house or shrine models whose complete form remains unknown. These may have been used in association with the ceramic head of a male figure wearing an Osiris crown recovered from Room 105=Room 5 in 1989 (Younker *et al.* 1990: Pl. 10; Daviau and Dion 1994: Figs. 1 and 2).

In Room 110, large slabs of plaster (A5:18) were scattered on a surface (A5:19) and in the debris layer (A5:17) immediately above. All this was sealed underneath collapsed mudbrick (A5:17, 12, 7) which accumulated for a total depth of ca. 0.75 m, evidence of collapse of the superstructure and ceiling above the stone walls of the lower storey. Ash lenses were also present in both the debris layers and on the floor.

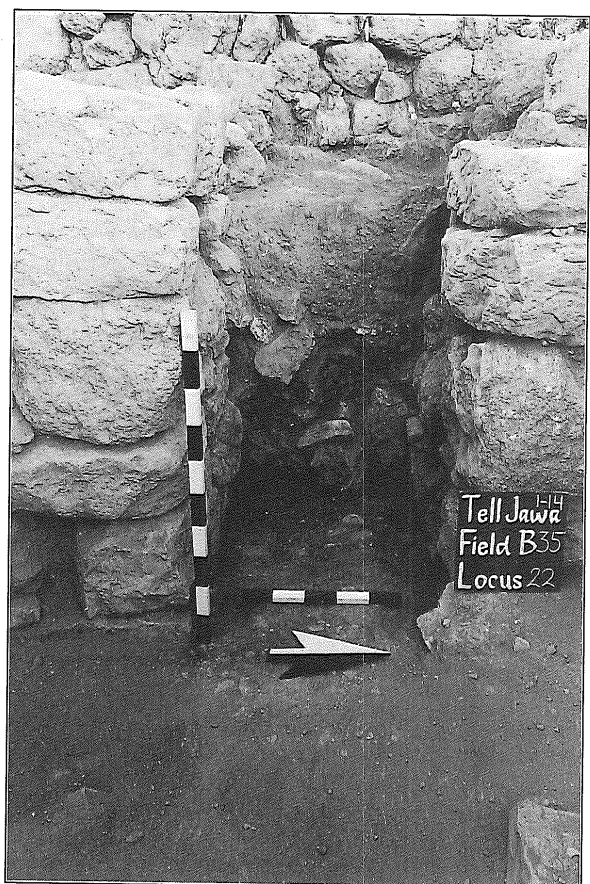
The northernmost wall (W1024) of Building 102, partially exposed north of Room 110, was identified as an outer wall on the basis of its two-row boulder-and-chink construction that is comparable to Wall 1006 on the east. The interior walls (1022, 1023), and Partition Wall 1025 surrounding Room 111, were all one row thick and formed of medium size flat-topped boulders (0.55 x 0.75 m). In Room 109 were several large, elongated boulders fallen from Wall 1008 at intervals suggesting stone piers that supported the ceiling. Further excavation to the west is needed to reveal the full plan of this building.

West of Building 102 in Field B was an open court (211). The soil layers (B55:19, 20, 21) in this court were stained grey (10YR 5/2) and contained 93 broken basalt artifacts along with several chert pecking stones. Sixteen complete artifacts, possibly manufactured from the broken millstones, were also recovered from this work area. Court 211 may also have served as the catchment area for water that flowed out of the town through Drain B24:24.

Further west, excavation continued in Square B35 in order to expose structures lo-

cated inside the south-west corner of the fortification system north of Drain B24:24 (Daviau 1994: Fig. 2). Two rooms were partially exposed in 1995; Room 215-213 was a broad room that ran north-south, parallel to the outer west wall (W2023) and formed a casemate room while Room 212 was a perpendicular room that extended east. Connecting these two rooms was Doorway B (B35:22), located in the middle of north-south Walls 2004 and 2029. The doorway measured ca. 0.75 m wide and was flanked by jambs constructed of smoothly hewn rectangular boulders, dry-laid in regular courses and keyed into their respective boulder-and-chink walls (Fig. 2).

Within both rooms (R212, 215) and the connecting doorway (B) were layers of compacted rockfall probably from the upper courses of the surrounding walls. The stones ranged in size from medium to large cobbles (0.12-0.25 m) and small boulders (0.25-



2. Field B, Doorway B between Rooms 212 and 213.

0.50). Within these loci, there were over 300 sherds, many probably associated with an underlying surface.

Field E

Excavation Strategy

In Field E, the goal was to expose additional rooms adjacent to the casemate wall system and determine the plan and integrity of Building 300. After the 1993 season, this complex consisted of two rooms that abutted the casemate wall (R302, R303) with an additional two rooms (R305, R307) that flanked Cistern 13 on the west (Daviau 1994: Fig. 3). In 1994, we opened squares on the east (E74, E75) and west sides (E53) of Cistern E64:13 (Fig. 3). Excavation in E74 was designed to investigate "Room" 309, a corridor that pierced the casemate wall system at the east end of Building 300 and remained unexplained after the 1993 season. Square 75 was opened to determine the full length of Building 300 where it touched the casemate wall system. Balk removal in E54 and E64 was necessary to completely expose Rooms 302 and 303 which contained large assemblages of food preparation equipment recovered in 1993 (Daviau 1994:182, Fig.7).

Results

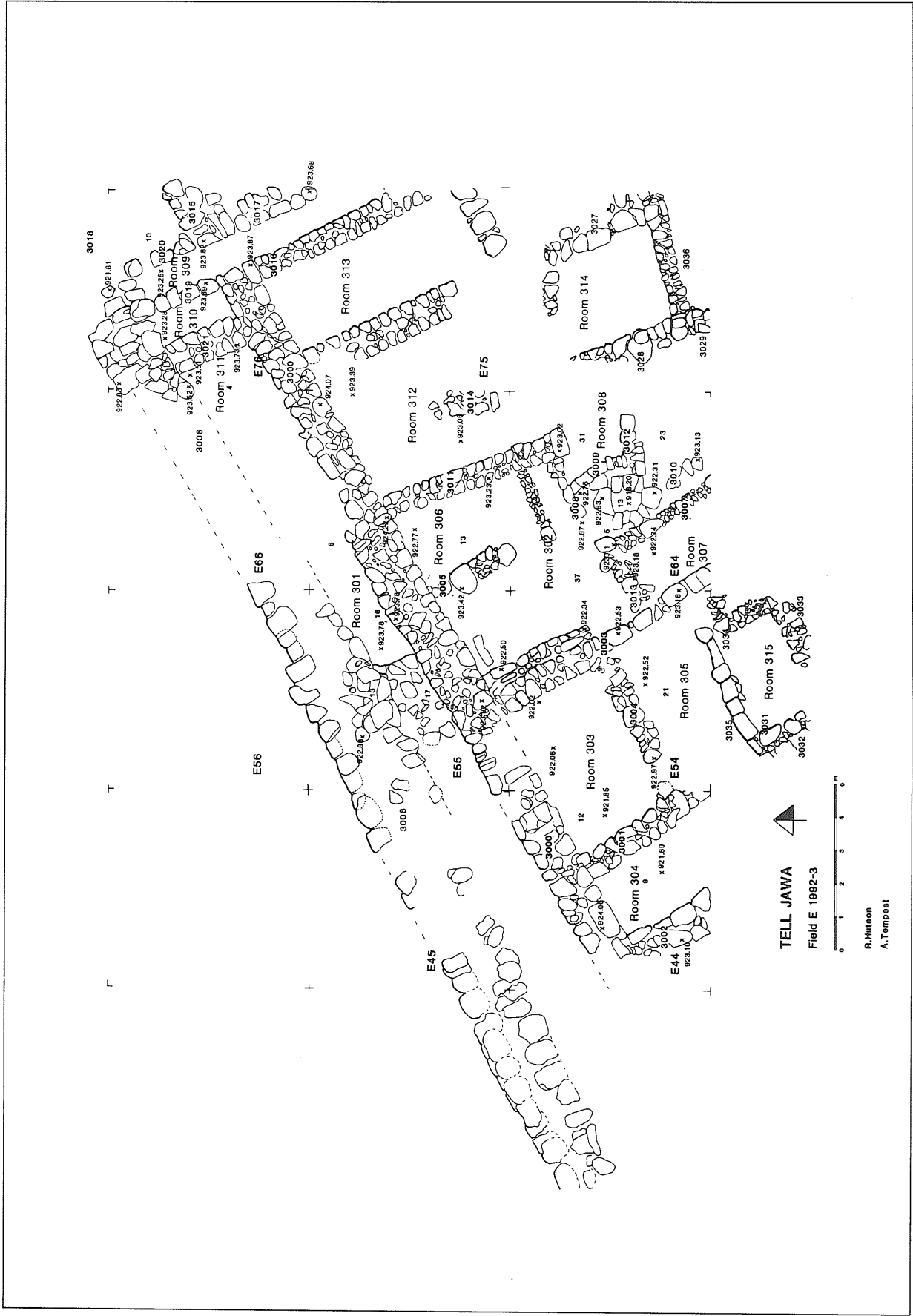
Partially exposed in 1993, a beaten earth floor (E54:32) stained with ash indicating cooking activities was shown to extend the full length of Room 303 (3.1 x 4.6 m; Fig. 3). Recovered from the floor in 1994 were sherds of cooking pots, store jars, pithoi, red slipped bowls, jugs and juglets. Domestic artifacts included 3 chert pounders, 1 basalt grinder, sherds of a ceramic footed bowl, and one utilized chert flake. Additional finds include small bowls, a strainer bowl, a red slipped juglet without its rim (not shown), sherds of a white slipped and painted decanter, a red slipped chalice, the upper half of a female figurine (Fig. 4) and a faience bead.

Immediately south was Room 305 (Fig.

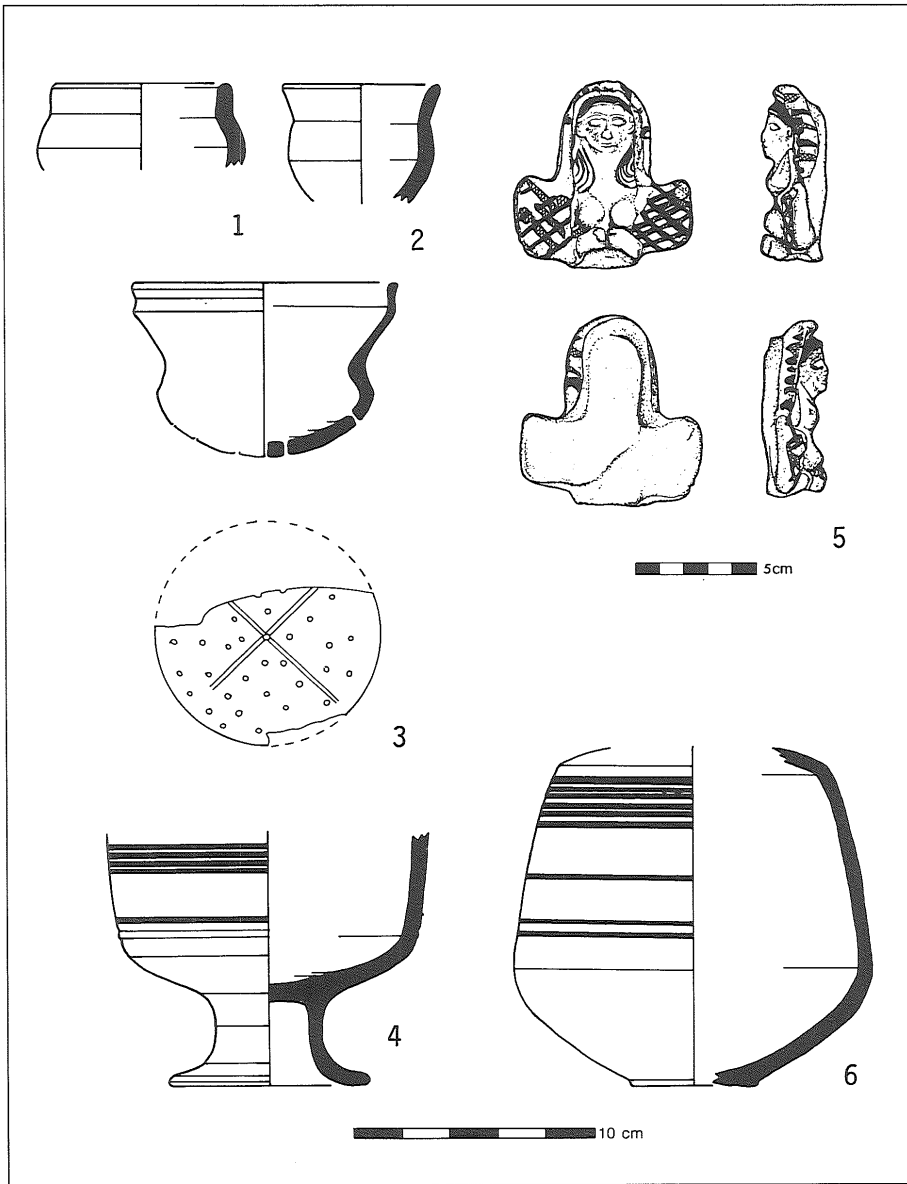
3), separated from Room 303 by a wall (3004) formed of medium boulders (0.50 x 0.75 m) and cobblestone units that connected the boulders to one another. The same building techniques were employed in the south wall (3035, 3037) of Room 305 which consisted of three piers, each formed of medium size, rounded boulders stacked in two courses. Doorway G was located in the centre of the wall and led into Room 315. Against the north face of this entrance, was a mudbrick step into Room 305 and an oven (E53:23). This installation consisted of an inverted cooking pot, broken at the point of carination and sealed in place by packed mud and eight small stones, three of which were broken basalt millstones and one was a small quern fragment. Very little ash (E53:24) and few bones were associated with this oven.

Embedded into the floor surface (E54:53) of Room 305 was a limestone boulder mortar (E54:54), 0.55-0.63 m in diameter (Fig. 5). Smashed *in situ* on the mortar were sherds of red slipped bowls, jugs, juglets, ordinary cooking pots and pithoi that were more concentrated along the east side of the room. In the south-west corner behind Mortar 54 were two slabs of a stone bench(?) (E53:26) that measured 0.18 x 0.86 and 0.18 x 0.93 m, respectively. Behind and underneath these dislocated stones were 8 unfired clay loom weights (donut-shaped), one flat perforated stone and 3 basalt grinders (Fig. 5).

Further south, Room 315 had a cobblestone floor (E53:17) with a small amount of ceramic vessels smashed *in situ* and three objects (2 upper millstones and 1 grinder) in the north-west corner of the room. Debris above the floor consisted of approximately 800 ceramic sherds, 1 polishing stone, 1 grinder, 1 spindle whorl, 5 iron points, 2 upper millstones, 1 small mortar, 1 obsidian point, 1 Canaanian blade, 1 blade, 2 bladelets, 1 scraper and 1 utilized flake. Finds amidst the upper debris layers (E53:6, 4 and



3. Field E, Building 300, middle Iron Age II.



4. Building 300, Room 303 finds; 1. miniature bowl, E54.91.2; 2. miniature bowl, E54.135.9; 3. strainer bowl, E44.70.15; 4. chalice, E54.59.1-4, red slip with black bands; 5. female figurine, TJ 1119, red slip on face, black paint on hair, wings of chair and shawl painted in white, black and red; 6. decanter, E54.104.1, white slip with black and brown bands.



5. Building 300, Room 305. Boulder mortar with stone slabs and unfired clay loom weights.

3) that filled Room 315 included 1 perforated stone/weight, 1 upper loaf-shaped millstone, 2 grinders, 2 pestles, 1 pounder, 1 tripod basalt mortar and 1 iron point. These finds suggest a variety of food preparation activities in Room 315 that were surely related to the oven in Room 305 one step away.

The earliest floor surface (E54-64:41) in Room 302 was uncovered in 1994. Surface 41 consisted of beaten earth that sealed against Bench E54:24, a feature that continued in use with later Floor E54:26=27 (Daviau 1994: 182-183). Cut into the lower floor (E54:41) was a hearth (E54:43) probably used for cooking. The ashes (E54:48),

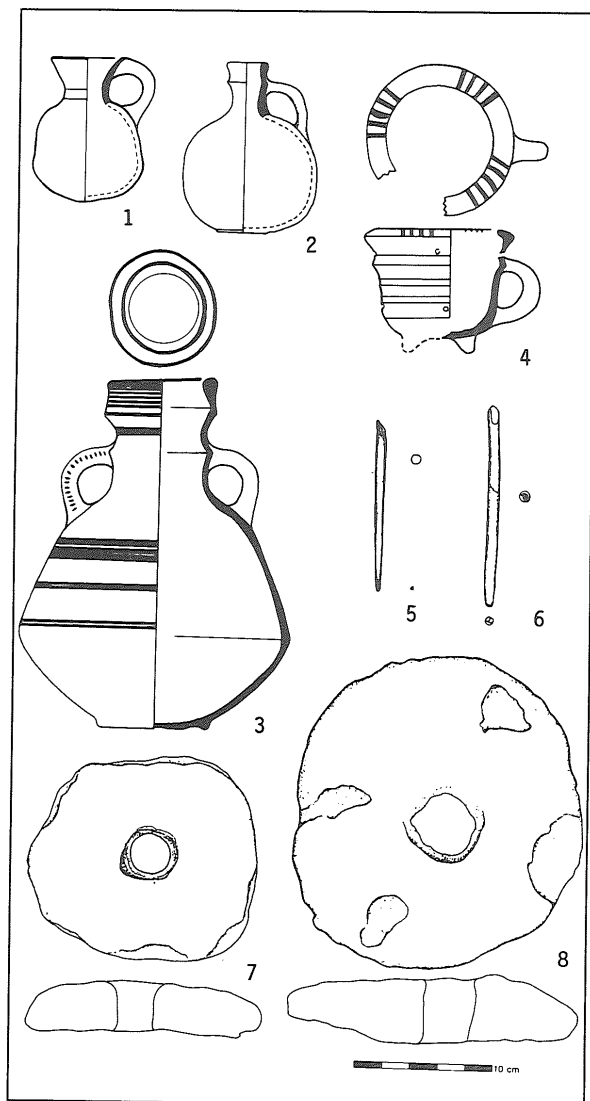
that accumulated on Floor 41 extended south to the lip of Boulder Mortar E54:38, an installation embedded in the floor. A large stone working surface, bedrock (E54:50), was immediately southeast of the mortar. No finds were present on the working surface, but smashed on the earthen floor (E54:41) was an assemblage of cooking pots, pithos sherds and several half-lentoid flasks, one of these flasks was inside Mortar 38.

Superimposed above this floor was Debris Layer E54:37 that also contained smashed pithoi, jars, jugs, bowls and red slipped juglets along with 4 polishing stones, 2 murex shells, 2 sling stones, 8 grinders, 2 chert pounders, 1 bone spatula, 1 basalt pestle, 1 mortar fragment, 1 whetstone, and 1 worked stone. Scattered among the ceramic sherds were 33 iron points, including javelin points and arrowheads, some oxidized to the sherds of a flask suggesting that these weapons had been in storage in a vessel when the room went out of use (Kelm and Mazar 1982:11, Fig. 11). Excavation of these floor levels (E54:41 and E54:26-27) in 1993 and 1994 showed that they were both in use with Bench E54:24 and probably represent a short period of occupation. Secondly, there is no evidence of subsequent occupation in Field E following the final destruction of Building 300.

The eastern wall (W3005) of Room 302 now stands 0.60 m in height and separates it from Room 306 (Fig. 3). In Room 306, several earthen layers contained flat-lying pottery while the earliest floor (E65:29) consisted of beaten earth and small cobbles, at least along its north end. Although Floor 29 was at a slightly higher level than the earliest floor (E54:41) in Room 302, they appear contemporary. Floor E65:29 was also strewn with sherds from pithoi, painted jugs, one with white slip and black painted bands (possibly an import), red slipped juglets, kraters, bowls and fragments of a tripod cup (Fig. 6). Underneath these sherds were two ivory sticks, probably spindles. Other artifacts on

Floor 29 and immediately above it include 1 bone spatula (broken), 3 basalt trays, 3 mortars, 6 iron points, 1 bead, 1 greenstone pendant, 2 door weights, 2 pestles, 1 basalt grinder, 3 shells, 1 upper millstone and 16 perforated sandstone disks whose function is unclear (Fig. 6).

Three rooms (R312, R313, R314) formed the eastern side of Building 300. In Room 313, there were three boulder-and-chink walls (3025, 3026, 3016), along with the



6. Building 300, 306 finds; 1. red slipped juglet, E65.75.1; 2. E65.92.1; 3. amphora, E65.79.18, white slip, ring base, with black and brown bands (Cypriot?); 4. tripod cup, E65.40.1; 5. ivory spindle, TJ 1603; 6. ivory spindle, TJ 1530; 7. perforated sandstone disc, TJ 1535; 8. Perforated sandstone disc, TJ 1540.

casemate wall, that formed the perimeter. One doorway led west into Room 312 that remains unexcavated. Inside Room 313, Floor E75:16, partially exposed in the southwest corner, consisted of a hard-packed plaster surface covered with smashed pithos sherds and an accumulation of ash and soil suggesting the presence of a nearby cooking area. Above the ash (E75:15) was a series of deep soil layers filled with small to medium size boulders that demonstrate significant upper storey collapse and, at the north end, the collapse of the casemate wall into the house.

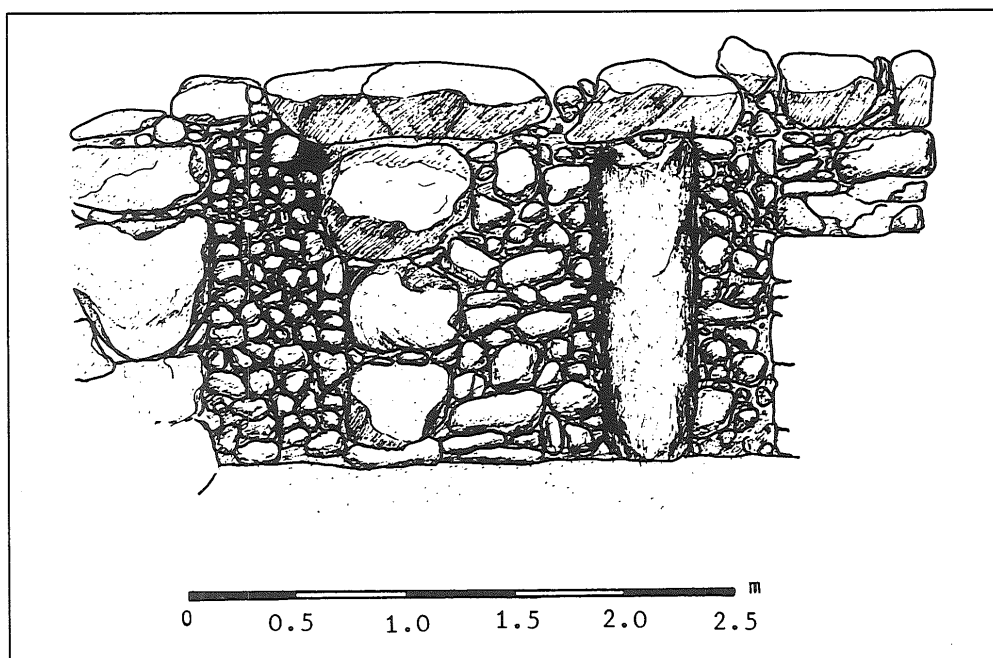
To the south, Room 314 was bounded on the west by two boulder-and-chink walls (3028, 3029) that were separated by Doorway J. The northern wall segment (3028) measured 1.00 m in width and had a dressed door jamb formed of large boulders. Extending further to the south, Wall 3020 was only ca. 0.75 m in width. On the east side of Room 314 was Wall 3027, the best preserved example of a pier and cobblestone wall (Fig. 7). Here the piers measure 0.65 x 1.5 m and are 0.67 m away from each other. The cobblestone sections between the piers were

formed of small and medium cobbles while the top course was formed of very large rectangular boulders, one measuring 1.25 x 0.75 m. The end of this wall was dressed, similar to the frame of a doorway.

By contrast, the south Wall (3036) was probably robbed out⁷ since it now stands 0.80 m lower than the top of Wall 3027. Inside the room (314) was a thick layer (0.67 m; E74:7) of hard-packed dark red clay with plaster inclusions sealed by large lumps of white plaster. The function and purpose of this soil layer is unclear at this stage of excavation. Although finds from Room 314 were few as the floor level was reached only during the final week, there were human bones *in situ* on the floor (E74:24) immediately above bedrock. In west Doorway J (E74:25) was a pillar-style female figurine, broken at the shoulders. During the 1994 season, the association of Rooms 314 and 313 with Corridor 309 was not clarified and further excavation is planned for 1995.

The Late Iron Age: Field C

In Field C, where late Iron II occupation was first uncovered in 1991, the primary task



7. Field E, Building 300, Wall 3027 with stacked boulders and limestone pillar with cobblestone connecting units.

7. V. Fritz first suggested that the wall had been robbed out (July 1994).

was to expose the northern part of a large structure (Building 800 in C-west) that had produced evidence for domestic activity (Daviau 1994: 185, Fig. 11). In the eastern part of Field C, exploration continued for the city gate since this appears to be the only area along the length of the casemate wall system where a gate structure is possible.

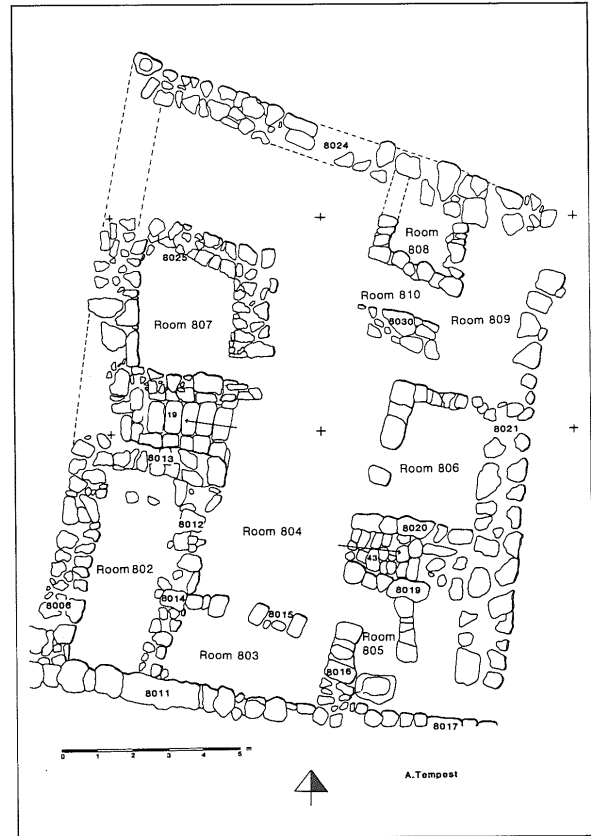
Excavation Strategy for C-West

The goal for the 1994 season in Field C-west was to expose the northern limits of Building 800 (Squares A83-84 and A93-94), currently located beneath a modern property wall (A83:1=93:4). Because of the irregularities in the grid system, Squares A93-94 each measure 6 m north-south and 7.1 east-west.

Results

Building 800 (Fig. 8) extended north for a maximum length of 18.00 m and included at least 8 and possibly as many as 11 rooms on the ground floor. The outer walls were identified this season on the north (W8024) and west (W8028). Wall 8024 ran north-west for a total length of 14.0 m, forming a slightly trapezoidal building. The wall itself was built of medium to large boulders and measured 1.90 m in thickness at its eastern end and 1.45 m thick where it entered Square A84. Due to time constraints, only the uppermost courses were exposed this season.

Excavation began along the west side of the building in Room 807 that measured 2.70 x 3.10 m. Within Room 807 was a beaten earth Floor (A83:16) covered with smashed vessels including cooking pots, red slipped wares, black burnished bowls, pithoi, juglets and lamps. Artifacts consisted of 1 basalt ball, a grinder, 2 upper millstones, an oversized hand grinder, lower millstone, pecking stone, and a bone peg/stopper. Nine donut-shaped, unfired clay loom weights, comparable to those found in Room 802 (Daviau 1994: 185), were also included in the artifact assemblage suggesting extensive textile pro-



8. Field C-west, Building 800, Stairway 19 (west side) and Stairway 43 (east side), late Iron II.

duction. One unique object whose precise function is unclear was a red slipped and painted (black and white) saucer-shaped stopper(?) (TJ 1589).

A thick layer of soil and collapsed boulders (A83:15?), probably from the Surrounding walls, covered the surface (A83:16) and formed a debris layer under Plaster surface A83:10. The debris, ca. 0.15-0.25 m thick, may itself have been a collapsed floor since above Plaster Surface A83:10 were more than 200 ceramic sherds, a grinder, a ceramic spout, an unfired clay loom weight, and a basalt upper millstone.

Room 807 was bounded by three dry-laid, boulder-and-chink walls. A single doorway (A83:20) located in the southeastern corner of the room opened into Central Hall 804. The west wall (8028) was built of two to three rows of small, medium and large boulders in boulder-and-chink construction and measured 1.4 m thick. Beginning 2.5 m north

of South Wall 8027, West Wall 8028 was thickened on its interior face. Such construction suggests the need for a strong wall to support the upper storey room. Additional debris layers (A83:5, 7) within Room 807 support this hypothesis. These loci contained more than 36 flagstones and a limestone table (Reg. No. 1543) that measured 0.36 x 0.46 x 0.15 m thick. This impressive feature is matched by high status artifacts including a tridacna shell.

North of Room 807, where excavation is planned for 1995, there is sufficient space for a narrow room running east-west immediately south of North Wall 8024. A limestone door pivot built into North Wall 8024 may have served as the entrance to the upper floor in Building 800.

South of Room 807 was a second staircase (A83:19), 2.20 m long with 6 preserved steps, each ca. 1.00 m in width, 0.40-0.50 m in depth, and 0.20-0.30 m in height. This is comparable to Staircase C27:43 recovered on the east side of Room 804 where the steps were also 1.00 m in width. By contrast, Staircase A83:19 did not have free standing support walls but was built between the south wall (8027) of Room 807 and the north wall (8013) of Room 802.

Room 804, originally thought to be the central room of a four-room style Building 800,⁸ now appears to have been located in the centre of seven surrounding rooms. Two superimposed floors (C27:55, 56), covered by Soil Layer C27:48 that had remained in place (in its lowest levels) following the 1993 season, were excavated by using a 1 m² grid to recover evidence for room function and use.⁹ Ceramic evidence from Floor 55

was predominantly Iron Age II, although one diagnostic could be dated to Iron I. A basalt sphere, the size of a large bead and a stone seal were the only two artifacts recovered in the area exposed this season. The seal was incised with the image of a horse, a cross mark and three drilled circles.

At a depth of ca. 0.15 m below Floor 55 was an earlier floor surface (C27:56). Excavated only in grid locations 1-2 and 37-38, Floor 56 yielded Iron Age II pottery. Evidence from Room 804 suggests that it was central to the traffic patterns in Building 800 in contrast to Rooms 802 and 807 along the back of the house where a large number of store jars, bowls, lamps and cooking pots were evidence of intensive domestic activities and storage.¹⁰

North of Stairway C27:43 were two additional rooms (806 and 809) along the east side of Building 800. The wall (A93:2) that divided these rooms from one another was formed of one row of small boulders in boulder-and-chink construction and was preserved 8 courses high (1.93 m). Built up against the north face of Wall 8023 inside Room 809 was Oven A93:27. This feature was constructed of 2 flagstones set on edge, one on the east and one on the north, along with one upper millstone and a grinder that formed its perimeter. The bottom of the oven was a white plaster surface (A93:45) whose association with contemporary floor levels is unknown due to the limits of excavation. Inside the oven, the lowest soil layer (A93:44) was hard packed moist reddish soil that contained lithics and bone fragments along with red slipped pottery sherds. This lowest layer may actually be debris above an earlier floor

8. This initial judgment was based on parallels with other Iron Age pillared houses that contained four or more rooms, such as those at Tall al-Far'ah (N), especially House 327 (Chambon 1984, Pl.21) However, by contrast, House 327 has only one storey.

9. The 1 m² grid was located in the north central sector of C27. All soil from each individual square was passed through a fine gauge sift. Due to the

instability of the pillars in Wall 8015, a balk consisting of Rockfall Layer C27:39 was left in place along their north side to protect workers from possible collapse.

10. Excavation in 1995 showed clearly that Surfaces C27:55 and 56 were in fact layers of ceiling and upper storey floor that had collapsed into Room 804.

but only future excavation can verify this sequence. Ash (A93:43) accumulated above Soil Layer 44 and was 0.08 m deep. No bio-data was recovered from flotation of this ash. The uppermost layer (A93:28) was a hard-packed moist soil layer with inclusions of nari. The western limit of the oven remains unexcavated although it currently measures 1.50 m east-west. Its width, north-south, is 0.49 m and the total depth was 0.51 m. Associated finds include the base of a cooking pot and one pestle.

The amount of high status ceramic wares (16% in 1993)¹¹ and specialty items present in Building 800, its large size and location near the gate suggest that this house was the residence of a person of great status, possibly a governor. The seal (R804) and ostrakon (R802) support this suggestion although more examples of both items should be present if this was indeed a governor's residence.

Excavation Strategy in Field C-East

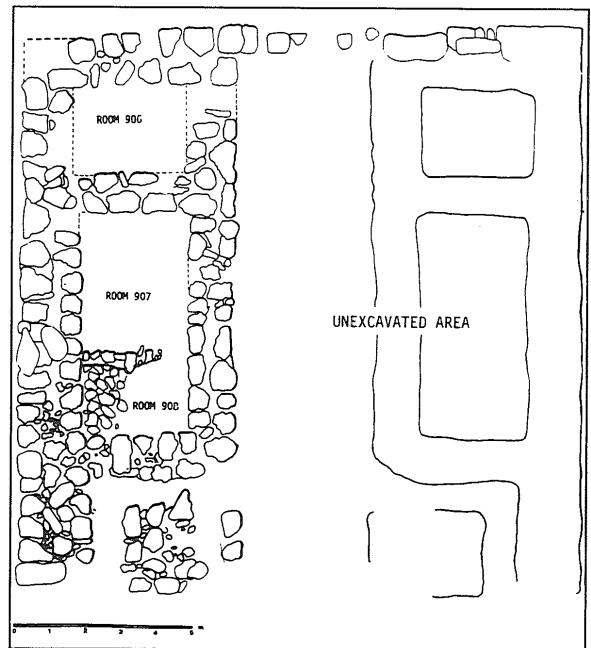
Three features visible above ground in Squares C61-65 pointed to Field C-east as the only possible location for the main gate of the Iron Age town. These features consisted of 1) a flanking wall and buttress (9007, 9008) that ran 15 m east-west on the slope of the terrace in Field C, 2) a north-south wall (9010) that ran uphill from Wall 9007 and appeared to be in line with the easternmost wall (9021) of a heavily built structure (Building 910) and 3) West Wall 9019 of the same structure (Daviau 1994: Fig.5). Plans for the 1994 season included expansion of C-east to the north (C65-66) to expose and identify Building 910.

Results

The west half of a probable gate structure was first identified by the delineation of

Wall 9019 and its extension to the north in Square C66 (Fig. 9). This wall bonded with Wall 9025 (C66:6) that ran east-west and formed the northern limit of the gate. Perpendicular to Wall 9025 was the east wall (9039+9021)¹² that ran south to bond with Wall 9018 and formed a unit that measured 6.10 x 12.80 m. Within Building 910 was one cross wall (9022) that divided the interior space into two unequal parts, Room 906 in the north and Rooms 907-908 in the south. Room 907 was subdivided by a partition wall (9023) that served as the north wall of Room 908.

The outer walls (9018, 9019, 9025, 9039+9021) of these rooms were constructed of medium to very large boulders which were of limestone (75%) and chert (25%) in a boulder-and-chink style. East Wall 9039+9021 ran along the west side of the central road and measured only 1.30 m. The widest wall (9019) was on the outer, west



9. Field C-east, Building 910, possible chambered gate building, late Iron II.

11. This data is based on a study entitled "Intrasite Distribution of Red Slipped and Black Burnished Wares at Tell Jawa, Jordan." This paper was presented at the Annual Meeting of the American Schools of Oriental Research, Nov.

21, 1993, in Washington, D.C.
12. Doorway F, identified in 1995, divided the east wall into two units, Wall 9039 north of Doorway F and Wall 9021 to the south.

side and measured 1.75 m while North Wall 9025 was 1.60 m thick. The southern wall (9018) was also 1.30 m but it was protected by a tower (9020) that abutted it on the south.

The cross wall (9022) between Rooms 906 and 907 was built of medium to large boulders and was two rows thick (1.00-1.10 m). Partition Wall 9023 separating Rooms 907 and 908 was built of small (0.25-0.50 m) limestone and chert boulders with one medium boulder that may have formed the door jamb.

Southern Room 908 measured 2.10 x 2.95 m and was paved with flagstones (C65:21) in its western half and with beaten earth (C65:15) in the east. Immediately above the beaten earth surface were 3 rectangular, unfired clay loom weights, a basalt millstone fragment, a perforated triangular stone, scattered red slipped pottery sherds, bits of charcoal and plaster fragments (C65:14).

A doorway (C65:26) connected Room 908 to central Room 907. Within the doorway, flagstones (C65:19) formed the threshold and continued across Room 907. The range in size of the flagstones was 0.17-0.42 m and appeared to cover the entire room. On the floor (C65:19) were a lower millstone fragment and a limestone grinder along with Iron Age II pottery sherds.

A layer of soil with cobblestones and boulder (small to large in size) filled Room 907 and covered Floor C65:19. Within this debris was Burial 94/1 which consisted of the cranium of a young female, identified so far on the basis of a metal earring. The northern half of Debris Layer C65:17 remains unexcavated.

To the north of Room 907, the debris layers under topsoil (C66:1) in Room 906 were cleaned but remain unexcavated although it is clear that Wall 9022 formed the

southern limits of a discrete room that measured 2.50 x 3.15 m. Further excavation is planned for next season to expose Room 906.

Only the north wall (9024) of the eastern half of the gate complex is visible but has not yet been excavated. The remainder of the eastern half of the complex appears to be buried under a modern property wall adjacent to a modern cemetery.

A road through the gate, also visible at ground level, measures 4.10 m in width.¹³ At the southern end of the roadway there was a small area of cobblestones (C63:22) that formed a pavement. The cobbles were embedded in a hard packed surface and appeared to seal against the northern edge of Wall 9010. The same hard packed surface ran east (as C73:8) and was exposed only in a limited area in the south balk. Additional excavation is needed to reveal the complete length of the roadway associated with the gate and the association of the outer wall (9000) with the gate itself.

The Umayyad Period: Field D—Building 600

Excavation Strategy

Excavation continued in Building 600 (Field D) that appears to date, in its final period of use, to the Late Byzantine-Early Islamic period. First opened in 1991, this building was a two-storey structure that contained a central arched room or atrium (607) surrounded by rooms on three sides (Daviau 1994: 188; Fig. 14). Two major tasks for the 1994 season consisted of the completion of excavation in Central Room 607 (Daviau 1994: 188; Fig. 18) and in northeastern Room 606, along with the excavation of additional rooms on the west (608, 609).

In 1994, the strategy was to reopen

13. The width of the roadway at Gezer was also 4.10 m while at Hazor and Megiddo it was 4.20-4.25 m. The current projected width of the gate at Tall Jāwā is 15-16 m, close in width to the Gezer gate

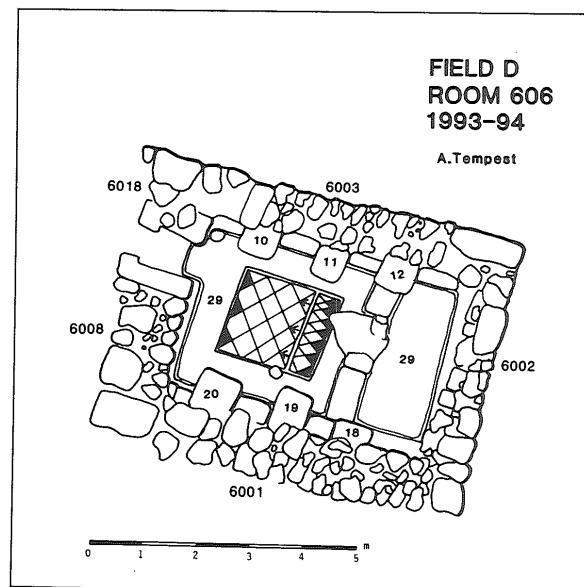
(17.00 m), whereas Megiddo was 17.50 m and Hazor measured 18.20 m (Herzog 1992:268, Table 2).

Square D33 in the north-east to ascertain the relationship of Room 606 to Central Room 607 and compare the floor level(s) in Room 606 to those in Room 605 to the south. Because Room 606 was located in two excavation squares (D32-33), a balk was left in place, recorded and finally removed in order to expose the entire room.

Limited excavation continued in Squares D22-23 to document the architectural phasing of the building, especially in Central Room 607. Hypotheses to be tested are 1) the Umayyad period occupants remodelled an earlier Byzantine period building; 2) Building 600 was remodelled after the earthquake of AD 747; and 3) there was a post-Umayyad occupation of this building.

Results in Room 606

Excavation resumed in Room 606 where collapsed walls stones, arch springers and hundreds of tesserae had been recovered in 1992. In the collapse (D33:7), there were 14 architectural pieces, the majority of which were voussoirs. The room itself (Fig. 10) measured 3.3 x 4.7 m and was spanned by three transverse arches (numbered west to east, D33:10=20, D33:11=19, D33:12=18) that measured ca. 0.68-70 m in width and currently stand ca. 1.66 m in height. The arches were formed of dry-laid rectangular stones, ca. 0.32 x 0.35 x 0.74 m in size. Tooling marks are clearly visible on all arch stones as well as on other architectural elements. Between the feet of the arches (10, 11, 12) against north Wall 6003 was a series of rectangular stones (D33:32:1, 2, 3, 4) of very hard limestone, all ca. 0.44-0.50 x 0.70 x 0.21-0.32 m in height, that formed low benches/shelves. Because the border of the mosaic pavement ran along the base of the shelves, it is clear that it was laid subsequent to their installation and possibly of the arches themselves which were not footed on floor level but at the height of the shelves.



10. Field D, Building 600, Room 606.

The arches did not spring from the walls; instead they were constructed in front of the walls with fill consisting of soil, cobbles and small boulders behind the springers.¹⁴

The southern spans of the arches were also built in front of the wall (6001), but were footed on a layer of fill (D33:27) that appeared to continue up the wall between the arches to give them support. White unpainted Plaster (D33:31) sealed the lowest part of the fill immediately above Floor D33:29 to a preserved height of .18 m and a length of 1.47 m. A concentration of painted plaster (D33:24 at 923.76 masl), located 0.12 m below the bottom course of Arch 18, was incised with graffiti that damaged the paint. At the same level, three lamps were found (923.78, 923.77, 923.85 masl) located on soil layer D33:25=26, immediately above the floor. By contrast with Arch 18, there was no evidence of plaster, painted or unpainted, on Arches 19 and 20.

Entry into Room 606 was through Doorway D23:20 located in the north-east corner of Room 607. Two steps led up to Room 606 which had its floor 0.32-0.50 m above that of Room 607. There was a small hemispherical depression in the mosaic floor immediately

14. All arches were preserved four to five courses in height and remained standing 1.43-1.66 m in height.

inside the doorway in the north-west corner of Room 606. Since its base was the lowest point in the room, this depression may have served as a sump or as a jar stand for a water jar although no recognizable sherds of such a vessel were found in the room.

The floor measured 2.88-2.90 x 4.88 m and was paved with a mosaic pavement (D33:29; Fig.10). Built into the floor was Installation 28 consisting of two flat stones that framed a doorway and divided the room into two unequal parts, 1.10 x 2.88 m and 2.90 x 2.88 m. The two stones of Installation 28 were dressed limestone and measured 0.46 x 0.91 m and 0.43 x 0.82 respectively and were 1.15 m apart. The smaller, eastern unit was paved with a plain mosaic. In the larger, western unit of Room 606, the mosaic pavement contained a decorated carpet design that consisted of a white/pale yellow background with a square outlined in red tesserae that was itself divided into two unequal parts. In the main part of the room, there was a design of diamonds formed of blue-black tesserae that ended in three yellow-orange triangles on the west. On the eastern end of this large square were three red arrows pointing west toward the doorway. The smaller rectangular sector consisted on one row of six and one-half diamonds and was bordered on the east by six upright triangles and one right angle triangle.

Decoration of Room 606, apart from the plaster in front of Arch 18, consisted of wall plaster painted red-orange, brown, red and black on a white background. The greatest concentration of plaster was along the east wall (W6002). Chunks of plaster and mortar were also frequent in the layers of collapse that filled Room 606. The mortar appears to be a mixture of charcoal ashes and lime mor-

tar.¹⁵ The most common element of decoration was mosaic tesserae. More than 10,000 have been recovered in debris layers filling Room 606 along with tesserae still embedded in fragments of mortar. Only an analysis of the relative sizes of these tesserae will be able to confirm whether there was mosaic wall or ceiling decoration in this room or a fine, floor mosaic on an upper storey.

Finds on Floor 29 were few and consisted of tesserae and ceramic sherds, some burnt (D33:27C,D33:27F=the eastern end of Room 606), possibly from the burning oil of the lamp found on the floor. Finds within the overlying layers of soil and collapsed voussoirs were consistently a mixture of Iron Age II pottery, Byzantine style vessel fragments and Umayyad-Abbasid sherds. Several lamp fragments with the grape vine motif (TJ Type 2.11-2.19)¹⁶ and glass sherds were scattered throughout the debris layers that filled the room. One intact lamp (TJ Type 1.4) and several fragments of roof tile had fallen deep within the debris layers in front of central Arch 19. In these same loci (D33:13, 16, 17), Iron Age II sherds were much fewer in number than in overlying loci and Umayyad sherds were dominant. Upper level disturbance throughout building 600 is evidence of modern disturbance.

Interpretation of the Phasing

Room 606 with its arches and its mosaic floor seems to have been built in one construction phase. The precise function of Room 606 during this phase is not certain. The small number of finds on Floor 29 does not allow for an accurate identification of room use although their paucity is suggestive. So too is the fact that we could not recover the inner row of East Wall 6002

15. Analysis is planned for the winter of 1994 by L. Pavlisch and R. Hancock at the University of Toronto.

16. A typology of ceramic lamps from Building 600 was prepared by M. Beckmann and presented in a joint paper with the author, entitled "Umayyad Painted Pottery and Abbasid Period Lamps: A

Chronological Dilemma," at a conference sponsored by the British Institute at Amman for Archaeology and History and Institut Français d'archéologie du Proche-Orient à Damas. The Colloquium, "Byzantine and early Islamic Ceramics in Syria-Jordan IVth-VIIIth Centuries," was held in Amman, Dec. 3-5, 1994.

(=D33:5) which may have been removed down to the level where two flat stones protruded from the wall, 1.25 m above the level of Floor 29. On Floor 29, Soil layers (D33:24-26) accumulated and served as the surface on which three channel-nozzle lamps and sections of painted plaster (D33:24) fell along with collapsed voussoirs when Building 600 was severely damaged. This surface may indicate a first stage of collapse that was followed by a more complete collapse that filled the room with architectural elements and made reuse impossible.

Excavation Strategy: West Side

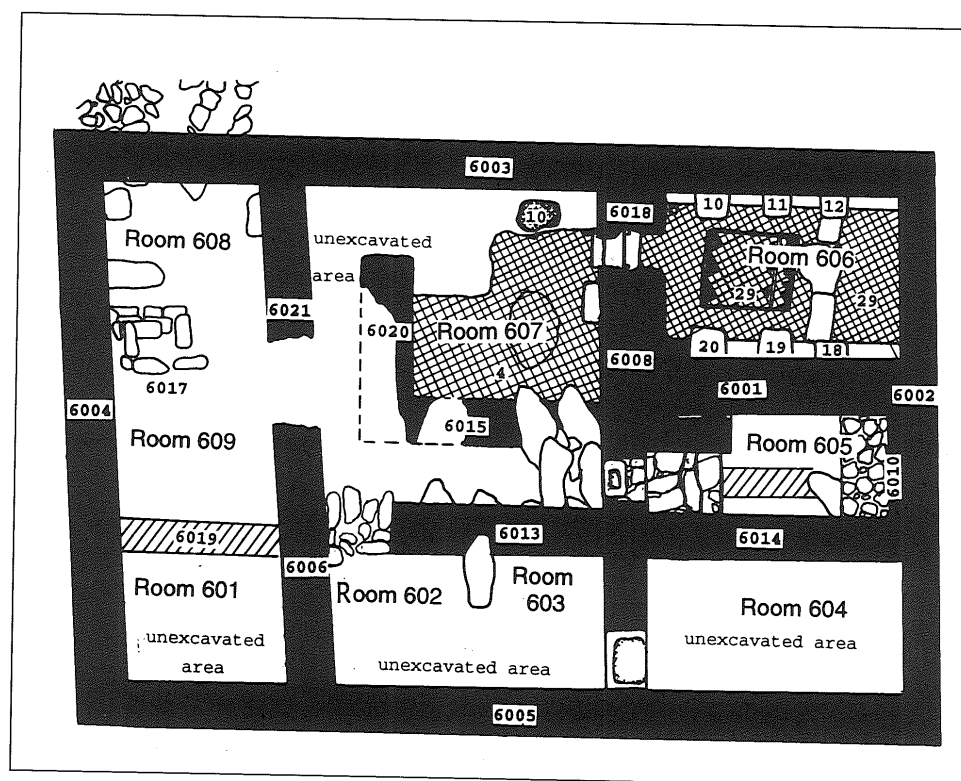
Along the west side of Building 600, excavation began north of Room 601, first exposed in 1991 (Fig. 11). The goal for the 1994 season was to expose two additional rooms (608, 609) on the upper storey, determine their association with Room 601 and lower Court 607, and clarify the function of the wall (D13:19=6006) that appears to run along the east side of Rooms 608 and 609, parallel to the western outer wall (W6004).

Evidence from these rooms may help to determine the exact number of storeys in the original construction phase of Building 600. This is especially true on the west where the state of preservation was expected to be better than on the east due to the deposition history of the site.

On the north-west in Square D14, excavation was undertaken to clarify the outer wall of Building 600 and attempt to locate an entrance into the building proper and a stairway from the upper floor to central Room 607 on the lower level. The height of Iron Age remains around Building 600 has led us to suspect that the entrance was on an upper floor rather than at ground level (Petherbridge 1984: 197, 202).

Results

Renewed excavation of Room 601 (Daviau 1992: Fig. 7) yielded a section of flagstone flooring (D2:18) located in the north-west corner between a stone pier and North Wall W6016 (Fig. 11, above W6019). Large portions of at least four different vessels in-



11. Field D, Building 600, upper storey Rooms 601-605, 608, 609, and lower storey Rooms 606 and 607, Umayyad.

cluding a casserole and lid, painted Umayyad vessels and glass sherds were located in the debris immediately above the floor. Embedded between two flagstones and spread over their edges was an accumulation of bitumen, ca. 0.15-0.20 m in size. Its surface was rippled in numerous folds suggesting a time when it was in a semi-liquid state. The precise use of this product and of a lump of sulphur recovered in 1991 from Room 603 (D22:4) remains unclear.

Wall 6016, preserved 1.25 m in height and 0.75-0.85 m in width, formed the south wall of Room 609. This wall was constructed of medium to large size boulders (0.25-0.75 m) of which 30% were chert and the remainder were limestone in boulder-and-chink style. The collapse of Wall 6016 at its eastern end makes it impossible to reconstruct the full plan of Room 609 on the upper storey although it is clear that the room extended north to Wall 6017 and measured ca. 2.00 m x 3.80 m.

Wall 6017 was also formed of limestone and chert boulders, some in the range of very large boulders (>1.00 m). This wall formed the south side of Room 608 to the north and contained Installation D13:32, a sloping hole (40°) through Wall 6017 that measured ca. 0.30 m in length. A jar (D13:22) inserted into the hole (D13:32) from the north fed into Installation D13:13 on the south. The jar was of light red brittle-ware with a smooth outer surface in contrast to the closest known formal parallel which is a vaulting tube from the baths at Pella that has a ribbed exterior surface (McNicoll *et al.* 1992:Pl. 98:5). The jar measures 0.29 m in length with a diameter of ca. 0.20 m. The function of the Tall Jāwā vessel in its current position is not fully understood although it appears to have served as a liner for Installation D13:32 that led to a possible sump (D13:13). The three flat boulders in a semicircular pattern that formed the

capstones of Sump(?) 13, bonded with Walls 6004 and 6017 showing that these features were all in use during the same occupation phase. Due to the limits of excavation, the purpose of this installation is unclear.

Above and beside these features was a series of rockfall layers that filled Room 609 and Room 608. These loci contained architectural fragments, wall stones and soil. Further support for the view that there was serious disturbance in Building 600 comes from the presence of mendable Iron Age II pottery on the surface of Soil Layer D13:6 below 0.30 m of collapsed wall stones with dressed edges. This material could have been introduced in antiquity, during an Umayyad/Abbasid period rebuild or in modern times when the nearby cistern (D15:2)¹⁷ and Court 607 were explored and partially emptied.

At this stage in the excavations, no main entrance into Building 600 has been identified although a stone platform (D14:7) against the north-west corner may mark the entry. Only one course of stone is currently preserved and excavation has not yet progressed below this pavement. Nevertheless, its location against the north wall (6003) suggests that the entrance is on the upper storey rather than at the level of central Court 607.

Conclusions

The 1994 season continued to reveal facets of the two principal occupation periods recognized at Tall Jāwā, Iron Age II and the Early Islamic period. Our work added new forms to the known types of vessels and artifacts identified in previous seasons. For the Iron Age, the discovery of five figurines, three female and two animal figures, will help to situate Ammonite material culture within that of greater Syria. Additional information concerning construction techniques and building plans will enable us to demonstrate the unique aspects of Ammonite

17. Immediately north-west of the corner of Building 600 was a pile of debris which is reportedly the

contents of Cistern D15:2 that was emptied in modern times.

architecture. The recovery of an area of ground stone tool manufacture has increased our knowledge concerning an important industry that was intimately connected with food processing in antiquity.

Additional examples of Islamic period lamps with inscriptions may contribute to a better understanding of the chronology of settlement at Tall Jāwā during the Umayyad and Early Abassid period. Because the lamps and, especially, the painted pottery from Tall

Jāwā have their greatest affinities with wares from 'Ammān, Umm al-Walīd and Umm ar-Raṣāṣ,¹⁸ our corpus may help to define regional trade and economic patterns on the central Jordanian plateau.

P. M. Michèle Daviau
Wilfrid Laurier University
Waterloo, ON N2L 3C5
Canada

18. See n.15 above. The paper by Beckmann and Daviau is currently in press in the proceedings vol-

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TALL ABŪ AL - KHARAZ THE SWEDISH JORDAN EXPEDITION 1994, FIFTH SEASON PRELIMINARY EXCAVATION REPORT

by

Peter M. Fischer

Preface

Excavations were carried out at Tall Abū al-Kharaz, north of Wādī al-Yābis and about 4 km east of the River Jordan, from 29 September to 1 November 1994. The director of the expedition, as during the previous years, was the author, from Gothenburg University in Sweden. Members of the team were Hikmat Ta'ani, the representative of the Department of Antiquities of Jordan from Irbid, who also acted as trench master in Trench XXIV and foreman in the field. Trench masters were José Gallart, University of Louisiana, in Trench XXII (part-time), Anders Kaliff, Department of Antiquities, Linköping, in Trench XXII (part-time), Madlaine Miller, University of Gothenburg, in Trenches XXVB and XXII (part-time), and Dieter Vieweger, University of Wuppertal, in Trench XXVA. Richard Holmgren, University of Uppsala, was the architect and photographer. The team was further supported by Hassan Rahmi Abu Sami. Twenty skilled workers from Pella and al-Mashār'a were employed.

Financial support was given by the Swedish Board for Investment and Technical Support (BITS), the Gyllenstiernska Krapperup Foundation, Nyhamnsläge, Sweden, the Anna Ahrenberg Foundation, Gothenburg, Sweden, and the private company Polylys Com, also of Gothenburg.

RESULTS OF THE 1994 SEASON

Introduction

The main objectives of the 1994 excavation were (for the location of areas and

trenches see Fig.1):

1. The search for defence walls in the south part of the tall, the most vulnerable sector of the site (Area 9, Trenches XXIV, XXVA and B).
2. The extension of the 1993 excavations in the north part of the tall, where among other finds an Iron Age house and towers were exposed (Area 7, Trench XXII; see *ADAJ* 39).

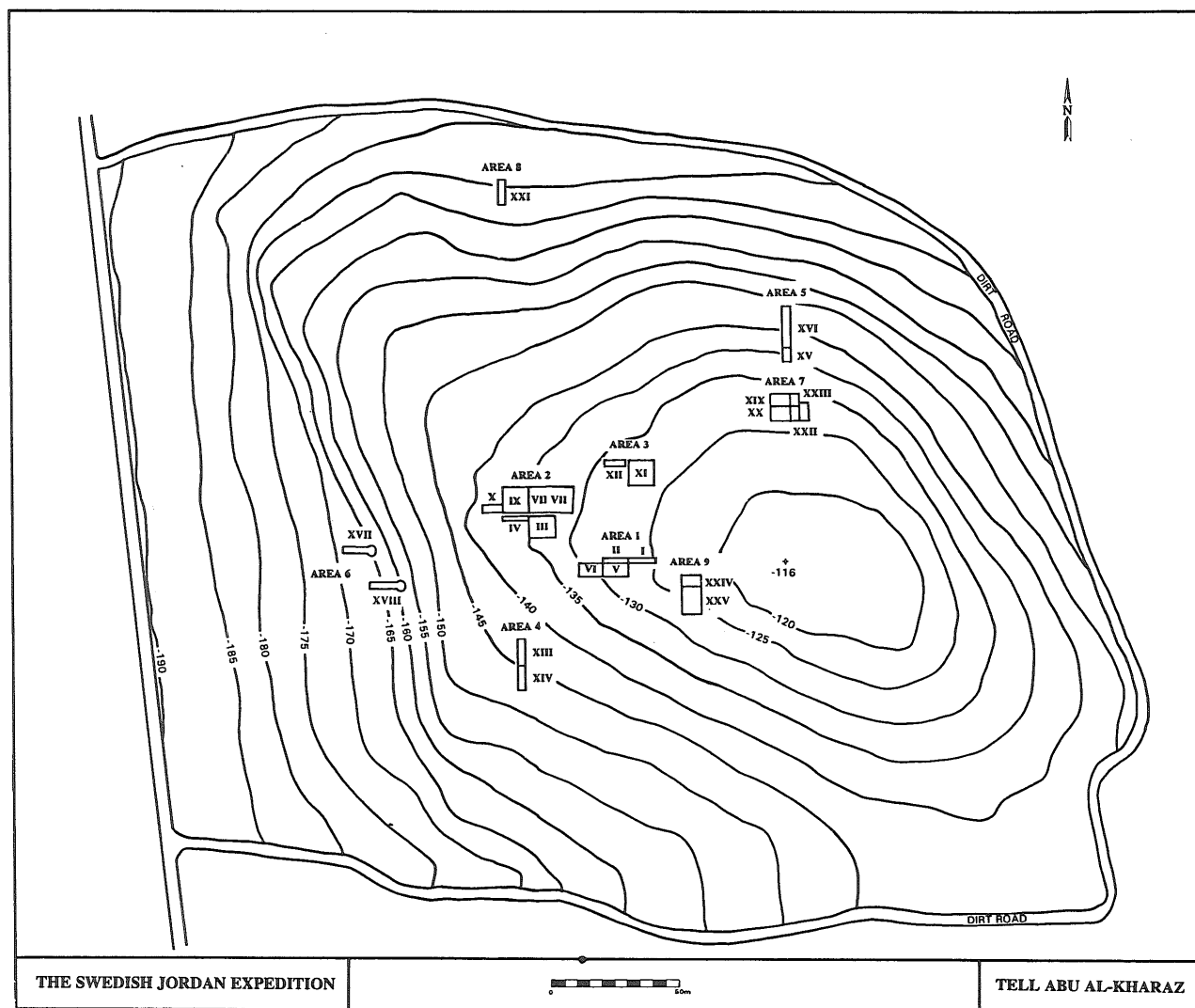
Information concerning excavation and sampling techniques, and electronic support, may be found in the preliminary reports previously published in *ADAJ* (Fischer 1991, 1993-95). In the description below, the results are presented area by area, and period by period from colluvial soil. The excavations took place on slopes. When a slope is excavated, the number of strata frequently differs from place to place, that is, strata with the same number from different areas do not necessarily belong to the same period.

Area 9: Trenches XXIV, XXVA and B

Area 9 lies in the south of the upper part of the tall east of Area 1 (1989). It measures 7x15m. The area includes a flat part, Trench XXIV (Grid SS31), measuring 7 x 4.75m, to the north, and the beginning of the upper part of the south slope, Trenches XXVA-B (Grid SS32), measuring 7x9.75m. The centre of the 0.5m wide baulk separating the two trenches corresponds to E 206.160 and N 200.613 ± 1m.

Colluvial Soil

The colluvial soil is 20 - 30 cm deep. Parts of stone walls which originate from



1. Tall Abū al-Kharaz: areas and trenches.

the three “main” periods represented at Tall Abū al-Kharaz, Iron Age, Late and Early Bronze Age, are visible on the surface. All walls run approximately east-west.

The pottery¹ is a mixture of all the periods found at Tall Abū al-Kharaz, however the Late Iron Age and the Early Bronze Age are the best represented periods. On top of Stratum 1 two Islamic finds were made: a well-preserved silver coin and a

lentoid flask from the Abbasid period. A lead-silver rosette-shaped pendant comes from the same level.

Iron Age

Strata 1-3

The two most recent phases, Strata 1 and 2, are separated by a layer of ash and were found in the northern part of the area. The feature that dominates amongst the remains

1. The following abbreviations have been used for the catalogue of illustrated pottery:

Description/abbreviations: identification number (trench/stratum/locus/find number), shape, HM (hand-made pottery includes techniques as pinching, drawing, mould-modelling and coiling; no further distinction is made in this report), WM

(wheel-made pottery includes wheel thrown and turntable pottery), fired hard (H), medium (M) or soft (S) or combinations, colour of clay, core, inclusions (refer to the Wentworth scale; Wentworth 1922: 377-292; and 1933: 633-634), slip (SS=self slip) and surface treatment.

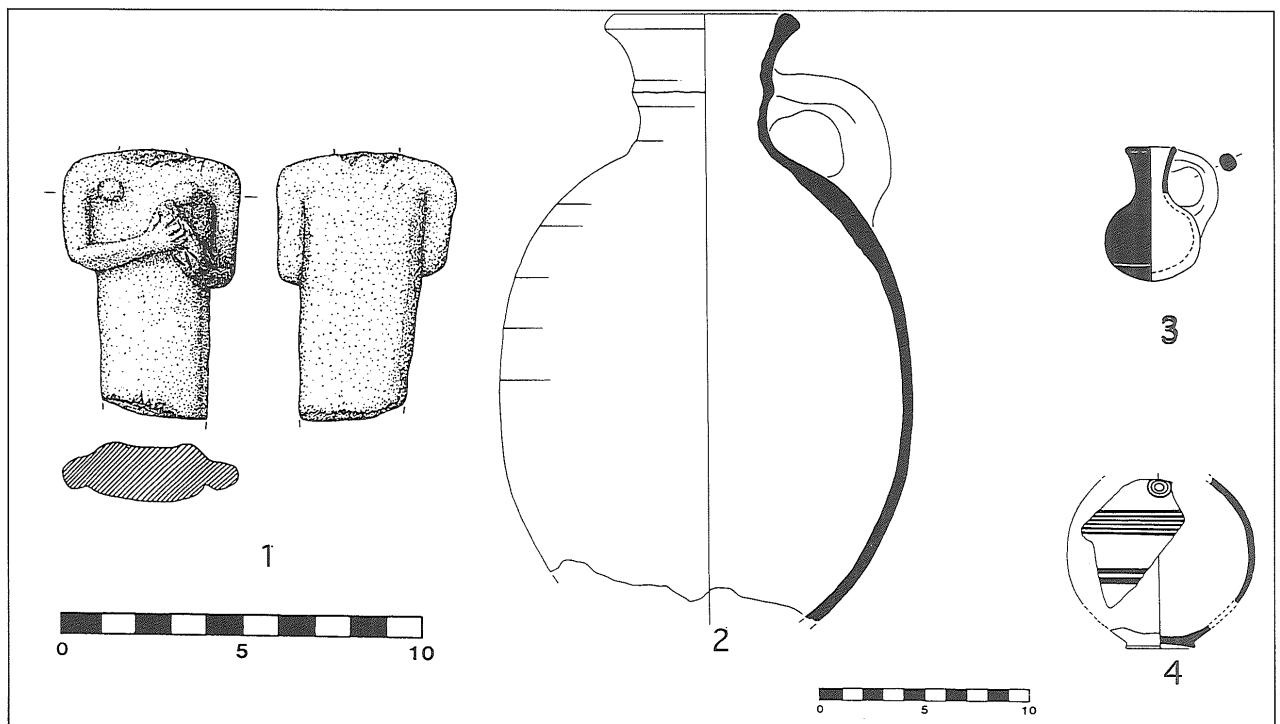
of domestic architecture is Wall 221 which was originally built in Stratum 2 and reused in the last preserved occupational phase (Stratum 1). It is the same "city" wall that was found in 1989 to the west in Area 1 and numbered Wall 4 (Fischer 1991: 73). Its total length is approximately 350 m and it encircles the upper part of the tell. The other architectural remains are represented by totally destroyed foundation walls of houses and stone pavements. Two ovens were found.

The pottery from both these strata contains typical Late Iron Age shapes, among which a 'Black Juglet' and an almost complete crater should be mentioned, together with a red-painted false spout of a jar (Tall al-Fār'ah, Chambon 1984: Pl. 46:10). Small finds include iron and bronze artefacts, and a bull and a female figurine both of hard fired clay. The slender female figurine is standing upright (Fig 2:1). She is holding an object in both hands just below her left breast. The object is very likely a musical

instrument, perhaps a tambourine (Tall al-Fār'ah, Chambon 1984: Pl. 63:1-2). Traces of glaze are visible on the back of the left shoulder of the figurine.

Architectural remains from Stratum 3 were found over the entire area of excavation. Defence walls from the Late and Early Bronze Age were reused and completed with new constructions. The result is an impressive approximately 5 - 6m wide construction for the defence of the vulnerable south part of the tell. Remains of partly stone-paved domestic buildings were found in the middle of Area 9 and to the north.

An interesting find was made outside a house in the north-eastern part of the area. A circular pit, approximately 1m in diameter, was dug close to the south-western corner of the house. It contained an almost complete but broken jug resting on a bed of pebbles (Fig.2:2). The pit was filled with ash (burnt straw?) and sherds, and covered by flat stones. A metal figurine of a lilac-



2. Iron Age finds: 1. XXIV1L1N874, female figurine with tambourine(?), HM, H, light red, thick grey core, medium-coarse, mainly white inclusions, traces of glaze on left shoulder. 2. XXIV3L69N907, jug, WM, H, light brown, medium-fine and some large white inclusions, SS. 3. XXIIIB2N906, Black juglet, WM, H, greyish-brown, medium fine, thick black slip, vertically burnished. 4. XXIIIB4L105/108W258-3, Cypriot Black-on-Red juglet, WM, H, light brown, fine, reddish-brown slip, burnished, matt black decoration.

grey colour was found lying on top of a flat flint stone which partly covered the pit (Figs. 3a and 3b). The well-preserved, approximately 10 cm high, statue depicts a warrior god, standing upright upon a plinth.

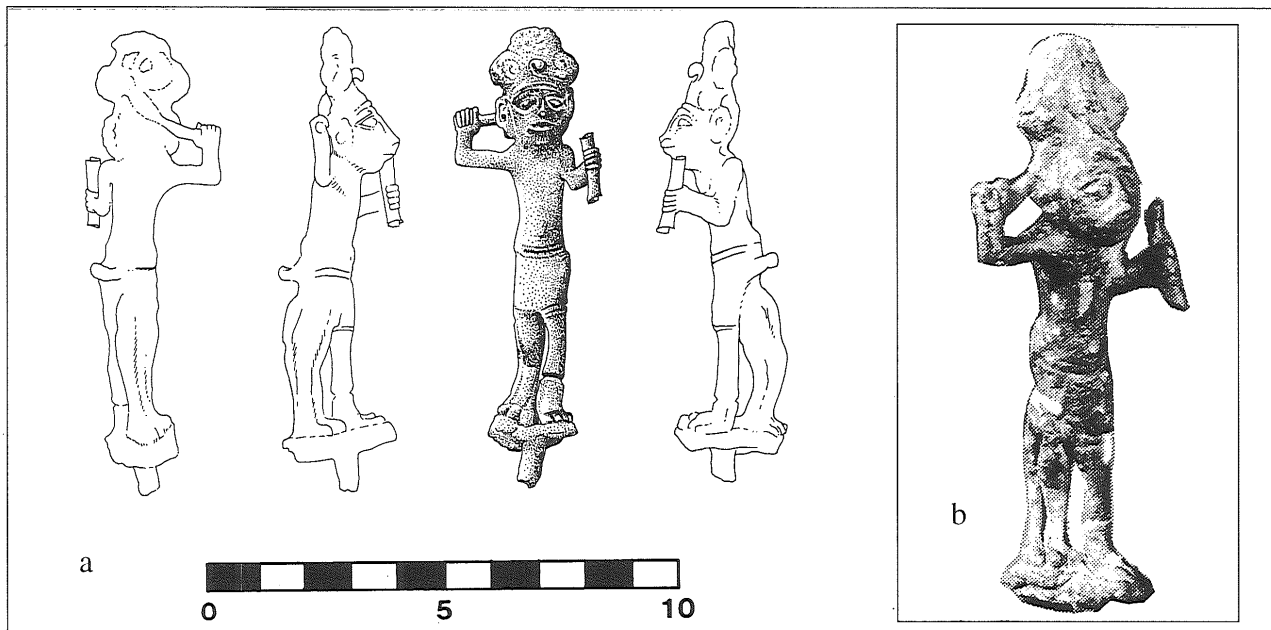
The god's face has a kindly expression and seems to be a mixture of lionine and human; he has a human body and arms. His left leg is human, but his right is very probably a lion's leg with a lion's paw. Two tangs are attached: one at his back and one below his feet for the purpose of attaching the figurine to something. His dress is a thin and short skirt with a waist band reaching from just below his navel to the knees. He has a cap with trefoil-shaped (ostrich?) plumes. On his forehead is the uraeus, the sacred serpent. His lifted right hand holds a weapon behind his head, resembling a scourge. His lowered left hand holds a papyrus scroll (?).

The overall impression of the Tall Abū al-Kharaz figurine is twofold: the god is very skilfully made by the craftsman to express both benevolence in his friendly face and threat in the raised weapon. Some attributes resemble the lion-faced Sekhmet, or the cat-faced Bastet or Schesemtet, for instance the weapon, the possible papyrus

scroll, the uraeus and the head-dress. However, it is very likely a male with naked upper body. No exact parallels could be found, but the general appearance of the figurine resembles other figurines from Palestine and Syria (see e.g. Seeden 1980: Pl. 102, 1722-1724, all females).

A small sample was taken from the plate and analysed by SIMS (secondary ion mass spectrometry) at the Chalmers University of Technology. It was anticipated, because of the quite heavy figurine's grey appearance, that it could be made of a silver-lead alloy. The preliminary, not yet quantified results, shows that silver and lead are constituents of the alloy, although copper and tin dominate. Other clearly demonstrable elements are iron, nickel, arsenic and antimony.

The preliminary date of Stratum 3 is based mainly on the jugs which have parallels at Megiddo V (Lamon *et al.* 1939: Pl. 8:177), Taanach IIB (Rast 1978: 138, Fig. 37:1; 195, Fig. 62:8) and also Hazor VIII (Yadin *et al.* 1960: Pl. LVIII). The cited parallels would point to a date within the first half of the Iron Age; however, the figurine seems to be older (see Seeden 1980, above).



3a and b. The metal figurine from Tall Abū al-Kharaz.

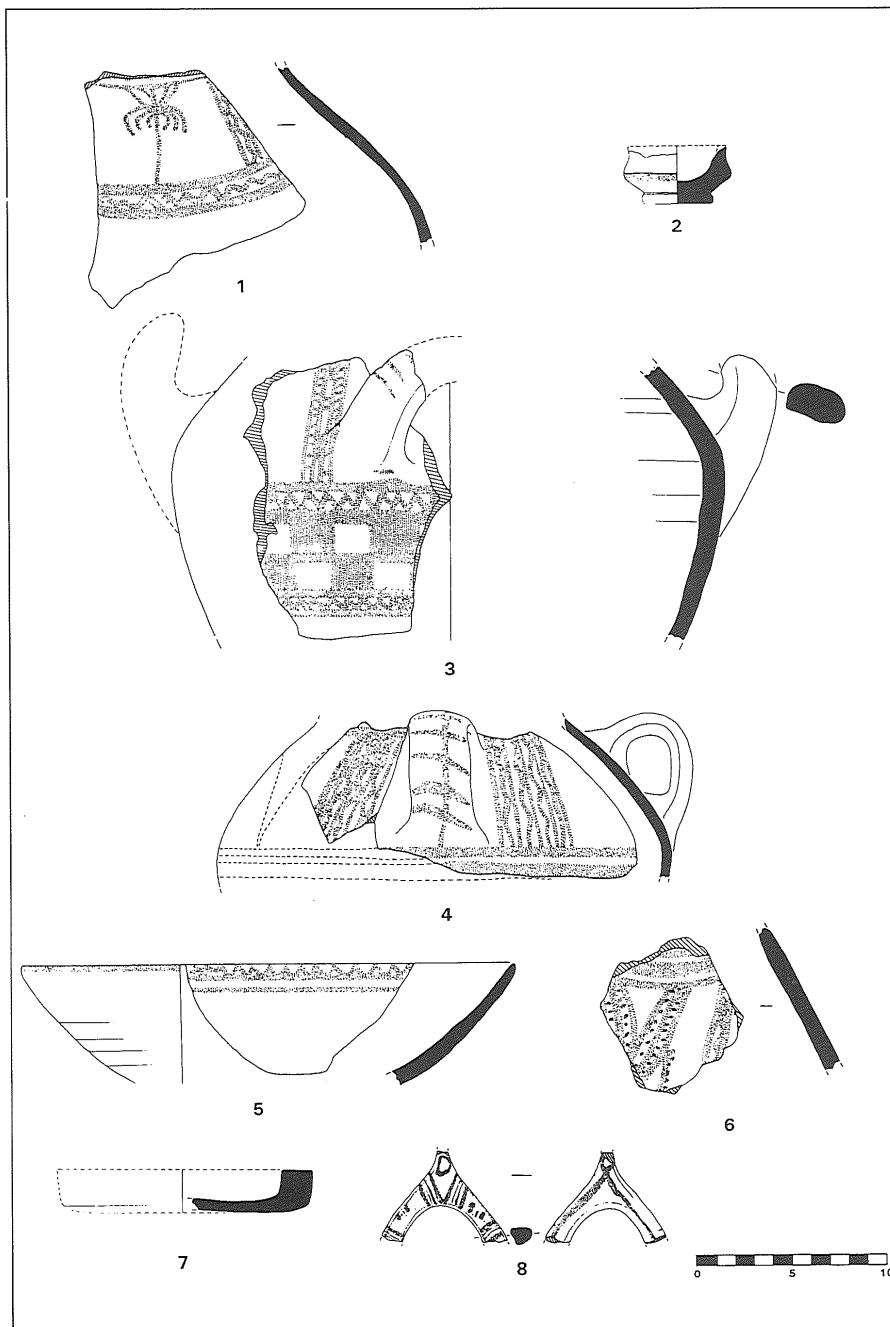
Late Bronze Age

Stratum 4

The almost 2 m wide Wall 225 in the centre of Trench XXV, running east-west, was used as a city wall during the Late Bronze Age. However, the foundation of this wall was built during the Early Bronze Age (see below) and later modified. The wall seems to be identical with Wall 9 in Area 1 (Fischer 1991: 75, Fig. 5c), and Wall

187 in Area 7 (Fischer 1995). Scanty architectural remains of this Late Bronze Age phase were found in the northern part of the area: the corner of a demolished house in the north-east, and a hearth and oven. Ash covers the remains.

The pottery includes Chocolate-on-White ware (see Fig. 4:3-6) and Cypriot imported early White Slip II (Fig. 5:8; cf. Åström 1972: 447-456).



1. XXIV3L27-1, jug, WM, MH, light brown, coarse, multi-coloured inclusions, yellow slip, brown decoration.
2. XXIVW248N904, miniature bowl, WM, MH, brown, medium-coarse, mainly black inclusions, reddish-brown decoration.
3. XXIIB5L104-4, jar, Chocolate-on-White, WM, MH, light yellowish-red, grey core, medium-fine, white and grey inclusions, yellowish-white slip, burnished, matt chocolatebrown decoration.
4. XXIV4L86N902, jug, Chocolate-on-White, WM, MH, light brown, medium-fine, few large white inclusions, thick yellow slip, burnished, matt brown decoration.
5. XXIIB5L105-3, bowl or chalice, Chocolate-on-White, WM, MH, light reddish-brown, thick greyish-brown core, medium-fine, multicoloured inclusions, thick pinkish-white slip, burnished, brownish-red decoration.
6. XXIV2L37-1, jar/jug, Chocolate-on-White, WM, MH, greyish-brown, coarse, mainly grey inclusions, thick greyish-white slip, burnished, chocolate-brown decoration.
7. XXII5L103-1, faience bowl, white, blue core, green on surface.
8. XXVA4L19N878, Cypriot early White-Slip II handle of bowl, HM, H, reddish-brown, light grey core, fine, white slip, chocolate-brown decoration.

4. Late Bronze Age pottery.

Early Bronze Age

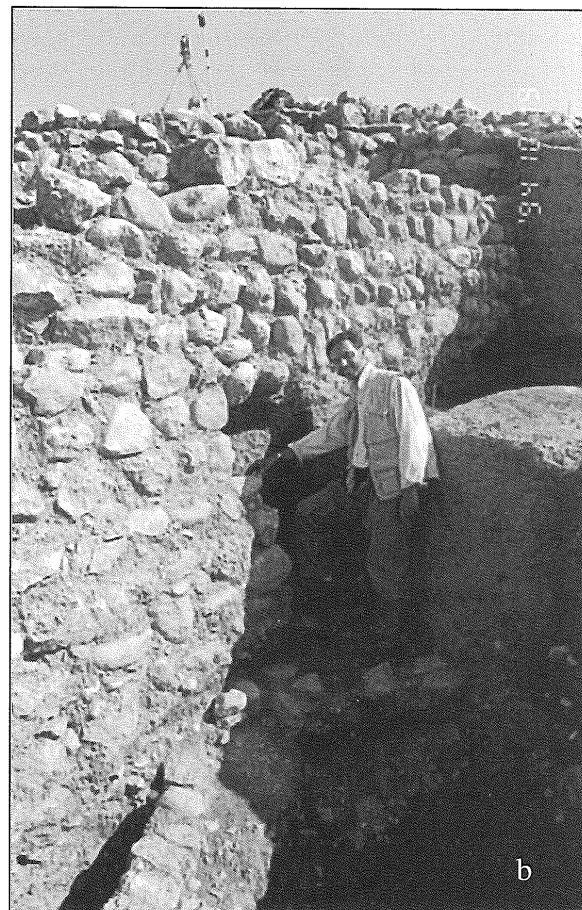
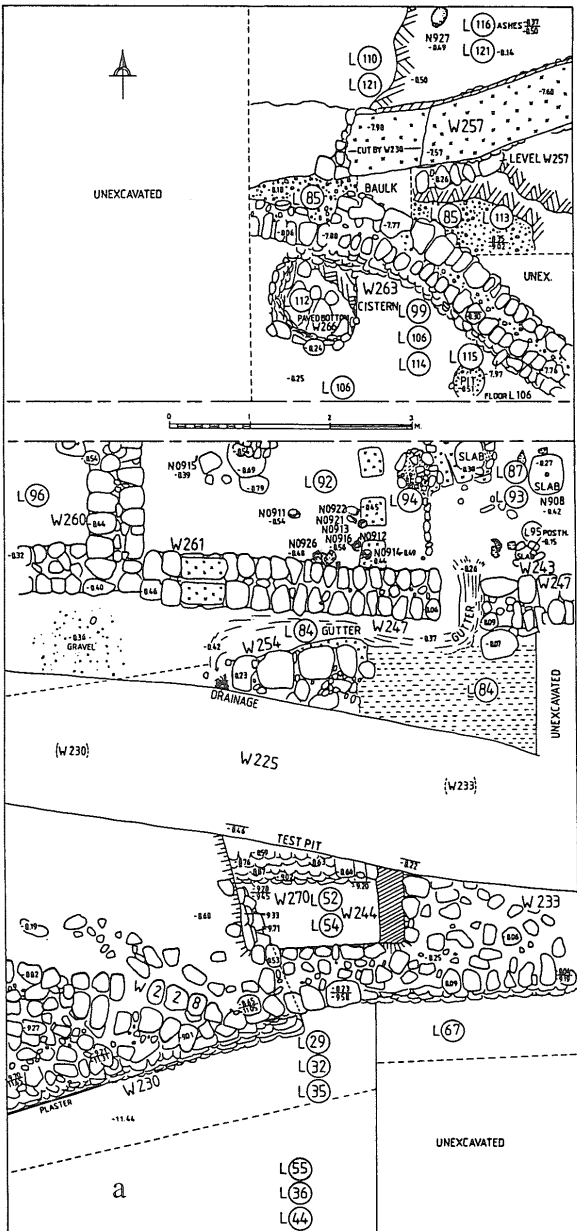
Strata 5-9

Stratum 5 is the most recent Early Bronze Age II (squatter) phase, and has been considerably disturbed by the following occupations (see the earlier reports for the preliminary divisions into "Squatter" and "Main" phases within Early Bronze Age II). Domestic buildings were erected against Wall 225 possibly rebuilt in Stratum 5 (see the outlines in Fig.5a). Among the small

finds a stone mace head should be mentioned.

The foundation of Wall 225 seems to have been constructed in Stratum 6 upon the massive city Walls 230/233 built in the previous phase. Domestic architecture was built to the north against Wall 247. It is a 0.6 m wide wall running parallel to the city wall at a distance of roughly 1 m.

Stratum 7 is a phase of intensive building activities (Fig. 5a). A very preliminary evaluation of the findings may confirm that this phase corresponds to Main Phase II according to the earlier preliminary excavation reports from Area 2. A massive stone city wall was erected in the southernmost part of the area with a preserved height of approximately 3m (Figs.5a and 5b). It was plastered once, remains of this being found close to its foundation. It is built in two sec-



5a. Early Bronze Age II city wall in the south, domestic architecture in the north (Area 9).

5b. Tall Abū al-Kharaz. Early Bronze Age II city wall. Early Bronze Age IB remains below.

tions on different levels (Walls 230 and 233). A tunnel-like opening can be seen between the walls. An approximately 2 m² test trench was opened on top of Wall 233 in order to investigate the "tunnel". It became clear that the walls were not built simultaneously, but a real tunnel could not be found. However, the test pit exposed two other well-constructed walls built on top of each other and parallel to the outer wall at a distance of about 2m. During the continued excavation inside the city walls another wall was found (Wall 254) which may be the innermost part of the city wall complex which would give it a width of 4 - 6 m.

This part is built on a foundation of mudbricks (!) which may be a still older city wall. It is difficult at this stage to decide exactly how and when the city wall complex consisting of a number of separate walls was constructed, for example, if the oldest part was the inner part in the north and later reinforced by additional walls on the outside, or vice versa. It cannot be ruled out, for example, that the wall to the south, Wall 230, might in fact be a huge tower. Below the foundation of this defence construction disturbed walls from an earlier phase were found. Domestic architecture was found inside the city wall. A stone-built cistern-like construction, about 1m large and deep, in the north part of the area may possibly represent a grain silo.

The pottery from Stratum 7 contains some complete and intact vessels including bowls, platters, jugs, juglets and jars (Fig. 6:1-6). A Red-on-White jar shows a very peculiar petrography which differs from the other petrographically examined Early Bronze Age sherds from Tall Abū al-Kharaz (Fig. 6:6; petrography report forthcoming).

The domestic architectural remains belonging to Stratum 8 are to the south built against a mudbrick wall (see above) which may represent a city wall built in the oldest phase (see below). A courtyard and two rooms were exposed. Small finds include

stone tools and pottery. A burnished mace head of alabaster (Fig. 6:10), a juglet and a number of storage jars should be mentioned.

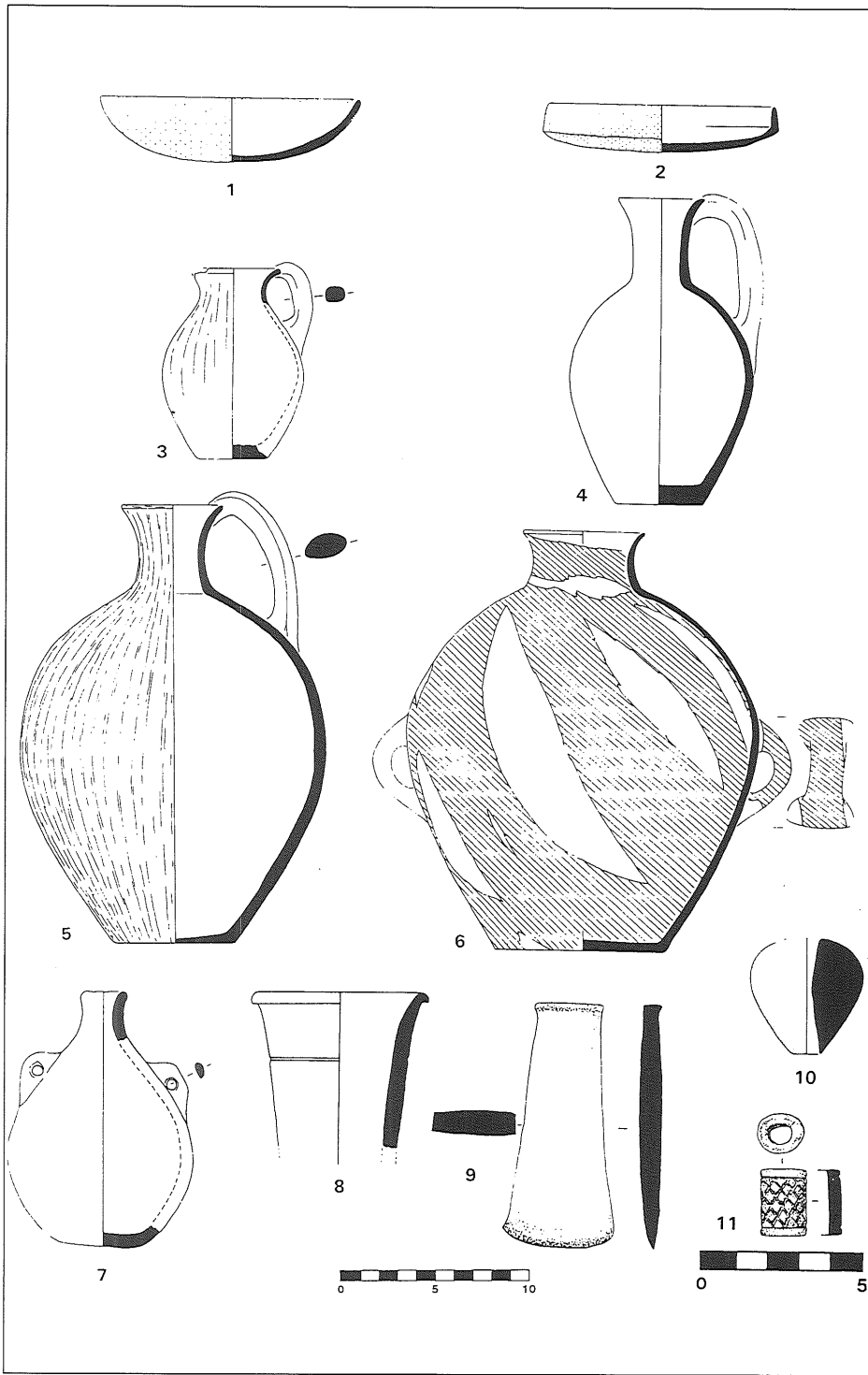
The only interpretable domestic architecture from the oldest phase in this area, Stratum 9, is a mudbrick bench built against a compact mudbrick "city wall". A number of interesting small finds were made, amongst them the largest copper (alloy?) axe so far found at Tall Abū al-Kharaz (Fig. 6:9). Its dimensions are: length 12.9 cm, width at the edge 5.6 cm and at the shaft 3.2 cm, and thickness 1.4 cm (approximately at the centre of the axe). Other finds are a type of juglet (Fig. 6:7) new to the repertoire of the site and storage jars .

A find from the same occupational period (K91VIIB, Area 2) provides evidence for contacts with Egypt during the Early Bronze Age IB period: an imported cylindrical jar of Egyptian marly clay (Naqada III; see e.g. Needler 1984: 216-217, nos. 76-77). This type of vessel is recorded from several EB I sites in southern Israel and northern Sinai (e.g. Gophna 1995: 279, Table1; Brandl 1989: 370, Fig. 10:3-4). However, it is to our knowledge the first recorded Egyptian cylindrical jar in the Jordan Valley in this period (pers. com. Y. Goren).

Area 7

Trench XXII which was partly excavated in 1993 was extended to the east. The new trench measures 3 m x 7 m. The Iron Age house and the towers, the Late Bronze Age city wall, and architecture belonging to the Early Bronze Age were further exposed (see ADAJ 39). A silo was found in an Early Bronze Age context .

Small finds include a faience bowl found in an Iron Age context but possibly from the Late Bronze Age. A cylinder seal very likely cut from a young female hippopotamus canine (pers. com. Leif Jonson; Fig. 6:11). It resembles the one of bone found in 1991 (Fischer 1993: 297, Fig 12:11 and Pl. III:2, 59).



1. XXVA7L92N914, platter / bowl, WM, H, yellowish-brown, medium-fine, some white inclusions, SS on inside, dark red paint on rim and outside.
2. XXVA7L92N916, platter, HM, H, reddish-brown, thick grey core, medium-coarse, mainly white inclusions, SS inside, dark red paint outside.
3. XXVA7L92N912, juglet, WM, H, light brown, medium-coarse, brown inclusions, light brownish-red slip, vertically burnished.
4. XXVA7L92N921, juglet, WM/HM, M, light yellowish-brown, medium-coarse, mainly black inclusions, traces of reddish-brown slip, possible burnished.
5. XXVA7L92N922, jug, HM/WM, MH, red, medium-fine, some multicoloured inclusions, red slip, vertically burnished.
6. XXVA7L92N926, jar (Red-on-White), HM, H, light brown, thick grey core, medium-coarse with white and black inclusions, thick white slip, red paint.
7. XXVAL9L108N930, amphoriskos HM/WM, MH, yellowish-brown, medium-coarse, black and white inclusions, SS.
8. VIIB12 "W60"-1, Egyptian cylindrical jar, HM/WM?, M, grey, fine, burnished.
9. XXVA10L123N935, axe, copper (alloy?).
10. XXVA8L101N881, mace head, alabaster, burnished.
11. XXIIB5L113N920, cylinder seal, hippopotamus (canine of young female?).

6. Early Bronze Age finds. Nos.1-6 are from the same room.

Acknowledgments

I would like to express my sincerest gratitude to TRH Prince Ra'ad bin Zeid and Princess Majda Ra'ad bin Zeid for their interest and support of SwedJordEx. Thanks to the generous assistance of the Department of Antiquities and its acting Director-General, Mr Faisal Al-Qudah, which included the loan of one of the Department's vehicles, the excavations were carried out successfully. Thanks are also due to HE Mr Christian Bausch, Swedish ambassador to Jordan, for his sincere interest in the project. I am also indebted to Prof. Emeritus Basil Hennessy for permission to rent the Pella Dig House, and to Dr Pamela Watson and Dr Margaret O'Hea, with whose Australian team we shared the dig house during October in a good spirit. Finally I wish to thank all the team members for their hard work, which greatly contributed to the suc-

cessful execution of the excavations.

Dedication

I would like to dedicate this report to my dear friend José Alberto Gallart. José was a professional assistant and a highly valued member of the Swedish Jordan Expedition at Tall Abū al-Kharaz 1992-1994. He loved archaeology, and was devoted to Jordan and its cultural heritage.

José was involved in a tragic car accident that took his life on 16 August 1996. He was 27 years old.

Peter M. Fischer
Institute of Classical Archaeology
and Ancient History,
Gothenburg University,
Dörjeskärgatan 37
S-421 60 Västra Frölunda,
Sweden.

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AN EDMITE FORTRESS AND A LATE ISLAMIC VILLAGE NEAR PETRA (JORDAN): KHIRBAT AL-MU'ALLAQ

by

M. Lindner, E.A. Knauf and J.P. Zeitler

Introduction

During the Petra surveys 1991-1995 of the Naturhistorische Gesellschaft Nürnberg e.V., directed by M. Lindner, the archaeologically little known region west of the ash-Sharā escarpment between Wādī Mūsā and aṭ-Ṭayyiba was explored (Fig. 1). On a wide ledge or shoulder of the escarpment, where Cenomanian limestone overlies the Cambrian sandstone, the springs of 'Ayn Braq (c. 1300 m), 'Ayn Amoun (c. 1330 m), 'Ayn al-Mu'allaq (c. 1400 m) and 'Ayn aṭ-Ṭayyiba were natural stations along an ancient route. Graf lists it among the major connections of the Roman era. He adds, however, that most of such roads clearly followed the more ancient Nabataean ones (1992: 258-9). After finding Iron II (Edomite) pottery at Khirbat al-Mu'allaq (by Suleiman Farajat, Inspector of Petra) and the discovery by excavation of an Edomite fortress at this place, one may consider a more or less similar significance of the route during the Edomite period of Southern Jordan.

Khirbat al-Mu'allaq: The Site History

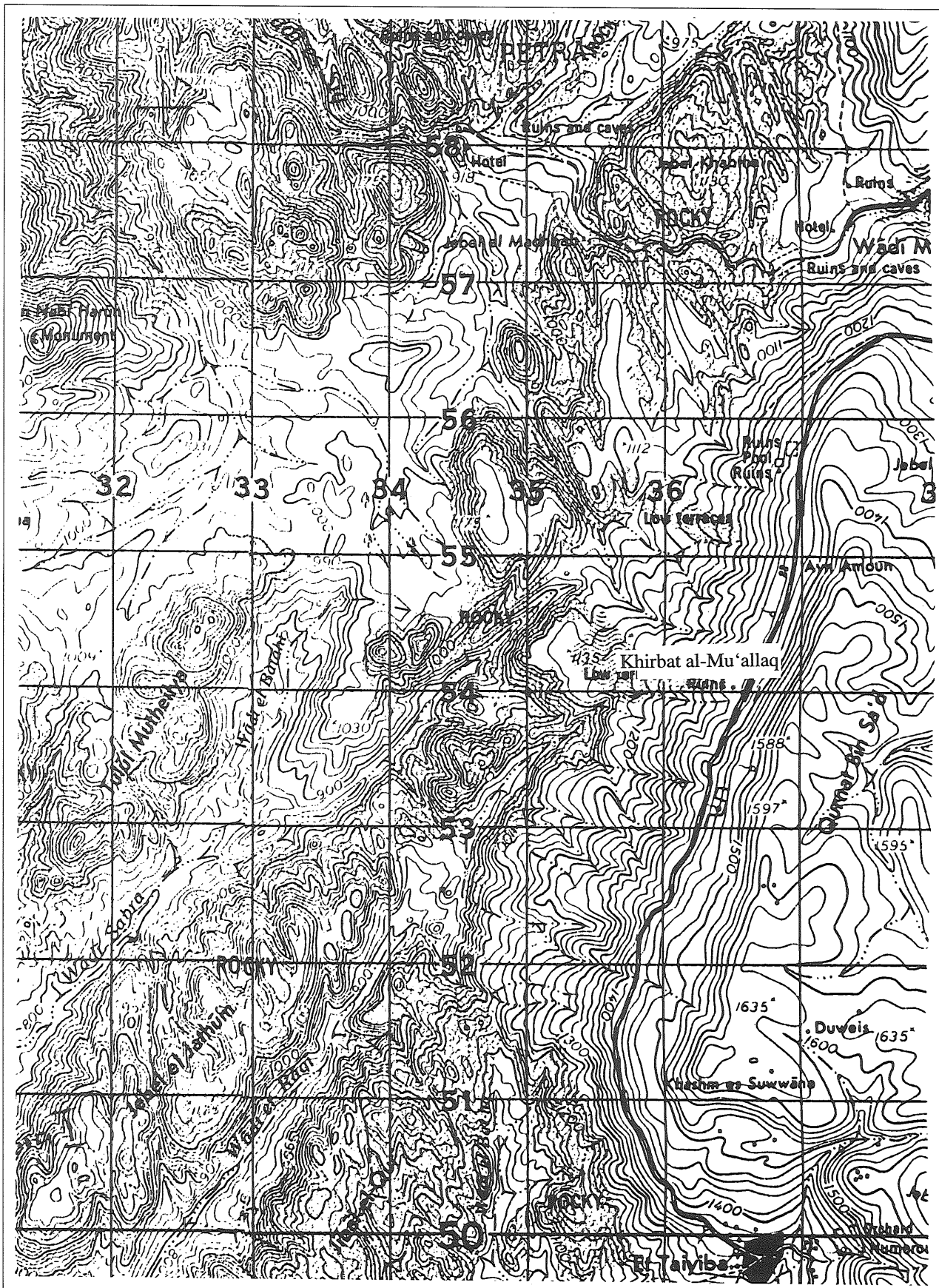
Khirbat al-Mu'allaq is located c. 6 km south of Wādī Mūsā, right by a new asphalt road following the ancient route to aṭ-Ṭayyiba (Fig. 2). It was visited by Musil in 1898 who described "die Quelle a'jun Mu'allaq und ein zerstörtes Dorf". Numerous vineyards and trunks of old olive trees bore witness that once industrious people had lived there. His companion, a "*fallāḥ*", told him that 70 years ago (i.e. possibly around 1830) "Lijatne" had raided their village, felled the olive trees and forced the inhabitants to emigrate to "al-Araba". In Musil's time, the

place was deserted (1907: 3,283). His informant may have referred to raids and battles mentioned by Russell and Simms when, in the 19th century, Mohammed Ali fought the Ottoman army and took control over all of Palestine and Syria until 1841. During a feud between the nomadic 'Alawin, who were allied with the Bdūl, and Abū Rashid who had separated from the 'Alawin, the Egyptian government intervened in an attempt to subdue the Bdūl in 1838/1839 (1991: 26-29; Russell 1993: 24-25).

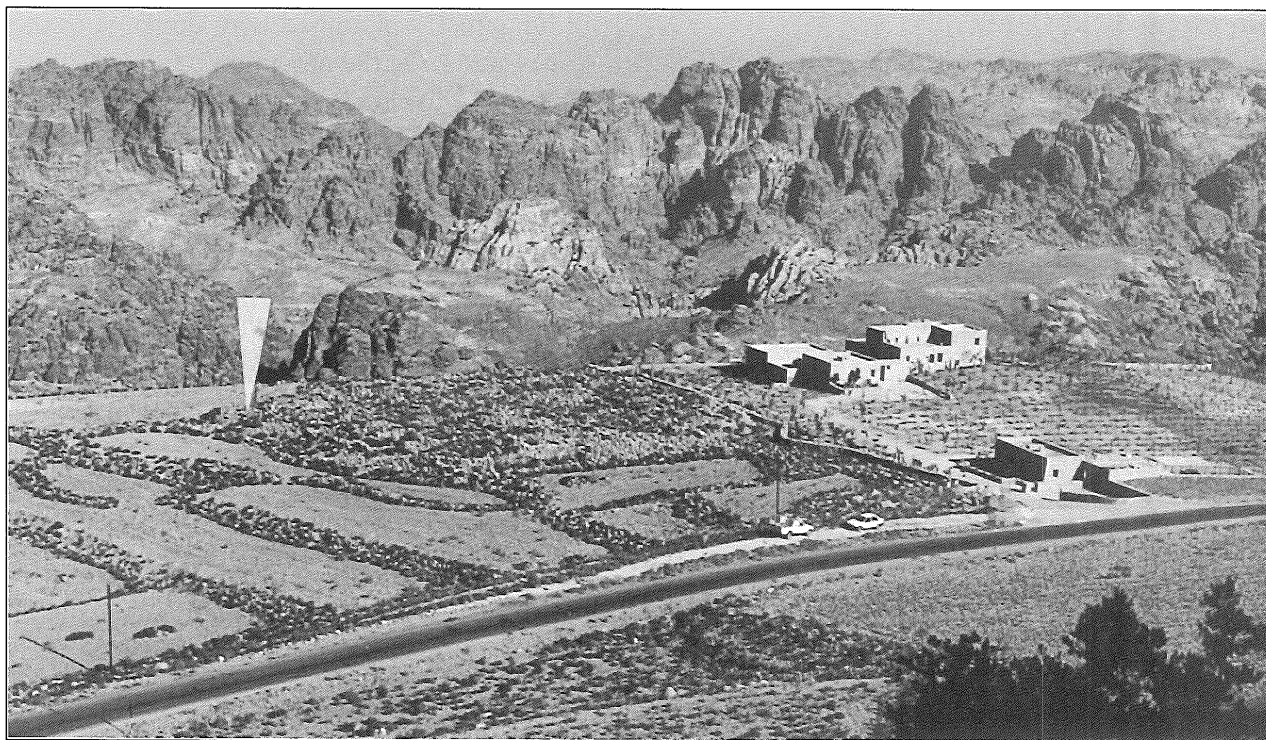
We do not know whether the "village" of al-Mu'allaq was inhabited by a Bdūl clan or by another tribe, but it may have been destroyed at that time. Even if this destruction was not the first one, the episode and its consequences, supposedly one of many in the 19th century, characterize the astonishing changes not only of habitation but also of environmental conditions through war and destruction as demonstrated by the next recorded visit. In the footsteps of Musil, Glueck explored Khirbat al-Mu'allaq in May 1934. He described the site as an extensive, ruined place with quantities of medieval and modern Arabic pottery. He found 'Ayn al-Mu'allaq rising above the site, irrigating a number of large terraced fields on the hillside. The last vestiges of the splendid "garden village" had disappeared within 36 years (Glueck: 46, 79).

'Ayn al-Mu'allaq

'Ayn al-Mu'allaq is located 115 m above and somewhat more to the south-east of Khirbat al-Mu'allaq. There are still more than 100 m to go until one reaches the plateau (c. 1550 m). The whole escarpment between Khirbat



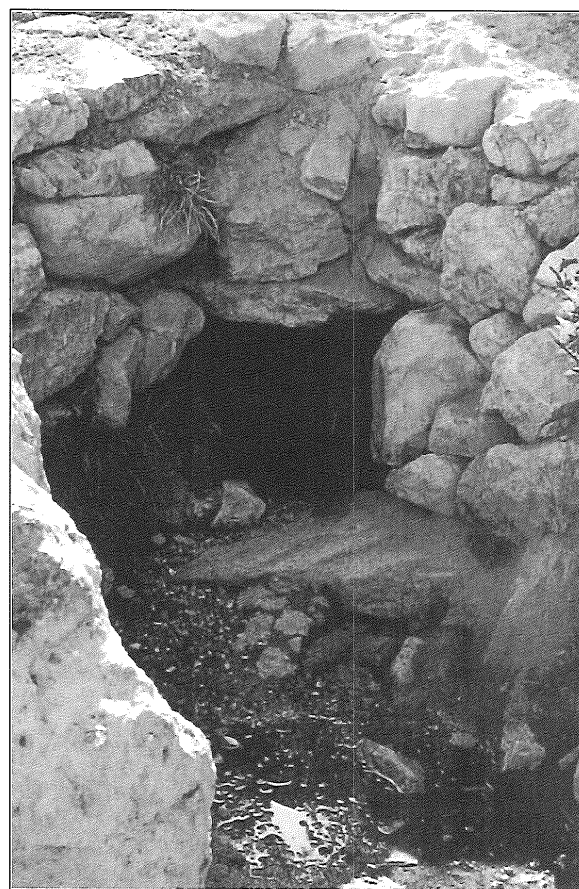
1. Location of Khirbat al-Mu'allaq on the 1:50 000 map of Jordan.



2. Khirbat al-Mu‘allaq with the excavation place (arrow) and the mountains of Petra in background.

and ‘Ayn al-Mu‘allaq, that seems extremely steep and barren when viewed from the road, is carefully terraced with lines of small and big stones creating strips of cultivable soil. Two Nabataean sherds and one Iron II sherd were collected among a scatter of unidentifiable fragments. Only a thin rivulet came out of the built enclosure of the spring in October 1992. Old grape vines and dead trunks, fig trees, apricot trees, olive trees and a middle-sized *Crataegus aronis* constitute a small oasis. A few field terraces profiting from the spring water are irrigated in winter as well as several terraced fields below the road. No human-made structures beside the spring enclosure and a built fireplace were noted (Fig. 3).

A few Nabataean and other plain sherds including the handle of a big vessel were collected on the surface. No traces of a conduit to Khirbat al-Mu‘allaq were visible. Where the water from the spring reaches the road below, a pipe of such a small size was installed under the road bed that obviously even in winter not much water is expected nowadays.



3. Built enclosure of ‘Ayn al-Mu‘allaq.

The Slopes of al-Qṣeir

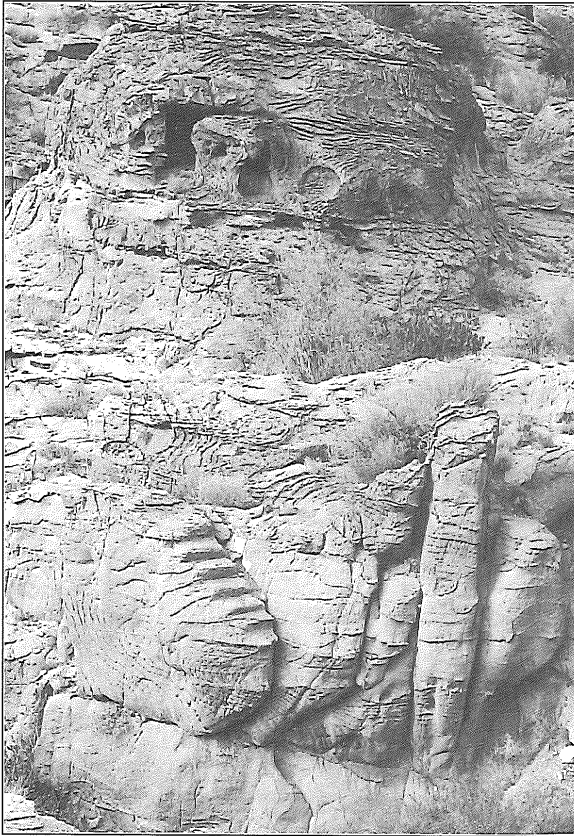
West of Khirbat al-Mu‘allaq and the Wādī Mūsā-aṭ-Ṭayyiba road, the slope of the ash-Sharā escarpment becomes gradually more gentle. After a while, the limestone peters out and sandstone crops out, first in gullies and later in very deep gorges. They drain the water of winter rains into rock wadis, leading into the Petra area to the north-west and into the Ṣabrā area to the south-west. The whole region is called al-Qṣeir by the local population. Seen from afar, especially in summer and autumn, al-Qṣeir seems barren. In fact, however, almost the whole slope from the road down to the watershed between Petra and Ṣabrā is terraced with lots of substantial fieldstone walls (Fig. 4). In April 1991, grain was growing on many of the terraces, and in October 1992 these fields were newly ploughed, interestingly, with the help of tractors in the upper and with donkeys in the lower parts. Olive trees had recently been planted in two places. The ownership is not clear. The authors were told their campsite at the slope (1240 m) belonged to a Bdūl family, and



4. Recently used, ancient terraces on the shoulder of Jibāl ash-Sharā with Khirbat al-Mu‘allaq in background.

Bdūl actually ploughed with donkeys in the lower parts. On the other hand, Bdūl officially do not own land, since they declined paying taxes in 1923 (Russell and Simms 1991: 321). Apparently, however, they actually cultivate land and arrange themselves with the people of Wādī Mūsā and/or aṭ-Ṭayyiba.

The terraces on the slopes of al-Qṣeir were already tilled by the Nabataeans. A house ruin of well-cut ashlar of the usual size with Nabataean pottery sticking out of the masonry is located at 1040 m in the middle of terraced fields. A threshing floor and a rock shelter, filled with grain sacks in October 1992, are no recent installations. A second house ruin further north-west is also located among terraces without any trace of an ancient road or pathway. With such houses or hamlets, the al-Qṣeir slope was part of the agricultural resources of Greater Petra. The steep gorges, first in limestone, further down in sandstone, exhibit remnants of walls which at different times had to hold back, slow down and preserve water. Only a thin scatter of Nabataean sherds and a few pieces of quite recent white-blue china fragments were collected on the slope. Al-Qṣeir ends in the south-west at a steep rock wādī which may have allowed the installing of a reservoir in antiquity. Steps on the opposite bank lead down from a hollowed-out hillock. With a basin at its entrance, it is in typical Nabataean style (Fig. 5). Higher up the slope, a large rock shelter with tumbled building stones in front of it belonged once to the same area of agriculture and habitation. Still further up, one can reach the conduit from ‘Ayn al-Buraq and a track to Petra. To the south-east from the al-Qṣeir slope, rainwater is received by Wādī ar-Raqī and further south by upper Wādī Ṣabrā. Both wādī entrances are deeply cut in the surrounding sandstone. The entrance to west ar-Raqī does not seem passable. West Ṣabrā is actually a short-cut from the Wādī Mūsā-aṭ-Ṭayyiba road to Ṣabrā and further on to Abū Khushayba via a substructed pathway, us-



5. Nabataean cave, chamber with basin in front and a staircase down to the steep rock wadi.

able for camels and horses. In its lower half the broadening wadi was once cultivated. Today, only 'ar'ar trees profit from the ancient terraces, belonging already to the ancient hydraulic works of Ṣabrā.

Khirbat al-Mu'allaq. The Ruin Field

As the reports of Musil and Glueck already demonstrate, by not describing it, the site of Khirbat al-Mu'allaq is, in fact, not easy to assess. The roughly trapezoidal ruin field of c. 60 x 48 m at 1335 m, 75 m distant from the modern Wādī Mūsā-aṭ-Ṭayyiba road, is with its longer axis orientated toward NNW, simplified as north in this report. Dry-stone walls of roughly cut limestones with a few sandstone ashlar all around are mostly doubled and 1.50 m wide with a gap of 0.60 m. There is serious doubt whether all of them are original border walls or just what is left after stones had been transferred to the field terraces, robbed for building purposes in the

neighbourhood or sold away by the owner. As far as could be ascertained, most of the interior walls are also doubled, 0.90 m wide and built at right angles from the present enclosure. Walls not built at a right angle were noted only at the southern side. Walls not doubled are 0.60 m wide.

Circular shafts and rectangular enclosures of c. 2 m in depth and 2.50 - 6.00 m in diameter are randomly distributed in the ground. They are made of carefully selected and positioned ashlar taken from the formerly existing walls. The upper diameter of the shafts is slightly larger than the lower one (Fig. 6). Due to the disturbance of the original ground plan, they must be later modifications. Supposedly, after the destruction of the original structure, people living and occasionally squatting at the site had to protect themselves and their property against wind and cold by constructing make-shift tents or shacks on top of the shafts and enclosures. In



6. Round shaft of recent use by a pastoralist and/or non-sedentary population at Khirbat al-Mu'allaq.

one of the shafts, an oval flat stone with a groove around and two outlets, obviously the lower part of an olive mill, is a reminder of former olive groves in the vicinity.

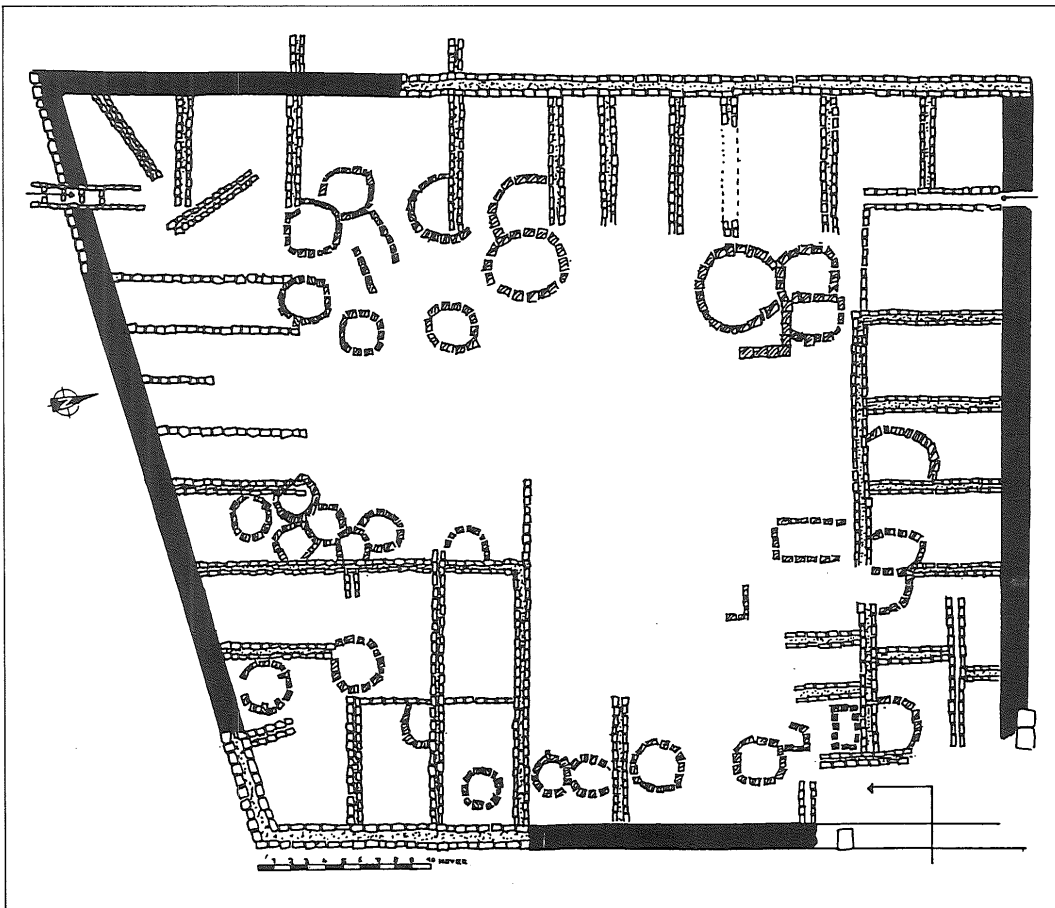
The stone work of Khirbat al-Mu'allaq was certainly not far extended toward the west, where the shoulder of the escarpment ends and the gentler slope of al-Qseir begins. The western periphery looks even more than the eastern one like a bordering wall. To the north, a modern building hides possible former extensions of the site, if there were any at all. The ground slopes to the west and the south, and was also bordered by a wall. Toward the east, agricultural activities have been undertaken at different times. The northern side of Khirbat al-Mu'allaq differs considerably from the other ones. What looks like a roadway, built on both sides with large ashlar of up to 1.00 x 0.50 x 0.40 m, still standing to a height of 1.30 m, leads to a tentatively presumed gate consisting of

ashlars of the same size and quality. The wall between the "roadway" and the ruin field proper is partly doubled. Due to failing substructures and/or to earthquake(s), the original gap is considerably enlarged.

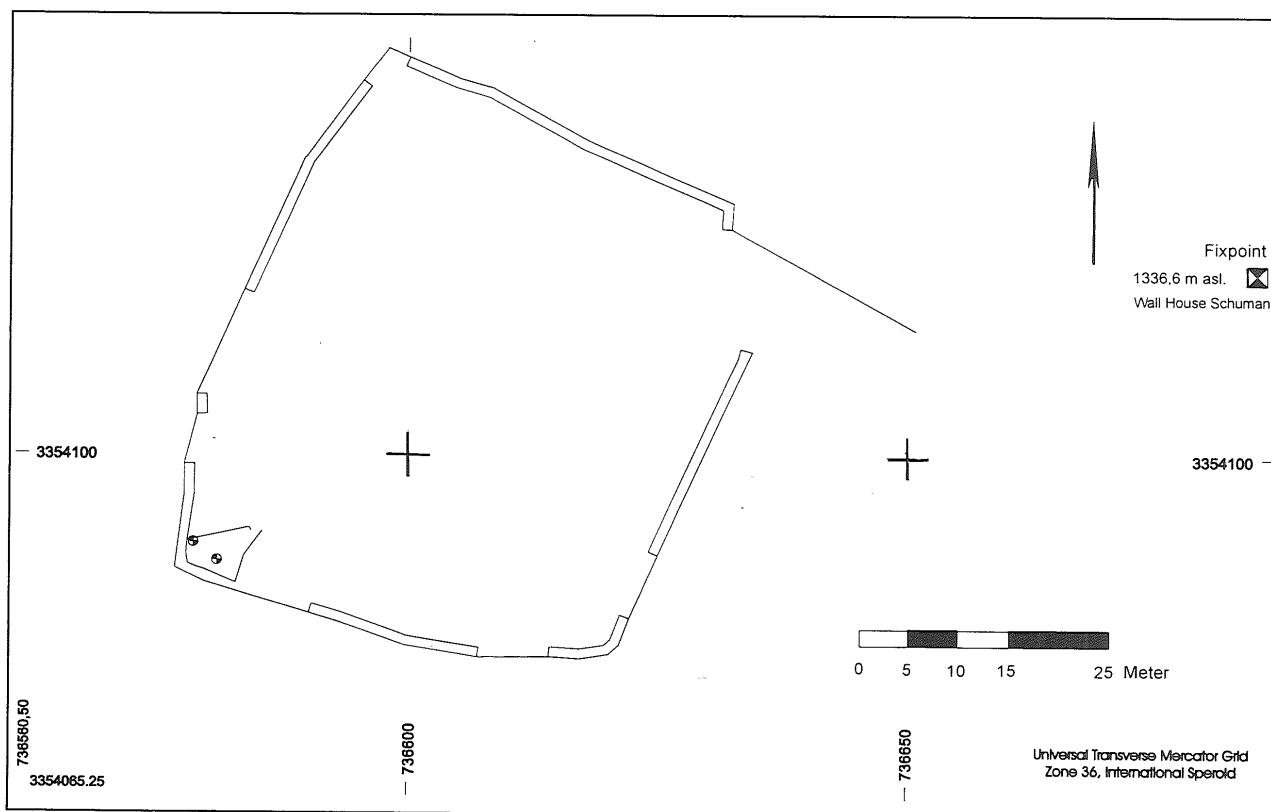
On the whole, the ground of Khirbat al-Mu'allaq with its either regularly laid or loose sharp-edged stones of different sizes makes crossing and surveying the ruin field cumbersome and perilous. Therefore, only a sketch ground plan, established with measuring tape and compass, could be presented till 1994 (Fig. 7). In 1995, however, it was possible to survey the ruin field and the excavation area exactly (Fig. 8).

A Small Scale Excavation at Khirbat al-Mu'allaq

Nobody so far has ventured a date for the origin of the walls of Khirbat al-Mu'allaq, and Glueck's finds of "quantities of medieval and modern Arabic pottery" were not



7. Sketch ground plan produced with measuring tape and compass.



8. Ground plan produced with theodolite and GPS.

exactly verified during the survey. Surface sherding of the site produced mostly fragments of a coarse reddish-brown pottery with a hard grey-black core. The clay is mixed with organic and unorganic material and in many cases blackened by soot and fire. The pottery was tentatively called "Mu'allaq ware". A small portion of the surface pottery was wheel-made coarse and fine Iron II ware, few of them painted. Only some pieces were Nabataean-Roman.

Considering the astonishing finds of Iron II pottery, with the permission and assistance of the Department of Antiquities, first a sounding and then an exploratory excavation were undertaken from 1991 to 1995. The excavation site at 1335 m asl was chosen at the south-west corner of the ruin field near the intersection of two well-recognizable massive double walls. The area was undisturbed by shafts or enclosures as described before, and close by what was considered the western wall of Khirbat al-Mu'allaq. From the excavation site, there is

an unrestricted view to 'Ayn al-Mu'allaq in the south-east and across the Petraean mountains with Jabal Hārūn towering above all of them.

The Surface

The surface of the excavation area was part of and identical with the almost unpenetrable surface of Khirbat al-Mu'allaq, consisting mostly of tumbled, dislodged and displaced limestone boulders and fieldstones with only a few sandstones among them. Surface finds ranged from fragments of pecked querns to sherds of coarse, hand-made reddish-brown pottery with a hard grey-black core; various types of ledge handles, sometimes together with a taenia in the lower part of the vessel; a smaller amount of coarse and fine Iron II (Edomite) pottery sherds, a few of them painted; a handle of an Iron II storage jar with two (unreadable) oval seal impressions; very few Nabataean-Roman sherds; a scatter of fossils from the Cretaceous formation of the plateau.

Stratigraphy and Architecture at Khirbat al-Mu'allaq Site 1

The first sounding was put down in 1991. It was located 5.20 m from a northern double wall (Wall 1), 5.20 m distant from the western boundary wall (Wall 6). The area of 2 x 1 m was gradually enlarged during the following campaigns and finally turned out as a triangle, called Khirbat al-Mu'allaq Site 1. Until October 1994, eight one-metre squares were opened. A grid of 10 x 10 cm was used to localise the finds and to draw the walls.

Stratum I (0 - 0.44 m) (Fig. 9) consisted of tumbled building stones and fieldstones, generally less carefully cut than the wall stones, in an unstratified layer of sand, loam and chalk. There were pottery sherds as on the surface and a few saddle quern and grinding plate fragments. Hardened floors without any paving and without sherds clearly connected with them followed each other in Squares C3, C4 and D4. When during the excavation Squares B4, C4 were cleared of debris material, at Wall 6 a lot of Iron II sherds were found, among them a rectangular fragment (9 x 18 cm) of an Iron II jar with an Edomite letter *Aleph* incised in it. A round millstone in Square E3 marked

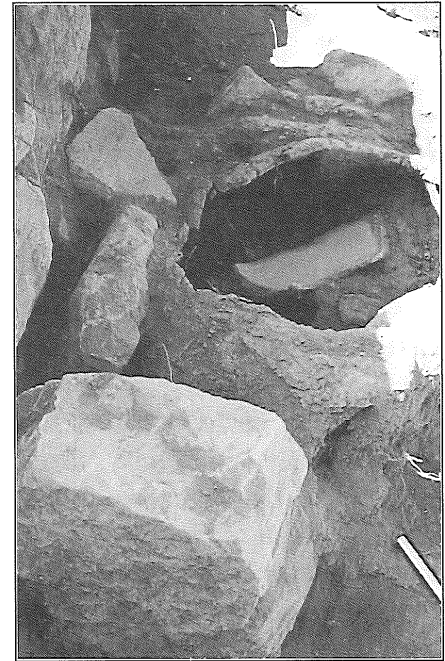


9. Stratum I of excavation with tumbled ashlars.

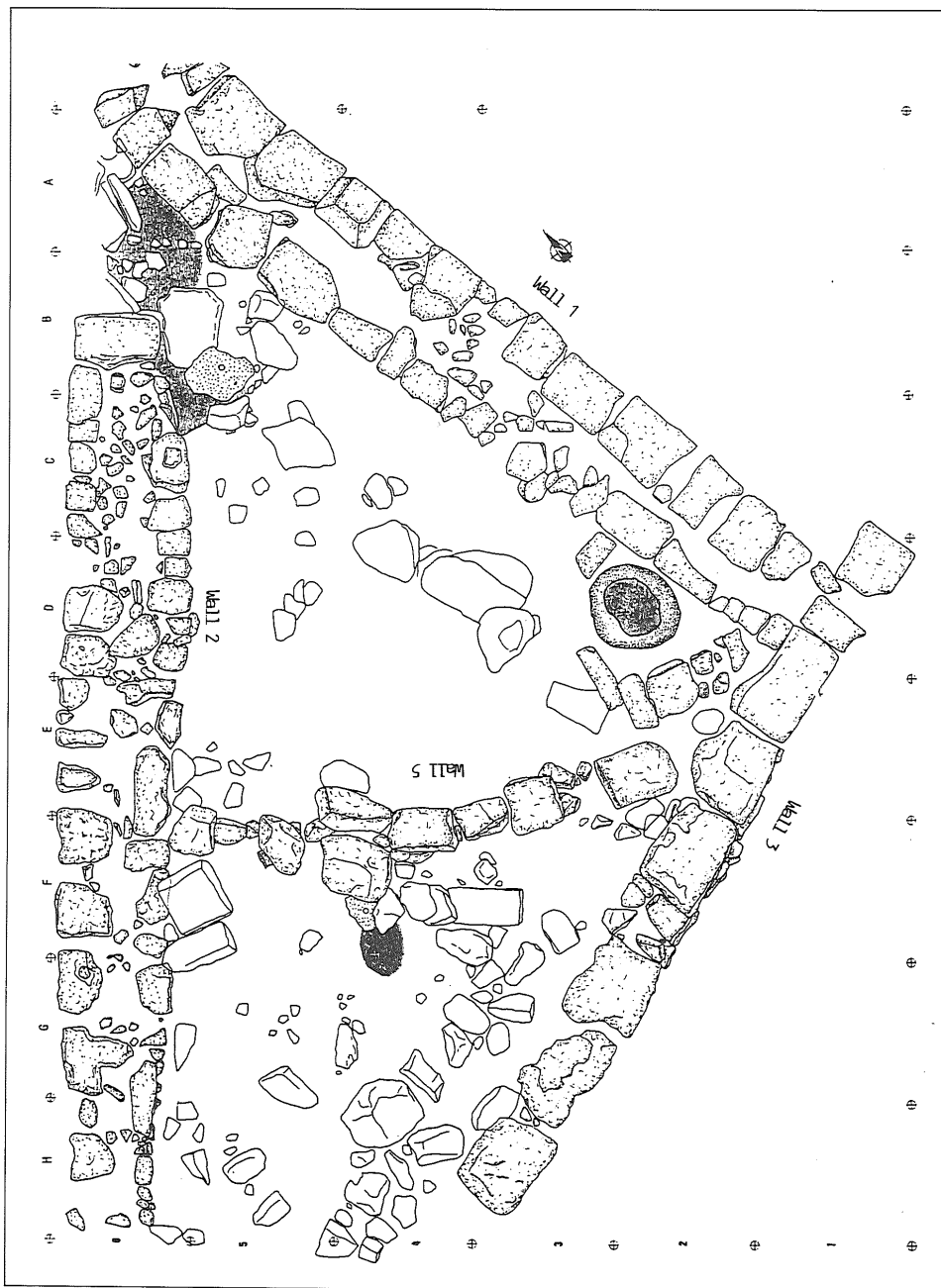
the end of the stratum.

Stratum II (0.45 - 0.78 m) produced only a few obviously tumbled building stones within the same unstratified matrix as before. Walls, formerly noted only as parts of the surface, were now revealed, for example Walls 5 and 6. Wall 1 exhibited its interior side of special structure and quality. A balk between Squares D4 and E4 was left standing. Two fireplaces with blackened hand-made sherds, charcoal and a few animal bones marked cursory occupation on different levels in Squares C3, C4. Another spot with habitation was marked by broken vessels of the hand-made ware, one of them shattered by a tumbled stone between Walls 5 and 2 in Square B4. The rim of an Iron II storage jar in Square E4 was consistent with the overall mixture of numerous hand-made and less Iron II pottery fragments.

Stratum III (0.77 - 1.24 m) exhibited the same soil as before, but was defined by a *ṭābūn* enclosed by well-cut (well-chosen?) ashlars in the corner of Walls 1 and 5. Its body, preserved up to at least 0.60 m high and having a lower diameter of c. 0.65 m, was set in a hard-packed floor on Squares C2/C3 (Figs. 10 and 11). The firehole was



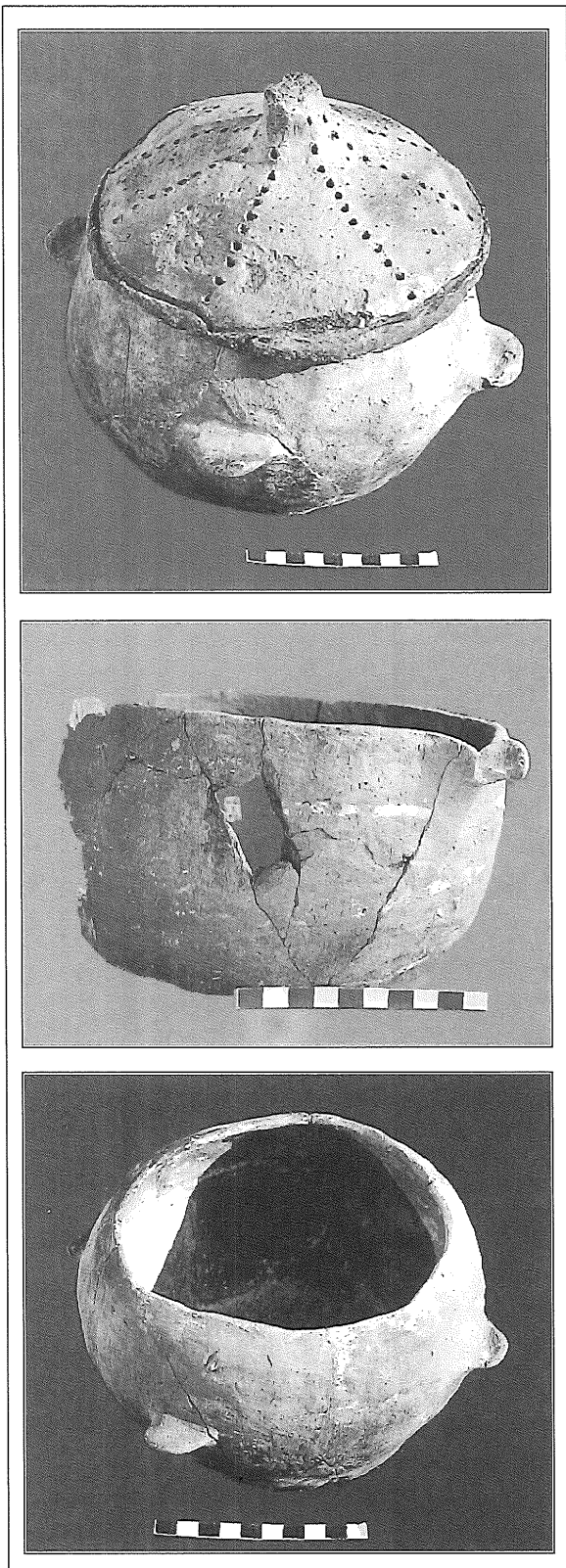
10. *Ṭābūn* of Stratum III.



11. Stratum III with *ṭabūn* and fireplaces.1

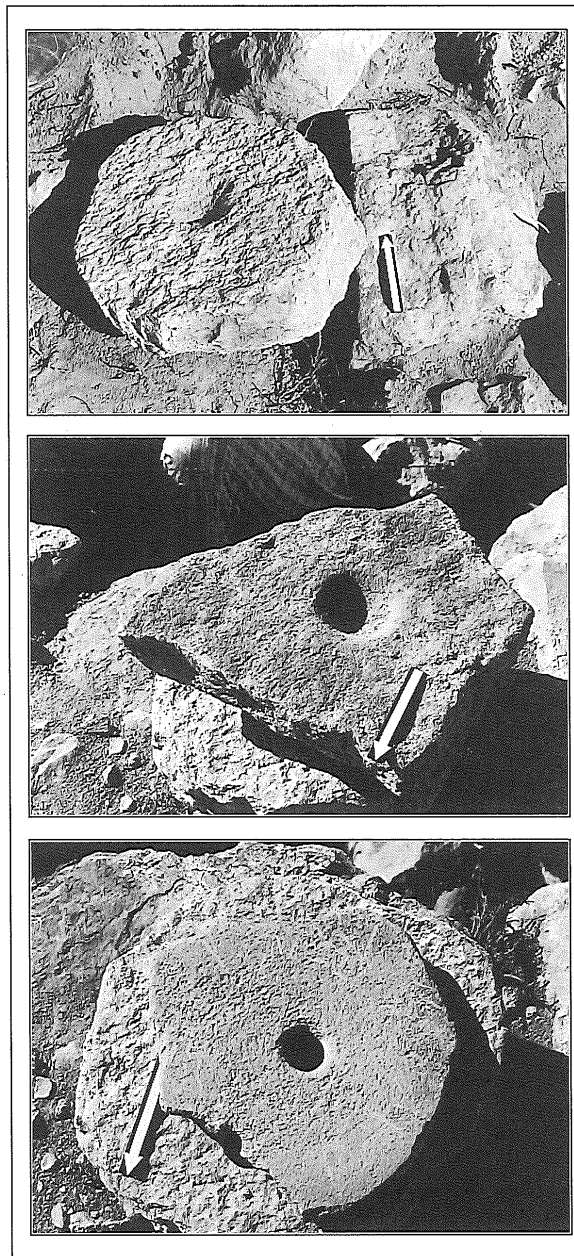
directed towards north. Two hand-made cooking pots, one with a decorated lid, both with finely molded ledge handles, were found complete, yet broken, beside the *ṭabūn*. Other fragments of the same ware were noted inside and outside the *ṭabūn* (Fig. 12:1-3). Astonishingly, one of the protecting ashlar was a voussoir with carefully chipped sides without any parallel in Khirbat al-Mu'allaq so far. Stratum III was further characterized by fireplaces and round millstones in different depths and locations,

for example in Squares B4 and C4, 1 m distant from Wall 1; in Squares D4 and C4, in the latter case together with a round millstone and a hammering stone of flint. One millstone, flattened on one and left rough on the other side, disclosed a second hole near the rim (Fig. 13:1-3). Thick hand-made blackened sherds and animal bones were found accumulated in Square C3. A tiny undistinguished piece of bronze, also from Square C3, was the only metal find during excavation. There was generally a higher



12. Late Islamic pottery from Stratum III.

concentration of hand-made sherds close to Walls 1, 3, 5 than in the center of the area formed by Walls 2, 5 and 6.



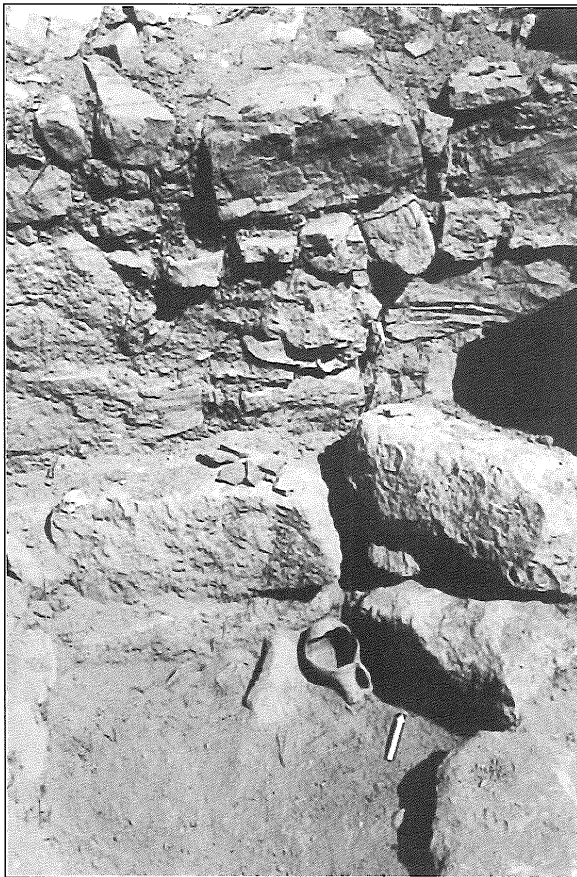
13. Millstones of Strata II and III.

Stratum IV (1.25 - 1.78 m) was marked by the discovery of a wheel-made juglet (H. 17.6; W. 13.6; B. 5.5 cm) with a slightly oblique handle, a sieve with six holes inside the neck and a spout attached at not quite a right angle. The neck is decorated with a schematic floral design and two simple lines. The light-brown vessel had been either relinquished intentionally or deposited at Wall 2 in Square G4 between three ashlar of bigger size and better quality, and had been unbroken before it was inadvertently dam-

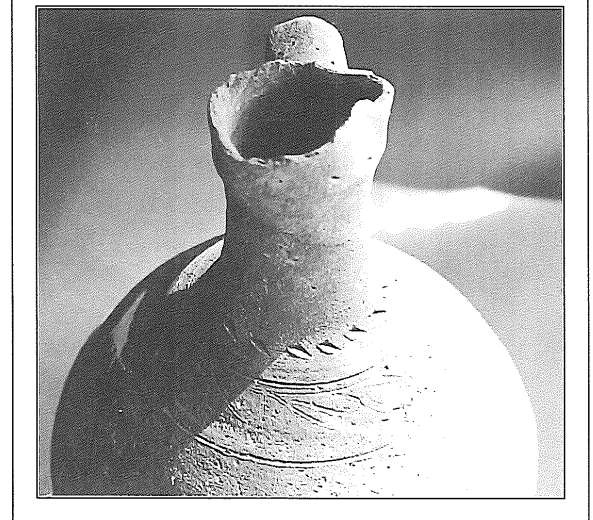
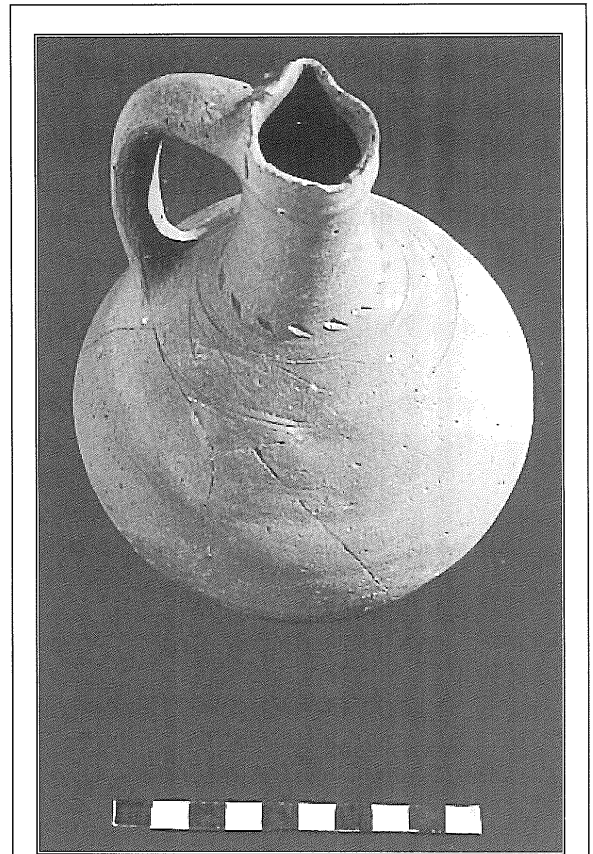
aged during the dig (Figs. 14, 15: 1-2). A sounding of 2 x 1 m directly at Wall 1 (Squares C3, D2) disclosed a layer of very hard soil mixed with loam, chalk and very small stone chips.

At 1.87 m only a small Nabataean-Roman body sherd and a possibly Iron II sherd were found. In the corner of Walls 6 and 2 (Square H4) an Iron II storage jar rim and a fireplace with a quern of 18 cm length, then a cooking place with ashes on hardened ground were noted in the otherwise sterile locus. A spurious paving with slab fragments of natural origin suggested a somewhat longer stay of people at this place as well as directly at Wall 2. An Iron II sherd was built into Wall 5 (Square E3). By a supposed entrance in Square B4 between Walls 1 and 2, a quern of 25 x 25 x 30 cm, made of a very hard limestone with a picked surface, was found in an otherwise empty hard soil.

Stratum V (1.79 - 2.43 m) produced two



14. Juglet found in Stratum IV.



15. Juglet from Stratum IV.

items apt to elucidate part of the site's history. First, at 1.80 m, broken slabs underneath the hard layer of Stratum IV, now again in softer soil (Square H4) with Iron II sherds exclusively, obviously stemmed from an older habitation level without any handmade pottery. Second, a large Iron II storage jar in Square H3 extended through the hard

layer at 1.60 m to 2.43 m. A few fragments of its upper part and a stamped (unreadable) handle belonging to it were found in the loose sandy fill. Stratum V marked the interface between the levelled groundfloor of the previous and the secondary structure (Figs. 16 and 17).

Removal of Walls 3 and 6: End of Excavation

The hard layer, first encountered at Wall



16. Iron II storage jar *in situ*.



17. Storage jar during restoration.

1 and later under Wall 5 constitutes the groundfloor of an Edomite structure (Fig. 18). Beneath Wall 5, 5 hand-made sherds, 2 Iron II body sherds, 1 Nabataean fine ware sherd, a bone and some charcoal were found.

When the corner stone between Walls 3 and 6 was taken out, we discovered more foundation stones. They belonged to the original Edomite Wall 6, but were removed later (robber trench) and set outside their former position (Fig. 19). The robber trench contained 5 Iron II (1 storage jar rim, 1 bottom, 1 platter rim), 17 Iron II body sherds, 1 possibly Nabataean-Roman body sherd and 1 limestone implement (?). The rebuilt angle between Walls 3 and 6 contained 16 Iron II sherds (3 bottom, 1 rim) 2 of otherwise indetermined sherds, one was decorated with red dots on the inside, another one with a double wavy line; 1 Nabataean body sherd, 1 body sherd of very homogeneous light whitish clay with a neat taenia and red slip inside and outside. Finally, in the fill between



18. Iron II groundfloor between walls II and VI.



19. Robber trench and reused Edomite foundation stones for a new outer wall.

Walls 1 and 3, 5 Iron II body sherds were recovered. Without extending the size of the excavation toward the center of Khirbat al-Mu'allaq, the aim of the excavation was accomplished, that is, to identify the habitation levels indicated by surface and excavation finds.

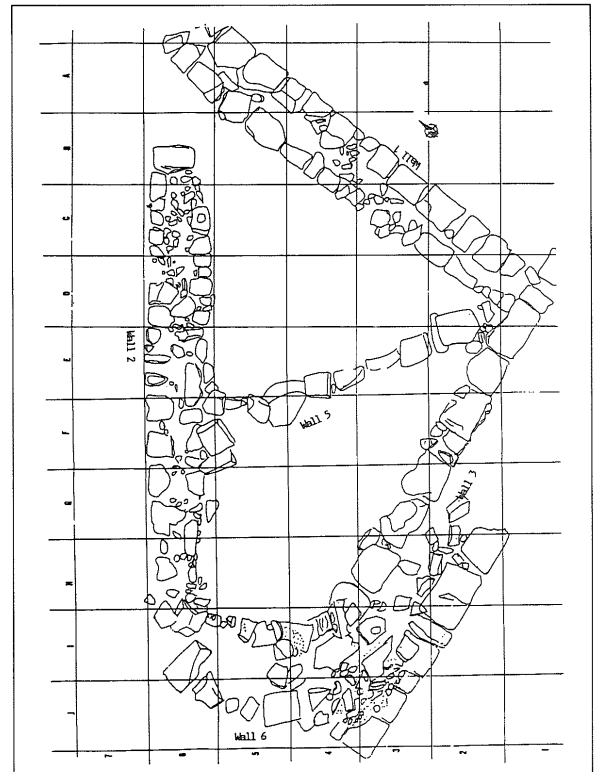
The Walls (Fig. 20)

Khirbat al-Mu'allaq is bordered by walls, but only Wall 6 can be considered as an original bordering wall.

Wall 1, running from north-east to south-west and joining Wall 3 at an almost right angle, is an excellently built dry-stone double wall of 0.90 m width, excavated to a length of 6 m. It consists of roughly but adequately cut limestone ashlar of an average size of 0.50 x 0.30 m thickness. Wall 1 seems to be a good example of the walls of the later al-Mu'allaq installation.

Wall 2, running from east to west in an acute angle from Wall 1 cuts a double dry-stone wall of 0.90 m width. Excavated to a length of 6 m like Wall 1, it consists of stone material less regularly cut than Wall 1. The space between the two parts is less clear, the visible exterior is not smoothed.

Wall 3, running from north-east to south-



20. The walls of the excavation area.

west is 0.45 m wide and not doubled. The roughly cut stones are larger than those of the preceding walls and up to 0.60 m long. The exterior is smoothed, the joints are filled with loam. The wall was secondarily attached, at a wide angle, to Wall 6.

Wall 4, was first numbered this way. Later its number was changed to Wall 6.

Wall 5, running from north to south between Wall 2 and Walls 1 and 3 is of less quality, in fact, the poorest of the excavated walls and not doubled. In the corner, with Wall 1, a *tabūn* with associated vessels was found. The wall functioned perhaps rather as windscreen or partition-wall than as roof-support.

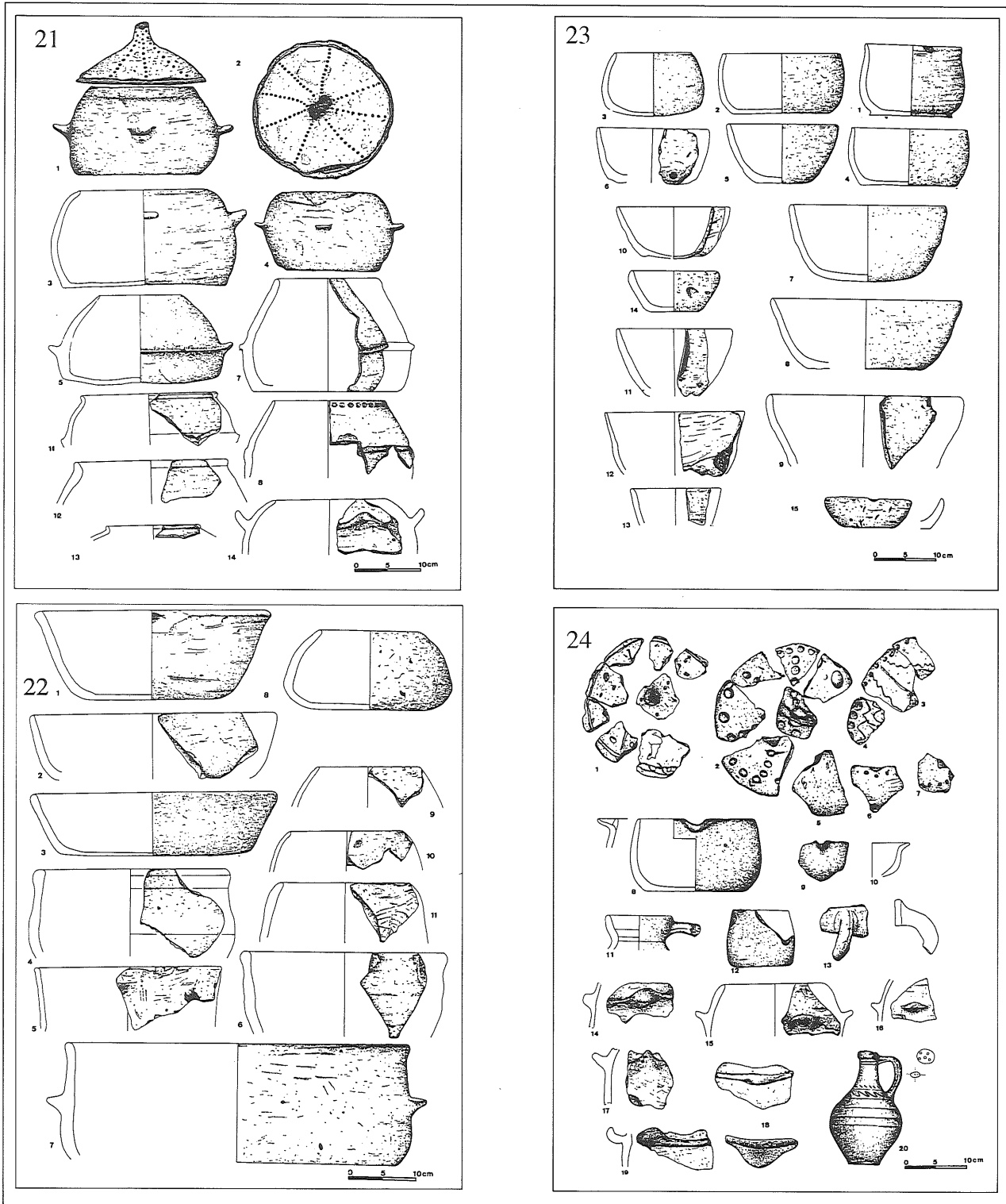
Wall 6, running from north to south is joined by Wall 2 at a right and by Wall 3 at a wide angle. It is 2 m wide and was excavated to a length of 5m. It consists of bigger, roughly cut ashlar and is neither to be compared with the poor quality of Wall 5 nor with the careful laying of Wall 1. It is built for durability, and it is not set upon the hard layer of Stratum IV as the other excavated

walls. It was most probably the bordering Wall of the original Iron II settlement. In 1993/94, Wall 6 was cleared and found to be covered with a lot of debris deposited there during later building activities.

Finds and Studies

The hand-made pottery of Khirbat al-Mu'allaq (Figs. 21-24)

Its ceramic technology appears only poor if compared with the Iron II and Nabataean-



21-24. Late Islamic pottery from Khirbat al-Mu'allaq and probably imported juglet.

Roman ware of the site. The majority of the vessels found so far is made of good clay and demonstrates a simple but effective firing method. There are as many mineral and organic inclusions as seemed to be and were necessary for village household pottery. Its main features are a grey-black core and mostly reddish-brown to light-brown surfaces, effected by intensified heating toward or at the end of firing. Mostly the surfaces were just passed over, some vessels carry a brownish or red slip. Decoration is scarce, but was at least attempted. Several cooking pots are decorated with finger-thumb indentations around the exterior of the rim (Fig. 21: 8). A spouted vessel (Fig. 24: 8-10) without taeniae and ledge handles shows a few white streaks on the exterior. There were only two sherds with a painted red band and one sherd with broad black streaks brushed vertically on the outside. The decorated lids will be mentioned later.

Most distinctive are cooking pots (Fig. 21: 1-13) with the bases wider than the openings and the bases or bottoms as thin and porous as possible. Their thickness varies between 4 and 7 mm, the thickness of the curve or bend from the base to the opening between 12 and 17 mm. Such a shape allows heating food with a minimum of fuel. There is a variety of ledge handles (Fig. 24: 14-19) from small, plain and neat to large, folded and coarse ones. On some of the cooking pots, and only on them, the handles seem to evolve out of a taenia in the lower half of the vessel. The worm-like continuous ledge was attached to the body after the handles had been put into place. The reason behind the method was not to embellish but to strengthen the pots which nevertheless used to break in the ledge handle zone. The handles, of course, served to put the pot on and take it off the fire. Their sizes, therefore, correspond with the size and possible content of the vessel.

A second distinctive group within the al-Mu'allaq pottery are decorated lids (Fig. 24:

1-7). They are round, slightly convex and on the upper side decorated with finger indentations and tool- or fingernail-scratched grooves around and inside the upper surface. In a second group (Fig. 21: 2) the lids are pierced with tool-made holes following a radial pattern between a crooked and obliquely cut-off knob and its periphery. A few holes perforating the lid are rather due to haste than made purposely. Concerning the first group of lids without a knob, it has been suggested that they might have been used as baking platters. The differing diameters of 12 to 26 cm, however, contradict such an interpretation.

Another definite group of vessels are bowls of different form and size (Fig. 23: 1-14). Only one of them sports a base. There were no cups, indicating that small bowls were used for drinking, and only two saucers, possibly having served as crude lamps (Fig. 23: 15).

Several hole-mouth vessels were apparently also used for cooking (Fig. 22: 8-11). A few large vessels with almost straight sides (Fig. 22: 4-7) are reminiscent of modern casseroles. Due to their width and their contents' temperature and weight, they were "handled" with ledge handles. These vessels might have been used for common meals of a family. Of middle-sized jugs or juglets (Fig. 24: 11-13) a few loop handles of brown clay with a self-slip were found. The lower part of a jug with the attachment point of a loop handle is made of a porous whitish clay mixed with sand and chalk. The outside is pock-narbed. The jug may have been used for cooling beverages (Fig. 24: 12).

Other Pottery Assemblages

Very few Nabataean-Roman-Byzantine sherds without decoration were found on the surface and in the lowest strata. A scatter of a red-brown ware in Strata III - IV was thrown on a fast-turning wheel with an excellent clay almost without grits. There are decorative fine lines on the exterior and care-

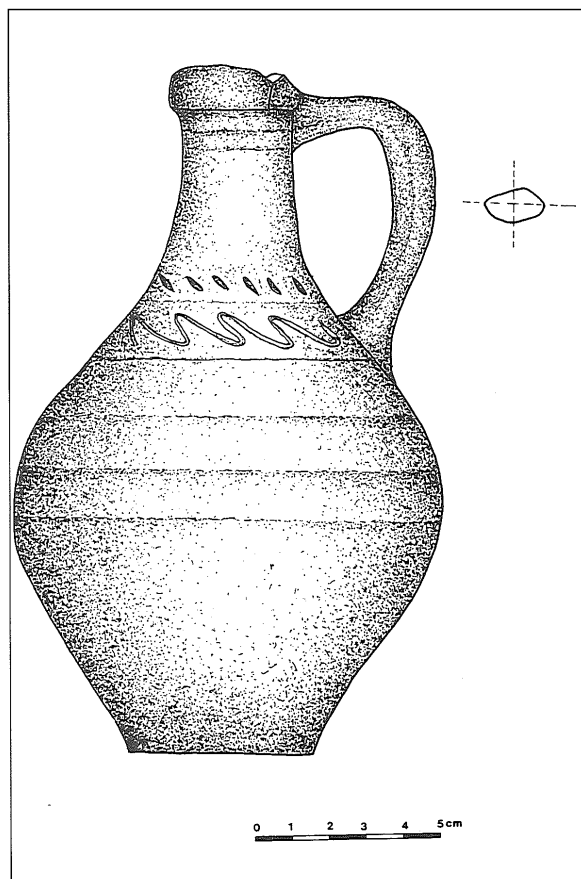
fully produced grooves on the interior of the flower-pot like vessels. The pottery is neither Iron II nor local ware and seems to be related to the juglet found in Stratum IV which has to be considered as imported (Figs. 15 and 25).

Other Finds

Other non-pottery finds comprise several oval (saddle) querns, slabs and fragments thereof, three hammer stones made of quartz, five round millstones, one of them with a second (eccentric) hole, fossils of the local Cretaceous formation, some sea shell fragments, one unidentifiable bronze fragment, one fragment of a coloured glass bracelet, a flint implement (scraper) and a (dubious) limestone implement.

Examination Results

The examination of animal bones from the excavation carried out by Angela von



25. The juglet from Stratum IV.

den Driesch, (Institut für Paläoanatomie, University of Munich, Germany) showed predominantly sheep and goat with a scatter of donkey, camel and *Scarus Harid* in Stratum I, in Strata II - IV also cattle.

Charcoal taken from the *tābūn* in Stratum III was C14 analyzed by the Niedersächsisches Landesamt für Bodenforschung and calibrated to 785 -1015 AD .

Closing the Gap: An Analysis of the Iron Age Pottery from Khirbat al-Mu‘allaq (J.P. Zeitler)

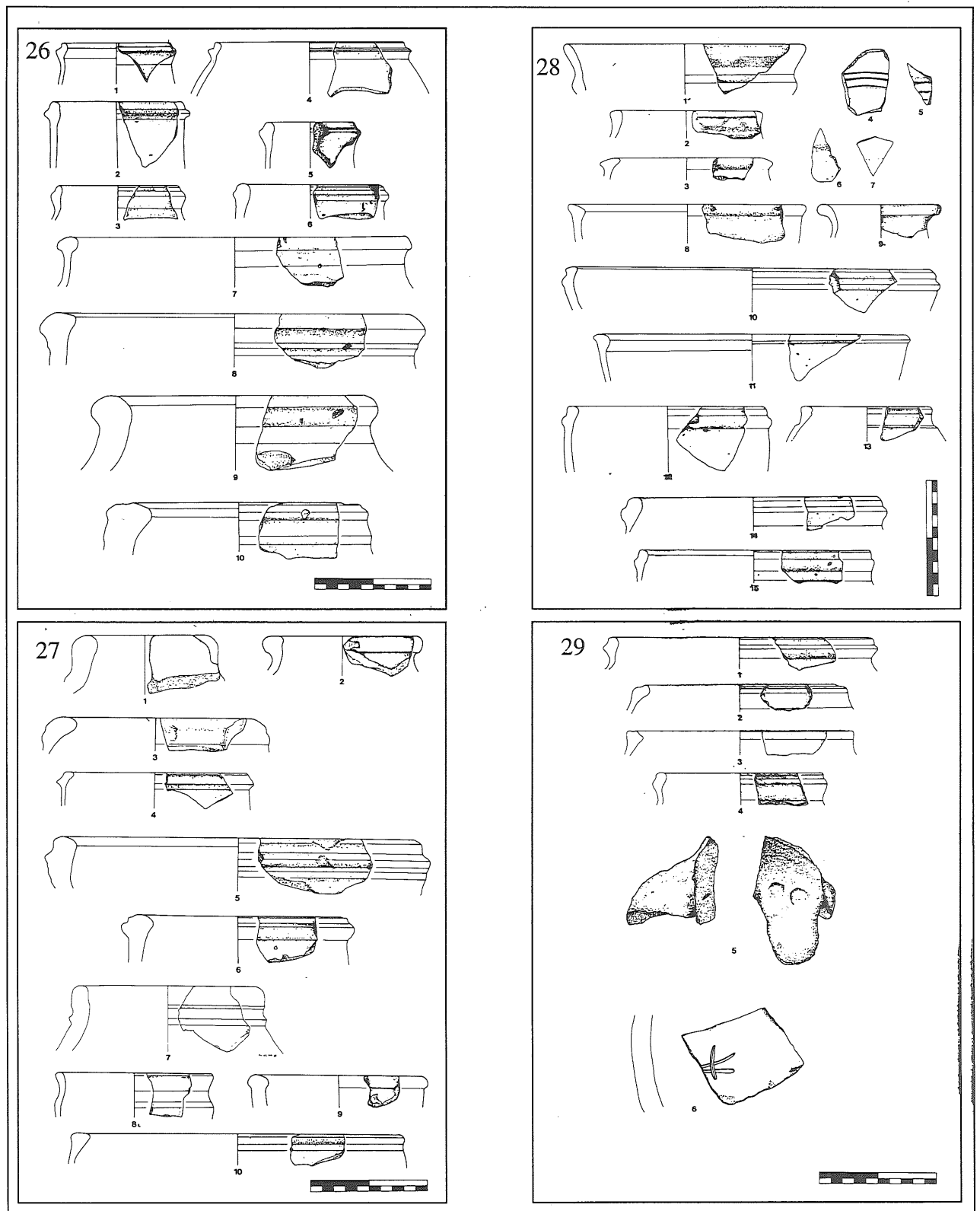
Discussing the “Edomite” pottery from the Petra region, two different pottery assemblages from different site locations were noticed. Locations in a favourable position, with pottery of a large variety both in typology and decoration, contrast with mountain top settlements with a high percentage of coarse pottery and a very low percentage of painted and fine ware (Zeitler 1992). This differentiation was based on the finds from Umm-al Biyāra, Ṭawilān, as-Sadah/Umm al-‘Ala and Ba‘ja III in the Petra region and from Buṣayra and some surface finds from as-Sela in northern Edom. Five sites - not counting the finds from as-Sela - are a rather small basis for grouping settlements in a region as large as ancient Edom. Therefore, new finds from hitherto undetected settlements were in great need to confirm or disprove the hypothesis of a relationship between pottery assemblage and site location in Iron Age Edom.

In 1994, Manfred Lindner and his team of NHG discovered and surveyed a site on top of a steep mountain, Jabal al-Qṣeir. The pottery showed the expected assemblage of coarse ware, while painted pottery was absent (Lindner, Knauf, Zeitler and Hübl, *infra*). This left one question open to be answered: was the strong resemblance of the pottery assemblages of Buṣayra and Ṭawilān coincidental, or would new sites with a similar topography show a similar connection

between site location and pottery. The site of Khirbat al-Mu'allaq, described by M. Lindner in detail above, now fills this la-

cuna.

The Iron II pottery from al-Mu'allaq (Figs. 26-29) fits within the frame of pottery



26-29. Iron II pottery from Khirbat al-Mu'allaq.

groups already defined elsewhere (Zeitler 1992: 167). The finds come from two different sources. Most of them were revealed during a trial excavation alongside an Iron Age wall, reused in Late Islamic periods. The stratigraphic context of the finds is given in the following description. The second group of pottery are surface finds from a general site survey before excavation. They are marked as GSF (General Surface Finds).

Group 1 : Jugs with high necks are represented by five pieces (Fig. 26: 1-3, 5, 6). Their topological variety is somewhat limited. Stratum I produced one piece, Stratum II three pieces and Stratum III one piece.

Group 2 : Only one cooking pot from Stratum III appeared in the excavation area (Fig. 26: 4).

Group 3 : Six sherds belong to large storage jars with short necks and everted rims (Figs. 26: 7-10; 27: 1, 2). Three pieces are from Stratum II, two pieces from Stratum III, while Stratum I contained only one piece.

Group 4 : Group 4 was previously described as large deep bowls. Two pieces of the al-Mu'allaq assemblage represent deep bowls, but with a rather small diameter (Fig. 27: 3,4). They come from Strata II and III.

Groups 5 - 6 : Bowls with flat, thickened rims and jars with collared rims. Both groups are not represented in the al-Mu'allaq finds.

Group 7 : This group, large jars with rilled rims is the most common pottery from the mountain-top sites. In Khirbat al-Mu'allaq, only four pieces belong to this group. One rim sherd from Stratum I (Fig. 27: 5) shows a rather faint profilation of the rim, different from the deep rills known from other sites. Another piece from Stratum I (Fig. 6: 27) is of the same variety, but represents a vessel with a very narrow neck. Another variety, with a high neck and shallow rills in the lower part of the neck, came from Stratum II (Fig. 27: 7). The most spectacular find, pieces of a large vessel with a

seal impression on the handle, came from Stratum V. This pot shows shallow rills on the upper side of the rim, the outside is smooth (Fig. 30).

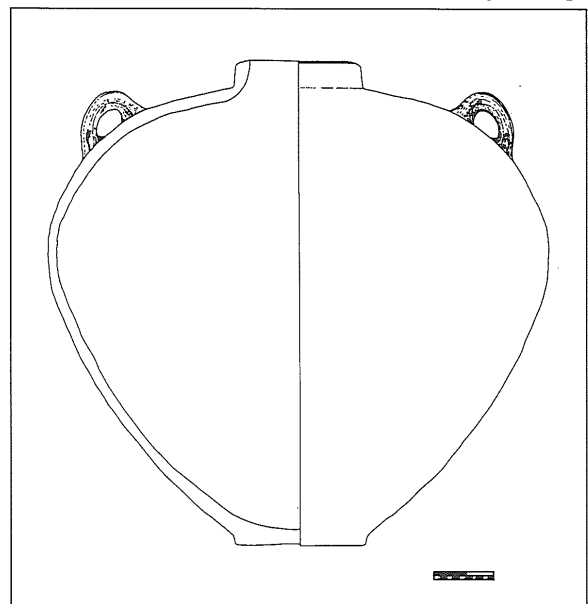
Group 8 : There are no bowls with high, profiled rims in the Khirbat al-Mu'allaq finds.

Group 9 : Bowls with a high, slightly out-turned rim are represented by two pieces from Stratum III and Stratum IV (Figs. 27: 8; 28: 1). Both are of medium fine quality. The piece from Stratum IV shows a band painted in brown slip on orange on the neck.

Group 10 : The pottery from Khirbat al-Mu'allaq shows a large variety of large bowls with profiled rims (Figs. 27: 10; 28: 3, 8, 10, 11). One piece comes from Stratum V, one piece from Stratum III, one from Stratum II and two pieces are from Stratum I. Their rims show different designs, ranging from a rill on the outside (Fig. 28: 10) to T-shaped variants (Fig. 28: 3).

Groups 11 - 16 : These groups are missing in the al-Mu'allaq assemblage.

Group 17 : This new type of pottery, straight bowls with a simple profiled rim, is unknown from the mountain top sites and only represented by a single piece from Stratum II in the al-Mu'allaq assemblage (Fig.



30. Iron II storage jar from Stratum V of Khirbat al-Mu'allaq.

28: 12). The shape is without close parallels in other Edomite settlements. The rim shape with a cordon close to the mouth of the pot and both temper and surface treatment of the piece argue for an Iron II date.

Group 18 : Another new type can be described as small bowls with a short, collared neck. They are present in two examples, one from Stratum II (Fig. 28: 13), the other one is a GSF. The latter shows a decorated outside (Fig. 28: 2).

Group 19 : This variety of cooking pots with a short neck and profiled rim (Figs. 28: 14,15; 29: 1 - 4) is unknown from the mountain top sites, but well known from Ṭawilān (see below). One piece was found in Stratum one, four pieces come from Stratum II.

Stratigraphical Significance

The observed stratigraphy seems to reflect filling and building activity mainly in the Late Islamic phase and is therefore of little value for chronological questions of the Iron Age finds. This is best demonstrated by the large vessel with a seal impression on the handle. The lower parts of the pot were still *in situ* during the excavation, while the upper parts were broken and damaged possibly during clearance work in Late Islamic periods and were found fallen into the pot. This argues for an undisturbed situation only up to Stratum V, being the lowermost sediment on the site. Therefore, the distribution of Iron Age Pottery in the upper Stratum has no chronological meaning, it only represents later, that is Late Islamic movements of the finds in the soil.

Khirbat al- Mu'allaq and other Edomite Pottery

In comparison with the pottery assemblages from Umm al-Biyāra, as-Sadah, Ba'ja III and al-Qseir, the pottery from Khirbat al- Mu'allaq shows differences in the assemblage. Although many groups are well represented both in the mountain top sites and in Khirbat al- Mu'allaq, the typological

range within a given group is usually larger in the Khirbat al- Mu'allaq finds. For example, the group of large vessels with short necks and everted rims (Group 3) show varieties with a small opening and thick walls (Fig. 27: 1) as well as varieties with a large opening and thin walls (Fig. 27: 7). The usual type known from other sites is also present (Fig. 26: 8 - 10). Group 10, usually with a typological clear but monotonous design, is represented by only two pieces of this clear variety (Figs. 27: 10; 28: 3). The other examples (Fig. 28: 8, 10, 11) show great modifications. Group 7, one of the most common pottery types from Edomite sites, lacks the usual three prominent rills on the outside of the rim. Group 19, cooking pots with a short neck, are absent in the mountain-top sites, whereas the standard cooking pot of those sites, Group 2, is only represented in one example from Khirbat al- Mu'allaq (Fig. 26: 4).

Two other types of pottery seem to be typical for the site. Painted pottery is present in a small, but considerable amount. The designs show some variation, ranging from the usual dark-brown on orange band painting (Fig. 28: 1-3, 5, 6) to an angular band within two lines (Fig. 28: 4). The other type is pottery with seal impressions on the handles (Fig. 29: 5, 6). Unfortunately, the seals are unreadable and provide no argument for an absolute date of the finds and the site.

Given the presence of two seal impressions, the find of a sherd with an incised letter is not surprising. The *Aleph* is clearly readable. Unfortunately, the sherd is too small to bear any traces of further letters. The lettering of pots before firing is paralleled in a find from Horvat Quitmit in the Negev (Beit-Arieth 1991: 99). Some examples of incised letters on Edomite pottery come from Buṣayra and Tall al-Khalayfi (Bartlett 1989: 222 - 225).

It was stated previously, that Edomite sites can be grouped together by their topographical situation and their pottery assemblages (Lindner, Knauf, Zeitler and

Hübl, *infra*). The topographical situation of Khirbat al-Mu‘allaq is similar to that of Ṭawilān. Therefore, it is expected that Khirbat al-Mu‘allaq reveals a pottery assemblage similar to Ṭawilān. The major drawback of the Khirbat al-Mu‘allaq finds is the relatively small number of pottery, due to the small size of the excavation area and possible alterations in Late Islamic times. Additionally, as the excavation only examined a small part of the total structure situated near its outside wall, it is to be expected that only a facet of the total functions within the building structure will be represented by the pottery assemblage. As the function of only one area seems to be reflected in the pottery assemblage, any hypothesis stating the function of Khirbat al-Mu‘allaq from the pottery assemblage can in fact only refer to a specific part of the site.

Given this *caveat*, parallels in the pottery of Khirbat al-Mu‘allaq and Ṭawilān are exceptionally evident. This is best to be demonstrated by the presence of Group 19, cooking pots with a short neck. They are abundant in al-Mu‘allaq and present in Ṭawilān (Bienkowski 1995: Fig. 15: 6-8). There are no published (excavated ?) examples from Umm al Biyāra. From Tall al-Khalayfi, one example is known (Pratico 1985: Fig. 14: 3). The type does not occur in the pottery samples from al-Qṣeir, as-Sadah and Ba‘ja III. Another link between Khirbat al-Mu‘allaq and Ṭawilān is the presence of painted pottery. This is not restricted to dark brown parallel bands, as one pot showing an angular band within two lines is present. A similar decoration was found on a bowl from Ṭawilān (Bienkowski 1995:17). Again, the mountain top sites lack this variety of decoration, and only as-Sadeh produced a minimum amount of painted pottery at all (Zeitler 1992: 171).

The Question of Chronology

This leaves still the question of chronology open to debate. Usually, a chronolog-

ical difference would be proposed from the fact, that Edomite sites produce different pottery assemblages. This was in fact suggested by S. Hart, who dated Umm al-Biyāra early and Ṭawilān late within a hypothetical chronological frame (Hart 1989). Khirbat al-Mu‘allaq pottery strengthens Bienkowski’s critical remarks (Bienkowski 1995: 52). Hart stated that elongated bottles from Umm al-Biyāra (Bennett 1966: Figs. 2, 9,14,15: 3, 1) and rounded jugs (Bienkowski 1995: Fig. 18 left) represent early types of Edomite pottery. Therefore, they should not appear in any pottery assemblage similar to Ṭawilān. As some typological affinities between the pottery of Ṭawilān and Khirbat al-Mu‘allaq could be established above, the presence of at least one rim sherd of a bottle from Khirbat al-Mu‘allaq (Fig. 28: 9), similar to the rims of the Umm al-Biyāra bottles argues against Hart’s chronological construction. Due to the high fragmentation of the pottery from Khirbat al-Mu‘allaq, no definitive statement can be given on the presence or absence of this type in Khirbat al-Mu‘allaq.

At present, it seems reasonable to repeat the observed typological differences in Edomite pottery from different sites, but any chronological attempts deduced from these differences would be speculations. As the newly discovered site of Khirbat al-Mu‘allaq fits into the proposed bipartite classification of Edomite settlements and their pottery, that is, sites with a rather coarse pottery on high and steep mountain tops and sites with a larger selection of fine pottery on the slopes of the Edomite plateau. An explanatory model for this grouping is already given elsewhere (Lindner, Knauf, Zeitler and Hübl, *infra*)

Discussion (M. Lindner)

Interestingly, Khirbat al-Mu‘allaq despite its easily attainable location, first at a much used track, then a proper road, was seldom visited. With the exception of Glueck, mod-

ern visitors, as there were, among them Weippert (pers. comm.), refrained from dating the site. There is a simple explanation. Apart from walls and a mass of tumbled and restacked, sharp-cornered limestone ashlar, at first sight Khirbat al-Mu‘allaq does not exhibit any pieces of architecture, indicating temples, tombs or even dwellings. There are no ashlar with the typical diagonal dressing favoured by the Nabataean stone masons and no distinctive amounts of Nabataean sherds on the surface. Shafts and hypogaeum-like secondary alterations of the original ground-plan make any investigation, even simple measuring and sharding an ordeal, and neither short nor prolonged examination of the site is apt to increase appreciation.

On the other hand, there can be no doubt whatsoever about the significance of the site location between the protecting escarpment of ash-Sharā, an important north-south route along springs and the cultivable slopes of al-Qṣeir with ancient terraces. Built of limestone ashlar with mostly dry-masonry walls, running straight from the outer walls toward the centre, the building complex was carefully planned and executed for a certain purpose. This purpose could not be ascertained by the excavation. As far as the Late Islamic upper structure of Khirbat al-Mu‘allaq is concerned one may think of a defensible village, a storehouse, a caravan station or a pilgrims’ “khan”.

The problem of the water supply remains unsolved. Despite a height difference of c. 125 m between the two sites no traces of a conduit from ‘Ayn al-Mu‘allaq were found. Of course, the excavation of 1991-1994 uncovered only a small part of the ruin field, and some structures, for instance cisterns, may remain undetected. There is no doubt about a destruction of the site by earthquake(s), proven by the layer of tumbled building stones measuring more than 0.44 m. They actually sealed everything what was relinquished before. There is only one

problem: How could it happen that despite sealing, at least in the excavation area, ceramic material of all deeper strata was found on the surface and that it was also mixed within the layers under the tumbled stones? To the excavators it seems the original second structure was never used for the purpose it had been built for. Instead semi-nomadic settlers or seasonal squatters lived in the available spaces, sometimes changing walls as needed. Others dwelt on top of the debris and the sand blew in in the meantime. They might have cleaned a space by dumping the remnants of the past in adjoining rectangles. At another time, settlers, while ploughing the land around, might have thrown stones and sherds back into the ruin field. There are no other explanations for the fact that fireplaces were found without a worked or consolidated groundfloor in the middle of an area which can only be called a dump. Only in one place and on one level, that is in Stratum III a *tābūn* with a fireplace and assorted vessels were revealed within an habitation area in the corner between two walls. There were, however, no striking differences in the hand-made pottery between Surface and Stratum IV.

With regard to pottery found at Khirbat al-Mu‘allaq, the coarse hand-made ware, partly equipped with ledge handles and taeniae, has to be identified as Late Islamic household ceramics. By careful drawing of many large fragments and whole or restored vessels, Glueck’s regret (1939: 267) about the “badly neglected Arabic pottery” may be remedied. The Late Islamic ware of Khirbat al-Mu‘allaq seems to be of local origin and significance; some types, however, for example ledge handles with a taenia and lids with incised radial decoration from a crooked cut-off knob to the rim, were noted at other places in Southern Jordan and will be described elsewhere. The wider distribution points to an era of reoccupation of former sites in the Petra region by a Late Islamic half-sedentary population. The juglet

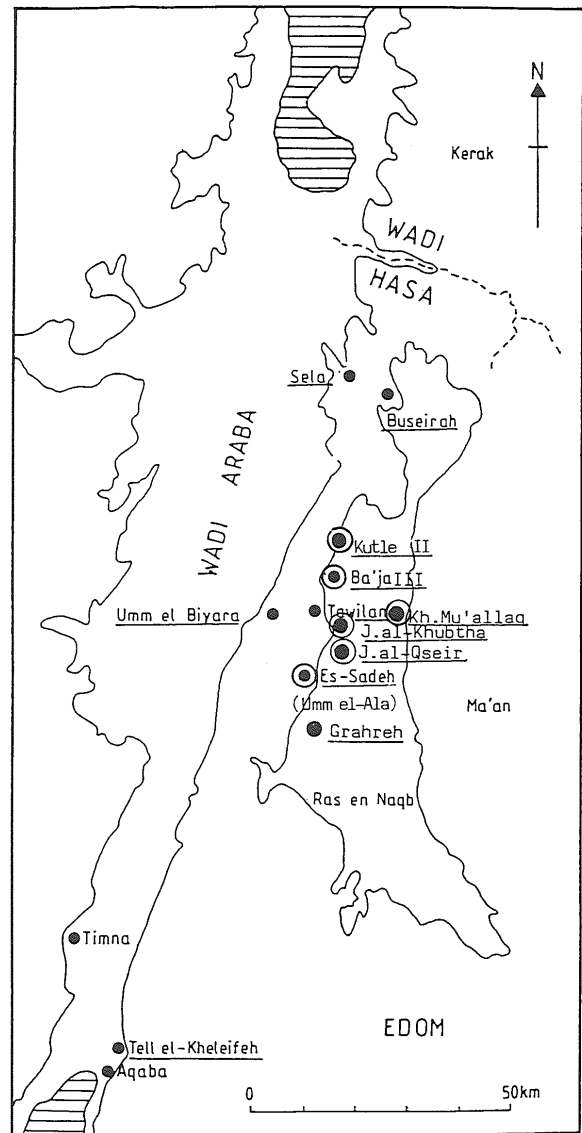
from Stratum IV as well as the undetermined wheel-made pottery from the lower strata, both imports, underline the same increase in prosperity.

With regard to comparisons, there might be a certain resemblance to but no identity with parts of the pottery Brown (1987: 281/6) and Vanini (pers.comm.) excavated at al-Wu'ayra, one of the two crusader forts of Petra. The preliminary dating of their pottery around the Crusade period (1099-1291) and the Early Ayyubid period, that is medieval Arabic time, might be compared with the result of the C14 analysis of charcoal excavated from the *tābūn* in Stratum III at Khirbat al-Mu'allaq, that is calibrated 785-1015 AD. As to the exact date, the lack of geometric painting in the al-Mu'allaq pottery assemblage is significant.

The Iron II (Edomite) pottery from Khirbat al-Mu'allaq follows the pattern of the known settlements at Ṭawilān and Buṣayra and the mountain strongholds of Ba'ja III, Umm al-'Ala (as-Sadah), Jabal al-Qṣeir and Jabal al-Khubtha, all of them identified as Edomite sites by NHG during the last years (Fig. 31). At Khirbat al-Mu'allaq, belonging to the "plateau", however, some fine and painted fragments demonstrate a higher level of urbanisation not to be found "in the rocks" (Lindner and Knauf *et al. infra*). A still more exact analysis is presented by J.P. Zeitler. For him, the Iron II pottery of Khirbat al-Mu'allaq fits into the bipartite classification of Edomite settlements without a chronological difference.

Conclusions (E.A. Knauf)

The survey of the walls in and above the surface of Khirbat al-Mu'allaq recalled the groundplan of a typical Iron II fortress with casemate walls. As the excavations of 1991-94 revealed, at least the upper courses of the partition walls are probably Late Islamic. It can be assumed, however, that these later walls follow in many instances Edomite



31. Iron II (Edomite) sites in Southern Jordan. Sites lately discovered by NHG are encircled (Sketch map).

foundations. Severe earthquake damage could be discerned in the north-east and north-west corners. The outer wall was at least rebuilt on the north and west sides of the ruin field.

The site was occupied during two periods: An Edomite fortress of the Iron IIC period was later reused as a village in the Late Islamic (Ayyubid through Ottoman) period.

Edomite Period

Edomite occupation at the site began prior to the erection of the outer walls, as evi-

denced by a fireplace without stones (bread baking place) and by a stone-lined storage pit in H5. Similar storage pits, antedating the construction of walls, have been observed at Ṭawilān. The storage pit of H5 was cut by a foundation trench of Wall 3. That trench, containing a few Iron II sherds was cut c. 0.50 m into virgin soil (Stratum V). Its south face has been robbed above the foundation. The excavated area forms an open courtyard in the south-west corner of the original fortress (Stratum IV). In B4, the balk under Wall 1 revealed a pit dug for a medium sized storage jar which had been removed. A large storage jar was dug in in H3 and found *in situ*. Otherwise the area was empty, suggesting the Edomite fortress was abandoned in an orderly fashion. Several finds from the surface and from later occupation strata date also from the Edomite period, notably seal impressions on jar handles, a jar inscription and painted pottery.

Late Islamic Period (Ayyubid through Ottoman)

After the Edomite site was abandoned, the area was frequented by transient occupants as evidenced by the traces of two camp fires in Stratum IV and also by a certain number of "al-Mu'allaq ware" sherds antedating the erection of Walls 1-4. Walls 1 and 2 were built immediately on top of Stratum III. They formed the south and north-west wall of two different houses, using the Edomite fortress wall as their back walls. Stones for the construction of these houses were taken from the Edomite ruin and possibly from unlocalized Roman-Byzantine installations. The south façade of the Edomite outer wall was robbed; the robber trench contained a rather high number of Late Islamic and several Nabataean through Byzantine sherds.

The area remained in use as a courtyard, partitioned by Wall 5 and closed by Wall 3, a row of stones following the line of the Edomite wall at a distance of c. 0.50 m. As

indicated by an accumulation of loose soil under Walls 3 and 5 above Stratum III, construction of these courtyard walls occurred somewhat later than the erection of Walls 1 and 3. In E5, a presumably imported juglet was placed into the corner of walls 2 and 5. A fireplace was observed in F4.

The Late Islamic occupation ended in violent destruction, in all probability caused by an earthquake, as evidenced by the fallen stones constituting Stratum I. A considerably large amount of household pottery was found together with a *ṭābūn*. The exact date of the Late Islamic occupation depends on the reliability of a C14 date of charcoal from the *ābūn* and on the dating of the juglet of Stratum IV which is subject to further study.

The surface of the site is characterised by various shelters, constructed by re-arranging the stones from the Edomite and Late Islamic settlements. They indicate the recent use of the site by another transient (pastoralist and/or non-sedentary) population.

Acknowledgements

The authors are greatly indebted to the Director-Generals of the Department of Antiquities of Jordan who in the years of 1991-1995 permitted and by their regional representatives, especially Suleiman Farajat, Inspector of Petra, supported the survey and excavation activities of the Naturhistorische Gesellschaft Nürnberg (NHG). The authors have to thank the friends who helped during the long time the project was going on. First E. Schreyer and I. Künne have to be named, the former for directing the excavation of Khirbat al-Mu'allaq and drawing the Late Islamic pottery, the latter for vigorous assistance during the excavation and for drawing the sketch maps together with U. Schmidt. J. Hübl worked during the excavation and surveyed exactly the site of Khirbat al-Mu'allaq. E. Gunsam, A. Schmid and E. Wieters, as very often before, helped to keep the excavation going. The pottery was drawn by E. Schreyer and G. Spiske. Hired men

from Wādī Mūsā and Umm Şayḥūn worked hard during the four campaigns. Suleiman Farajat, Mohammed Murshed and Dakhilallah Qublan provided excellent advise. Ms Schumann, our next door neighbour, allowed her house keeper to entertain everybody on site with innumerable cups of tea.

Personally I have to thank Prof. E.A. Knauf for bringing the excavation to a satisfying end, and J.P. Zeitler for analysing the Iron II pottery from the excavation.

Manfred Lindner
J.P. Zeitler
Naturhistorische Gesellschaft Nürnberg.
D - 90403 Nürnberg
Gewerbemuseumsplatz 4
Germany

E.A. Knauf
2, rue de Montchoisy
CH-1207 Genève
Switzerland

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JABAL AL-QŞEIR: A FORTIFIED IRON II (EDOMITE) MOUNTAIN STRONGHOLD IN SOUTHERN JORDAN, ITS POTTERY AND ITS HISTORICAL CONTEXT

by

Manfred Lindner, Ernst A. Knauf, John P. Zeitler and Hannes Hübl

Introduction

In recent years, several Iron II (Edomite) sites have been discovered and described, among them Ba'ja III (Lindner and Farajat 1987) and Umm al-'Ala (as-Sadah) (Lindner *et al.* 1990) by teams of the Naturhistorische Gesellschaft Nürnberg (NHG). The discovery of more Edomite sites in southern Jordan was anticipated. Actually, during another archaeological expedition in October 1992, the team of NHG was able to reach and to explore another Iron II site, previously unknown to the archaeological community, on the Edomite plateau south of Petra, and, like Ba'ja III and Umm al-'Ala, a mountain stronghold. Whereas the new site was visited twice by only two members of NHG and a local guide in 1992, it was surveyed by a team of five in October 1993. The rather complicated project was performed by land-rover, donkey and on foot with Sa'idiyīn bedouins acting as loyal helpers for the five days' expedition.

Location and Access (Figs.1 and 2)

The new site, called Jabal al-Qşeir, is located at c. 1140 m asl (Map of Jordan 1:50 000 35° 26' 33" East, 30° 14' 23" North) c. 2.5 km WWS of aţ-Ṭayyiba and 2 km SSW of Sayl Bathah, the latter being a valley which took its name from Wādī Bathah traversing it (Glueck 1934/35:80; Lindner in preparation). Jabal al Qşeir is a mass of domeshaped hill tops or "cupolas" in grey Ordovician sandstone towering upon a red-brown Cambrian sandstone foundation (Fig.3:1, 2)). It can easily be seen, but not discerned as a stronghold, from the new road north and south of aţ-Ṭayyiba, running along the encircling lime-

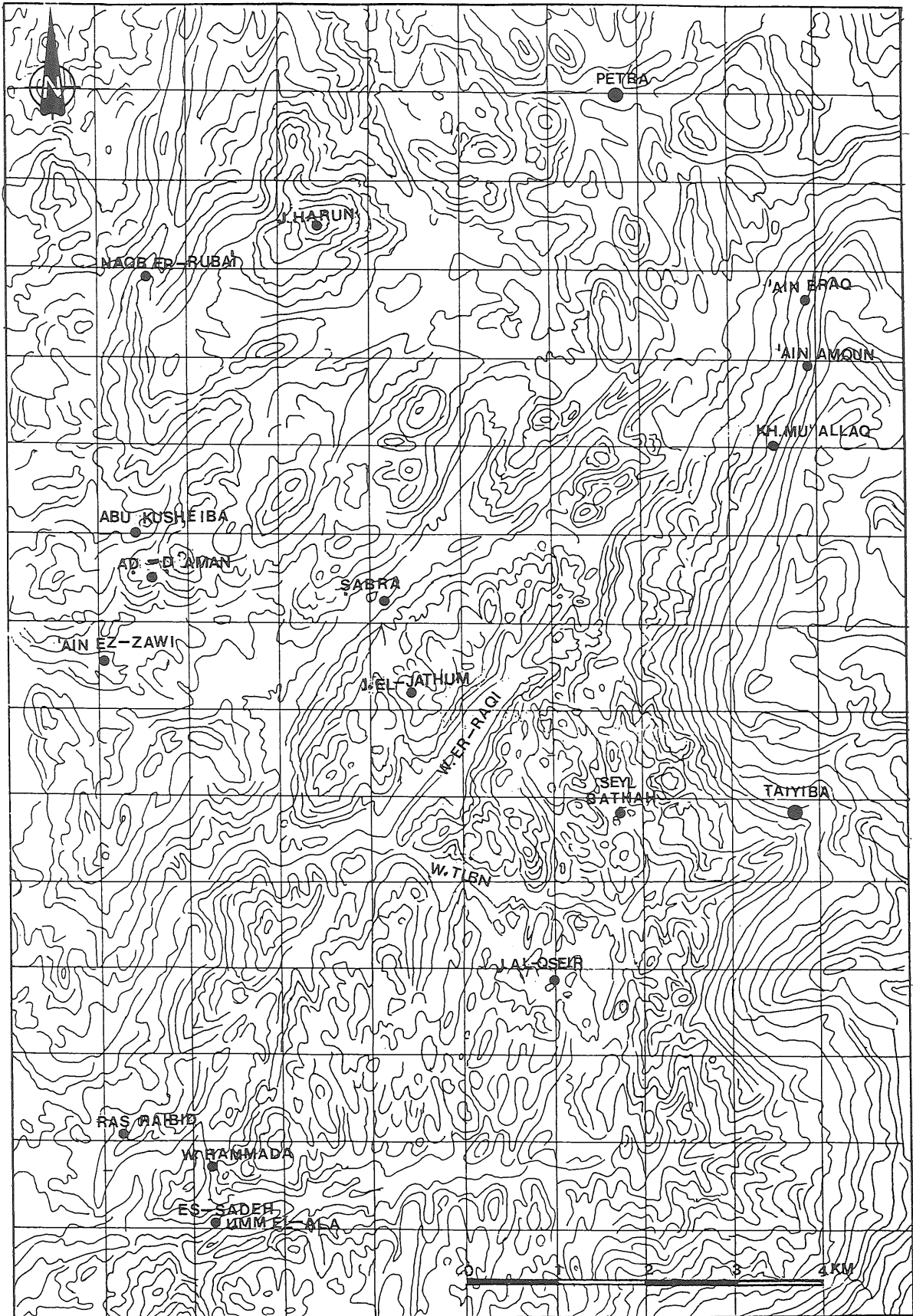
stone massif of Jabal ash-Sharā. Jabal al-Qşeir had to be reached from Sayl Bathah. Following a goat track, a limestone slope was used the first time in 1992. In 1993, a zig-zag path with apparently ancient substructures, better to be seen from its end in the wadi, allowed donkeys to transport the luggage but not the surveyors down to Wādī Tibn. From the deep, gravel-filled gorge with steep slopes, stout walls are to be observed at the Cretaceous scree further east above the northern bank. They do not seem to belong to another built pathway but to ancient agricultural activities. At the southern bank of Wādī Tibn, a circular foundation, probably of a kiln (4 m in diameter), was noted.

From the wadi bed upward, there is no easy path to follow, in fact none at all. Deep clefts in the Cambrian sandstone, where the donkeys failed in 1993, and a boulder-strewn slope have to be managed before one enters the foothills and then the white "cupolas" of upper Jabal al-Qşeir.

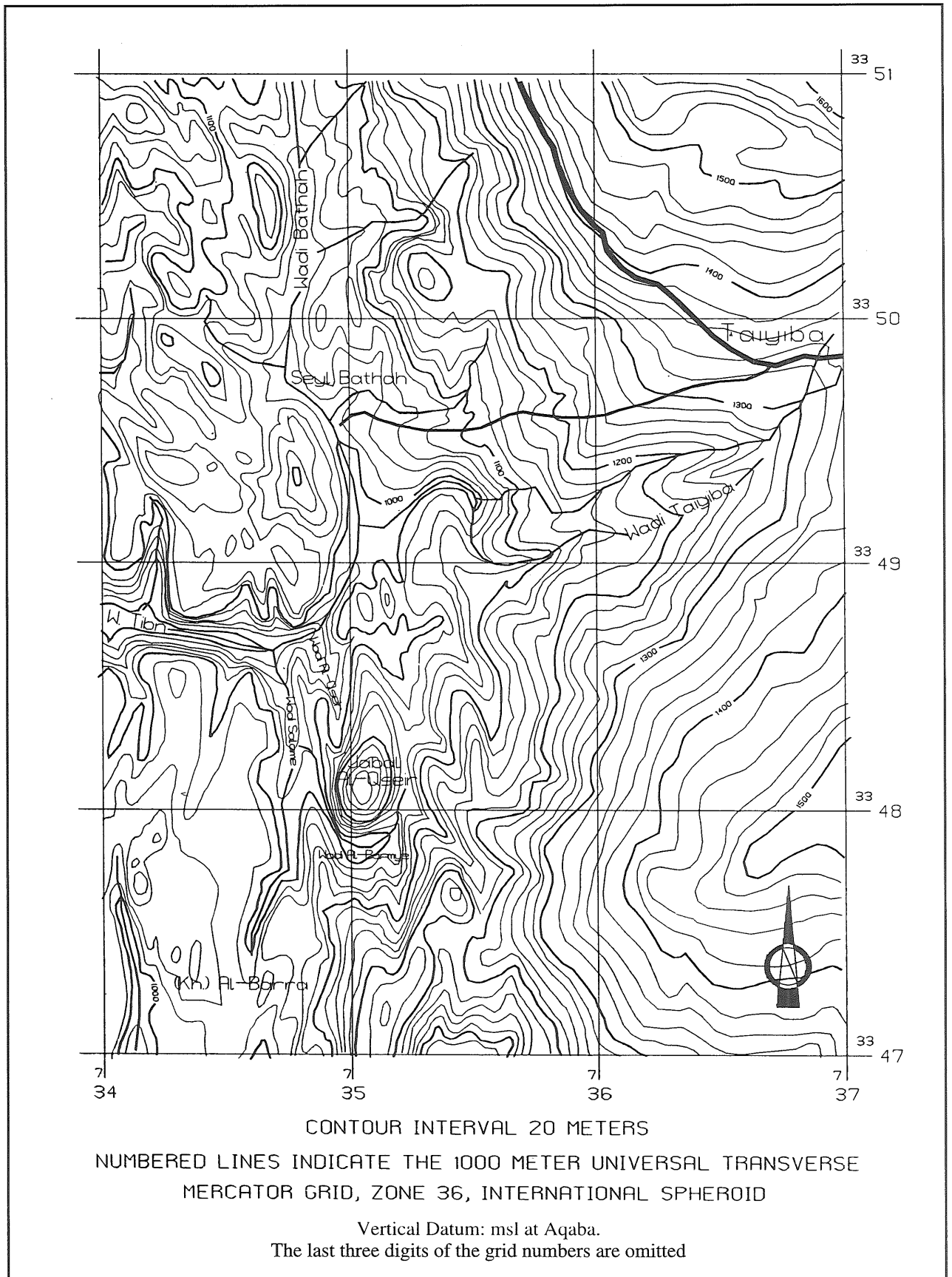
Description of the Jabal al-Qşeir Site

Entrance and Walls

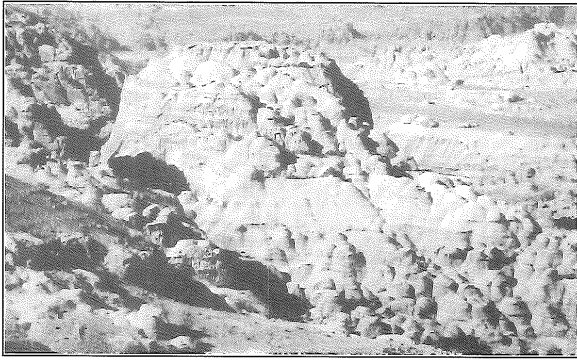
Climbing over weathered slopes of increasing steepness, a narrow rock defile with juniper trees, a gate of sorts (recognised by rock cuttings) is entered. The front of a "cupola" to the left is fortified with a masonry wall. To the right, impressive remnants of a long wall across a gentler slope section mark a gap in the natural defence and therefore a place of a possible attack (Fig. 4). The walls, built of non-descript brownish ashlar of different sizes, were originally higher than the scant 1 m of today. The front courses of larger and more regular stones were laid on ar-



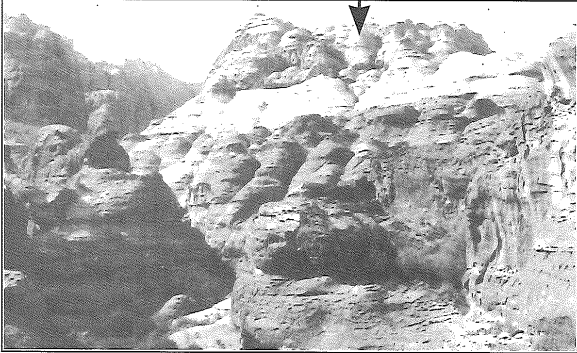
1. Sketch map of the region west of the ash-Sharā escarpment.



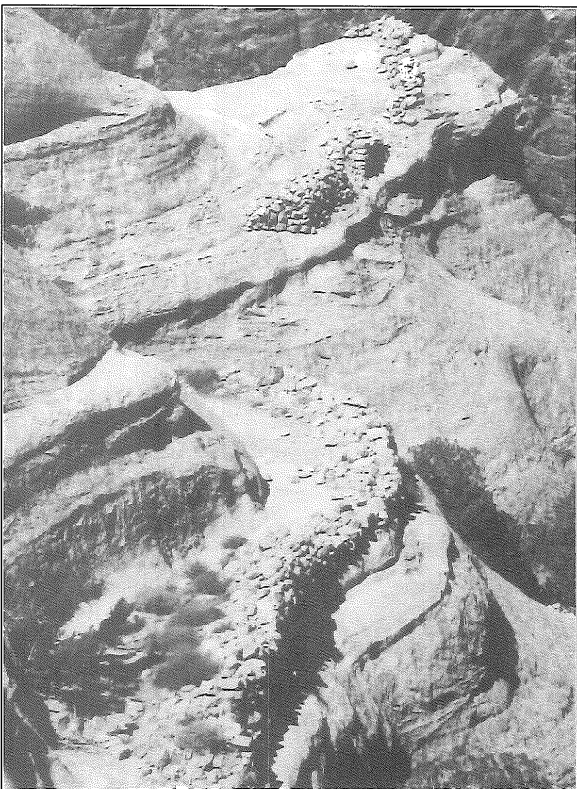
2. Map with the location of Jabal al-Qseir and its surroundings (H. Hübl).



3:1. Jabal al-Qseir jutting out of a mass of more sandstone hillocks.



3:2. Seen from Wādi Tibn, Jabal al-Qseir towers upon a foundation of red-brown Cambrian sandstone. The walls are marked by an arrow.



4. Line of defence walls above the entrance gorge of Jabal al-Qseir. Note the empty ledges between the preserved wall sections.

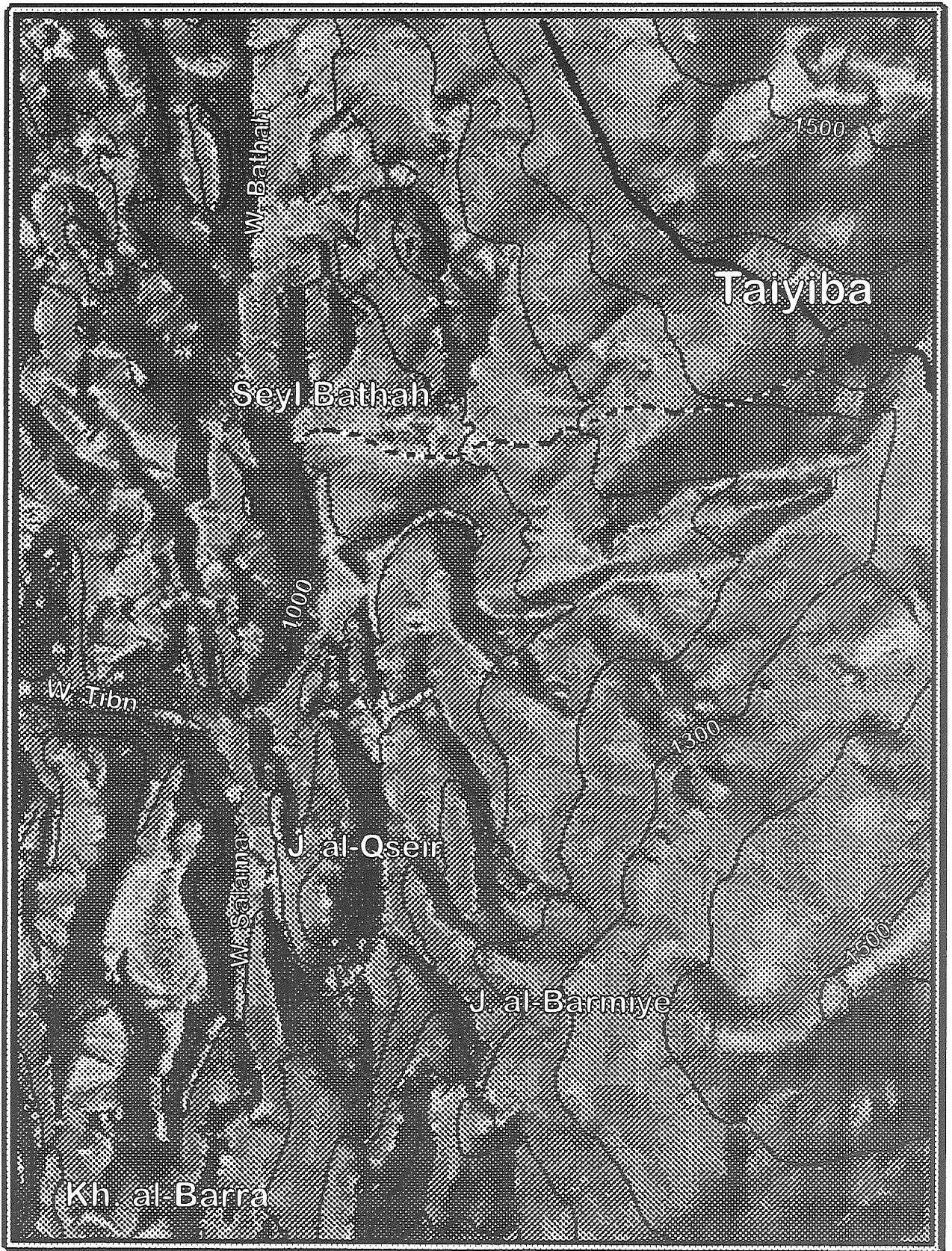
tificial ledges the space behind was filled with smaller ones. Where the wall towers above the “gate”, a small section fell down from the ledge, visible at this spot with the tumbled stones still lying below it. Further on, two more wall sections are missing, but remnants, abutments and empty ledges, show that there was once a continuous wall, bridging gullies and gorges and running all around the gentler slope. Anchored at a square abutment the wall also crossed the “gate” area, possibly with a regular door or gate, and a rock shelter above it (Fig. 5).

A Second Access to the Site (Fig. 6)

After the survey of 1993 it was possible to expand the scope of inquiry and to leave Jabal al-Qseir massif by another route which has to be regarded as a second point of entry or exit. A trail, running around Jabal al-Qseir to its southern flank, follows a wadi, called al-Barmiye after Jabal al-Barmiye towering above it. Terraces and barrages of large blocks controlling winter flash floods cannot be attributed to bedouin populations of modern periods. There are no defence works. The rock wall of Jabal al-Qseir is inaccessible from the wadi. An aggressor from this side had to cross the upper defence line and the “gate” area, and that entrance was most carefully guarded. Further upward, along first the southern, then the western cliffs of Jabal al-Qseir, remnants of an ancient road lead to a plateau with traces of multi-phase occupation. The place, unre-



5. The walls of Jabal al-Qseir.

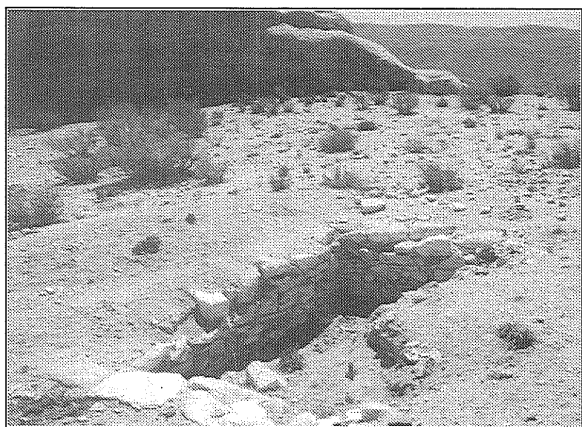


6. Computerized location of Jabal al-Qseir with Sayl Batha, Wadi Tibn, Jabal al-Barmiya and Khirbat al-Barra (H.Hübl).

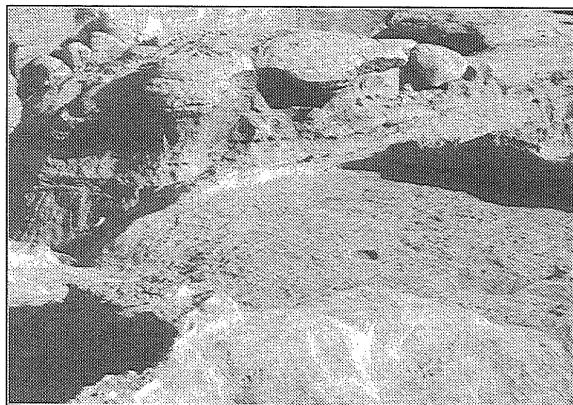
corded so far, is called (Khirbat) al-Barra. The chronology of two houses is uncertain, the surface finds include Epipalaeolithic stone implements (for the diagnosis H.G. Gebel has to be thanked), Nabataean and medieval pottery sherds (Fig. 7).

Rock-Cut House Foundations

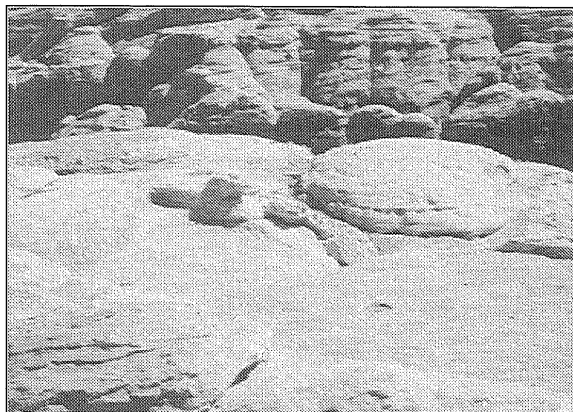
Distributed over the space behind the walls and above the unwallled steep sites, rectangular rock-cut foundations on different levels or “storeys” are typical for the site. Only in a few places, dry-stone masonry fragments still cling to their original foundations, which are mostly swept clean by rain and wind. The authors regard them as house or tent (hut) foundations. Level places were hard to find on the mountain. Therefore, foundations had to be cut into or out of the extant dome-shaped hillocks. Some are cut to find a level place, others are modelled with upright sides, an entrance and steps leading to it. A round hole in the centre of one of them suggests a pole for supporting a roof or a propped-up tent-like covering (Fig. 8:1,2). One foundation indicates three rooms, one bigger and two smaller ones (Fig. 9:1). The other foundations show only one room each. The inner space of one of the ‘rooms’ on the summit area measures 4.30 x 3.00 m, the rock-cut walls are c. 0.50 m wide, the diameter of the central pole-hole is 0.15m. There are two steps leading to an en-



7. Undated house ruins at al-Barra, a possible access point to Jabal al-Qseir.



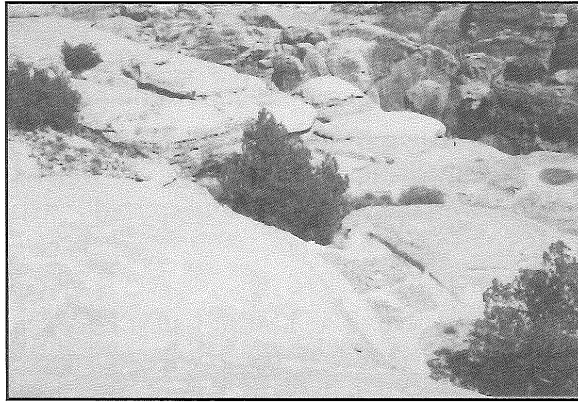
8:1. Tent or hut foundation with a hole for an erector pole on upper al-Qseir.



8:2. Hut or tent foundation. At-Tayiba in left upper corner.

trance at the northern side. The house or tent was located at a lofty place above one of the deep basins (see below) with rainwater being diverted around the foundation (Fig. 9: 2).

Nearby but not directly at some house foundations, potholes of 0.30 to 0.50 m in diameter and with a depth of c. 0.20 to 0.30 m were noted. A natural origin as well as the use as a waterhole cannot be considered. In one case a cistern, now with a carob tree growing in it, is only a few metres away. Strange as it may sound, the potholes might have been used for making wine. “Cup-holes” contrary to “cup-marks” were perhaps mortar presses for a small quantity of grape juice (Duncan 1931: 40). “The must created by the static weight of the grapes collected within the cupholes was deemed a valuable commodity during ancient times” (Forbes 1956: 132). However, the potholes might have served only to set up a large jar.



9:1. Rock-cut house foundation with three partitions.

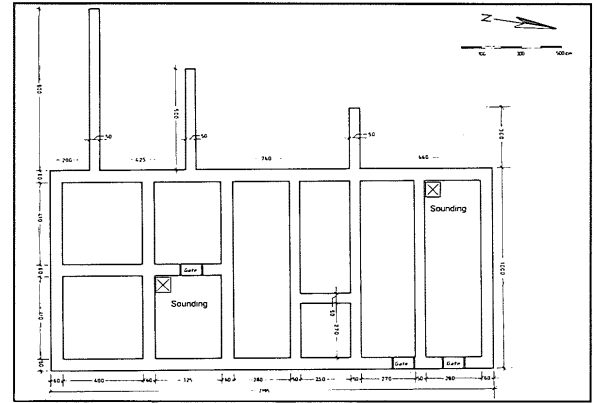


9:2. Rock-cut foundation with Jabal Barmiya and Jabal ash-Sharā in background.

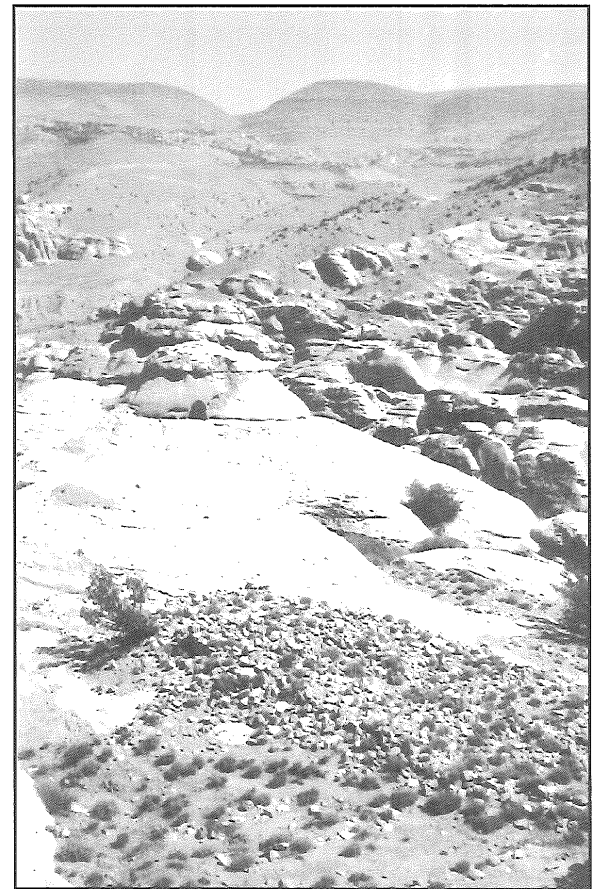
Preserved House Ruins

In only one area of the whole site was it possible to build a larger structure. It is a compartmentalized longhouse of 22 x 10 m with walls above ground up to 0.50 m and reaching into the ground for another 0.75 m (Fig. 10). The building stones seem to be tumbled, but most of them appear to be *in situ*. The upper courses of the wall might have been rearranged later on (Figs. 11, 12: 1). The longhouse style is reminiscent of the longhouses on top of the Umm al-'Ala plateau (Lindner *et al.* 1988: 73-83). On Jabal al-Qseir, the longhouse together with a few more individual houses built on a rock-cut level at the sloping terrain toward east (Fig. 12: 2) constitutes a small dwelling cluster with a piriform cistern, a presumed resting place (used as the team's campsite in 1993) and a possible lookout north of it.

Where, on the west rim of Jabal al-Qseir, the mountainside drops nearly perpen-

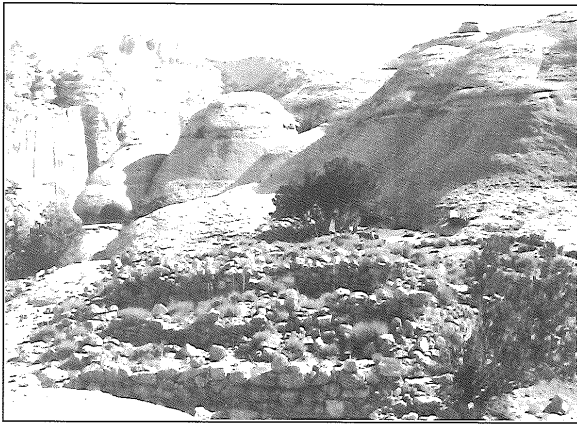


10. Groundplan of the long-house on Jabal al-Qseir with the location of two soundings.



11. The long-house of Jabal al-Qseir with a few more house ruins. Aṭ-Ṭayiba and aṭ-Ṭayiba-Batha road in upper left.

ularly toward West Salame and the plateau of al-Barra, three houses were built upon rock-cut levels. A *Ceratonia siliqua* grows in a cistern nearby; another cistern 10m further down was filled with water and covered with branches in 1992 and 1993. Right in front of the house ruin closest to the brink of



12:1. Long-house of Jabal al-Qseir with the "high place" in right upper corner.



12:2. Levelled ground for a house with building stones still about. Cistern at back of it.

the abyss, fragments of large storage jars, half covered with tumbled building stones were observed on the surface. The roots of a juniper tree (and its predecessors) had grown through the ceramic material, altering thereby the fabric of the ware considerably.

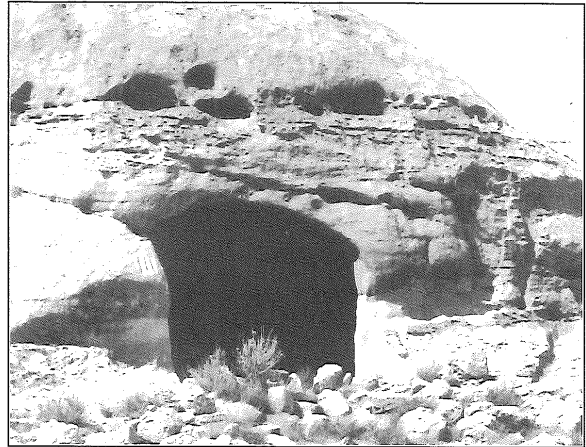
Rock Chambers and Rock Shelters

The several man-made rock chambers and shelters do not exhibit a straight horizontal lintel. The entrance to one cave is slightly rounded. Building stones at its front are the remnants of a house with the cave used as a backroom. The entrance is marked with three bold chisel strokes (Fig. 13: 1). A rubbing stone and a quern of 25 x 25 cm were noted in front of another cave chamber with a rounded entrance. Rock shelters

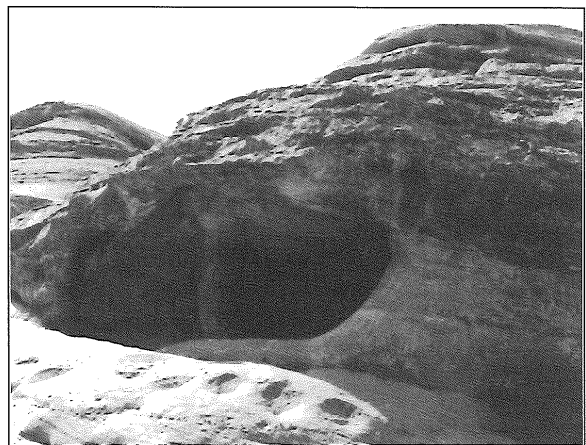
above the walls were perhaps part of the defence system. Another shelter looking northward reveals a man-made partition and cuts for an attached front building (Fig. 13: 2). In all cases, the tooling of the rock walls is coarse with the strokes widely spaced.

A Cave Tomb ?

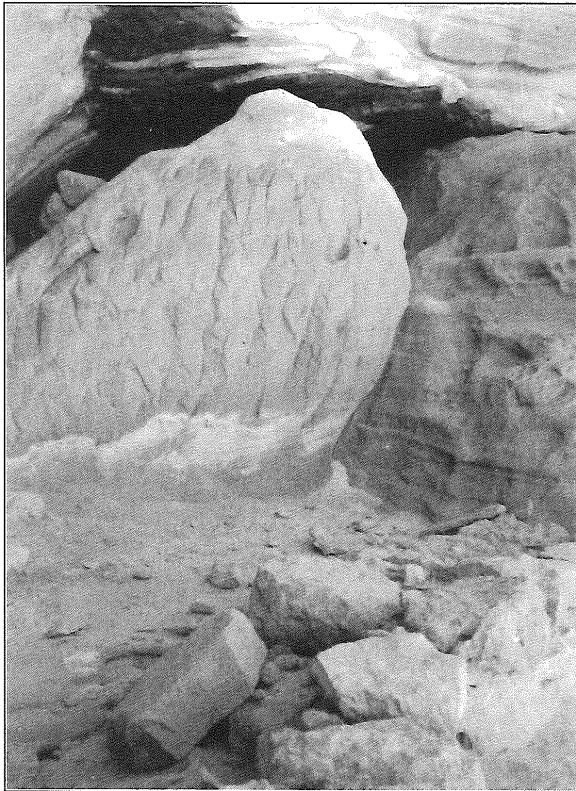
A cave of c. 2 x 2.50 m and a height of 1.30 m is protected by an upright three-cornered stone and by a short double wall. With its blackened ceiling, it was obviously used as a dwelling over centuries. A few bones were the remnants of meals. The location at a distance from the houses suggests an initial function as a tomb; at other times it may have been a lookout for a guard (Fig. 14).



13:1. Cave chamber with rounded lintel, chisel strokes and ashlars of a front building.



13:2. Cave chamber with partition and remnants of a front building.

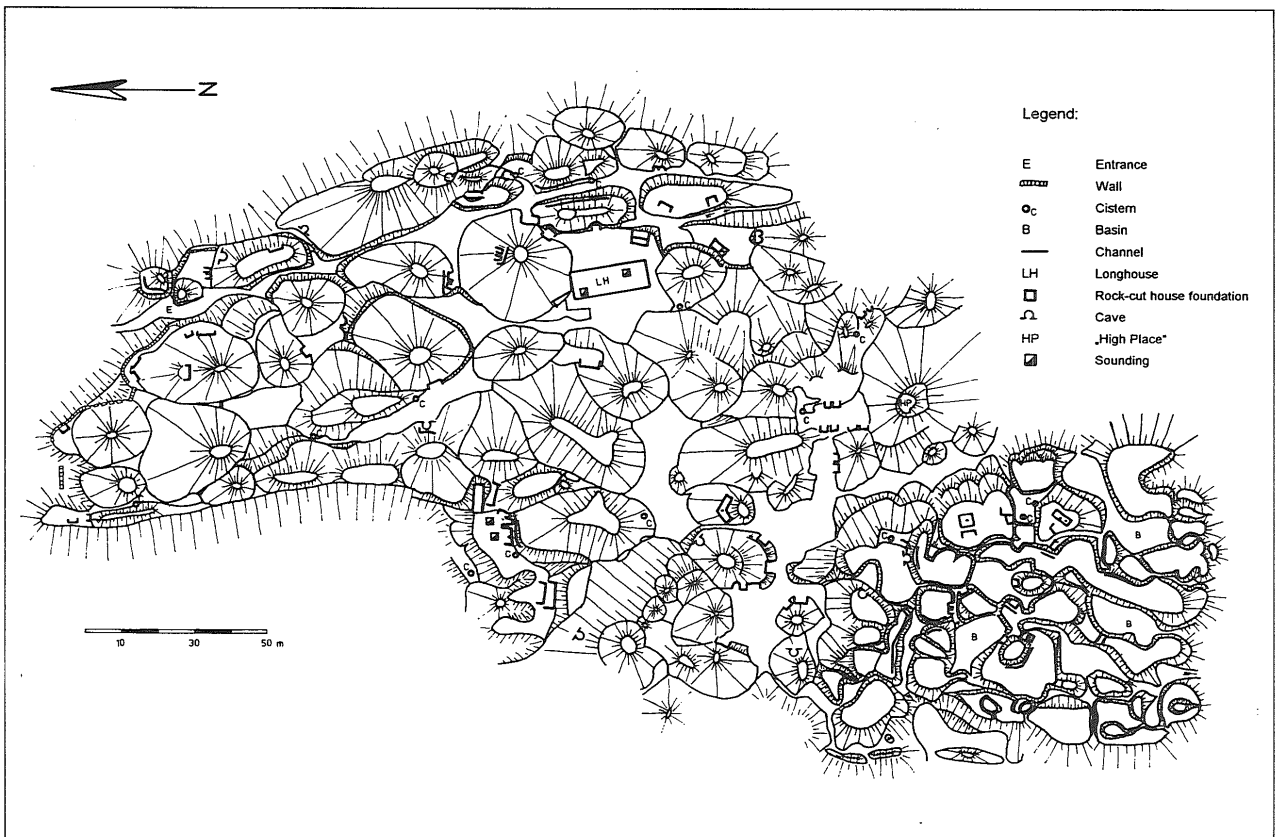


14. Three-cornered rock-slab protecting a small cave with a damaged double wall in front.

Cisterns - the Water Supply of Jabal al-Qseir (Fig. 15)

About 20 piriform cisterns with circular openings, originally plastered interiors and eroded channels leading to them, were placed where rainwater flowed naturally between the "cupolas". One was noted near the longhouse, two of them below the "high place" (see below), others near other house ruins. Some other cisterns may be filled with sand and debris and are therefore not visible. Only one piriform cistern at the western flank of the mountain contained water. The precious reservoir is used by goat-herding pastoralists who laid branches across the opening and a rope with a tin container next to it (Fig. 16: 1).

With most of the channels and grooves originally conducting water to the cisterns eroded and most of the waterproof plaster gone, the reservoirs are empty today. However, trees (*Ficus spec.*, *Ceratonia siliqua*, *Pistacia cf. khinjuk*, carob) growing in sev-

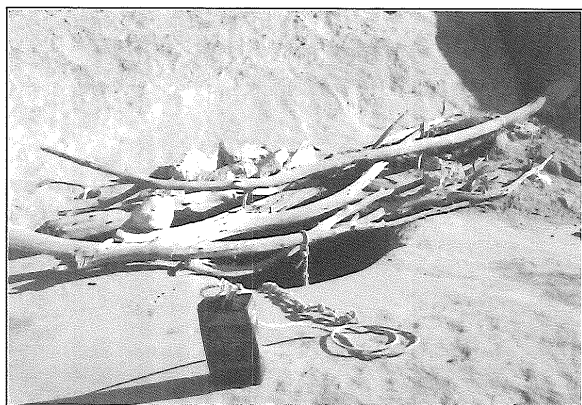


15. Bird's-eye view of the summit area of Jabal al-Qseir (H.Hübl).

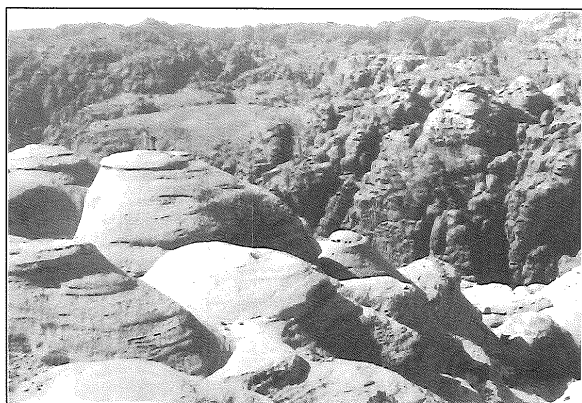
eral of them demonstrate that water still flows into them when it rains. Contrary to the long aqueducts of the Nabataeans, only short channels are to be seen, and no channel with a rectangular cross-section or a covering. Significantly, almost every hillock is equipped with at least one channel, in several cases even with two of them, conducting rainwater into different directions. Number, size and form of the cisterns indicate an excellent water-supply. A surplus of rain in one year supplied water even in dryer years, commented H. Hübl while accessing the groundplan of the stronghold (Fig. 16: 2).

Steps, Footholds and Pathways

Worn footholes and single steps in the rocky surface facilitate walking in the stronghold. What might have been used as communication or as defensive pathways between the hillocks and the different levels



16:1. The only piriform cistern of Jabal al- Qšeir containing water in October 1992 and 1993.

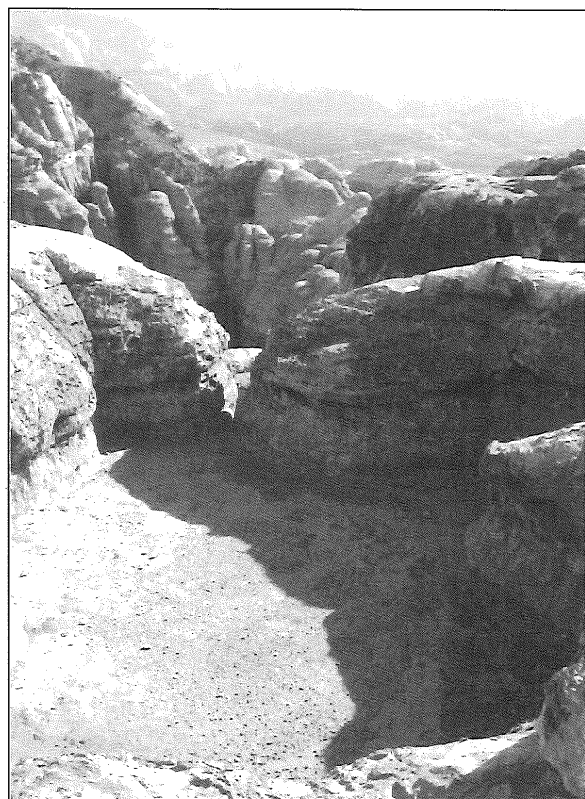


16:2. Surveying Jabal al-Qšeir: H. Hübl and Dakhilallah on top of one of the hillocks.

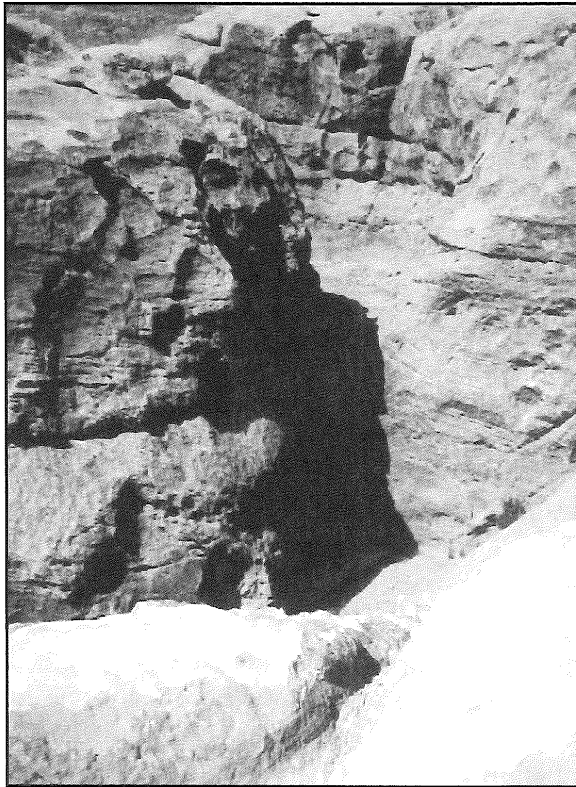
of the settlement, are mostly narrow gullies, water channels or short flights of steps which also conduct water. One gully is furnished with footholds on either side where stepping stones might have been inserted.

Deep Basins in the Summit Region of Jabal al-Qšeir

Large basins, some 6 m deep with almost perpendicular sloping walls, are notable at the uppermost part of Jabal al-Qšeir (Fig. 17). They filled easily with water when it rained. In one case a channel conducted water into a basin (Fig.18: 1). Remnants of closing walls were noted at some outlets. If used as reservoirs, the evaporation grade must have been high. Therefore other purposes might be imagined, even gardening where now only ratam bushes thrive. The authors are convinced that the basins, an originally natural phenomenon, were artificially enlarged. Similar basins were noted at Adnub north of Petra, hitherto unrecorded.



17. One of the deep basins on top of Jabal al-Qšeir. The outlet in the back could be closed.

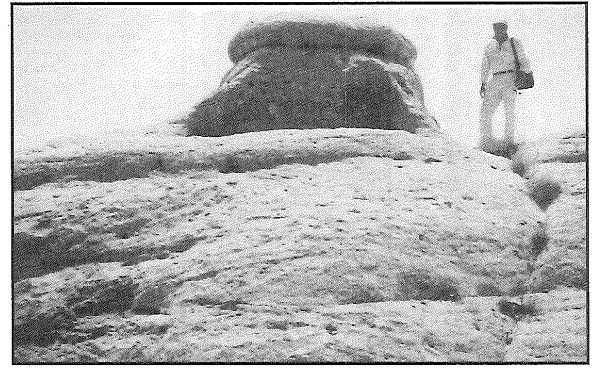


18:1. Wide channel conducting water into one of the basins.

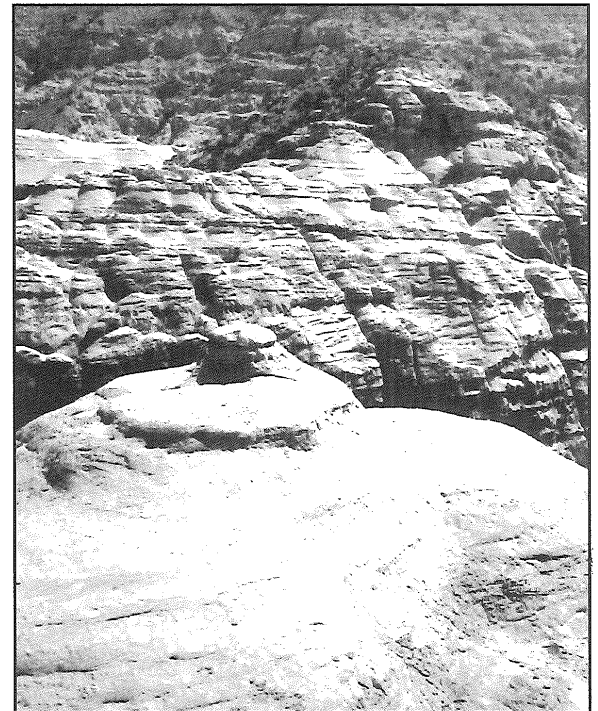
An Edomite High Place ? (Figs. 18: 2; 19)

Halfway up toward the east of the site, there is a small open area with the foundations of a few houses. Worn steps are leading up to an isolated, particularly shaped “cupola” of 1.50 m height. Two wings protruding from its foot toward north where also the steps go up, protect a small upright hole in the right corner with a semi-circular groove in front of it (Fig. 20: 1), apparently an offering place. The “cupola” stands out from the area and is visible from far away. It is reminiscent of another prominent rock between Siq Umm al-Hiran and Ba’ja I (Lindner 1986: 112-115). In both cases, despite the fact that nothing tangible about Edomite “high places” is known, the idea of a natural shrine, modified or not modified by human hands, cannot easily be dismissed.

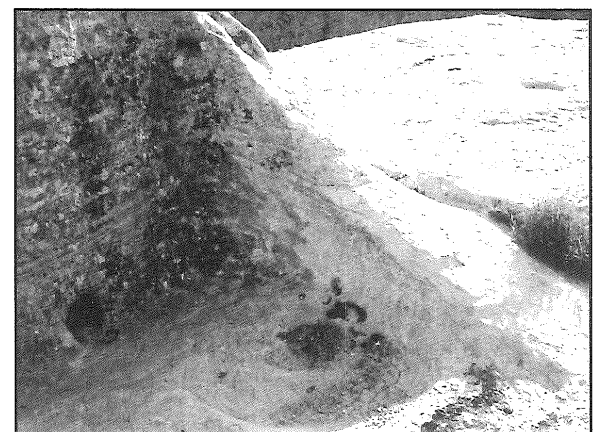
The same may be said about a carefully carved but undecorated stone protruding from a rock-cut place with a strange couple of holes at the top (Fig. 20: 2).



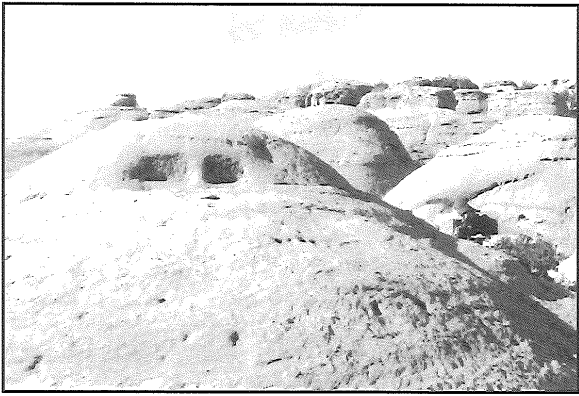
18:2. “High place” of Jabal al-Qseir with eroded steps leading up to the offertory hole.



19. “High place” of Jabal al-Qseir with Jabal al-Barmiya and Jabal ash-Sharā in background.



20:1. Offertory hole with semi - circular hole at the “high place”.



20:2. Rock-cutting of unknown significance with "high place" in background.

The Stronghold of Jabal al-Qṣeir in Antiquity

The notable number of juniper trees and the thriving of a carob tree, with eatable pods, even now indicate quite a different state of the mountain when people lived there. More trees and shrubs would have grown around dwellings and given shade for the inhabitants. In spite of an average rainfall of not more than 50 - 100 mm, with not a single drop of water wasted but conducted towards cisterns and basins, even gullies and small gorges would not have been entirely barren. Regular "gardens" in the basins of upper Jabal al-Qṣeir are conceivable. There is one gully on the mountain where the density of ratam bushes even today makes it impossible to walk through. When it rained, running water could be diverted to small patches of sown ground with any outlets closed or with a small wall fencing it in as long as necessary. With goats and sheep kept out of the stronghold, living on the mountain might not have been so difficult as it seems to the visitor of today.

The Finds

Surface Finds

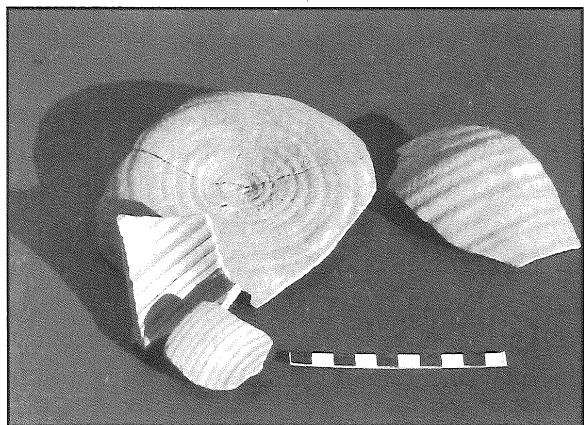
Some pottery finds came from house ruins, but due to the limited number of areas to be excavated, mostly dispersed surface pottery was collected. Among the numerous fragments, Iron II pottery of the type found at other mountain strongholds like Umm al-

Biyāra, Umm al-‘Ala and Ba‘ja III was predominant.

A few very finely ribbed sherds of water jugs (Fig. 21: 1) and a few sherds of cooking pots are probably of Nabataean or Byzantine ware. Generally, very little ceramics from the Nabataean to the Byzantine periods, and no diagonal tooling of ashlar were noted. One lamp fragment is Late Roman or Byzantine. The only ancient inscription on the site is a Nabataean "salam" pecked into a rock-shelter at the foot of the mountain.

It was a surprise when, in addition to two fragments excavated in the upper stratum of Area 1 at the longhouse (see below), a remarkable scatter of a later Arab ware, mostly fragments of cooking pots, was discovered in 1993. The coarse handmade pottery had been found in abundance before by one of the authors (Lindner *et al. infra*), at the site of Khirbat al-Mu‘allaq.

Interestingly, a fragment of a lid, with radiating lines of punctured holes, from the surface of Jabal al-Qṣeir, is a duplicate of a complete lid, excavated together with the pot belonging to it, at Khirbat al-Mu‘allaq (cf. Lindner *et al. infra*). The chronology of the "al-Mu‘allaq ware" is not absolutely certain yet. However, a C-14 test of charcoal, excavated at Khirbat al-Mu‘allaq together with a *tābūn* and the afore-mentioned vessel and lid gives a calibrated date of AD 785-1015. If old wood was used indeed to fire the *tābūn*, the "al-Mu‘allaq ware" might well be



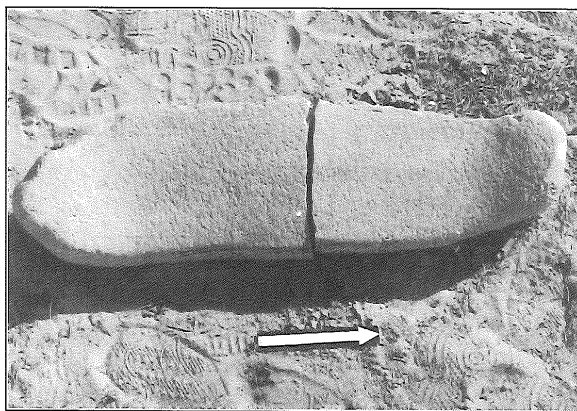
21:1. Ribbed ware from Jabal al-Qṣeir.

dated to the period of the Crusaders in the region. That date is likely to be the same as of an apparently similar or related pottery found at al-Wu‘ayra (Petra) by Brown (1987: 284; 1989: 629) and Vanini and Desideri (1995).

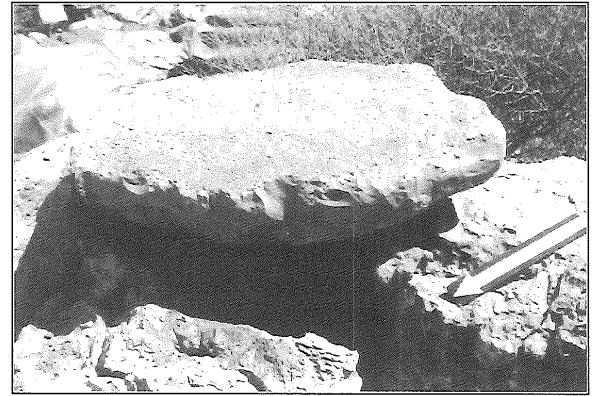
Beside a quern unearthed in Area 1 (D) (see below), and another in front of a cave, only two stone mills of 30 and 50 cm lengths made of a finely grained quartzite, were found by the longhouse (Fig. 21: 2). The disparity between the amount of surface pottery and querns is surprising and not easy to explain.

Soundings

With the exception of two “al-Mu‘allaq ware” sherds (fragments of the bottom part of a cooking pot are exactly like those found at Khirbat al-Mu‘allaq) the results of soundings in four areas of the site corroborated what the surface had already indicated, that is the Iron II date of the stronghold. Area 1 (D) at the southern compartment of the longhouse revealed Iron II sherds of household and storage vessels and a carefully worked oval quern of 30 cm length (Fig. 22: 1). After 0.85 m from the top of the extant wall, bedrock was reached. No different strata could be observed. Area 2 (E) at the northern wall of the longhouse, beside the two “al-Mu‘allaq ware” sherds, had Iron II sherds of household and storage vessels which were heaped upon each other without



21:2. Quern of fine red quartzite (arrow 10 cm).



22:1. Quern from a sounding in the long-house.

indication of any stratigraphy. A fireplace in its upper part attested to the reuse of the area by herders/squatters. Because Iron II sherds were noted between the upper layers of the wall of Area 2 (E) and because the stone material and building method of the following layers were of a better quality, at any rate, the northern part of the longhouse was presumably later (repaired or rebuilt), coinciding with the presence of the users of the “al-Mu‘allaq ware”.

Two soundings of 0.30 m down to bedrock were made at the block of buildings (with cisterns and storage jar fragments at the western rim of Jabal al-Qṣeir), where the sherds had been observed. Apparently, the vessels together with the house walls were moved toward the edge of Jabal al-Qṣeir when an earthquake destroyed all installations of the stronghold. In Area 4 (D) was a fragmented storage jar of c. 0.80 m in diameter with a threefold everted rim. In Area 3 (E) a similar jar together with smaller ones was unearthed. Under the sherds, the rock wall was levelled and furnished with a rock-cut frame. In its exact centre, there was an almost circular 5 cm deep depression of 0.50 m in diameter surrounded with a bulge or lip. The roughly rectangular frame of the installation measures 1.10 x 2.10 m and is c. 0.25 m deep. From the depression a “cake” of humus was dislodged. Eight cowrie shells of different sizes were found among the sherds. The authors are not certain about the purpose of the rock-cut installation, because

no direct parallel is known to them, but the resemblance to Palestinian presses should be mentioned. A press with “a circular hole surrounded by a ‘lip’, also used for olives” was interpreted as a wine press by Ahlström (1978:54, Fig. 24) during his Jenin-Megiddo survey. On the other hand, the rock work might have been nothing but the standing place for a particular jar with a rounded bottom (Fig. 22: 2).

The Food Supply of Jabal al-Qṣeir in the Iron II Period

The grain ground with the querns of Jabal al-Qṣeir had to be brought to the mountain. Strongholds cannot live without being provisioned from outside. Ancient terraces show that grain was grown in many fields around the mountain, some of them being cultivated again today.

Seasonal agriculture as well as ambulatory pastoralism might have been practised by people actually living constantly on the mountain (cf. Knauf 1988: 64). The inhabitants of undefended villages or non-settled people (see Bienkowski 1992:3) may be imagined to have sought refuge in the stronghold only when necessary. In that case, a small number of caretakers would hold the fort most of the time.

A similar scenario may be proposed for Khirbat as-Sela‘ with a rich spring on the opposite range at the present-day village of as-



22:2. Rockwork with a frame and a flat circular centre under broken storage jars.

Sela‘ (Lindner 1973, 1986, 1992); for Umm al-Biyāra (Petra) with a spring in Wādī aṣ-Ṣiyagh at the foot of the mountain and the open village of Ṭawilān a couple of hours away; for Ba‘ja III, where the fields and hypothetical farmsteads/hamlets (Ba‘ja I and perhaps Ba‘ja IV) were down in the fertile plains (Lindner and Farajat 1987); and finally for Umm al-‘Ala separated from the spring in the upper Wādī as-Sadah and with fields at the foot of the mountain (Lindner *et al.* 1988, 1990).

Comparison with other Iron II Mountain Strongholds

In order to define the position of Jabal al-Qṣeir in comparison with four other indisputable Edomite sites, all of them explored by or (in the case of Umm al-Biyāra) well-known to the authors, five typical aspects shall be listed.

Table 1. Archaeological characteristics of Iron II (Edomite) mountain strongholds compared with Jabal al-Qṣeir.

	rock-cut foundations	long-houses	piriform cisterns	defence walls	Iron II pottery
as-Sela‘	+	-	+	(+)	+
Umm al-‘Ala	-	+	+	+	+
Umm al-Biyāra	-	+	+	-	+
Ba‘ja III	+	-	+	+	+
Jabal al-Qṣeir	+	+	+	+	+

Interestingly, Jabal al-Qṣeir combines all the characteristics of the five sites: Iron II pottery, defence walls, piriform cisterns, long-houses, rock-cut foundations. There are reasons for such a unique setup.

Rock-cut house foundations cannot be made from a ground of sandstone eroding in flat fragments as is the case on Umm al-Biyāra and Umm al-‘Ala. They are useful and therefore typical in regions where homogeneous sandstone erodes in cones and “cupolas” as on as-Sela‘, al-Ba‘ja III and Jabal al-Qṣeir.

Longhouses were discovered on the plateau

of Umm al-‘Ala (Lindner *et al.* 1988: 71-83). They were not to be found or were not noticed on as-Sela‘. Umm al-Biyāra has not been entirely excavated. Ba‘ja III is too small for such installations. Even on Jabal al-Qṣeir there is only one place where a longhouse could be built.

Piriform cisterns were noted at all five sites assuming that the cisterns of Umm al-Biyāra are of Iron II origin. Due to the similarity of the pear-shaped cisterns, one of the authors has already suggested the activity of ambulatory cistern makers analogous to itinerant blacksmiths or carpenters (Lindner 1982: 146). There might be a chronological difference between cisterns with circular and with square openings. Both types were seen on as-Sela‘ but as-Sela‘ is a multi-period site. On Ba‘ja III, however, both types were noted despite the fact that no pottery was found which is later than Iron II.

Defensive walls may have connected the rock-cut tower foundations of as-Sela‘. A strong tower at the “khandig”, the access stairway, was part of a defence system. Umm al-Biyāra was a natural fortress and did not need defence walls. The stone and rock works in the lower part of the mountainside, for example steps, stairs, gates, ramps are firmly rooted in Nabataean tradition. They belong rather to a cultic than a defensive installation (Lindner 1989: 293-303). Ba‘ja III was a tower fortress in itself. It was sufficient to cut away a section of the northern rock wall to make it virtually impregnable. Yet, the access from that direction with cisterns and gardens was closed by a wall (Lindner *et al.* 1987, 1988). There is no reason to attribute the walls of Jabal al-Qṣeir to later occupants of the site. Otherwise, more pottery of that later period should be found. In any case, the ledges cut in the rock in order to hold the ashlar of the walls are eroded exactly to the same extent as the other rock works of the site.

Iron II Pottery of the kind generally associated with the Edomites, mentioned in

the Hebrew Bible and by Neo-Assyrian sources (lately compiled by Bartlett 1989, Knauf 1992 and Bienkowski 1992), was found at all five sites. Only on as-Sela‘, the connection between Iron II pottery and the architecture is not obvious (Lindner 1986, 1992). Seemingly, there is not much difference in the pottery assemblages and their chronologies. A few sherds of thin and simply painted “fine ware” was found on the surface and at the slopes of Umm al-‘Ala. Such a refinement seems to be lacking at the other sites, but the search for pottery was not equally intensive at all four sites (cf. Zeitler). A few words have to be added concerning as-Sela‘, recently described again by one of the authors (Lindner 1992), before Jabal al-Qṣeir had been discovered. At that time, rock-cut foundations of tower-like structures and of houses had no striking parallels with other presumably Edomite sites. We still do not know the significance of the supposed “high place” on as-Sela‘ (or was it a house foundation after all?) with what resembles a processional stairway leading up to it (Lindner 1989: 273-285; 1992: 144). But other remnants of half-built, half rock-cut houses and “towers” stand in the Iron II tradition and are clearly paralleled by the architecture of Jabal al-Qṣeir.

Density of Edomite Settlement Sites

Considering the latest state of knowledge, the distances from Jabal al-Qṣeir to other Edomite sites in southern Jordan are surprisingly small. With Iron II (Edomite) pottery lately found on Jabal al-Khubta (9 km) (Lindner 1986: 133-35), at Khirbat al-Mu‘allaq (6 km) (Lindner, in preparation) and at Khirbat al-Minye (9 km), already noted by Glueck (1935: 78) and verified by Suleiman Farajat (unpublished), a high density of Edomite settlement activity in southern Jordan emerges. Hart, after his first Edom survey of 1984/85, noted a significant number of unfortified villages in contrast to as-Sela‘ and Umm al-Biyāra with their nat-

ural defences (1987: 287). Later, he saw the Edomites as a group of people beleaguered from all sides (1986: 54). Mountain strongholds fortified by man or nature controlling their environs but undiscovered up to now due to their limited accessibility, may eventually even outnumber undefended places.

Table 2. Distances of Iron II (Edomite) sites from Jabal al-Qṣeir in southern Jordan.

al-Ba‘ja III	20 km
Ṭawilān	14 km
Ghrārah	14 km
Umm al-Biyāra	9.5 km
Jabal al-Khubtha	9 km
Khirbat al-Minye	9 km
Khirbat. al-Mu‘allaq	6 km
Umm al-‘Ala (as-Sadah)	4.5 km

Speaking of density, one has to look especially at the distances between Jabal al-Qṣeir and the known sites from al-Ba‘ja III to Umm al-‘Ala. Although measured approximately as the crow flies, and in spite of the difficult terrain, those Edomite sites are not more distant from each other than hours or maximally two days.

Strongholds near Commercial Routes

Jabal al-Qṣeir poses the question of why (at least some) Edomites lived (at least for some time) on an uncomfortable windy mountain top (no disadvantage in summer!) without access to spring water, when ca. 2.5 km to the east the village of aṭ-Ṭayyiba offered certainly the same abundant springs in antiquity that made the settlement persist through Ottoman times (as a general rule, established by the geographer W.D Hütteroth, each Palestinian village which subsisted during the 16th-18th century AD existed already in the Iron Age). Were the inhabitants of Jabal al-Qṣeir, in their choice of a dwelling-place, guided by tribal custom? Were they forced into this marginal area by military threats from Judah, Aram-Damascus,

Ashur or the desert Arabs? Does the settlement reflect the eternal opposition between a central government and a tribal population (Knauf 1992: 52) or conflict between the tribes themselves? Did the mountain strongholds meet military requirements of the Edomites’ Assyrian suzerains? Were the inhabitants of Jabal al-Qṣeir highway brigands who sought refuge at their “eagle’s nest” (Obadja 3f.) after having intercepted and looted caravans traversing the neighbourhood with precious goods (cf. Ezekiel 27:16)? Or was it rather their task to watch over and protect those commercial enterprises in the service of the Edomite king and his Assyrian overlord?

First answers to these questions will be formulated by E.A.Knauf (see below). As a matter of fact, the sites discussed here, were never far away from important routes between Syria, southern Arabia and Gaza. That is true for as-Sela‘ near the (later) Sultani Road (Starcky 1966: 890); for Um al-‘Ala near a route from Wādī ‘Araba to the (later) Desert Road (Lindner *et al.* 1990); for Ba‘ja III near the route between Faynān and (later) Petra; and finally for Jabal al-Qṣeir near the routes west and east of the ash-Sharā escarpment, both equally important commercial highways in Nabataean and Roman times. According to the pottery finds at Khirbat al-Mu‘allaq and Khirbat al-Minye they were already in use during the Edomite period.

Chronology of the Jabal al-Qṣeir Stronghold

The authors do not doubt that the Jabal al-Qṣeir site was planned and executed as a stronghold from the beginning. There is nothing to indicate an origin during a Jewish-Edomite struggle before the eighth century BC (Bartlett 1972: 26-37; Weippert 1982: 294), specifically not during a legendary garrisoning of Edom by David in the early tenth century BC (2 Sam 8: 14; Bienkowski 1992:1). There is no architecture in Edom before the eighth/seventh century

BC (Knauf 1988: 67). For Bienkowski, according to present evidence the bulk of the Edomite settlement sites does not precede the seventh century BC (1992 A).

Thus, the original occupation of Jabal al-Qṣeir might reasonably stem from a period when the erecting of houses and defence walls was already customary in Edom, and when it was necessary and/or favourable to stay on the mountain even without the presence of spring water and without cultivable soil right at the spot. That may have been when in the course of the vassal-dom to Assyria since 732 (734) BC (Bartlett 1989: 128) the Edomites, formerly mostly pastoralists up to 700 BC were induced or forced by Assyrian control and capital (Knauf 1992: 50) not only to become settled but also to mine, process and trade copper (Hauptmann 1986: 37; Hauptmann and Weisgerber: 1992: 61-66; Knauf 1992: 51). They certainly had to do with the Arabian trade at the northern end of the incense road (Knauf 1988; Bienkowski 1992: 9), all of it leading to the maximum of Edomite settling activity in the seventh/sixth century BC (M. Weippert 1982: 295), more specifically under a succession of kings since c. 735 BC (Bartlett 1989: 129).

If the stronghold of Jabal al-Qṣeir is not dated in the beginning of Edomite settling activity, the Edomites did not dwell very long on their "eagle's nest". They may or may not have survived the end of their civilization brought about by Nabonidus (553/552) (Bartlett 1979: 53; Weippert 1987: 101) until they were forced to resume their nomadic-pastoral life which most probably had never entirely disappeared. Perhaps the people returned then to the springs of aṭ-Ṭayyiba, leaving houses, walls and cisterns they did not need anymore. At any rate, the time span of Edomite use of Jabal al-Qṣeir was not very long. According to what Bienkowski (1990) stated about the life time of other Edomite sites in the region, an end of Edomite Jabal al-Qṣeir together with the end

of the sixth century BC can preliminarily be assumed.

The Pottery of Jabal al-Qṣeir (John P. Zeitler) (Figs. 23-27)

The Jabal al-Qṣeir survey revealed a large amount of Iron II pottery, commonly known as "Edomite". Similar pottery from other sites within the Petra region have already been described elsewhere (Zeitler 1992), and it will be sufficient to refer to the typological groups which had been previously defined (Lindner *et al.* 1990: 206 ff; Zeitler 1992: 167 ff). A total of 121 pieces fit within this typological frame, while more than 500 sherds are plain pieces without rim or decoration and will not be dealt with in detail here.

Group 1

20 fragments of jugs with high necks could be identified within the sample (Fig. 23:1-3, 5-6). They show a typologically poor variability, most of them monotonously repeating the simple thickened rounded rim. Only one example has a smoothed surface (Fig. 23: 3). Functionally, they most probably had been in use as simple water jugs.

Group 2

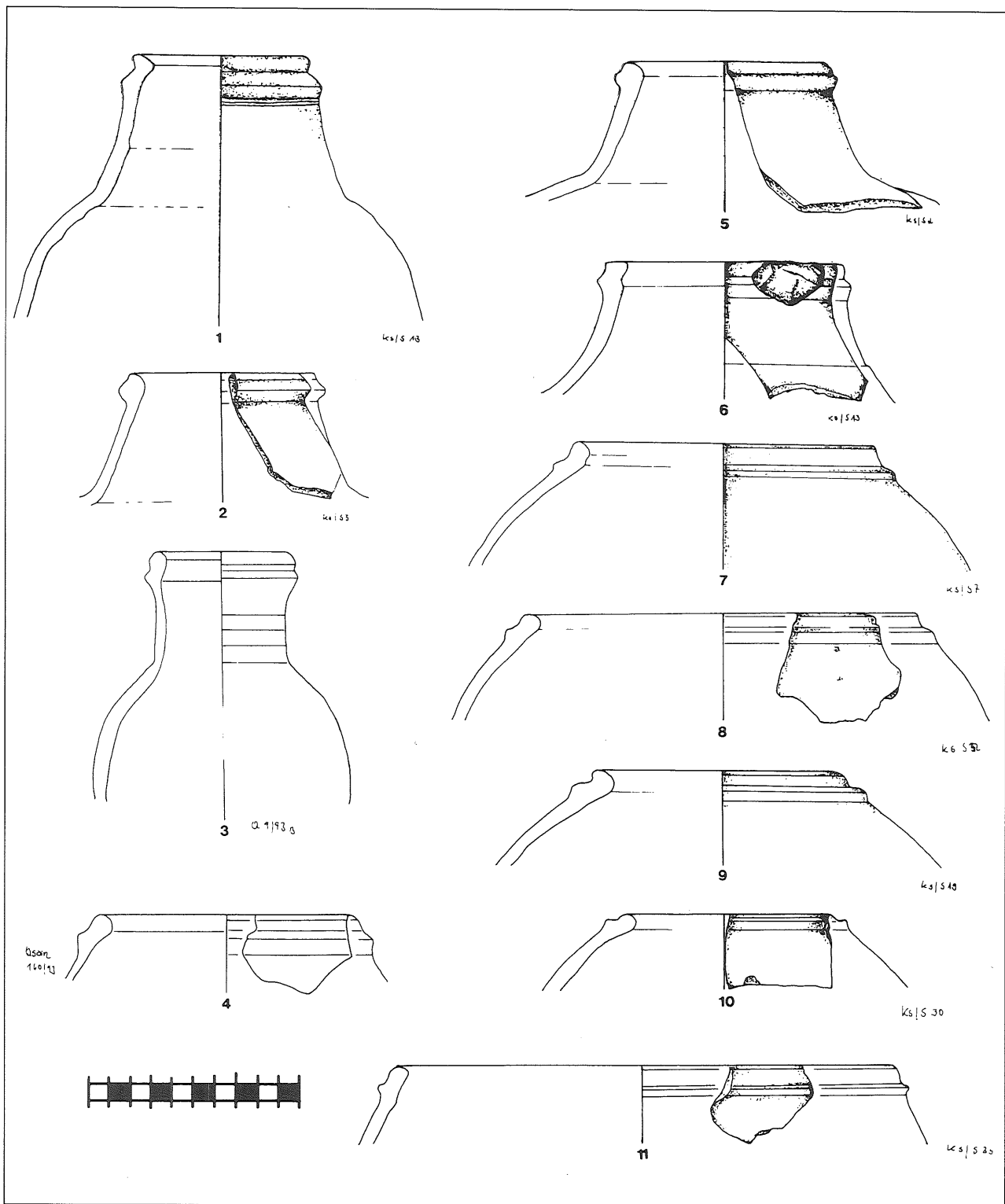
21 sherds belong to the large group of cooking pots with profiled rims (Fig. 23: 4, 7-11). The handles are usually broken, but some pieces show the point of attachment.

Group 3

Within the sample, there are seven rim sherds of large storage jars with short necks and everted rims (Fig. 24: 1-4). The typological range is small, variations occur in the profiles of the rims.

Group 4

14 pieces are attributable to this group of large and deep bowls, commonly called craters (Figs. 24: 5; 25: 1-3). The function is not

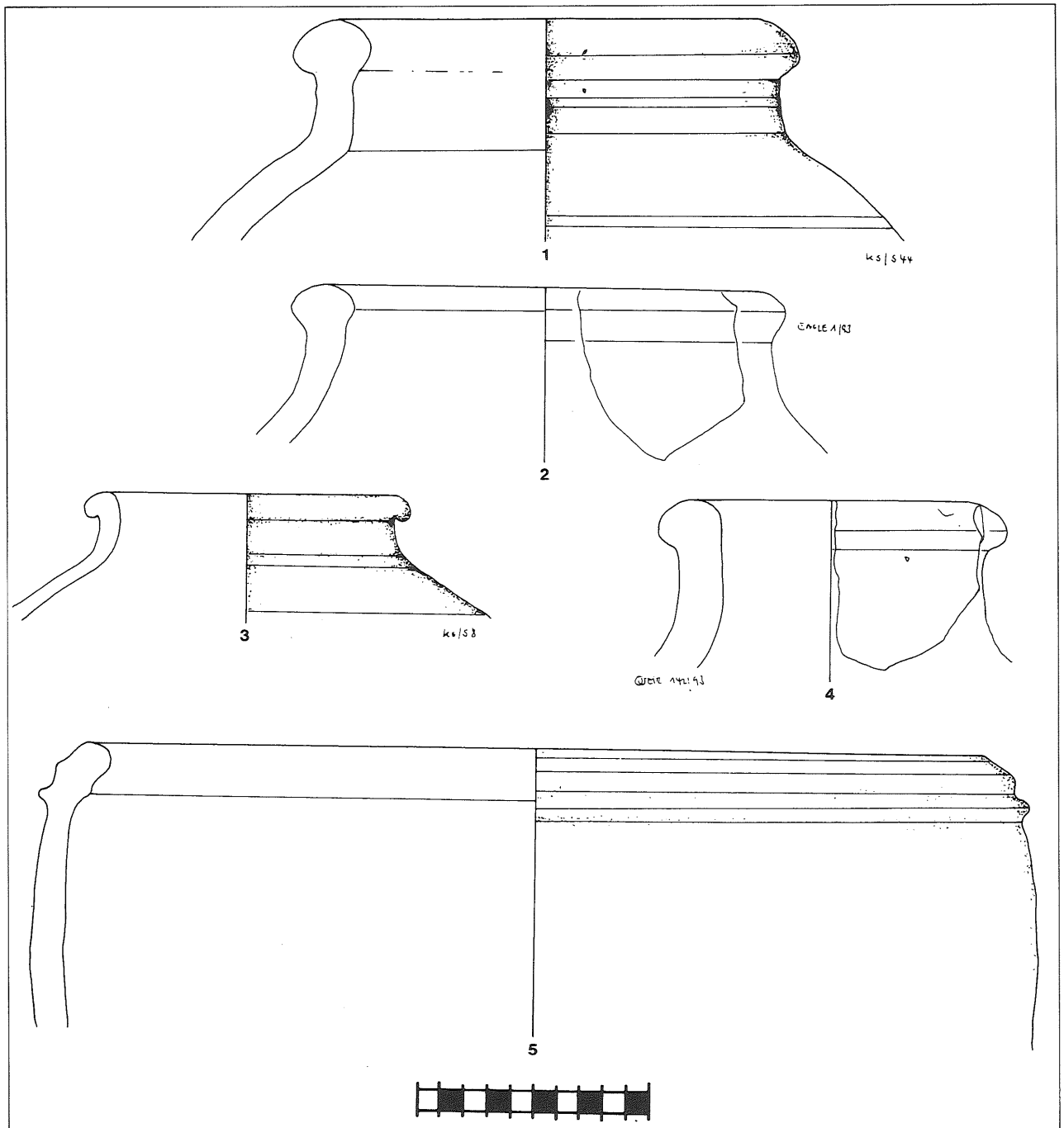


23. Iron II (Edomite) pottery from Jabal al-Qseir.

necessarily fixed on large mixing vessels. The large volume and the great number within the sample might also indicate a use for storage of dry food.

Group 5

Only two pieces of medium sized bowls with flat, thickened rims occur within the sample (Fig. 25: 6). They would have been



24. Iron II (Edomite) pottery from Jabal al-Qseir.

useful both for preparation and serving of food.

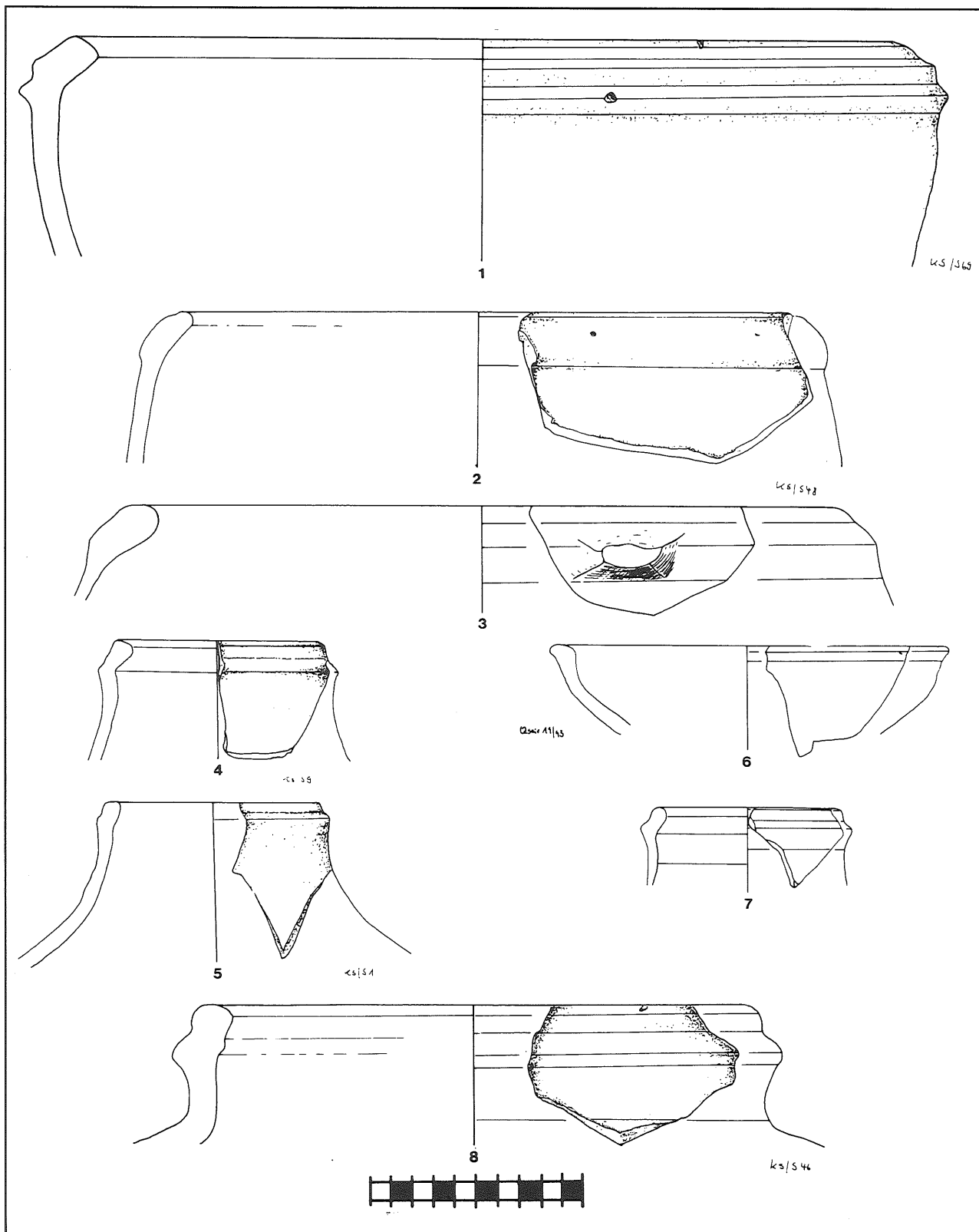
Group 6

This type of jars showing a straight and collared rim is only present in three examples (Fig. 25: 4-5, 7). They seem to form a variant of group 1 and should be connected

functionally with storage in a wider sense.

Group 7

These large vessels with rilled rims are the most common type of Iron II pottery from southern Jordan. The 31 pieces from Jabal al-Qseir show, that they come in different sizes (Figs. 25: 8; 26: 1-4), most prob-

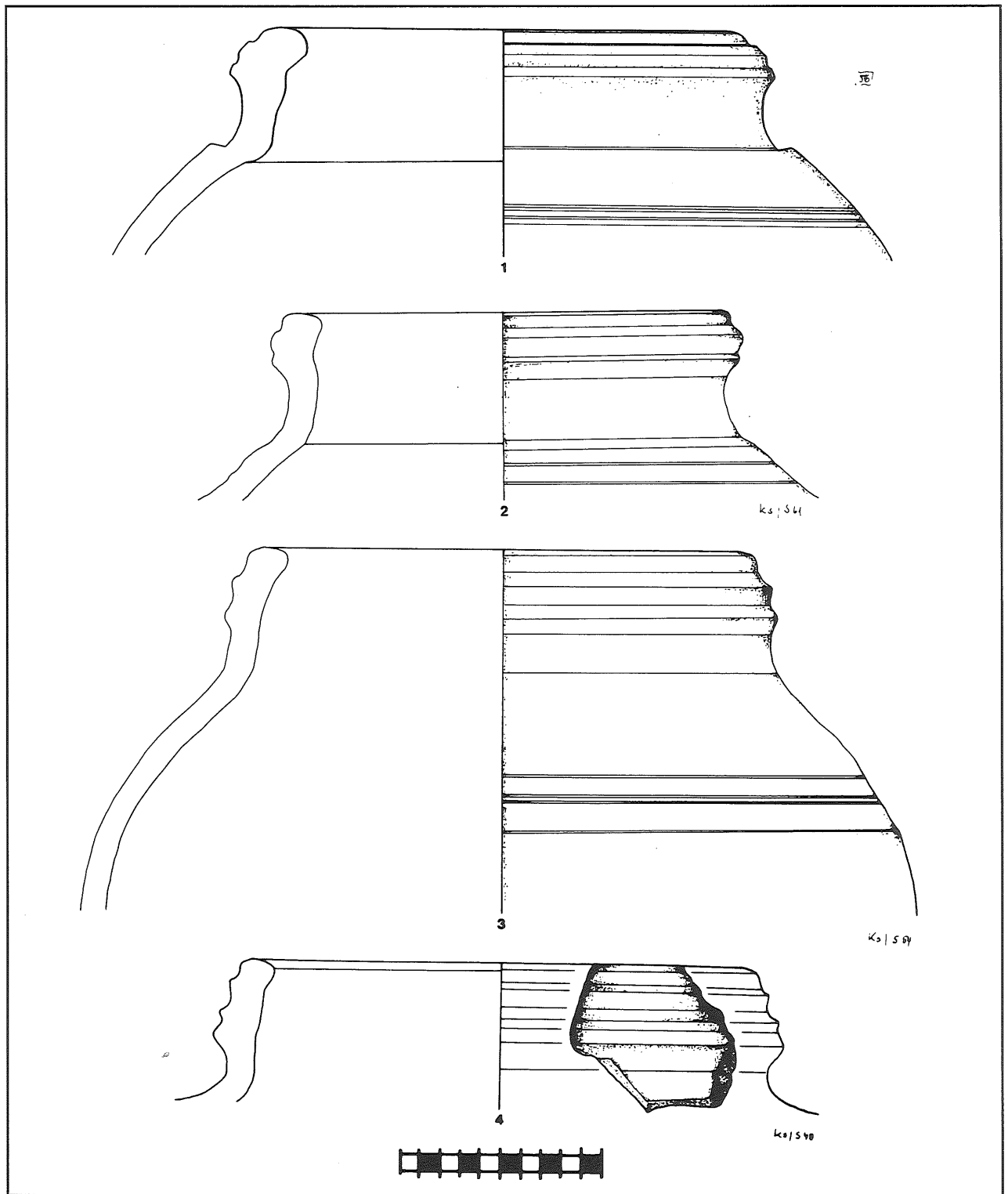


25. Iron II (Edomite) pottery from Jabal al-Qseir.

ably to serve different demands of storing smaller and larger amounts of liquid.

Group 8

Bowls with high profiled rims, serving as

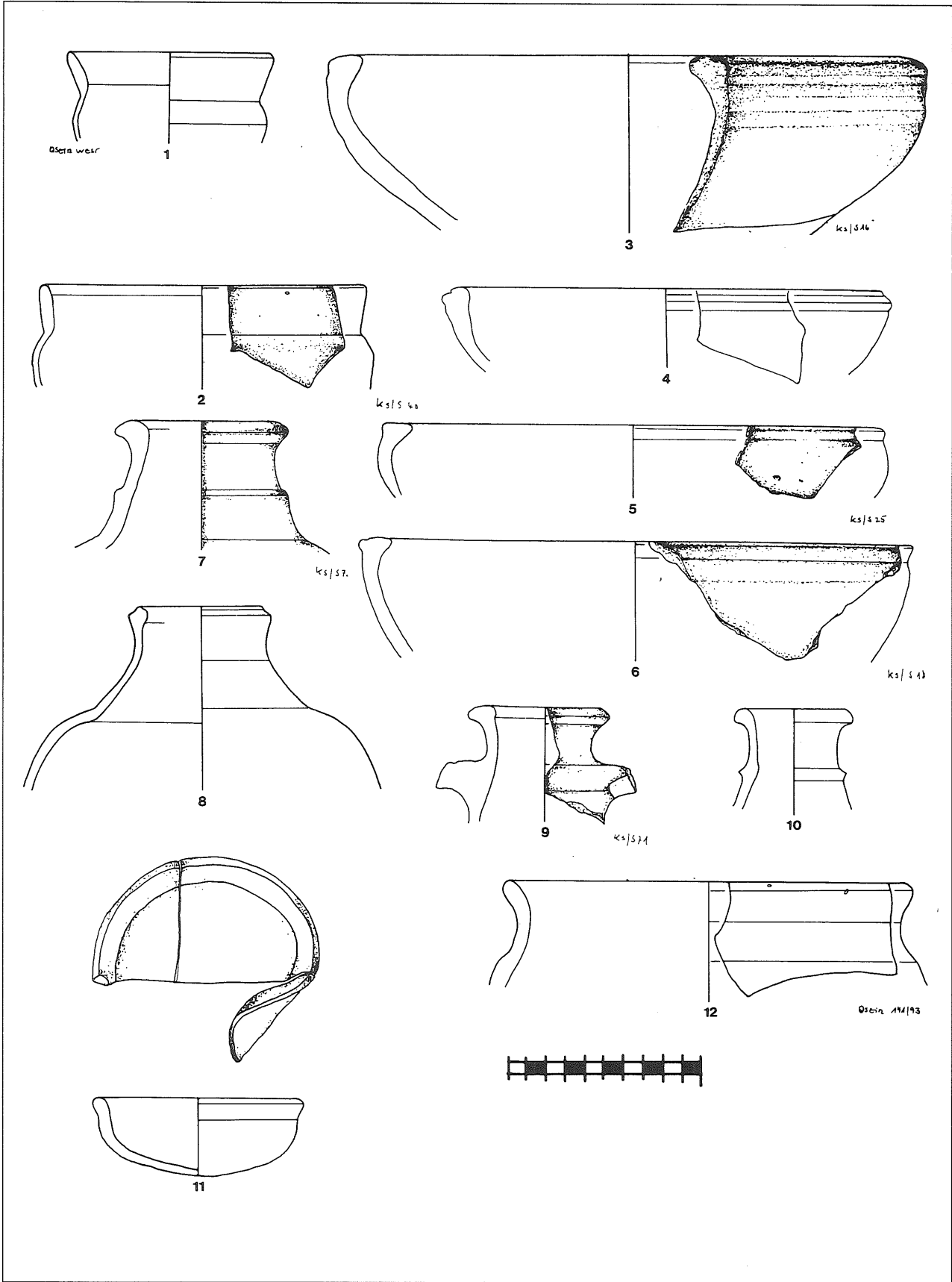


26. Iron II (Edomite) pottery from Jabal al-Qseir.

fine table ware, are absent in the sample from al-Qseir. The shape and quality suggests that they were part of the group of status and luxury goods.

Group 9

Only two pieces of bowls with a high, slightly everted rim are represented in the sample (Fig.27: 1,2). They are usually of a



27. Iron II (Edomite) pottery from Jabal al-Qseir.

medium fine quality and although being rather thin, the surface is only randomly smoothed. They belong to the table ware and were probably used for the consumption of food.

Group 10

Large bowls with profiled rims (Fig. 27: 3-6), probably part of the kitchen equipment for the preparation and serving of food, are represented with seven examples.

Groups 11 - 14

Not a single piece of these groups was found in the Jabal al-Qṣeir sample. They are rather fine than coarse and usually painted with parallel bands of medium brown paint. Compared with other Iron Age types from southern Jordan, they could be classified as status and luxury goods.

Group 15

Jugs with straight, profiled necks and everted lips (Fig. 27: 7-10), are represented by ten pieces. These seem to be a specific type similar to Group 1, but with a more elaborate shape. As the profiling of the neck could be taken as a minimum of "design", they could be classified within the table ware.

Group 16

Within the al-Qṣeir sample, four pieces of a type unknown on the other sites appear. They are classified as a new group of medium sized bowls with a high neck and rounded rim (Fig. 27: 12). Although rather coarse, the shape and the smoothed surface argue for a qualification as table ware.

Lamps

Two large pieces of Iron II oil lamps were collected. They show no specific characteristics (Fig. 27: 11).

It is unnecessary to discuss again the problems of dating "Edomite" pottery. All necessary facts were presented during the Liverpool Conference (Bienkowski 1992:

108, Zeitler 1992: 171). Although our Groups 3 and 7 belong to the types argued by Finkelstein as being Iron I (Finkelstein 1992: Fig. 2), Bienkowski has already pointed out the problems of Finkelstein's chronology (Bienkowski 1992: 108, Bienkowski 1992b: 167ff.). The types suggested as Iron I by Finkelstein create a serious problem if his chronology would be accepted: they all represent water storage containers. If they would be extracted chronologically from the Iron II occupation, the scenario would be of a community only storing water in a hypothesized Iron I era, as no other types of pottery can be ascribed to an Iron I settlement. This is, of course, impossible and only the product of a theoretical construction, disproved by functional considerations on any given site. It is therefore sufficient to state that the homogeneous finds from al-Qṣeir fit into the large complex of Iron II pottery from southern Jordan.

Despite its lack of chronological distinction, the real value of Iron II pottery from the Petra region is its functional indications. It has already been stated (Zeitler 1992: 172 ff), that different site locations produced different pottery assemblages. This again is proved with the hitherto unknown assemblage from al-Qṣeir. Contrasting to Tall al-Khalayfi (Glueck 1967; Pratico 1985), Ṭawilān and Buṣayra (see Bienkowski 1992: 111 and Zeitler 1992:176 for full bibliography of Ṭawilān and Buṣayra), not a single piece of painted pottery was found on al-Qṣeir. This is not a result of the sampling technique – many small pieces were collected for a thorough and methodical survey of the surface. Sites with a very small amount of painted pottery are common in Edomite archaeology, hitherto represented by Umm al-Biyāra, al-Ba'ja III and as-Sadah. In this context, it is remarkable that some types are rare but present in the Umm al-Biyāra and as-Sadah assemblage, but absent in the considerably large collection from al-Qṣeir. It is even more striking, that

the missing types do represent a specific function. All five of them (Groups 8, 11, 12, 13 and 14) belong to the group of fine table ware, usually painted and with a smooth or even polished surface. As coarser table ware is represented in the assemblage (see below), this seems to indicate a further differentiation of the function of the sites.

Analysing the given assemblage, there are vast differences in the percentages. The largest group (31 pieces) are huge vessels (Group 7). They could only have been used for storage purposes, as their sheer weight makes it impossible to carry them over a long distance. An example from Khirbat al-Mu'allaq shows, that these vessels were sunk into the floor and used for storing liquids, most preferably water, wine or oil. According to the large number of different rim sherds in al-Qṣeir, the storage of liquids must have been an important purpose within the site. This is underlined by the presence of 20 large jugs (Group 1), allowing the storage of smaller units. The exact function of Group 4 is unknown. They could have been used as mixing bowls as well as containers for food such as grain or dried legumes. The first possibility would argue for an acute awareness of the need to store quantities of liquid while the second simply shows a necessity of daily life.

Another aspect of daily life, food preparation, is well illustrated by the high number of cooking pots (Group 2). 21 pieces, nearly 20 % of the whole assemblage, are attributed to this group. The total of the hitherto discussed groups, serving storage and food preparation, reaches a number of 86, that is 70% of the whole assemblage. This is a clear indicator, that basic functions played the major role at al-Qṣeir. Looking at the general pattern, storage dominates with a rate of 61 % of the pottery while preparation and consumption of food reaches 37 %. This indicates a settlement, where the life-style of the community is best shown by the total absence of painted pottery and the rare occurrence

of fine table ware (Groups 9 and 16).

A striking parallel in the pottery assemblage with Ba'ja III must be noted. Both sites lack painted pottery, although one has to keep in mind, that the total of the Ba'ja III finds collected during the survey is rather small and therefore not necessarily representative (Zeitler 1992: 167). On the other hand, both Ba'ja III and al-Qṣeir show jugs of Group 15 (Zeitler 1992: 171) and, as indicated above, both show rock-cut foundations of buildings spread irregularly over the hill surface (cf. Fig. 17 with Lindner 1992: Fig. 13:23).

The typical assemblages of "Edomite" pottery in the Late Iron Age of southern Jordan indicate a functional grouping of the different sites. With only a good handful of observed sites, it is, of course, too early for definite models about the hierarchy of Edomite settlements. But combined with the building types and the setting within the landscape, some structures become clear. It has already been noted, that sites in a favourable position produce a large amount of painted pottery. The most prominent site is Buṣayra, also showing a unique architecture, where buildings A and B are considered as palaces (Bienkowski 1992b). Therefore, it is reasonable to suggest that Buṣayra was an administrative center. On a minor scale, Ṭawilān probably had a similar, regional function.

With the results from al-Qṣeir, a differentiation of settlements on high mountain sites seems to be possible. As-Sadah and Umm al-Biyāra can be grouped together, showing a dominance of large rectangular buildings with long corridor-like rooms. On these sites, a minimum of painted pottery occurs. A second group would be formed by Ba'ja III and al-Qṣeir, showing a conglomerate of smaller buildings and, in the case of al-Qṣeir, also a large rectangular building. No painted pottery is present. A fourth group of Edomite settlements is represented by Ghrārah. There a building with a central

court which is situated on a small plateau (Hart 1987: Fig. 7; 1988). The site produced painted pottery. It is most likely to be interpreted as a farmstead.

In conclusion, two trends appear. The first is the high individualism of Edomite settlement layout and structures, arguing against a strong centralized administration. The second is the low grade of urbanisation during the Late Iron Age in southern Jordan. All sites in the Petra region, Ṭawilān, Umm Biyāra, as-Sadah, Ba‘ja III and al-Qseir are located within rich arable lands, marginal to poor rock outcrops. This offers opportunities of mixed farming, using the arable land for crop production and the hills for pasture. All sites have cisterns, arguing for a long-term domestic use. If, as suggested by the author (Zeitler 1992: 176), sites like Umm al-Biyāra and as-Sadah can be interpreted as places of regional control—either of a “central government” or a local clan—sites like Ba‘ja III and al-Qseir represent the local farming communities.

Edomite Settlement Structure in the Greater Petra Region: First Thoughts toward an Explanation (E.A. Knauf)

The Edomite mountain strongholds, discovered by Manfred Lindner and his team in the course of the past ten years, should not have come as a great surprise to the students of Edomite history who are, of course, familiar with Obadja 3 and 4: “You who dwells in the hollows of cliffs, establishes yourself on the mountains, and says to yourself ‘Who will bring me down to earth?’ - even if you placest your nest as high as the eagle’s nest, even if you establish yourself among the stars, I will bring you down from there, says the Lord”. At least for the Judaeian prophet of the early sixth century BCE, the mountain abodes were typical rather than exceptional for Edomite settlements.

On the other hand, nobody who ever ven-

ured to ascend one of these natural fortresses (and be it the most accessible among them, Umm al-Biyāra) can help wondering why the Edomites, or at least part of the Edomites, established themselves in such bothersome retreats while they supposedly had the Edomite plateau with its springs at their disposal. One may look for an explanation by both a diachronic and a synchronic approach.

Historical Observations

Throughout the Near and Middle East, mountain areas served (and serve) as areas of retreat for populations under pressure, for North Africa’s Berber inhabitants as well as for south-east Arabia’s Mahra and related groups, and the last remnants of Aramaic-speaking communities in Syria, Turkey and Iran. In northern and central Transjordan during the fifth and fourth centuries, that is in the cases of Ammon and Moab, settled life seems to have retreated from the plateau and to have withdrawn to the edge of the plateau and into the wadis of the mountain precipice; Rabbat Moab was superseded by al-Karak as the region’s political and economic centre, Rabbat Ammon was an isolated outpost amidst bedouin country, linked to the west by a series of watch-towers; a similar line of towers, often mistakenly attributed to the Ammonites, defended the western wadis against the eastern plateau (Hübner 1992: 155 n.141; 210-212; Knauf 1992). Thus became true (though not in its entirety) what the prophet Ezechiel forebode: “Therefore, I now am giving you (Ammon) as a possession to the people of the east, who will establish their corrals and spread their dwellings in your place; it will be they who eat your fruits and drink your milk. I will transform Rabbah into a pasturage for camels, and Ammon into a thrift for small stock” (Ezek. 25: 4-5; cf. also Ezek. 25: 10).

One may, then, regard the Edomite mountain strongholds as refuges from the very end of Edomite history, when hostile Arab tribes

flooded the plateau and dispossessed its former inhabitants. This interpretation, however, encounters several obstacles: (a) Edomite pottery does not (yet?) allow to differentiate between “early” and “late” ware; as far as the ceramic evidence is concerned, the mountain strongholds, Buṣayra, Ṭawilān and other Edomite sites have to be regarded as contemporaneous. (b) Edom’s “friends” who suddenly turn against him are usually regarded as formerly allied, now hostile Arab tribes (Obad 7). This interpretation, however, is highly doubtful. Most probably, the “friends” are the Neo-Babylonians, with whom Edom had loyally cooperated (and thereby, prospered) and who, in 553/2 BCE, probably without much reason, conquered Bozrah and annexed the country. The relationships between Edom and the Arabs seem to have been predominantly friendly (cf. Gen 28: 9; 36: 3); when the Nabataeans rose to power, they still venerated the Edomite god Qaus, a fact that betrays prolonged and peaceful contact between the two groups (Knauf 1989a). (c) The verses Obad 3 and 4, which mention the Edomite mountain strongholds, do not date from the period of Edom’s devastation, but rather from its prosperity (cf. vv. 2-3).

Although it is conceivable that Edomite groups dwelling in the mountains survived the disappearance of settled life from the plateau for some time, it is advisable to look for the *raison d’être* of the mountain installation somewhere else than in political history. In general, archaeological facts, features and installations have little to offer to the student of political events; they testify, however, to economic and social structures, to which our attention should now turn.

A Structural Approach

Regarded as contemporaneous, the natural fortresses of the mountain strongholds contrast with the man-made (and Assyrian influenced) fortresses like Buṣayra (and, e.g., Ghrārah) on the plateau. They testify, in

all their inconvenience, to that proud strive for independence which is characteristic of tribalism, in this case opposed to the new (and Assyrian induced) Edomite state. It is by no means impossible that each settlement formed the “citadel” of an individual clan or tribe who constantly fought all its immediate and some of its more distant neighbours, if not prevented from doing so by some “colonial occupation force”. Such things happened and are, incidentally, reported in an Assyrian letter from Transjordan (Mittmann 1973; Knauf 1989b: 41 n. 185); another primary example of tribal discontent is provided by the Arabian oasis town of al-Jof in the 19th century, when each quarter of that settlement stubbornly fought its neighbours (Knauf 1989b: 71 with n. 356).

Differences in size, inventory and ceramic repertoire between the sites do, however, suggest that they formed part of a somewhat broader system which can partially be reconstructed. We assume that the presence of Edomite fine ware (or Palace ware) at a given site indicates its centrality (within a number of satellites) and thus, the interface between the local clan and the state administration. Concomitantly it is to be supposed that sites with an extremely small ceramic repertoire (comprising, in most cases, only storage jars and cooking utensils) were satellites which were only temporarily inhabited. Store houses, if such could be identified, would also point to a mobile population (in analogy to recent, Ottoman and 20th century store houses possessed by pastoralists and part-time migratory agriculturalists throughout central and southern Jordan). It seems that sites on the western escarpment of the plateau, like Khirbat al-Mu‘allaq and at-Ṭayyiba, served as central places for one or more mountain strongholds. With such a settlement system, the villages on the plateau provided a secure water supply and a fairly secure source for cereals (given that all of Edom, more or less, forms an agriculturally marginal area). The mountain strong-

holds, on the other hand, provided security to the villagers in case of foreign invasion. Keeping in mind the difficulties that extensive goat-herding can cause for agriculture and horticulture (Köehler-Rollefson 1988), one does not indulge in extreme speculation by assuming that the mountain area was predominantly used by the pastoral segment of the Edomite village population. After all, the economic (i.e., basically agricultural) revolution that Edom underwent in the course of the seventh century can only be explained by the need of food surplus production caused by Edom's participation in world trade and industry. The more marginal a country is, the larger the area of agricultural production must be in order to ensure even a meagre surplus. The precarity of Edom's economic position may serve as an additional explanation for the construction of the mountain strongholds as a last and desperate attempt to increase the area of crop and meat production.

The peculiar installations discovered by Manfred Lindner and his teams of NHG find their explanation in the dichotomy of state and tribes, in the dichotomy of farmers and herders, in the opposition of fertility and security (operative not only on the Edomite plateau) and finally, in the demands of the world economy on the marginal country of Edom which both fed and integrated the various dichotomies identified on the local level.

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M. Lindner
J. P. Zeitler
Naturhistorische Gesellschaft
D-90403 Nürnberg
Gewerbemuseumspl. 4
Germany

E. A. Knauf
2, rue de Montchoisy
University of Genève
CH-1207 Genève
Switzerland

H. Hübl
Universität für Bodenkultur Wien.
Wien
Austria

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THE EGYPTIAN STATUETTE IN PETRA AND THE ISIS CULT CONNECTION ¹

by

Alicia I. Meza

Among other cultic objects, a fragment of an Egyptian votive statuette was unearthed during the 1975 excavations of The American Expedition to Petra (Amman JAM 16193, Figs. 1,8,11). The fragment lacks its head, part of the shoulders, and its base; it measures 20.5 x 13.4 cm, and it is made of a fine, polished black-green schist. The main figure, a priest, is holding a small figure of the mummiform god Osiris with the agricultural implements in his hands and his arms crossed over his chest (Fig. 1). The smoothness of the material and the velvet polished surface of the piece enhances the outline of the priest's legs under the transparent dress.² The style of dress, attitude, and material are similar to statues which belong to the last king of Dynasty XXV or to Psamentik I, the first king of Dynasty XXVI (Bothmer 1960: 32).

The importance of this find, as an artifact deposited out of its primary context, or place of origin, is twofold: first, egyptological and second, anthropological. The egyptological importance of the artifact is that, besides being a beautiful piece of art, it is inscribed with three lines of hieroglyphs that give us information about the statuette's owner and his family. The anthropological importance of the find is that it opens a door for new research on the cultural interaction between Ancient Egypt and Jordan during the Nabataean time.

The statuette was found in the cella of the temple of "The Winged Lions" in Petra and its presence in this particular place was attributed by the excavator, Philip Hammond, to a possible diffusion of the "Osirian cult" from Egypt (Hammond 1977: 81-101). Hammond also recovered two terracotta figurines, one in the same temple and another in a Nabataean house, that were identified by



1. The Osiride statuette, front view.

1. My deepest thanks go to Dr Fawzi Zayadine, for providing me with information for my research and to Muna Zaghoul, Juliette Jabaji and Siham Balqar for their assistance.
2. The style of costume and the priest's attitude, holding the Osiride figure, first appear in Egyptian iconography during the New Kingdom (Vandier

1958: 470, 490). Both features continued to be in use in sculpture in the round throughout the Late Period of Egyptian history. The fragment's material also indicates a Late Period manufacture, since black-green schist was almost exclusively used at this time. (Bothmer 1960:32-33, Figs. 2-3).

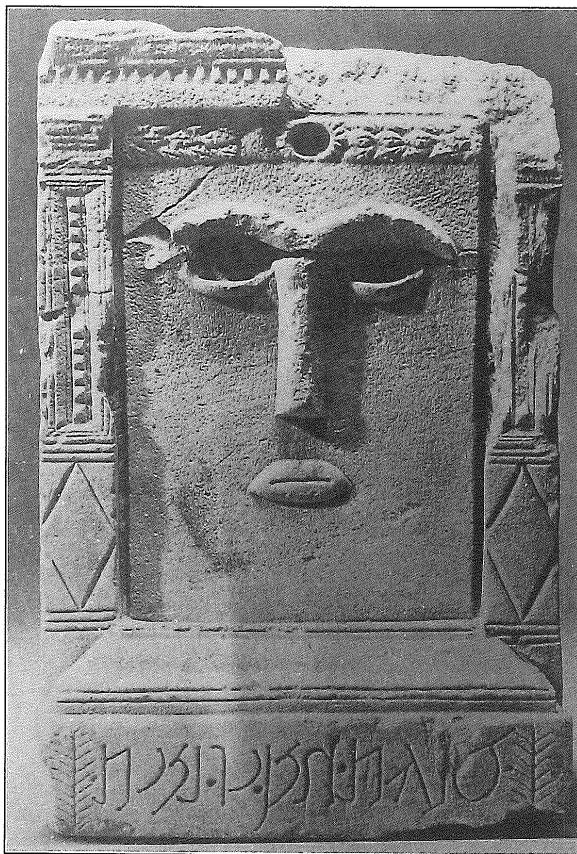
him as the goddess Atargatis, but which were listed in his registry book as wearing a “cloak gathered in front and secured by Isis knot” (pers. comm.). Another parallel figurine was also found in a potters’ kiln in Petra by Zayadine (1982: 386-88 see Fig. 2a). This figurine, as the other two, is seated and draped in a long mantle that has a rounded fringe in the front. Her right hand is raised to her chin and she wears a crown consisting of a disc amid a trefoil plant (Fig. 2). This figurine is described by Zayadine as a “mourning Isis” and not as the goddess Atargatis, since an inscription found at Wādī aṣ-Ṣiyyagh reads “Atargatis of Manbig” (Hierapolis in Ancient Syria) demonstrating that the goddess was not at home in Petra. According to Zayadine (1991: 283), fifteen cities dedicated to the Isis cult are listed in the Oxyrinchus papyrus from Upper Egypt. This papyrus is dated as of the beginning of the second century AD but it probably is of a much earlier date. Petra is mentioned as the most important of these centers, being located in the caravan route to Eastern Asia. The

city presents innumerable niches of sacred stones or “baetyls” that belong to the cult of several gods and goddesses such as al-Kutba and al-‘Uzza. One such a “baetyl” interpreted as belonging to Isis was found at az-Zanṭūr, Petra (Zayadine 1991: 284-306). It presents two stars as eyes and on the top a crown or frieze with a solar disc between two palmettes or spikes of wheat. The star-eyes are a common feature on the baetyls of Wādī Rumm and Petra (Fig. 3). Al-‘Uzza is also identified as al-‘Uzza-Aphrodite who is the main goddess of Petra.

At Delos, Greece, Isis and Aphrodite are also identified with each other. A niche with a phallic stone, attributed to Osiris is also located, near a niche dedicated to Isis, at Wādī aṣ-Ṣiyyagh. At Wādī Abū ‘Ullaqah the goddess is depicted with her feet upon a stepped platform, which may symbolize a throne. I am tempted to identify this type of stairs or steps which are located above different monuments carved on the rock in Petra (Fig. 4), with the hieroglyphic sign for “*3st*” or Isis and “*st*”, seat, throne (Fig.5). The stair, the



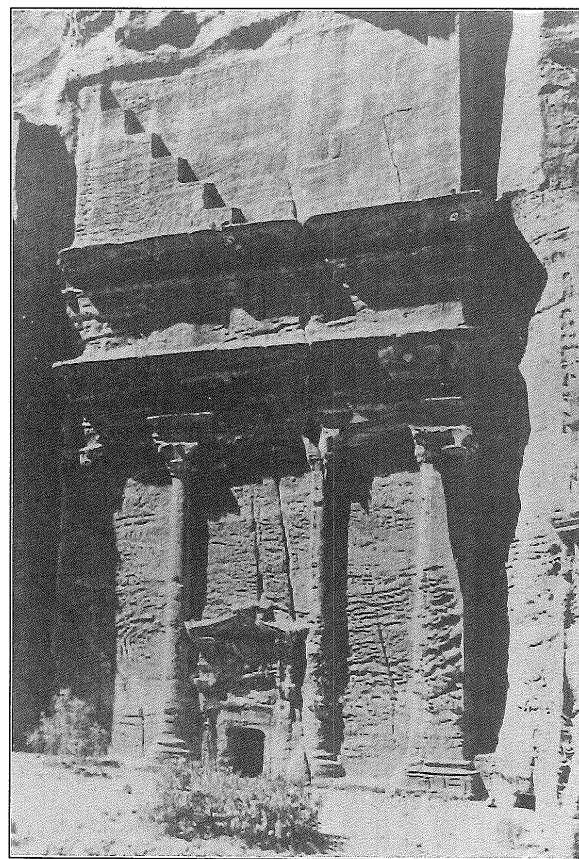
2. Mourning Isis.



3. Goddess with star eyes.

symbol of the Isis crown in Egyptian representation, is also used to write the word “*Wsir*” or Osiris (Fig.6).

There is another representation of Isis, as Isis-Tyche, on the Treasury of Petra (Fig.7). Here, she carries a cornucopia in her left hand. At the Brooklyn Museum of Art, New York, there is a statue without head (unpublished), which presents the knotted, pleated garment and has a cornucopia in her left hand, similar to the Isis-Tyche of Petra. According to an article by R. Bianchi (1980:9-31), we should not identify every sculpture with a knotted garment under her breasts with Isis, since that particular type of dress originated during the XVIII Dynasty and it was later worn by Greek women, who may have copied such style from the Egyptians. The so-called Isis knot is a misnomer since it does not resemble the “*tye*” amulet which has been identified with a tie or straps and is often associated with Isis. Nev-



4. The steps carved on top of tombs at Petra.

ertheless, the figurines identified with the mourning goddess and the Isis-Tyche present that type of knotted garment.

The figure carved above the Tholos of al-Khaznah, at Petra, and which has been attributed to Aretas III, 85-62 BC, or Aretas IV, 9 BC to 40 AD, is a representation of Isis-Tyche, and is sculptured in this manner, may be to honor the Nabataean queen. This type of depiction follows the Ptolomaic costume of representing their queens in the role of Isis-Tyche. According to Fiema and Jones, (1990:34), Arab tribes were installed in the Delta and helped Cambyses during his conquest of Egypt in 525 BC, since a dedication of a temple by Malikus I was found at Tall ash-Suqafiya, west of Ismailiya. This same king sent his calvary to help Julius Caesar to conquer Alexandria. According to Zayadine (pers. comm.), numerous graffiti were also found in the Sinai proving an occupation by the Nabataeans from the first to the third cen-



5. Isis' crown with stepped platform.

tury AD.

The depiction of Isis, mourning the death of Osiris, in the Nabataean city of Petra may account for the appearance of the votive statuette within the cella of the Winged Lions' Temple, if this temple was dedicated to the Isis cult. Furthermore, the inscription on the statuette gives us a clue on its possible place of origin, name and function of the priest offering the Osiris statuette, as well as its immediate genealogy.

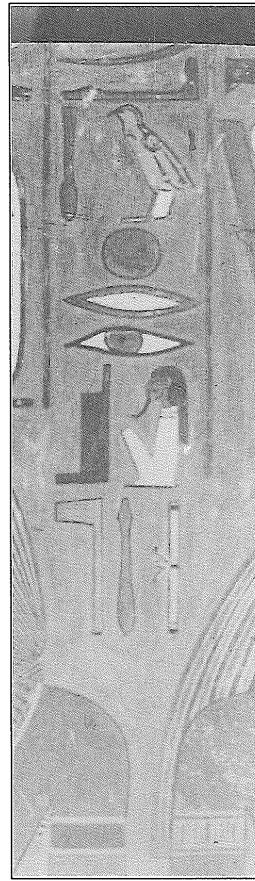
Two broken lines of vertical hieroglyphic inscription are next to the left leg of the priest who is presenting the Osiris statuette (Fig.8). The text reads:

Left column:

S3 n hbs-diw p3 `s3 hr [...]

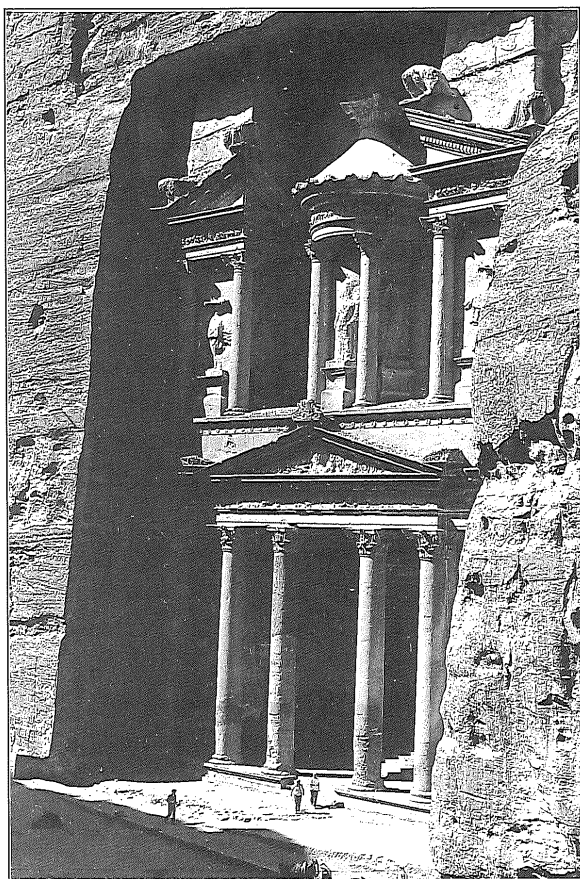
"The son of the *hbs-diw* priest, Pashahor [...] (Fig.9).

The priestly title "*Hbs-diw*" or 'robing priest' is a specific title of the Osirian cult in



6. Stepped platform to write the Osiris' name in Ancient Egyptian.

Athribis (Vernus 1978:444-47). The explanation for the five strokes written in a group with the word "*Hbs*", is more complicated, since it is a word that presents diverse variants in writing. According to Vernus, this word and the five strokes were related to the Osirian cult in the city of Edfu and later in Athribis throughout Dynasty XXX. Their possible meanings are, "...he who covers the five gods"; "...he who covers the god with five stripes". The exact significance is obscure, but its origin can be traced to sarcophagi of the Middle Kingdom. Later on, the concept was subsequently used in the title of Athribis (Vernus 1978:446-47). Vernus, in his footnotes, cites references to the five strokes, which have been interpreted as a designation for the god Geb (Fairman 1945:107; Faulkner 1958:14, line 20: 5). The word "*hbs*" has also been interpreted as a participle that not only involves the person who executes the action but also



7. The Treasury of Petra with Isis-Tyche on top, center.

the occasion on which the action is executed (Gardiner 1911:42). Although the title “*Hbs*” with the five strokes had been employed earlier, its official use seems to have been consolidated during Dynasty XXV and in connection with Athribis, as mentioned above.

The bird interpreted as being a falcon for the word “*Hr*” could also be a vulture and be read as an alif completing the word *Pa-`sha* [...]. This interpretation is closer to the name “`s3.t” listed in Personennamen, (Ranke 1952:71), where “`s3 ” is written with the “`s3 ” sign followed by the vulture to complement the word with the alif sign. In page 103, number 14, a name from the Turin Papyrus is listed: “p3-`s3-*imn*”; here the “p3 sign is written with the flying duck followed by an alif and the “`s3 ” sign which is followed by a “t” and three strokes before the “*imn*” word. This could be a plausible interpretation for reading the priest name as either *Pa-`sha-Hor*, *Hr* being in place of



8. Left side of the priest holding the statuette.

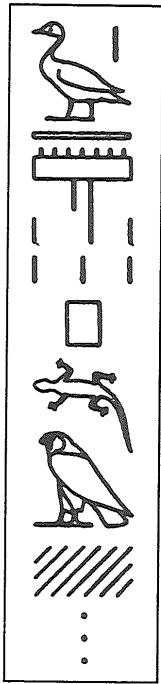
“*imn*” as cited in Ranke, or taking the whole group as standing for the word *pa-`sha*, the rest of the name being lost.

The right column reads:

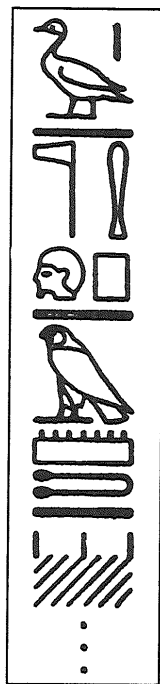
S3 n hm-ntr tpy n Hr Mnt [...]

“The son of the first prophet of Horus, “Montu[...]” (Fig. 10).

The rest of the name could be *Montuhotepw* since in Ranke (1952, Band I:154-55), there are four instances where the name Montu (the name is written with the “*mn*” sign followed by the “*n*” sign and then the “*T*” sign) is followed by the word “*Htpw*” written with the plural “*w*”. This is a very plausible possibility since a flat sign followed by three strokes can be distinguished in the inscription. Perhaps the flat sign is a mistake for the “*htp*” sign followed by the three strokes standing for the plural “*w*”, “*htpw*”, as written in Ranke. The name is also quoted in Vernus’ Athribis (Vernus



9. First line of hieroglyphic inscription, next to the priest's left leg.



10. Second line of hieroglyphic inscription next to the priest's left leg.

1978:66) in a familiar group dating from the XXV Dynasty. In a study of Theban officials and priests by G. Vittmann (1978:88-91;144 - 47), the name *Montuhotep* is of a long family tradition within the two professions, which originated in Thebes.

In the index of private names, *Montuhotep* is a name given during the time between the XXV-XXVI Dynasties. These two lines of inscription near the left leg, of the Petra statuette, can be interpreted in two ways: The person holding the osiride figure is the son of the *Hbs Diw* priest *pa`shahor* or "*pa`sha...*" who is the son of the first prophet of Horus, *Montwhotep*. Or *Montwhotep* is the priest holding the statuette, the son of the first priest of Horus and born to the *Hbs Diw Pa`sha Hor*.

The back pillar is inscribed with one hieroglyphic line (Fig.11), which reads:
Ntrw imyw km ntrw hntyw st wrt hst

"The gods who are in Athribis, the gods who are the foremost of the great place of praise." (Fig.12).

The sign with the three elongations may

stand for the "K" sign (Gardiner 1911:1,6) and the flat sign that follows is a line that Vernus includes in the group belonging to the XXV-XXVI Dynasties and standing for the Athribis' name (Vernus 1978:347). The group along with "t" sign and the "niwt" sign may read "Km" (Gautier 1927:199-205). In "Athribis", (Vernus 1978:344 - 47), Vernus presents a chronological variant for writing the Athribis' name throughout Egyptian history. The model that fits the group of signs carved in the statuette corresponds to the end of Dynasty XXV, first half of Dynasty XXVI.

According to the 'Lexikon der Ägyptologie' (1975:519-22), the first time that the name of "*Km wr*" is used to denominate Athribis is under King Sahure of the V Dynasty. During Dynasty XVIII a new denomination is also employed "*Hwt-Hri-ib*" or "mansion of the heart". The main divinity of Athribis was the Crocodile Hentyhty expressed as a falcon



11. Back pillar of statuette with inscription.

position of the statuette in its temple, namely looking left, its secondary context is unclear. Since the statuette was already broken when found and mixed with other artifacts, there is no way of knowing if it had been placed in the temple as a votive object or if it had just been discarded there.

We cannot say with any assurance that, because this object was found in a Nabataean temple, the Nabataeans worshipped Osiris. An Egyptian may have carried it from his native land or a Greek or a Roman soldier may have left it there.

Dynasty XXV ended approximately 665 BC after the Assyrian invasion of Egypt, which swept through the area of Palestine as well, and a new dynasty emerged in Egypt in 664 BC: Dynasty XXVI (Smith 1988:395-416). During these turbulent times, the Edomites were living in the Petra area and the Nabataeans were yet to come. According to Starcky (1964), the Nabataeans moved into the land of Edom in about 600 BC and into the Petra area about 400 BC.

According to an article by M. Smith (1991:101-109), Psamentik I may have died abroad after having been 55 years on the throne of Egypt. In describing the circumstances in which the king may have died abroad, Smith indicates that during the last two decades of the seventh century BC there was intensive Egyptian involvement in Asia. Assyrian power was declining and the Babylonians were gaining strength at the end of the reign of Psamentik I. Egyptian armies were positioned in Western Asia in 616 BC and again in 610 BC, according to the Babylonian Chronicles. The Egyptian armies remained in this region even after the defeat of Assyria by the Babylonians in 605 BC. During the years of 610 BC, or an earlier date, Psamentik I may have crossed Egypt's borders in order to accompany his army, even if not to battle, than to raise the troops' moral

or to collect tribute. Psamentik I journeys to Asia were recorded by Herodotus and Diodorus indicating other motives as well (Smith 1991:108;109). Curiously enough, this same time period is the one that fits the Egyptian statuette's type of inscription and its manufacture. Perhaps as I hinted above, during the Egyptian involvement in Asia someone, associated with the progress of the Egyptian army in this region, carried the statuette to Petra, where an earlier sanctuary dedicated to Isis may have already existed. Or perhaps, this was just the action of a pilgrim who went to the temple dedicated to Isis mourning Osiris. Nevertheless, can we say with assurance that the Nabataeans worshipped Osiris? There is not enough proof, since this is the only Osirian artifact that has been found in Petra. Other Egyptian artifacts have been found throughout the Palestine area (Schulman 1990:235). Scarabs from Dynasty XVIII were found in the Petra area (Ward 1964:45-46). At al-Bālū'a in Jordan, a Moabite site, a basalt stele was found on which three figures are depicted (today in the Jordan Archaeological Museum, 'Amman), one of them an Egyptian king wearing the crown of Upper Egypt. The other two are not very clear; but one of them is a goddess which wears the "atef crown" of Egypt. The central figure is a king who is receiving a commanding staff from the Egyptian king.³

The Egyptian influence on the culture of Palestine while this area was under Egyptian control is undeniable. It is equally obvious that there was also an Asiatic influence upon Egyptian culture; and although there were many cross-cultural contacts, we cannot assert that a cult of Osiris had been established in Petra. One possible cultural contact is the Isis cult described in Zayadine's article (1991:300), and which may have preceded the actual Winged Lions' Temple. The votive statuette may have been deposited in

3. The Bālū'a stele was first published in an article by Ward and Martine (1964: 5-22). The Osiris statuette from Petra was first published by Ham-

mond (1977-78: 81-101), with the caption, "Site II fragment of Egyptian funerary statuette used as offering, cella area".

this way in the Isis temple as a token of piety toward the goddess' deceased husband.

Nevertheless, the presence of the Egyptian statuette in Petra is significant for two reasons. First, it is proof of the exchange of material culture between Egypt and Jordan, although the specific reasons for its transport and deposit in the Nabataean temple are unknown. And second, it gives an important basis for further research. Since the statuette is much earlier than the temple, this find could have been part of an earlier temple's

foundation when it was uncovered by the Nabataeans who reused it as a votive object. Only future archaeological work and research may provide us with answers to the questions and speculations formulated above.

Alicia I. Meza
104-60 Queens Blvd.
Forest Hills 11375
New York.
U.S.A.

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1995 ARCHAEOLOGICAL EXCAVATION OF THE SOUTHERN TEMPLE AT PETRA, JORDAN¹

by

Martha Sharp Joukowsky

Introduction

This report presents the results for the third year of archaeological survey and excavation of the Southern Temple ('Great Temple') at Petra conducted under the auspices of the Jordanian Department of Antiquities. These archaeological investigations from June 17 to August 15, 1995 were sponsored by Brown University, Providence, Rhode Island, U.S.A.² Located to the south of the Colonnaded Street near the Qaşr al-Bint Temenos Gate, this 7000 square meter Temple Precinct is comprised of a stepped Propylaea leading into a newly-discovered double-colonnaded, hexagonally-paved Lower Temenos, which is bounded on the east and

west by elegantly apsed Exedrae. A partially uncovered 'Grand Stairway' leads up to the Upper Temenos and to the Southern Temple itself (Fig.1). The Southern Temple was opened to exploratory research in 1993, and excavations have continued in 1994 and 1995 with the investigation of several temple areas. In 1995 the focus was on the Pronaos and Adyton in the Temple and other *in situ* features of the Lower Temenos — the West Exedra, the East Colonnade, and the subterranean canalization system.³

Strategy⁴

The goals of the 1995 season were to: 1) continue clearance of the Temple Precinct of

1. The Southern Temple represents one of the major archaeological and architectural components of the city, as well as one of the largest temple structures to be found at Petra. The Southern Temple lies to the south of the Colonnaded Street and southeast of the Temenos Gate. It occupies a position of paramount importance. From north to south the Southern Temple Precinct is comprised of a Propylaea, which leads to a sacred area or Lower Temenos ending in what we posit is a monumental 'Grand Stairway' which in turn leads to the Upper Temenos, the sacred enclosure for the temple proper.
2. The staff was comprised of M. S. Joukowsky, Director; A. W. Joukowsky, Administrator and Photographer; E. Schluntz, Assistant Director; L. Traxler, Chief Architect-Surveyor; G. Bilder, Computer Analyst; M. Slaughter, Photographic Recorder and Photo Development; L.-A. Bedal, Ceramic Analyst, K. Mallak, Finds Recording; J. Blackburn, Draftsperson; T. Tullis, Geologist, Brown University; D. Brill, Professional Photographer; Senior Archaeologists, E. Payne, J. Basile, J. Bell, L. Sisson, J. Rucker, L. Tholbecq, and field workers F. Ra'ad, L. Khalidi, A. Harris, Z. Habboo; and volunteers R. Ballou, F. Bennett, C. Bennett, N. Koprulu, P. Boczkowski, D. Quigley, J. Nicholas, C. Tullis, C. Worthington, W. Azoy, S. Scott, Fr. A. Scott, and M. Sylvester. G. Abbadi was assigned to us by the Department of An-

tiquities for help in moving architectural components, soil removal. His service to us was indispensable. Besides T. Tullis, 1995 Southern Temple Consultants included C. Augé, numismatics, S. Schmid, Nabataean fine wares analysis, and P. Warnock, botanical materials analysis.

Under the general supervision of Suleiman Farajat, the Department of Antiquities of Jordan assigned Mohammed Abd Al-Aziz (Al-Ghunmiyyin) as our Department of Antiquities representative.

3. The Southern Temple canalization system excavations and GPR survey have been covered in The Water Canalization System of the Petra Southern Temple. in *SHAJ* VI (in press).
4. The site-specific excavation strategy created in 1993 was further developed in 1995. This included the use of Electronic Distance Measurement (EDM) interfaced with the COMPASS program developed by MASCA of the University of Pennsylvania and our site specific computer data base, with a consistent nomenclature. Site datum and sub-datum points were established in 1993. Topographic and *in situ* positions of architectural components have been acquired in relation to set points with absolute elevations. The Petra Southern Temple Precinct is approximately 113m north-south by 55.68m east-west. The Petra site al-Katuta and Zibb Fir'awn outcrops lie at 908m above sea level. Our site datum point, known as Pt. 103, has an elevation of 895.48m or is 12.52m below Zibb



1. Aerial photograph of the Petra Southern Temple, looking southwest (Photograph by A. A. W. Joukowsky).

earthquake debris and to clarify its architectural plan; 2) investigate and assess the nature, extent and depth of the stratigraphy within the various areas of the Temple Precinct; 3) provide an up-dated working plan of the precinct design by survey (Fig. 2); 4) chart the Temple's stratigraphy and phases of use, and 5) to consolidate portions of the excavated remains.

Phasing the Deposits

While specific chronological information from coins and pottery is not yet avail-

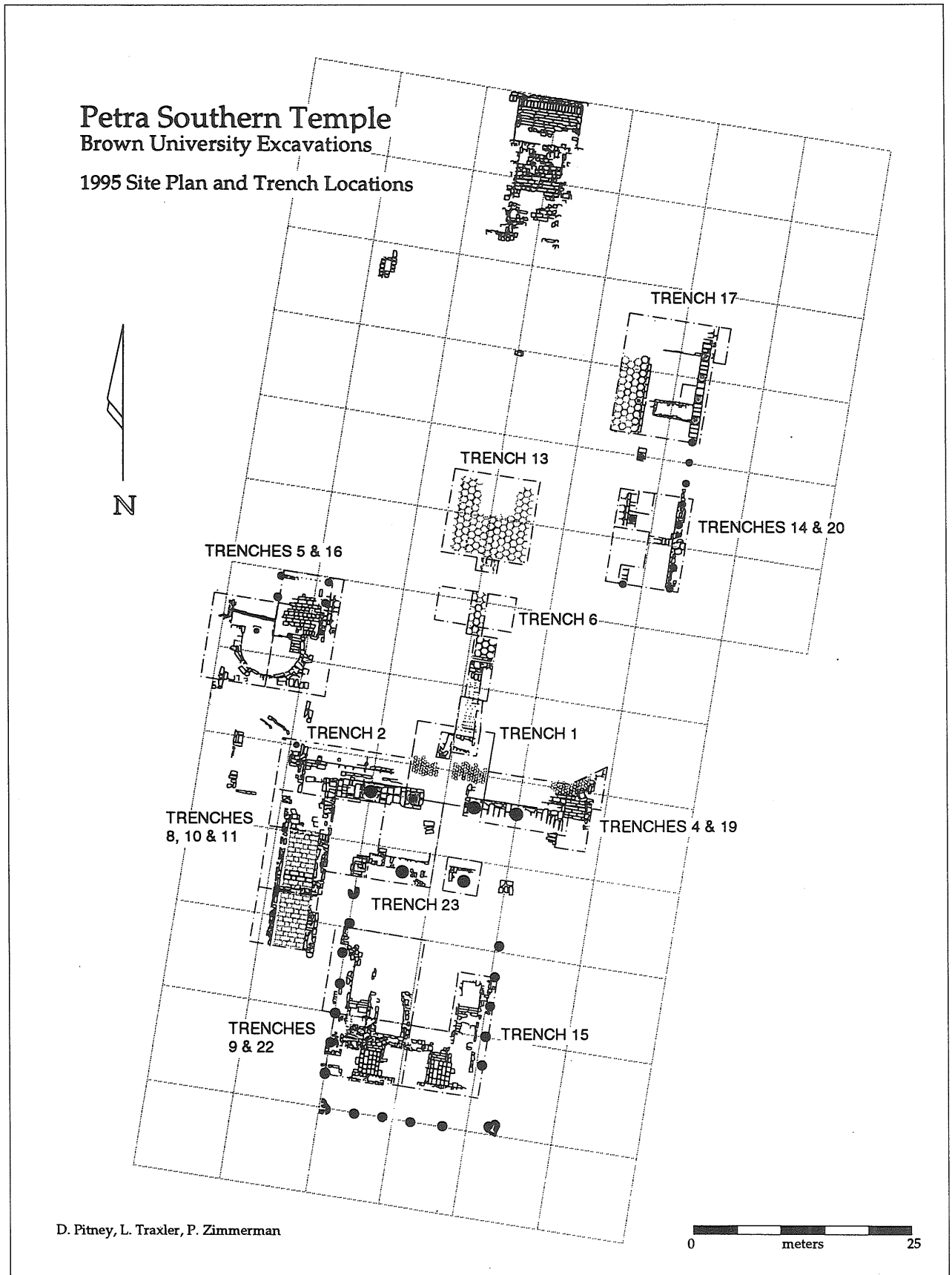
able, it is possible to create a relative chronology, based on stratigraphy and architectural phasing. The documentary research indicates that as many as 18 phases are now represented within the Petra Southern Temple precinct from its founding in the first century CE to its demise at some point in the Byzantine period.⁵ Examination of these factors has suggested the following construction developments, from earliest to latest.

Phase I — (pre-106 CE) *Propylaea*: east retaining wall;⁶ *Lower Temenos*: Ex-

Fir'awn . The Upper Temenos hexagonal pavement of the Temple Forecourt has an elevation of 884.41m — there is an 11.07m difference between it and Pt. 103. The Lower Temenos elevation of the large hexagonal pavers is 878.50m — there is thus a differential of approximately 6m between Lower Temenos and Upper Temenos. The Colonnaded Street has an elevation of 871.18m — there is a 7.5m differential between it and Lower

Temenos. There is a 37m differential between Zibb Fir'awn and the Colonnaded Street.

5. These phases are not meant to be cast in concrete. They only represent an approximation on the basis of the available data.
6. Also included in the phase is the Trench 7 wall recovered in 1994 in the lapidary west, which lies outside the Southern Temple precinct.



2. 1995 Site plan with trenches. (D. Pitney, L. Traxler, P. Zimmerman).

edra West, east wall with arch springers;

Phases II-IV — Site reconfiguration — use and intentional fill build-up;

Phase Va — ‘Grand Stairway’ from Lower to Upper Temenos;

Phase Vb — Canalization System;

Phase Vc — ‘Grand Stairway’ rebuilt; *Temple*: Pronaos Antae and columns;

Phase Vd — *Lower Temenos*: Wall with arch springers filled in; Stylobate and Double Colonnades; *Temple*: Podium and Stylobate, four exterior columns; Cella walls and columns; outer West Temple Wall;

Phase Ve — Post ca. 106 CE(?) Propylaea Steps; *Lower Temenos*: West Exedra wall repair. Hexagonal pavement. *Upper Temenos*: East and West Walkways;⁷ *Temple*: Forecourt paved with small hexagonal pavers; Adyton walls, Stairways, and Intercolumnar Walls. (Fig. 3 is a tentatively restored phase plan);

Phase VIa — Destruction, ca. 363 CE; abandonment *Lower Temenos*: refuse; *Temple*: Forecourt above ground drainage.

Phase VIb — Canalization repair, *Lower Temenos*;

Phase VIc — *Lower Temenos*: West Exedra compacted earth floor; *Upper Temenos*: re-leveling of hexagonal pavers; Pronaos east-west wall and platform; West Walkway bench;

Phase VIIa — *Lower Temenos*: compacted earth floor; east Intercolumnar Wall; West Exedra platform, stairs, sandstone floor.

Upper Temenos: *Temple*: Forecourt east-west surface canalization; Temple west catchment drain; paver damage to West Temple Walkway; Pro-

naos door blocked — flooring added;

Phase VIIb — Abandonment - *Temple*: Adyton and Pronaos refuse; east Wall;

Phase VIIc — *Temple*: Adyton column collapse;

Phase VIId — *Lower Temenos*: East - lime production; West Exedra kiln; *Temple*: Adyton stair and floor robbing, Pronaos abandoned;

Phase VIII — Collapse and abandonment (ca. 551 CE);

Phase IX — Reuse of area for farming activities.

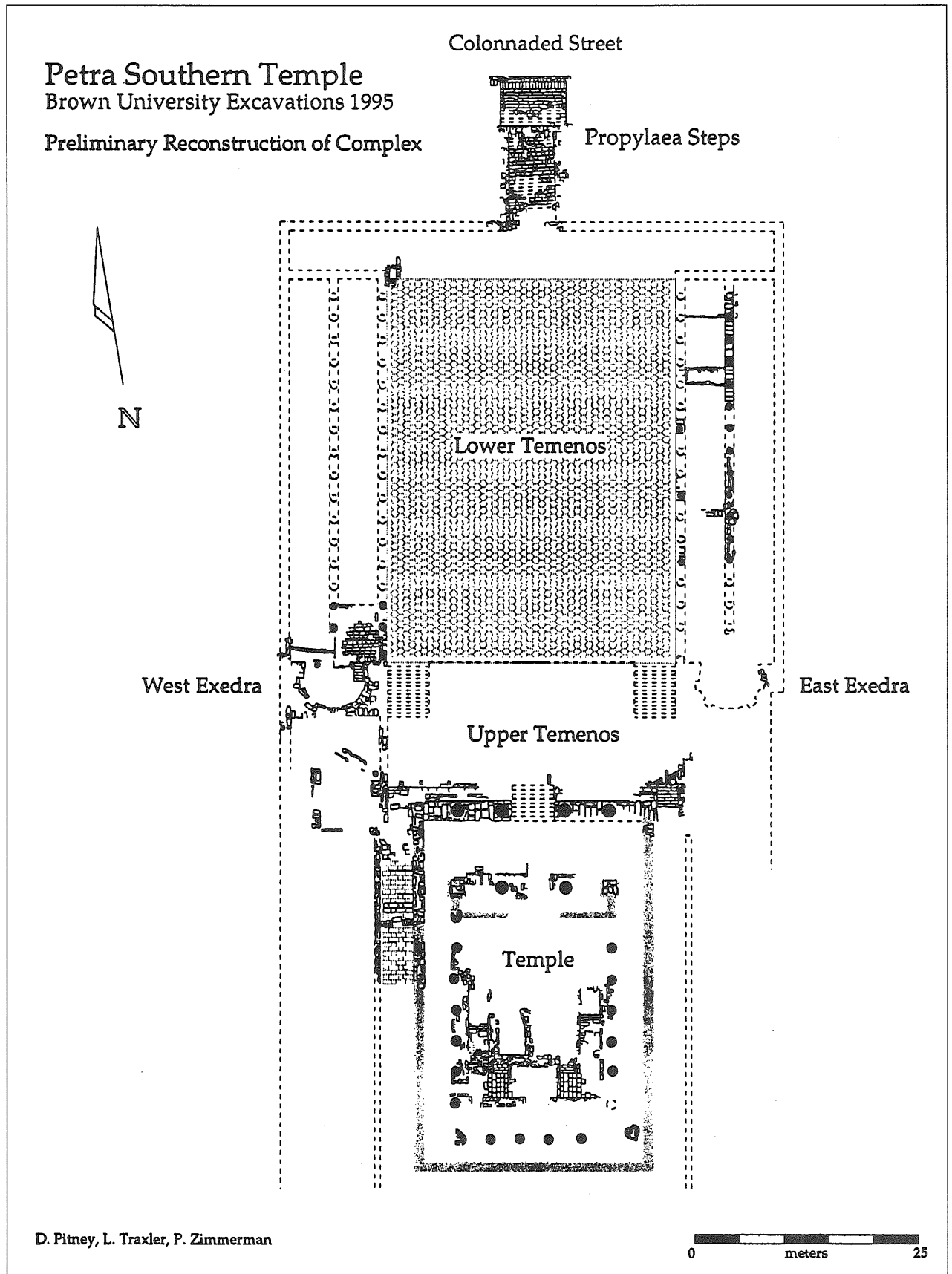
Individual research questions were devised for the various areas of the Temple Precinct — the Propylaea Steps, the Lower Temenos, the ‘Grand Stairway,’ the canalization system, the Upper Temenos and the Temple itself. Following that order, the results are presented below, followed by a brief discussion of the 1995 artifact record.

The Propylaea Steps

Although the Propylaea Steps had been surveyed, their dates and construction have not been securely phased. The Temple Complex underwent dramatic spatial changes during its life span, and these are also reflected in the Propylaea Steps. Their present appearance is not to be confused with the original access to the precinct, for they post-date the erection of the east-west retaining wall facing the Colonnaded Street. Subsequently modified after the street was paved in ca. 76 CE, their present orientation reflects their rebuilding at the same time or slightly later than the Street. At that time they served as the entrance from Street into the Temple Precinct. The location of the earliest Propylaea entrance is problematic; specific dates for the construction of these steps is unclear. Further archaeological investigations will be designed to locate struc-

7. The West Walkway recovered in 1994 was left unexcavated until the backfill from more southerly trenches could be disposed of. This walkway is

similar in design to the walkway of the Qasr al-Bint.



3. Reconstruction of the Late Nabataean reconstruction phase (D. Pitney, L. Traxler, P. Zimmerman).

tural evidence in this area.⁸

Lower Temenos

There was continued excavation, documentation and consolidation of the West Exedra⁹ in Trench 5 instituted in 1994,¹⁰ and 1995 Trenches 16,¹¹ 17, and 20.

West Exedra (Fig. 4)

Clearly, the West Exedra was among the earliest and most important structures in the

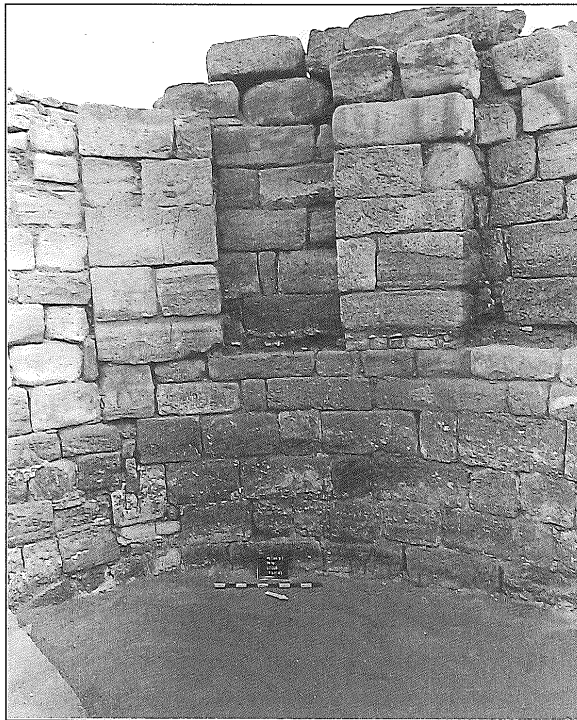
Southern Temple Precinct.¹² Although excavated to a six meter depth, no founding level has yet to be found for this buttressed 13-course structure (Fig. 5). The 1995 excavation of the upper fill layers completely exposed architectural features including the niching and buttressing of the walls and the twin freestanding entry columns. There was further definition of the double columnar entry, the north plaza, the form and depth of the apsidal walls, the staircase discovered in



4. Aerial photograph of the Lower Temenos, Exedra and the Southern Temple, looking south (Photograph by A. A. W. Joukowsky).

8. These were not undertaken in 1995, but our consolidation of the steps has resulted in easier public access to the Lower Temenos.
9. Lying under massive collapse, there is also the now-faint outline of an East Exedra of the Lower Temenos. It was surveyed in 1995—the symmetrical plan of the Lower Temenos has been elucidated.
10. With SP26.
11. With SP 31- SP 33. SP 37 involved the partial clearing of Bedouin blocks to the north of the

- Exedra.
12. An investigatory probe in the Lower Temenos west saw the continued excavation of the West Exedra (1994 Trench 5 and 1995 Trenches 5 and 16) to what we believe was one of its later floor levels (on the east, Trench 5) and an earlier floor level (on the west, Trench 16). Excavation proceeded with the removal of debris layers packed against the walls of the West Exedra, which formed a 6m high escarpment linking the Upper Temenos and the Lower Temenos.

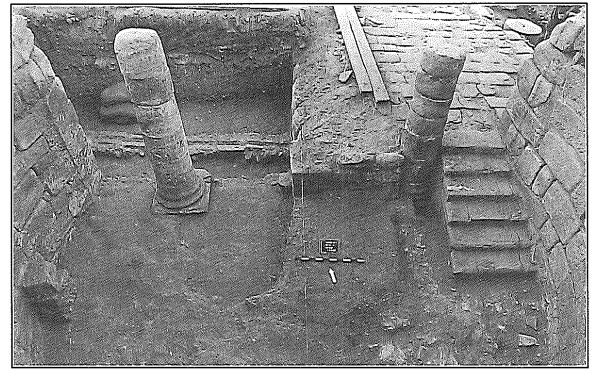


5. West Exedra, looking southwest (Photograph by A. A. W. Joukowsky).

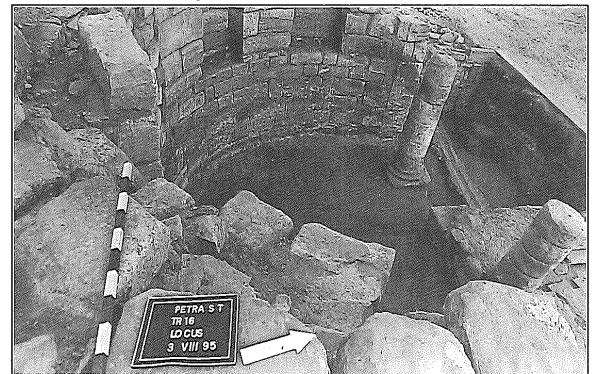
1994, and the location of floor levels and foundation levels. New architectural components were revealed. As can be seen in Fig. 6, the platform floor uncovered in 1994 did not continue westward, however, a founding floor level for the stairs was recovered. (There was no western engaged column to mirror the east column recovered in 1994 — where the elephant-headed capital was discovered.) Additionally there was the appearance of a north-south wall in the northwestern part of the trench which was partially contemporary with the apsidal wall, and formed a natural boundary in the extreme northwestern corner of the trench. Between two floors of later re-use was a sealed fill layer containing significant numbers of bones, shells, charcoal deposits, and ceramic remains. In addition, under the packed surface north of the West Exedra proper, a shallow water channel (Fig.7) was excavated, resting on a footing of pebbles. There was

13. Each curbstone is 79cm wide, 38.5cm long, and 16.5cm in thickness.

14. They measured 1.28m in length. Its upper elevation at the north was 879.57m, and at the south



6. West Exedra, looking north (Photograph by A. A. W. Joukowsky).



7. West Exedra, looking northwest (Photograph by A. A. W. Joukowsky).

the additional recovery of architectural features in the north that suggest the beginnings of foundation courses for the West Exedra walls.

Phase I was assigned to the laying of the foundation, Stylobate, string course, bedding, and floor levels of the West Exedra and the water channel north of the structure. There was then construction of the apsidal Exedra wall with niches and buttresses, the north-south wall of the northwestern corner, and the twin freestanding entry columns.

In Phase Vd the West Colonnade was constructed with columns averaging 81cms. in diameter. Following soon thereafter in the West Exedra east was a small segment of the Lower Temenos Hexagonal Paving with curbstones laid at an elevation of 879.33m,¹³ as well as a column resting on the raised Stylobate.¹⁴ Variegated red and white rec-

was 879.505m. The bottom elevations at the north end were 879.31m, and at the south were 879.33m.

tangular curbstones¹⁵ delimited the western edge of the Hexagonal Pavement,¹⁶ and interspatial triangles between the pavers formed a straight western edge which abutted the curbstones. Set into the center of the southernmost hexagonal paver was a hexagonal bronze drain fitting.¹⁷

In Phase Ve, repairs were made to the West Exedra, including the south part of its apsidal wall (between the two south buttresses) and the north sector of its west north-south wall. While the West Exedra wall appeared to have been constructed in the traditional Nabataean style with large well-fitted, diagonally dressed ashlar, the center of its arc was obviously a later modification or perhaps a repair, since its masonry style is vastly different.¹⁸

In Phase VIa there was fill and squatter occupation, represented by the robbing of features associated with the initial use phase of the West Exedra, which we have tentatively dated to ca. late third - late fourth centuries CE. Under a late floor bedding was a dis-

tinctive fill suggesting a period of abandonment or squatter occupation before its later reuse; it contained a homogenous assemblage of Nabataean painted plates and fine wares.

In Phase VIIa there was reconstruction and reuse of the West Exedra, by 1) the construction of rubble walls between the two freestanding entry columns, 2) a stone platform between these walls, another new wall, a roughly paved floor,¹⁹ with stairs leading down to 3) a floor bedding of sandstone flags and cobbles²⁰ (Fig.6). At this same time a north-south wall was constructed on the east side of the West Exedra, incorporating both the *in situ* columns and drums — it apparently served as a retaining wall for the stone platform of the Exedra north. The reused stones were either robbed from earlier structures or were found lying around; they were dry-laid and mortarless — earth and chinking stones filled the spaces after which a coat of plaster was applied over the wall itself. Underlying top soil was yet another north-

15. This is intentional not only because it is aesthetically pleasing but because the same pattern is found on the eastern edge of the colonnade in the Lower Temenos (Trench 14 1995); apparently the curbstones are used as a transitional decorative element between the hexagonal pavers and the retaining wall.

16. Trenches 6 and 13, 1994, and in Trench 14, 1995. Each paver is 80cm wide (flat side to flat side). Their thickness is 16cm and each side of the hexagon is 46cm.

17. Finding the hexagonal pavement and curbstones ties the eastern side of the West Exedra with the rest of the Lower Temenos. The bronze drain fitting may reveal another part of the canalization system of the temple — this drain is 18cm to a side and 29.5cm across. Its center hole is 13.5cm in diameter. Apparently formed in one piece with the flat hexagonal plate is a pipe extending vertically 27cm down through the paving stone. This pipe has two vertically oriented oval holes approximately 15cm from the top. They measure approximately 4 by 1.5cm. There are shallow channels cut into the pavement block into which it is set, and the cavity underneath it, made us question if it served as part of the major subterranean canalization system. A probe inside the drain brought up very loose sandy soil,

somewhat moist, of a coarse consistency with small amounts of bone, pottery, and very small stones. It is impossible to see into the drain, but examination by touch seems to indicate an almost completely filled channel.

18. There is no attempt at regular coursing, and irregular rounded stones are used extensively. There is also reuse of other architectural elements, such as door jambs, tiles, and stones used for chinking.

19. This floor footing was found at an elevation of 879.87m. It is a very irregular surface of multi-colored sandstone blocks and cobbles but to the north, it appears to become more of a hard packed surface. This is the appropriate level to be the footing for the floor associated with the bottom of the stairs excavated in 1994. A ceramic vessel was found in pieces lying on the surface of the floor, which was identified as Late Roman A ware.

20. And is the same type of floor/footing uncovered in the Pronaos (Trench 23), although not as well preserved. Here there were important bone remains, metal finds, and charcoal in ash lenses which have been sampled. This sealed deposit may provide the first secure chronological evidence for the structure.

south wall of fallen and robbed stones. There was no evidence of mortar between these stones as well, instead fill and small stones bonded its elements together. It was constructed on a layer of abandonment between the column and the engaged column on top of the Stylobate.

This season's Phase VIIa excavations have shed little light on either the purpose or multiple reuses of the West Exedra. Excavation of the later fills indicated at least three different phases before primary contexts were reached — a series of modern and early modern fills, fills associated with burning, and early/ancient fills, with more homogeneous artifactual assemblages directly above the primary contexts. No architecture, slag, or other debris associated with kilns or ovens was found, nor was there irrefutable domestic/occupation evidence. The fine thick dark gray ash deposit of 0.85m in depth was centered in the West Exedra. The reason for this deposit still is unclear. There was no strong evidence supporting any theory about its origins, what was being fired, and whether the ash layers spread throughout a large area of the Lower Temenos were in any way connected.²¹ Within this ash layer there was a great diversity of artifacts — a large amount of pottery including two lamp fragments, random concentrations of bone, glass,

fluted plaster, as well as capital fragments including three elephant trunks.²² The dating of these artifacts was mixed and ranged from pre-Byzantine to modern. The questions still remain — what was being burned here, and for what reason?

On the whole, the usefulness of the later Phase VIII fill layers in contributing to an understanding of the West Exedra area may be limited. These were comprised of large amounts of rubble — small irregular stones with very little soil matrix, plaster, and very large ashlars with one curved face, presumably collapse from the West Exedra wall. Little pottery was contained in this deposit. Later in this phase was the accumulation of topsoil which has been contaminated by its exposure.²³

While much was accomplished in 1995 to define the form and relative chronology of the West Exedra, evidence concerning function and absolute chronology was scarce indeed. While coins in the pebble fill and pottery from under floor beddings might reveal much as to the dates of its construction, their context was disturbed. As for function, there was no real evidence pertaining to this aspect of the West Exedra.

Now we turn to the Lower Temenos East, its East Colonnade, and the newly discovered structure lying below.

-
21. I posit the area served as a kiln. There was a large concentration of ridged roof tiles found which may have been used to support the walls or roof of a kiln. The eastern entry column has been burned and scorched and more eroded at this level than the rest of the column. It is possible that the column was used as a firing column for a kiln. The only other evidence that might suggest repeated firing is the large amounts of olive pits found on the eastern edge of the ash layer. We assume that firing took place in the West Exedra; its heavy concentration does not appear to have fallen in from the Upper Temenos above.
22. Many other carved limestone fragments including elephant ears, cheek-pieces, and trunks have also been identified and registered as having come from the Lower Temenos, which sug-

- gests that this may have been the place of this decorative capital's origin.
23. The main suggestion is for further excavation outside the Exedra wall. Excavation immediately east of the West Exedra wall would probably reveal the relationship of the West Exedra to the 'Grand Stairway.' Excavation south of the apse wall might determine the nature of the southern fill-in wall/repair and the relationship between the apse and Upper Temenos, and north of the current northern limits to understand the West Exedra's relationship to the double colonnade and the Lower Temenos plaza. A deeper probe within the West Exedra will enable us to find the foundation level of its wall. Finally, removing the (Byzantine ?) platform would be interesting to see what is built into its foundations; it would also reveal the original structure.

Lower Temenos East Colonnade (Fig. 8)

The archaeological investigation of the Lower Temenos East was undertaken in Trenches 14,²⁴ 20, 17,²⁵ in addition to several Special Projects. It was concluded that there were four major construction phases here, represented by the earliest, Phase I, a north-south wall with arch springers; then a Phase Vd remodeling of two east-west retaining walls, E-W Wall N and E-W Wall S; after which the area was filled in and became the support for the construction of the Stylobate; In Phase Ve, there was the installation of the hexagonal pavement. In Phase VIII, the area served multiple reuses as a dump, an industrial complex, and finally in Phase IX as a farmer's field.

In the Phase I original construction of the Lower Temenos,²⁶ 2.10 m directly below the colonnaded East Stylobate, was a north-

south wall with limestone diagonally dressed ashlar mortared together and plastered. Built into this wall were arch springers 0.56 meters in width projecting some 0.22m to 0.28m from the wall face. The top elevation of these springers was 878.05m (thus they rested some 0.94m below the Stylobate level), and they were set approximately 1.40m apart. This wall with its east and west arch springers was constructed in a distinct style suggesting that it is the earliest architectural feature of the Lower Temenos. It must have served the Temple Precinct until it was filled in and the Phase Vd Stylobate and its Double Colonnade were constructed above it. Although two test trenches were excavated the bottom elevation is unknown and the exact purpose of this wall also remains a mystery. This leads us to speculate that there may have been an earlier Nab-



8. Lower Temenos Colonnade looking southwest (Photograph by A. A. W. Joukowsky).

24. With Special Projects 22, SP 24. SP 27 -29 involved column drum searches.

25. And Special Projects SP 25 and SP 38.

26. From the 1994 evidence, we assumed the hexagonal pavers to be constructed on fill, and we were correct, but we didn't suspect that the fill

overlay a massive construction of arches that had been built 6m below the hexagonal court! This indicates the Lower Temenos had an earlier monumental construction phase, which we have tentatively assigned to Phase I.

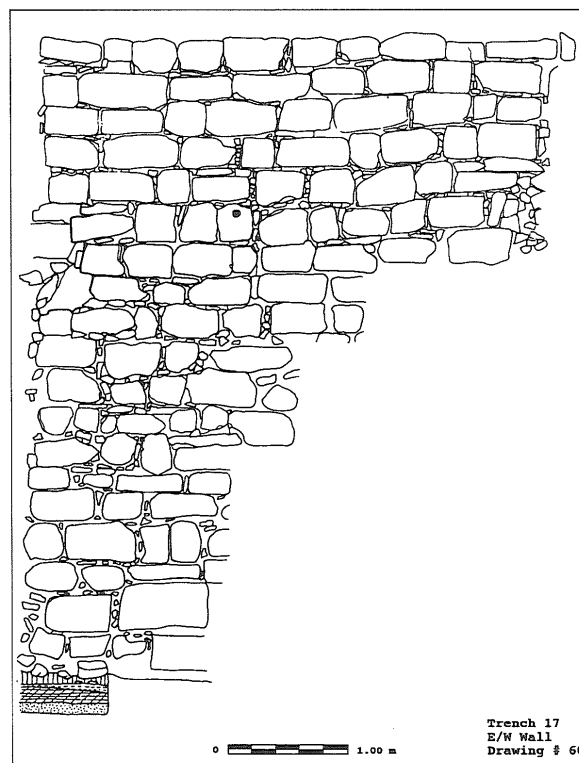
ataean access to the Temple's Lower Temenos from the Street area — not the Propylaea Steps which serve as the present day Temple access.

In Phase Vd the Lower Temenos was constructed. This was a time of major rebuilding for east-west walls were erected both in the north, E-W Wall N (Figs. 9 and 10), and south, E-W Wall S. We presume that the purpose of these walls was to provide extra structural support for the Stylobate and serve



9. Lower Temenos E-W Wall N sondage with N-S wall with arch springers, looking south (Photograph by A. A. W. Joukowsky).

as retaining walls for the fill and build-up against the Phase I North-South Wall with arch springers.²⁷ The depth of E-W Wall N was determined by a Trench 17 sondage.²⁸ At a 873.52m elevation, an 0.80m x 0.50m sondage was excavated to determine the depth of the North-South Wall and E-W Wall N in Trench 17. E-W Wall N was found to have been constructed on a layer of rubble. At a depth of 3.86m the evidence suggested that the fill was intentionally brought



10. Lower Temenos E-W Wall N section (Drawn by L. Payne, Drafted by A. H. Bedewy).

27. The 19 course E-W Wall N opened at 879.07m and closed at 873.67m elevation (5.40m in height). It is 4.43m in length by 2.10m in width, and was built on a level of rubble sandwiched between layers of compressed soil. The top course of this wall overlaps the East and thus post-dates it. The top courses consist of medium sized, rounded sandstones packed in an irregular pattern in a hard mud-mortar. The north face, however, exhibits careful construction technique with a facing of headers and stretchers with neatly packed fill in between them. The average size of the ashlar are 0.31m x 0.28 m (headers) and 0.52 x 0.27 m (stretchers). The majority are diagonally dressed, all from top right to bottom

left. Chinking stones are prevalent, and some ashlar we presume were re-used and were found plastered and decorated with blue and yellow painted stripes.

28. The base of E-W Wall S in Trenches 14 and 20 was not located. Further investigations will answer questions concerning the depth of deposit below the base of the East wall. The test trenches are designed to enable work to continue for quite some depth, but excavations here were very labor-intensive. It would, however, be interesting to see if the bottom of the wall would reveal a floor and help us understand the original purpose of these walls.

in to serve as support for a new scheme of rebuilding the Lower Temenos.²⁹

Another two subphases included the east and west Stylobate construction for the Double Colonnades of the Lower Temenos. The Stylobate foundation wall indicated two phases of construction; an earlier of close fitting Nabataean dressed blocks, and a later of coarse blocks with a thick mud mortar and stone fill.³⁰ Covered by topsoil in Trench 17, the east Stylobate was revealed at an opening elevation of 878.99m. It was constructed of limestone slabs (0.52m x 0.96m) separating larger, square convex-shaped slabs (0.96m x 0.96m) which supported the columns and served as their bases. The 30m area excavated revealed spacing for 12 columns, but we posit that there were a minimum of 14-to-16 that adorned each line of the double-rowed colonnade (refer to Fig. 3).

Sequential to the Stylobate construction the hexagonal paving was laid. Thus to Phase Ve was assigned the covering of the

Lower Temenos with large hexagonal pavers. These pavers were the eastern perimeter of the hexagonal pavement which extended from the east across to the West Exedra and its Double Colonnade. Set into a complete paver was an hexagonally shaped drain (Fig. 11), 0.28m to a side with a central hole of 0.12m in diameter serving as the evacuation point.³¹

The earliest deposition in Phase VIII³²



11. Lower Temenos hexagonal pavement with drain, looking east (Photograph by A. A. W. Joukowsky).

29. Found were jars and jugs of a slightly finer ware than in the higher strata excavated. There were also scattered roof tiles, a large collection of bone, four capital corners with spiraled vines, five squared volutes, six carved architectural fragments, and two paving stones, one of which was a fragmented hexagonal. Also associated with this deposit were large amounts of ceramic pipe. Browning has an illustration of pipes (1995: 49, fig 13), to which he refers as Nabataean). Between a 4.62m and 4.86m depth were 294 roof tiles, more jar and jug forms as well as scattered fine ware bowl fragments, 52 bones, and three small Attic bases (0.42 m diameter) and two small column drums (0.34m diam.). At 4.86m in a layer of compacted coarse sand were three yellow and red painted plaster pieces and 17 bones. At this depth a change was made in loci because of the discovery of sink holes suggesting that other architectural features might underlie the deposit. Here were recovered 89 roof tiles, five fragments of red plaster, and a small collection of ceramics varying from large storage vessels to Nabataean small forms, and 35 bones. In a 1.00m extension to the north there were 58 roof tiles, 25 fluted column pieces, and seven painted plaster pieces; as well as a small Attic base and carved decorative pieces. At 5.17m depth there was an abundance of painted red, yellow and black plaster, 243 roof tiles mainly

jar and jug forms, and cooking pots often with off-white or red slips, seven Nabataean painted sherds, and two small pine cones from a capital.

30. The upper course is composed of two rows of limestone and sandstone blocks, between 0.30m-by-0.30m and 0.20m-by-0.20m. The lower courses are composed of roughly hewn headers and stretchers. The stretchers average 0.60m-by-1.00m; the headers average 0.50-by-0.50m. They are set in a rough mud mortar with stone inserts.

31. As noted above, an identical drain was found in the West Exedra which still contained a bronze sleeve set into the smaller hexagonal cutting.

32. Possible Construction Phase VIII - In Trench 17, an additional North Wall was unearthed at 879.02m, extending between the East and West Stylobates. It varies from the construction techniques used in earlier construction phases. This wall measures 0.37m x 4.20m and was excavated to a depth of 0.72m. Only the top two courses of this wall have been excavated and these are constructed of diagonally dressed limestone blocks — the top course consists of what appear to be re-used sarcophagus blocks (0.36m x 1.20m) which have 0.04m holes in the top; the northern face is roughly dressed in a concave fashion. Too little of this wall has been excavated to determine how it should be phased, and its purpose is as yet unknown.

was a sediment layer overlaying a series of thin ash and sediment. The quantity of material culture suggests that this was a domestic dump predating the industrial use of the area. As it was the latest deposit in which carved architectural fragments were recovered, it raises the possibility that this may represent a level of reuse of the Double Colonnade. In later Phase VIII, the south-eastern Lower Temenos functioned for manufacturing mortar. A thick lime layer sealed a hard packed surface that abutted the West and East Stylobates suggesting that the lime was stored here using the walls as a wind break. At some point the northeastern Lower Temenos was also reused in an effort that left behind a great deal of ash, kiln wasters, and pottery. Most plausibly this ash can be associated with the same sort of ash and lime levels found to its south.

The upper levels of the Lower Temenos East in Phase IX were used for farming. Comprised of overlaying layers of soil and rubble fill, there appeared to be a concentration of architectural fragments in the lower deposits, including the majority of elephant sculpted fragments along with a large number of miscellaneous carved architectural fragments. Column fragments and blocks show scarring from plows at a depth of 45 cm below the surface.³³

In conclusion, the Lower Temenos has a complex stratigraphy. The ceramics associated with these phases have not been carefully re-examined. Nonetheless there are clear transitions in the pottery types represented as well as an assortment of identifiable diagnostic fragments that support the phasing presented. The Stylobate foundation wall, the east-west retaining walls and their related fills as described above follow the construction sequences associated with the building of the Lower Temenos.

We now turn to the results of the excavations of the 'Grand Stairway,' followed by

the 1995 excavations of the subterranean Canalization system.

The 'Grand Stairway' (Fig. 12)

Initiated in 1994, in 1995 we completed the test excavation and surveyed and cleaned a portion of the Stairway bedding from the Upper Temenos to the Lower Temenos. The subdatum was fixed at 882.49m on the seventh step, and the trench was extended 5.6m north to ascertain the length of the Stairway and its east ashlar support wall. The Stairway itself measured 9.5m in length, and the hexagonal pavement at the foot of the retaining wall was 2.5m in width.

The tentative phasing for this area is problematic — this area represents four major phases of remodeling and use. Phase Va is the Stairway construction, Phase Ve is the in-



12. 'Grand Stairway' linking the Lower Temenos to the Upper Temenos (Photograph by A. A. W. Joukowsky).

33. According to local workmen, these fields were in use as late as the beginning of this century.

stallation of large hexagonal pavers; Phase VIa represents the earthquake destruction, and Phase VIb Temple reconstruction — the steps are filled in and used as support for the Upper Temenos, with the construction of a monumental white limestone north retaining wall with its curbstones. These phases can be described as follows:

At an 882.48m elevation, a four course ashlar east wall of stepped limestone ashlar was constructed in Phase Va at the edge of the Temple Forecourt to the east. The wall blocks were of Nabataean construction, hewn, dressed diagonally and mortared in place. (In the lower wall level were two rows that have so far been uncovered, but there are presumably further rows that remain buried.)³⁴ Laid against the east ashlar wall was the stair bedding consisting of friable sandstone slabs with a mortar coating. Eleven steps were excavated down to their leveling stones, and of these five (Nos. 13-17), were totally covered with mortar. In the surrounding soil were large amounts of mortar and molded plaster — some of which was red. As the step bedding mortar was presumably used as an adhesive, the actual steps must have been robbed of their treads.³⁵

Extending to the north into Trench 6 (1994) at 879.21m elevation, was a section of damaged hexagonal pavement assigned to Phase Ve. Recovered artifacts included roof tiles and mortar, indicating a possible roof collapse. An elephant trunk fragment was also found in this deposit, and lying on the floor and providing its terminus ante quem were two datable artifacts — a Minimus coin, and a Nabataean lamp fragment with a first - second CE date³⁶ — obviously, the

pavers were laid before the coin and lamp fragment were discarded, that is in ca. the first or second century CE.

The Phase VIa earthquakes rocked the columns and capitals that tumbled down from the Upper Temenos — their fragments and other detritus were buried in this fill. Overlying the stair bedding at 882.78m elevation was a brown, loose sandy soil, filled with mortar, and 38 architectural fragments — acanthus fragments, pomegranates, cornices, tendrils, pine cones — and pottery, including 23 Nabataean fragments.

A change in soil consistency was noted while excavating the second course of ashlar at an 880.71m elevation. Significant amounts of cultural material unearthed included Nabataean forms as well as jar and jug fragments, along with 23 carved architectural fragments, and a capital fragment of a limestone elephant head (Fig. 13).³⁷

At 880.18m in a brown compacted silty soil mixed with charcoal, molded plaster, broken ashlar and many architectural fragments from fallen capitals, there was a large assortment of Nabataean pottery with one small piece of Islamic green tin-glazed ware, plus assorted body sherds of indeterminate origin. Architectural fragments numbered 10 with the most outstanding being two limestone capitals — finely decorated with vines — plus yet another limestone elephant trunk fragment.

After the earthquake in Phase VIc the temple appears to have undergone a rebuilding program, and many datable artifacts indicated its later re-use. Between an opening depth of 880.97m and a closing depth of 879.30m, the Stairway was found to end

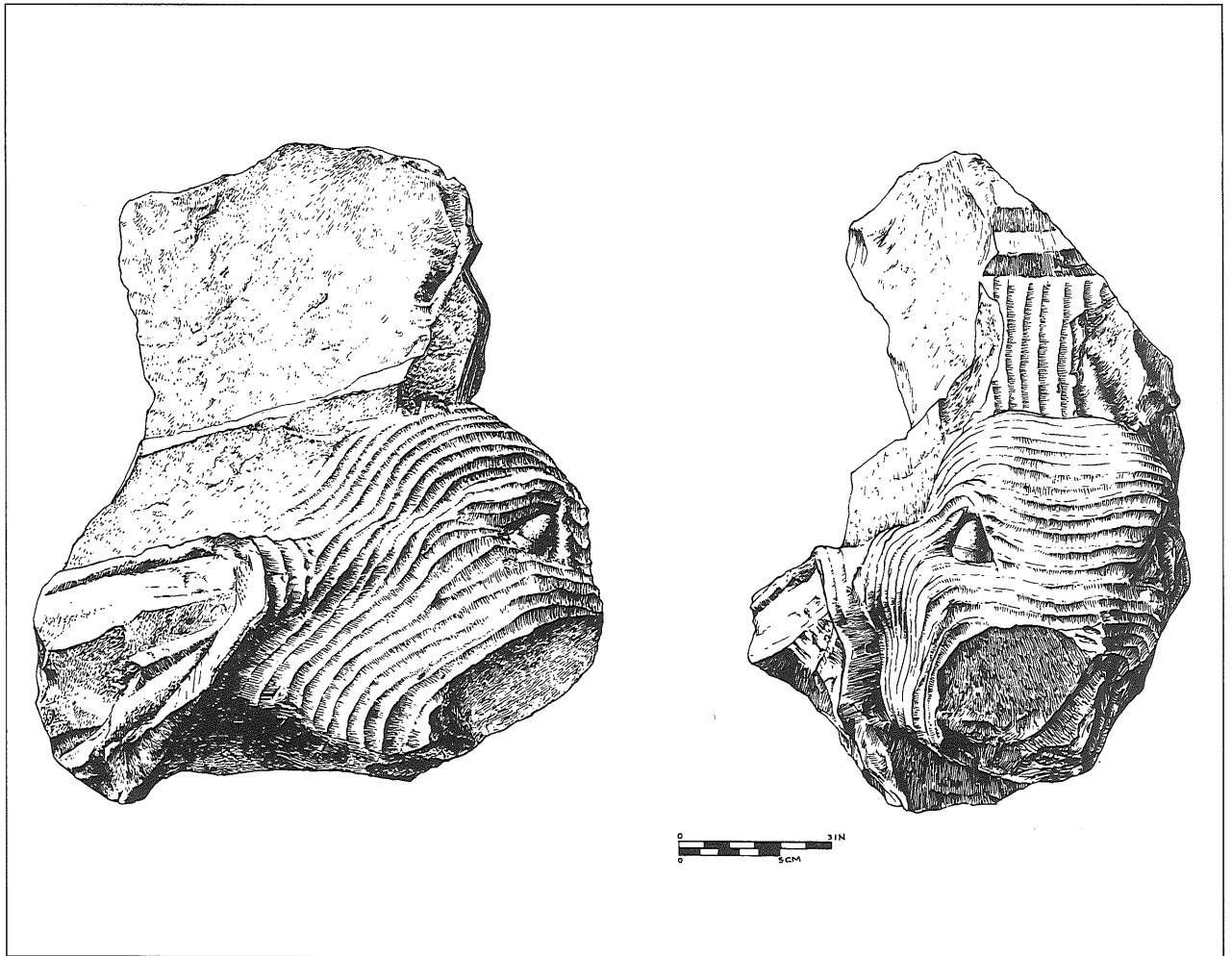
34. Step elevations from S to N. Steps 1-6 excavated in 1994; 7th: 882.49m; 8th: 882.31m; 9th: 882.12m; 10th: 881.91m; 11th: 881.77m; 12th: 881.60m; 13th: 881.41m; 14th: 881.21m; 15th: 881.06m; 16th: 880.88m; 17th: 880.71m.

35. Some of the steps have red plaster coating their risers, which may indicate that the facing of the steps was not covered by stone. Cultural material included some 15 Nabataean fragments, 60

sherds of indeterminate origin, and carved architectural fragments.

36. Amr, K. 1978. *The Pottery from Petra*. BAR International Series 324: pl.13, type 2.

37. Catalog no. 95-S-16, measurement L. 28.9cm x W. 29.6 cm. Present is the right ear, two eyes, one with its eyeball, and forehead. Another elephant trunk fragment was found in the same area as the head.



13. Elephant-headed capital fragment (Drawn by L. Sisson, Drafted by J. Blackburn).

abruptly on the north being blocked by a four course wall of large white mortared sandstone blocks. This wall cut off the stairs and was positioned over the Hexagonal Pavement. In front of the wall was a row of curbstones — one course of three hewn blocks mortared into place. It was assumed to have served as a gutter for water drainage for it was bonded to the wall by a plastered channel. At this writing it is unknown if the Stairway descends behind the intrusive wall down to the level of the pavement or, in fact, continues under the pavement, which would then fix the later date for the Hexagonal Pavement. The purpose of this wall is a matter of speculation, but it may have been placed on the pavement to block the staircase and provide a retaining wall for fill, which

then was built up to support the Temple Forecourt pavement (elevation 884.33m).

There then appears to have been an abandonment of the temple with little or no evidence for further use. During the subsequent centuries, silt and sand covered the earthquake detritus and formed the topsoil layers we see today, which almost completely enveloped the Temple architecture. It is hoped that further seasons of excavation will help us understand even more clearly the sequencing of events and transitions that occurred during the first centuries of this millennium.

Canalization System and Ground Penetrating Radar

In 1995 it was discovered that the paver

disturbance in Trench 13³⁸ was the result of tunnel capstone collapse. The capstones which caused this destruction had fallen into the tunnel. Due to their large size — one was 1.25m in length — the constricted excavation area and the safety in exploration, this project was not pursued until the fallen capstones had been partially excavated. Found were the intersection of tunnels — the continuation of the north-south tunnel as well as the branch to its east which carried water into the main tunnel. A second branch, offset from the east tunnel,³⁹ entered the main tunnel from the west.

The phasing is tentatively set forth as follows: Phase Va is the original construction of the tunnels, Phase Vd represents fill; Phase Ve, the Hexagonal Pavement is then positioned above the Canalization system, and in Phase VIa there is destruction. Phase VIb represents repair; Phase VIII, the abandonment and Phase IX is the later agricultural use of the Lower Temenos.

Ground penetrating radar (GPR)⁴⁰ was used at Petra for the first time in 1995.⁴¹ It was employed to determine the depth of Temple deposits to discover if any unexpected features existed below the surface and to trace the extent of the underground tunnel system. The preliminary results are

encouraging.⁴² The north-south tunnel was traced along the Temple center line from the four main Temple columns to the top of the Propylaea Steps and down to the Colonnaded Street. Not only was the east-west system in the Temple Forecourt traced, but an east-west tunnel system was found to extend from an intersection with the main tunnel in the Lower Temenos in both directions to the inner row of the East and West Double Colonnades. Additionally, the main north-south tunnel system was traced for a short distance in both directions from the “drain hole” with the hexagonal inset in a limestone hexagonal paver that was found in the west of Trench 17. A tunnel was found to extend diagonally from the intersection in the south end of Trench 13 toward the direction of the “baths,” which lie to the west of the Lower Temenos. Not enough data have been analyzed to know how far this tunnel can be traced, and the spoil heap of the baths will probably preclude our tracing it very far. The main north-south drainage system was traced to the Lower Temenos north to what apparently is a planar feature sloping down to the south that should appear at 0.5-1.00m elevation near the top of the Propylaea steps. It dramatically dips to a depth of 5-6m, and attains this depth about 7.5m south of its most

38. Trench 13, a 10m x 10m trench, was excavated during the 1994. In south balk of Trench 13 there was a disturbance consisting of a mound of rubble overlying a dislodged hexagonal paver which was visible at the bottom of the 0.44m hole under the floor. Because it was in-line with the north-south canalization tunnel, it was reasoned that this disturbance was the result of the collapse of a tunnel capstone which undermined the floor and caused its cave-in. Found on the last day of the 1994 excavation season, the area was covered with metal roofing, the trench was backfilled and the questions were left for 1995, Special Project 20.

39. If this second branch were offset to the north it could account from the floor damage visible in the southeast corner of Trench 13.

40. Ground penetrating radar sends a bipolar radar pulse downward and listens to its reflections from features below the ground. The strength

and character of the reflection depends on the contrast between the dielectric properties of the materials, namely their ability to become charged. The contrast between air and rock or soil is sufficient and we expected to be able to locate the tunnels, which we were successful in doing. We started making surveys over known tunnels to learn how they would show up and then made parallel adjacent traverses to follow them. We found that at some locations the tunnel did not show up, or did not show up well, because we assumed they were completely or partially collapsed at those locations. We also made profiles across known locations of rock walls buried in rubbly loose sand and were able to see a signal from the walls as well.

41. This was undertaken by T. Tullis, Department of Geological Sciences, Brown University.

42. At the south end of Trench 13.

shallow point. Excavation will confirm this feature.

Additionally the Colonnaded Street was documented by GPR, and the area where blocks are slightly askew and sunken on the street surface is where we project the canalization system coursed. We therefore project that at least part of the system, perhaps the overflow, extended north under the Propylaea Steps, coursed under the Colonnaded Street and discharged into the Wādī Mūsā.

There was also an investigation the so-called “bath” system adjacent to the Southern Temple,⁴³ to search for hoped-for connections between it and the Lower Temenos. The results were inconclusive, but we may have discovered an additional room that as far as we know does not appear on any of the present plans of the complex.

The Southern Temple

The Southern Temple is tetrastyle in antis — four columns at the front with the central columns spaced at 7m and the two end columns at 5m to the east and west respectively. The columns alone stood 15m, and in addition with the triangular pediment and entablature — the temple height would have been approximately 19m. The Temple measures, 28m east-west and 40m north-south. It has a Forecourt of hexagonal pavers. First we will describe the Upper Temenos east Temple exterior and its features.

The East Temple Exterior (Fig. 14)

Special Project 30 delineated the East Podium, and Trench 19 explored the possibility of an East Walkway.⁴⁴ The phases of these deposits were as follows: Phase Vb appeared to be the earliest construction when a north-south wall, (hereafter, the N-S L5 wall), was built and yet another conduit of the subterranean canalization system was defined.

In Phase Vd the Temple Podium and Stylobate were realized. Built in Phase Ve was the stairway access to the East Walkway and the small hexagonal pavers in the Temple Forecourt were laid. After Phase VIa when remodeling took place, in Phase VIIa, there was the installation of a drainage system with ceramic pipes placed on top of the pavers of the Temple Forecourt. In Phase VIIc there may have been repair, and a restuccoing of the east exterior Anta wall. This was followed by another destruction, and finally in Phase IX there was abandonment.

Phase Vb was the earliest phase of the site’s history to have been excavated in the Temple East. Constructed parallel to the Podium the L-S L5 wall opened at an 885.97m elevation, and its depth was registered at an 884.46m elevation. On the west it was well-constructed with large hewn ashlar, however, its east face consisted of small horizontal stones, and was probably rebuilt at some later time. If there was a northern extension to this wall, it lies under fallen column collapse. The west face of the N-S L5 wall and the canalization indicate a Nabataean or Roman origin for this installation.

At elevations of 884.46m and 883.09m, just east of the stairs, the underground canalization was discovered extending north-south with an northerly descent and a slight northeasterly curve (Fig.15). Slightly askew hewn capstones were found at 884.46m, indicating that they had been moved in antiquity perhaps to repair or clean the system. The tunnel walls consisted of three course dressed sandstone ashlar, covered by a 4cm thick mortar. The depth of the tunnel was 1.20m, and its floor width measured 0.63m. Its approximate length was 12m. We assume that this tunnel served as an eastern artery for the main subterranean Canalization system, but the area excavated, unfortunately, was

43. Special Project 21 — the results will be documented by J. Rucker, N. Clapp and myself.

44. SP 30 was a right angle trench delimited by column fall. Its dimensions were 7.20m E-W by

4.60m N-S with a hypotenuse of 8.20m. To its south is Trench 19 which lies east of Trench 4 excavated in 1993 — with dimensions of 5.20m N-S by 3.40m E-W.



14. Aerial photograph of the Upper Temenos, Southern Temple and Adyton, looking south (Photograph by A. A. W. Joukowsky).

too narrow to permit a deep probe to confirm a connection between them.

To Phase Vd was assigned the construction of the Temple Podium, Stylobate and, their foundation wall. Built just before the podium itself was a four course foundation comprised of large ashlars. The Temple Stylobate was constructed at an 884.98m elevation (its areal dimensions in this trench were 2.95m in length by 0.79m in width); its surface exhibited deeply cut tool marks. Interstices between the blocks were filled with small stones and a gray mortar mixed with what appeared to be ash. A number of these Stylobate blocks were removed and then replaced in antiquity.

In Phase Ve, between the elevations of 885.40m and 884.45m, were six sandstone steps for forecourt access to the eastern walkway. These stairs were placed between N-S L5 wall and the podium.⁴⁵ The stairway measured 2.40m north-south by east-west 2.00m — each step was comprised of two ashlars. Resting on two flat limestone flagstones that abutted the small hexagonal pavement of the Temple Forecourt, the step bedding was comprised of an intentional footing of red sand, a hard layer of mixed sand and clay, and directly beneath the pavement were small flat leveling stones and a layer of a hard “yellow” sandy pebble bedding.⁴⁶

There was no evidence of bonding be-

45. It might be that the Podium is contemporary to the north-south L5 wall, but it also could be reasoned to be later. Similarly, it may be that the stairs are later than both wall and Podium. The date of the building of the Hexagonal Pavement remains unclear. There is no evidence of a con-

temporary installation, nor of a later one. It may be possible that the Pavement and the stairs were constructed together.

46. This appears to have been a secondary bedding after the reinstallation of the pavement.



15. East Walkway with Canalization, Temple Podium and Stylobate, looking west (Photograph by A. A. W. Joukowsky).

tween either the stairs and the wall to the east, or between the stairs and the Podium. At some point this bedding lost its structural integrity, and the stairs slightly slumped to the northeast. They may have been built by the Temple architects as an add-on afterthought. The small hexagonal pavement of the Temple Forecourt in this limited area measured only 3.70m by 2.50m. Two pavers had been recut in the eastern limit of the pavement and they were not well aligned with N-S L5 wall in the southeast corner.

Phase VIa marked the destruction of the Southern Temple. The following phase, Phase VIb, was attributed to some sort of repair to the Canalization. In this sector measuring 0.50m by 0.36m, there was the re-

moval in antiquity of the southeast corner of the pavers, after which, they were relaid. The ceramics indicated that this intervention may not have been later than the Roman period, and may have been even earlier. This phase was also the best candidate for the latest possible rebuilding of the N-S L5 wall.

In Phase VIIa north of the podium, was the installation of an east-west ceramic pipe canalization encased in a gray/white mortar protected by flat small reused stones. The drain opening elevation was at 884.77m and it closed at 884.57m. In their positioning of the above-the-ground canalization on the pavement, these later architects partially destroyed the N-S L5 wall. The drain was sloped from east to west — its dimensions measured 5.20m in length by 0.20m in width — each pipe segment was 0.20m in length with an average diameter of 0.10m. There were two fills inside it — a loose lower sediment layer with a silty-muddy layer on top. With limited material remains we have tentatively assigned this phase to the Late Roman or Byzantine period.

In Phase VIIc the Southern Temple was destroyed and the exterior East Anta collapsed. Here many carved architectural fragments were recovered.⁴⁷ Phase VIII was also a collapse layer of coarse earth mixed with ashlar and architectural fragments. In the destruction of the N-S L5 wall, Nabataean and Roman lamps were found. Thereafter in Phase IX is abandonment, represented by one major layer of sediment and erosion which overlie general destruction. This seems to be a natural erosion deposit washing down the slope from the south. The top elevation of this overburden was 886.32m and its lower elevation was 885.98m — it completely covered the area. There was no trace of further occupation.⁴⁸

Among many cogent questions remaining

47. A sizable wall, 3.70m by 0.80m, in the east was constructed using carved capital elements from the Temple collapse. Assigned to this phase, it will not be described until more is known about

its nature.

48. At some later time a large pit was excavated both into this layer and the layer of collapse underneath it.

about these deposits concern the origin the subterranean canalization system extension and its role in draining water from the Temple. The dating of the different phases of this area is problematic.

The Temple Pronaos⁴⁹

The phasing of the Pronaos deposits can be outlined as follows: Phase Vc was the erection of the east and west Pronaos Antae and the interior Pronaos Columns. Phase Vd the Temple Stylobate and the four Stylobate Columns were erected and the Pronaos floor bedding was laid. There was destruction in Phase VIa, and in Phase VIb the Pronaos floor was robbed. In Phase VIc an east-west wall with a doorway and platform were built up to the interior Pronaos Columns and the West Anta, and in Phase VIIa the Phase VIc east-west door was blocked. Following in Phase VIIb, the Temple Pronaos was used for refuse and in Phase VIIId it was abandoned. Phase VIII was the final collapse, and Phase IX marks the final abandonment of the structure. A discussion of the phases follows.

In Phase Vc the Pronaos plan was clarified. Resting on finely carved Attic bases were massive interior temple columns (Fig. 16) which we have identified with the original Temple construction.⁵⁰ Both sandstone columns were supported by well-preserved limestone Attic bases, 2.10m in diameter, carved in two pieces and perfectly preserved to a 0.70m height.⁵¹ The Attic bases rested on leveling blocks, and their elevation confirmed the Pronaos was at the same elevation as the Stylobate. The West Pronaos column's top elevation was 888.64m and its founding



16. Pronaos West Column, looking east (Photograph by A. A. W. Joukowsky).

elevation, 886.00m.⁵² Traces of white and red stucco up to 11cm in thickness still adhered to the lower diagonally dressed column shafts.

The upper course of the massive east 2.50 meter wide Anta wall⁵³ was cleared, but completely excavated was its twin, the interior West Anta⁵⁴ (Fig. 17); which was found at a 888.70m elevation. This well-constructed wall rested on a limestone base similar to the Attic profile of the columns. Measuring 1.50m square, its projection to the south was 1.20m in width, its west face was flush with the west face of the Anta and its east face inset 0.30m. Exposed along its

49. Trench 23 measured 10m north-south by 6.5m east-west. SP 23 was 3.1m north-south by 3.6m east-west

50. The interior eastern column's second drum had an elevation of 887.68m. Its founding elevation was 886.00m (bottom of base) — it was recovered standing to a 1.68m height. Two dressed sandstone drums, height 0.50m and 0.48m., diam. 1.50m stood on its well-preserved Attic base.

51. The profile of the base is identical to that of the

bases of the front columns, as are its dimensions. The base is preserved in very good condition, unlike the weathered bases of the exposed front columns.

52. On these drums two more drums have been re-erected — the reconstructed height is 2.64m.

53. This was left unexcavated in 1995.

54. The north face was uncovered in Trench 12, 1994.

2.10m north-south length, its maximum preserved height was 2.86m above the surface of Pronaos floor bedding. Fine white mortar was still visible on this feature's exterior.

The Phase Vd Stylobate⁵⁵ consisted of well preserved white rectangular sandstone blocks with an average elevation of 886.07m. The front four Temple columns were also erected during this phase. The Pronaos floor bedding (for the robbed flooring) rested some 28cm below the level of the Stylobate, and 16cm below the foundation of the West Pronaos column and West Anta.⁵⁶ At 885.07m elevation this bedding of irregular sandstone slabs, (20-15cm in length and width) was built up to the column base, however, it was built over at a later time making its limits difficult to determine.⁵⁷

In Phase VIa, presumably after a lengthy period of use, the Temple suffered a catastrophic destruction after which the Pronaos was still in use but its character dramatically changed. Thereafter the Phase VIb remains suggest abandonment for there was a layer of sterile soil, ranging from 885.98m to 886.04m elevation upon which the next occupation level rested. It seems that at this time the Pronaos pavement was robbed.

In Phase VIc there was evidence for a dump, rather than an occupation level, perhaps deposited before newcomers rebuilt, or it could have been fill deposited by later builders. Overlying the floor bedding was an east-west wall 7.30m in length. Built across the south Pronaos, its west end abutted the northeast corner of the West Pronaos column and the West Anta, and in the east it extended into the east balk. Its average eleva-



17. Pronaos West Anta (Photograph by A. A. W. Joukowsky).

tion was 886.57m, its maximum preserved height was 1.30m, and its width was 1.28m. Composed of hewn and unhewn sandstone blocks, ca. 0.30m-0.50m in length, a few reused ashlar (the only dressed stones), were set into a mud mortar to form a division wall, not a load-bearing wall, for where it abutted the northwest face of the West Pronaos column, it preserved the column's red plaster decoration. A doorway, (now filled) 1.42m wide originally pierced the wall 2.0m from its west end.

Bonded to the east-west wall to its south, and extending into the south and east balks was a "platform" structure composed of

55. The Stylobate and the front Stylobate columns were uncovered in the 1993 field season.

56. Within the bedding in the northeast Pronaos were uncovered three suspicious-looking sandstone blocks, laid in a slightly oblique north-south line. They resemble the canalization capstones, but they seem to be too far west to be in line with the south tunnel of the main canalization system. Small sink-holes (one slightly over 1m in depth) suggest, however, a canal-

ization artery.

57. It is possible that this bedding is not original to the temple construction — if it might have been installed to support a later (not original) floor. Perhaps partial removal of this bedding in the future will help to determine its date. Its elevation is beneath the sandstone foundation block of the column, suggesting that it must be bedding, rather than pavement because otherwise this block would have been covered.

hewn and unhewn blocks, ca. 0.20m-0.80m in length, reused dressed ashlar and small stones. Its average elevation was at 886.85m, and its maximum preserved height was 1.23m. The exposed east-west width was 2.20m, and the north width was 1.70m. This platform was poorly constructed — the interior was purposeful fill rather than laid stones.⁵⁸ On its southeast was a sandstone multicolored surface or pavement, which was built 1.38m to the southeastern edge of the column, as if it had been constructed around it. Extending from the east balk was a small projection, which may have been stairway leading up to the platform level. The purpose of both the wall and platform were unclear. They may represent the raising of the Cella floor level.

Phase VIIa was assigned to the doorway blockage of hewn and unhewn sandstone blocks, small rocks, and a great deal of mud mortar. Its average elevation was 886.50m and it bonded with a “pedestal” composed of hewn sandstone blocks, small rocks, and mud mortar built into the east-west wall. This feature was not carefully laid, with the exception of a single large 0.98m x 0.40m ashlar which formed its north face. The doorway blockage and the pedestal must be contemporary. Once these features were installed, access to the area south of the east-west wall would have been limited, if not completely cut off.

Phase VIIb was a late one meter thick deposition comprised of erosion remains or abandonment. Phase VIIc was a fill of loose and coarse soil which opened at 886.75m and closed at 885.83m. It appeared to have been an intentional dumping of waste, including a large amount of pottery and bone. The pottery consisted of a variety of types, from cook pots and jars (few large storage vessel fragments) to a fair amount of fine ware — late Nabataean wares, including a squat one-handed juglet, and bowl frag-

ments. Roof tiles were scattered throughout this fill, with a heavy concentration in one 0.50m square deposit, where they were associated with small clumps of ashy-gray mortar. Also found were painted plaster fragments, including some in red, green, yellow, blue, white, and black. A few pieces still carried designs, including one group with a green acanthus-type leaf with black veins on a red background. Hundreds of unburnt bone fragments ranging from small bird bones to large goat long bones were recovered — there were no visible cut-marks on their surfaces.

There was then evidence for a brief (?) Phase VIId abandonment before the Temple collapse consisting of a thin layer (between elevations of 887.03m and 886.95m) of clean fill which overlay the floor bedding and the platform level. Unlike the destruction debris layer, this deposit contained few architectural fragments. Yet another fill extending from 885.95m to 885.79m was of relatively clean fine soil just under the destruction phase. It contained small amounts of pottery, bone, glass and metal, and 344 white limestone tesserae, a few still joined with thick off-white mortar, but there were no carved architectural fragments. The pottery was a fairly churned-up random mix, including one large *Terra Sigillata* bowl base fragment.

Phases VIII and IX were the major destruction and final abandonment of the Temple. This phase of the Temple's history was clearly in evidence in the heavy destruction debris layer found throughout the Pronaos, consisting of broken ashlar, over 150 carved architectural fragments, and virtually nothing else. Although much of this debris appeared to have fallen in a single episode of collapse — some this rubble probably also accumulated over time as any remaining architectural elements finally collapsed. At elevations from 887.60m to 887.03m, this de-

58. A limestone column base fragment has also been used as construction material.

posit was almost entirely comprised of plaster and stone tumble. The columns fell in this phase. The platform was also destroyed and its stones mixed with the rubble, making it difficult to excavate. Recovered were 200 plaster fragments of four different types — curved white, flat white, white and lipped and flat red. Their average size was 10cm x 5cm x 4cm. Some of the red fragments are 8cm in thickness. The gradual Temple collapse and erosion of Phase IX rested on top of the major destruction level between elevations 887.66m to 887.27m under a layer of topsoil debris.

In conclusion, the 1995 Pronaos excavation was an essential and informative project for gaining a better understanding of the Southern Temple layout and occupation phases. As we suspected, many of the original embellishments — flooring, columns and wall plaster — did not survive. But there is now ample evidence for later periods of Temple activity indicating that the building enjoyed a long history of occupation.

The Temple Adyton

The Cella entry is marked by two columns which are 1.50m in diameter, but passing into the Cella, we note that they are larger than either the eight columns flanking the Cella walls or the six at the temple rear which have diameters of 1.20m. Yet to be excavated is the central portion of the Temple Cella, which together with the Adyton is some 29m north-south by 18m east-west. At this point we move south to the evidence from the Temple Adyton.

The Adyton was dominated by the remains of a large, central vault with constructions flanking it on each side that mirror each other — stepped arched passages led to paved platforms; and to the east and west of these respectively are twin north-south vaulted structures (Fig.18) which in turn were separated from parallel vaulted stairways with arched windows and doors, that descended and provided access to the Temple cella and/or exits.⁵⁹ They may have accessed the paved walkways on the structure's exterior. The goals for the Adyton included the excavation of: 1) the eastern (Trench 15) and western (Trench 22)⁶⁰ interior staircases; 2) the cella's intercolumnar walls; 3) the arches in the intercolumnar walls as doorways, windows or niches; and 4) the West Adyton vaulted area located to the east of the staircase between the western interior staircase east wall, and north of the major east-west wall.

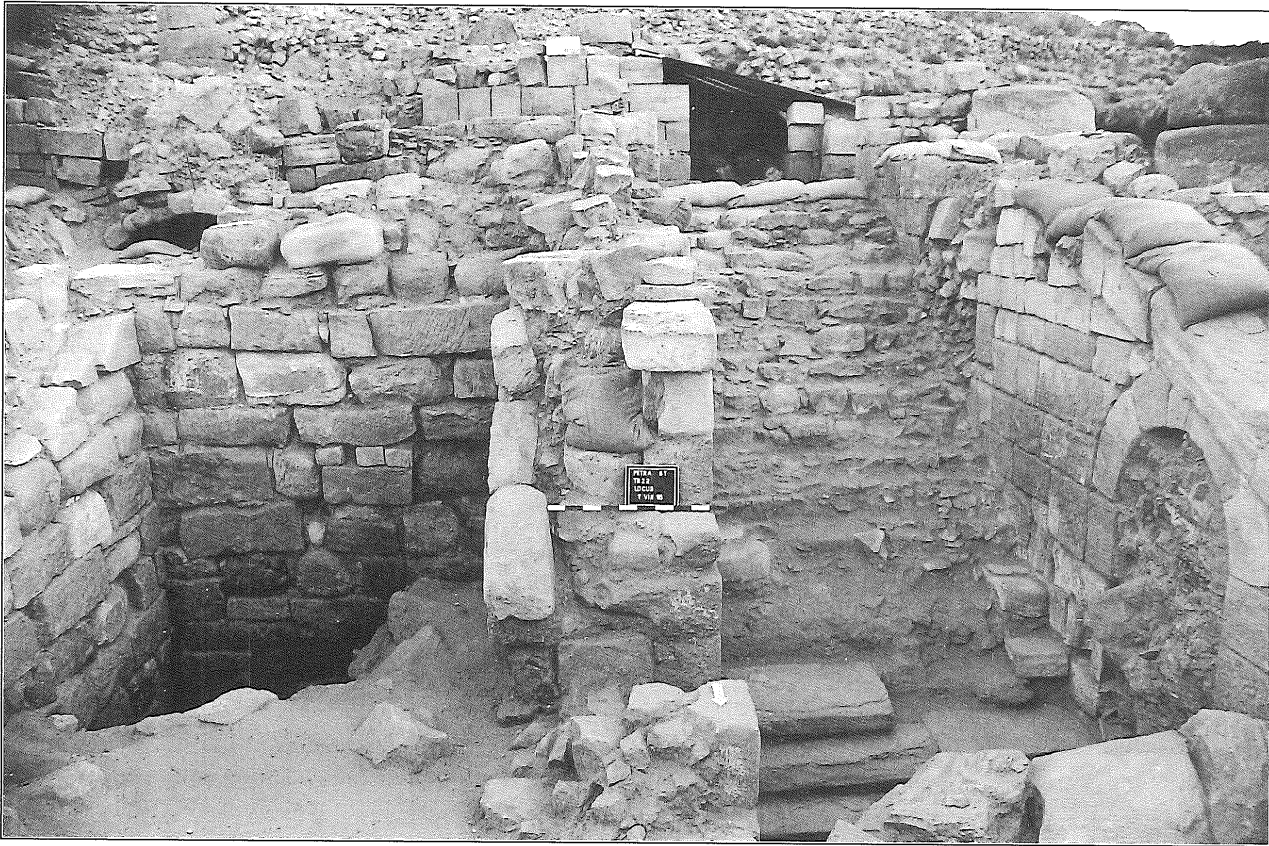
The Adyton has several construction phases that may have been part of a single major construction plan, or represent separate additions due to an elaboration of the Temple and the need to improve the structural integrity of the building.⁶¹ The most likely phasing scenario is that the columns, Phase Vd, belonged to the original Temple construction with the later addition in Phase Ve, of the cella's exterior intercolumnar walls and central vault. This construction was immediately followed in Phase VIa with the erection of the interior cella walls and the interior east and west staircases. (The completely excavated 11m long east Staircase is

59. In 1995 the vaulted eastern stairwell of Trench 15 was completely excavated.

60. The excavation of Trench 22 was not completed by the end of the 1995 season as a result of the combination of a great depth of the deposit above the floor level and the difficulty of moving its massive stone collapse.

61. All evidence points to a Nabataean date for at least the first three construction sub phases: diagonally dressed ashlar blocks set with mortar and chinking, and the plastering of architectural

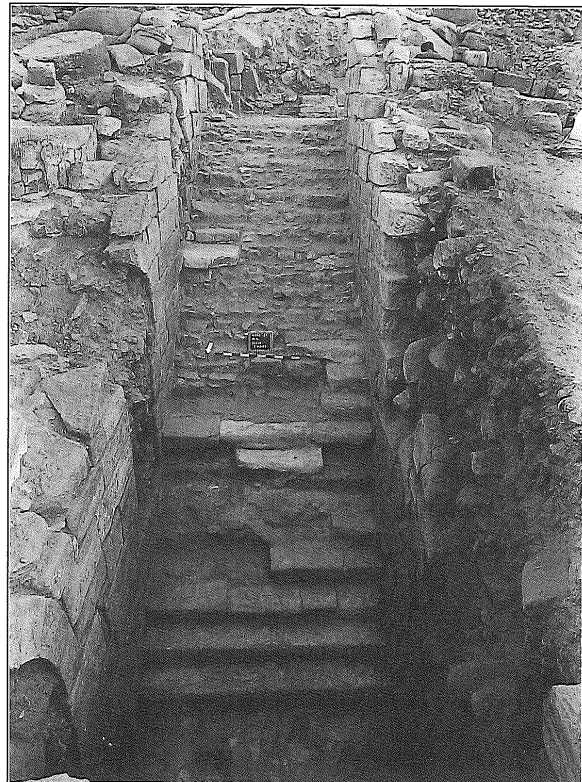
features being the most supportive of this. Ceramics were minimal and limited to sherds in the fill/debris (increasing in number at levels closer to the floor surface); the vast majority was fine red ware, with many examples of the painted fine red ware as well as ridged storage jars all of which can be attributed to the Nabataean Period (the painted ware seems to be mostly of the Classical Nabataean style = first century CE).



18. Adyton West Stairway and West Vaulted Room, looking south (Photograph by A. A. W. Joukowsky).

shown in (Fig. 19). At a later date, in Phase VIb, there was the re-building of the upper courses the West Adyton as well as other interior walls. Phase VIIb was a period of abandonment with a level of clean fill just above the floor surface; Phases VIIc-VIIId were a series of destruction/collapses, the robbing out of floor pavers; the subsequent accumulation of fill and topsoil occurred in Phases VIII and IX. Each of these phases is briefly discussed with emphasis placed on the more completely excavated West Adyton.

In Phase Vd there was the erection of the columns, which represent the earliest phase of the Adyton's history. Constructed of hewn sandstone drums, these columns were originally covered with decorative (fluted) white or unfluted red plaster and adorned with limestone capitals elegantly carved with acanthus leaves, pomegranate flowers, pine cones and volutes. The extant decorative plaster found on the columns would not have



19. Adyton East Stairway, looking south (Photograph by A. A. W. Joukowsky).

been visible with the later Intercolumnar Walls built up around them — suggesting they were originally intended to be free-standing and viewed from all directions.

It is clear that the intercolumnar walls were constructed for support in Phase Ve between and around the columns — the masonry was, however, of Nabataean signature suggesting that the intercolumnar walls were part of a Nabataean reconstruction of the Temple. These walls were a casemate structure with a shell of regularly cut and diagonally dressed sandstone ashlar blocks, between which was a fill of small-to-medium-sized stone rubble. The southern exterior wall of the temple and the central vault within it were probably built in this phase.

The west intercolumnar wall extended north-south along the west side of the cella. Constructed of sandstone ashlars many of which were diagonally dressed, the top course was the lowest course of a vaulted ceiling with stones with concave faces. Under these was a course of triangular stones creating a sloped ceiling in line with the staircase below. On the south was a doorway leading from the top landing to the Temple west exterior. There were three arched openings in the exposed portion of this wall shown in Fig. 20: 1) the southernmost was

high up in the Staircase — an upper window; 2) the center arched opening was halfway down the Staircase — a lower window, and 3) the northernmost was an arched opening at the base of the Staircase — a doorway.⁶² Windows were probably used to allow light into the Adyton which otherwise would have been dark. Other openings appeared to be tall and narrow doorways passing from the lower stair landing into the Adyton.

Walls divided the interior staircases⁶³ on the Adyton east and west from the inner East and West Adyton. Standing parallel to the Intercolumnar Wall was an interior north-south wall, N-S L22,⁶⁴ separating the interior West Staircase and the West Adyton. Its south face is the north wall of the upper landing; its northern extension was not completely excavated. Constructed of sandstone ashlars many of which were diagonally dressed, there were also two openings in this wall: 1) the southernmost, which was located halfway down the Staircase, was a window for the passage of light into the West Adyton from the window in the West Intercolumnar Wall; and 2) the northernmost, located at the bottom of the Staircase, was probably a door leading from the lower landing into the West Adyton. It appears that these interior walls and staircases were constructed after the cel-

62. Top elevations: East face is 891.84m (S); 890.30m — in the center, at greatest preserved height just south of the upper window; 889.46m — where the slope levels out north of the upper window. Bottom elevations: east face, 890.86m south; 887.70m center — at the greatest preserved height just south of the upper window which also corresponds to the top of the highest complete step along this wall face; 887.27m, center — the lowest excavated point below the upper window corresponds to the top of the lowest excavated step. Measurements: Height east face, 0.98m (3 1/2 courses at top landing); 2.6m (8 courses south of the upper window). Height west face, 0.85m; Length is 14.85m (doorway at the top of the Staircase to the south face of Column C4-A), and the width is 1.9m at the top landing, and 1.8m at the upper window.

63. The Western interior north-south staircase extends between the west intercolumnar wall and the in-

terior wall and connecting the bottom floor with the second story landing. It, like its twin on the east, is constructed of a bedding of irregular stone rubble and yellow clay and paved with rectangular sandstone pavers. Plaster was used as a mortar under the pavers. The pavers of the top eleven steps were completely robbed away in antiquity; only small pavers abutting the walls remain of the next three steps. The heavy stone debris from the collapsed columns prevented the robbing out of the large rectangular pavers of the lowest four excavated steps which remain in situ.

64. Top elevations 891.92m (S); Bottom elevations: 889.26m (center - west face at lowest excavated step). Measurements: Height (west face): 1.0m (3 courses at the top landing); 2.0m (6 courses at the 12th step down); (east face) is 2.13m (6 1/2 courses at the junction with Wall/Locus 43); Its length is 9.4m (from the south face to the north balk).



20. Adyton West Stairway with arched window and door, looking west (Photograph by A. A. W. Joukowsky).

la's exterior walls due to the fact that they abutted the exterior walls and were not bonded to them. The fact that these windows and doors were built into the intercolumnar wall suggests that Phases Ve and VIa were part of one major restructuring of the temple.

The top three courses of an east-west ashlar crosswall (E-W L6)⁶⁵ defined the northern extent of the lower landing of the west interior staircase. It was not bonded with either the west intercolumnar wall or with the interior north-south wall (Wall 47, *infra*), but was instead built up between the two in a later construction phase (Phase VIb). How much later this wall was constructed after Phase VIa remains unclear. It could have been the final step of an overall reconstruction of the temple and therefore contemporary with Phases Ve and VIa, or a later Roman - Byz-

antine addition that purposefully restricted access to the Staircase traffic from the West Cella.

The West Adyton: There was also an interior east-west wall, Wall 43, marking the subdivision of the West Adyton from the Central Vault — it supported the second floor landing. Its top elevation was 890.88m and its depth was at 886.08m. The height of its north face was 4.8m, and it was 1.2m in width. Constructed of sandstone ashlar except for three square blocks of limestone set into the center of the seventh course from the bottom, the lowest four courses were more regularly cut than those of the upper seven courses (many of which are badly eroded) — they may be of an earlier date.

Along the central axis of the Adyton was an interior north-south wall constructed of

65. Top elevations are 889.53m (NW), 889.44m (SW); The bottom elevations are 888.54m (at current ground level). Measurements: Height

(south face) are 0.9m (as currently revealed); West (south face) is 0.6m (as currently revealed) and its thickness is 1.5m (top ledge

sandstone ashlars, Wall 47. It was 5.1m in height and 5.1m in length; its elevation on the south-west was 890.09m and its floor rested at 886.08m. At its southernmost end where it was bonded with the north face of Wall 43, it stood eleven courses in height. Its uppermost course was of triangular stones which served as a foundation for a sloped vaulted ceiling similar to the one over the west interior staircase. Three courses of this vaulted ceiling were preserved.

Phase VIIb was a period of abandonment before the initial collapse of the Temple. It was represented by layer of clean fill with no large stone debris just above the undisturbed floors and steps. This hypothesis was further supported by a thick layer of clean fill above the lower stair pavers and the floor surface uncovered in the southeast corner of the West Adyton.

Phase VIIc was the collection of fill and debris within the Temple Cella. Other than the possible evidence for a Phase VIIb abandonment on the lower steps and in the corner of the West Adyton, this fill/debris was associated with the Temple collapse and later filtering in of sand over the last several centuries.

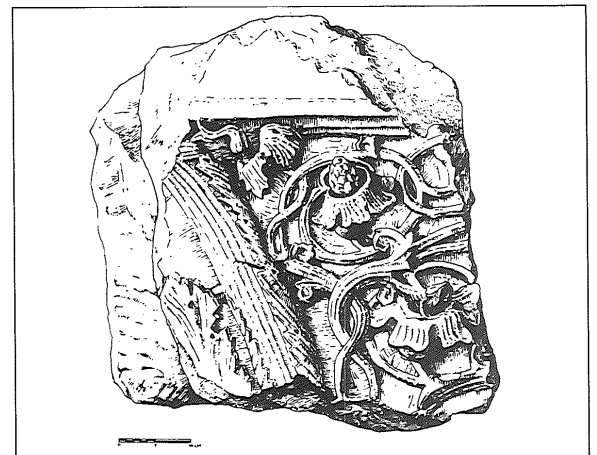
The west Temple columns collapsed to the east into the West Stairwell and West Adyton, which was congested with drums and finely sculpted capitals embellished with a profusion of fruits, flowers and vines (Figs. 21a and b). These elements were the best evidence for a singular episode of Adyton collapse — probably the initial episode. Narrowing down the date of this collapse may come from the discovery of three coins found above the step pavers sealed by collapsed drums and capitals — they were deposited before the collapse which predates the robbing of the remaining step pavers, and the subsequent collapse(s) that sealed the disturbed area of floors and steps. Subsequent to this was a long period of abandonment in which sand and additional debris filtered in and there was the accumulation of

topsoil. Overall this fill/debris consisted of ashlars, vaulted ceiling stones and columns, surrounded by sand, smaller stones, and carved architectural fragments. There were few potsherds, roof tiles and tesserae, although their numbers increased in the deposits just above the floor.

It still remains premature to speculate



21a. Capital fragment (Photograph by A. A. W. Joukowsky).



21b. Capital fragment (Drawing by J. Blackburn).

whether the Temple Adyton was a two or three level structure, but future excavations should provide us with a better understanding of this sector's architectural plan. Excavation has given us many answers for the construction of the Temple, but many problems remain to be solved.

Conservation and Consolidation

The proper protection and conservation of each of the temple sectors has been a major responsibility of the current project. Ongoing since the inception of our work in 1993 has been the consolidation of its deteriorating blocks. At the outset we made preliminary trials for consolidating or replacing deteriorating masonry with a lime-mortar adhesive. This was a basic and important measure of site preservation and presentation. One of the site's most important consolidation efforts was the anastylis of the lower curbing of the Propylaea Steps. Other such projects prioritized the Stylobate and Crepidoma of the temple facade. Other completed projects include:

- The removal and reinstallation of the east buttress in the West Exedra;
- The construction of steps (using ancient elements) at the Temple entry;
- The replacement of column drums with better preserved elements in the Temple facade and in the east Double Colonnade of the east Lower Temenos;
- Restoration and consolidation of the West Anta Wall in the Pronaos;
- The retirement of heavily eroded drums;
- The construction of a 230 m fence around the temple to protect it from animals and for tourist safety;
- The construction of a massive flood control channel to divert water away from the structure;
- West Exedra drainage protection with the construction of a casemate wall to the south;

- The backfilling of trenches so they are not exposed to air and water seepage during the rainy periods; and
- The protection of delicate areas by roofing them over with zinc sheeting held in place by sandbags.

Further projects are under consideration as our work progresses.

The Catalog

Found in spolia in the grid bordering A1/a1, the most spectacular find of the 1995 season was the head of Tyche (Fortuna) wearing a turreted crown and merlon ornament, which must have been part of an architectural façade (Figs. 22a and b). Although she is sculpted in sandstone and is abraded, she is a clear indication of the Hellenistic tradition at Petra. She measures 38cm in height, 35cm in width and is 29cm in thickness. Her turreted crown has a central diadem which rests on her wavy hair which is parted in the middle. Her condition has been compromised — there is damage from surface salts, her left face is worn as are her eyes, she lacks her nose, and her serious almost pouting mouth is damaged on the left side; yet she exhibits full cheeks and a rounded chin.⁶⁶

Other artifactual materials in our computer data base include Nabataean, Late Nabataean, Roman red wares, and Byzantine ceramics — lamps, coins, bone, glass, metal, tesserae, and fragments of molded stucco and painted plaster. But the continued recovery of hundreds of architectural fragments delicately carved with complex floral and fruit designs continues to be overwhelming. The excavation of the West Adyton was made burdensome by the large number of architectural elements, including what we posit may be a complete capital from the Temple Cella Colonnade. The lower order of acanthus leaves (Fig. 23) was sculpted in two parts, and the upper order of crisp floral and

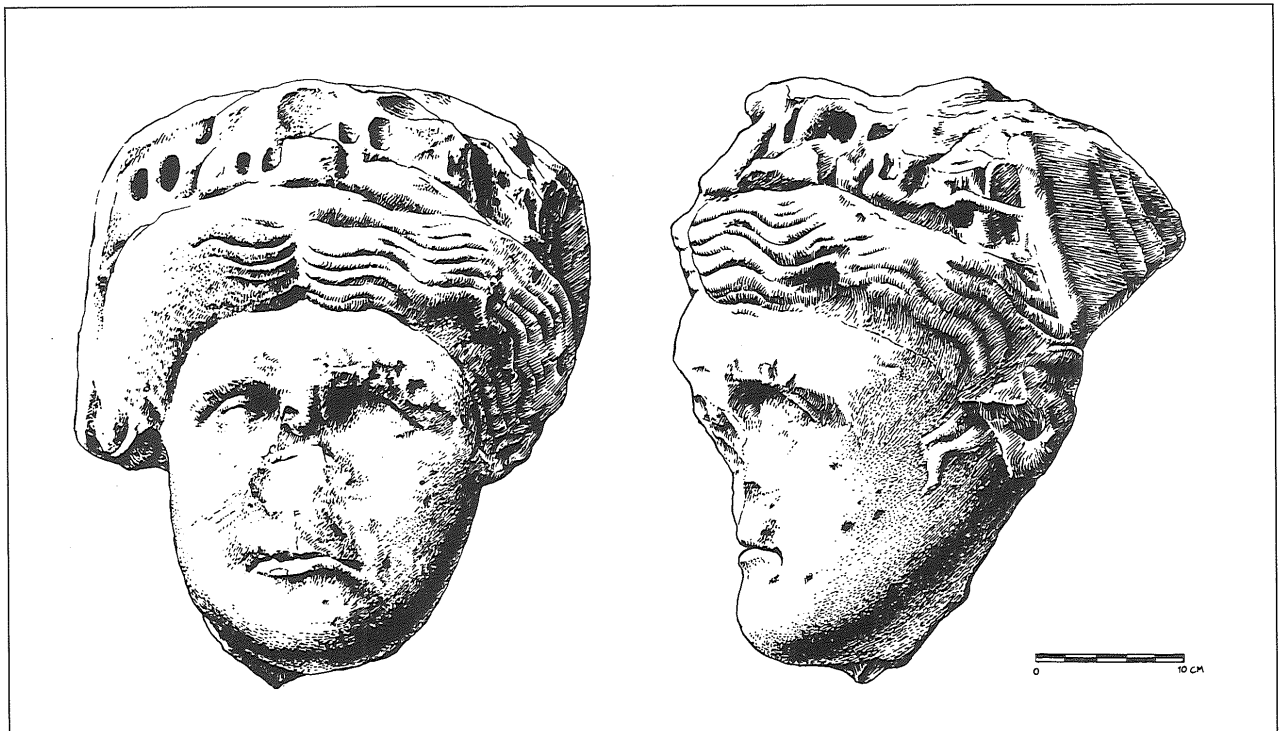
66. J. Basile will research and publish Tyche



22a. Head of Tyche (Photograph by A. A. W. Joukowsky).

fruit motifs was recovered in four parts, one of which is shown in Fig. 24.

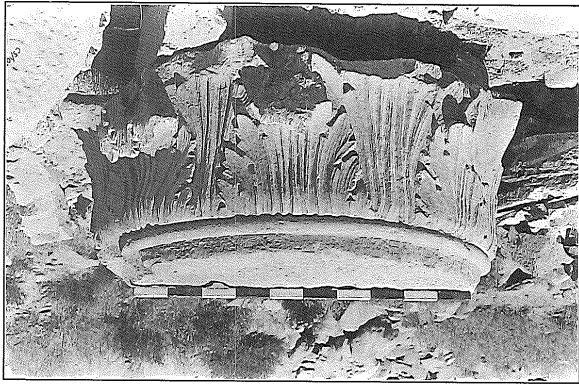
The catalog of more than 300 objects has been prepared for the Department of Antiquities, and all registered artifacts except the lamps, coins, and architectural fragments are in storage at the Petra Museum.⁶⁷ Of especial interest are the 37 elephant head fragments, 29 of which are elephant trunks. Using our data base, thousands of architectural fragments and registered pottery elements have been stored on-site. Animal bones have been transported to Amman where they will undergo analysis. Recovered and registered were some 57 coins, 172 lamps, most of which were fragmented, four figurine fragments, 12 bone artifacts including two complete bone pins and two spoon fragments, and five metal objects including a finger ring and a probable bracelet.



22b. Head of Tyche (Drawing by J. Blackburn).

67. Nabataean fine wares typological analysis will be undertaken by S. Schmid, and drafting of architectural details and small finds have been undertaken by J. Blackburn assisted by A. H. Bedewy. The continued study of the numismatic evidence

will be documented by C. Augé, and the lamp analysis will be submitted as a 1996 MA thesis by D. Barrett, a graduate candidate at Brown University's Anthropology Department.



23. Lower order of capital with acanthus leaves found in the West Adyton (Photograph by A. A. W. Joukowsky).



24. Cella Capital (Photograph by A. A. W. Joukowsky).

Conclusion

In summary, the Southern Temple architectural plan has been further clarified with excavation backed up by electronic distance measuring equipment, and ground penetrating radar in an attempt to course the extensive underground water systems. Our understanding of the stratigraphy of the temple site itself continues to be hampered by the

lack of dateable materials. Thus our conclusions must remain tentative until they can be supported by sealed archaeological contexts.

1995 has been a most productive season of research at the Petra Southern Temple. In closing, I wish to acknowledge the assistance and support of Brown University for its subvention of this project, particularly Vartan Gregorian, President for his sincere encouragement. I also wish to express great appreciation to Dr. Ghazi Bisheh, Director-General of the Department of Antiquities for his interest in our work. He coordinated the use of heavy equipment to help us in the removal of overburden and architectural elements to on-site safe storage. Dr. Pierre Bikai and Dr. Patricia Bikai, of the American Center for Oriental Research in Amman, coordinated the logistical arrangements for our team, as well as the myriad of details involved. I am indebted to the many individuals who have supported our research. You know who you are, and without your contributions the project would not have achieved such a brilliant success. And lastly, I wish to thank my talented and devoted team for their dedication to the recovery of the Petra Southern Temple. They have completely committed themselves to this project.

Martha Sharp Joukowsky
Brown University, Box 1921
Providence RI 02912
U.S.A.

THE FAÇADE OF THE VAULTED ROOMS ALONG THE SO-CALLED *CARDO*- IN UMM QAYS (ANCIENT GADARA), AREA III: ARCHITECTURAL DESIGN AND RECONSTRUCTION

by

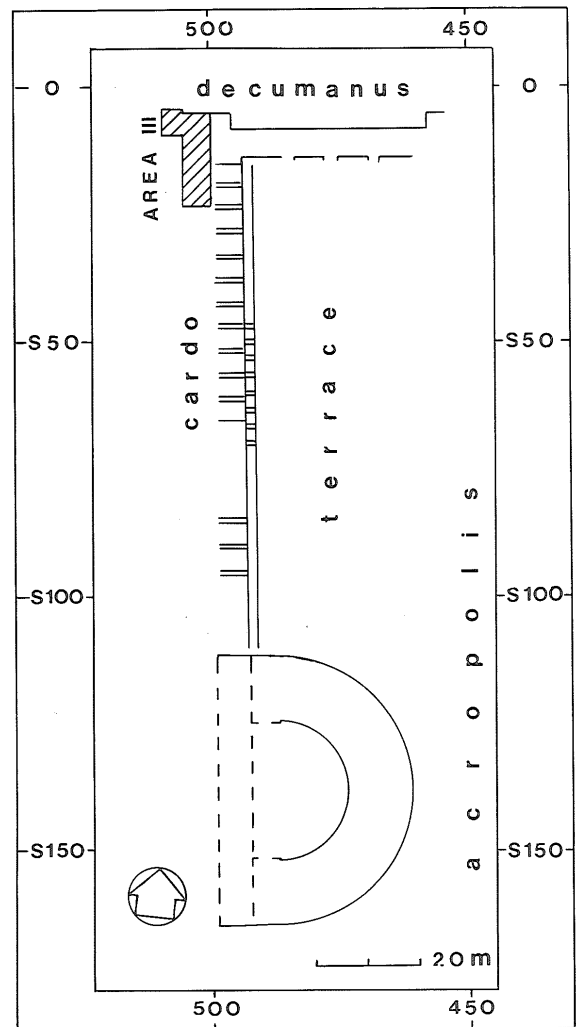
R.L.J.J. Guinée, N.F. Mulder and K.J.H. Vriezen

The Site

The ruins near Umm Qays are identified with the ancient city of Gadara. Inside the walled city, which covers a site of approximately 1100 x 450 m, two areas may be discerned: an Acropolis hill (approximately 250 x 250 m) in the east, and a large Lower City in the west. The main street of the ancient city, *Decumanus Maximus*, runs east-west. At the north-west corner of the Acropolis the pavement of a north-south street (*cardo*) branches off from the *Decumanus Maximus* and runs along the western slope of the hill to the area in front of the Roman Theatre which is built on the hill side (Fig. 1). Between the Theatre and the *Decumanus* a large Terrace is situated at the bottom of the slope. A line of nineteen (possibly twenty) vaulted rooms were built against the Terrace's retaining wall which align the street's pavement.¹ The construction of the Terrace, the Theatre and the vaulted rooms is dated in the Roman period, tentatively at the end of the first or in the second century AD. In the following, only the Roman building phase will be referred to (the two churches and the columned courtyard that were built on the Terrace in Byzantine times will be mentioned, but not dealt with in depth).

The Excavation of Area III

The northern part of the street's pavement, labelled Area III, was excavated in 1977, 1979 and 1980 (Fig. 1).² In Area III



1. Umm Qays. Location of Area III.

four fields were investigated. Fields 1, 2 and 4 were each 5m wide and, together, they were 17m long, extending from the *Decumanus* corner to the area in front of the en-

1. U. Wagner-Lux, E.W. Krueger, K. and T. Vriezen, Bericht über Oberflächenforschung in Gadara (Umm Qes) in Jordanien im Jahre 1974, *ADAJ* 23 (1979): [31-39] 34; N.F. Mulder and R. Guinée, Survey of the Terrace and Western theatre area in

Umm Qais, *ARAM* 4 (1992): [387-393] 389.

2. U. Wagner-Lux and K.J.H. Vriezen, Preliminary Report of the Excavations in Gadara (Umm Qes) in Jordan, 1980, *ADAJ* 28 (1984): [87-90] 87-89.

trance to the third vaulted room (S 6.66 - S 23.34). Field 3 was a 4m wide extension to the west of field 1, aimed to uncover the western side of the *cardo*-street. The western boundary of the pavement, however, was not reached; therefore the width and the character of the so-called *cardo* could not be determined.³

At some recent time, prior to the excavation, a ca. 1.30m wide trench had been dug along the façade from the second room southwards exposing the remains of the entrances to the vaulted rooms still *in situ*.

In the excavation it appeared that north of S 12.70 the larger part of the basalt pavement of the *cardo* was destroyed and carried away. This is the area where the *cardo* joins the *Decumanus Maximus*. Here, underneath the remains of the pavement, a canal hewn out of the rock leading to a large cistern was found. In the same area, under the level of the pavement several other canals were found as well. The large cistern was used for a long time, but due to constructions made around its opening in post-Roman times, the pavement was apparently destroyed.

South of S 12.70, however, the situation differed considerably: the basalt pavement was found undisturbed. It was laid out in a more or less regular pattern of slabs.⁴ On the pavement a 0.52 - 0.62m thick layer of clear coloured and gray coloured earth was deposited, in which many worked basalt stones were found. Over this deposit an 0.36 - 0.60m thick accumulation of layers of earth had built up. The worked stones were situated directly on or only a few centimeters above the pavement. They were apparently the building stones of the façade of the vaulted rooms which had fallen westwards onto the street.

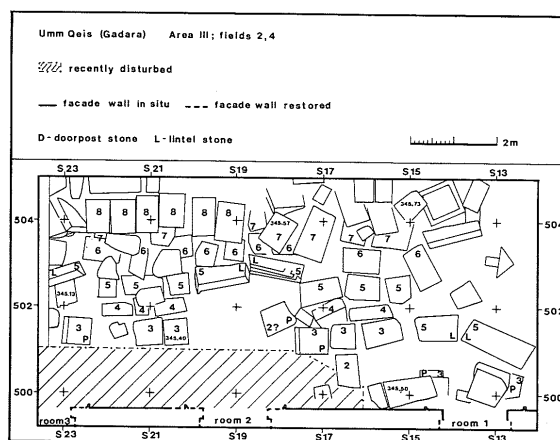
3. The question whether this pavement is part of a side street or of a monumental square may only be solved by continued excavation.

4. U. Wagner-Lux and K.J.H. Vriezen, *op.cit.* (n. 2), fig. 2, Pl. XIII,1 and XIV,1.

5. U. Wagner-Lux and K.J.H. Vriezen, A preliminary report on the excavations at Gadara (Umm

The Debris of the Façade of the Vaulted Rooms

In this way, to the south of S 12.70 a ca. 10m long section of the façade wall, lying toppled over in its original order, one course next to the other, was uncovered and excavated (Figs.2 and 3). The situation was comparable to the find of the collapsed west wall of the centralised church on the Terrace (Area I) a few years before.⁵ And like the demolition of that church building, the collapse of the façade of the vaulted rooms along the *cardo* was apparently caused by an earthquake, and dated by ceramic finds to the Omayyad period. (presumably the earth-



2. Debris of the façade of the vaulted rooms (Area III, fields 2 and 4).



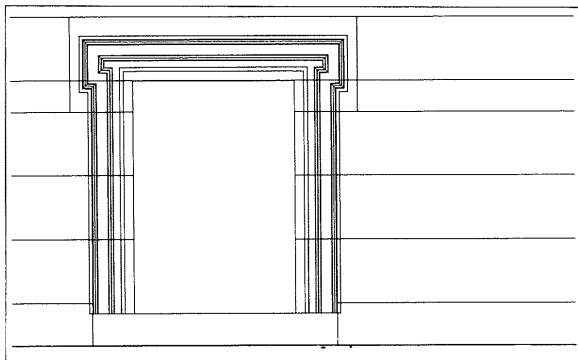
3. Debris of the façade during excavation (looking W).

Qes) in Jordan from 1976 to 1979, *ADAJ* 24 (1980): [157-160] 157; U. Wagner-Lux and K.J.H. Vriezen, *Vorläufiger Bericht über die Ausgrabungen in Gadara (Umm Qes) in Jordanien in den Jahren 1976-1978*, *ZDPV* 96 (1980): [48-58] 52f., Abb.3.

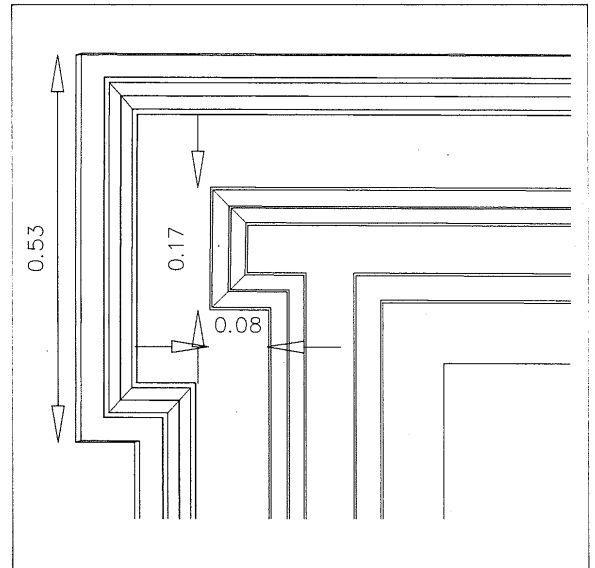
quake of 749).⁶

Figure 2 shows the section of the collapsed façade wall as uncovered in fields 2 and 4. The plan reveals remains of the three northern door frames and stone courses of the wall in between as they were found lying on the pavement. Not all the stones of the collapsed wall were preserved. In particular, the recent trench digging had caused a serious disturbance carrying away many stones that must have fallen just in front of the façade. However, enough data was available to make a reconstruction of the wall as, in addition to the debris, parts of the wall were still *in situ* up to two stone courses high, as were also both doorposts of the entrance to room I and the southern doorpost of room III. To the south of Area III the trench recently dug had exposed more parts of the façade still standing one or two courses high.

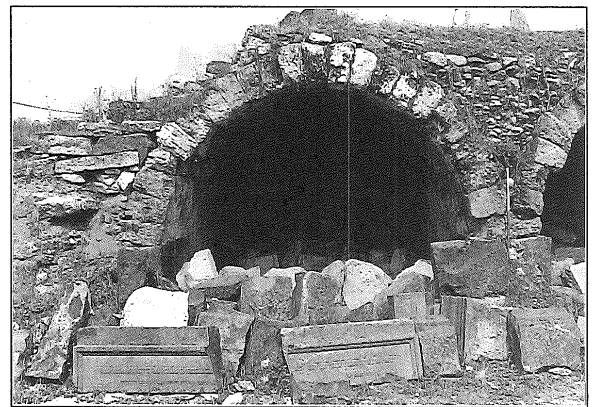
According to this data the door frames are made up of five courses of stones, in which a profile was cut (Figs. 4 - 7). The doorposts, which are set upon a threshold,⁷ are made of four courses, their height being ca. 0.70m, 0.61m, 0.61m and 0.30m from the lower to the upper. One long stone, 0.58m high, placed horizontally makes the lintel (the fifth course). In the façade wall between the door frames, the stone course level with the lower course of the doorpost is only 0.57m high, underneath which a foundation course (F)



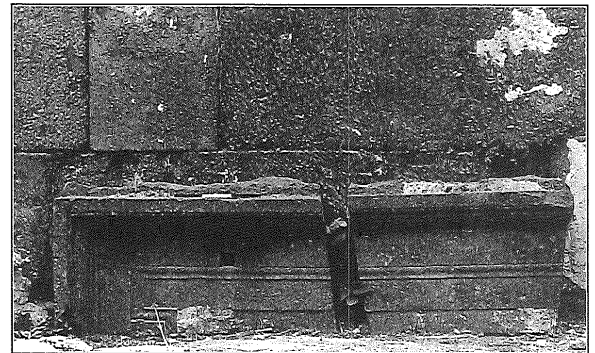
4. Reconstruction of the door frame of the vaulted rooms (applies for rooms I,IV and X-XX).



5. Reconstruction of part of the door frame.



6. Lintel of one of the doors in front of room II.



7. Detail of one of the door lintels on the Terrace.

becomes visible. Continuing upwards over the lintel a 0.58m high stone course is laid (the sixth course), on which a 0.29m high course forming a horizontally profiled ledge on the façade is placed (the seventh course).

6. K.J.H. Vriezen, *The Centralised Church in Umm Qais (Ancient Gadara)*, *ARAM* 4 (1992): [371-386] 375.

7. During the excavation and the archaeological-architectural survey, thresholds were not seen in the entrances to rooms II-IX and XVIII-XX.

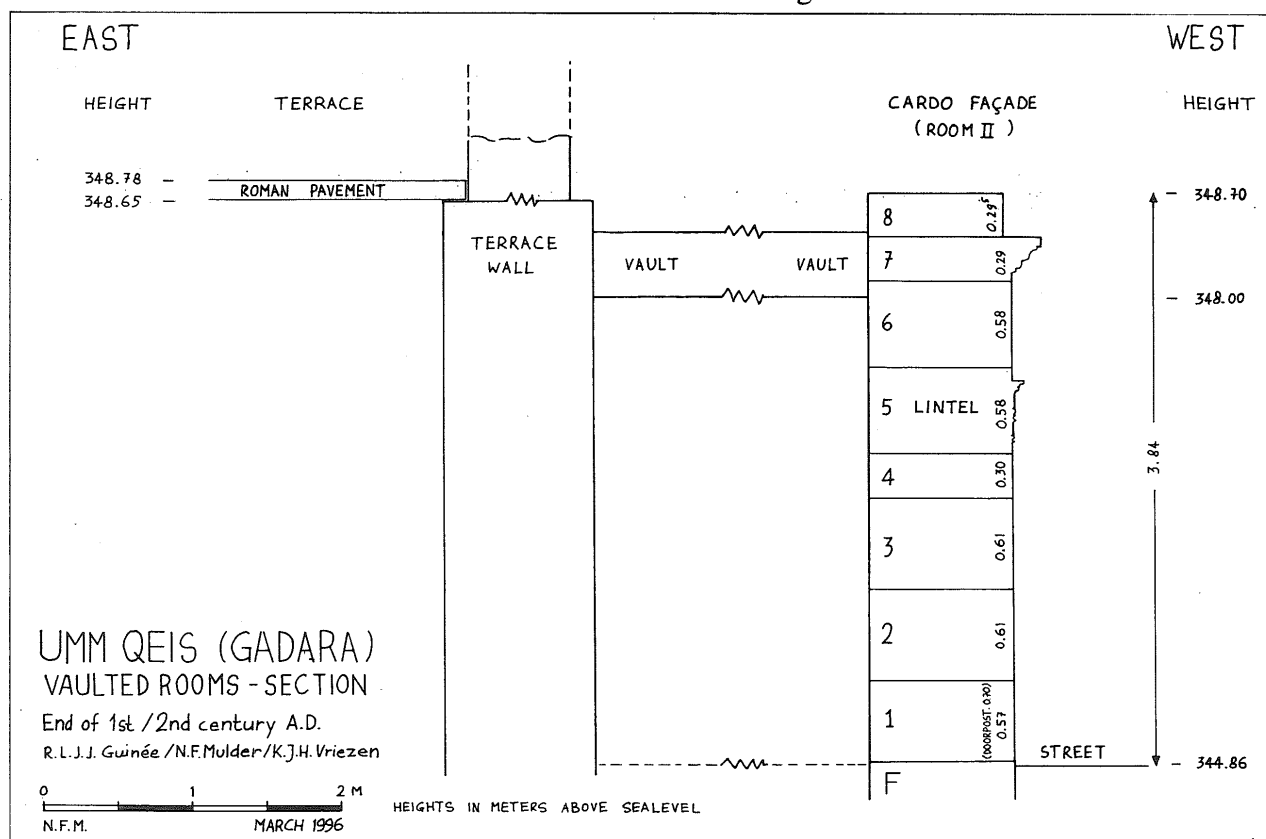
The eighth course, 0.295m high with not only a smooth finish on the front, but also on the upper side, apparently formed the top of the façade wall. Possibly this also was the level of a roof covering the vaulted rooms, as the upper side of this course corresponds more or less to the level of the Roman pavement on the Terrace (Fig. 8).

In Fig. 2 the stones are labelled according to the stone course of the façade wall they belong to: 2-8 (meaning the one but the lowest course and the upper course, respectively). Profiled stones of the doorposts are marked with P and lintels are marked with L. Among the stones of the collapsed wall hardly any stones of the lower two courses are represented. This is due to the recently dug trench and the fact that many stones of these lower courses were not collapsed, but were still *in situ* at the time of the excavation.

The Archaeological-Architectural Survey. Description of the Vaulted Rooms

In 1992 and 1993 an archeological-architectural survey of the Terrace, Theatre and *Cardo* Quarter was made. The aim of this project was to set up a comprehensive documentation of the area and to present a reconstruction and interpretation of the buildings in their urban setting.⁸ During this survey, the remains of the vaulted rooms along the west side of the Terrace were also studied (Fig. 9). The vaulted rooms are numbered starting from the north from I to XX.

Eleven of the rooms are still covered with a barrel vault. Where the vaults have disappeared, traces of the countours of the vaults are still visible on the retaining wall of the Terrace. The remaining parts of the walls, vaults and façade which are still standing have been measured and drawn.⁹



8. Umm Qays (Gadara). Section of the vaulted rooms at the west of the Terrace.

8. N.F. Mulder and R. Guinée, Survey of the Terrace and Western Theatre area in Umm Qais, *ARAM* 4 (1992): 387-393.

9. During the survey, it was noted that sometime after

the excavations had finished, a part of the façade, between room III and room VI, had been restored up to a height of ca. 2m.

The inventurisation of the architectural elements, already started during the excavations of Area III, have been completed as far as possible.¹⁰ Furthermore the techniques of construction of walls and vaults have been studied, as well as the decoration and the design. According to this data it has been possible to reconstruct the architecture of these vaulted rooms with their façade.

Functionally, the vaulted rooms are the substructure of the platform of the Terrace,



9. The vaulted rooms at the west of the Terrace looking southward.



10. South corner of the façade of the vaulted rooms with rusticated stone blocks.

as they buttress the Terrace's retaining-wall,¹¹ which makes up the rear walls of the rooms. The Terrace wall, up the dividing walls of the rooms and their façade were built by using the same technique and they bond with each other.

At the northern end, due to an inset in the wall, the façade of the vaulted rooms is distinguishable from the northwestern *anta* of the monumental entrance at the north side of the Terrace. The southern end of the façade is clearly marked with the use of rusticated stone blocks at the corner (Fig. 10).¹²

The walls of the Terrace and of the vaulted rooms, including the façade, were constructed by using basalt blocks in combination with *opus caementicium*. The facings of the walls were made of ashlar, the fill consists of a mass of rubble bonded with lime mortar, which also bonds the ashlar blocks to the supporting masonry of the core. As yet, no traces of plaster have been found. The barrel-vaults were built of white fine limestone blocks and rest upon the basalt dividing walls. The space in between the vaults is filled up with *opus caementicium* and so a flat roof has been achieved (Fig. 6).

Although the data suffice to reconstruct the façade, some questions still remain. One question is with regard to the position of the uppermost, the eighth, course. The blocks of this course were found as being the westernmost line of ashlars in the debris of the collapsed wall (Fig. 2:8). The height of the stoneblocks is about 0.295m, the length varies between 0.51 - 0.59 m, while the width of

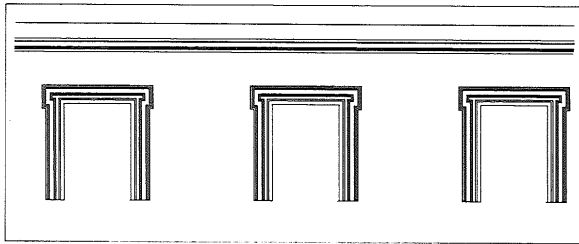
10. Many of the building stones, especially from the south part of the façade wall, may be preserved in front of the rooms. However, this area was not yet excavated at the moment of the survey.

11. For these kinds of substructures of terraces in Pella, Capitolias, Gerasa and Muwaqqâ, see R.H. Smith, Excavations at Pella of the Decapolis, 1979-1985, *National Geographic Research* (1985): [470-489] 478, fig.14; R.H. Smith and L.P. Day, *Pella of the Decapolis 2*, Sydney/Wooster 1989: 83; T. Weber, *Pella Decapolitana* (ADPV 18), Wiesbaden 1993: 21; C.J. Lenzen and E.A. Knauf, Beit Ras/Capitolias: A Pre-

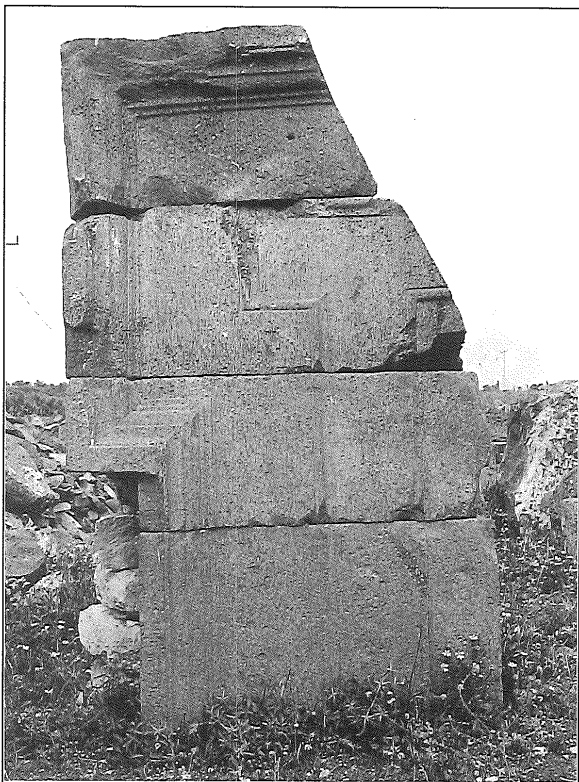
liminary Evaluation of the Archaeological and Textual Evidence, *Syria* 64 (1987): [21-46] 31ff., fig.5-6; I. Browning, *Jerash and the Decapolis*, Amman/London 1982: 82, fig.26 and 122, fig. 58; R.E. Brünnow and A. v. Domaszewski, *Die Provincia Arabia II: Der äussere Limes und die Römerstrassen von el-Ma'ân bis Bosra*, Strassburg 1905: 183, fig.757.

12. Rustication is applied in many other buildings in the Decapolis, e.g. in Gerasa: in the Hippodrome, around the South Gate and in the South Theatre. See I. Browning, *op.cit.* n.11, figs. 47, 50, 63, 64.

all blocks is about 0.91m. The fact that, apart from the upper side, only one of the short sides is smoothly finished, indicates that this side was the front. The other short side of the blocks, the back, is only worked in the upper



11. Reconstruction of a part of the façade of the vaulted rooms.



12. Architectural ornamentation of the external Monumental Gate (to the west of the city).

zone (0.10m). Most probably the blocks were placed against the vaults and did not project from the façade, which is about 1.00m wide. This means that only the cornice, the seventh course, was projecting from the façade (about 0.20m), giving a visual contour (Fig. 8).

The façade is soberly ornamented. The doorframes are profiled and, above the doors, a cornice runs continuously along the entire façade (Fig. 11). No traces of decoration, like painting, were found. Special attention must be paid to the ornamentation of the entrances in which a lintel has been introduced (Figs. 4-6). An almost identical ornamentation, although in larger dimensions, may be found in the doors on the Terrace (Fig. 7). The nearest parallel for the ornamentation found in Umm Qays is in the Monumental Gate west of the ancient town (Fig. 12).¹³ A pre-Roman example of such a lintel may be seen in 'Irāq al-Amīr'.¹⁴

Apart from the ornamentation, the following observation may be made regarding the façade. The reconstruction of the façade, as shown in Fig. 8, is made for room II and, in general, it is valid for all rooms. In the southern part of the street, however, the level of the pavement gradually gets lower, the thresholds and the foundation course project more and more from the street level as one goes south.

Another observation to be made is the fact that the average height of the stone courses slightly decreases higher up the wall.¹⁵ Although the façade is not that high, this may have simplified the tasks of lifting and bed-

13. For the Monumental Gate see also P.C. Bol, A. Hoffmann and Th. Weber, *Gadara in der Dekapolis*, *Deutsche Ausgrabungen bei Umm Qais in Nordjordanien 1986 bis 1988. Vorbericht*, *Arch. Anz.* (1990): [193-266], 216-239, Abb. 28 and 30.

14. J.-M. Dentzer *et al.*, 'Fouille de la Porte Monumentale à Iraq al-Amir. La campagne de 1978' *ADAJ* 26 (1982): [301-321], 307, fig.4.

15. The façade is constructed of stoneblocks of different lengths placed in courses of uniform heights.

The lowest three courses are of 'double' height, the fourth of 'single' height, the fifth and sixth course again of 'double' height, but less than the lower three courses, and the seventh and eighth course are of 'single' height. The heights vary for each stone course:

0.550-0.590m (course 1), 0.595-0.635m (course 2), 0.595-0.635m (course 3), 0.300-0.320m (course 4), 0.580-0.590m (course 5), 0.580-0.590m (course 6), 0.285-0.295m (course 7), 0.290-0.300m (course 8).

ding by putting lighter blocks in the upper parts of the construction.¹⁶ One should be aware of this practice, when using the heights of the stone courses to find the dimension of the standard used in the design of a particular building.

Measurements for a Reconstruction

The fact that a large part of the vaulted rooms are still quite well preserved, offers the opportunity to do some systematic research on the measurements of the elements of the building, as well as on measurements of the building as a whole. These investigations will contribute to the basis for the reconstruction of the demolished parts of the building and to the understanding of the problems concerning the theoretical design of the building.

In the study of the standard used for the construction of buildings, the method usually applied is first to divide the measurements (in meters) by a hypothetical standard, which in this case may be the Roman foot. The hypothetical dimension of the foot may be about 0.295m, as this value was found on many occasions, measuring the height of the stoncourses, which amounts to 0.29-0.30m or 0.58-0.59m.¹⁷ Then, the round number nearest to the result of the division, is taken to be the plural of the standard. After dividing the measurements by this plural, the standard can be found.

The total height of the façade, from the lower stone course including the upper

course, was established at 3.84m, this is the absolute height at the entrance to room II (Fig. 8) and held to be the average height for the whole façade wall as well.

The total length of the façade, from the inset to the *rustica* corner is 97.42m. Based on the assumption that the height of the façade is 13 and the length 330 (Roman) feet, the applied standard must be between 0.2952m and 0.2954m.¹⁸

The separate elements of the substructure were also studied systematically. Where possible, the interior of the rooms was measured. The rooms are rectangular and similar, their width varies between 3.45m and 3.89m (average: 3.68m), and their length between 4.84m and 5.00m (average: 4.91m). The width of the walls between the rooms varies between 0.91 and 0.98m (average: 0.96m). The details of the façade were also measured. The distance between two door openings varies between 3.09m and 3.64m (average: 3.30m). For the measurements of the doors, see below.

On occasions, investigations for the standard applied may be hampered by several factors. It should be realised that not in every building a round plural of the standard is to be found. Deviations may be caused, when during construction the work was not executed accurately according to a theoretical design. Buildings may have suffered disasters such as earthquakes or may have been used as quarries, which caused stoneblocks to move among themselves. Furthermore,

16. Of course, the weight of the stoneblocks also depends on the dimensions of the width and length and on the specific weight of the building stone applied. For a good example of decreasing height see the peribolos of the Temple of Bel at Palmyra in: J.-P. Adam (ed.) *Roman building Materials and techniques*. London, 1994: 115, fig. 263.

17. Some remarks about this hypothetical standard are already made for the Western Theatre in Gadara: R. Guinée and N.F. Mulder, Umm Qeis. The Terrace, Western Theatre and Cardo Area in the Roman period: Architectural design integrated in the landscape: the design of the Western Theatre, in *SHAJ VI*, Amman: Department of Antiquities of

Jordan (forthcoming). The same average heights of 0.58-0.59 m for the stone layers were found by H. Kalayan at the South Gate in Gerasa. H. Kalayan, Restoration in Jerash [With observations about the related Monuments], *ADAJ 22* (1977-8): [163-171], 163.

18. H. Kalayan found 0.2936 m for the in Gerasa applied (Roman) foot, H. Kalayan, *op.cit.* n. 17, 163; J. Dentzer-Feydy found a foot of about 0.292 m, cf. J. Dentzer-Feydy, Remarques sur la métrologie et le projet architectural de quelques monuments d'époque hellénistique et romaine en Transjordanie. Pp. 161-171, esp. 162 in *SHAJ V*, Amman: Department of Antiquities.

buildings often have survived only in part. This applies especially to the elevations, limiting the possibilities for verification.¹⁹ However, in studying the design scheme of a building, it is not necessary to know the exact standard that was used. More important are the relative proportions of the building's various dimensions.

In Search for the Design Scheme

In order to find out what theoretical design scheme formed the basis for the façade of the vaulted rooms, the door openings may be a good starting point. An experiment was conducted to investigate how the widths of the door openings were related to their heights. For this reason as many as possible door openings were measured. Where (parts of) both doorposts were still *in situ* the width has been established, which varies between 1.46m and 1.52m. The height of the door openings could only be established where the doorposts were preserved on the spot up to the fourth stone course, or where they could be reasonably completed by substituting the missing post stones by the aver-

age height of the stone course in question, as calculated elsewhere from the façade remains. The height of the door openings varies between 2.17m and 2.23m. In the following table the width and height of the door openings are shown, where they could be established (all having a threshold *in situ*).

In Table 1 it may be seen that in almost each case the ratio between width and height is about 1:1.50. The same ratio, 1:1.50 or 2:3, between the width and height of door openings, also occurs in other buildings in the area of the Decapolis (cf. the hippodrome of Gerasa²⁰). Yet, this does not mean that the Roman architects did use this particular proportional scheme for their design, but the figures indicate the framework within which these design schemes were developed. In this experiment only the proportions of door openings were studied, but this metrological analysis can also be executed for other elements of the vaulted rooms and their façade, as well as for the Terrace in its entirety.²¹

The use of particular proportions becomes plausible, when the proportions found in the

Table: 1.

DOOR OF ROOM	WIDTH (M)	HEIGHT (M)	RATIO (W:H)
IV	1.51	2.23	1:1.48
X	1.48	2.21	1:1.50
XI	[1.49]	2.17	1:1.45
XII	1.49	2.22	1:1.49
XIII	1.50	[2.21]	1:1.47
XV	1.52	[2.14]	1:1.41
XVI	[1.49]	[2.22]	1:1.49
[...]=reconstructed value, completed with average dimensions			

19. For these remarks see also R. Guinée and N.F. Mulder, *op.cit.*, n.17; J. Dentzer-Feydy, *op.cit.*, n.18,p.161.

20. A.A. Ostrasz, The Hippodrome of Gerasa: A Case of the Dichotomy of Art and Building Technology. Pp.183-192 esp.188 in *SHAJ V* (1995). Amman: Department of Antiquities.

21. This will even be possible for the architectural details, like the ornamentation of door frames, capitals, etc. Cf. J.Dentzer-Feydy, *op.cit.*, n.18,p. 171; *idem*, Les chapiteaux corinthiens normaux de Syrie méridionale 1er partie, *Syria* 67 (1990): 633-663.

analyses of various elements of the building complex can be related to each other in one comprehensive design scheme. The vaulted rooms are part of the Terrace construction, which is evident by the bonding of walls and by the execution of ornamentation. Although the Roman building phase of the Terrace complex consists of separate elements, like the monumental entrance with the *antae* in the north along the *Decumanus Maximus*, the substructure with the vaulted rooms and the elevation on the Terrace, these elements are all part of one building: the Terrace. However, the existence of one comprehensive design scheme for the whole

complex may only be proved by continued metrological study.

R.L.- J.J. Guinée
Heiningen 563
NL-4623 TSbergen op Zoom

N.F. Mulder
Marislaan 9
NL-2316 XV Leiden

K.J.H. Vriezen
Theological Faculty
Utrecht University
P.O.Box 80.105
NL-3508 TC Utrecht

THE SOUTH THEATRE AT JARASH, 1994 CAMPAIGN

by
Frank Sear

Introduction

In June 1994 a team of architects and archaeologists from the Universities of Melbourne and Adelaide was granted permission to survey the South Theatre at Jarash.¹ The survey was part of the Australian 'Roman Theatres' project, funded by the Australian Research Council, which began in 1990.² The choice of the South Theatre was an obvious one by reason of its unusual architectural features. That these have never been the subject of scholarly study is not altogether surprising. In a site as exceptionally well-preserved as Jarash, even so remarkable and unusual a building as the South Theatre would have difficulty competing for scholarly attention with the site's many other archaeological riches. As a result publication has been patchy and no detailed survey of the South Theatre has ever been published. In recent years greater attention has been paid to the North Theatre which has now been excavated, while the main focus of the South Theatre has been as the restored venue for the Jarash Festival. It may be useful at this point to give a brief outline of the work that has been conducted upon the two theatres to date.

Previous Work on the North and the South Theatre at Jarash

The first western traveller to visit Jarash was Ulrich Seetzen in 1806. In the account of his travels, published in 1810, he mentions 'two superb amphitheatres.'³ In 1812 John Burckhart made a brief visit to Jarash and in 1816 John Buckingham visited the site and published the first, rudimentary, plan of the city.⁴ When Irby and Mangles visited in 1818 they spent a week there and praised the scene of the large theatre as 'singularly perfect'.⁵ The Palestine Exploration Fund was established in 1865 and in 1867 a small party led by Charles Warren brought back some of the earliest photographs of Jerash. A photo of the theatre from the north taken in 1877-1889⁶ shows the *ima* and most of the *summa cavea* standing as well as several columns of the *scaenae frons*, including the two with a section of architrave at the east end of the *scaenae frons*.⁷

The North Theatre or odeum was surveyed by Krencker in 1902, but the plan was not published until 1934.⁸ An unpublished plan and section of the South Theatre by O. Puchstein appeared in Fiech-

1. I would like to take this opportunity to thank the Director-General of the Department of Antiquities for granting us permission to conduct this survey and to record our gratitude to William Lancaster, then the Director of the British Institute of History and Archaeology at Amman, and Pamela Watson, the Assistant Director, for their unfailing help and support. The 1994 team consisted of Frank Sear (director), Andrew Hutson and Zig Kapelis (architects), and Scott Newman and Maurice Smith (students).
2. The theatres surveyed so far are those at Gubbio, Volterra and Taormina.
3. U.J.Seetzen, *A Brief Account of the Countries adjoining the Lake of Tiberias, the Jordan and the Dead Sea*, London 1810.

4. J.S.Buckingham, *Travels in Palestine, through the Countries of Bashan and Gilead*, London 1821.
5. C. L. Irby and J.Mangles, *Travels in Egypt and Nubia, Syria and the Holy Land*, London 1832.
6. Cliché Bonfils. Neg. H.S.M. 976, fiche 8C.5, in the Harvard Semitic Museum.
7. The photo is published by J.Seigne, 'Monuments disparus sur photographies oubliées.' Pp. 99-116, Fig.15 in *Jerash archaeological Project 1984-1988*, II (Syria 66, 1989), Paris 1989.
8. D.Krencker, 'Römische Städtebaukunst an den Rändern des römischen Weltreiches.' Pp.22-9 in *Bericht der 72. Hauptversammlung des Vereins deutscher Ingenieure in Trier 1934*. See also G.Schumacher, 'Dscherasch,' *ZDPV* 25, 1902: 145-50.

ter's history of theatre buildings in 1914.⁹ In 1925, following the appointment of John Garstang as the first Director of the Department of Antiquities in Jordan, conservation work began on the South Theatre under the direction of George Horsfield.¹⁰ Horsfield cleared the orchestra and revealed the whole stage area, and the architectural fragments from the upper part of the *scaenae frons* were collected and placed in the orchestra to await study.¹¹ Clearance of the North Theatre also began in 1925.¹² The inscriptions found in the South Theatre were published by Jones in 1928.¹³ Both the North and the South Theatre were briefly described in Kraeling's monumental work on Jarash which appeared in 1938, and Welles published further inscriptions found in the south theatre.¹⁴ However, greater attention was paid to the small theatre outside Jarash at Birketein, and the first plan of this theatre was published.¹⁵ In 1953 it was decided to restore the South Theatre with a view to establishing the Jarash Festival and in the period of 1953-6 a great deal of restoration work was done, particularly in the area of the *scaenae frons* and *tribunalia*.¹⁶ Work continued on the theatre throughout the 1970's and early 1980's as part of the Petra/Jarash project and at this time three further inscriptions were discovered in

cleaning work.¹⁷ In 1982-3 excavation of the North Theatre was resumed and consolidation and restoration are still proceeding at the time of writing.¹⁸ In a book published in 1982 Browning discusses both the North and the South Theatre, although at the time his book was written the North Theatre was still in the same half-buried state it had been in 1925.¹⁹ Browning comments at some length upon the most recent restoration work to the South Theatre. He also offers a graphic reconstruction of the *scaenae frons*.

The Present State of Preservation of the South Theatre

When the restoration of the South Theatre began in 1953 most of the *ima cavea* was relatively intact including the vaults over the *aditus maximi*, but little survived of the *tribunalia* or the rows of seats behind them (Fig.1). The central two *cunei* of the *summa cavea* stood almost to their full height and only the top few rows of seats were damaged in the lateral parts of the *summa cavea* (Fig.2). Most of the outer casing around the *summa cavea* had been destroyed. Only the footings of the stage front survived *in situ* and the foundations of the stage, which was apparently a solid masonry structure. All the podia of the *co-*

9. E.R.Fiechter, *Die baugeschichtliche Entwicklung des antiken Theaters*, Munich 1914:Abb.95. The plan however marks three, instead of two, radial corridors under the west side of the *summa cavea*.
 10. A plan of the building appeared in an article by A.Harrison, *BSAJ* 7, 1925: Pl. 1.
 11. C.S.Fisher, in C.H.Kraeling, *Gerasa - City of the Decapolis*, New Haven 1938: 20.
 12. G.Horsfield, Jerash: Annual Report on Works of Conservation, *Government of Trans-Jordan, Antiquities Bulletin*, no. 1, 1926.
 13. A.H.M.Jones, 'Inscriptions from Jerash,' *JRS* 18, 1928: 144-78, nos.12-14, 16, 33.
 14. C.B.Welles, 'The Inscriptions'. Pp.355-494, nos. 51-55, 161, 192 in C.H.Kraeling, *Gerasa - City of the Decapolis*, New Haven 1938. For the theatres see C.S.Fisher, *ibid*: 19-20 (South Theatre); 22-3 (North Theatre).

15. C.McCown, 'The Festival Theatre at the Birketein,' *ibid*: 159-67.
 16. G.Lankester Harding, 'Chronique archéologique,' *RB* 63, 1956: 68; D.Kirkbride, 'A brief Outline of the Restoration of the South Theatre at Jerash,' *ADAJ* 4-5, 1960: 123-7.
 17. J.Pouilloux, 'Deux inscriptions au théâtre sud de Gérasa,' *LA* 27, 1977: 246-54; J.Pouilloux, 'Une troisième dédicace au théâtre sud de Gérasa,' *LA* 29, 1979: 276-78.
 18. V.A.Clark, J.M.C.Bowsher, J.D.Stewart, C.M.Meyer and B.K.Falkner, 'The Jerash North Theatre: Architecture and Archaeology 1982-1983.' Pp. 205-302 in F.Zayadine (ed.), *Jerash Archaeological Project 1981-1983*, I, Amman 1986.
 19. I.F.Browning, *Jerash and the Decapolis*, London 1982: 125-31.



1. The *scaenae frons* and eastern *aditus* of the South Theatre at Jarash in 1946 (Dept of Antiquities Archive, photo no. A 996).



2. General view of the South Theatre at Jarash from the north in 1946 (Dept. of Antiquities Archive, photo no. A 797).

lumnatio stood and some columns. A pair of columns at the west end and another on the east side survived complete with capitals along with the architrave they supported. The *scaenae frons* wall itself stood in parts to a height of 10 or 11 courses of masonry, almost to capital height. Little survived of the two side entrances onto the stage or the three doorways in the *scaenae frons* wall. The vaults over the *aditus maximi* leading into the orchestra had survived, but the un-inscribed plaque over the western entrance had to be recomposed from fragments on the basis of an old photograph. Between 1953-1955 the *postscaenium* passage was excavated and the *scaenae frons* wall was dismantled and rebuilt. The three doors of the *scaenae frons* were rebuilt using new material in the pediments to substitute for parts which were missing and reinforced concrete beams were inserted inside the lintels. The arched entrances at the sides of the stage were rebuilt, as well as both arched entrances into the orchestra and the *tri-*

bunalia above them. In the course of this work the west end of the *scaenae frons* wall and the pair of columns carrying a portion of architrave at were found to be in such bad condition that a structural engineer was needed for advice. However the work was terminated before such advice could be sought. Meanwhile some rebuilding took place but the new work was not bonded to the old. Kirkbride warns: "It must be stressed most strongly that if any future campaign of restoration is contemplated at the theatre, this section of the wall must receive priority treatment."²⁰ In 1956 funding ran out and it was some years before the stage and *proscenium* wall were finished. Eventually the orchestra and *cavea* were cleared and the upper seating consolidated. The area behind the *cavea* was also cleared so that there is once again a passage around the back of the *cavea* (Fig. 3). Work continued on the theatre throughout the 1970's and large sections of the outer wall of the theatre were rebuilt as part of the Petra/



3. Back of the *cavea* of the South Theatre at Jarash showing the outer wall and the passage behind (173.25A).

20. D.Kirkbride, 'A brief Outline of the Restoration of the South Theatre at Jarash,' *ADAJ* 4-5, 1960: 125.

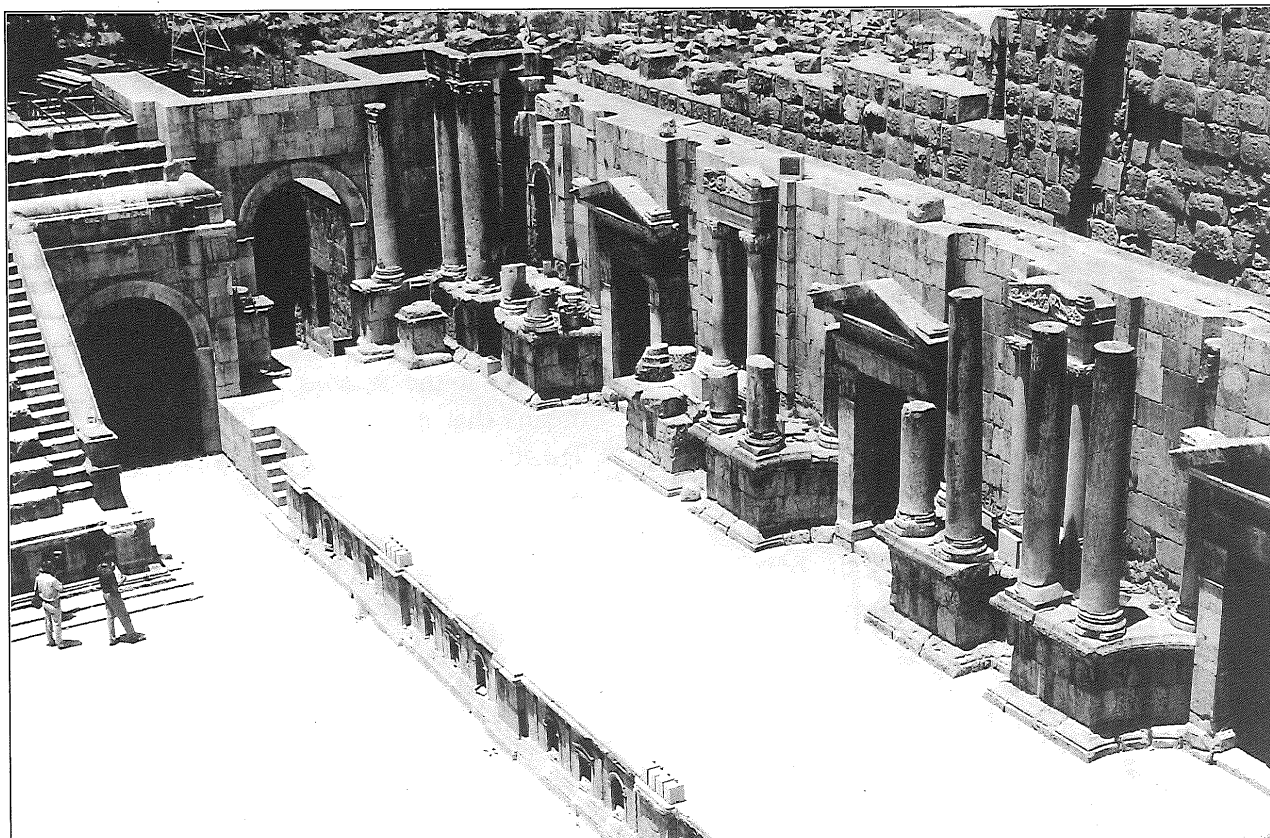
Jarash project.

The Design of the South Theatre

The reason the South Theatre was chosen for the present study is a peculiarity in the design of its *scaenae frons*. The South Theatre at Jarash is unusual in that, although it has a rectilinear *scaenae frons*, its architect has attempted to give the impression that the three doorways are enclosed in semicircular niches by curving the ends of the podia nearest to the doorways (Fig. 4). These curves are repeated in the entablatures, and the illusion is completed by columns partially slotted into the wall surface immediately to the sides of the doorways. The resultant 'niches' are formed by the podia and *columnatio* alone. However because the slotted columns are actually behind the edges of the doorways, the effect is a carefully contrived illusion of fully for-

med curved niches (see below Fig. 7). Thus in its completed state the *scaenae frons* of the South Theatre must have had something of the appearance of that of Sabratha where there are in fact curved niches enclosing the three doorways.²¹

Jarash is not the only Roman theatre with this feature. Another example was unexpectedly discovered in July 1992 when the theatre at Taormina in Sicily was being surveyed by the team. The *scaenae frons* is of the rectilinear type and in front of it are podia carrying a conventional *columnatio* consisting of a single line of columns (Fig. 5). However it was soon discovered that the columns were set up in their present position at a later period when the orchestra was transformed into an arena. Underneath the podia of the present *columnatio* are the partly demolished remains of earlier podia. We measured them and found that the podia



4. Stage and *scaenae frons* of the South Theatre from the south-east (167.32).

21. This theory is discussed at greater length in a recent article, F.B.Sear, 'The *Scaenae Frons* of the Theater of Pompey,' *AJA* 97, 1993: 687-96.



5. Theatre at Taormina, Sicily.

framing the *hospitalia* curve inwards to form semicircular 'niches' in a similar manner to Jarash. It also became clear that in addition to the columns along the edge of the podia there must have been a column immediately adjacent to each of the lateral doorways. These columns must have fitted into the V-shaped slots in the *scaenae frons* wall, which are otherwise inexplicable. It will be observed that the slots correspond exactly to the ends of the curved podia and the reconstructed drawing of the *scaenae frons* shows how the columns must have been arranged (Fig. 6).

The theatre at Taormina is thought to be late Trajanic/early Hadrianic on the basis of the architectural ornament of the columns.²²

In the case of the South Theatre at Jarash an inscription dating to between AD 83-96 records that a certain T. Flavius donated 3,000 drachmas to build a *kerkis* of the theatre.²³ An inscription dating to AD 90 records the consecration of the *theatron*,²⁴ but the whole theatre was not complete at this time.²⁵ A cylindrical stone basis found near the west end of the stage with a long inscription dating to between AD 102-114 suggests that the *scaena* is Trajanic.²⁶ This means that the scene building of the South Theatre at Jarash was almost contemporary with that of Taormina.²⁷ This discovery is of particular interest because the theatre at Taormina has long been thought to be related to theatres of the eastern Mediterranean.²⁸

22. R.J.A.Wilson, *Sicily under the Roman Empire*, Warminster 1990: 76.

23. A.H.M.Jones, 'Inscriptions from Jerash,' *JRS* 18, 1928, no. 13: 152-3.

24. By *theatron* I understand the place where the audience sat. See *CIL* X 833-5 from the Large Theatre at Pompeii where *theatrum* is distinguished from *crypta* and *tribunalia* and can only refer to the seating of the *cavea*.

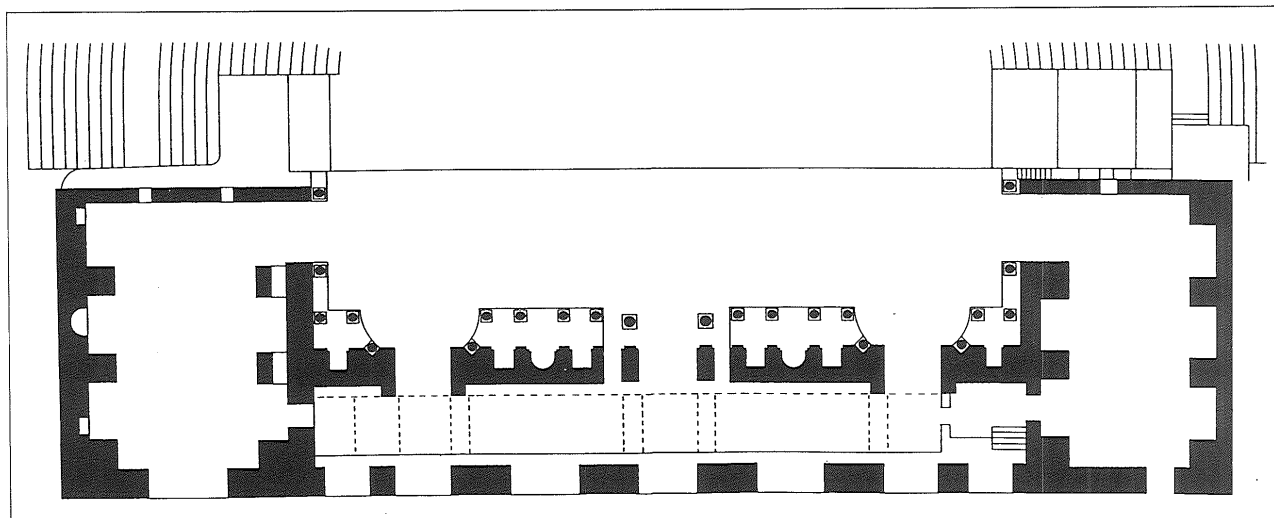
25. J.Pouilloux, 'Deux inscriptions au théâtre sud de Gérasa,' *LA* 27, 1977: 246-54; J.Pouilloux,

'Une troisième dédicace au théâtre sud de Gérasa,' *LA* 29, 1979: 276-8.

26. A.H.M.Jones, *loc. cit.*, no. 14: 153-6.

27. It may be noted that the capitals of the doorways are of a similar type to those on the South Gate and the Hadrianic Arch. The latter was built in AD 129/30.

28. O.Belvedere, 'Opere pubblici ed edifici per lo spettacolo nella Sicilia di età imperiale,' *ANRW* 2.11.1 (Berlin/New York 1988): 364-66.



6. Taormina, Roman Theatre. Restored plan of the *scaenae frons* (Barry Rowney).

There are of course a number of differences between the two theatres. Firstly the slots into which the columns are inserted are semicircular at Jarash, while those at Taormina are V-shaped. However the V-shaped slots at the theatre at Taormina are explicable by the fact that the building material was concrete faced with bricks, which do not lend themselves to curved shapes as easily as stone. In both cases the aim is the same - to slot the columns halfway into the wall. Secondly, whereas at Jarash all three niches are semicircular, at Taormina only the outer ones are semicircular, while the central one is a wide rectangular niche containing a triple doorway. As I have argued elsewhere this feature links the theatre at Taormina stylistically to the theatre at Beneventum and ultimately to the Theatre of Pompey in Rome.²⁹ However the triple doorway was short-lived and for most of the second and early third centuries AD architects preferred the simpler design of three curved niches, as is found at Jarash.

As for other theatres in Arabia and near-

by provinces with related features, the animated profile of the *scaenae frons* of the theatre at Philadelphia (Amman), which seems to date to the Antonine period, is also formed by the podia and *columnatio* alone.³⁰ As at Jarash the *scaenae frons* is rectilinear, but because the *scaenae frons* has all but disappeared it is impossible to tell whether there were columns slotted into the wall. Parts of the eastern *aditus maximus* and the east end of the stage of the Roman theatre at Heliopolis (Baalbek) were revealed in an excavation in 1904.³¹ The podium arrangements are similar to the South Theatre at Gerasa: a rectilinear *scaenae frons* with a podium forming projecting curved niches. The sharp cut-off of the podium on the west side looks rather like the central break in each podium in the South Theatre at Gerasa. Finally, it has come to my attention that the scene building of the theatre at Hierapolis in Asia Minor has recently been cleared to reveal a rectilinear *scaenae frons* with five doorways, the central three enclosed in curving podia. The

29. F.B.Sear, *loc.cit.*: 687-96.

30. The architrave of the *scaenae frons* bore an inscription in Greek commemorating Antoninus Pius. A headless statue of an emperor in armour, perhaps Antoninus Pius and a draped female statue of Faustina Major filled two niches of the *scaenae frons* (F.el Fakharani, 'Das The-

ater von Amman in Jordanien,' *ArAnz* 90, 3, 1975: 377-403).

31. B.Schulz, H.Winnefeld, *Baalbek. Ergebnisse der Ausgrabungen und Untersuchungen in der Jahren 1898 bis 1905*, i. Text (Berlin-Leipzig 1921): 42-3.

building was completed at the time of Hadrian, although the *scaenae frons* was rebuilt at the time of Septimius Severus.³²

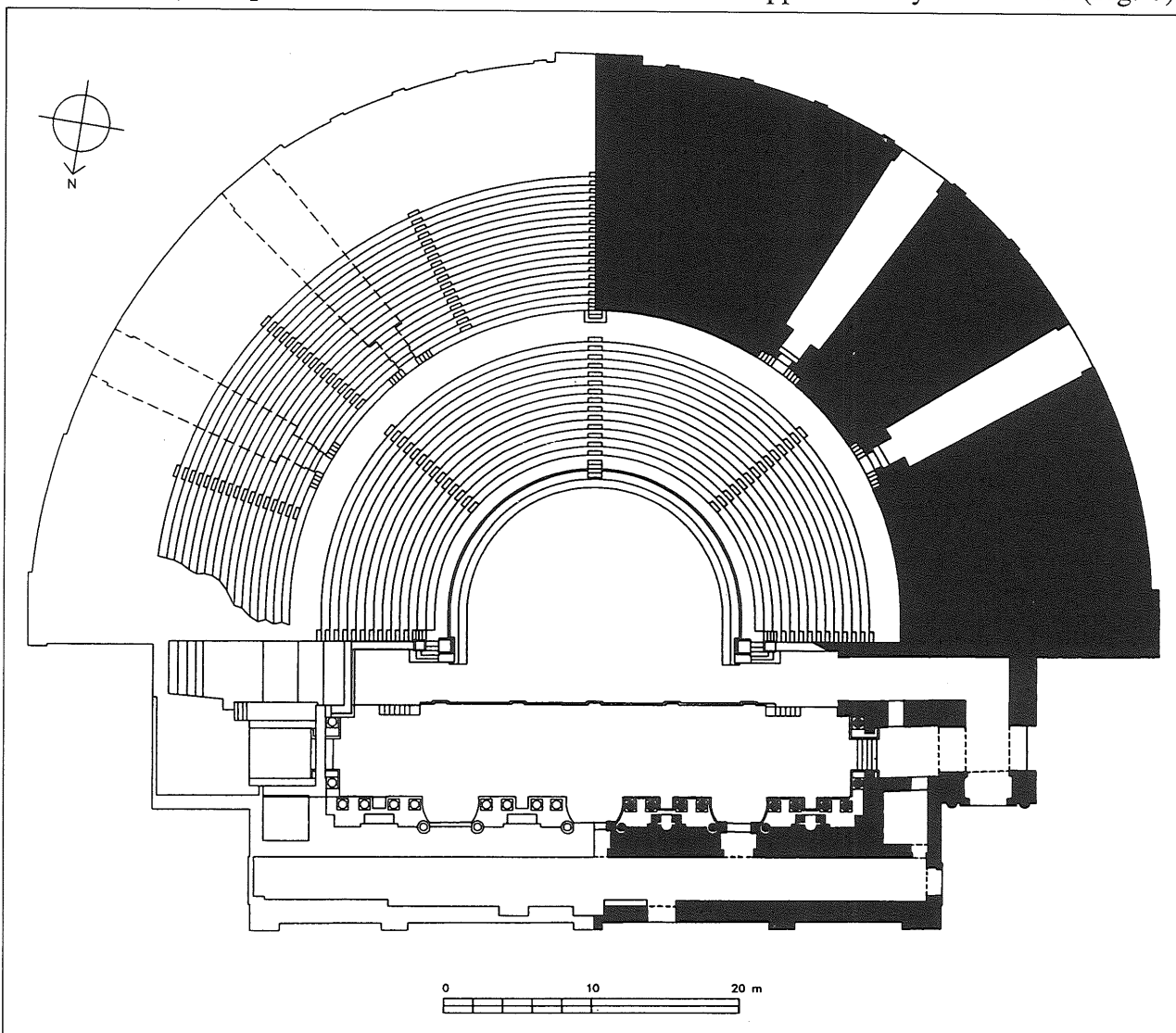
The 1994 Campaign

These unusual design features were the starting point of our interest in the South Theatre at Jarash. The first step was to make a detailed study of the building and to produce detailed plans, sections and drawings of it. However as our preliminary survey proceeded it became clear that this is an exceptionally well-preserved theatre with not only a very complete *cavea*, but with an

enormous quantity of well-preserved architectural material belonging to the *scaenae frons* behind the theatre. It seemed to us that the sheer quantity of material which had survived warranted a total restoration of the building, at least on paper. The following is a brief description of the various parts of the theatre with some indications of what form the restoration might take.

The Cavea

The South Theatre faces north and rests against the hill of the Temple of Zeus. It has a *cavea* approximately 76 m wide (Fig. 7).



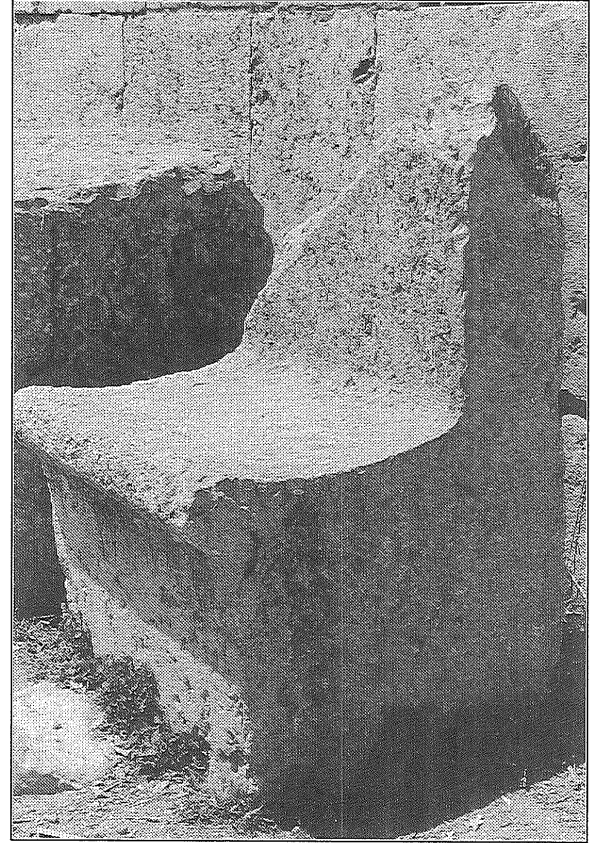
7. Plan of the South Theatre at Jarash (Andrew Hutson, Zig. Kapelis).

32. P. Verzone, 'Hierapolis di Frigia nei lavori della Missione archeologica italiana.' Pp. 396, 417-

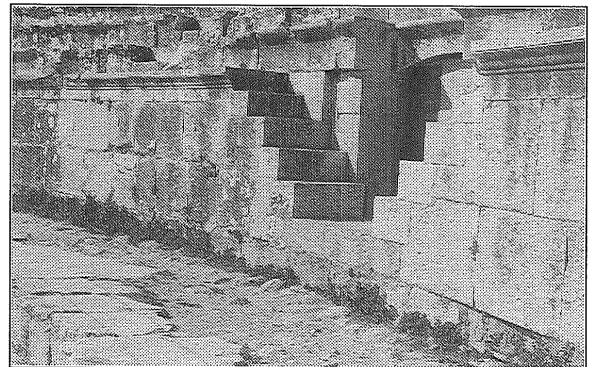
22, 426-36 in *Un decennio di ricerche archeologiche*, I, Rome 1978.

The *ima cavea* cut into the hillside has 14 rows of seats, divided into four *cunei*. The seats of the outer *cunei* are numbered, starting from the bottom row, from right to left, from A to COH (=278). The lettering shows at least three different hands. A *praecinctio* surrounded by a podium separates the *ima* from the *summa cavea*. The *praecinctio* is 2.19 - 2.21 m wide, including the top row of backless seats, which are 32 cm deep. Behind them is a space, 33-34 cm wide, which was used as a foot-rest for the row behind. The row behind, the top row of seats of the *ima cavea*, had high backs which suggests that they were for persons of importance. Most of these seats have disappeared, although 15 fragments can still be seen at intervals along the corridor. They are 56 cm deep, including the overhang at the front and 49 cm without it. When placed over the cuttings behind the top row of seats they reduce the width of the *praecinctio* to 1.04 - 1.06 m. The best-preserved seat (the last one on the west side) has a back 87 cm high and a seat 44 cm high (Fig. 8). The back is broken at the top and was originally somewhat higher. On the analogy of similar high-backed seats in the theatre of 'Amman and the West Theatre at Umm Qays, the Jarash seat can be restored as a little over a metre high.³³ The floor level of the *praecinctio* was probably at the bottom of the two rows of orthostates which form the podium around the *praecinctio* (Fig. 9). This is about 29 cm above the level of the foot-rests of the seats with high backs. Thus the paving of the *praecinctio* would have been about 70 -75 cm below the top of the backs of the seats around the *praecinctio*. These would have formed a kind of inner wall to the *praecinctio*. The diverging staircases built into the thickness of the podium wall separating the *ima* from the *summa cavea* look extremely odd because they are totally

exposed to view (Fig.9). Normally one would expect a thin section of walling to hide them as can be seen for example in both the large and small theatre at Amman, the theatre at Philipopolis, and the theatre at Bostra. The present arrangement looks very much like Butler's restoration of the



8. Part of a high-backed seat in the *praecinctio* between the *ima* and the *summa cavea* (174.26).



9. Staircases linking the *ima* and *summa cavea* (173.14A).

33. At Amman the back is 1.08 m high and the seat 47 cm high x 57 cm deep. At Umm Qais the

seat is 43 cm high and the back 1.12 m high x 65 cm deep.

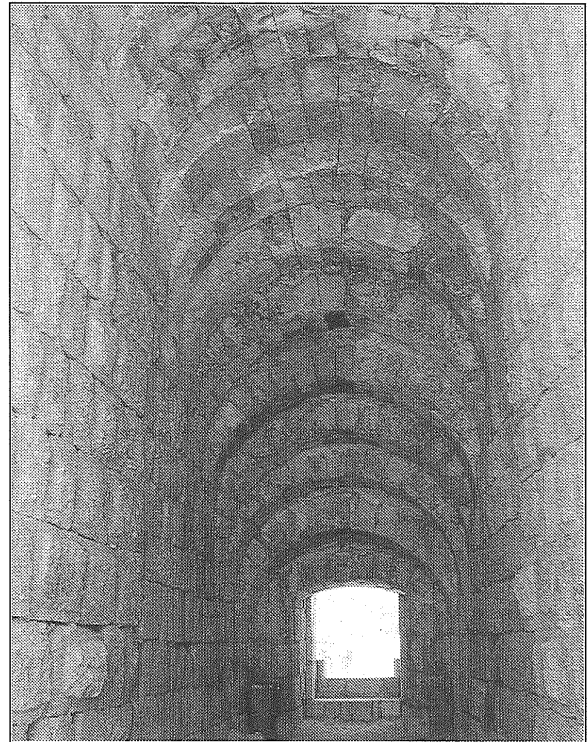
large theatre at Amman.³⁴

The hillside flattens out a little above the level of the *praecinctio* with the result that the *summa cavea* had to be supported on an *aggestus* or earth fill. The fill, which probably came mainly from the earth removed to shape the *ima cavea*, was contained by the heavy walls of the *analemmata*. It was further compartmentalised by six pairs of walls between which are passageways leading from the hill behind the theatre into the *praecinctio*. These passages are vaulted over with rising vaults composed of a series of stone arches, which correspond to the rows of seats above them (Fig. 10). The *summa cavea* is divided by staircases into 8 *cunei* and has been restored with 15 rows of seats, bringing the present overall height of the theatre, measured from the orchestra, to 16.28 m.

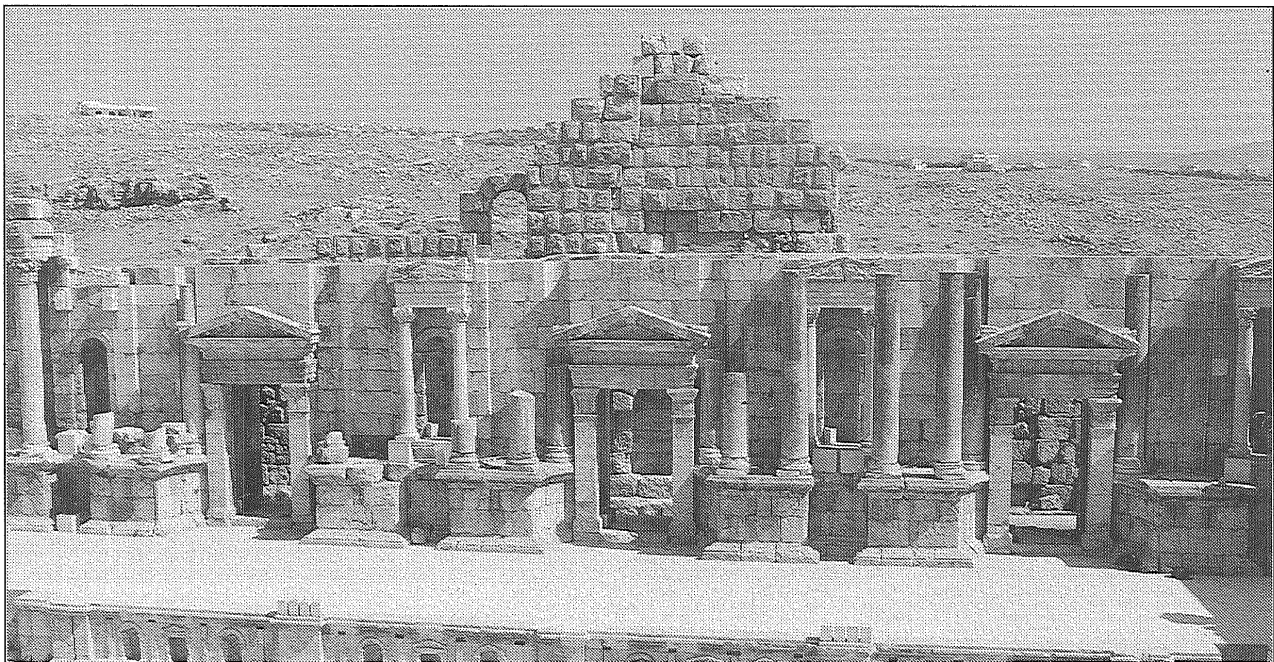
Orchestra and Proscenium Wall

The orchestra, 19.91 m in diameter, is paved with stone. The *proscenium* wall is 1.51 m high at the west end, 1.56 m high at the east, and because of the slope of the orchestra it is 1.61 m high in the middle. It is

divided by five broad pilasters, 87 cm wide x 16 cm deep, into four sections in each of which is a small pedimented niche and a pair of round-headed ones (Fig. 11). Con-



10. Passage into the *praecinctio* from outside the *cavea* (174.21).



11. General view of the *scaenae frons* (173.34A).

34. H.C.Butler, *PUAES*, Div.2 - *Ancient Architecture in Syria*, Sec.A - *Southern Syria*, Leyden 1907: pl. IV.

tinuous base and cornice mouldings run along the whole stage front following the projections of the pilasters. At each end of the stage is a staircase rising away from the centre of the orchestra. The staircases have treads, 60 cm wide and mainly 32.5 cm deep with risers mainly 22.5 cm high. There are six risers.³⁵ The stage is 6.32 m wide to the podia which support the *columnatio* and 8.36 m to the back wall.

The Doorways in the Scaenae Frons

The rectilinear *scaenae frons* wall is pierced by three doorways, 1.82-1.86 m wide flanked by square pilasters 49-50 cm wide (Fig. 11). The pilasters have 3-sided square capitals, 69 cm high and about 51 cm wide at the base. The capitals have two acanthus leaves on each face and 7 vertical channels, which are also a feature of the friezes of the *columnatio*. They support an entablature with a 3-stepped architrave, 60 cm high, and a frieze, 37 cm high, decorated with vertical channels capped with an egg-and-dart carved from the same block. The cornice, 23 cm high, has a row of small square dentils at the bottom, an egg-and-dart, modillions and coffered panels with flowers and an egg-and-dart framing them. On the corona is the vertical channel motif with a bead-and-reel above. The raking cornice of the pediment is similar but with a cyma recta sima with palmettes. In the tympanum is a disc.

The Niches in the Scaenae Frons

Flanking each doorway is a round-headed niche framed by a pedimented *aedicule* supported on two columns (Fig. 11). There are four niches on the lower storey and the architectural fragments behind the theatre suggest that there were corresponding niches in the storey above. The shell block from the head of the niche, which includes the hood moulding is 1.30

m wide x 65 cm high. The hood moulding is 22.50 cm wide including the cyma recta moulding at the top. There is also a horizontal cyma recta moulding at the bottom of the head of the niche which runs round across the top of the 'pilaster' at the side of the drum, which is also 22.50 cm wide. There are flat pilasters at the sides of the niche, 61 cm wide, each with a capital consisting of an ovolo and a big cyma recta. In front of each niche is a pair of columns each on a square podium. The shafts are 2.75 m high and taper from 40 cm to 37 cm. The architrave has two fascias and is capped by a cyma reversa. The frieze has vertical channels or flutings and is carved out of the same block as the architrave. Above it is an egg-and-dart, which is carved out of the same block as the pediment which has a running acanthus scroll with flame palmettes at the corners.

The Podia and Columns of the Columnatio

The *columnatio* originally had two storeys with a sloping roof extending over the area of the stage. There were 26 columns on each storey, including the ones flanking the doorways at each end of the stage, as well as the 8 smaller columns flanking the niches - a total of 68 columns for the whole *scaenae frons*. The columns on the west side of the *scaenae frons* are 5.23 m high, including base and capital; those on the east side are 5.31 m high. The columns rest on four podia, 1.89 m high x 2.04 m deep, and are arranged four to a podium. The central pair of columns is more widely spaced than the outer pair and each podium is cut back in the middle. The edges of the podia nearest to the doorways and the corresponding entablatures curve round to enclose the doorways giving the impression of a niche, even though the *scaenae frons* wall is in fact rectilinear. Pairs of columns at the ends of the podia nearest to the doorways, slotted into

35. These staircases have no outer wall to hide them and are totally modern. I am suspicious of them.

Also note that a large amount of the *pro-scaenium* wall is modern restoration.

semicircular recesses in the *scaenae frons* wall, serve to emphasise this illusion. The column bases (including plinth) are mostly 82 cm wide x 32 cm high, but the height can vary between 31- 42 cm. The lower diameter of the columns is 62 cm, including anathyrosis; without 57 cm. The shafts vary between 4.06 - 4.32 m high (there is a complete column shaft in the *postscaenium*, which is 4.24 m high).³⁶ The capitals vary in height between 66 -77 cm high. The slotted columns have round bases, 36 - 41 cm high, and shafts 4.04 - 4.26 m high.

The Entablature

The architrave of the lower order projects 1.14 m from the wall face at the west end (Fig. 4). One end of the projecting block, 1.80 m long, is engaged into the wall, while the other end rests upon a column. The rear 92 cm of the block, engaged into the wall, is uncarved, while the projecting 88 cm is carved. At the front it is joined to another block 2.24 m wide x 26 cm wide at the bottom, which rests upon a pair of columns and is carved on three sides. The width of the soffit is 50 cm. The overall height of the architrave is 57 cm. The friezes are less than 40 cm high.

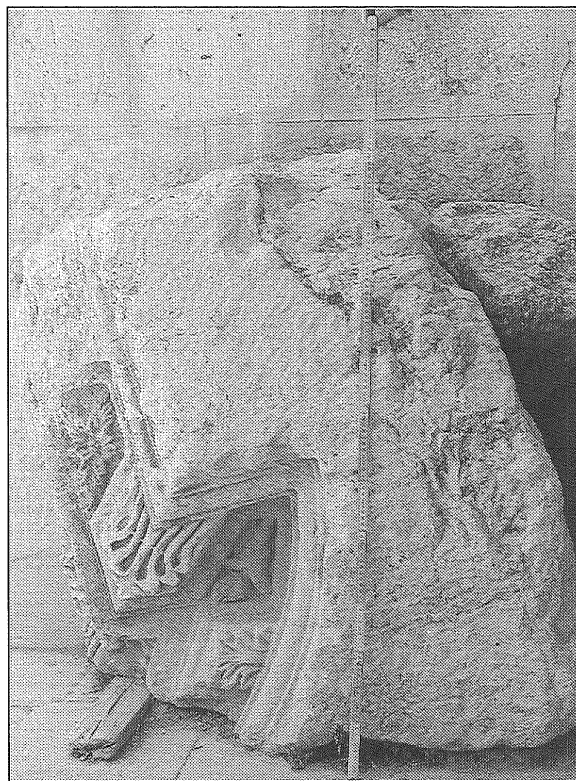
Cornices

The cornices of the lower order are 57-59 cm high, with dentils about 6.5 cm square, and an undecorated ovolo above. The modillions have acanthus scrolls on their undersides and are 12-13 cm wide x 12-13 cm deep x 6 cm high at the back. They are 19 cm apart, and in between is a coffer with a flower in the middle. Around coffer and modillion runs a rough ovolo unadorned. On the corona are vertical channels, 6 cm high with a bead-and-reel above. The sima is a cyma recta, 18 cm high, decorated with alternately

flame and upright palmettes. There are two fragments in the east *aditus* (Fig. 12). One is from a corner and measures 63 x 78 cm on the underside (without the dentils) and the other is from an inner angle of one of the curved niches. It has a curved section 57 cm long; a projection of 28 cm and a straight section 44 cm long. Its decorative detail is like the first fragment.

Architectural Fragments behind the Postscaenium

Behind the *postscaenium* are large numbers of architectural blocks, most of them identifiably from the *columnatio*. In the short time available after we had surveyed the cavea and the scene building we examined these blocks in order to estimate whether a restoration of both orders of the *scaenae frons* would be feasible.³⁷ The ma-



12. One of the cornice fragments in the eastern *aditus* (175.22).

36. In some cases the wrong capital has been restored. For example the column on the south side of the door at the east end of the stage is about 18 cm too low.

37. I am referring to a paper restoration, although a physical anastylosis of the *columnatio* may also prove possible.

terial proved to be embarrassingly rich and a preliminary examination suggested that very few of the architectural components of the lower storey of the *columnatio* were missing. In addition to the parts of the *columnatio* which have already been restored innumerable other fragments, demonstrably belonging to the lower order, were identified. Frieze blocks were the main components of the lower storey which were conspicuously lacking. This may explain why the restoration of the *columnatio* extends only as far as the architraves. The restored lower order of the *columnatio* has ten columns missing or incomplete. However behind the *postscaenium* there is a number of column drums about 57- 8 cm in lower diameter tapering to 53 cm which may belong to the lower order. A large number of architrave and cornice blocks from the lower order survive and because the portions which were inserted into the wall face are left uncarved it may be possible to assign them more or less to their original position. The main aim of a future campaign will be to make a detailed inventory of the blocks and, having assigned those which demonstrably belong to the lower order, to identify the material belonging to the upper order. A preliminary examination suggests that a great deal can be learnt about the upper order from the surviving fragments. They are of similar type to those of the lower order, but smaller in scale. The upper order probably had columns 4.20 m high with shafts about 47 cm in diameter. The upper order, like the lower, was probably Corinthian to judge by a capital with an underside about 43 cm in diameter. Another find was a small column base with a plinth approximately 58 cm across, which seems of the right scale for the upper order. Another column base on a plinth has an upper torus, 50 cm wide, which suggests a column with a lower di-

ameter of about 45- 47 cm. Large numbers of three-stepped architrave blocks, between 45 - 49 cm high, presumably belong to the upper order. Although few frieze blocks from the lower order have turned up, a large number of frieze blocks, on average about 30 cm high, apparently belonging to the upper order, have been identified. There are several upper cornice blocks with dentils and consoles, mainly 43 - 44 cm high. There are several complete shell niches, one metre wide including mouldings, with flanking pilasters, 14.5 cm wide. As the fragments make up more than four niches, it is likely that there may have been seven niches in the upper storey, four corresponding to the niches of the lower storey and three over the doorways.

Towards a Reconstruction

The lower order consists of podium (1.89 m high), columns (on average 5.27 m high), architrave (57 cm high), frieze (c. 40 cm high) and cornice (57 cm high). Therefore the total height of the lower order from stage level to the top of the cornice is 8.70 m. The upper order probably had podia about 90 cm high,³⁸ columns 4.20 m high, architrave 46 cm high, frieze c. 30 cm high, cornice c. 44 cm high—a total height of 6.30 m. The overall height of the *scaenae frons* must therefore have been about 15 m. Including the stage, at 1.54 m, the overall height measured from the bottom of the podium running around the orchestra in front of the *proscenium* wall would have been 16.54 m.

The *cavea* is 16.28 m from the orchestra to the top surviving seat. However there is room for many more rows of seats. The distance from the outer wall of the *cavea* to the edge of the rim of the top surviving seat is 7.80 m. As the seats near the top of the *cavea* are 46 cm high x 66 cm deep and their edges project 10 cm, there is 7.14 m to the rim of

38. Vitruvius prescribes that the height of the upper podia should be half that of the lower (*De Arch.* 5.6.6).

the seat above or the back of the top surviving seat block. If we assume a wall, 1.50 m thick around the top of the *cavea* and a *praecinctio*, 1.02 m wide (like the lower one) then there is a space, 4.62 m wide, for further seating, 7 rows in all, adding another 3.22 m to the height of the *cavea*. To this we should add a further 1.50 m for a protective balustrade around the top of the *cavea*, making the *cavea* 21 m in total height, measured from the orchestra.

Some of these calculations may have to be modified when all of the fragments have been measured and studied more closely and when a complete inventory has been made. However it seems likely that, if we assume a stage roof sloping at about

22.5° and about one metre thick including roof tiles, the overall height of the stage building to the apex of the roof would have come to almost exactly the same height as the balustrade around the top of the *cavea*. This is what Vitruvius prescribes³⁹ and what can be seen in a number of well-preserved Roman theatres of the second century AD such as those at Aspendos and Bosra.⁴⁰

Frank Sear,
Dept of Classics and Archaeology
The University of Melbourne
Parkville, Vic. 3052
Australia

39. *De Arch.* 5.6.4.

40. For Aspendos see D. De Bernardi Ferrero, *Teatri classici in Asia Minore*, 3, Rome 1970: 161-

174; for Bosra, see H.Finsen, *Le Levé du Théâtre Romain à Bosra* (Analecta Romana Instituti Danici, suppl VI,) Copenhagen 1972.

THE ROMAN 'AQABA PROJECT THE 1994 CAMPAIGN

by

S. Thomas Parker

Introduction

This report summarizes salient results of the first season of the Roman 'Aqaba Project (RAP). After some background, it turns to the project's goals and research design. The report then summarizes results from the project's excavation and regional survey. Finally, preliminary conclusions from this research are presented.

The first campaign was conducted from May 15 to July 6, 1994 under a permit granted by the Department of Antiquities. The project is sponsored by North Carolina State University and is affiliated with the American Schools of Oriental Research (ASOR) and the American Center of Oriental Research (ACOR). Principal funding for the 1994 season was provided by the National Endowment for the Humanities, an independent federal agency. Additional funding was provided by the National Geographic Society, Joukowsky Family Foundation, Samuel H. Kress Foundation, North Carolina State University, Kyle-Kelso Foundation, Institute of Classics of the University of Helsinki, IBM Corporation, and various private donors. Additional grants enabled four students to participate on the project. Elizabeth Ann Pollard Lisi and Elizabeth Stephens both received Jennifer C. Groot Fellowships in the Archaeology of Jordan. Kirsten Anderson received a fellowship from the Kyle-Kelso Foundation. Jennifer Blakeslee received a travel grant from the Endowment for Biblical Research. The author is grateful to all these agencies and individuals for their support.

Special thanks are due to Dr Safwan Tell, then Director-General of the Department of

Antiquities, Dr Fayez E. Khasawneh, President of the 'Aqaba Regional Authority, Dr Pierre Bikai, Director of ACOR, and Dr Donald Whitcomb of the University of Chicago. Their support is gratefully acknowledged.

The field team in 1994 consisted of 15 staff, 35 students, and 70 local Jordanians. Sawsan Fakhiry, Inspector of the 'Aqaba Region, served as representative of the Department of Antiquities. Senior staff included John Wilson Betlyon as Numismatist, Vincent Clark as Semitic Epigrapher, Dorianne Gould as pottery and small finds registrar, Nelson Harris as assistant camp manager, Janet Jones as glass specialist, Andrea Lain as human osteologist, Mary Mattocks as landscape architect and drafts person, Tina M. Niemi as geologist, Erick S. Parker as surveyor, S. Thomas Parker as director, stratigrapher, and ceramicist, Andrew M. Smith II as director of the survey, Michael P. Speidel as classical epigrapher and project advisor, Michelle Stevens as lithics specialist and survey archaeologist, Jonathan Tedder as photographer and videographer, Michael Tophlyn as faunal analyst, and Peter Warnock as archaeobotanist and camp manager. Area supervisors were Vincent Clark (Areas C and L), Dorianne Gould (Areas E, F, H, O and K), Mary Louise Mussell (Areas D and J), Joanne Ryan (Areas B, G, and M), and James Terry (Area A).

Student staff serving as trench supervisors included Kirsten Anderson, Heather Beckman, Jennifer Blakeslee, Ghida El-Osman, Mark Friedrich, Susan Dana Gelb, Christopher Groves, Jane Ann Hanck, Shery Hardin, Nancy Hulbert, Bradley Kurtz, Anne

McClanan, Sarah Morgan, Matti Mustonen, Brian Overton, Charles Parker, Megan Perry, Elizabeth Ann Pollard Lisi, Christopher Port, Alexandra Retzleff, David Simpson, Elizabeth Stephens, Joseph Stumpf, Lennart Sundelin, Will Tally, Laurent Tholbecq, Mary Turner, Jan Vihonen, Brian A. Wade, Joel Walker, Kristi Jo Warren, and Michele Zapanick. Marie Barnett and Mary Ann Schumpert were architect/surveyors. John Rucker served on the survey. Heather Beckman, Jennifer Blakeslee, and Elizabeth Ann Pollard Lisi were assistant registrars. Elizabeth Stephens supervised field processing of faunal and human osteological remains.

The Regional Environment

The project focuses on the region around the modern city of 'Aqaba, at the northern end of the Gulf of 'Aqaba (Fig. 1). The region lies within the great rift that extends southward through the Jordan Valley, Dead Sea, Wādī 'Arabah, Gulf of 'Aqaba, and beyond. 'Aqaba thus lies at the border between the southern end of Wādī 'Arabah and the northernmost extension of the Red Sea.

The contemporary climate is arid, with mean annual rainfall of 40 mm per annum confined to the winter months. It is also characterized by high temperatures, often exceeding 40 degrees C in summer. Despite the aridity of the region, fresh water is available through tapping groundwater just below ground surface. 'Aqaba is surrounded by deserts—Sinai to the west, Negev to the north, and Ḥismā in southern Jordan and northwestern Saudi Arabia to the north-east and east.

The coastal plain is ringed by mountains to the north-west and north-east, but lies open via Wādī 'Arabah to the north and is accessible via Wādī al-Yutum to the north-east. Steep gorges have been eroded into the mountains flanking Wādī 'Arabah by flash floods from torrential winter storms carrying sediment. At the mouths of these drainages

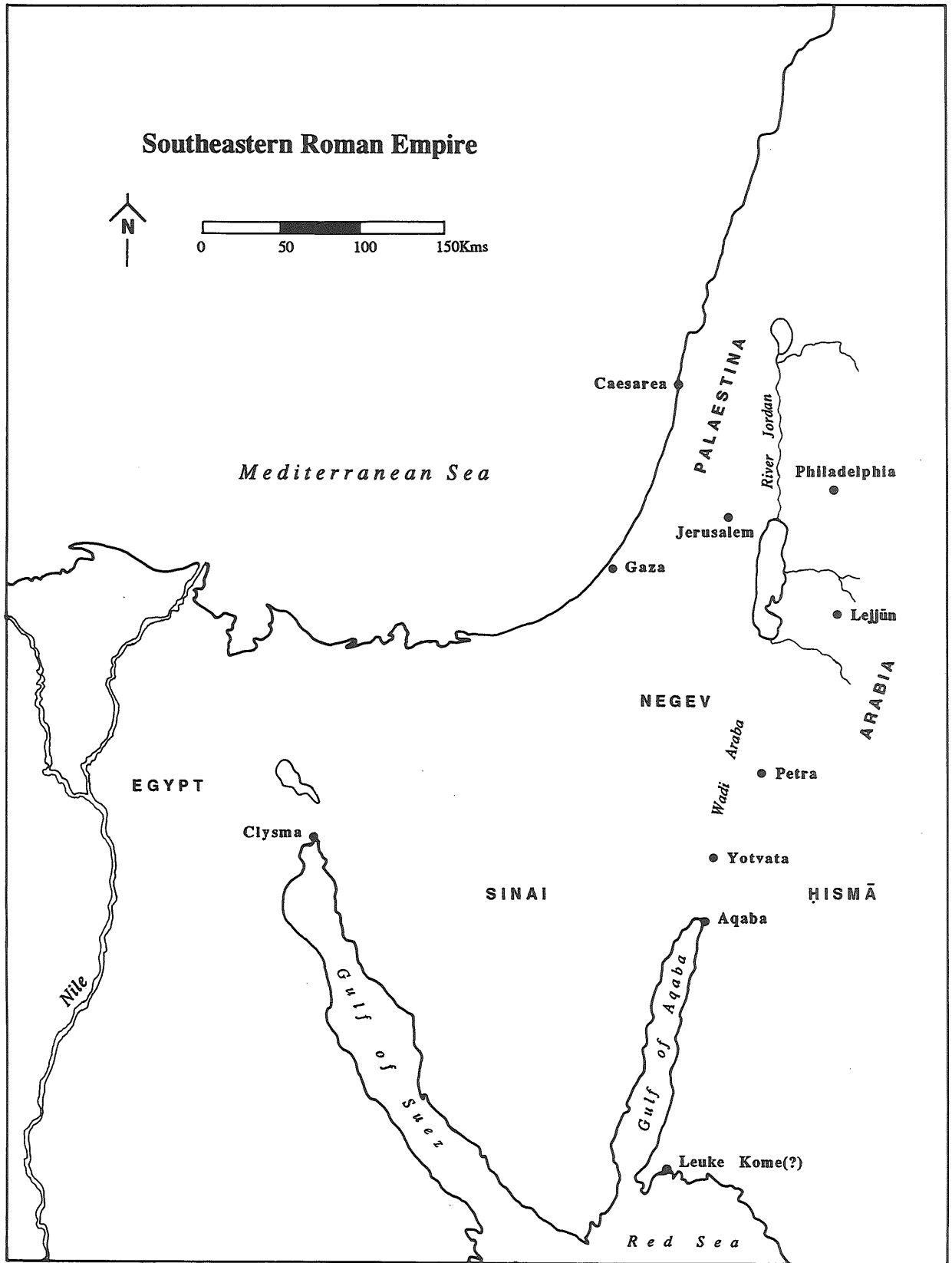
large alluvial fans have been formed by these accumulated sediments and radiate into Wādī 'Arabah, including around 'Aqaba. Modern flood control works divert run-off from the modern city of 'Aqaba, which is built largely on older alluvial sediments (Niemi 1995).

The site lies in an active tectonic zone and has experienced several earthquakes in historic times. Tectonic motion along the fault zone has subsided the valley floor and lifted the flanking mountains. The eastern mountains are Precambrian granites. Many igneous dikes, of varying composition from diabase to felsite, have cut through the granites. North of 'Aqaba and overlying the Precambrian granites are the so-called Nubian sandstones (Cambrian to Silurian). Erosion of these sandstones has created large dune fields in Wādī 'Arabah beginning ca 50 km north of 'Aqaba. The mountains west of 'Aqaba are composed largely of Cretaceous limestone, sandstone, and dolomite. The limestones are frequently interbedded with chert, shale, and phosphate. The valley floor extending to the gulf is covered with sediment derived from alluvial fans and mudflats. These sediments date from the Pleistocene to the Holocene (Niemi 1995).

Historical Sources

Numerous historical sources refer to Aila (Schertl 1936). Some of the more important are presented below. A variety of variant spellings is attested for the site in these sources, including Aila, Ailana, Aelana, Elana, Haila, Ailath, etc. For consistency in this and all subsequent reports, and by agreement with Donald Whitcomb, the Nabataean/Roman/Byzantine city will be referred to as "Aila". The adjacent Early Islamic walled town will be called "Ayla".

Diodorus (ca 60-30 BC), probably relying on earlier Hellenistic sources, mentions that around the coast of the Gulf of 'Aqaba "are many inhabited villages of Arabs who are known as Nabataeans. This tribe occupies a



1. Location map of 'Aqaba and Wādī 'Arabah.

large part of the coast and not a little of the country which stretches inland, and it has a people numerous beyond telling and flocks and herds in multitude beyond belief." He also states that these Nabataeans lived off their flocks but also preyed on merchant shipping in the Red Sea (Diodorus 3.43.4, Loeb transl).

The most important early evidence on Aila is Strabo's *Geography*, from the early first century AD. Strabo confirms that the region was inhabited by Nabataean Arabs, who were pastoralists but also engaged in piracy until suppressed by Ptolemaic naval forces (*Geography* 16.4.18). His first explicit mention of Aila is in reference to its distance to Gaza, from which

is said to be an overland passage of 1,260 stadia to Aila, a city (Greek *polis*) situated near the head of the Arabian Gulf. This head consists of two recesses: one extending into the region near Arabia and Gaza, which is called Ailanites, after the city situated on it, and the other, extending to the region near Egypt... the overland journeys are made on camels through the desert and sandy places (*Geography* 16.2.30, Loeb transl.).

Elsewhere, describing the southern Arabian peninsula, Strabo mentions that frankincense, myrrh, and other aromatics from south Arabia were sold to merchants who arrive "in 70 days from Ailana (Ailana is a city on the other recess of the Arabian Gulf, the recess near Gaza called Ailanites, as I have said before)" (*Geography* 16.4.4).

Aila is also mentioned by the Elder Pliny (*NH* 5.12), Josephus (*AJ* 8.6.4 [8.163]), and Ptolemy (*Geography* 5.17.1).

Trajan's annexation of Nabataea in AD 106 as the Roman province of Arabia brought Aila under direct Roman rule. The *via nova Traiana*, which extended from the borders of the Roman province of Syria

through Arabia to its southern terminus at Aila, was completed between AD 111 and 114. Two milestones of the *via nova Traiana* have recently been discovered at 'Aqaba itself, dated 111/112 (MacAdam 1989: 172).

The partition of provincial Arabia by Diocletian (284-305) transferred southern Transjordan, including Aila, to the province of *Palaestina*. Several Late Roman and Byzantine sources provide important details about the city. Eusebius, ca 290, mentions that Aila was located on the outer borders of Palestine, that commercial traffic from India and Egypt passed through Aila, and that *legio X Fretensis* (formerly based at Jerusalem) was then garrisoned at Aila (*Onomast.* 6.17-21). A fragmentary monumental Latin building inscription of ca 317-326, discovered in the early Islamic town, may reflect the legion's presence at Aila (MacAdam 1989). The legion was posted at Aila until at least the turn of the fifth century (*Notitia Dignitatum Or.* 34.30).

The Peutinger Table, a Late Roman road map, shows Aila (Haila) at the junction of several important land routes: one north through the Negev into Palestine, another basically following the *via nova Traiana* northeast into Transjordan, and a third westward across southern Sinai towards Egypt.

The first literary evidence of Christianity at Aila is attested in 325, when a bishop of Aila attended the Council of Nicaea. Later bishops are listed at church councils in 451 and 536 (Abel 1967: v.2, 201). Another bishop of Aila from the early seventh century is attested among the Nessana papyri in the Negev (Kraemer 1958: 146, no. 51). A Christian Greek epitaph dated 555 has also been reported at 'Aqaba (Schwabe 1953).

Procopius of Caesarea (late sixth century) mentions Aila as a city on the shore of the Red Sea at the head of a narrow gulf (i.e. the Gulf of Aqaba; *B. P.* 1.19.3, cf. 1.19.19). He states that Roman vessels sailed from Aila into the Red Sea (1.19.23). Aila is also mentioned by several other Byzantine writers,

some of whom describe the city as a station for pilgrims en route to Mount Sinai. One such pilgrim, ca AD 570, states that "from Mount Sinai it is eight staging posts to Arabia, and the city called Aila. Shipping from India comes into a port at Aila, bringing a variety of spices" (Antoninus Placentius, # 9, *CCSL* 175: 149). The architect who designed St. Catherine's monastery at Mount Sinai in the mid-sixth century is described in an inscription as "Stephanus, son of Martyrios, builder and architect of Aila" (Sevcenco 1966: 257, 262, no. 3).

Muslim rule over Aila began in 630, when Yuhanna ibn Ru'ba, perhaps the bishop of Aila, negotiated its surrender at Tabuk with the Prophet Muhammed himself. Of special note is the guarantee offered by the Prophet for the protection of Aila's ships and caravans on land and sea (Zayadine 1994: 499), suggesting continued importance of commerce in Aila's economy on the eve of the Muslim invasion. Soon after, ca 650, the Muslim founded a new fortified town less than 1 km to the south-east. Recent excavations have revealed that this Early Islamic town flourished from the mid-seventh to early thirteenth centuries AD (Whitcomb 1986, 1987, 1988a, 1988b, 1989a, 1989b, 1989c, 1993, 1994, 1995). A suggestion that the walled Early Islamic town represents the reused Roman legionary fortress of *legio X Fretensis* (Knauf and Brooker 1988) has rightly been rejected (Whitcomb 1990).

The Arab geographer Shams ad-Din Muqaddasi visited Early Islamic Ayla in the tenth century AD and reported that the city "is usually called Ayla, but [the true] Ayla is in ruins nearby, about which it is written 'Ask them concerning the town by the sea.'" (Khouri and Whitcomb 1988: 11). It has reasonably been supposed that Muqaddasi was looking from the Early Islamic town northwest to the ruins of the Roman and Byzantine town, by then abandoned and in ruins (Khouri and Whitcomb 1988: 12). As seen below, new evidence from the current pro-

ject supports this interpretation. A fifteenth century Arab chronicler, al-Maqrizi, mentions an arched gate just outside Ayla that he attributes to the Romans (Zayadine 1994:488).

The early Islamic town was abandoned in the early thirteenth century AD. A new settlement appeared ca 1 km farther south down the coast around the present Hashemite castle. This Late Islamic settlement included the castle (as a caravan station), date palm plantations, and fishing village reported by various travellers (Khouri 1988: 140-41; Whitcomb 1994: 7; Zayadine 1994: 501).

Previous Research

The region of 'Aqaba was until recently little known archaeologically. Some useful information may be gleaned from travelers who visited the site in the nineteenth and twentieth centuries and from prior scholarly research in the region.

Among the earliest travelers to visit 'Aqaba was Eduard Rüppell in 1822, who reported seeing ruins called Gelena (Rüppell 1829: 248ff). He was followed by Leon de Laborde in 1828 (Laborde 1836: 45). Edward Robinson reached 'Aqaba from Sinai in April, 1838. As he traveled around the northeastern head of the gulf he reported that "the extensive mounds of rubbish, which mark the site of Ailah, the Elath of Scripture, were on our left. They present nothing of interest, except as indicating that a very ancient city has here utterly perished." (Robinson 1841: 241). Other early visitors included E. Joy Morris in 1840, who also saw mounds of ruins on the edge of the sea (Morris 1842: 262).

One important early visitor was Richard Burton, who reached 'Aqaba by sea in 1878:

Inland and to the north rise the mounds and tumuli, the sole remains of ancient Elath, once the port of Petra, which is distant only two dromedary marches. During rain-floods the site is an island:

to the west flows the surface-water of the Wady el-'Arabah, and eastward the drainage of the Wady Yitm has dug a well defined bed. A line of larger heaps to the north shows where, according to the people, ran the city wall: finding it thickly strewn with scoriae, old and new, I decided this was the *Siyághah* or "smith's quarters." Between it and the sea surface is scattered with glass, shards, and slag (Burton 1879: 240).

Among several valuable observations are the supposed line of a city wall on the northern side of the site and the quantity of slag and "scoriae" on the surface. Also notable is Burton's remark about problems posed by surface water flowing around the site. He later notes that the locals had constructed earthen dams to divert water away from the town and its date palm plantation (Burton 1879: 241). Morris, Burton, and Charles Doughty, who visited 'Aqaba ca 1876, all reported seeing a wall or crude masonry dam built across the mouth of Wādī al-Lithm (i.e. Wādī al-Yutum; Morris 1842: 265; Burton 1879: 241; Doughty 1936: 84-85).

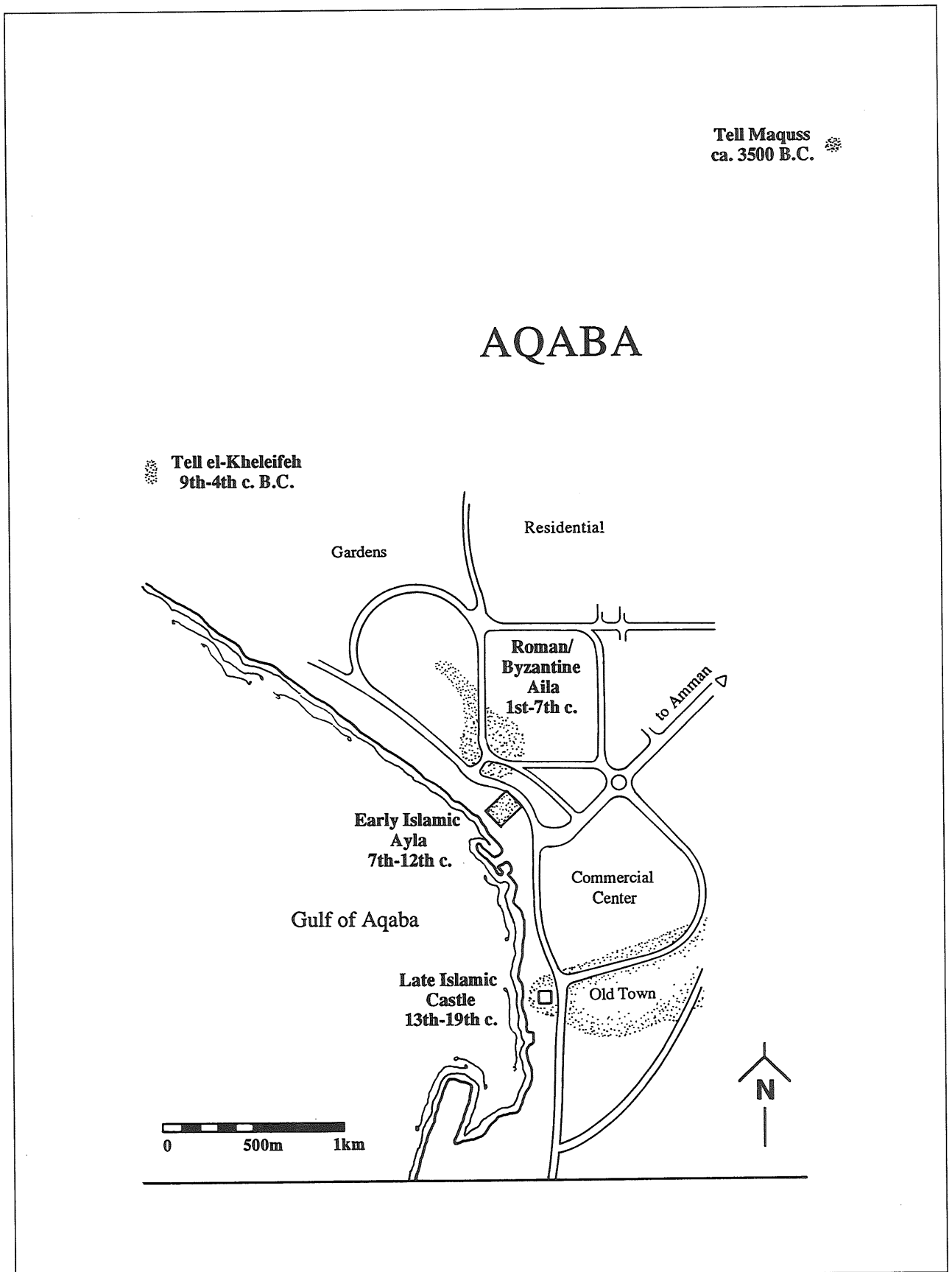
T. E. Lawrence visited 'Aqaba in 1913. He suggested that visible surface ruins and scattered artifacts represented "an Arab settlement of some luxury in the early Middle Ages" (Woolley and Lawrence 1936: 144). It now seems clear that he correctly located the Early Islamic settlement of Ayla. Of special interest is his observation that "There are remains a little farther inland, and these represent probably a small village outside the gates of the larger place." (Woolley and Lawrence 1936: 144). Recent work now suggests that these remains are in fact the classical Aila.

Fritz Frank visited the region during his survey of Wādī 'Arabah in 1933. He apparently was the first scholar to notice the low-lying mound of Tall al-Khalayfi, located 550 m north of the modern shoreline, ca 2 km NW of Aila and ca 3.5 km NW of the Late Is-

lamic castle at 'Aqaba (Fig. 2). He suggested that Tall al-Khalayfi, which seemed to be of pre-classical date from its surface pottery, was in fact Solomon's port of Elath/Ezion-geber (Frank 1934: 243-45).

Nelson Glueck surveyed the region in 1934 and 1936, then conducted extensive excavations at Tall al-Khalayfi in 1938-1940. During his initial visit to 'Aqaba he noted that "About a kilometre west-northwest of 'Aqabah (i.e. the late Islamic castle) we came upon a very large site, thickly strewn with sherds, which has been correctly identified with the Roman Aila. The site was, however, originally Nabataean, being covered with large quantities of Nabataean sherds of all kinds. In addition there were large quantities of Roman, Byzantine, and mediaeval Arabic sherds. Some fragments of glass were found, which are probably Roman in origin....No sherds earlier than Nabataean were found at Aila." (Glueck 1935: 46-47). A second visit in 1936 confirmed the absence of pre-classical pottery from the site. He also recorded two Byzantine capitals with bas-reliefs recently found at 'Aqaba, perhaps from a Byzantine church. Greek inscriptions carved over each warrior-saint identified them as St. Theodore and St. Longinus (Glueck 1939: 1-3).

Glueck's excavation of Tall al-Khalayfi yielded valuable evidence of the Iron II and Persian periods. He initially dated the foundation of the site to the tenth century BC and accepted Frank's identification with Biblical Elath/Ezion-geber. Finds of imported Greek pottery and Aramaic *ostraca* pushed the *terminus* of occupation into the fourth century BC. Although he reported a "few Nabataean sherds" from the surface of the site (Glueck 1939a: 3), no evidence of Nabataean occupation or artifacts was ever reported from the excavations. He also stressed the importance of copper-processing in the site's economy. Glueck produced a fine record of published preliminary reports (Glueck 1935; 1938a; 1938b; 1939a; 1939b; 1940), but no final re-



2. Map of the modern city of 'Aqaba, with ancient and Medieval archaeological sites .

port appeared before his death. In his last published statement about the site in 1965, Glueck expressed some caution about his initial interpretations but continued to assert that Tall al-Khalayfi could have been Elath/Ezion-geber or at least was “a fortified industrial, maritime, storage and caravanserai for both.” (Glueck 1965: 71).

A recent reappraisal of Glueck’s work has cast doubt on his proposed identification of Tall al-Khalayfi as Solomon’s port of Elath/Ezion-geber. Pratico’s reinterpretation of the pottery now suggests occupation no earlier than the eighth century BC and continuing into the fifth or perhaps fourth century BC (Pratico 1993). A stamped Rhodian jar handle of ca 200 BC, a surface find, is the only published evidence for later occupation (Pratico 1993: 62).

Aurel Stein visited ‘Aqaba in April, 1939. He noted that the “ancient name of Aila clings to a mound stretching for about half a mile [ca 800 m] at a short distance from the northern extremity of the Gulf of ‘Aqaba.... The mound bears on its sandy surface an abundance of sherds which have enabled earlier visitors of archaeological competence to determine occupation of the site from the Nabataean and Roman periods down to mediaeval times.” (Gregory and Kennedy 1985: 304).

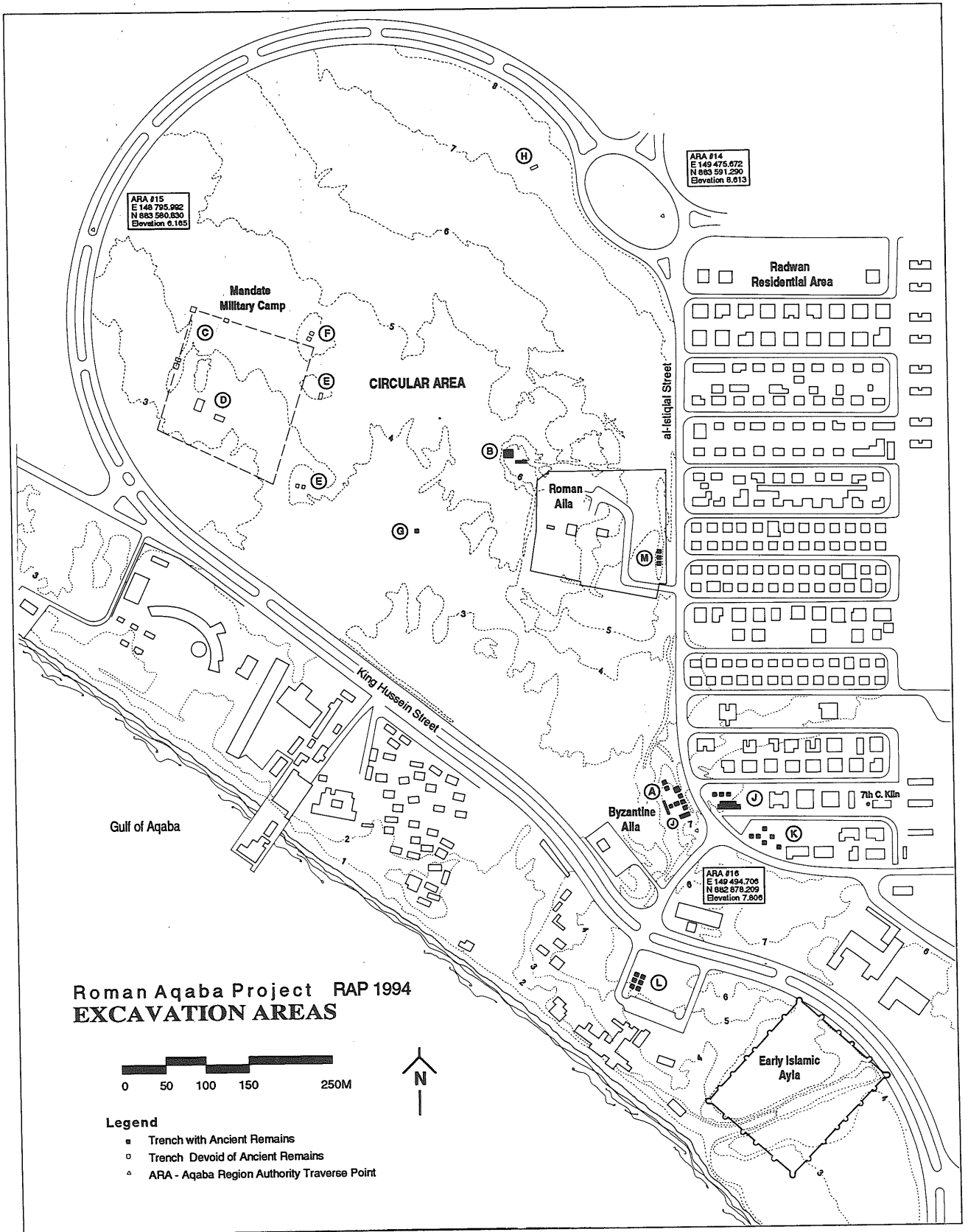
With the site of Aila seemingly well located by these early visitors, it seems surprising that its exact location was soon lost. Only a few years after Stein’s visit, Kirkbride and Harding visited the modern site known as “Aileh” and reported no sherds of the classical period. Further, they inspected a section of the site excavated to its lowest stratum by modern construction activity and claimed that this showed the site was no earlier than Byzantine (Kirkbride and Harding 1947: 24). The first archaeological excavation of ‘Aqaba was conducted in 1954 by Salim Saad, apparently just east of the present ‘Aqaba Hotel. He “uncovered what was thought to be a section of a city rampart, along

with Nabataean lamps and pottery sherds.” (Khouri 1988: 138). Unfortunately, both the artifacts and report of this work were shortly thereafter lost, and nothing was ever published (pers. comm. from Salim Saad).

The post-World War II era witnessed explosive growth of ‘Aqaba as Jordan’s only seaport and a tourist resort. Modern ‘Aqaba rapidly expanded from its old center around the Late Islamic castle northward over the archaeological site (Fig. 2). By the 1980’s it could truthfully be stated that “The site of Roman Aila is unknown.” (Gregory and Kennedy 1985: 429).

Although the precise location of the classical Aila was now a mystery, new excavations in the 1980s revealed important pre-classical and post-classical sites. In 1985 Khalil excavated Tall al-Maqasṣ, a small mound ca 4 km north of the present coastline near the modern airport (Fig. 2). The site, dated to the mid-fourth millennium BC, yielded evidence of copper-working (Khalil 1987; 1992). Rediscovery of Early Islamic Ayla began in 1986, when Whitcomb located a rectangular walled town on the beach, apparently founded in the mid-seventh century AD (Figs. 2 and 3). These results and scattered literary references suggested a port that flourished until the early thirteenth century (Whitcomb 1986, 1987, 1988, 1989a, 1989b, 1989c, 1993, 1994, 1995; Khouri and Whitcomb 1988; Melkawi, ‘Amr and Whitcomb 1994). Although these excavations yielded quantities of pre-Islamic artifacts mixed with later material, no stratified remains antedating the seventh century were found. Among these were fragments of a Latin building inscription of AD 317-326 (MacAdam 1989) and a Byzantine lintel inscribed with Christian symbols and a Christian Greek inscription (Zayadine 1994: 489). All this hinted strongly that pre-Islamic Aila must lie nearby.

Suggestions about the location of pre-Islamic Aila were advanced from a surface survey by Meloy in 1990. He surveyed the



3. Map showing location of all areas excavated by the Roman Aqaba Project in 1994.

region north-west of the Early Islamic town. This is a largely flat-lying area now covered by modern buildings and sand dunes lying within 500 m of the modern shoreline. The portion within the modern ring road, designated the Circular Area, encompasses about 40 ha. Here Meloy identified several mounds, traces of mudbrick walls and scatters of surface artifacts. Surface pottery, mostly dated from the first century BC to the sixth century AD, suggested that this area could have been part of classical Aila (Meloy 1991). The survey and the encouragement of Donald Whitcomb encouraged the author to excavate in this sector to find classical Aila.

Principal Research Questions

The project seeks to answer the following principal question: what was the role of the city of Aila in the economy of the Roman Empire and how did this role evolve over the centuries of the city's existence ?

From this primary question, several subsidiary research questions may be grouped into three major categories:

1. What was Aila's role in international trade between the Roman Empire and its eastern neighbors? What specific products passed through the port? Where were their origins and destinations? What structures were developed at the site to facilitate this trade? What were the principal routes of access ?
2. What was the impact of the regional natural environment on the economy of the city? Conversely, how did human activity impact the regional environment? Most Roman cities controlled a *territorium*, that is a rural hinterland that provided agricultural and raw materials. Was Aila's hinterland adequate for self-sufficiency in various necessities, or was some level of importation necessary ?
3. How was economic and other human activity organized within and around the urban space ? How did the physical plan of

the city evolve ? Can areas of specific activities be identified, such as residential districts, industrial areas, commercial districts, caravanserais, harbor installations, cultic buildings, and military quarters ?

Research Design

In order to answer these questions, the project's research design consists of two major components: 1) a regional archaeological and environmental survey of the environs of 'Aqaba, focusing especially on Wādī 'Arabah north of the city, which is largely *terra incognita*, and 2) excavation of the classical city in order to learn about its plan and history and to recover artifactual material for analysis. A preliminary reconnaissance was conducted in 1993 to study the site and formulate the research design; a reconnaissance of southeastern Wādī 'Arabah evaluated prospects for a full-fledged archaeological survey (Smith and Niemi 1994). The results were sufficiently encouraging to plan the current project, which launched the first of three planned field seasons in 1994.

The Regional Survey

A major gap in our knowledge of the environs of 'Aqaba is southeastern Wādī 'Arabah, which offers the easiest access to the site from the north. The region was thus targeted for survey by the project. Wādī 'Arabah is a linear valley that extends ca 165 km north from 'Aqaba on the Red Sea to the escarpment overlooking the Dead Sea. The south-east sector of the valley, that is the study region, extends ca 70 km NNE from 'Aqaba to the watershed of the 'Arabah valley, ca 12 km north of al-Gharandal.

The primary goal of the survey is to explore both the hinterland of the city of Aila and one of the city's presumed principal land routes. The survey team is studying the natural environment (geomorphology, hydrology, climate, flora, and fauna) and recording evidence for past human activity by visiting

previously known archaeological sites and searching for new sites. Although the focus of the project is the classical period, sites of all periods encountered were recorded.

A total of 161 archaeological sites were visited and recorded by the survey team in 1994. The principal periods represented in preliminary analysis of the collected artifacts were Middle Paleolithic, Pre-Pottery Neolithic B (PPNB), Chalcolithic/Early Bronze, Early Roman/Nabataean, Late Roman, and Early Byzantine. There was more limited evidence of occupation in the Late Byzantine and Early Islamic periods. Detailed results of the survey are forthcoming in a separate article.

Excavation of Aila

Based on Meloy's 1990 survey, excavation initially focused on the so-called Circular Area, believed to encompass part of classical Aila (Fig. 3). The sheer size of the Circular Area necessitated sampling selected areas. Selection of excavation areas was determined by analysis of aerial photographs, traces of architectural remains visible on the surface, and scatters of surface artifacts. Nine widely scattered excavation areas (Areas A-H, M) were laid out to sample the Circular Area. As will be seen below, three areas (A, B, and M) closest to al-Istiklāl Street immediately came upon significant ancient remains and will be discussed below. Results from the other excavation areas were negative in terms of ancient remains but yield important evidence on the geomorphology of the region. These will be discussed first.

Areas C, D, E, F, G, and H. Meloy noted several mounds of sand and palm trees close together within the Circular Area. Several surface features suggested the possibility of ancient occupation. Diagnostic sherds dated largely from the first century BC to the fourth century AD. Therefore the project opened six excavation areas, each of one to three trenches, designated Areas C, D, E, F,

G, and H (Fig.3).

Several wall lines of mudbrick visible on the surface in Areas C and D dated to the mid-twentieth century and probably represent a British military camp. In Areas E, F, and H no ancient remains were found under topsoil. In Area G a deposit of mudbrick slump, presumably from some kind of structure nearby, was found atop sterile sand. But no visible structures appeared and only a few artifacts were recovered.

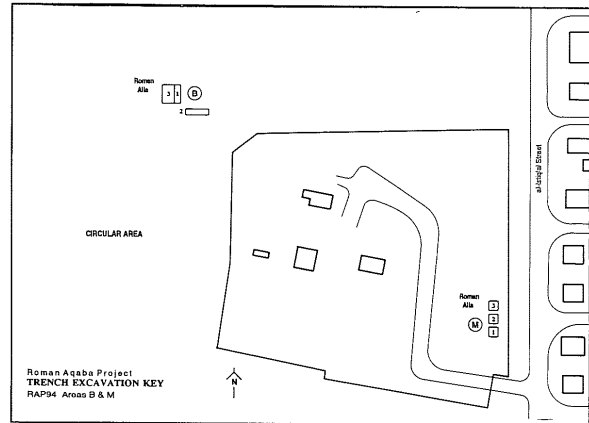
Because the 'Aqaba Regional Authority plans to develop the Circular Area, it seemed appropriate to search for ancient cultural remains at deeper levels in these areas. Therefore, a series of trenches up to 3.50 m deep was excavated with mechanical equipment adjacent to each excavation area. In most cases the deep trenches revealed thick deposits of fluvial and/or beach sand but little evidence of cultural remains. Therefore, by the second week Areas C, D, E, F, G, and H were closed out and their personnel moved to more promising areas. Nevertheless, these areas did aid in defining the parameters of classical Aila and yielded important evidence about possible changes in the coastline, discussed below.

Area B. On the northwestern corner of a now abandoned military base west of al-Istiklāl Street are three mounds of sand and palm trees (marked G8, G9, and G10 on Meloy's map, cf. Meloy 1991: Fig.3). G8 is the highest mound in the entire Circular Area at an elevation of 8.4 m. Although Meloy observed that these mounds had been disturbed by modern military trenching, he nevertheless noted many potsherds and some ceramic slag atop all three. The diagnostic sherds dated primarily from the first century BC to the fourth century AD, that is Early Roman/Nabataean and Late Roman. The recent trenching had revealed traces of mudbrick walls and a few dressed building stones in this area. This suggested that the mounds were remains of structures, probably of the Early and Late Roman periods (Meloy 1991).

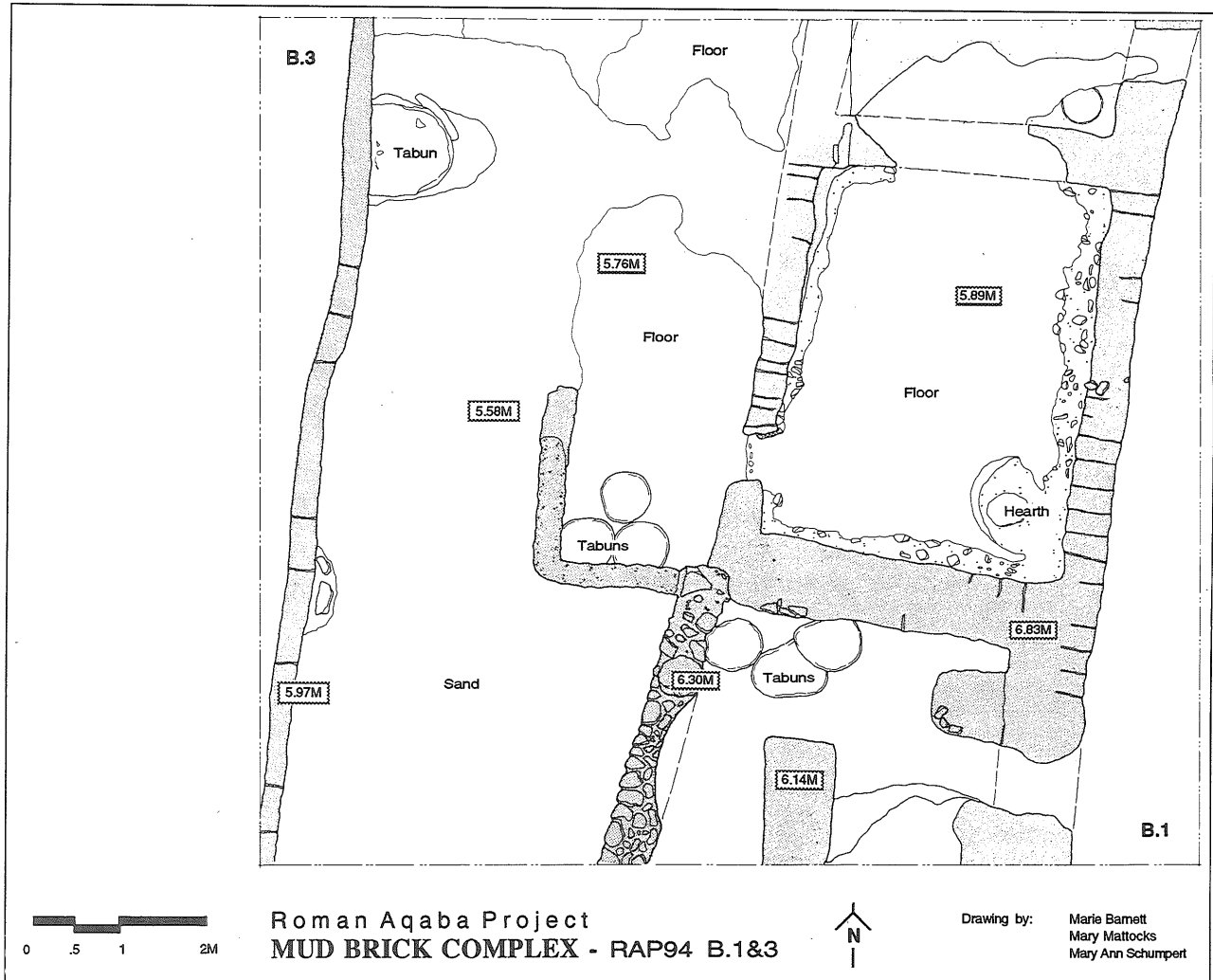
The three mounds surveyed by Meloy seemed too disturbed for worthwhile excavation. But another, lower mound adjacent to the north-west corner of the abandoned military base was excavated as Area B (Figs.4 and 5). Three trenches (B. 1-3) were laid out atop this mound. B.1 and B.2 (both 2 x 10 m) were laid out to provide N-S and E-W cross sections of the mound. B.2 was later expanded by a 2 x 7 m extension to the south-east of the original trench. B.3 (7 x 10 m) was opened west of B.1 to elucidate structures exposed in B.1. The 1.50 m balk between B.1 and B.3 was eventually removed as well.

Excavation revealed a complex of mud-brick structures (Figs. 5 and 6). Occupation

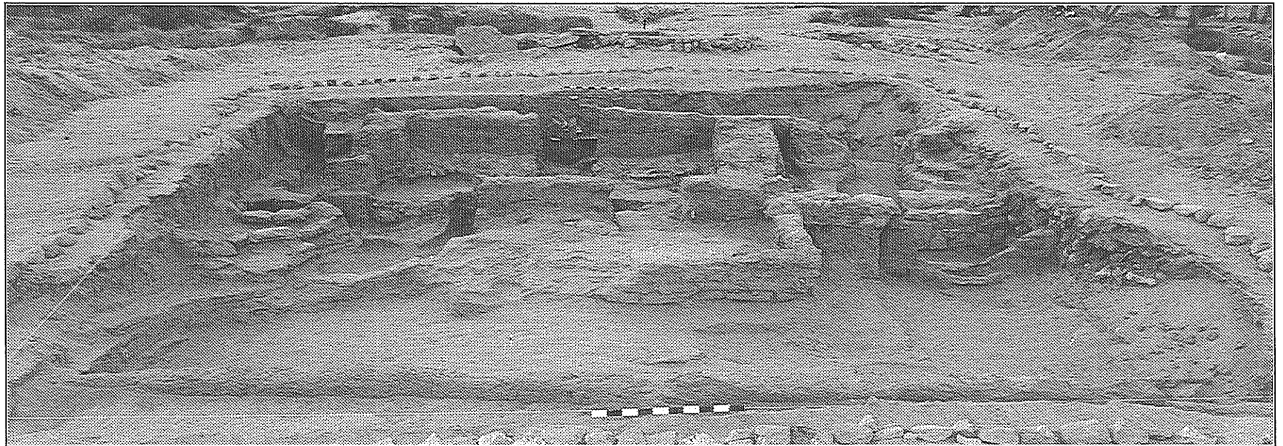
began in the Early Roman/Nabataean period (first centuries BC/AD) and continued in several phases through the Late Roman pe-



4. Map showing location of trenches in RAP Areas B and M.



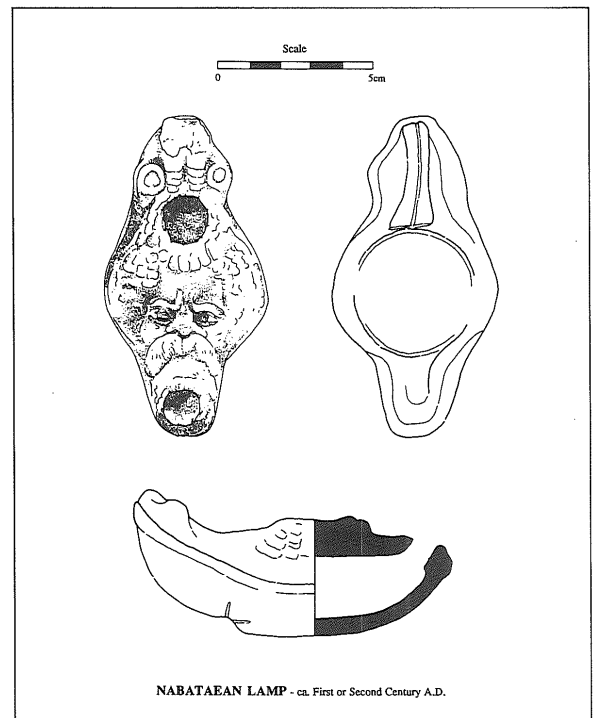
5. Plan of mudbrick complex in Area B (Trenches B.1 and B.3). The Nabataean/Roman structures were subsequently disturbed by modern military trenching.



6. General view of domestic mudbrick complex in Area B (Trenches B.1 and B.3). View to east.

riod (second to early fourth centuries AD). Although the ancient structures had been disturbed by modern trenching, they contained many *ṭawābīn* with associated ash and other installations. Artifacts provided useful economic evidence about this early period in the city's history. The pottery included Eastern Sigillata, a few amphorae, glass sherds, many faunal remains (ca 70% fish), several imported stone objects, and seven bronze coins. A Nabataean lamp from Area B with a man's face in low relief probably dates to the first or second century AD (Fig.7). It is paralleled at Mo'a in the Negev (Cohen 1993: 1139). The evidence suggests that Area B was a domestic complex occupied until perhaps the fourth century AD, then abandoned. Only a handful of Byzantine sherds and two Byzantine coins (both from modern contexts) suggest a possibility of transient later occupation before the modern military trenching.

Area M. East of Area B and on the western side of al-Istiklāl Street, a deep trench for a sewer pipe had been dug in 1993. Many sherds of the Early Roman/Nabataean period were noticed near this trench, suggesting evidence of the earliest period of the city's history. Therefore three 5 x 5 m trenches were opened as Area M in a N-S line just west of and parallel to the modern street (Figs. 3 and 4). These trenches (M. 1-3) yielded mostly Early Roman/Nabataean material. Notably, the area did not yield a single Byzantine



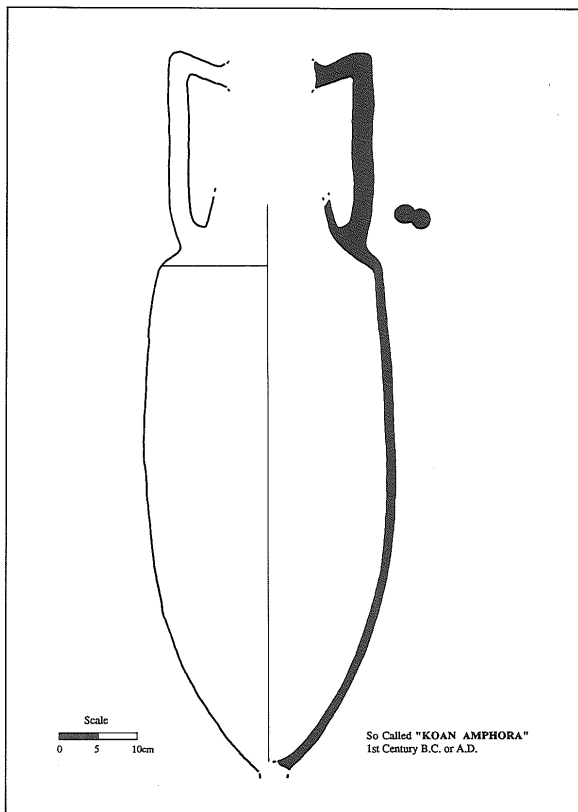
7. Drawing of a Nabataean molded lamp, decorated with the face of a human male in low relief, recovered from Trench B.3. Probably first or second century AD.

sherd.

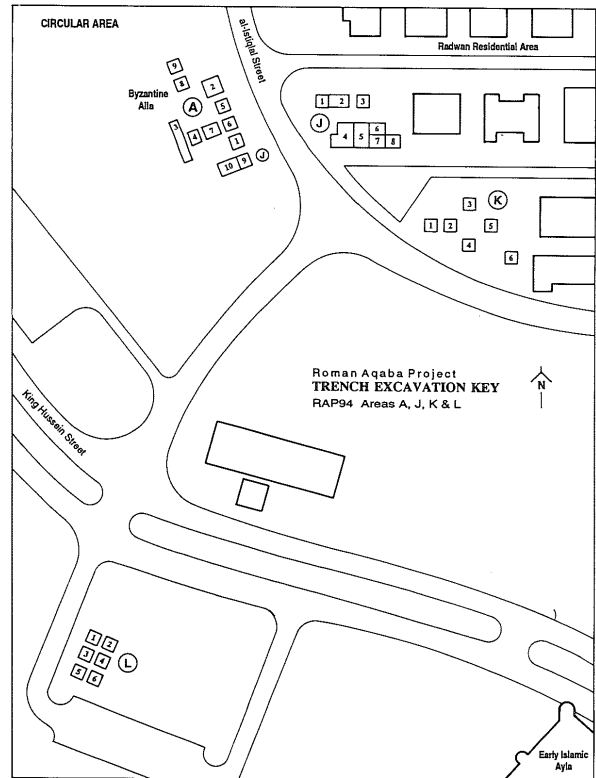
Excavation revealed stone and mudbrick structures. These experienced several phases of use, with mudbrick walls and associated *ṭawābīn* in the earlier phases and crude stone walls in the later phases. Rich artifactual remains included two Nabataean coins, glass sherds, classic Nabataean painted and unpainted pottery and Eastern Sigillata. Trench M.1 also yielded several largely reconstructable ceramic vessels from

mudbrick tumble marking the end of one phase. Among these was a so-called Koan amphora (Fig. 8) produced in the western Mediterranean in the first centuries BC/AD. These vessels were wine containers. They are attested at other Red Sea ports and as far east as India (Peacock and Williams 1986: 105-06). In fact, sherds of this same type of amphora were found in other excavation areas, proving that the vessel from Area M was not an isolated find. It thus constitutes important evidence for wine traded from the western Mediterranean to the Red Sea via Aila in the Early Roman period.

Area A. A low mound of sand, nearly 500 m south of Area B and ca 300 m south of Area M, is located in the south-east edge of the Circular Area, directly adjacent to al-Istiklāl Street (Figs. 3 and 9). Much of the mound now lies under the modern street. The mound clearly extends much further,



8. A so-called “Koan amphora” (actually from the western Mediterranean) found in Area M. It dates to the first century BC or AD and probably served as a transport vessel for wine.



9. Map showing location of trenches in RAP Areas A, J, K, and L.

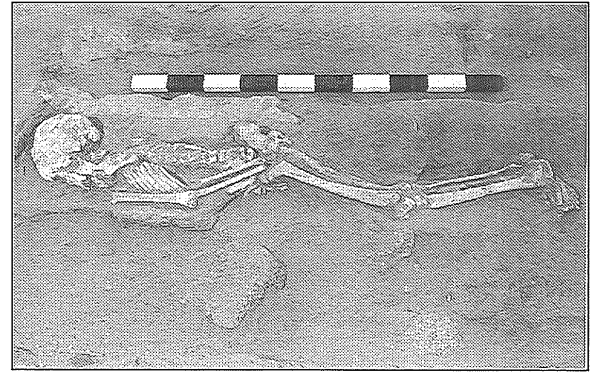
into the Raḍwān residential area. The surviving portion west of al-Istiklāl Street measures ca 100 x 50 m and rises over 3 m in height. Meloy noted that the mound was rich in surface artifacts, including pottery and glass sherds and ceramic slag. Most of the surface pottery was Byzantine, especially fifth/sixth centuries AD (Meloy 1991: 407-10). Thus it was hoped that excavation of this mound (Area A) would provide evidence of Byzantine Aila.

A series of nine trenches (A.1-9) of varying dimensions was laid out to sample portions of the mound. Trenches A.1-7 basically formed a T, with the N-S line extending through Trenches A.2 (8 x 8 m), A.5 (6 x 6 m), A.6 (6 x 6 m), and A.1 (6 x 6 m) and an E-W line through Trenches A.6 (6 x 6 m), A.7 (5 x 7 m), A.4 (5 x 5 m), and A.3 (2 x 8 m). The seven trenches together encompassed an area of nearly 300 sq. m.

Excavation in Trenches A.1-7 revealed a complex of mudbrick structures just below

the modern ground surface (Fig.10). Beneath the complex was a thick (ca 1m) layer of mostly sterile sand. Tina Niemi, project geologist, suggested that earlier remains might lie under the sand layer. Further, the 'Aqaba Regional Authority was planning extensive road work that threatened to destroy Area A. Therefore, given this emergency, mechanical equipment was employed to search for earlier remains north of the existing trenches in Area A. After removal of the overlying sand layer, two additional trenches were laid out to the north of the original seven trenches. Trench A.8 (4 x 4 m) uncovered domestic installations, including three *tawābīn*. The trench also yielded four coins, dating from the late third to mid-fourth centuries, a steatite (schist) cooking bowl and Late Roman Red Ware (mostly African Red Slip) of similar date. This was the earliest stratified evidence from Area A. The steatite vessel, previously attested only in Early Islamic contexts at 'Aqaba (Whitcomb 1994: 27-28), is the earliest dated evidence for the importation of these distinctive artifacts into Jordan, apparently from the Arabian peninsula.

Trench A.9 (4 x 4 m), situated immediately north of A.8, uncovered a portion of a cemetery with at least five mudbrick tombs. Each tomb consisted of a shallow cist dug into the soil (Fig.11). The sloping walls of the cist were lined by two low parallel mudbrick walls surmounted by a mudbrick cap. Three tombs were excavated. Each contained a single articulated skeleton. Two were adults, aged ca 18-25 years (Fig.11) and 25-40 years, and one child aged 1-1.5 years. The tombs were mostly devoid of grave goods. A few associated sherds were predominately Early Byzantine, a date supported by a coin dated 347-355 found within one tomb, providing a *terminus post quem* for the cemetery. How long it remained in use is problematic, but the tombs were covered by sand and thus no longer visible by the time the mudbrick complex was founded

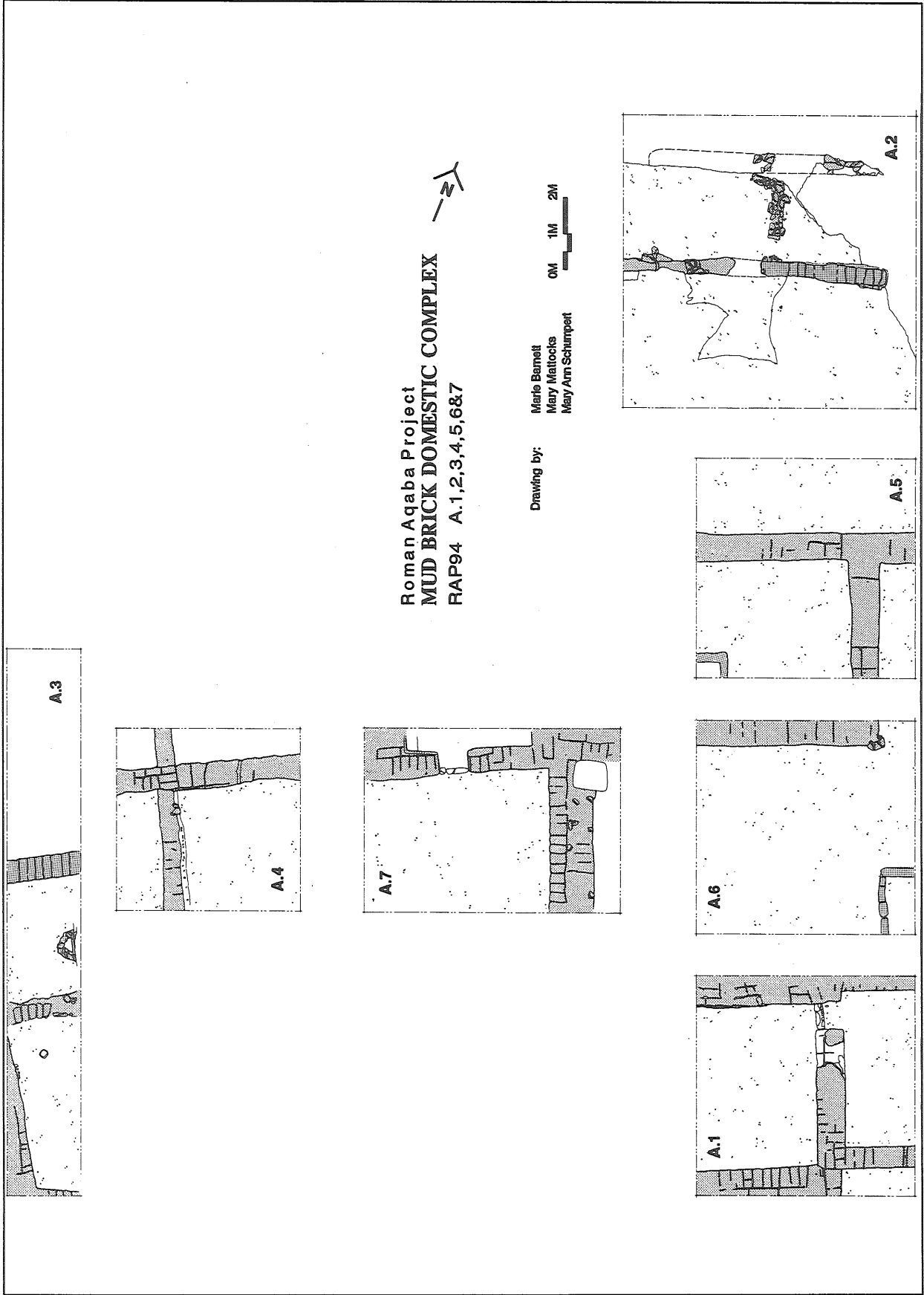


11. An articulated skeleton, probably an adult female aged ca 18-25 years, from a mudbrick tomb in Area A. Probably fourth century AD. View to west.

just to the south.

The mudbrick complex in Area A consisted of several rooms with associated floors built around a paved courtyard (Fig. 10). Most of the mudbrick walls survived only one course high. Portions of about a dozen rooms or courtyards were exposed, some connected by doorways with stone-paved thresholds. Most of the floors had been swept clean of artifacts before abandonment, as reflected by the paucity of artifacts in primary association with the structures. But domestic activities were suggested by installations built into the floors and walls of the complex and by artifactual evidence. These included fragments of steatite cooking vessels, glass sherds, two basalt millstones, and various domestic ceramics.

Close dating of the complex proved problematic. The pottery was mostly Late Byzantine (sixth/early seventh centuries), including African Red Slip of the sixth/early seventh centuries. The complete absence of glazed wares precludes a date after ca 800. However, a few Early Islamic sherds usually appeared in the later phases along with the predominately earlier pottery. Especially characteristic were so-called Mahesh Wares, attested in late Umayyad/early Abassid levels at Early Islamic Ayla (Whitcomb 1989c). This suggested that the complex, or at least its latest phase of occupation, dates to the eighth century. It was founded earlier, however, in the Late Byzantine period.



10. Plan of the mudbrick domestic complex in Area A. Its latest phase of occupation dates to the Early Islamic period.

Area J. Discovery of mudbrick structures in Area A drew attention to the east, directly opposite al-Istiklāl Street, where the artificial mound seemed to extend. Thus a vacant lot east of the street was targeted for excavation as Area J (Fig. 9). It initially consisted of six 5 x 5 m trenches laid out in two parallel rows of three trenches each. Trenches J.4-5 were later expanded 5m to the south. Two more trenches were opened to the east in the southern line: J.7 (5 x 5 m) and J.8 (2 x 10 m). Finally, two other trenches were opened west of the road, just south of Area A. These were Trenches J.9 (6 x 6 m) and J.10 (6 x 8 m).

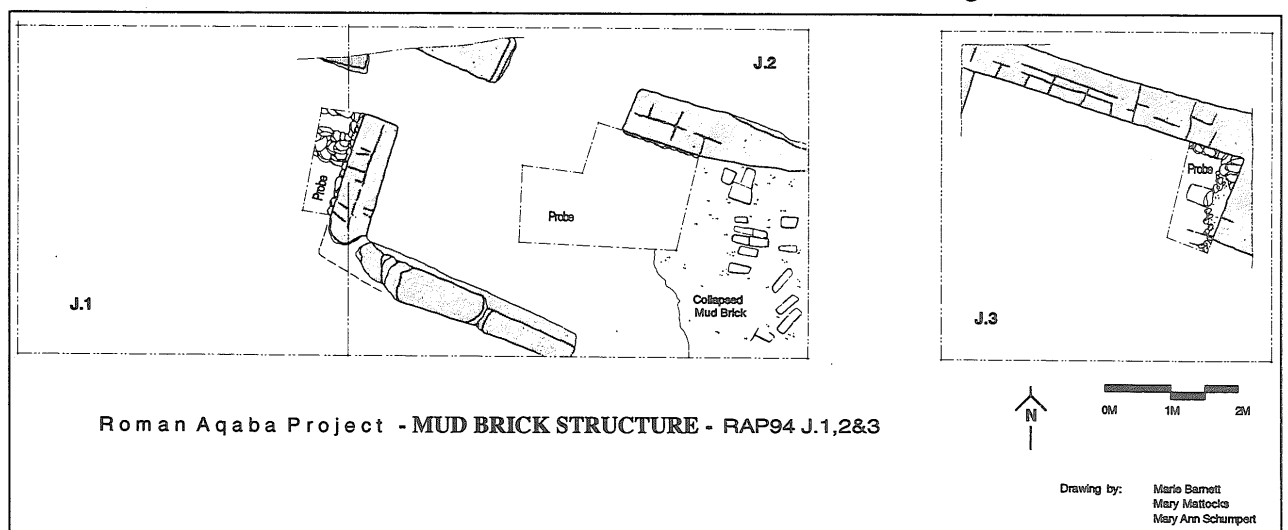
The more northerly row (J.1-3) uncovered parts of a massive mudbrick structure ca. 18.20 m wide (Fig. 12). Plastered walls of this structure rested on stone foundations. The walls and associated piers possibly once supported barrel-vaulted roofs. More fragmentary remains of these mudbrick structures were also discovered in the southern range of trenches (J.4-8), where the later city wall had cut and partially covered the mudbrick structures. Latest pottery from the foundations was Early Byzantine, including diagnostic African Red Slip sherds from the fourth century AD. Several fourth century coins were also retrieved from the foundations of the structure. The structure seems to

have witnessed little actual use. Deep probes to the foundations within the structure revealed little occupational debris and no substantial floors. The structure partially filled with sand before collapsing in several phases.

The function of the structure remains enigmatic, both because much remains unexcavated and southern portions were demolished and/or covered by later construction. A Christian basilica is one possibility, perhaps associated with the Early Byzantine cemetery in Area A just to the northwest. Mudbrick basilicas are attested in Egypt in the fourth century. A bishop for Aila, as noted above, is attested as early as 325. But more excavation is required to test this suggestion.

These mudbrick structures were cut by construction of a massive stone curtain wall and projecting tower (Figs.13 and 14). The wall averaged 1.60 m thick, was preserved up to ca. 2.00 m in height, and extended E-W for 28 m through the entire southern range of trenches. It rested directly on sand and was constructed mostly of local granite and diabase mortared into two faces surrounding an interior fill of mortared rubble.

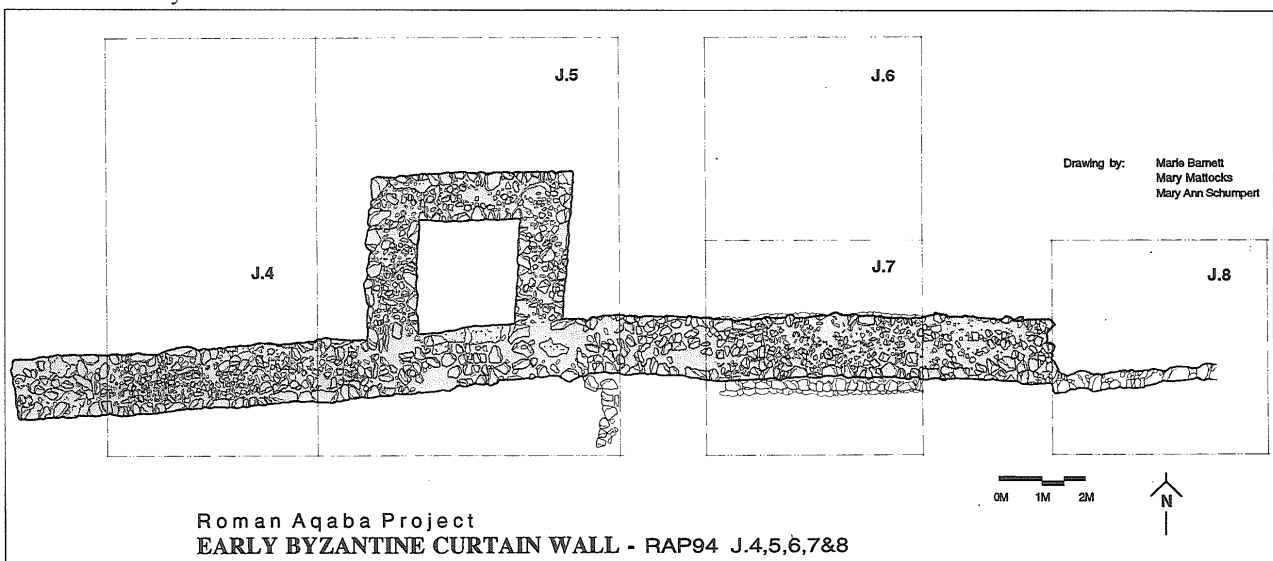
A rectangular tower was bonded to the north face of the curtain wall and projected outward 4 m. Although both curtain wall and



12. Plan of the mudbrick vaulted structure in Area J. It probably dates to the fourth century AD.



13. The Early Byzantine curtain wall and projecting tower in Area J. It was probably constructed in the late fourth or fifth century AD.



14. Plan of the Early Byzantine curtain wall and projecting tower in Area J.

tower were excavated to their foundations, no doorway was found to give access into the tower. The tower, like much of the curtain wall, was cut into the earlier mudbrick structure, part of which filled part of the tower's interior. The remainder of the interior was filled with mostly sterile sand. There was no trace of interior floors. This suggested that the lower portion of the tower was never intended for use as a room, but rather was filled immediately after construction, perhaps to create an elevated fighting platform.

The curtain wall presumably represents

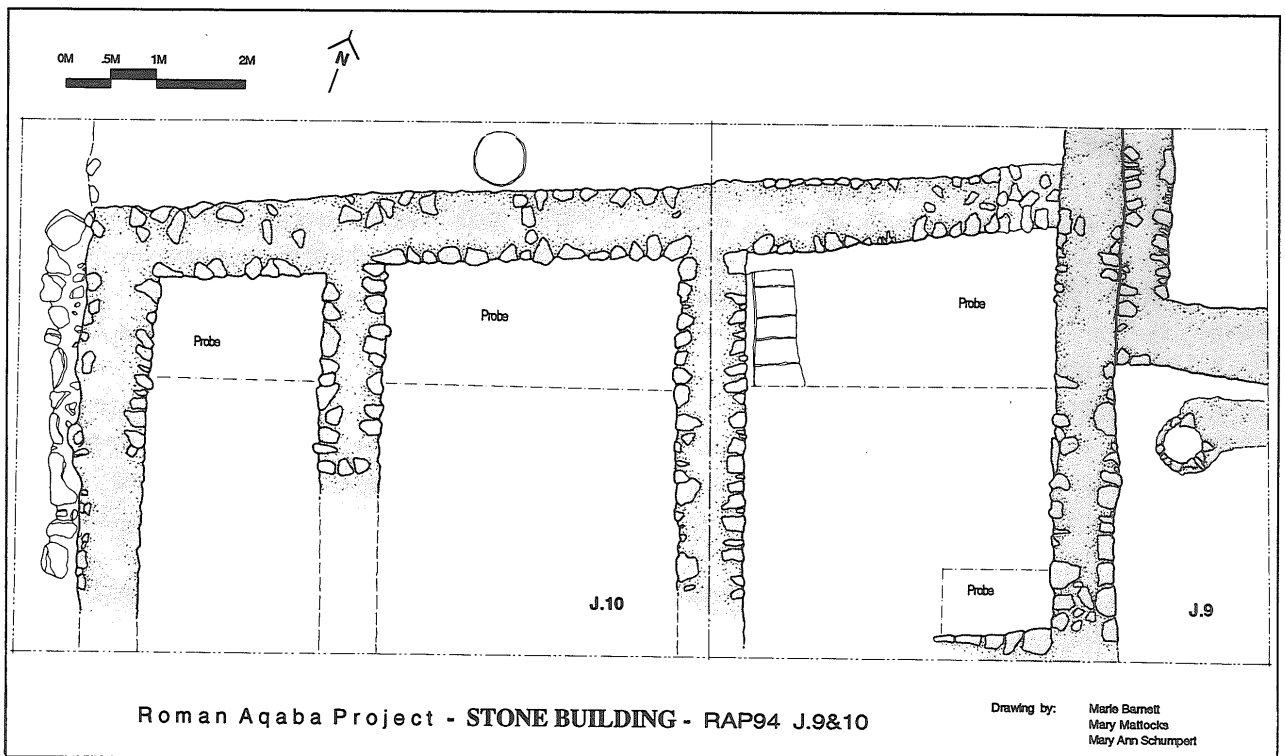
part of the city wall of Byzantine Aila. Early Byzantine pottery was recovered from the fill within the tower and mid-fourth century coins were found both in the rubble core of the wall and in sand fill within the tower. This suggested that the curtain wall dates to the Early Byzantine period and must have been constructed after the mid-fourth century. Late Byzantine (i.e., sixth/seventh centuries) pottery sealed under collapsed portions of the tower and curtain wall suggested that the curtain wall had gone out of use by this period. The wall and tower then served

as a dump, which included kiln wasters and ceramic slag. Some debris probably derived from the seventh century pottery kilns found just to the east (Melkawi, `Amr, and Whitcomb 1994). The curtain wall was robbed to its foundations in Trench J.8, the most easterly trench, but seemed to have once extended further east into the area now occupied by modern apartment buildings. Pottery associated with this robbing suggested it may also have occurred in the seventh century, when the adjacent Early Islamic town was built.

To the west the curtain wall disappeared under al-Istiklāl Street, suggesting that more of the wall might be found across the street. Therefore, late in the season two additional trenches (J.9, 10) were opened along the presumed line of the city wall, just south of Area A. Excavation revealed a complex of stone walls that formed a series of three adjacent rooms along this line (Fig.15). But none of the walls was substantial enough to be the city wall. These rooms yielded Late Byz-

antine pottery, suggesting that the walls might in fact overlie the city wall. On the last day of excavation a more substantial wall of large stones was found under the western most later wall in J.10 (visible as the unshaded wall on the extreme western edge of Fig. 15). This earlier wall extended for 3 m N-S and perhaps represents part of the northwestern corner of the curtain wall, that is where the wall turned southwards towards the shoreline. Further excavation may uncover the remaining E-W wall segment and thus complete another long portion of the Byzantine city wall.

Area K. Just southeast of Area J, across an oval paved parking lot, is another vacant lot. A group of six 5 x 5 m trenches was opened here as Area K (Fig. 9). The goal was to locate ancient remains through horizontal exposure; therefore individual trenches were widely scattered over the lot. Once the Byzantine city wall was discovered just to the northwest in Area J, it seemed likely that Area K would provide evidence of



15. Plan of Late Byzantine stone building in Trenches J.9-10. The earlier wall, shown unshaded, visible at the extreme western edge of the drawing may be a remnant of the Early Byzantine curtain wall.

occupation within the Byzantine city.

All six trenches revealed ancient remains just below the modern ground surface. A complex of stone walls, mudbrick walls, and associated floors appeared, partly covered by extensive dumps. Rich artifactual remains were recovered from these dump layers, including over 44,000 potsherds, nearly 5,000 glass sherds, hundreds of animal bones, some carbonized plant remains, and ca 40 coins. The latest pottery from these dump layers was Early Islamic, mostly Abbasid. One of the latest dump layers yielded an Abbasid coin of the early tenth century. An Arabic *dipinto* was found in an earlier context from the same trench (K. 4). The text was painted in black ink on a camel bone. The project's Semitic epigrapher, Vincent Clark, suggests dating the *dipinto* on paleographical grounds between the early eighth and early ninth centuries AD (Clark, pers. comm.), which accords well with its stratigraphic context. Other notable artifacts from these dump layers were fragments of bronze, copper, and iron artifacts, jewelry, and beads of various materials. There were also various imported stone artifacts, such as fragments of steatite cooking vessels, marble, basalt (used for small mills), and alabaster.

Removal of these dump layers exposed more architecture, including several phases of mudbrick and stone walls with associated occupation. Within these structures was some evidence of domestic and industrial installations, such as *tawābīn* and clay mixing pits. The latest pottery from the layers under the dumps was Umayyad and Early Abbasid. This suggests that Area K served as a domestic and possibly industrial suburb to the Early Islamic town in the Umayyad and then Abbasid periods. It was subsequently abandoned and used as a dump after the ninth century.

Despite the fact that all excavated loci excavated in Area K could be dated to the Early Islamic period, there were clear hints of earlier occupation. Most coins identified thus

far from Area K are Byzantine. The predominant pottery from the area was Late Byzantine (ca 500-650), although usually mixed with some Early Islamic sherds. Given that the deepest probe in Area K reached only ca 1 m below the modern ground surface, it seems likely that future excavation will find Byzantine occupation under the Umayyad stratum.

Area L. Nearly 250 m south-west of Area K and only ca 150 m west of the Early Islamic town is a parcel of undeveloped land near the beach, ca 100 m from the shoreline, excavated as Area L. A surface survey yielded many artifacts. A modern construction trench just west of Area L had revealed apparent ancient structures and occupation just below the modern ground surface. The goal in Area L was to locate any remains of harbor works or other installations that might have been associated with the port of ancient Aila. Area L consisted of six 6 x 6 m trenches laid out in two parallel rows of three trenches each (Fig. 9).

Excavation revealed ancient stratification immediately below the surface. A complex of mudbrick and stone walls with associated floors and domestic installations was located along one side of what appears to have been a street. Four phases of occupation were recognized. The pottery was predominantly Early Islamic, dating primarily to the late Abbasid period (ninth/tenth centuries AD). Various glazed wares, including imports from Iraq, Egypt, and the Ḥijāz were recovered. Other finds included ca 2,000 glass sherds, over forty fragments of steatite vessels, a dozen basalt grindstones and mortars, six copper/bronze weights, and a complete pair of iron scissors. Fish bones were especially prevalent in the rich faunal corpus from the area.

Therefore it appears that Area L, like Area K, was a suburb of the nearby Early Islamic settlement. It seems to have witnessed significant domestic occupation followed by extensive dumping, all within the late Ab-

basid period. Although it seems likely that earlier Islamic occupation underlies the late Abbasid phases, it remains unclear whether pre-Islamic remains lie deeper within Area L. Some pre-Islamic sherds and a few Byzantine coins were found mixed in later contexts. Since the deepest excavation in Area L reached only ca 1.70 m below the modern ground surface, further excavation is required.

Analysis of Organic Remains

Archaeobotanical Remains. The excavation yielded a significant amount of botanical remains, recovered by hand retrieval, sieving, and flotation of soil samples. Preliminary analysis of the remains provides some insights into the local economy and environment.

The relative scarcity of large wood fragments and the abundance of dung suggests that timber was not readily available in the region during the classical and Early Islamic periods. The one exception is palm wood, which does appear fairly frequently in the botanical record. Palm trees can provide large and fairly straight logs but the fibrous nature of its wood makes them difficult to cut. The palm apparently was used for both construction and (along with its fronds) as fuel. Most of the rest of the wood derived from varieties of shrubs. Dung clearly served as the principal fuel for most purposes, including cooking. Several charred but intact dung balls were recovered, most apparently from camels. Preliminary analysis suggests that the regional environment in the Roman and Byzantine periods was not appreciably different from modern conditions. This raises the question of where fuel was obtained to supply the city's metal-processing and, at least by the seventh century, pottery industries (Melkawi, 'Amr and Whitcomb 1994).

Most dietary plant remains recovered were grains, with barley predominating but wheat also being present. Some dung con-

tained barley, suggesting its use as animal fodder. Wheat presumably was mostly for human consumption. Apart from grain, grape pips were also attested. Conspicuously absent from the record were figs, olives, dates, and legumes. The absence of dates is especially surprisingly given the presence of palm wood and the existence of an extensive date palm plantation at the site in modern times. The lack of olive pits is less surprising, for the region's present environment could not have supported substantial olive cultivation and thus olives and olive oil were probably imported into the city. However caution is required by the relatively small corpus of evidence available thus far.

Faunal Remains. The 1994 excavations recovered thousands of animal bones and shells. Not surprisingly, various species of fish comprised a significant portion of the faunal corpus. Hunting seems to have made virtually no contribution to the local diet. The vast majority of mammalian bones were derived from caprines (sheep and goat), with camel bones as a significant minority. There was very limited evidence for a few other domestic mammalian species exploited for food, such as cattle, pig, and chicken. These species were much more prominent at contemporary sites farther north along the Arabian frontier, such as the forts of the *limes Arabicus* (Toplyn 1994). But the harsher environmental conditions around 'Aqaba seem to have limited their exploitation in this region. A few other domestic species used principally as work animals, such as donkey, horse, and dog, were present but also extremely rare.

Of particular importance are the sex and mortality profiles of the caprines recovered. Preliminary analysis suggests that most of these animals were imported "on the hoof" to the city for immediate consumption, rather than being raised by the local population. This model of importation for urban consumption is paralleled at other urban centers of the Roman Empire. It strongly contrasts

the forts of the *limes Arabicus* farther north, where the evidence suggests a subsistence model of locally managed caprine herds (Toplyn 1994). This raises the question of the external sources of these animals.

Conclusion

Much has been learned about ancient Aila and its environs from the first season. The regional survey has provided a wealth of new evidence about Aila's hinterland. The excavations have identified major portions of the Nabataean, Roman, and Byzantine city of Aila. Further, new evidence of the suburbs of the Early Islamic town has also emerged. The large artifactual corpus has begun to provide insights into the economy of the city.

First, there is clear evidence of human activity in the region in the prehistoric era, especially the Middle Paleolithic, Pre-pottery Neolithic, and Chalcolithic periods. Further, it also seems that human settlement in the region has tended to migrate from north to south from at least late prehistoric times through the Late Islamic period. The earliest attested sedentary occupation is at Tall al-Maqaṣṣ and its associated sites, dated to the mid-fourth millennium BC and now ca 4 km north of the present coastline. In the Iron II and Persian periods the only known settlement was at Tall al-Khalayfī, now ca 500 m from the coast.

By the first century BC the focus of settlement shifted over two km south-east of Tall al-Khalayfī to Nabataean Aila (RAP Areas B and M). There was a substantial Nabataean settlement here by the first centuries BC/AD. Both areas yielded remains of apparent domestic structures. Although Area M yielded evidence mainly from the first centuries BC/AD, Area B was occupied from the first to perhaps the fourth century AD.

Large quantities of imported goods, including fine ware pottery and amphorae from the Mediterranean, glass from the Levant and Egypt, and exotic stone suggest that

Aila was a thriving center of commerce in this period, as also documented by written sources. Results of the regional survey suggest that the Early Roman/Nabataean period was the best represented period both in terms of number of sites occupied and quantity of datable artifacts in Wādī 'Arabah north of Aila.

The ceramic corpus included 373 sherds of terra sigillata, mostly Eastern Sigillata A from eastern Mediterranean production centers. Wine amphorae from the western Mediterranean were also passing through the port, perhaps in transit to destinations via the Red Sea. The recovery of a small number of kiln wasters and ceramic slag from Area M suggests that Aila may have been producing some pottery as early as the Nabataean era. Trade via the Red Sea was certainly thriving in this period (Sidebotham 1986).

The glass consists of a variety of forms, mostly plain utilitarian vessels with a few luxury vessels. Some of the glass vessels from Aila are paralleled at the Egyptian Red Sea port of al-Qūṣeir. Among these are examples of cast and cut colorless wares, which appear to be Egyptian imports of the first two centuries AD (Meyer 1992: 19-20, pls. 4:62, 5:93, 6:103-09). There is as yet no evidence of glass production at Aila.

A variety of stone imported for various uses also passed through the port in the Roman period, including marble, limestone, basalt, sandstone, and alabaster.

It is impossible as yet to evaluate the impact of the Roman annexation of AD 106 upon Aila. Continuity of occupation from the Early Roman to the Late Roman period is demonstrated in at least one area (Area B). Completion of the *via nova Traiana* in 111-114 with its attendant forts and garrisons probably improved both physical infrastructure and security for commercial traffic. The Romans soon began exploitation of the copper mines of Wādī 'Arabah, apparently the most intensive period of exploitation ever witnessed at these mines (Hauptmann

and Weisberger 1987, 1992; Rothenberg 1962, 1971, 1988, 1993). The 1994 excavations at Aila produced over 500 objects of copper or bronze, including some small fragments of copper ore and copper slag.

By the Early Byzantine period the principal focus of Aila had again clearly shifted another 500 m southward. A mudbrick vaulted structure in Area J and a cemetery in Area A, possibly associated with the mudbrick vaulted structure, were both established in the fourth century. But not long after, perhaps in the late fourth or early fifth century, the stone curtain wall with its interval towers cut through this sector as the northwestern segment of Byzantine Aila's defenses. Therefore Byzantine Aila must have been centered somewhere south of the city wall. How far the Byzantine city extended to the east, where a pottery industry flourished in the seventh century ca 150 m east of Area J, is unknown. Certainly the Byzantine city did not continue as far southeast as Early Islamic Ayla, which was founded *de novo* ca 650.

It is reasonable to associate the Byzantine fortifications with the presence of *legio X Fretensis*, based at Aila throughout the fourth century and presumably into the fifth century. The recovery of two coins of Constantius II (337-361) from two different construction loci of the wall and tower would seem to negate the possibility that this wall is the building project suggested by the fragmentary Latin inscription of ca. 317-326 found at Early Islamic Ayla. At least two of the three major land approaches to the city were controlled by Roman garrisons in the fourth century: a string of garrisons lined Wādī 'Arabah, including a Tetrarchic fort at Yotvata (*ad Dianam*, cf. Meshel 1989), and the *via nova Traiana*, where its southern segment through Wādī al-Yutum north-east of Aila was protected by forts at al-Wu'ayra, Khirbat al-Khalde, and Qaşr al-Kithara (Parker 1986: 105-10).

The history of Byzantine Aila is obscure. International commerce via the Red Sea in

general and the Gulf of 'Aqaba in particular remained a high priority to the imperial government. This is illustrated by the campaigns by Romanus, *dux Palaestinae*, ca 500. He re-established Roman control over the island of Iotabe, possibly at the entrance to the Gulf of 'Aqaba, where tariffs were levied on cargoes (Parker 1986: 150-51). Literary sources make clear that Aila remained an active port through the sixth century, including trade with India. Copper ore and copper slag were recovered from Byzantine contexts, suggesting that copper extracted from the mines of Wādī 'Arabah was still being processed at Aila.

But ca 530 Justinian initiated a dramatic change in the security situation on the frontier. He demobilized many of the regular Roman frontier forces (*limitanei*) and transferred primary responsibility for the defense of the southeastern frontier to the Ghasanids, who ruled as allied kings over an alliance of Saracen tribes. *Legio X Fretensis* probably disappeared about this time, as for example the evidence suggests for *legio IV Martia*, based at Betthorus (al-Lajjūn) and several other forts farther north in Arabia (Parker 1986: 149-52; 1987: 819-23). There seems to have been no garrison at Aila by the early seventh century. Arab sources make no mention of any garrison in accounts of Aila's submission to Muslim forces in 630. The fact that stone structures were erected over the presumed line of the city wall in Area J.9-10 suggests that the wall had ceased to have any military function by the Late Byzantine period. Its masonry was then extensively robbed, perhaps to build the adjacent Early Islamic town in the mid-seventh century.

One of the most important discoveries in 1994 was the Early Islamic occupation around the Byzantine city wall, well outside the walls of Early Islamic Ayla. The walled town measures only ca 145 x 170 m, or 2.465 ha. At its height in the Umayyad and Abbasid periods, one could imagine the walled

town serving as the urban core but with extensive extramural settlement for industrial and domestic use. Excavation in Areas A, K, and L all revealed evidence of significant Early Islamic occupation. In Areas A and K this seems confined to the seventh and eighth centuries, after which the areas were abandoned or used as dumps. But the domestic occupation in Area L, closest to both shoreline and the Early Islamic town, continued well into the Abbasid period, after which it too was used as a dump by the tenth century.

The evidence suggests that these extramural areas north and west of the walled town were abandoned by the tenth century. This interpretation receives further support from Muqaddasi, cited above, who states that

the extramural settlement was in ruins by the time of his visit in the tenth century. This also seems to confirm Whitcomb's view of Ayla in the Fatimid period as an era of decline, with a smaller, poorer population (Khoury and Whitcomb 1988: 13; Whitcomb 1994: 7). Finally, Early Islamic Ayla was itself abandoned by the early thirteenth century, when settlement moved another one kilometer southward to the site of the Late Islamic castle.

S. Thomas Parker
North Carolina State
University
Raleigh, North Carolina
U.S.A.

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THE 1994 AND 1995 SEASONS OF EXCAVATION AT ABILA OF THE DECAPOLIS

by

W. Harold Mare

THE 1994 SEASON

Introduction

The eighth season of excavation at Abila of the Decapolis-Quwayliba (Fig.1), northern Jordan,¹ was conducted from June 11 to July 30, 1994 with W. Harold Mare, Director, and Covenant Theological Seminary, St. Louis, Missouri, as principal investigators.²

Ancient Abila is a large site, extending about 1.5 km north-south and about 0.5 km east-west, consisting of two tall and a saddle depression in between.³

Objectives

The objectives set forth for the 1994 season of excavation at Abila of the Decapolis had three major components: 1) to do pure research into the physical materials available at the site (i.e., ceramic evidence, stratigraphic profile, architectural remains, human skeletal remains, geological, faunal and floral evidence, numismatic specimens, inscriptional evidence, soil analysis, etc.), which would be of help to understand the cultural history of the site); 2) to perform cultural research management in doing salvage archaeology, by retrieving and preserving as much as possible of the physical remains exposed or disturbed by unlawful digging, as, for example, has occurred extensively in the tombs; and 3)

to continue our intensive educational program consisting of byweekly lectures in camp and an extensive educational touring program of Jordan on weekends to aid the staff in understanding better the archaeological cultural history of Jordan and how this integrates with the culture and history of Abila of the Decapolis; part of the educational program also included provision for regular college or graduate school archaeological courses including a practicum in the field for which three to four hours of credit could be earned.

The objectives accomplished in the Abila of the Decapolis excavation in 1994 were as follows:

1. Tall Abila (The North Tall), Area A (John D. Wineland)

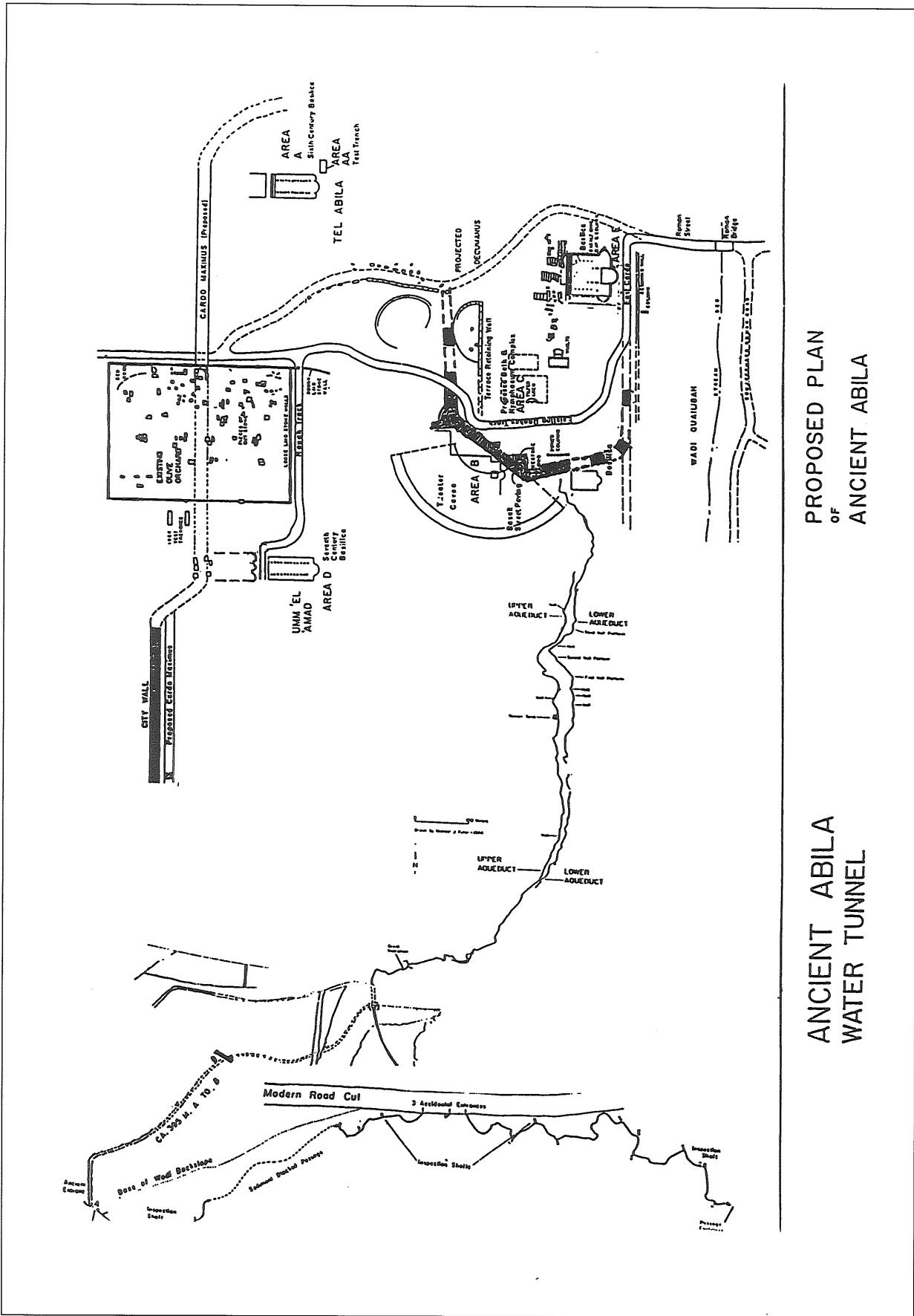
On Tall Abila further excavation continued to the west of the monumental stairway of the sixth-seventh century basilica (which measured ca. 20 m wide and 34 m long) in the atrium area where the Area Excavation team found additional evidence of floor mosaics; on an upper floor level additional sections of the large mosaic pavement were found laid with large white tesserae in diamond shape squares with crosses in the center of the squares; some 30 cm below

1. Abila/Quwayliba on the Wādī Quwayliba is an archaeological site located about 15 km north-northeast of Irbid and 4 km south of the Wādī al-Yarmūk.

2. The excavation season was also sponsored by Cincinnati Bible College and Seminary, Ohio, Calvin Seminary, Grand Rapids, Michigan, and by Cascade Seminary of Biblical Languages, Minneapolis, Minnesota.

3. Our extensive survey and excavations since 1980,

as well as the many building remains visible in all directions all over the site, point to the fact that sections of the city existed, varying in size from archaeological period to archaeological period, on the two tall and in the saddle depression as well as east to west on both sides of the stream which flows from the spring in the main valley, Wādī Quwayliba, north to the al-Yarmūk Valley. Ancient Abila has a long archaeological history extending from about 3500 BC to 1500 AD.

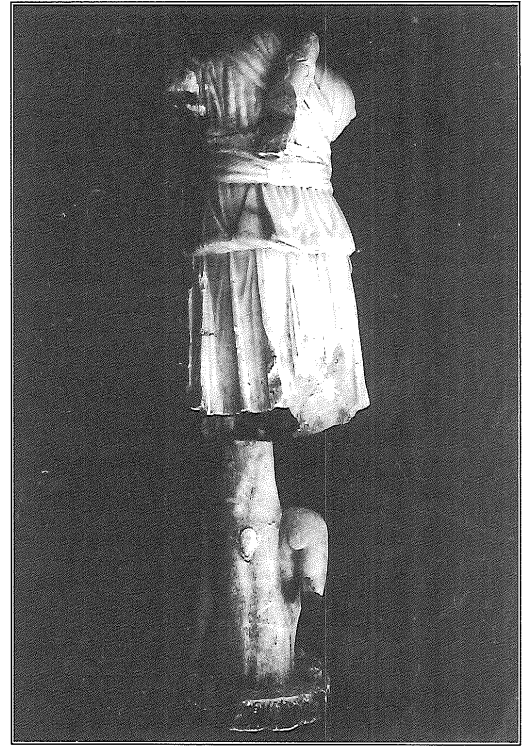


PROPOSED PLAN
OF
ANCIENT ABILA

ANCIENT ABILA
WATER TUNNEL

1. Plan of Ancient Abila, with Aqueducts.

that upper floor the team found another level of mosaic flooring in geometric and spiral cross designs, a floor belonging to an earlier building, presumably an earlier Christian basilica, or possibly to a Greco-Roman temple. The team also excavated outside and south of the acropolis wall (to the south of the church's atrium) and found considerable quantities of Early Bronze sherds, suggesting that Abila's Early Bronze settlement extended over a larger portion of the tall beyond that found to the east in Area AA. A probe was made just to the west of the atrium in an attempt to find remains of the *Cardo Maximus*, but instead, large quantities of Early Bronze sherds were also found, as well as sherds of later periods; the north-south street is presumably to the west of the probe, in an area near a tower-like structure which we partially excavated in 1994. In a series of probes along the north wall of the Area A basilica the team found extended sections of the Byzantine sub-surface water channel which had coursed its way west-southwest from the sections of it in Area AA on the east, extending toward a cistern, presumably under or along the north wall of the church, a water channel which no doubt collected rain water from the roofs of the public buildings on this area of the tall's acropolis and directed it to the church's cistern for use in the church's religious activities. It was here in the debris along the north wall of the Area A basilica that the team found a large, life-size, well-sculptured, white marble statue of the Greek huntress goddess Artemis (Roman goddess Diana). Aside from the head and arms and one leg which were missing, the majority of the statue, measuring 1.64 m in length, was preserved, including the torso with its well-sculptured folds, belt and quiver on the back, and one leg, with well-sculptured foot and sandal and post, and the hind quarters of a small deer; on the base were small marble projections indicating the place where the second leg had been attached (Fig.2).



2. Marble Statue of Artemis, back view, with Quiver.

Tall Abila (The North Tall), Area AA
(Glenn A. Carnagey and Susan Ellis-Lopez)

In Area AA, located just to the north-east of the central and north apses of the Area A basilica the excavation team further deepened the 12 m probe of Area AA 1 where Middle and Early Bronze Age phases were exposed, producing loci of Early Bronze I, II, and III. In Square AA 5, just to the east of AA 1, excavation at a higher level than in AA 1 produced a mixture of pottery of different periods, but as excavation here continued increased quantities of Early, Middle and Late Bronze Age sherds kept coming to light. In the squares to the east of AA 1 and 5 and AA 7 the team found additional artifactual evidence pointing to phases of Byzantine habitation and living surfaces, and uncovered additional sections of the sub-surface Byzantine water channel (plastered), including the east end of the channel at the east crest of the acropolis; it was into this hydraulically plastered channel that presumably water spouts (*simae*) spaced along the roof edge of

the large public buildings emptied their rain water.

The Saddle Depression. The Theater Cavea, Area B (Bastiaan Van Elderen)

In the saddle depression between the two tall, at the theater cavea (Area B), the 1994 excavation team uncovered increased sections of the extended Byzantine basalt street, both in its north extension toward the east-west Decumanus, and also to the east and north, demonstrating that this street ran in a semi-circle from the Decumanus: south from the east edge of the Area E cruciform basilica, then west between the theater cavea and the bath/nymphaeum, and then north to join the Decumanus again; this agrees with our projection about the street in our previously published plan of Ancient Abila. Also next to the section of the Byzantine basalt street, near where it extends over the earlier Roman limestone street/plaza, the team uncovered a large section of mosaic of white tesserae laid up against two walls constructed at about a 75 degree angle to each other. The team also made an extensive probe back into the middle level of the theater cavea up against a large perpendicular wall there, uncovering a large statue niche (ca. 3 m high; the Greek letters ΔΙ (part of the spelling of Zeus in oblique cases), were painted on the back upper curve of the niche, suggesting that a statue of Zeus was placed here), and a large quantity of fragments of glass goblets and numbers of lumps of glass slag, all pointing to the existence of an ancient glass installation in the immediate area in the Roman-Byzantine periods.

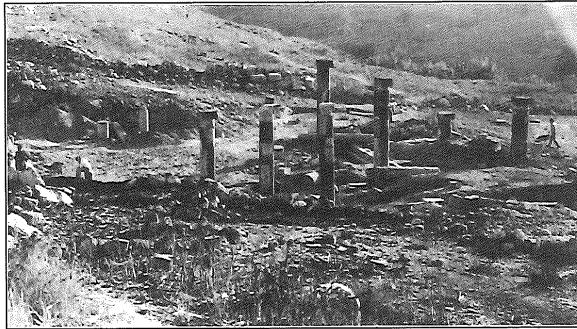
Saddle Depression. The Bath/Nymphaeum Complex, Area C (John R. Lee and Steven McDougal)

At the massive pile of ruins, the proposed bath/nymphaeum complex, just to the north of the theater cavea, the Area C team probed

farther into Area C 2, exposing more of the erect column there which seems to be resting on a floor surface, but the team was not able during this season's work to reach that floor surface. On the east side of the ruins the team exposed a number of later secondary walls just in front of the domed arch there, which punctuates the middle of this east façade. They also exposed two of the water sluices which emptied the Umm al-'Amad Aqueduct's volume of water from 'Ayn Quwayliba into a large vaulted settling basin/tank on the north side of the structure. Also through a square excavated just above one of the sluices they were able to clear out some of the debris in it. Just west of this vaulted basin /tank and sluices the team also cleared away the debris of another settling basin/tank, which contained two reused basalt sarcophagi placed on either side of the basin and used as smaller distribution containers; they also found there the remains of an additional sluice. To the immediate south of this second distribution basin/tank, but on a lower level, the team found an additional vaulted settling tank extending far back into the structure. Calculation derived from the electronic total station and the use of other measurements indicate that the bath/nymphaeum complex measured approximately 25 m on each of its sides.

The Saddle Depression. The Byzantine Basilica, Area E. (Clarence Menninga)

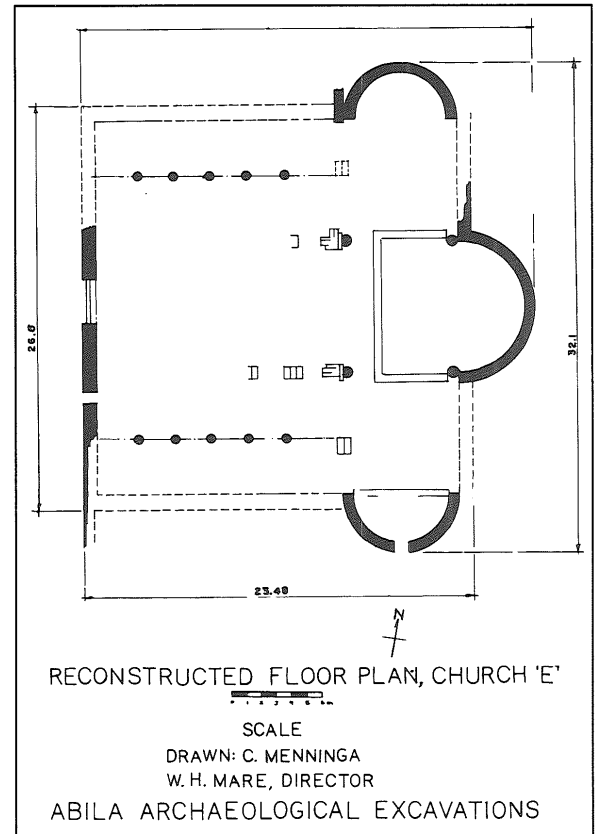
In the Area E basilica, located just to the north-east of the bath/nymphaeum complex, on the lowest terrace and just to the west of the Roman bridge (Fig.3), the excavation team probed the north and south sectors of the structure near the point where the church's central iconostasis begins. The objective was to see if the church was cruciform in design. Here on the south they excavated the exposed remains of part of a semicircular wall and found the lower courses of a south side apse, together with the foundations of an iconostasis screen and posts and two small sections of



3. Area E Basilica.

mosaic flooring; a small opening in the center of this apse on the south may point to the reuse of this section of the basilica as a mosque. Additional probing on the north side of the basilica produced lower courses of a similar north side apse, together with a mosaic floor within this apse. The archaeological evidence shows that the Area E basilica was cruciform in plan. Probing within the central altar area did not uncover any mosaic fragments, nor any burials. Further in the west section of the basilica, excavating along the south side of the nave and in the outer south aisle, did not produce any evidence of the stylobates for this five-aisle church, nor any flooring, leading to the conclusion that these materials had been removed from the basilica in ancient times. Following the removal of a 4 to 5 m overlay of debris covering the western sector of the basilica, debris which had filtered down the saddle over the centuries, including massive amounts of sheep dung from modern shepherding activity,⁴ a portion of the western wall of the church was uncovered, together with a central entrance with the threshold stone, and a south aisle entrance (Fig.4).

Contrary to our original projection of a rectangular structure here,⁵ this Byzantine basilica, cruciform in plan, is almost square, being ca. 32 m in width (including the side apses), and ca. 26 m in length. An exciting find in the debris came to light: the team



4. Area E Basilica, Top Plan.

found the Abila Excavation's first full inscription inscribed on the bottom section of a long granite column which had been reused in the church; the inscription (studied and published by Bastiaan Van Elderen, the Staff Epigrapher) began with the familiar second century AD formula (found in inscriptions at Jarash), "Agathe Tyche"; the shape of the letters also indicates that the inscription was composed in the late second century AD.

The inscription reads: ἀγαθῇ τυχῇ ὑπερ σωτηρίας τῶν κυρίων Δισχασδεινίου φιλοτειμησάμενος ἐκ τῶν ἰδίων τὸν στῦλον ἀνήγειρεν ἕξ(ησεν) κς. Van Elderen's translation reads, "To good Tyche: For the safety of the rulers, Dischasdeinionus, having achieved his ambition, from his own expenses erected this column. He lived 26

4. Earlier excavation of this material showed a thorough mixture of pottery material from all the archaeological periods.

5. We had estimated it to be about 25 m wide and 40 to 60 m in length - similar proportions to the Area A and Area D basilicas.

[years].”

Our conclusion is that the column and inscription had decorated some public building, possibly a temple, and then the column was later reused in the church.

Umm al-‘Amad (The South Tall), Area D
(Robert Clarke and Ward Patterson)

At the seventh century AD basilica on the south tall, Umm al-‘Amad, the excavation team uncovered, outside the south wall and toward its west end, more mosaic floor in squares to the west of those excavated in 1992; this mosaic was composed mainly of plain white tesserae, but in some cases the tesserae were of geometric design in red, black, etc. This additional evidence of flooring indicates that there was an extended series of service rooms along the church’s south wall. The team made an additional probe just to the west of the monumental porch columns but by the dig’s end they had not reached the mosaic flooring which had shown up in an earlier season. The team placed major emphasis in excavating the surface ruins (walls, column drums, etc.) in a sector across the modern path just to the north-west of the basilica to see what relationship there might be between these ruins and the basilica. Here in several squares the team found a basalt threshold leading into some building to the north, together with a pavement under which ran a sub-surface drain which in its turn seems to have run towards the cistern located just north of the Area D basilica whose water served the needs of the church. Also in this north-west sector mosaics on two floor levels were found, the upper floor level showing circular patterns and crosses and other designs.

Umm al- ‘Amad (The South Tall), Area DD
(David Vila)

Area D is a new area on a lower level and across the modern road several meters

to the west of the porch of the Area D basilica; this area was separated in 1994 from Area D because of the discovery there in 1992 of the apse of an earlier basilica (Fig. 5). This apse contained an inscribed mosaic floor in geometric design. Here in 1994 the excavation team, in probing to the north of the apse found in 1992, uncovered two additional apses, thus showing that this earlier basilica was triapsidal; in two of the apses inscribed mosaic floors were found. In probing to the south of the south apse the south wall of the basilica was uncovered, and excavation to the west of the apses revealed in the area of the south aisle patches of mosaic floor, of circular pattern, and a cache of glass lamp fragments, together with one complete glass lamp with projecting glass stem. Conclusion: the basilica had an elaborate system of ceiling-hung circular chandeliers/candela (into which glass lamps were inserted) for extensive illumination of the church. Also found here with the glass cache were parts of a brass jug with a metal handle cast in the form of a leopard, a vessel probably used to fill the chandelier glass lamps with oil. Just west of the central apse the team found remains of the foundation blocks (of the iconostasis) for the basilica’s altar area inside of which was opus sectile paving, including a block carefully incised with a circle and a carefully inscribed Christian cross within the circle. Some 12 m to the west of the north apse the team found the church’s deep cistern (ca. 3 to 4 m deep), which produced large quantities of sherds from Late Roman through



5. Area DD Basilica, foreground; Area D Basilica, background.

the Ayyubid and Mamluk periods. With this mixture of pottery we conclude that this Byzantine church's cistern had been used by later inhabitants as a refuse for all kinds of pottery and pottery sherds which they found in this area. Nearby within the confines of the basilica numbers of secondary walls had been constructed.

During all of the 1994 excavation season the team found no evidence of stylobate material, column drums, bases or capitals, leading to the conclusion that when the nearby later seventh century AD basilica was being constructed, the builders ransacked the earlier Area DD Byzantine basilica, conveniently taking for reuse its basic building materials. However, that the church has three apses preserved shows that the structure had at least two stylobates and two rows of columns, presumably similar in plan to the Area D basilica.

Tomb Excavations. Areas H (Robert W. Smith)

In 1994 the tomb excavation team searched diligently along the east wadi slope of Wādī Quwayliba to the north-east of Tall Abila for further evidence of undisturbed Roman-Byzantine tombs. (Up through 1992 seventy-four tombs and graves had already been excavated.) Due to extensive unlawful modern looting, such tombs were hard to find, although one or two small graves were found and excavated, and one small undisturbed tomb complex was excavated. In addition, one or two tombs were salvaged. The tomb team spent considerable time this season finishing excavating and drawing the Area H 36 pottery kiln (found in 1992) located along the upper slope of Area H, where the potters could take advantage of an updraft from the strong westerly winds. The team was unsuccessful in finding the major earlier Iron and Bronze Age cemeteries. Through 1994 the Abila tomb excavation teams have excavated 84

graves, tombs, and tomb complexes.

The Educational Program (Reuben G. Bullard and Mark Damron)

The comprehensive Educational Program included lectures, featuring senior staff members, scheduled twice weekly centering on different disciplines, such as geology, epigraphy, the history of Abila and the Decapolis, ancient coinage, tomb excavation, expertise in the recording system, etc. In special lectures, Fawzi Zayadine, of the Department of Antiquities, gave a presentation on the History and Archaeology of Irāq al-Amīr, and Pierre Bikai, Director of the American Center of Oriental Research, 'Ammān, spoke on the Archaeology of Petra, emphasizing the New Scrolls discovered in a recently found Byzantine church there. Weekend educational trips for the staff included Jarash, 'Ammān, Pella and the Jordan Valley, Gadara, the Desert Castles, and an extensive trip to Petra, 'Aqaba, Wādī Rumm, etc., as well as visits to other sites.

Acknowledgements for the 1994 Excavation Season

The excavation was undertaken with the support of the Director-General of the Department of Antiquities of the Hashemite Kingdom of Jordan, and assisted by Sultan Shureidah, the Irbid Inspector of the Department of Antiquities and Wajeih Karasneh, the Umm Qays Inspector of the Department of Antiquities. The Staff consisted of 50 persons (46 from the United States, 2 from Canada, 1 from South Africa and 1 from the Fiji Islands), and 50 to 55 local workmen. The Department of Antiquities and the Ministry of Education of Jordan had arranged for the Abila Excavation Staff to use the facilities both of the Khurayba Boys School (Mr Jameel Naamneh, Principal) and the nearby Selah Girls School (Mrs Anneh Ababneh, Principal). The American Staff of

fifty members⁶ was very valuably aided by the Department representative, Sultan Shureidah, augmented by the local staff cook and his assistant and by the 50 to 55 local workmen hired for the various labor tasks in the field and in camp.

The Khurayba Boys School and the Selah Girls School, being near Abila provided easy access to the site as the American Staff was transported to the site each working day.

The Abila Excavation wishes to express its sincere appreciation to the Director-General of the Department of Antiquities, Dr Ghazi Bisheh, to Sultan Shureidah and Wajeeh Karasneh, Department Representatives, to all members of the Department of Antiquities and to all of the Abila Staff for their outstanding support and assistance, as they helped to make the 1994/1995 seasons of ex-

cavation at Abila of the Decapolis an outstanding success. We also extend our thanks to Dr Wesley Ulrich, M.D., and Aileen Coleman, R.N., for their many kindnesses in storing all of the Abila Excavation equipment at the Annoor Hospital in al-Mafraq, Jordan.

THE 1995 SEASON

Introduction

Our 1995 Abila of the Decapolis Special Underground Aqueduct Excavation from July 3 until August 5, was staffed with 10 members,⁷ together with Nassar Khursawneh, Department Representative, and with the valuable encouragement and cooperation of Dr Ghazi Bisheh, Director-General of the Department of Antiquities of the Hashemite Kingdom of Jordan, and with the important

6. Of the American Staff of 50 persons, the Senior Staff consisted of W.H. Mare, Director, Ward Patterson, Cincinnati Bible Seminary, Bastiaan Van Elderen, Calvin Seminary; John R. Lee, St. John Fisher College, Rochester, New York, Robert H. Kyle, Covenant Seminary; Glenn A. Carnagey, Cascade Seminary of Biblical Languages, Minneapolis, Minnesota; Robert W. Smith, Miami University, Ohio; John D. Wineland, Miami University, Ohio; Clarence Menninga, Calvin College, Michigan; Robert T. Clarke, III, Sweetwater, Tennessee, David H. Vila, St. Louis University; Susan Ellis Lopez, Heritage College, Mabton, Washington; Steven R. McDougal, St. John Fisher College; Timothy Snow, Cincinnati Bible Seminary, Hendrick Reitsema, Covenant Seminary, Camp Manager, and Joni VanDerPol, Covenant Seminary, Registrar. The General Staff members' positions were as follows: Area Supervisors and Assistants: John D. Wineland, Area A; Area AA, Glenn A. Carnagey, Susan Ellis Lopez; Bastiaan Van Elderen, Area B; John R. Lee, Area C, Steven McDougal, Area C; Robert T. Clarke, Area D Supervisor, Ward Patterson, Assistant Area D; David Vila, Area DD; Clarence Menninga, Area E Supervisor; and Robert W. Smith, Tomb Areas Square Supervisor included: Anne Albers, Robert Berry, Matteson Bowles, Ada Braun, Jared Bryson, Jody Cullen, Mark Damron, Ailen Dean, Derek Fishel, James Gray, Dr. Janet Gray, Christine Hitchcock, Josef Kahabka, Sudarsan Kant, John Kirchner, Bethany Madsen, Saralyn Madsen, Kevin Morrow, Dara Nykamp, Hendrick Reitsema, Riana Reitsema, Mark Sher-

man, David, Stegen, Sara Swinson, Marvin Taylor, Douglas VanDerPol, Mark Verbruggen, Susan Vila, Harrietann Weller, Leo Werner, Rachel Wheelles, and Connie Wineland. The Specialists were: Ceramicists, W. Harold Mare, Bastiaan Van Elderen and Glenn Carnagey; Architect, Harold Stigers, Robert Kyle and Jared Bryson, Assistants; Epigrapher, Bastiaan VanElderen; Osteologist, Robert H. Kyle, M.D.; Geoarchaeologist, Clarence Menninga; Zoologist, Jared Bryson; Photographer, Timothy Snow and James Gray, Assistant Registrar, Joni VanDerPol, Ada Braun and Roger Noble, Assistants; Daniel Dyke, Computer Imaging Director; Glenn Carnagey, Director of Computer Processing, Matteson Bowles, Derek Fishel and Jody Cullen, Assistants; Draftsmen-Artists, Robert Smith, John Kirchner and other members of the Staff; Educational Director, Dr Reuben G. Bullard and Mark Damron, Assistant. The Support Staff consisted of: the Department of Antiquities Representatives, Sultan Shureidah and Wajeeh Karasneh; the Camp Manager, Hendrick Reitsema; the Medical Advisor, Robert H. Kyle, M.D., and the Cooks and their assistant.

7. The Staff members of the 1995 excavation were as follows: W. Harold Mare, Director, James Gray, Area Supervisor; Robert Berry, Area Supervisor; David Vila, Area Supervisor; Janet Gray, Assistant Area Supervisor; Robb Ludwick, George Van Voorhis, Mary Van Voorhis and Jessica Robertson, Square Supervisors; and Elizabeth Mare, Business and Administrative Assistant. Several local Jordanians were hired to assist in the work.

assistance of Sultan Shureidah, Inspector of the Irbid Office of the Department of Antiquities.

The objectives of the 1995 excavation season were as follows: to trace in detail, map and find by excavation and survey the interlocking connections of the various underground aqueducts at Abila, and to show how they served to bring water into the civic center of Abila to meet its religious, cultural, commercial and industrial needs, as well as to supply the needs of citizens living in the outlying residential districts.

To meet these objectives, the following areas of excavation and investigation were planned:

1. *Area Aqueduct 1*, Work just to east of the Area C bath/nymphaeum complex in the underground vaults and settling tanks/basins.⁸
 2. *Area Aqueduct 2*, Work in the underground aqueduct segments along the east ledges of the south tall, Umm al-'Amad.⁹
 3. *Area Aqueduct 3 A*, Proceed with a Test Trench Project near the main spring, 'Ayn Quwayliba, and two probes to the east of the Area C bath/nymphaeum complex to trace the sluices which open into one of the Area C, Aqueduct 1 settling tanks/basins.¹⁰
 4. *Area Aqueduct 3 B*, Develop the Test Trench Project in the area of the Khurayba Aqueduct exit in the hill just south of 'Ayn Quwayliba, to see possible connections between the Khurayba underground aqueduct and the Umm al-'Amad underground aqueducts.¹¹
 5. *Area Aqueduct 4*, Investigate the newly discovered underground aqueduct opening found in the small wādī just to the west of Tall Abila and Umm al-'Amad.¹²
- Progress and objectives obtained were as

follows:

1. *Area Aqueduct 1*. In this area near the bath/nymphaeum complex, the team opened up the east-west underground vault, located just to the east side and at the north edge of the bath/nymphaeum; this vault was about 4 m below the upper structure of the main part of the bath/nymphaeum ruins. Then the team excavated the first segment of the underground north-south vault, also just to the east of the major bath/nymphaeum ruins. At the south end of this north-south vault segment large cut limestone blocks were resting within the soil in such a precarious position that the team was forced to open up a 4 x 6 m square at the soil surface above and just to the south of the underground north-south vault to expose properly the material below; in this 4 x 6 m square a north-south wall was exposed, the lower courses of which were of Roman construction.
2. *Area Aqueduct 2*. In this segment of the underground aqueducts which coursed their way south-north under the east ledges of Umm al-'Amad the excavators probed and dug out sections of the aqueducts where soil chokes had blocked their way, and then mapped these various interlocking and interconnecting aqueducts which brought water from 'Ayn Quwayliba on the south to the area of the bath/nymphaeum complex, located in the civic center in the center of Abila. The investigators determined that there were two, and possibly three, Umm al-'Amad underground aqueducts, with many cross channels linking the system together, in the segments of which the masons cut openings from the surface down to the

8. James Gray, Robb Ludwick and George Van Voorhis.

9. Robert Berry, Robb Ludwick and George Van Voorhis.

10. David Vila, Janet Gray, Mary Van Voorhis and

Jessica Robertson.

11. George Van Voorhis.

12. W. Harold Mare, Robert Berry and Robb Ludwick.

tunnel channel level (openings in Latin called, *putei*, or *lumina*) every 30 to 40 m, spaced in this manner for access, fresh air, cleaning, and to make the digging procedure less complicated. The masons who dug the aqueducts also cut small lamp niches into the sides of the walls of the aqueducts into which they placed small ceramic lamps to provide light when they were chiseling out the aqueducts; these niches no doubt were also used for the lamps of those who later repaired or cleaned out the aqueducts. At several points stone platforms were placed part way down in the openings, with holes cut into the platforms to allow persons standing on the platforms to lower their buckets through the holes to obtain water for their personal use. In the excavating and mapping process, with the use of a Brunton compass, the team was able to determine that these Umm al-'Amad underground aqueducts extended north as far as the small hill just east of the theater cavea, to a point just south of the bath/nymphaeum complex. To the south the aqueducts extended to the vicinity of 'Ayn Quwayliba, and in one case, the team, through its underground mapping, established that one of the underground aqueducts actually extended west, and slightly north, some 30 m beyond 'Ayn Quwayliba, giving further support to the hypothesis that the Umm al-'Amad aqueduct system connected somehow with the Khurayba Underground Aqueduct which exits on the lower slope of the hill to the south of Umm al-'Amad; the Khurayba Aqueduct's exit on this south slope of Wādī Quwayliba was about 400 m to the south-west of 'Ayn Quwayliba. At the north end of the Umm al-'Amad Aqueduct system near the bath/nymphaeum complex the excavation team found, deep underground, a well constructed Roman arch/vault with settling tank/basin.

3. *Area Aqueduct 3 A.* The excavation team here laid out and excavated three test trenches along surface water courses near 'Ayn Quwayliba (water courses which headed in the south-west direction toward the Khurayba aqueduct exit) to try to find surface openings into any interconnecting underground aqueduct, linking the Khurayba system on the south with the Umm al-'Amad system on the north. These test trenches did not uncover any surface openings (*putei*) into an interconnecting underground aqueduct.

This excavation team then moved to the Area Aqueduct 1 sector, to open up two 4 x 4 m squares, east of the bath/nymphaeum and a few meters south of two collapsed sluice openings which brought water north into the east-west underground vault just east of, and on the north edge of, the bath/nymphaeum complex. The team opened up these two squares in an attempt to find out more of the nature of these sluices cut in the rock below the soil layer, to find out the specific direction they extended south, and in the process to understand better how the sluices connected with the Umm al-'Amad Underground Aqueduct system running north from 'Ayn Quwayliba. In the process of excavating these two squares the team uncovered a fine flagstone floor belonging to some, as yet unidentified, building, and an apse (extending east), which may be part of ruins of another Abila church; if this latter hypothesis proves to be correct we would now have a total of six churches thus far found at Abila of the Decapolis.

4. *Area Aqueduct 3 B.* In the area in and around the Khurayba aqueduct exit at the south slope of Wādī Quwayliba, the excavation team laid out several test trenches in an attempt to find more evidence of the connection between the Khurayba underground aqueduct, south, and the Umm al-'Amad underground aqueducts, north.

At the outer north edge of the Khurayba aqueduct exit the investigators excavated and traced a plastered platform extending north, with two descending steps, leading down about 2 m to a place where the water then flowed into an underground receptacle leading north-east toward one of the Umm al-'Amad aqueducts.

5. *Area Aqueduct 4*. The team of excavators here investigated the newly-found, well-cut *putei* type surface opening leading deep down into some type of channel. This opening is located on a higher level than the *putei* openings leading into the Umm al-'Amad underground aqueducts. This installation, located in a shallow wadi just west of Tall Abila and Umm al-'Amad, consisted of an opening which gave access to a shaft descending on about a 60 degree slope. By carefully repelling down the shaft, the team determined that the shaft was 24 m deep, ending up on a floor of accumulated rock and debris which had fallen in during the centuries. This accumulation of debris prevented the team at the time of their investigation from

making a further descent into what we think might be an additional north-south underground aqueduct system, running from north to south toward 'Ayn Quwayliba to link up with an interconnecting underground aqueduct in the south Wādi Quwayliba and also with the Umm al-'Amad system near 'Ayn Quwayliba.

Conclusions on the 1995 Special Aqueduct Project

From our 1995 Abila of the Decapolis underground aqueduct and settling tank investigation and excavation, we have determined that the Abila water collection system was well planned, intricate and more extensive than we had originally thought.

We propose that this system was essentially constructed on the Roman model described by Sextus Julius Frontinus, the first century AD Water Commissioner at Rome.¹³

W. Harold Mare
Covenant Theological Seminary
St. Louis, Missouri, 63141
U.S.A.

13. Frontinus, *The Aqueducts of Rome*, tr. C.E. Bennett; .B. McElwain, (ed.) in *The Loeb Classical Library*, Book I (Cambridge, Massachusetts:

Harvard University Press, 1961). Exploration Fund 1889: 30.

TALL NIMRĪN: PRELIMINARY REPORT ON THE 1995 EXCAVATION AND GEOLOGICAL SURVEY

by

James W. Flanagan, David W. McCreery and Khair N. Yassine

Introduction

The fourth season of excavation at Tall Nimrīn in ash-Shūna South was conducted from May 25 through July 5, 1995. James W. Flanagan of Case Western Reserve University, David W. McCreery of Willamette University, and Khair N. Yassine of the University of Jordan again served as co-directors. The excavation staff comprised twenty-seven scholars and students from Jordan, the United States, and Canada.

The project's long term goal is to document the site's occupational sequences, with special emphasis on the environmental, ecological, and economic history of the Tall and its immediate vicinity. In this, the final season of the first phase of the project, four specific objectives were set. The first was to complete excavation and correlate findings in several squares that had been opened in previous seasons (N25/W50, N35/W20, N35/W25, N40/W20, N40/W25).¹ The intention was to gather more data from the Byzantine, Persian, Iron I-II, and Middle Bronze Age strata (Fig. 1: location of squares excavated in 1995).

Second, in order to further document the context of the Byzantine coin hoard found in 1993 (Flanagan, McCreery and Yassine 1994b) we chose to excavate square N35/W30. The square is adjacent to and immediately west of the one that yielded the hoard and also immediately north of a square that produced ostraca in 1993.

A third goal was to pursue geological/

archaeological research both in the immediate region and along the eastern shoreline of the Dead Sea. For logistical reasons, this research was separated from the excavation season and took place in late August and early September.

The final goal was to advance and enhance the digital records of the project. Additional work was done on the computer programs used to record and report on field activity, and digital photography was used for important elements of the project. A Kodak/Nikon DCS200 camera was used in the field and camp in an effort to expedite electronic publication of results.

Stratigraphy

Preliminary stratigraphic analysis has identified eight major strata and thirteen phases of occupation from the 1995 excavation.

Modern (Stratum VIII)

Stratum VIII, consisting of modern topsoil and recently erected fence posts, was removed from N35/W30. Before excavation, the surface of N35/W30 sloped sharply from south to north (from -188.42m MSL at N35/W30 to -190.96m MSL at N40/W30). The loose surface soil containing plastic-coated copper wire, black PVC fragments, and other modern debris, attests to the post-1967 military presence on the site, but the shallow depth of this deposit (0.15m-0.30m) indicates that there was not extensive bulldozing or other disturbance in this square as

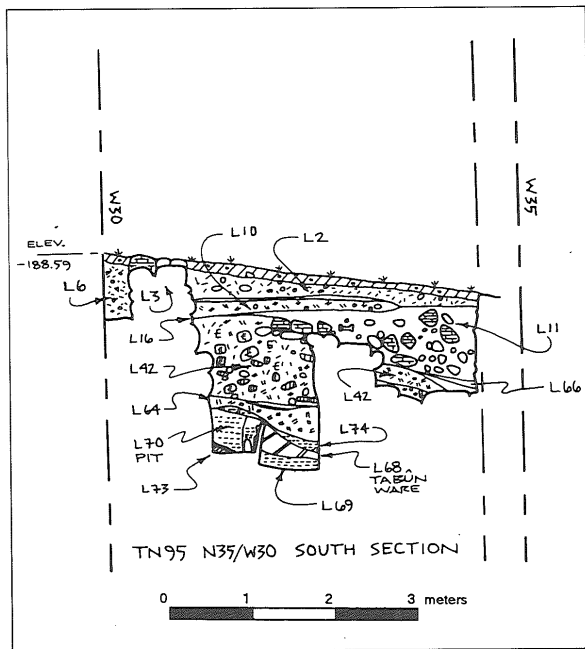
1. In accordance with the polar point system used to map and identify excavation squares at Tall Nimrīn, each five meter square on the site grid is identified by the single point closest to the central

reference point (00/00), on top of the tall. Thus, N35/W30 refers to the five meter square whose SE corner lies 35 m north and 30 m west of 00/00.

was the case in N25/W20 to the south and N50/W00 to the east.

Mamluk (Stratum VII)

Glazed and painted Mamluk ceramics were found in abundance scattered on the surface of Tall Nimrīn (Flanagan, McCreery, and Yassine 1990; Dornemann 1990). Although the Mamluk stratum appears to have been extensively damaged by bulldozing (especially near the summit of the tall), stratified material had been found during the 1990 and 1993 excavations in squares N15/W70, N20/W70, N20/W65, N25/W50, S40/W175, and S40/W170 (Flanagan, McCreery, and Yassine 1992:102-105; 1994a:207-208). Apart from Mamluk pottery recovered from balk trim in N25/W50, the only stratified late Islamic material found in 1995 came from N35/W25. The latest *in situ* occupational loci were a large pit, L39 (1.35m in diameter and 0.67m deep), and surfaces L10 and L16 (Fig.2). These loci produced distinctive Mamluk painted and glazed ceramics, providing the first documented examples of stratified late Islamic occupation near the summit of the mound. Due to their proximity to the mod-

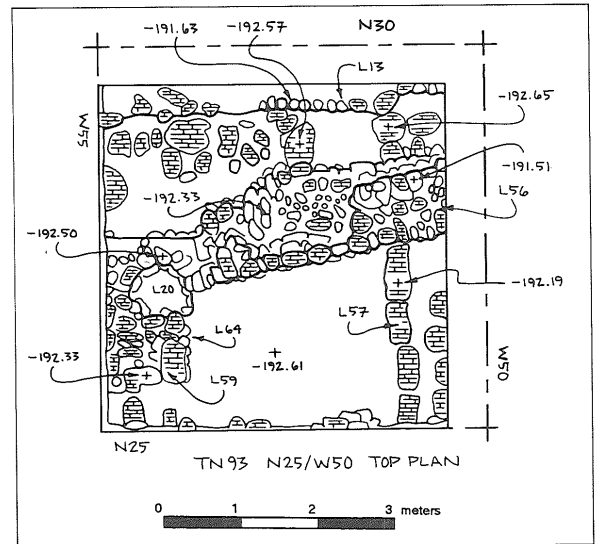


2. N35/W30 South Section.

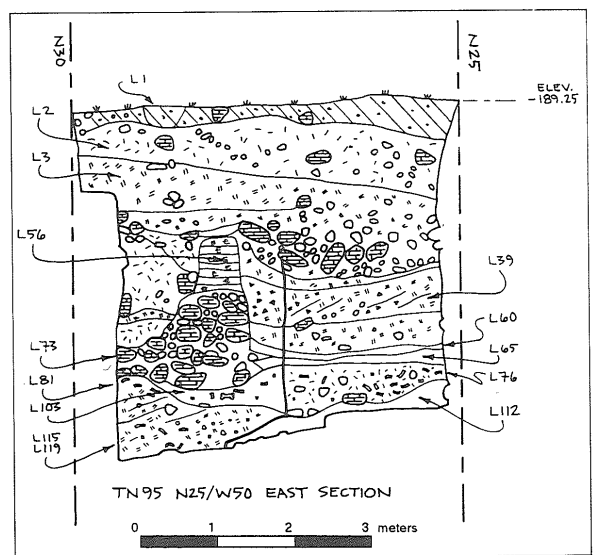
ern surface of the tall, all of these loci had suffered some damage and were only partially preserved.

Late Byzantine/Umayyad (Stratum VI)

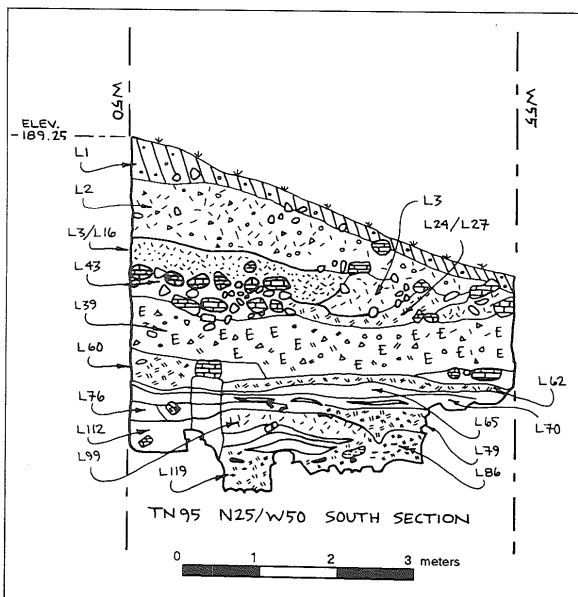
Stratum VI was best represented in N25/W50 where it consisted of stone alignments L56, L57, L59, L64 and associated surfaces L60, L62, L65, L67, L68, and L69 that were identified near the end of the 1993 season and removed at the beginning of the 1995 excavation (Figs.3, 4 and 5). As was noted in the 1993 report (Flanagan, McCreery and Yassine 1994a: 208), these walls and surfaces appear to date to the early Umayyad pe-



3. N25/W50 1993 Final Top Plan.



4. N25/W50 East Section.



5. N25/W50 South Section.

riod or possibly the late Byzantine period. Wall L57, which abuts wall L56 and overlies the surfaces associated with L56, represents later building activity at the end of this phase. Careful analysis of the ceramics and stratigraphy of the loci mentioned above will hopefully allow more precise dating of this stratum in the near future. Late Byzantine and Umayyad pottery was also recovered from N35/W30, but Stratum VI is close to the modern surface and badly eroded in this square.

Roman/Byzantine (Stratum V)

A series of fill layers--L792, L81/72/9², L85, and L86/105-- were below the structures of Stratum V in N25/W50, but they have been tentatively assigned to Stratum V. The collapsed locus L79 contained large quantities of ash and burnt material, including burnt mudbrick, but very little charcoal suitable for C-14 dating. Two other important loci associated with this phase are pits L110 and L123. No stone alignments or other distinctive architectural features were detected in this phase in N25/W50.

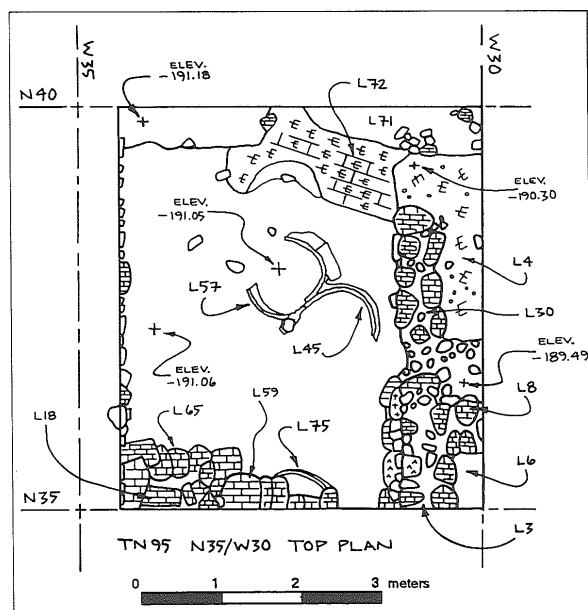
The mixed pottery readings from this stratum suggest that careful analysis is needed to determine whether the fill layers actually date to the Roman/Byzantine periods or to the Persian period. Pits L110 and L123 are either late Roman and/or early Byzantine, and they seem to be roughly contemporary. Although the fill layers contained some Roman and Byzantine ceramics, late Iron II and Persian period pottery was much more abundant. The fill layers may date to the Persian period (Stratum IV) and have been contaminated by the late Roman/early Byzantine pits (L110 and L123) cut into them.

Stratum V is well represented in N35/W30 although the remnants of this stratum have eroded away from the northern end of the square. Stone walls L8 and L3 are the most prominent Byzantine remains in N35/W30. L8 is an E/W oriented stone alignment two rows (0.65m) wide and four courses (0.69m) high. It extends 1.05m into the square from the eastern balk and corners with N/S stone wall L3. L8 appears to be an extension of walls L7 and L29/32 from N35/W25 (Fig.6), and like them, displays evidence of two construction phases. Stone wall L3 is two rows (0.65m) wide, six courses (1.10m) high, and extends 1.55m into the square from the south balk. Although L3 was constructed during the Byzantine period, it appears to have been reused in the Mamluk period as is indicated by its association with the Mamluk surfaces L10 and L16 (see Figs.2 and 6). N/S stone wall L30 may be the northern extension of L3 but this has not been firmly established (see Fig.6).

Poorly preserved white plaster surfaces L64 and L66 are probably the remnants of Byzantine floors contemporary with walls L3 and L8 (see Fig.2). Cobble layers L31 and L22 also appear to be rough Byzantine

2. L79 combines L80/82/102 which according to the project's system of retaining the lowest number for collapsed loci, constitutes L79. Elsewhere, two or more locus numbers separated by slashes indicate

loci that have collapsed. Thus L79/80/82/102 would indicate that loci L79, L80, L82, and L102, have collapsed into Locus 79.



6. N35/W30 Final Top Plan.

surfaces or possibly bedding for destroyed plaster floors. Occupational debris associated with these walls and surfaces includes L4 and L62. L4 is composed of reddish mud-brick material containing numerous plaster fragments, very similar to the Byzantine layers found south of wall L7 in N35/W25 in 1993.

Two factors frustrated attempts to clarify the stratigraphic context of the 1993 coin hoard: first, the erosion of the Byzantine stratum in N35/W30, and second, the fact that walls L3 and L30 run parallel to and very near (0.28-0.48m west) the east balk (see Fig.6). Excavation of the soil layers associated with the coins (L3/5/10 in N35/W25, 1993 excavation) was impossible. However, it does appear that walls L30, L3, and L8 in N35/W30 and walls L7 and L8 in N35/W25 constitute the west, south, and east walls of a Byzantine room in which the coins were discovered.³ As indicated in the 1993 report (Flanagan, McCreery and Yassine 1994a:210), the building appears to have gone out of use sometime before the coins were deposited in it.

3. No sign of a connecting north wall has emerged in either N35/W25 or N35/W30. Both the current slope of the tall and the stratigraphy at the N35 balk

Persian (Stratum IV)

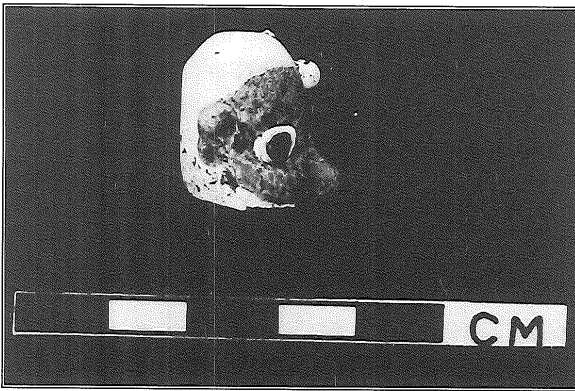
Very few Persian period architectural features were identified even though Persian pottery was found in abundance. In N25/W50, Stratum IV was represented by a series of surfaces L90, L106, L107, and L104/108, but none were found in association with contemporary architectural features. All of these surfaces slope down from south to north becoming much thicker in the northern part of the square. L90, L106, and L107 are all cut by the Stratum VI wall L56, foundation stones L100, and foundation trench L103. All of the surfaces are cut in the west by the Stratum V pits L110 and L123. The series of four surfaces cover Persian period fill layers L113, L115, L119, L120, and L122. These also slope up dramatically from north to south. The slope of the layers and overlying surfaces suggest the presence of a large structure, probably belonging to an earlier phase, located south or southeast of N25/W50.

A stamp seal with the incised profile of a lion (Fig.7) and a glazed, male figurine head (Fig.8) were found in the Persian period stratum (L104) in N25/W50. The objects were analyzed by Art Heuer at the Materials Science and Engineering (SEM) Laboratory at Case Western Reserve University. Initial results of this analysis are illustrated in Figs. 9-



7. Seal (RO no.1) from N25/W50 L104.

line indicate that all traces of the northern wall have eroded.



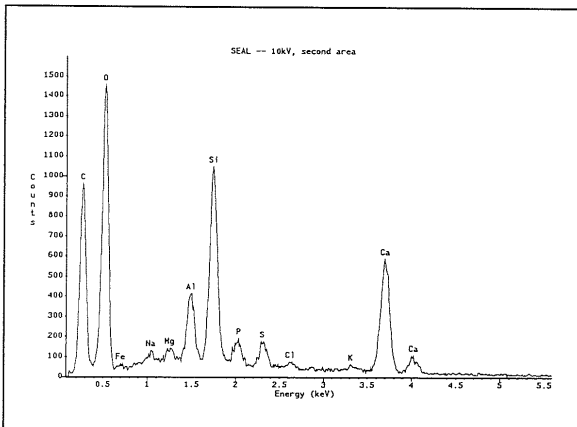
8. Figurine Head from N25/W50 L104.

12.

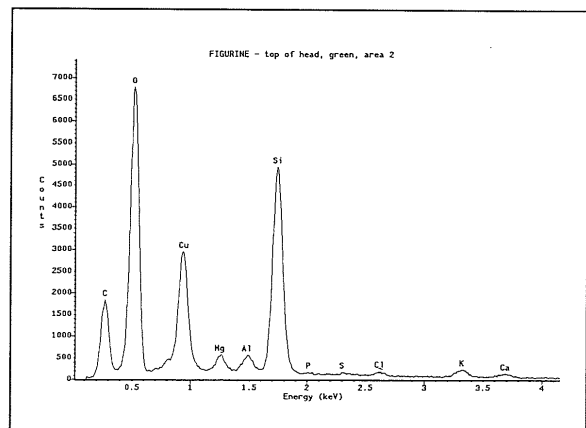
The preliminary analysis of the data indicates that the seal is composed primarily of calcium carbonate (calcite) and silica (Fig.9), and the chemical composition of the glazes on the figurine is variable (Figs. 10-12). The white area on the crown of the figurine head has high aluminum (Al) con-

centrations (Fig.10), the green areas near the forehead are high in copper (Cu, Fig.11), the tan area of the face has high lead (Pb) levels (Fig.12), and the black eyes have relatively high silver (Ag) content. A more comprehensive report of this analysis will appear soon in the Tall Nimrin electronic publication.

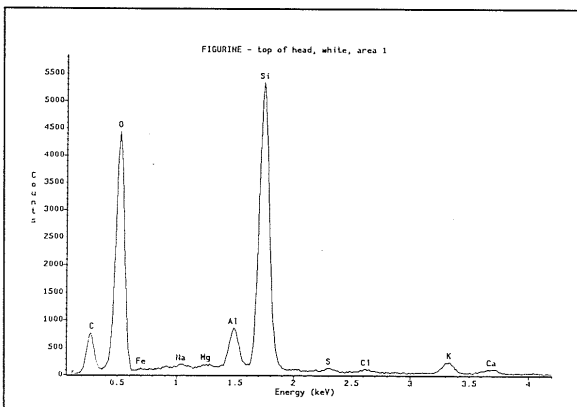
The Persian period occupation in N35/W30 is only attested by two stone alignments, L65 and L63. L65, which extends E/W 3.50m from underneath L3 and L63 near the east balk, is a poorly preserved alignment of limestone cobbles and boulders one course high and one-two rows (0.5-1.0m) wide. It slopes down gradually towards the west and was badly damaged by the Mamluk pit L39. L63 overlies L65 along the same alignment and may either be a later phase of L63 or equal to L65. Both L63 and L65 ap-



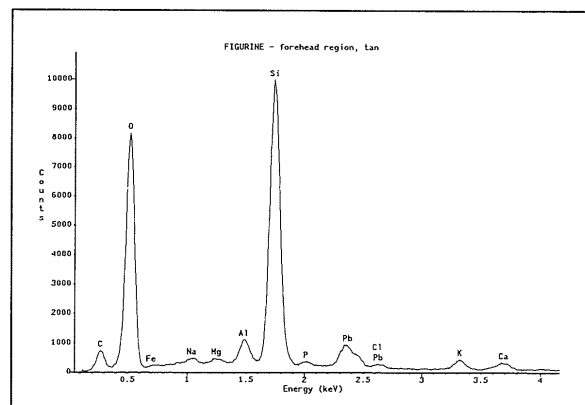
9. SEM Analysis of Seal (RO no.1) from N25/W50 L104.



11. SEM Analysis of Green Glaze on Figurine Head from N25/W50 L104.



10. SEM Analysis of White Glaze on Figurine Head from N25/W50 L104.



12. SEM Analysis of Brown Glaze on Figurine Head from N25/W50 L104.

pear to be the western extension of the lower courses of wall L32 in N35/W25 which was dated to the Persian period in 1993. No clearly defined living surfaces were detected in association with L63 or L65.

On the last day of excavation in N35/W30 a four letter ostracon was excavated in the trim of the western balk and identified during pottery reading. It consists of a four letter, single word inscription written on the exterior of a small (roughly 5cm x 4cm) jar sherd (Figs.13 and 14). The inscription is approximately 2cm long and the letters, each of which is clearly legible, range in height from 0.5cm to 1cm. The script is very similar to that of other ostraca found in nearby squares and appears to date to the late fourth century BC (Flanagan, McCreery and Yassine 1994a:221-222; Dempsey 1993).

Project epigrapher Deirdre Dempsey's preliminary field reading of the ostracon is "klyh" which may be a personal name meaning either "YH is perfect" or "YH has measured", where YH would be a theophoric element (pers. comm.). A similar ostracon found in N30/W25 in 1993 had an oddly shaped "yod" that was initially read as a "nun" (Flanagan, McCreery and Yassine 1994a: 222). In light of this year's inscription, which is clearer than the 1993 os-

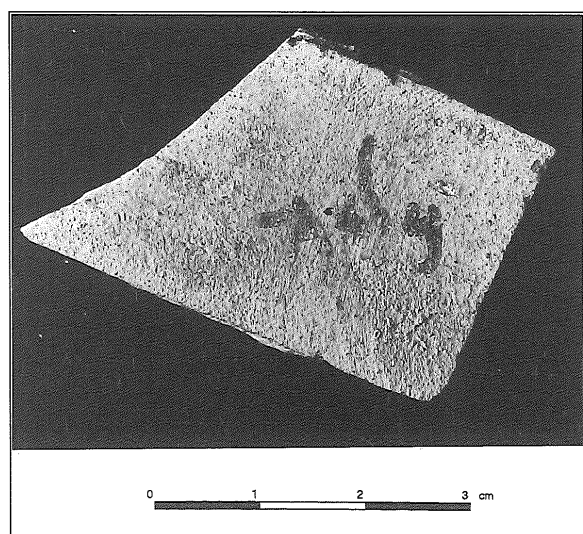
tracon, the previous reading should be amended from "klnh" to "klyh" (Dempsey, pers. comm.).

Iron II (Stratum III)

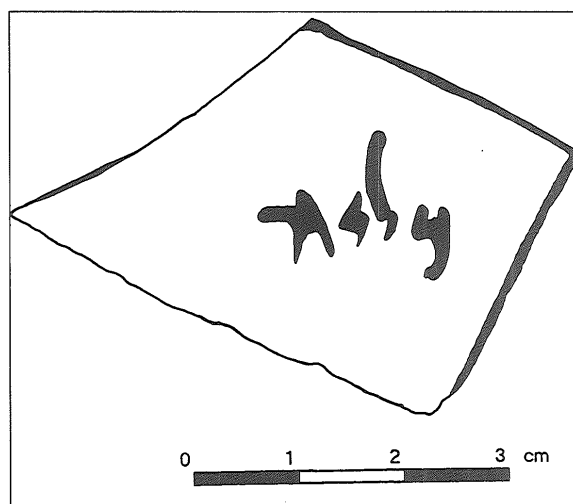
Four distinct Iron II phases were well attested in N35/W20, N35/W25, N35/W30, N40/W25, and N25/W50. Designated Stratum IIIA–IIID in this report, the four phases span approximately 200 years from the early ninth to the late eighth/early seventh centuries BC.

The earliest Iron II phase (Stratum IIIA) is tentatively dated to the early ninth century. It consists of cobble surface L203/230 and mudbrick walls L234 and L171 along with their stone foundations L251 and L204 in N40/W25 (Fig.15). The cobble surface and the associated walls may be part of a single building. However, this is difficult to ascertain because of limited horizontal exposure and damage caused by the pits of Stratum IIIB.

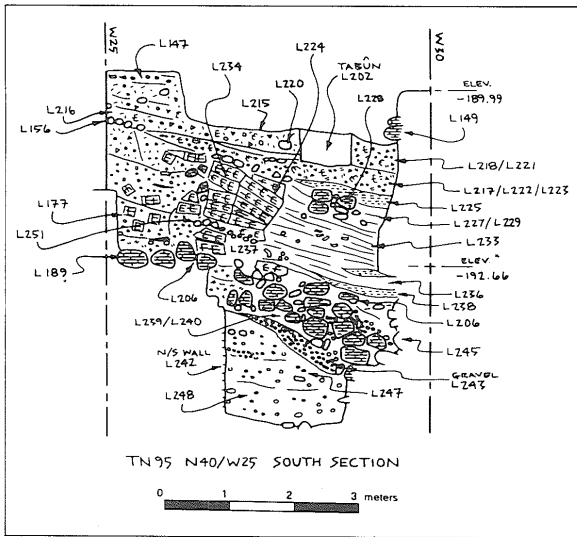
In N35/W20, the E/W oriented stone wall L91(=L181 in N40/W20), is the major Stratum IIIA feature. L91 is clearly associated with surface L69 in the east balk of N35/W20 and is contemporary with N/S stone wall L110 in the east section of N40/W20 and the ninth century mudbrick structure



13. Ostracon (RO no. 42) from N35/W30 West Balk Trim.



14. Ostracon (RO no. 42) from N35/W30 West Balk Trim.



15. N40/W25 South Section.

(L15 and L28) found in N25/W20 in 1989 (Fig.16). L91 follows the same alignment as wall L78(=L255 in N40/W20) beneath it. L91 appears to be rebuild of the tenth century wall (Fig.17).

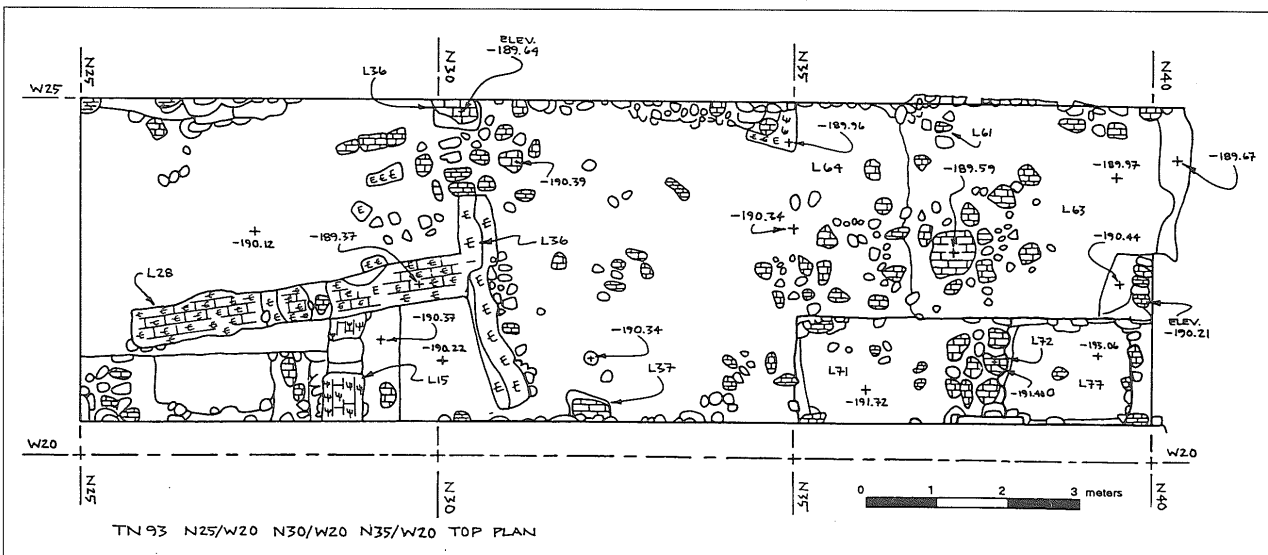
In the late ninth/early eighth centuries BC, a series of Stratum IIIB pits were dug, damaging the Stratum IIIA features described above (L173/186, L196/200, L231, and L235 in N40/W25 and L90 in N35/W20). The pits in N40/W25 range in diameter from 0.45m to 1.50m, from 0.49m to 1.05m in depth, and appear to be contemporary with the pits found in 1990 and

1993 in N25/W20 and N30/W20 which also cut into ninth century occupational layers (Flanagan, McCreery and Yassine 1994a: 216).

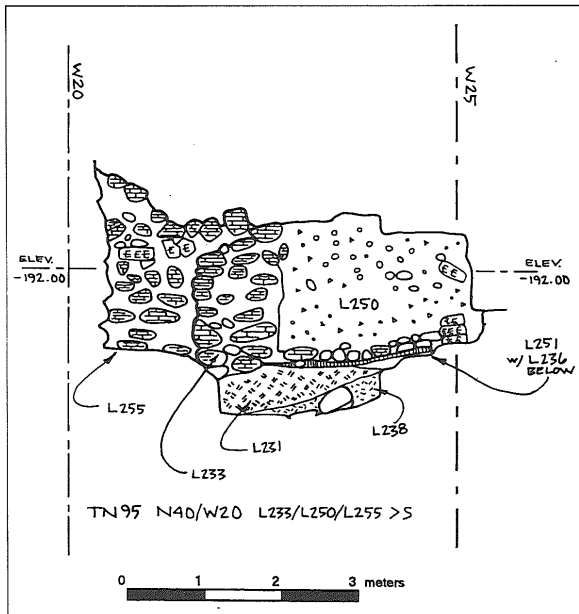
Extensive occupational remains of Stratum IIIC including walls, surfaces, and a number of *ṭawābīn*, immediately overlie the pits of Stratum IIIB. This phase is best preserved in N35/W30 and N40/W25. Two *ṭawābīn*, L202 and L165, and cobble surface L156 comprise the primary features of this phase in N40/W25 (see Fig.15). L202 (=L70 in N35/W25) is 1.0m in diameter, preserved to a height of 0.40m - 0.58m, and had 0.05m thick walls. *Ṭābūn* L165 was excavated in 1993.

The *ṭawābīn* contained, and were surrounded by, fine white ash (suggesting extremely hot temperatures), and sparse cultural material. The cobble surface associated with the *ṭawābīn* (L156 in N40/W25), extended into squares N40/W20 (designated L90), and N35/W20 (=L86). The E/W oriented mudbrick walls L95 and L66 in N35/W20 appear to be part of a structure associated with the exterior, cobble pavement L86 (L156 in N40/W20) and the *ṭawābīn* found in N40/W25.

In N35/W30, Stratum IIIC is represented by *ṭawābīn*, pits, and a mudbrick wall. L72 is



16. N25/W20, N30/W20, N35/W20 Top Plan.

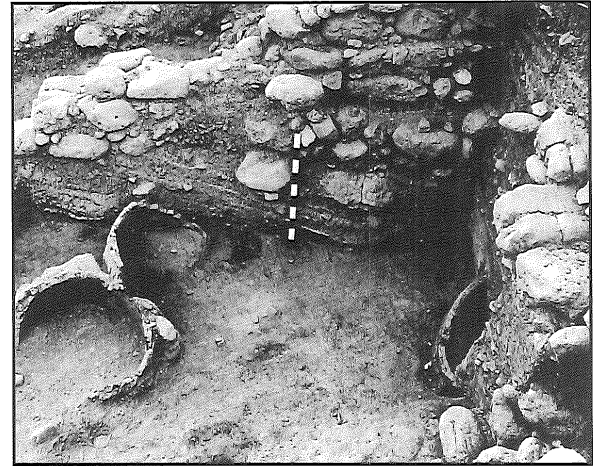


17. N40/W20 L233, L250, and L255 >S.

a mudbrick wall with only one course of preserved bricks resting on a stone foundation. The wall has a NW/SE orientation, is from 0.85-0.97m wide, and extends from under the stone wall L30 near the east balk, 2.68m into the northern end of the square. At N38.80/W31.90, L72 is truncated by a large pit, L46 (ca. 1.25m diameter). To the south of L72, four *ṭawābīn* in various states of preservation were uncovered (see Figs.2, 6, and 18).

All of the *ṭawābīn* are roughly the same size (i.e. approximately 0.85m in diameter), and appear to have shifted slightly from their original position, sliding down-slope to the west, slightly distorting their circular shape to elliptical. *Ṭawābīn* L45, L55, and L57 are clustered near the center of the square, while L75 abuts and extends into the south section (see Fig.2). L45 and L55 have been damaged by pit L39, and L57 was cut by pit L46. *Ṭawābīn* L75 is particularly well preserved, having escaped damage from Mamluk pitting activity, and is distinguished from the other *ṭawābīn* by large storage jar body sherds that line the exterior of the *ṭawābīn*.

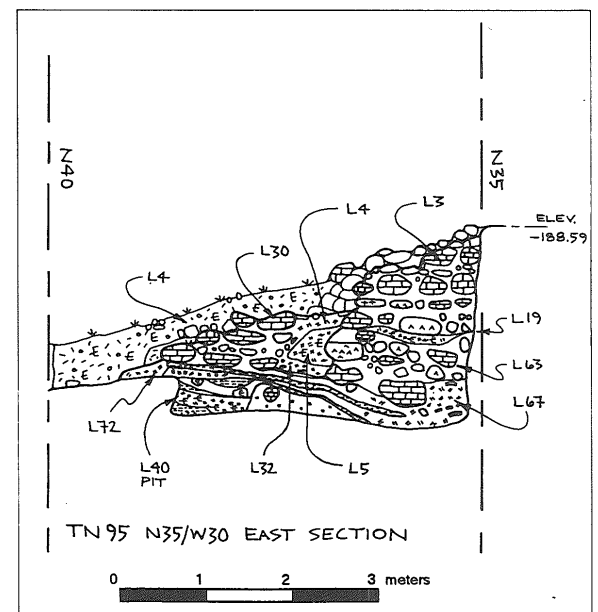
Despite the large quantities of ash, very little botanical material was recovered from



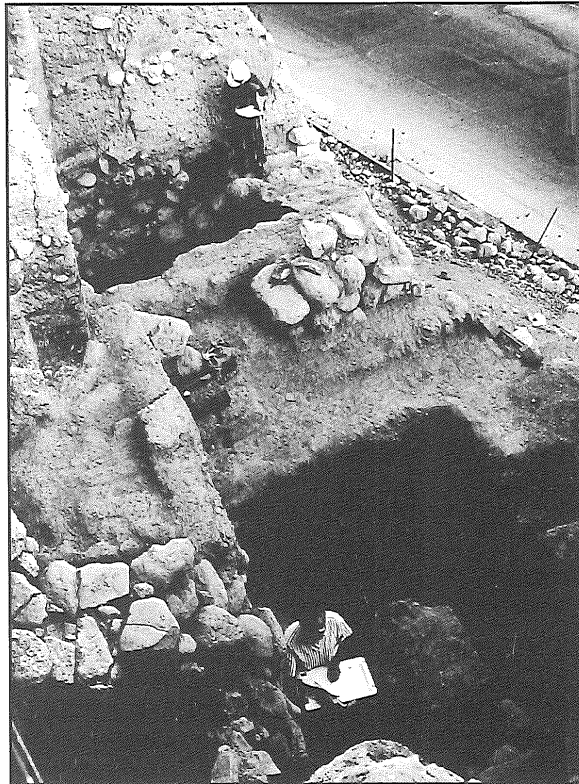
18. *Ṭawābīn* in N35/W30.

the *ṭawābīn*. Small quantities of *Zizyphus*, *Hordeum*, *Triticum*, and *Vicia* were found in association with L57. Pits L40 near the east section (Fig.19) and L70 along the south section (see Fig.2) appear to be associated with the *ṭawābīn*. The same is true of ash layers L38, L67, and L73. The bases of all four *ṭawābīn* stand at approximately -191m MSL, and they appear to be roughly contemporary with each other and with the *ṭawābīn* found in N35/W25 during the 1993 excavation. Our working hypothesis is that the "*ṭawābīn* phase" dates to the mid- eighth century BC.

It is interesting to note that a total of eight



19. N35/W30 East Section.



21. General View of N40/W20 and N40/W25.

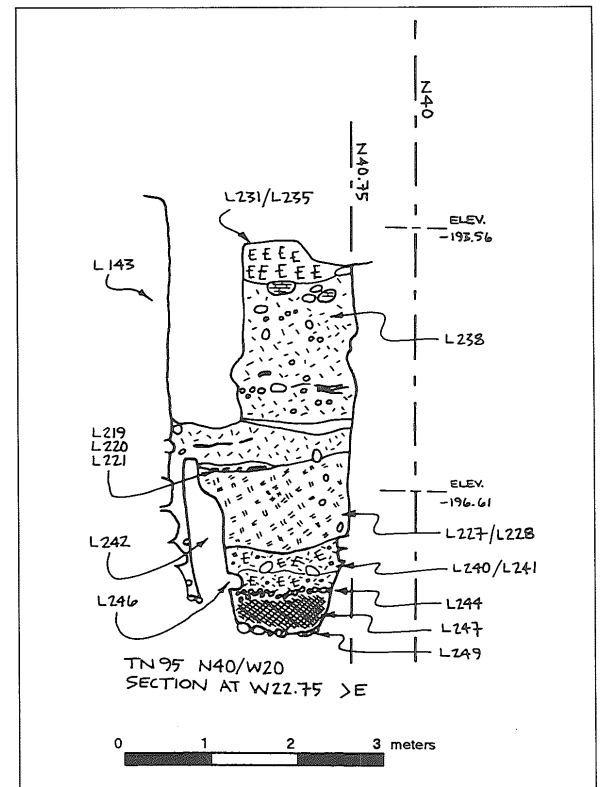
1992:92, Fig.2).⁴ These late Iron I walls and surfaces immediately overlie the monumental mudbrick walls of Stratum I. Sometime before the late tenth century destruction of this area, the doorway leading to the south (east of L233), was blocked by L255, and NW/SE wall L108 was constructed (see Fig.17). Plaster floor L236 running beneath L251 (see Fig.17) indicates that E/W oriented mudbrick wall L250 (=L87 in N35/W20) and its stone foundations L251 were built at this time. There is no evidence of damage to the earlier structures that might have necessitated these modifications. Considering the well-preserved mud plaster on L250 and L255, as well as on walls L72, L79, and L78 in N35/W20, it seems likely that the de-

4. In 1990, two designations were made for the plaster floors on either side of N/S wall L125. L166 was assigned to the floor east of L125 and L140 was the floor west of L125. In 1993, portions of L166 were excavated as L209. In 1995 the final remains of surface L166/209 and L140 were excavated as L236. L116, L209, and L236 all abut the bottom course of L125 and thus can safely be collapsed

struction represented by L120, L129, L130, L137, L138, and L139 in N40/W20 occurred shortly after the construction of L108, L250, and L255. Eight consistent C-14 dates from the destruction debris marking the end of Stratum II provide a secure date of late tenth century BC (see Table 1, samples 05-12).

Middle Bronze (Stratum I)

The earliest phase of occupation identified in the 1995 season came from a deep N/S probe in N40/W20. NE/SW oriented mudbrick wall L242 was the earliest architectural element. It clearly predates the monumental wall L222 which overlies it (Figs.22 and 23). L242 is 0.55m wide, 0.86m high, and rests on the one course high, two rows



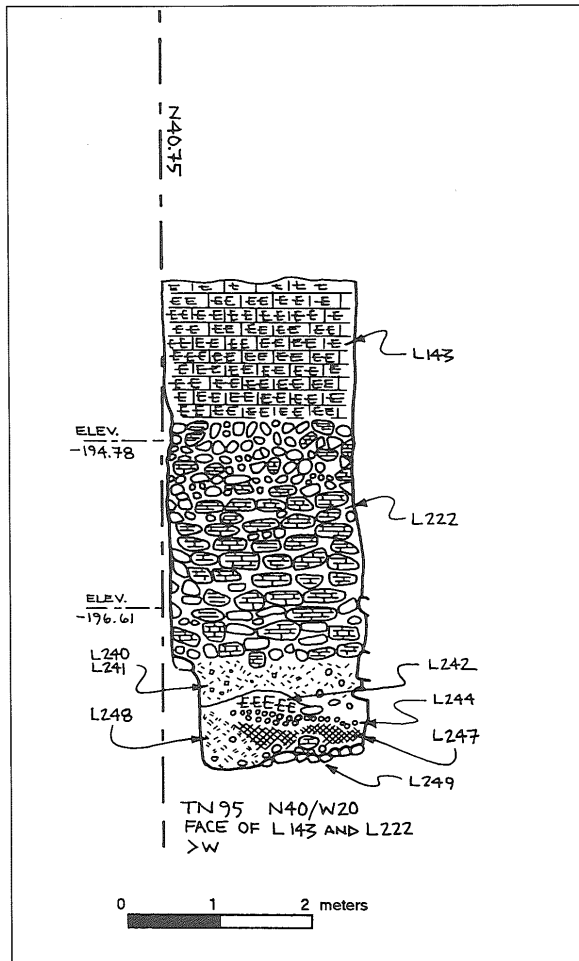
22. N40/W20 Section at W22.75 >E.

into L116. L140 also abuts L125 and is thus contemporary with L116 east of L125. Both of these surfaces extend under NW/SE wall L108 indicating that L108 is a later wall, probably contemporary with the blocking of the doorway to the south by 1255, and that the plaster surfaces of the earlier phase were reused in the later phase.

Table 1. Summary of Carbon 14 Analyses from Tall Nimrin {as of December 1995}

<i>Sample # †</i>	<i>Provenance</i>	<i>C-14 Date</i>	<i>Intercept Date</i>	<i>2 Sigma Range</i>
01-β46493	N45/W20 L58 B455	3590±70BP	1947BC	2140-1750BC
02-β69740	N35/W20 L75 B311	2990±90BP	1220BC	1420 -930BC
03-β46490	N25/W20 L40 B136	2950±70BP	1180BC	1400 -942BC
04-β69733	N25/W20 L22 B113	2920±70BP	1110BC	1310 -910BC
05-β69746	N40/W20 L120 B49	2840±70BP	990BC	1200 -830BC
06-β69751	N40/W25 L188 B300	2820±60BP	940BC	1130 -830BC
07-β46495	N40/W20 L133 B339	2790±70BP	926BC	1155 -810BC
08-β46494	N40/W20 L88 B119	2780±50BP	921BC	1050 -830BC
09-β69748	N40/W20 L139 B131	2800±50BP	920BC	1040 -830BC
10-β69749*	N40/W20 L133 B368	2790±70BP	920BC	1120 -810BC
11-β69747*	N40/W20 L120 B100	2780±70BP	910BC	1110 -810BC
12-β69750	N40/W20 L136 B427	2760±60BP	900BC	1020 -810BC
13-β69739	N35/W20 L73 B299	2750±80BP	890BC	1070 -790BC
14-β69741	N35/W20 L75 B354	2740±60BP	850BC	1010 -800BC
15-β69745*	N35/W25 L53 B392	2690±60BP	820BC	930 -790BC
16-β46489	N25/W20 L25 B348	2630±70BP	807BC	920 -760BC
17-β69734*	N25/W20 L22 B132	2600±70BP	800BC	850 -530BC
18-β69738*	N35/W20 L49 B073	2620±60BP	800BC	850 -760BC & 640 -560BC
19-β46491	N30/W20 L15 B107	2520±90BP	770BC	840 -400BC
20-β69737*	N35/W20 L48 B037	2310±90BP	390BC	760 -670BC & 550 -170BC
21-β69744*	N35/W25 L31 B202	2270±90BP	370BC	520 - 70BC
22-β69735*	N25/W50 L37 B261	1050±70BP	1000AD	870-1160AD
23-β69736	N25/W50 L49 B347	990±90BP	1030AD	880-1240AD

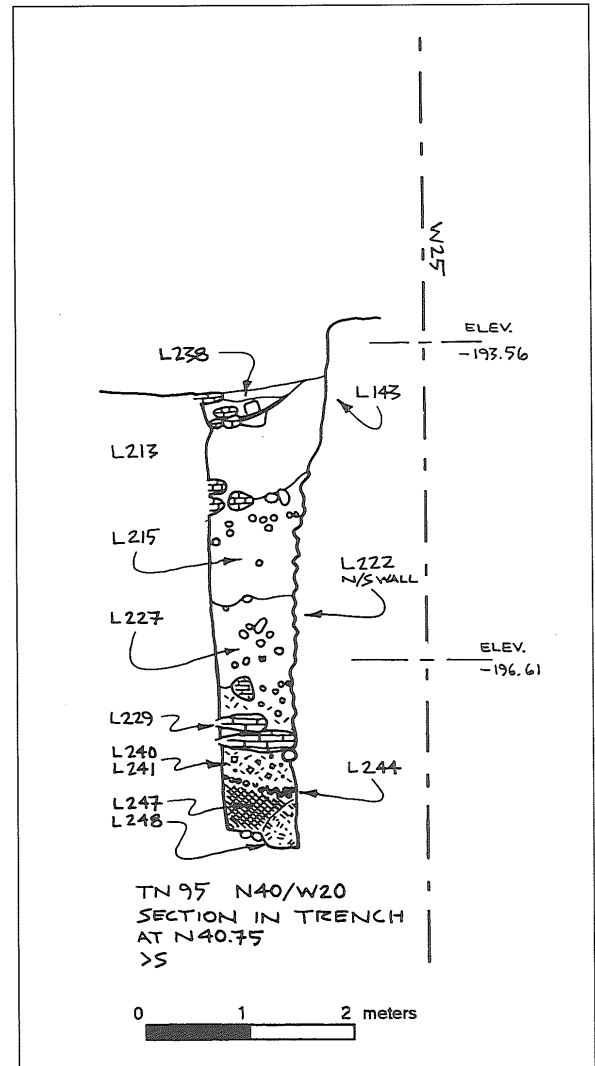
†Explanation of the numbering system:
 -The first two digits represent a sequential numbering of the samples which are arranged from oldest to youngest.
 -The numbers beginning with "β" are the Beta Analytic Inc. lab numbers. The β464.. sequence was processed in 1991, the β697.. sequence was processed in 1994.
 *denotes most recently processed samples, not previously published



23. N40/W20 Face of L143N/S and L222 >W.

wide stone foundations of L246. L246 in turn is resting on a gravel surface (L244) which immediately overlies bedrock (L247), a natural layer of compact silt/sand above a tightly packed layer of alluvial cobbles (L249).⁵ L244 appears to have been intentionally deposited in order to level the irregular bedrock, and the locus probably served as the original living surface for wall L242 (see Fig.22). In the SW corner of the probe, a pit (L248) was cut into bedrock. Pit L248 appears to be contemporary with wall L242 and contains ashy material from the early occupational layers L240 and L241 which overlie L244 and abut wall L242 (see Figs.22, 23, and 24).

With such limited exposure it is difficult



24. N40/W20 Section in Trench at N40.75 >S.

to interpret the features of Stratum IA. However, they appear to be consistent with the evidence of early domestic occupation found near this elevation in the adjacent squares N45/W20 and N45/W25 during the 1989 season (Flanagan, McCreery and Yassine 1990:137-144).

There is abundant evidence of the latest phase of the MBII occupation immediately below the Iron IC remains. This period, during which the monumental Middle Bronze Age walls were constructed, can be divided into sub-phases, Stratum IB and IC. At the beginning of Stratum IB, stone walls L230

5. Bedrock (L247) was found at elevations ranging from -197.80m to -197.96m MSL. This is 0.28m-

1.03m higher than the levels of bedrock found in N45/W20 and N45/W25 in 1989.

and L222 were constructed on top of earlier MB domestic debris (L240, L241, L243 and L245). Both walls are approximately 2.0m (10 courses) high, but L230 is 1.50m wide while L222 is approximately 2.75m wide.⁶ The walls are bonded at their point of intersection and therefore assumed to be contemporary.

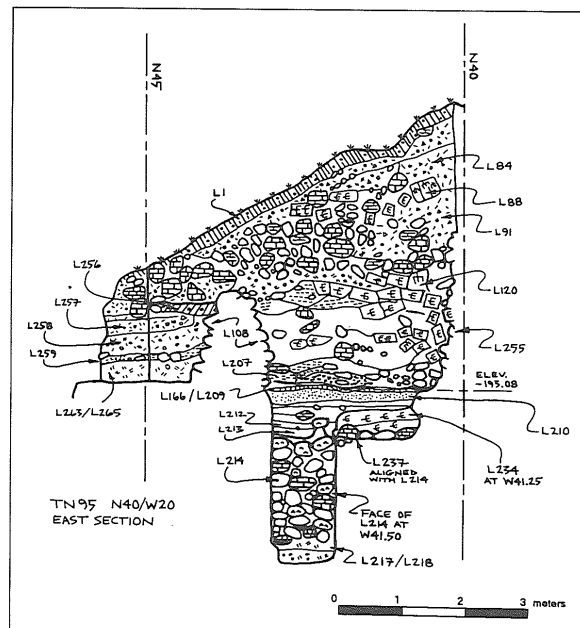
In spite of very careful excavation, we detected virtually no signs of foundation trenches or living surfaces associated with the interior of these walls. This seemed highly unusual for such massive, well built walls, but a single explanation may account for both absences. Soon after the walls were constructed, the debris of L227 and L228 was deposited against their interiors. If this is correct, the walls would have functioned both as retaining walls and, with the fill, as an elevated platform. The architecture is most probably related to a MB fortification system.

In Stratum IC, a number of new architectural features were added in a clearly discernable sequence. After the deposition of L227 and L228, MB wall L143E/W was built on top of L230 (see Fig.22). Although it is eroded on top and along its northern face, L143E/W stands 1.5-1.8m high (12-14 courses) and is 1.0m wide. Next, stone alignment L201N/S was built on top of L222 and mudbrick wall L143N/S was constructed over L201N/S (see Fig.23). Both L201N/S and L143N/S abut L143E/W which supports the conclusion that they were constructed slightly later. L201N/S is 6-7 courses high (0.90m) and of undetermined width. L143N/S is 10 courses high (1.5m) and 2.75m wide.

L214 was the next wall to be constructed, resting on fill layer L217 and abutting

L143E/W. L214 is oriented N/S, preserved to a height of 1.70m (8-9 courses), and has a minimum width of 0.95m.⁷ The poorly preserved N/S mudbrick alignment (L234) on top of L214 may be the remains of a mudbrick superstructure (see Figs.20 and 24). Stone alignment L201E/W, also resting on fill layers L217 and L218 and abutting L143E/W, was probably built at the same time as L214.

Similar to our interpretation of walls L222 and L230, no clearly defined surfaces were found in association with L201N/S, L201E/W, L214, L143E/W, or N143N/S. However, the top of L217 and L203 may have been used for a short time as temporary surfaces. This would have been prior to filling the space between the walls with the debris of L215 and L238 (see Figs. 20 and 22). Surface L212 extends across the square and probably represents the primary living surface of Stratum IC (see Figs.20 and 25) on the level of the in situ door socket associated



25. N40/W20 East Section.

6. The precise width of L222 has not yet been determined since its west face has yet to be exposed in N40/W25. Mudbrick wall L143 N/S, which overlies L222, is 2.75m wide so it is assumed that L222 is at least 2.75m wide. If L222 protrudes 0.20m beyond L143N/S along its west face as it

does along its east face, the width of L222 would be around 3.15m.

7. It is impossible to determine the precise width of L214 at this time since its eastern face runs parallel with, and under, the east section of N40/W20.

with L214. Again, as with L222 and L230, the paucity of living surfaces associated with the lower levels of L201N/S, L201E/W, L214, L143E/W, and L143N/S can be explained by assuming that these were retaining walls upon which people were living, rather than free-standing structures.⁸

The dating and sequence of construction proposed for Stratum IB and IC in this report is essentially the same as that suggested at the conclusion of the 1993 season (Flanagan, McCreery and Yassine 1994a: 217-219). We have gone beyond that report with our hypothesis that the walls of Stratum IB and IC never served as free-standing structures but as retaining walls to create a platform upon which the MB people lived.

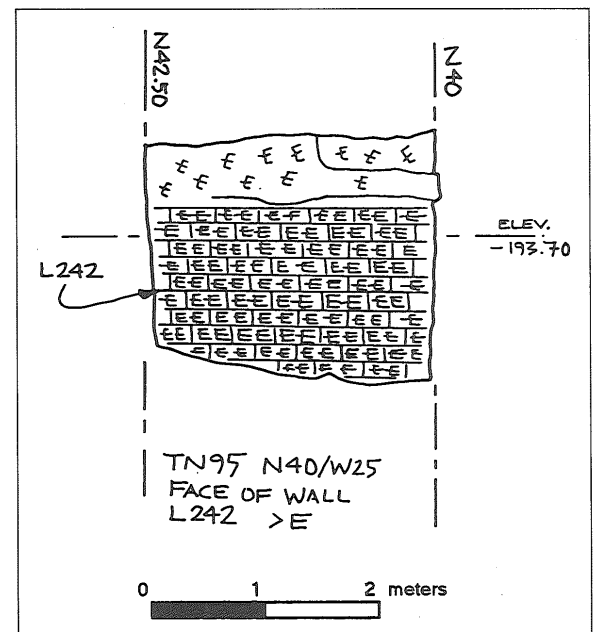
Although the order in which the structures of Phase II were erected is relatively clear, the length of time taken to complete all the walls is not easily determined. There may have been a single continuous construction project taking less than a year to complete. If this could be demonstrated, for example with firm C - 14 dates, then Stratum IB and IC could be collapsed into a single phase.

Stratum IC is represented in N40/W25 by E/W mudbrick wall L244 (=L143E/W in N40/W20), N/S mudbrick wall L193/242 (=L143N/S in N40/W20), and a series of fill layers (L243, L247, L248, and L249). South and west of the mudbrick walls, the loci contain large quantities of small to medium pebbles and cobbles mixed with 10YR 6/4 (light yellowish brown), 7.5YR 6/6 (reddish yellow), and 10YR 7/3 (very pale brown), medium compact to medium loose silt clay (see Figs.15 and 20). Particularly noteworthy is that the gravel layers slope steeply from east to west (approximately 30°). Pockets of soil whose color and composition are identical with L247 in N40/

W20 were found intermingled with these fill layers. This indicates that at least some of the fill came from pits dug into the local bedrock.

By the end of the excavation season, 13-15 courses (1.70m-2.20m) of well-preserved mudbricks had been exposed along the west face of L242 (Figs.26 and 27). Although we had excavated below the elevation of the top of L201 on the east side of the same structure (L143) in N40/W20, we did not encounter stones in N40/W25 (-194.95m MSL compared with -194.47m MSL). Because L201 extends under wall L143, if it extends into N40/W25, it may be hidden behind a mudbrick facing. In any case, in N40/W20, the top of L222 stands at 195.52m MSL. Therefore, we would expect to encounter the western face of L222 within the next 0.55 m of excavation unless it is also covered by a mudbrick facing.

E/W oriented L244 (=L143E/W in N40/W20) was exposed to a height of 1.60m-1.65m (12-13 courses). It is 0.80m-1.00m wide, and extends west 0.70m beyond the



26. N40/W25 Face of Wall L242 >E.

8. Similar deep fill layers have been found associated with the MBII city wall at Pella (Bourke *et al.* 1994: 93-96). The interpretation of the monumental MBII walls at Tall Nimrin presented here,

corresponds closely to Ussiskin's conclusions in his analysis of the MBII fortifications at Jericho and Shechem (Ussiskin 1989).



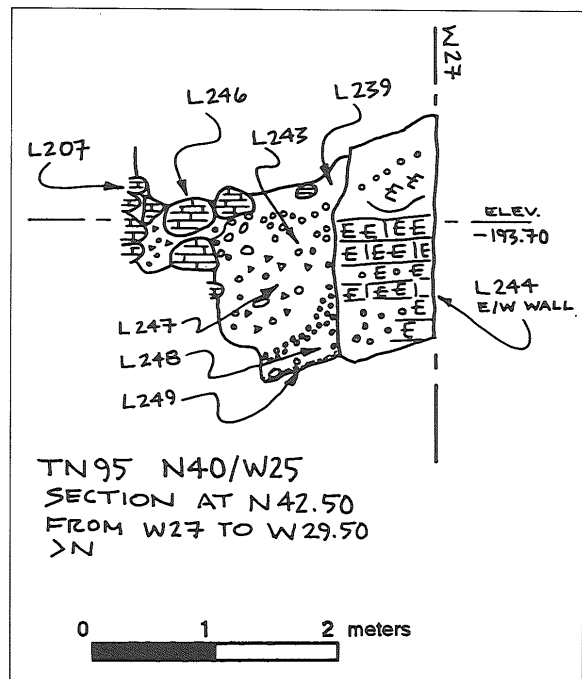
27. West Face of L242 in N40/W25 >E.

junction with L242 at N42.50/W27.00 (see Figs.20 and 28). At N42.50/W27.70, L244 forms a corner with a N/S wall that originally extended into N45/W25 but was truncated by the road cut. The same sloping fill layers that abut the west face of L242 (L243, L247, L248, and L249) extend northward along the western face (i.e. corner) of L244 (Fig.28).

Because we anticipated living surfaces associated with L244 and L242, the deep, sloping, gravel fill layers were a surprise. They can probably be explained as the remains of a *glacis* that was thrown up against the mudbrick walls L242 and L244 soon after construction.

This would account for not only the absence living surfaces, but also, together with fill in N40W20) the well-preserved west and south faces of L242 and L244. They are in remarkable condition despite the 500 year occupational hiatus during the LB and early Iron I periods. Because the faces were cov-

ered by fill and the *glacis* soon after construction, they were protected from erosion



28. N40/W25 Section at N42.50 from W27 to W29.50 >N.

during the LB period of abandonment. The *glacis* in N40/W25 and the deep fill layers found in N40/W20 also explain why foundation trenches were not necessary for the massive MBII L230 and L222 walls.

After the 1989 excavation we proposed that settlement on the site expanded westward as time went on. The results of the 1995 excavation support this hypothesis, but also suggest that the late MBII city was smaller than we had suspected. More excavation is needed to clarify the precise function of the massive MBII walls, but it appears that L242/193 (=L143N/S in N40/W20) was part of the western fortification wall and that L244 (=L143E/W in N40/W20) may have been part of a square tower located at the northwest corner of the MBII settlement.⁹

More horizontal exposure is needed in order to define more precisely the nature and extent of the late Middle Bronze Age settlement. However, the information gathered thus far suggests that the fortified settlement was quite small (possibly less than one hectare) and was centered SE of N40/W25.

Ceramics

Ceramic field readings were made by Rudolph Dornemann, and staff members McCreery, Momani, and Jarallah. Following the field season, Cherie Lenzen also examined ceramics relevant to her research. Approximately 14,000 diagnostic sherds were recovered. 68 percent of the ceramics (487 bags), came from squares N25/W50 and N35/W30. Most of the stratified ceramics dated to the Iron II, Persian, and Byzantine periods, although N40/W20 and N40/

W25 also produced well stratified MBII ceramics. As in past seasons, all periods from EBIV/MBI through the modern era were represented in the ceramics assemblage with the exception of LB and early Iron I.

The stratified ceramic assemblages should be particularly important for clarifying the Iron II/Persian and Byzantine/Umayyad transitional periods. The MBII and Iron IC-II ceramic assemblages are also particularly rich and significant. The ceramics from the 1995 season are currently undergoing detailed analysis and will be published separately.

Flora and Fauna

David McCreery, assisted by Kristi Dahm, supervised the recovery of paleobotanical remains by means of a simple tub flotation system. A total of 85 flotation samples were processed. Overall, the 1995 flotation samples were not as rich as those from previous seasons, but a variety of cultigens was well represented, including wheat, barley, jujube (*Zizyphus*), lentil, bean, chickpea, flax, olive, grape, fig, and almond. The samples also produced a number of wild grasses and legumes. Preliminary field readings suggest that *Hordeum* and *Zizyphus* are the best represented species, both in terms of overall seed count and the frequency with which they appear in the samples. Wheat was found in all excavation squares but was not as abundant as barley. Very small quantities of fruits and legumes were found in N25/W50, N35/W30, and N40/W20.

The presence of almond and *Zizyphus* associated with Iron II and Mamluk *ṭawābin* in N25/W50 and N35/W30 suggests that the

9. The theory that L244 (=L143E/W in N40/W20) might be the remnant of a square tower is based on the observation that in the road cut, L244 has an exposed north face 3.0 m long, bounded by two, 2.0 m wide N/S walls. Both N/S walls were truncated by the road cut. If one projects a symmetrical square tower extending to the north, the tower would have an interior space of 9.0m² (3.0m x 3.0m) and exterior dimensions of 7.0m x 7.0m.

This would place the northern face of the tower at N49.50, almost exactly where we have projected the northern limit of the mound to have been before bulldozers cut into the northern flank of the tall to make room for the modern highway. If this scenario is accurate, the north face of L244=L143E/W visible in the road cut would have been the interior face of the tower's south wall.

nutshells were being used as fuel. Although the Middle Bronze Age botanical assemblage in N40/W20 and N40/W25 is disappointing in some respects, it did contain sparse botanical remains, including a few barley, wheat, and *Zizyphus*. The scarcity, however, indicates that little domestic activity took place in the immediate vicinity of the monumental MBII walls. Similarly, the material from the squares constitutes a significant addition to the late Iron II, Persian, Roman/Umayyad, and Mamluk botanical assemblages.

Project osteologist Michael Finnegan, assisted by Robert Lane, conducted the faunal analysis. A total of 391 bone bags were collected containing approximately 11,000 readable bones.

Domesticated species represented in the faunal assemblage include *Ovis*, *Capra*, *Equus*, *Bos*, *Gallus*, and *Sus*.¹⁰ As expected, "medium mammal" (MM) was the most frequent field reading followed by sheep/goat when the specimen allowed more specific identification. *Bos*, *Equus*, and *Gallus* were also fairly common although not as well represented as sheep and goats. Wild species included *Cervus*, unspecified fish, unspecified small and medium birds, and possibly *Sus*. The small number of wild species suggest that hunting and fishing while practiced, were not a major source of animal protein.

Geological Survey

From August 28 through September 8, 1995, William Fritz, David McCreery, and

Sa'ad Hadidi conducted a limited geological survey of the Dead Sea Basin from Tall Nimrīn to the Ghawr aṣ-Ṣāfi. Attention was focused on examining the ancient Lake Lisān shorelines at various elevations. Thirteen archaeological sites in the region were also visited and their locations and elevations carefully recorded using the ACOR Trimble Navigation G.P.S. Pathfinder Basic+ system.¹¹

The objective of this field work was to document the retreat of Lake al-Lisān/the Dead Sea over the past 15,000 years and to assess the impact the regression had on settlement patterns around the lake. The research is an important aspect of the Tall Nimrīn Project's investigation of the paleo-environment of the Dead Sea Basin. The project is specifically concerned with the effects that the paleoenvironment had on settlement and how it might be reflected in the archaeological record. As Lake al-Lisān shrank from a large, fresh body of water to a much smaller, highly saline lake, it must have had a tremendous impact both on the natural environment and human adaptive strategies. Determining the dates and rates of the shoreline retreat, as well as the extent of lake level fluctuations during the retreat, will significantly enhance our understanding of the environmental context in which Tall Nimrīn was founded and developed.

From their preliminary study of the late Pleistocene/Holocene lake levels, geologists Johnnie Moore and William Fritz became skeptical of theories that propose major fluctuations in the lake level over the past few

10. The pig bones could be those of wild boar that are indigenous to the region and are still hunted for sport in the nearby Zor of the Jordan River. Although not abundant in the assemblage, it is noteworthy that the majority of *Sus* bones this year were found in the MBII fill layers in N40/W20 and N40/W25.

11. In light of several differentially corrected GPS reading and a re-evaluation of the maps in light of the GPS data, the following is a more accurate location for the benchmark (00/00) on the summit of Tall Nimrīn than has been previously reported

(see Flanagan, McCreery and Yassine 1994a: 205): Latitude -- 31° 54' 3.134" N; Longitude -- 35° 37' 28.761" E (WGS 84 Ellipsoid); UTM WGS-84, Zone 36, 3532453.7N, 748217.7E. The previously reported elevation (i.e. - 187.25 MSL) of the central reference point 00/00 appears to be accurate, but according to the readings of the GPS rover unit it may be as much as 0.45m too high. It should be noted that MSL is based on a bench mark in 'Aqaba rather than a Mediterranean Sea Level reference point as was that case in many of the older maps.

millennia. Rather, their evaluation of the evidence suggested a gradual filling of the lake to its maximum stand of -180m MSL around 13,000 BP, followed by a rapid, approximately linear retreat until ca. 3,000 BP when the lake reached a level of around -380m MSL. According to this model, the lake level has dropped a only 30 m during the past 3,000 years.¹²

In order to test the hypothesis, it was necessary to determine the location and elevation of archaeological sites that would have been near the shoreline in different periods. Neolithic Ghрубba, Chalcolithic Ghassūl, and Early Roman Calouri were considered to be particularly important sites because of their low elevations. It was found that none of the locally available maps (1:50,000, 1:25,000, and 1:10,000 scale maps were consulted), were adequate to locate and determine the elevation of sites with the desired degree of accuracy. This made the GPS equipment a necessity. After differentially correcting and averaging a minimum of 180 points, we achieved locational accuracy of $\pm 2.00\text{m}$ and elevation accuracy of $\pm 0.50\text{m}$.

The results indicate that the locations and elevations of the sites examined closely correspond to the lake level curve proposed by Moore and Fritz. Still, a more detailed examination of the paleo-shorelines and closely associated settlements is needed to provide further collaborating evidence for the linear regression of the lake level curve. This would also make possible more precise determination of the lake level during different archaeological periods. To that end, in November 1995, McCreery collected C-14 tufa samples from a gravel quarry near Sūwaymah. These should allow more precision in describing the lake levels in the lat-

er periods.

The alluvial gravels from the Wādi Nimrīn/Shu'ayb at South Shūnah both pre-date and post-date Lake al-Lisān. Around 13,000 BP at the lake's high stand, the gravels around Tall Nimrīn were accumulating as part of a subaqueous alluvial fan covered by at least 20 m of water. Long before the first settlement ca. 4,000 BP, the lake had retreated from the -199m MSL elevation of the new village and probably stood at around -350m MSL some 6.5 km to the ESE. By this time also the lake was well on its way to becoming the lifeless, highly saline Dead Sea of today.

This might seem like an odd time to establish a new village. However, the abundant fresh water supply from the Wādi Nimrīn and its springs as well as the arable land around the site no doubt contributed to the selection of the location. The retreating lake may also have played a role in that for the first time there was easy access between Jericho on the west bank of the Jordan River and the region around Tall Nimrīn on the east bank. The Wādi Shu'ayb/Nimrīn had provided easy access between the eastern highlands and the Jordan Valley since at least the Neolithic period, but until the Middle Bronze Age, the northern extension of the lake posed a formidable barrier between the eastern and western ghors of the southern Jordan Valley. It is probably not coincidental that as soon as direct E/W travel from Jericho was possible, Tall Nimrīn was established at the mouth of the Wādi Nimrīn. Continued study of the geological and environmental history of the Dead Sea and its environs will no doubt shed further light on the settlement patterns and subsistence economies of the early occupants of the Jordan Valley, including those who founded Tall Nimrīn.

12. The average of two differentially corrected GPS readings taken on September 3 and 4, 1995, puts the current level of the Dead Sea at -410.85m MSL, approximately 10 m lower than it was twenty years ago. Undoubtedly, the lake is dropping

faster now than it has at any other time in the past 3,000 years. It should be noted that the lake does have annual fluctuations and its level in September is near the annual low following the long, dry summer season.

Conservation Measures

Various options were considered for repairing the erosion damage on the face of MBIIC mudbrick walls L143N/S and L143E/W in N40/W20. We decided to experiment with mudbrick plaster, the methods that protected the walls in antiquity. Mudbrick detritus from the excavation was mixed with shredded modern barley straw and used to patch the face of L143N/S and chink the stones of the north face of L230 in N40/W20 during the excavation season. Even though the repairs were made during the hottest part of the year (the worst time of the year to attempt mudbrick constructions), they held up well. As a result, in November similar mudbrick plaster was applied to the top and northern and western faces of the monumental MBII mudbrick walls L143E/W in N40/W20 and L242 and L244 in N40/W20 (Figs. 20 and 29).

In late November an earthquake with an epicenter 120 km south of 'Aqaba, measuring 6.2-7.2 on the Richter scale, rocked

the Jordan Valley. Despite widespread damage sustained by modern structures throughout the Valley, the recently consolidated walls at Tall Nimrīn remained virtually intact. Although the use of mudbrick plaster for consolidation and preservation purposes does involve regular maintenance, it appears to be a viable option with the advantages of being inexpensive, attractive, and authentic. Hence, the strategy will be employed more extensively in the future at Tall Nimrīn. The possibility of constructing a series of small drainage channels to divert winter runoff away from excavation squares and the road cut is also under study.

Conclusion

The 1995 excavation produced very gratifying results. N25/W50 and N35/W30 provided additional evidence for the Iron II/Persian and Byzantine/Umayyad transitional periods in the form of stratigraphy, architecture, ceramics, as well as floral and faunal remains. N25/W50 documented the pres-



29. >SE at Middle Bronze Walls in N40/W20 and N40/W25 Following Consolidation with Mudbrick Plaster.

ence of deep, well stratified deposits of Roman/Umayyad occupation on the western slope of the Tall. Although the expected Iron Age fortifications did not emerge in N25/W50, the Iron II/Persian period horizon was uncovered. Iron II walls may be found in further excavation. The absence of MB ceramics in N25/W50 in spite of excavation depth (that is -194.20m MSL) supports the findings in N40/W25 that the MBII settlement probably did not extend this far to the west.

The new square N35/W30 provided further evidence of *in situ* Byzantine, as well as Mamluk deposits near the summit of the site. Unfortunately, the Byzantine and Islamic strata are so close to the modern surface of the mound that they are badly eroded and only partially preserved. It is noteworthy that the only squares that have produced Persian period ostraca—other than N30/W25 where 80 percent of the ostraca were found—are N25/W20 and N35/W30 that are contiguous with N30/W25.

N40/W20 and N40/W25 further clarified the nature of the Iron IC occupation, documenting two distinct tenth-century phases of construction before the destruction of this stratum around 925 BC. These squares also yielded additional evidence for the extensive Iron II occupational phases. The construction sequence as well as the function of the monumental MBII walls were substantially clarified this season as well. The evidence from N40/W25 indicates that the western face of L242 was covered by a glacis almost

immediately after its construction. The fill layers in N40/W20 suggest that the occupation associated with L143N/S and L143E/W (=L242 and L244 in N40/W25) was near the top of these mudbrick walls with a possible short-term living surface being used at the base of L201N/S and L201E/W. The most surprising and somewhat controversial conclusion from this area is the hypothesis that these two squares (i.e. N40/W20 and N40/W25) are situated at the NW corner of the Middle Bronze Age city. As was suspected from the results of the 1989 excavation, the monumental stone walls L222 and L230 in N40/W20 were found to be resting not on bedrock, but on top of the remains of the late EBIV/early MBI settlement.

At the conclusion of four seasons of excavation many questions remain, but the project has met and exceeded its goals of documenting the occupational sequence of the site, demonstrating the site's significance in order to facilitate its preservation, and collecting archaeological and geological data needed for a preliminary reconstruction of the environmental and socio-economic history of the site and its environs.

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The success of the Tall Nimrin Project is due not only to the dedicated efforts of the core staff and field personnel,¹³ but also to the assistance provided by a number of people living in Jordan. Special gratitude is due to Department of Antiquities' Director- Gen-

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In the 1995 season, as in the past, the Tall Nimrin Project was licensed by the Jordanian Department of Antiquities, approved by the Committee on Archaeological Policy of the American Schools of Oriental Research, and sponsored by the co-director's institutions, Case Western Reserve University, Willamette University, and the University of Jordan. Funding has been pro-

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J.W. Flanagan
Department of Religion
Case Western Reserve University
Cleveland, OH 44106
U.S.A.

D.W. McCreery
Department of Religious Studies
Willamette University
Salem, OR 97301
U.S.A.

K.N. Yassine
Department of Archaeology
University of Jordan
Amman - Jordan

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PELLA / TALL AL-ḤUṢN EXCAVATIONS 1993 THE UNIVERSITY OF SYDNEY - 15TH SEASON

by

Pamela Watson and John Tidmarsh

Introduction (P. Watson)

The University of Sydney's excavations at Pella (Ṭabaqat Faḥl) in the winter of 1993 were concentrated on the summit of Tall al-Ḥuṣn, the southern of the two tallis which make up the urban settlement of ancient Pella. The main city mound of Khirbat Faḥl, on the northern side of the Wādī al-Jirm, has been extensively excavated since the Joint Sydney-Wooster Project began in 1978. Investigation of the summit of Tall al-Ḥuṣn (Area XXXIV), south of the Wādī al-Jirm, was undertaken in an extended season in 1988 and a second season in 1989 by Pamela Watson.¹ This resulted in the partial exposure of a large Late Byzantine complex on the upper summit, Late Byzantine domestic structures on the south-western and mid-northern areas of the lower summit and remnants of a major Early Roman public building in the south-west. Early Roman/Hellenistic architecture and deposits were exposed beneath the Byzantine surfaces on the lower and upper summits in some areas. In other areas the Byzantine levels immediately overlaid substantial Early Bronze Age architecture and deposits.²

Aims

The aims of the 1993 season on Tall al-Ḥuṣn were as follows:

- 1) to determine the plan of the Byzantine complex on the upper summit;
- 2) to date the earlier building of this complex, which comprises a largely stone-built structure on the highest point, and a later series of stone-walled rooms with mudbrick superstructures, attached in the sixth century AD;
- 3) to clarify the Early Roman phases exposed previously;
- 4) to investigate the Hellenistic occupation of the summit, with the hope that phases not represented on the main city mound, especially early Hellenistic deposits, will be found here;
- 5) to record the major wall lines visible over the entire summit.

Strategy (P. Watson)

Delineation of the plan of the Byzantine complex was accomplished in three ways (see Fig. 1 for Plot locations):

- 1) Strategic plots were fully excavated to floor level and selected soundings continued below the floors (Plots A, C, E, F, G, H, L, N, and O). This enabled full exposure of walls within these plots and established the stratigraphic sequence of collapse, occupation and construction of the structures. These excavations made it clear that the depth of collapse debris

1. Reported in Edwards *et al.*, Preliminary Report on the University of Sydney's Tenth Season of Excavation at Pella in Jordan, *ADAJ* 34 (1990): 76-80, and Walmsley *et al.*, The Eleventh and Twelfth Seasons of Excavations at Pella (Ṭabaqat Faḥl) 1989-1990, *ADAJ* 37 (1993): 198-210.

4. The season was directed by Pamela Watson, who concentrated on the Byzantine complex and its earlier phasing, and John Tidmarsh, who investigated the Early Roman and Hellenistic occupation of the

site. The team comprised Ruba Abu-Dalu (Department of Antiquities representative), Ben Churcher (field director), George Findlater (surveyor), Geoff Stennett (architect), Erin Crumlin, Jenny Lindbergh, Helen Nicholoso and Margaret O'Hea (Trench supervisors), Rachel Sparks (small finds cataloguer), Noël Siver (conservator), Catriona Sparks (photographer), Paul Donnelly and Judith Sellers (illustrators), as well as two sequential groups of enthusiastic volunteers.

was considerable, ranging from four to two metres.

- 2) Continuing wall lines visible on the surface were planned, but many of these disappeared beneath an overburden of topsoil, necessitating a third approach.
- 3) Narrow plots were laid out over the assumed lines of wall continuations, and these were excavated only as far as was necessary to clear the top of the wall for planning purposes, and to establish the position and width of doorways (Plots J, K, P, Q, R, S, U - Z, AA - HH). Only topsoil and upper collapse deposits were removed in this operation.

Previous work on Tall al- Ḥuṣn had established that the Byzantine complex was built in a number of phases. The earliest building showed evidence of renovations, as well as being enlarged by the addition of numerous rooms to the north and west. These additions were dated in the 1989 season to the sixth century, on ceramic evidence from the associated construction deposits. This season, soundings were made below the floors of the earlier building in order to date this building.

Two plots were continued below the Byzantine phases, exposing Roman and then Hellenistic architecture (Plots B and G). Removal of a large Hellenistic deposit exposed in Plot F in 1989, revealed Middle Bronze Age features immediately below. These were not investigated further at this time.

The entire upper summit was field-walked and planned. Although the exposed wall lines are not necessarily all contemporary, the major lines seem to form a coherent pattern consistent with the established Roman/Byzantine layout of the area.

Plot Investigations (Fig. 1)

Area XXXIV Plots A, C, E, F, G, H, J, K and L had been excavated in 1988 and 1989; only B, C, F, G and L were continued in 1993.

The new plots opened in 1993 were M - Z and AA - HH. Of these, all are wall-tracing plots, except for M (a small 0.5m² trench excavated on the west slope for the placement of the site toilet), N and O (Byzantine complex), and T (for the investigation of a possible entrance through the citadel circuit wall).

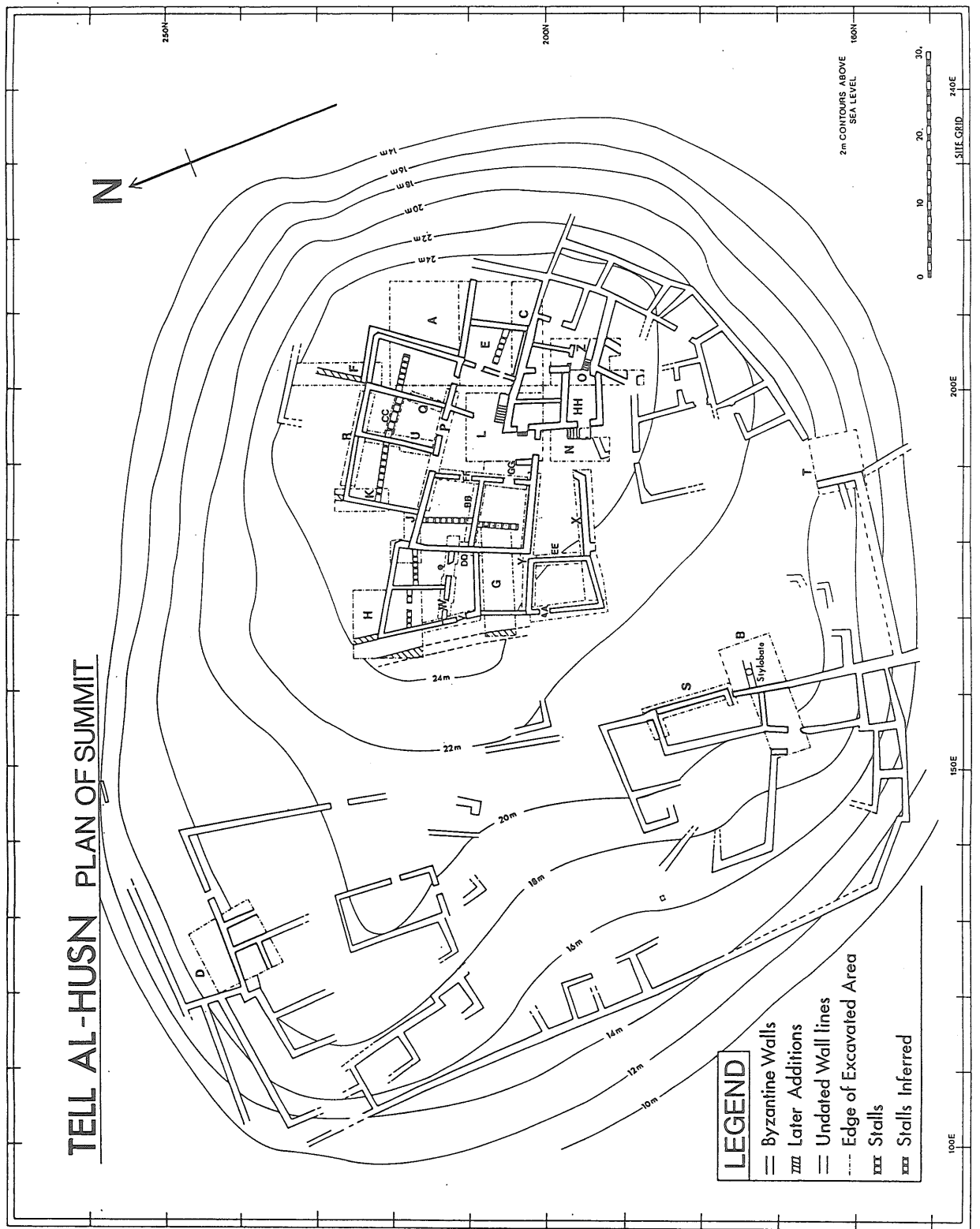
RESULTS

The Byzantine Complex (Figs. 1 and 2) (P. Watson)

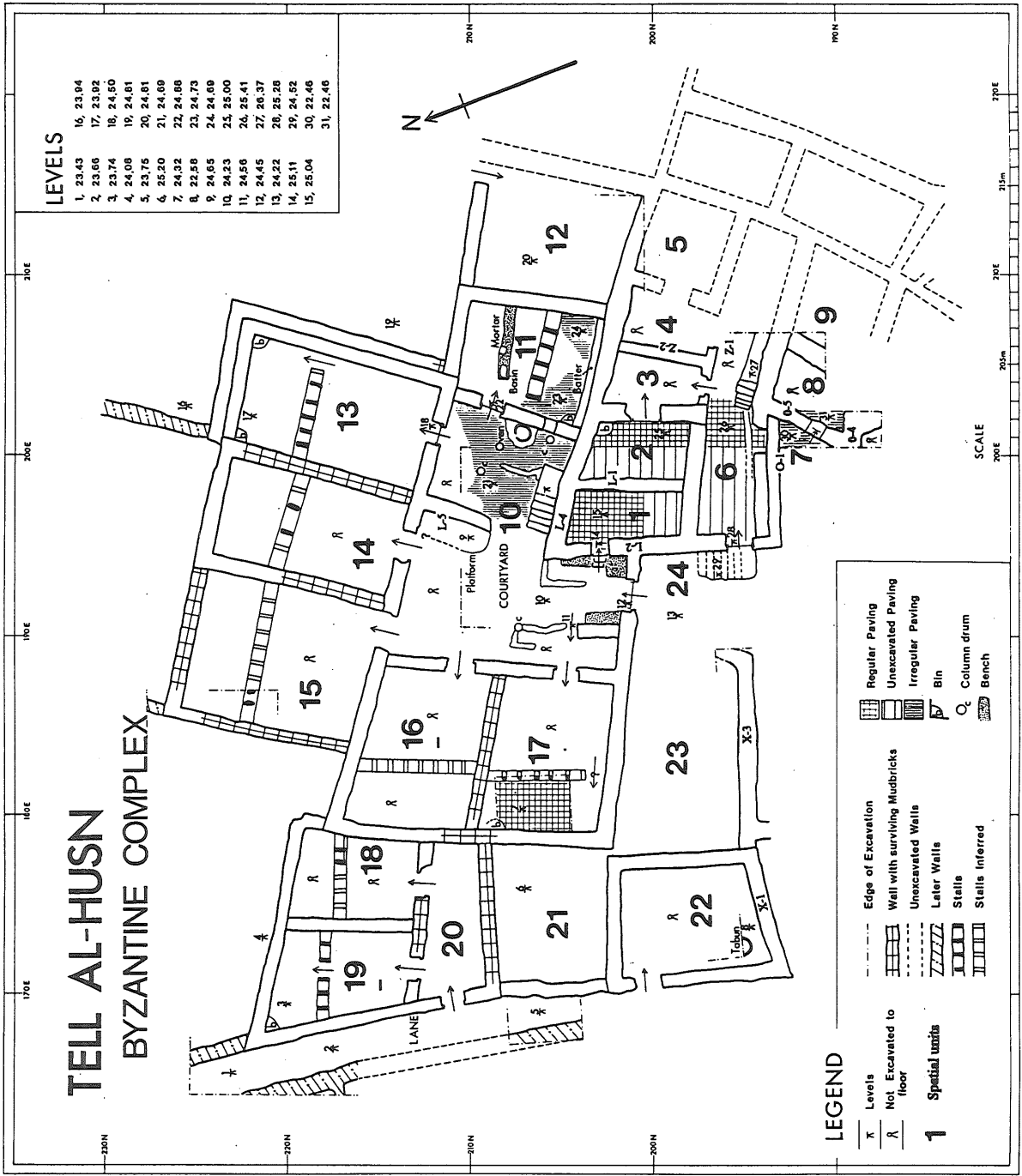
(i) *The Earlier Core Building* (Plots C, L, N, O, Z, HH, units 1-9)

The southeastern quarter contains the earlier building which has revealed successive phases of construction and rebuilding. It was exposed to floor level in Plots C, L, N and O, and delineated by wall-tracing in Plots Z (which was also extended in parts to floor level) and HH. The remaining walls planned were visible on the surface.

Only one room, unit 1, opens into the sixth century complex. The remaining rooms open into each other or to the south, where a long paved corridor space (unit 6), running east-west, contains staircases ascending from the lower exterior surface on the west (unit 24, in Plot N), to a higher level at the eastern end (Plot Z, Fig. 3). South of this corridor, in units 7, 8, and presumably 9, the surface level drops sharply, with roughly 3.0m difference in height (Fig. 4). The corridor surface is also higher than the floors of the rooms to the north, by approximately 0.5m. The corridor and three of the five rooms excavated to floor level (units 1, 2, and 8), were paved with stone slabs (Fig. 5). In the mid-northern room, surface level was only reached in a small 1.0 m² sounding. In this area it was hard-packed earth. A similar surface was reached in Plot O in the room directly south of the corridor (unit 7), although there was some evidence of paving further



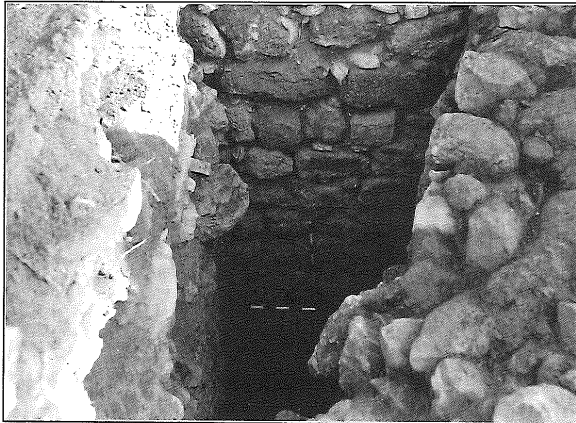
1. Tall al-Husn (Pella), plan of summit, showing wall lines identified in the survey and excavation 1993, and location of the excavated plots (Area XXXIV).



2. Tall al-Huṣn (Pella), plan of the Byzantine complex on the summit.



3. Byzantine complex, staircase at the eastern end of corridor, unit 6, with pavement in foreground, view east.



4. Byzantine complex, wall O-1 and associated floor, with wall O-5 on the right, view north.



5. Byzantine complex, partly exposed stone-paved room, unit 1, view west.

out from the wall here.

The northern wall of the core building runs the entire east-west length of the build-

ing and contains no doorways. It is a roughly-coursed wall of rubble-stone construction and has become very unstable over time. This was even apparent in the sixth century, when a sloping stone buttress (batter) was built to reinforce part of its northern face (in unit 11).³ At its eastern end, the north face had collapsed outwards, while falls from the mid-southern face proved to be quite dangerous for work in the loci south of the wall. A broad staircase flanks its north face at the western end (in unit 10, Fig. 6), presumably ascending to an upper floor. The considerable height of the extant walls of this building and the amount of stone tumble in the collapse suggests that there was a second stone storey to the structure.

Three principal styles of masonry are evident in this building:

- (a) The first, as described above, is uncoursed rubble construction held together with mud mortar. It is rough and uneven and was probably hidden from view by a thick mud pisé plaster, judging from the quantity of this material within the stone collapse. The tops of these upper walls may well have been in mudbrick, as these were also found within the collapse, although not in the same density as found in the collapse of the sixth century rooms, which definitely had mudbrick superstructures.
- (b) The second masonry style is bifacially constructed, with an occasional bonding stone running between the faces. It consists of large roughly-squared stones arranged with smaller snecking stones into rough courses. It is contemporary with the first style, as walls of both construction bond with one another, and the one construction can blend with the other within one wall.
- (c) The third masonry style is also bifacial, of well-cut and squared ashlar blocks in regular courses, with rubble core. The

3. In Plot C, locus 2, see 1988 Report in *ADAJ* 34 (1990): 79.



6. Byzantine complex, eastern wing of courtyard, unit 10, showing the staircase abutting wall L-4 with the cantilevered seventh and eighth steps removed, the courtyard pavement, and the protective wall around the oven (the oven has been removed). View south.

blocks are generally medium large but irregular in size; courses are levelled by a layer of small stones. Walls in this style were identified in Plot Z (walls Z-1 and Z-2, bonded, Fig. 7)⁴ and form the lower two courses of wall L-1 (unit 1). Wall Z-1 becomes wall C-3 in Plot C (excavated 1988). Another wall of well-coursed, squared (but not ashlar) blocks is found in wall O-1, whose extant height from the floor is 4.0m (Fig. 4). This well-built wall may belong to the third group, although it is less regular and contains some snecking stones. It appears that this third style forms part of the original building which has been rebuilt, and possibly radically altered at some stage prior

to the sixth century additions.

The evidence for this is based on two forms of analysis:

- 1) A descriptive assessment of the masonry styles and their structural relationships, and 2) A sounding placed beneath the pavement in unit 1.
- 1) As described above, masonry styles (a) and (b) are contemporary. Most of the walls excavated to any depth in this building conform to these styles. Style (c) walls are cut by the construction of (a) and (b) walls, and in notable cases the latter types represent rebuilds on top of the finer walls, for example walls L-1 and O-5. Wall O-5 contains an earlier doorway between units 7 and 8. This

4. Walls are numbered from 1 in each plot. In the text, references to numbered walls are preceded

by the plot letter. Thus wall 1 in Plot Z is referred to as wall Z-1.



7. Byzantine complex, wall Z-2 in unit 4, view north west.

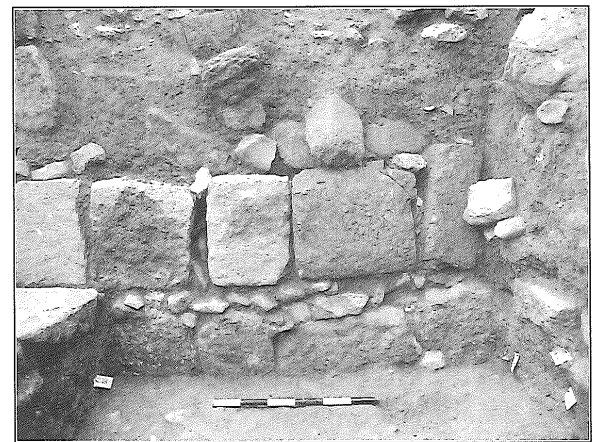
doorway was blocked and then the whole wall was rebuilt above it at lintel-height, although no spanning lintel remains. The rebuilt wall rests on the blocking material where it runs over the doorway.

- 2) The sounding in unit 1 revealed a foundation trench for wall L-2 cut from underneath the pavement packing (Fig.8). However wall L-1 has a small foundation trench cut from the same level, but the wall itself continues down. This foundation trench must be for a rebuilding of wall L-1 at the time wall L-2 was built and the pavement floor was laid. The finer masonry of the lower two courses of wall L-1 continues down to an earlier floor level which meets this wall (Fig. 9). Removal of this floor revealed the base of the wall which partly lay on top of an earlier wall emerging at an angle at the south end of the sounding (Fig. 10). Excavation ceased at this point and the sounding was backfilled. Pottery from the earlier floor can be dated generally to the Roman period (first - second centuries AD), but a more specific identification awaits a full analysis of the finds.

Thus, three major phases are evident. The earlier building of generally ashlar masonry dates originally to the Roman period. It was extensively rebuilt in the Late Roman/Early Byzantine period in a rather rough manner, and finally, major well-built additions were constructed in the sixth cen-



8. Byzantine complex, the foundation trench and foundations of wall L-2, with the paved floor on the left, in unit 1 sounding. View west.



9. Byzantine complex, wall L-1 lower courses and earlier floor, in unit 1 sounding. The later paved floor is on the left. The wall face of the upper courses had collapsed into the room, exposing the rubble and mud core. View east.

tury at the same time that repairs were made to the poorly-built walls.

The earlier core building, as rebuilt, is characterized by its largely stone construction, probably faced in pisé, a predominance of stone-paved floors, and considerable changes in surface level from one spatial unit to another, necessitating the use of staircases. As our excavation of most rooms was only partial, these sometimes have to be assumed. It was clearly intended for human use only.

(ii) *The Sixth Century Additions* (Plots A, E, F, G, H*, J*, K, L, M, N, P, Q, R, S, U, V*, W*, X*, Y, AA*, BB, CC, DD, EE*, FF, GG*; units 10-20)



10. Byzantine complex, sounding below the paved floor in unit 1. Wall L-1 is on the left and L-2 on the right. The collapsed wall stones and pisé fallen on the paved floor are visible in the background. A wall of an earlier period, on a different alignment, is appearing beneath the scale. View south.

Plots marked by an asterisk (*) contain structures that seem to have been added later to the main sixth century structure. This supposition is based primarily upon visual assessment rather than stratigraphical investigations below the surface levels.

The sixth century additions to the original building were first identified and dated in the 1988-9 seasons. The 1993 season was devoted to tracing the full plan of the structure and establishing the access systems. The structure forms a northern and north-western addition to the original building and centres around an L-shaped courtyard in Plot L (unit 10, Fig. 2, Figs. 11 and 12). The only access to these additions is from the south, leading directly into the courtyard. Six rooms were built around the courtyard, each with one door opening onto the yard (units 11, 13-17). A seventh room, unit 1 of the core building, also opens onto the courtyard, east of the entrance. None of the rooms are neatly squared or rectangular in shape, but rather rhomboidal. All six rooms

conform to a standard design: they are divided crossways by a bench standing approximately 0.70 - 0.90m in height, two-thirds of the way down the length of the room, away from the door. The top of the bench is partitioned into compartments by pairs of upright orthostat blocks placed at regular intervals, one upon the other. Each bench has an access through it, either at one end, or in the centre. All of the rooms except one, have their doorway in the short side opening onto the courtyard. The exception is unit 11 which has a doorway towards one end of the long side facing the courtyard. This room is also distinguished by the presence of a window opening onto the courtyard from the smaller section of the room, behind the bench.

These additions form one coherent sector of occupation. A smaller sector, using the same standard room design, abuts the western side of the complex, with no access between the two (Plots H, J, V, W, and DD, units 18-20). It consists of two rooms with



11. Byzantine complex, eastern wing of courtyard, unit 10. Wall L-5 and abutting platform are on the mid-left, the staircase abutting wall L-4 on the right. View east towards unit 11.



12. Byzantine complex, courtyard, unit 10. View south-east towards the entrance and unit 1.

orthostat benches, each with a doorway in the short side opening south to a broad entrance corridor. This corridor opens westwards onto a narrow lane which runs along the western side of the complex. The lane itself belongs to the latest additions to the entire complex (see (iii) below).⁵ The system of access prior to these arrangements is unknown.

(iii) Final Phase Additions and Reorganization

The space to the south of this smaller sector (unit 21 in Plot G) seems to have been an open exterior area whose surface ran to the top of the retaining wall which defined the eastern side of the lane at this point. South again of the open area lies a

single-room structure placed on its own at the south-west corner of the complex (unit 22, in Plots X, Y, AA, and EE). The enclosing walls bond with each other but only barely abut the south-west corner of the core building. There is no evidence of a bench dividing the room, although only the tops of the walls were exposed and a small sounding made to floor level at the southern end (in Plot X). The depth of deposit is uncharacteristically shallow here (c. 0.30m). A beaten earth surface was reached in the south-west corner of the room associated with a *ṭābūn* and ash deposits. The ground surface in this area is sloping down towards the south and west. The room appears to be a later addition to the main complex, and, as its only opening is to the western lane, has no integral relationship with the core building in terms of either room design or systems of access.

The rough tumble of a rubble wall continues the eastward line of wall X-1, as wall X-3. The latter abuts the former, and is similar in appearance to the latest-phase walls of the lane. This wall was not fully investigated, but probably belongs with the latest additions to the entire complex as identified in Plots F, G, and H (see 1989 report, n.5).

The existence of a final building phase marked by rubble-wall additions to the major enclosure walls and the definition of a laneway, has been identified and discussed in the 1989 report.⁶ Other features identified in 1989, such as the second, kitchen-like bench in Plot E (unit 11) and the large oven outside this room, bounded by a protective wall which inhibits easy access to the rooms of units 11 and 13, suggest that the function of the complex may have altered in its final phase. The 1993 season revealed more features, principally in Plots L and GG, which seem to have been added at a later stage and were in use at the time of

5. Discussed in the 1989 report, *ADAJ* 37 (1993): 203.

6. *Ibid.*

the destruction of the complex. All these features have a distinctive domestic aspect. Again, the fact that they encroach upon major spaces and normal routes of access as originally designed for the complex, supports the hypothesis that they represent a functional change in the use of the building.

In Plot L, a protective wall around the large oven in Plot E (unit 10) was fully exposed. When the baulk between the two plots was removed, the small rough wall to the north of the oven in E was found not to continue around the oven to the south, but to extend in a south-westerly direction as a retaining wall for a roughly paved courtyard surface in the eastern wing of the courtyard. North of this pavement the surface drops 30 - 40cm leading to the doorway into unit 13. The nature of this lower area is difficult to determine as it lies outside the excavated area and there was no time to extend this. A feature emerging from the north baulk just to the west appears to be part of another cooking facility, although too little has been revealed to be sure. Whatever the case, access into units 11 and 13 is thereby rendered narrow and awkward.

The southern termination of wall L-5 which extends for a short way south into the courtyard, is ill-defined, due to collapse. The wall has no return at this point, and merely acts as a dividing mechanism rather than an enclosure. The eastern courtyard pavement ends here and the surface becomes one of gravelled clay, full of small pottery fragments. This has been eroded by a shallow wash gully which runs westwards, exposing what appears to be an earlier wall continuing exactly along the line of wall L-5, as if the latter were built directly on top of an earlier wall.

The staircase against wall L-4 proved to be partly solid and partly to span an open space about a metre wide, below the seventh and eighth steps from the bottom (Fig. 6).

Remnants of these upper steps were cantilevered over a large amount of collapse. How this space was originally spanned is not immediately evident. No wooden timbers survived, and no shaped voussoir blocks indicating vaulting, were present in the collapsed mass. However the courtyard surface continued beneath the stone tumble into this space.

A stone platform abuts wall L-5 in the north of the plot, continuing into the north baulk. Another platform lies against the west face of wall L-2 and forms part of the step up to the doorway into the paved room behind. A small low enclosure lies to the north of this step/platform. The partial excavation of Plot GG revealed that the western wall of the courtyard entrance passage formed the south jamb of a rough threshold which was flanked on the north by a narrow structure. This has proved to be the eastern side of a large bin-like structure whose north-east corner is defined by an upright column drum. The opening through the rough threshold permitted access to the doorway into unit 17, although the arrangement is again, clumsy and narrow. Benches abut both the western and eastern walls of the passage into the main courtyard.

A fine, soft grey occupation deposit covered the courtyard surface in patches, tending to mound against and within some of these features. It would seem to be the remains of general sweepings and rubbish accumulation in the yard. The artefacts found in the collapse deposits present a similar domestic picture. More water jars, coarse storage jars and fine ware plates have been added to the corpus of pottery apparently in use at the time of the destruction.⁷ As found in the previous seasons, there is little suggestion that people were caught unawares. The relatively low density of domestic artefacts other than pottery indicates that the occupants had packed up and left the building,

7. *Ibid.*, figs. 19-21.

probably quite recently.

The final demise of all the buildings on the summit of Tall al-Ḥuṣn has been attributed to an earthquake, based on the strong indications that the collapse occurred as a single event (see 1989 report). On the basis of comparative analysis of the pottery with coin-dated corpora from similar collapse deposits in the main tall excavations, this has been dated around the middle of the seventh century, and attributed to the earthquake of AD 659. Coin evidence from this season of excavations still awaits detailed analysis.

Conclusions

The history of the latest building complex to occupy the summit of Tall al-Ḥuṣn has proved to be far more extensive and complicated than first thought. At present, five major architectural phases and their approximate dates are tentatively proposed (closer dating awaits full analysis of the finds):

Phase 1 - The Roman period. Parts of the original building, constructed of ashlar blocks, are extant. The building style is reminiscent of other walls on Tall al-Ḥuṣn which have been dated to the early Roman period (in Plots B and T).⁸

Phase 2 - Late Roman/Early Byzantine. Major repairs were made to the original building, which must have stood in ruins at the time, as whole walls were either replaced or rebuilt from the lower courses. The long northern wall is an entirely new addition, as if the northern extent of the original building was too damaged to merely renovate, and it had to be abruptly truncated. The quality of the rebuilding was poor, although quite large in scale.

Phase 3 - sixth century Byzantine. An extensive series of well-built rooms was added to the original building, at the same time as repairs were made to the Phase 2 walls. The new complex was centred around an inter-

nal courtyard and the rooms were built to a standardized design.

Phase 4 - Later Byzantine (?). Other sectors were added to the main complex, in the west and south-west, but these were not linked internally to it. Units 18-20 follow the standard sixth century design and directly abut the main complex. The sequence of construction may have been quite close in time, if not contemporary. It is possible that units 22 and 23, which do not conform to the sixth century design, belong to Phase 5 rather than Phase 4.

Phase 5 - Early Islamic, pre-AD 659. Rough additions were made in the form of wing walls to the north and along the southern perimeter, and a lane along the eastern flank. Domestic accoutrements were added to the central complex.

The interpretation of the final phase, for which we have the most evidence, has been discussed above. The interpretation of the main architectural phase (Phase 3) has been discussed in the 1988 and 1989 reports, and should be reconsidered in the light of the most recent information. As the surfaces and living areas remained the same or were extended throughout Phases 3-5, we cannot rely on the evidence of the artefacts associated with Phase 3, as none survive. Our primary source for any interpretation of the function of this complex in the sixth century must be the architecture itself.

As described above, the plan of the new structure is quite distinctive, being composed of a characteristic type of room repeated around three sides of a central courtyard. The entire new complex had a single entrance from the exterior. The standard room is characterized by the presence of a bench divided into regular compartments by upright orthostat blocks. The bench subdivides the room at a ratio of one-third to two-thirds, and the entrance to each room is generally in the short side of the larger part

8. For Plot B, see *ADAJ* 34 (1990): Pl. VI.2; for Plot T, see below and Fig. 21.

of the room. Thus access to the larger area of the room is quite easy from the courtyard, whilst the smaller area is at the far end, through a relatively narrow opening in the bench. Each exposed threshold in these benches has revealed a pivot stone, indicating some kind of door or gate was used to close this opening. In Plot G, the smaller area behind the bench was paved in mudstone, and a large storage jar (in chaff-tempered coarse ware) was broken *in situ* on the floor. In Plots A, E, G, and H, whose rooms were excavated down to the surface, small corner platforms or bins were found in one or both of the rear corners of the small areas. No bins were located in the large areas of these rooms. These features suggest that the small areas were used for storage and human working activities.

Two main explanations of the function of the orthostat benches have been proposed. The first is that they were designed as manger stalls for large animals such as horses or cows, which would have been stabled in the large areas of the divided rooms, with easy access from the central courtyard. Parallels for such usage are readily available on the main tall at Pella, where the AD 747 earthquake destruction caught large animals in rooms containing this orthostat bench feature. The same feature is found in the extant remains of the basalt towns in the southern Ḥawrān, the Golān and the northern Galilee. Similar stables have been found in good condition in the Roman/Byzantine towns in the Negev. In some of these cases the benches are not merely flat tops but have inset stone basins or troughs. This does not mean, however, that every time this feature occurs it must have functioned as a stable.

The second explanation, which has been proposed by some archaeologists working in the Galilee, is that these are “window walls”, so constructed to let in light and air.⁹ The

problem with this interpretation in the Tall al-Ḥuṣn context, is that these structures are evidently two-storeyed, with little opportunity for light and air to be facilitated by the presence of this feature on the ground floor.

The first explanation, for these rooms to function as stables, with storage and working facilities separated at the end of the room, seems the most likely. Is this, then, a large domestic farming complex? The location of the complex, on the summit of the citadel hill of the city, with precipitous access from all sides, through quite densely walled and terraced urban terrain, seems to work against this. It would be difficult, inefficient, and tedious to move to and from the grazing fields outside the city everyday. A more likely reason to stable large animals in such a concentrated manner, given the geographical location, is if it were to function as a cavalry stable for a small garrison. It is the most suitable site within the city boundaries, given the defensive and observatory advantages of its position. The relationship with the earlier building is then more understandable. This wing, with its solidly paved floors at different levels, staircases and corridors, is clearly limited to human traffic and may well have functioned as the administrative centre for the military or police of the city and its region. The presence of a benched vestibule at the courtyard entrance is more explicable in a public rather than a domestic context. Another point to note in this regard, is that other Byzantine domestic structures have been excavated on Tall al-Ḥuṣn, in Plots B and D,¹⁰ and none of them were designed with the standard orthostat-bench rooms which dominate the complex on the upper summit. Nor is there any known precedent for such a concentration of this type of room in one complex, again suggesting that the whole was designed with a specific purpose in mind.

9. These two interpretations were discussed in the 1989 Report, *ADAJ* 37 (1993): 200 - for refer-

ences see ns. 80-82.

10. *ADAJ* 34 (1990): 79-80.

To describe the complex as a fortress is probably misleading. It has no typical fortress planning, no towers or built defensive features, save for the double wall placed on the north-east corner of the complex. The building should be viewed as a policing and administrative garrison, rather than as a predominantly defensive building.

The change to a manifestly domestic function where the stabling of large animals was no longer required and subsequently rendered impossible, occurred in the final phase of its life. This may well reflect the changed political and administrative circumstances after the Moslem conquest. It is hoped that detailed analysis of the artefacts will enable a closer dating of the phases of this building and establish important correlations with the wider events of the region's history. This in turn, will flesh out our very generalized and imperfect understanding of the organization of one provincial Byzantine city and the impact of major political change on the society of this region.

The Hellenistic/Early Roman Occupation (J. Tidmarsh)

Although there is evidence for a dense occupation on the main city mound (Khirbat Faḥl) during the second and early first centuries BC, no Early Hellenistic (third century BC) structures have as yet been located there. The reason for this lacuna at Pella and, indeed, throughout much of the Levant is unclear although it may be in part due to the foreign policy of the Ptolemies (rulers of Coele-Syria during the third century BC) who seem to have concentrated on defending their borders rather than extending them by means of extensive settle-

ment outside Egypt itself.¹¹

Stray finds from Tall al Ḥuṣn, such as an unstratified Attic lamp of Howland Type 25 (late fourth/early third centuries BC),¹² suggest that there may have been Early Hellenistic occupation on the tall, but this, as yet, has not been conclusively demonstrated.

The excavations of the 1993 season revealed the presence of later Hellenistic settlement on Tall al Ḥuṣn (see below) but as yet the earliest phases have not been reached. It is planned to continue this investigation in the following seasons.

Plot XXXIVG

This plot is situated on the western summit of Tall al-Ḥuṣn and runs in an east-west direction. It had been opened in 1989 when the Byzantine fortress complex had been explored.¹³ During that season walls on a different orientation had been found beneath the Byzantine levels.¹⁴ The aim in the 1993 season was to investigate these earlier structures.

What has been revealed to date (Figs. 13 and 14) is a series of rooms (loci 6,7,8,9,11), of which locus 6 with its hearth (F12), thin plaster surface (F9), and vast quantity of cooking ware and animal bones may well have been a kitchen. The thick plaster/rubble surface uncovered in locus 9 is more suggestive of an open courtyard than a room.

The walls (4,5,6,7,8,11,12) bounding these loci consist of rough unworked fieldstones without mortar. Their upper courses were of mudbrick. Fallen plaster in locus 8 and traces of plaster still *in situ* on Walls 12 and 8 show that at least some of these walls were covered in unpainted white plaster.

The complex, as excavated so far, has revealed several rooms of similar orientation

11. R.H. Smith, *The Southern Levant in the Hellenistic Period*, *Levant* 22 (1990): 123-125.

12. R.H. Howland, *The Athenian Agora IV. Greek Lamps and their Survivals*, Princeton, 1958: 67-82.

13. A.G. Walmsley *et al.*, *The Eleventh and Twelfth Seasons of Excavations at Pella (Tabaqat Faḥl) 1989-1990*, *ADAJ* 37(1993): 198-208.

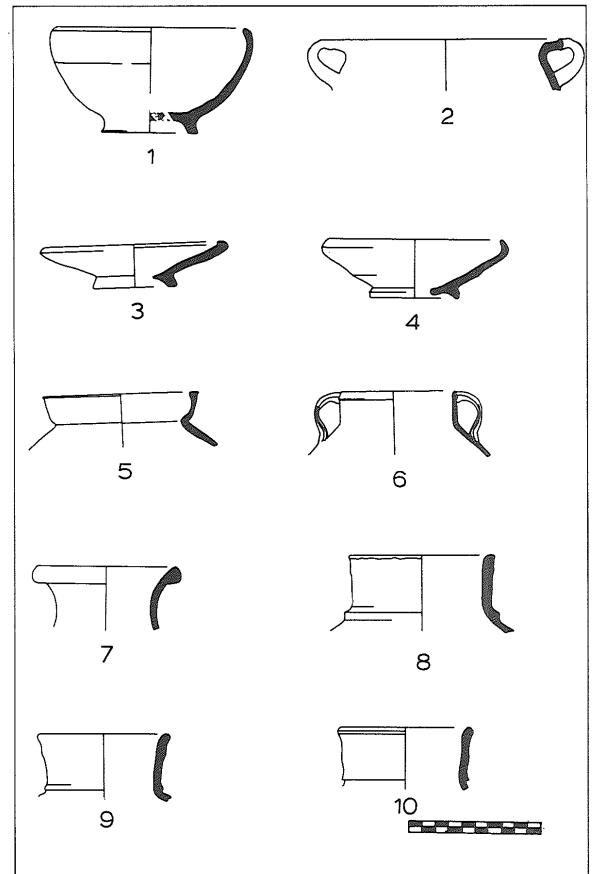
14. *Ibid.*: 208.



14. Plot XXXIVG. View to east of Late Hellenistic/Early Roman domestic architecture.

which must represent part of one or more domestic structures. In their latest phases these rooms are associated with Late Hellenistic/Early Roman pottery (Fig. 15), notable amongst which are the jars with broad ridged collars (Fig. 15: 8,9,10).

The presence of Early Roman pottery and the absence of any destruction level in this complex or in the Hellenistic levels of Plot XXXIVB (see below) differ markedly from the situation seen on the main mound at Pella where there is strong evidence in Areas III, IV, VIII, and XXIII of a widespread Late Hellenistic destruction which must be associated with the conquests of Alexander Jannaeus in 83/2 BC.¹⁵ Following this destruction, there is a break in occupation on the main mound lasting for at least several centuries, as shown by the fact that remains of Early Roman settlement there are virtually absent despite the ambitious late first century AD construction program undertaken in the Wādī al-Jirm.¹⁶ It is tempting to argue, therefore, that whereas Jannaeus was able to sack the Hellenistic city on the main mound he was unable to overcome the natural and man-made defences of Tall al-Ḥuṣn. As a result, occupation on that tall continued relatively undisturbed throughout Early Roman times. This scenario must, of course, remain un-



15. Late Hellenistic and Early Roman pottery from Plot XXXIVG.

1. CN 7280. XXXIV G 3.11. Bowl. Coarse light brown ware.
Clay 10YR 8/3. Patchy dull brown-black glaze on interior and exterior.
2. CN 7255. XXXIV G 6.10. Cooking pot. Metallic coarse terracotta ware. Clay 5YR 4/6.
3. CN 7177. XXXIV G 12.3. Bowl. Coarse light brown ware. Clay 5YR 7/4.
4. CN 7176 XXXIV G 11.4. Bowl. Coarse light brown ware. Clay 10YR 7/4. White inclusions.
5. CN 7169. XXXIV G 6.8. Cooking pot. Metallic coarse terracotta ware.
Clay 2.5YR 6/8. Grey core.
6. CN 7285. XXXIV G 8.11. Cooking pot. Metallic coarse terracotta ware. Clay 2.5YR 7/6.
7. CN 7175. XXXIV G 11.4. Jug. Metallic buff ware. Clay 7.5YR 6/6.
8. CN 7277. XXXIV G 3.13. Jar. Hard pale ware. Clay 5YR 6/6.
9. CN 7276. XXXIV G 3.13. Jar. Metallic buff ware. Clay 10YR 7/3.
10. CN 7173. XXXIV G 6.10. Jar. Metallic buff ware. Clay 7.5YR 7/6.

15. Josephus, *Jewish Antiquities*, 13.392-397.

16. R.H. Smith and L.P. Day, *Pella of the Decapolis*

II, Wooster, (1989): 4.

proven until a more complete investigation of the Hellenistic levels on Tall al-Ḥuṣn has been carried out.

Plot XXXIVB

Plot XXXIVB is on the western side of the plateau top of Tall al-Ḥuṣn, in the south-west quadrant. Excavated previously in 1988 and 1989,¹⁷ it is L-shaped and oriented east-west with an extension to the east of the large north - south wall, Wall 1.

During the 1988 and 1989 seasons the Byzantine levels of the plot had been uncovered and largely removed prior to the investigation of earlier structures which had started to appear in those seasons. In 1993, therefore, we concentrated largely on that part of the plot to the west of Wall 1 where further Byzantine levels were cleared (e.g. in loci 7 and 10) and the pre-Byzantine architecture revealed. Locus 10 is of interest here because of the well-constructed Byzantine box drain (F25) running from the south baulk into Wall 6.

Within this plot (Fig. 16), loci 5 and 6 represent rooms bounded by walls (6,9,10/11,12,13) of unworked fieldstones. They are as yet incompletely excavated and although no definite floors or occupation surfaces have been isolated, most of the pottery recovered from the uncontaminated levels within these loci is Hellenistic in date (Fig. 17). Notable amongst this pottery is the presence of numerous fragments of floral and figured Megarian bowls (Fig. 17: 3,5,6.) of which at least one is an Attic import of high quality. Before the finds in this plot, relatively few fragments of Megarian bowls had been recovered at Pella. Locus 12, bounded by the west and north baulks as well as by walls 12 and 13, probably represents a further room which is associated with Late Hellenistic/Early Roman pottery.

Towards the end of the current season a small sondage was begun to the east of Wall 1 in locus 8 which had already been partially dug in 1988 and 1989. The aim of this sondage was to locate a foundation trench for Wall 1 on its east side. As yet this foundation trench has not been located but from 8.34 were recovered a Late Hellenistic/Early Roman juglet and cooking pot (both almost complete) as well as an Eastern Terra Sigillata dish (Fig. 17: 8,9 and Fig. 18).

It is planned to continue work in both this plot and Plot XXXIVG in future seasons in order to explore the earlier Hellenistic phases.

The Bronze Age Occupation

Besides Byzantine and Hellenistic, the other period which was well represented in the 1993 excavations was the Bronze Age with structures of Middle Bronze date being found in plots XXXIVF and Early Bronze remains in XXXIVT. Up until now, however, relatively little in the way of Late Bronze Age material has been found on the summit of Tall al-Ḥuṣn - an aspect which will also need further investigation in the coming seasons.

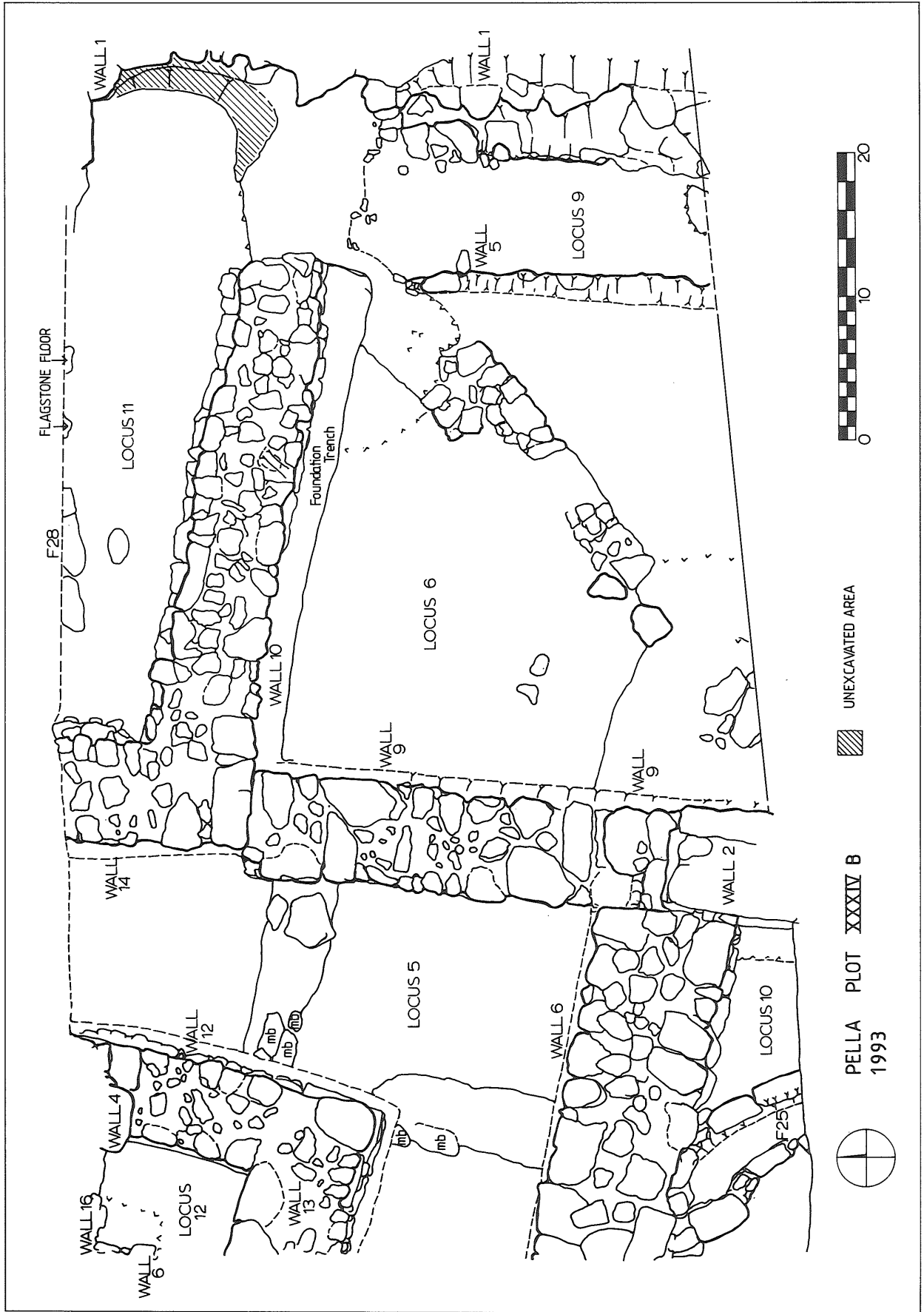
Plot XXXIV F

Plot XXXIVF is situated on the north side of the summit of Tall al-Ḥuṣn and runs north-south. It was originally opened in 1989 when the Byzantine levels were explored.¹⁸ It was re-opened in 1993 in order to investigate the reason for the abundance of Hellenistic pottery found in loci 6.2 and 6.3 in 1989.

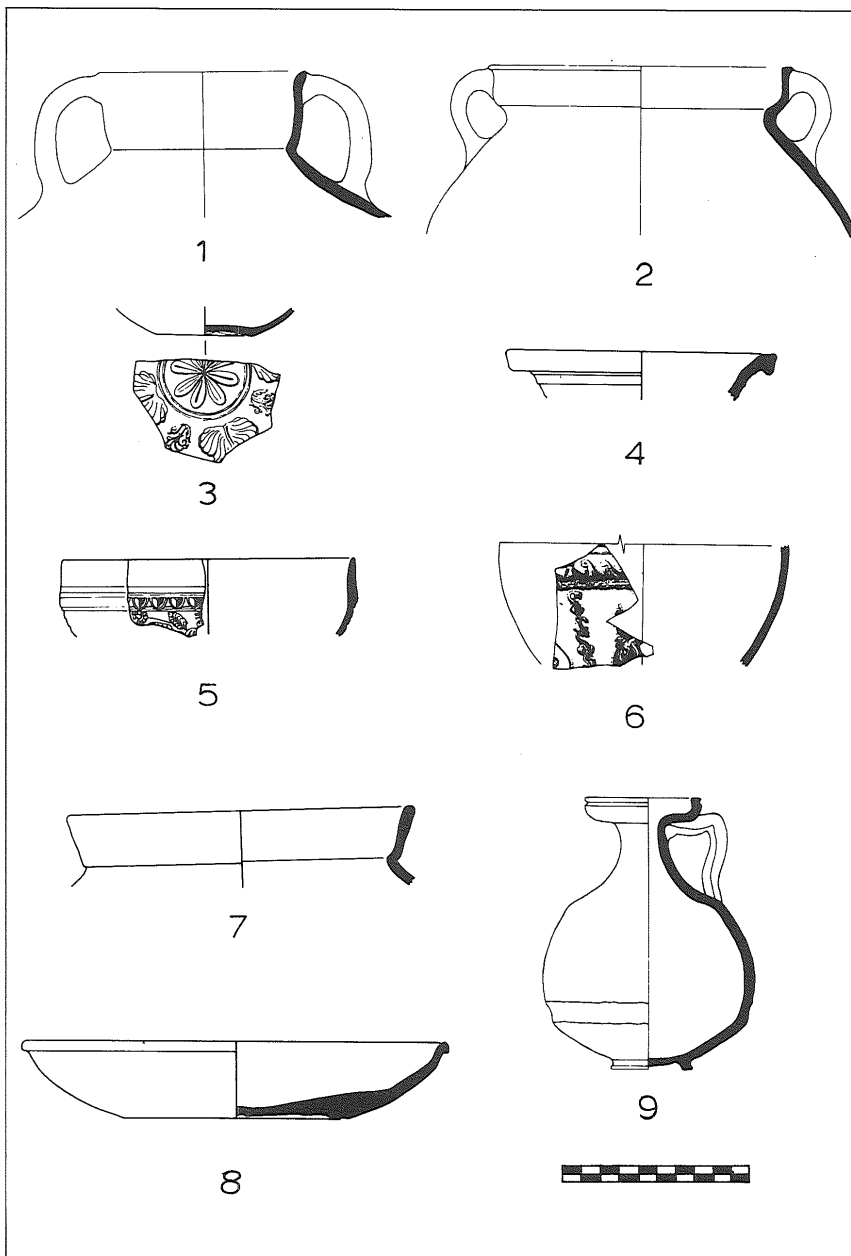
Loci 6.4 and 6.5, dug in 1993, contained large quantities of Hellenistic pottery, especially the sherds of large storage jars. On preliminary investigation, much of this material seems relatively early - possibly third century BC - and so generally earlier than

17. P.C. Edwards, S.J. Bourke *et al.*, Preliminary Report on the University of Sydney's Tenth Season of Excavation at Pella in Jordan, *ADAJ* 34

(1990): 79-80; *ADAJ* 37(1993): 204, 208.
18. *ADAJ* 37(1993): 198-208.



16. Plot XXXIV B, plan of Late Hellenistic architecture.



17. Late Hellenistic and Early Roman pottery from Plot XXXIVB.

1. CN 7154. XXXIV B 5.40. Cooking pot. Metallic coarse terracotta ware. Clay 5YR 6/8. Dark grey core.
2. CN 7156. XXXIV B 5.39. Cooking pot. Metallic coarse terracotta ware. Clay 2.5YR 5/8. Grey core.
3. CN 7147(a). XXXIV B 5.37. Megarian bowl. Clay 2.5YR 7/4. Thick brown glaze.
4. CN 7151. XXXIV B 5.37. Jar. Coarse light brown ware Clay 5YR 6/6. Grey core. Patchy thin brown glaze on exterior.
5. CN 7147(b). XXXIV B 5.37. Megarian bowl. From same vessel as 5.3.
6. CN 7150. XXXIV B 5.37. Megarian bowl. Clay 5YR 6/6. Good brown glaze fired red-brown in patches.
7. CN 7153. XXXIV B 5.40. Cooking pot. Metallic coarse terracotta ware. Clay 10YR 7/8.
8. CN 7157. XXXIV B 8.34. Plate. Eastern Terra Sigillata ware. Clay 5YR 6/6. Patchy orange-red glaze.
9. CN 7161. XXXIV B 8.34. Juglet. Coarse light brown ware. Clay 7.5YR 6/4. Patchy dull brown glaze on upper exterior and interior.

that found to date on the main mound. Unfortunately this pottery was not associated with any structure and so should probably be considered as part of a fill or rubbish deposit.

Directly below these Hellenistic deposits were encountered walls and features associated with occupation surfaces 9.2 and 12.1. The pottery recovered from these surfaces belongs to the Middle Bronze Age and the associated walls are probably of the same period although further investigation is needed to confirm this.

What has been revealed so far, therefore, seems to be a Middle Bronze Age domestic area (Fig. 19) with evidence of cooking on the occupation surfaces which are bounded by a series of storage/rubbish bins (Features 4,6,7) and by Walls 8 and 10. The evidence for cooking is represented by blackened sherds, charred bones and small areas of burning on the floors themselves. The occupation surfaces are of tamped earth with no evidence of plaster or stone paving.

In this summary, Walls 1, 8 and 10 are worthy of comment. Wall 1, which runs ap-



18. Eastern Terra Sigillata plate from plot XXXIVB.



19. Plot XXXIVF. View to north of the Middle Bronze Age domestic area. The storage bins are to the east of the plot.

proximately east-west, was uncovered in 1989 and further revealed this season. Its construction is of field stones of approximately 40 to 50 cm. in diameter with those on its south face having their exterior surface roughly worked. There is no evidence of mortar or plaster. Its north face has not been exposed although the wall's thickness is probably about 1.70 m. Although the wall remains to be fully investigated, most of the pottery found in its associated tumble (6.6) dates to the Middle Bronze Age and so this wall may well belong to the Middle Bronze occupation of the tall.

Wall 8 runs approximately north-south and forms the western boundary of occupa-

tion surfaces 9.2 and 12.1. Only several courses have been revealed so far and they consist of outer faces of unworked fieldstones with a probable mudbrick central core. Its width is about 1.0 m. Although its lower courses have not been uncovered, Wall 8 certainly seems associated with Middle Bronze Age occupation levels 9.2 and 12.1.

Wall 10 also runs more or less north-south and forms the eastern boundary of the occupation surfaces 9.2 and 12.1 where it is continuous with the walls of the three bins (Features 4,6,7) mentioned earlier. It consists of large unworked fieldstones with no evidence of mortar. As yet only partially revealed, it is possible that this wall may, in fact, be a bench or platform.

Plot XXXIVF, then, shows evidence of a significant, and previously unsuspected, Middle Bronze Age occupation on Tall al-Ḥuṣn.

Plot XXXIVT

Plot XXXIVT lies on the south side of Tall al-Ḥuṣn, just below its summit (Fig. 20). The purpose in opening this plot was to investigate the possibility that an apparent gap in the perimeter wall located during the planning of the summit this season (see below p. 15) may mark the position of a gate. The upper courses of several walls (Walls 1,4, 5) already visible prior to excavation revealed the presence of relatively well cut masonry which may have marked the position of a tower or bastion. In the event, neither gate nor tower were found.

Excavation between Wall 1 and Wall 7 revealed a large, and as yet incompletely defined, platform (F2) consisting of loosely packed unworked field stones of 10 - 30 cm in diameter which were chocked with smaller stones and clay. It is at least one metre thick and so must have had some supporting function. The platform is bounded to the north by three narrow terraces, made of rough fieldstones bonded by clay, which appear to be of



20. Plot XXXIVT. View to south. The stone platform is well seen at the south end of the plot. Wall 7 is in the north-east corner.

similar date to the platform itself.

The date of this platform, however, is still to be determined although a large amount of Early Bronze Age pottery is appearing from within its upper layers. Furthermore, it is reminiscent of the massive stone platform found previously on the east side of Tall al-Ḥuṣn in Plot XXXIVA and assigned to the Early Bronze Age.¹⁹

To the east of the stone platform, Wall 7 (Fig. 21) runs in a north-south direction. Its most northerly part has four courses of pseudo-isodomic masonry on its west face while its eastern face has not been revealed. There is no binding mortar or external plaster but rather a central core consisting of clay and small unworked stones. The southern part has been robbed in its upper courses although the trace can be identified by following the undisturbed rough stone foundation course (F1) underneath.

Wall 7, including its foundation course, has been cut through the stone platform (F2) as well as the three narrow terraces mentioned above and so must be later in date. On superficial examination, the latest pottery from the wall's foundation trench (14.1) seems to belong early in the Roman period and this is consistent with its style of masonry.



21. Plot XXXIVT. Wall 7 from the south-west.

On the west side of the stone platform, which abuts it, Wall 1 runs parallel to Wall 7 and has at least two phases. The earlier one is dated by the pottery in the foundation trench (7.1) to the Early Bronze Age whilst the later phase with its well cut rectangular blocks bonded with a lime mortar is probably Roman.

To the west of Wall 1 and related to its early phase is the occupation surface 8.4 with its ash lenses, burnt sherds and bone. Preliminary inspection of the pottery from 8.4 points to a date in the Early Bronze Age for the surface.

This plot, therefore, reveals evidence of Early Bronze Age activity in the southern sector of Tall al-Ḥuṣn with overlying Ro-

19. *ADAJ* 37(1993): 208-210.

man construction. There is no evidence of a gate although the well-cut masonry of Wall 7 suggests that this wall was part of an important structure which will be investigated in future seasons.

Planning of the Summit (P.Watson)

Major wall lines visible on the surface of the summit of Tall al-Ḥuṣn and outside the excavation plots were planned (Fig. 1). Some of these walls form the continuation of the earlier core building of the Byzantine complex in the south-east and need further excavation to be understood in detail. Other units are identifiable in patches over the entire area of the summit.

The most outstanding contribution the surface planning has made to our understanding of the occupation of the summit, is the revelation of a circuit wall enclosing this area. It is clearly identifiable on the east, south, and west sides of the summit, but the overburden of topsoil along most of the north side of the tall has obscured its continuation here. There was insufficient time to extend the planning below this wall, which is located somewhat below the edge of the summit and difficult to access. How-

ever it is apparent that radial walls extend down-slope perpendicular to this wall, as if forming a system of buttresses. It is hoped to continue this planning in a future season. Up-slope of the wall, a series of rooms can be identified in places, as if forming an irregular casemate structure. The wall follows the curve of the hill by turning irregularly at angles rather than curving. The date of the wall is uncertain, although the excavations in Plot T have shown that there was considerable rebuilding at different times, and that the original formation of the contours of the summit may date back to the Early Bronze Age.

P. Watson
British Institute at Amman
for Archaeology and History
P.O. Box 519, Jubaiha
Amman 11941
Jordan

J. Tidmarsh
School of Archaeology,
Classics and Ancient History
University of Sydney
NSW 2006A
Australia

THE BYZANTINE CEMETERY AT KHIRBAT AS-SAMRĀ': PRELIMINARY HUMAN OSTEOLOGICAL ANALYSIS

by

Abdalla J. Nabulsi

Introduction

The Byzantine cemetery at Khirbat as-Samrā' belongs to the ancient settlement's populations through the period from the fifth until the eighth century AD. It is one of numerous ancient cemeteries in Jordan that have suffered or are suffering disturbances and destructions still leaving little material for archaeological and biological studies. This has led to the loss of valuable information on human settlement in Jordan.

In the present study, the results of the anthropological examinations of the human skeletal remains excavated in the 1993 season from the Byzantine cemetery at Khirbat as-Samrā' are to be presented. The investigation presents a case study on the relevance of biological analysis to the osteological material from disturbed sites.

Material and Methods

22 single burials were excavated at site A of the Byzantine cemetery, which is dated to the sixth century AD. Human remains were salvaged from 18 tombs only. The obtained skeletal material from Tombs 16 and 18 was nearly complete. Only 30-50% of the original cranial and post cranial parts were secured from Burials 3, 4, 5, 7, 8, 10, 11, 14, 17, 19, 20 and 22. In Tombs 9, 12 and 21 only few bones or bone fragments remained. Burial 1 was intact but the salvaged material for analysis was very restricted, due to the extreme fragility of the bones. Any human bones found in tomb fills above the tomb slabs (as a result of robberies!) were excluded from the analysis.

The excavated human bones were mostly fragmented and fragile. Though the max-

illary parts were missing in all examined cases, the skull from Tomb 16 was nearly intact. Reconstruction of the crania and long bones was restricted to the available fragments. Few bone samples were taken for microscopical examination. Relevant macroscopic methodologies were applied to determine age, sex (Brothwell 1981; Sjøvold 1990; Szilvássy 1990). As far as possible, age estimation was based on molar analysis, cranial suture and ossification of the long bones, while sex was determined according to the discriminating characters of the pelvis, skull, bone robustness and, if needed, with the aid of non-gender specific objects found in the burial, for example earrings and hairpins by females. Palaeopathologic diagnosis (Schultz 1984; While and Folkens 1991) was based on macroscopic examination. Epigenetic traits of the skull were determined according to Hauser and De Stefano (1989) and anthropometric measurements were taken in line with the modified terminology and techniques described by Bräuer (1988).

Results and Discussion

The deteriorated condition of the examined human skeletal remains, as macroscopically established, was substantiated by microscopic analysis. These failed to reveal recognizable bone tissue structures. This could be attributed to naturally induced fragility, as a result of climatic factors or root intrusions, and / or to destruction, resulting from multiple disturbances of the burials, as became apparent in the state of the excavated tombs. On some skulls, dark brownish spots were observed on the frontal and parietal cranial parts. These were found to be

traces of cloth, with which the individuals were wrapped before burial, thus indicating ceremonial burials. Similar observations were established on the skeletal material excavated from churches within the ancient settlement and dated to the seventh-eighth century AD.

The examined skeletal remains consisted of six children and 12 adults (Table 1). Child burials included two infants and four juveniles, from which only burial 22 could be determined as female. Among the adult ones, six females and four males were determined. Sex of burial 9 and 19 remains non-definable. Individual 20 was classified as male due to the apparent muscularity, indicated by the muscle attachments on the long bones, while a number of factors, including artefacts found in the respective tombs, have indicated that burials 4 and 10 involved females.

Even after including the four empty tombs, whose form indicate infant or child burials, the sample size remains small (22) for detailed demographic analysis. Yet, the ancient population at Khirbat as-Samrā' appears to have suffered from high infant and child mortality (over 40 % of total deaths). The estimated average death age (21.9 years) and a mortality rate of 54.6 in 1000 indicates that population growth rate was very low or even zero. Furthermore, life expectancy was probably low (between 30 and 40 years) and seldom exceeded 50 years.

Palaeopathologic diagnosis were based on macroscopic observations. Traces of periostitis, bone outgrowth, were diagnosed on the ventral side of os sphenoidale and on the outer auriculo-temporal bones of the available crania. These may be related to common infectious diseases of the respiratory system. From seven possible cases, cribra orbitale was diagnosed in individual 18 only. Beside dental wear and age related loss of molars, as in individual 17, the teeth of the examined individuals were generally in a good condition. Dental infections were limited to the

presence of abscess cavities alongside caries on the upper and lower jaws of individual 16, and the presence of dental caries in individual 3. Further indicators of diseases or premortal injuries were not detected on the available cranial material.

Stress related pathological features were observed to be more frequent and stronger on the upper than on the lower extremities, but weaker on the left side extremities than on the right ones. Joint attritions, on the articulation surfaces of caput humeri and caput femor as well as on the cavitas glenoidalis of the pectoral bone, were diagnosed in three individuals: 16, 17 and 18. These were well developed in individual 16 (grade IV b on the right cavitas glenoidalis) and less manifested in individual 18 (grade IIa on both caput femori). Osteophytes and spondylophytes were diagnosed on the vertebrae of five individuals. They were detected on the thoracic and lumber vertebrae, especially on the second and third, of individuals 8, 17 and 18, and less developed on the lumber vertebrae of individuals 10 and 16. No pathological features were observed on the post-cranial remains of burials 3 and 7. A sacralised sixth lumber vertebra was observed in individual 18 and can be considered as an epigenetic character.

Burial 1 represents an extreme pathological case. Periostitis, bone outgrowth, and probably periostosis, was diagnosed on all of its long bones. Based on dentition, the age of the child was estimated to be 12-18 months. Yet, the length of both femori (ca. 107 mm) was too short (109-152 mm) for the supposed age (Brothwell 1981). This may suggest that the child had suffered from a severe "infectious" disease, which had prevented normal development.

The incidence of cribra orbital and hypoplasias, among other pathologic features, are often related to malnutrition, which probably was common among ancient populations (Larsen 1987; Rösing 1990; Reshef and Smith 1993). The so far low rate of cribra or-

bitale and the absence of further malnutrition related pathologic features in the examined sample from Khirbat as-Samrā' suggest comparatively good nutritional conditions in the population concerned. The diagnosed dental condition of the individuals 3 and 16, which is often associated with a rich diet (Larsen 1987), strengthen these reflections. On the other hand, the previously mentioned high child mortality and the pathologic condition of individual 1 suggest a probable prevalence of infectious diseases in the population at that time. These speculations still have to be confirmed through further excavations and examinations.

The obtained anthropometric measurements are listed in Table 2. The cranial data indicate a wide range of biological variability among the ancient population of Khirbet es-Samra. This was well demonstrated by the estimated cephalic index values varying between 70% to 80%. Taking the high inter-correlations between cranial breadth measurements into consideration (Howells 1949, 1969), the sample under study appears to reflect more dolichocephalic, that is elongated, than brachycephalic, that is rounded, cranial features. Postcranial data indicate a medium stature. The expected means for males and females are (170 cm and (160 cm respectively. These results lay within the regional ranges of variation reported among similarly ancient (e.g. Henke and Wahl 1990) and more recent (e.g. Shanklin 1946; Field 1956) populations in Jordan.

Presently, a biologically defined ethnicity of the sixth century population at Khirbat as-Samrā' is not possible. This is less related to the small sample size but primarily to the absence of comparative and comprehensive anthropological studies on the ancient Jordanian and other neighbouring populations, and including the factors that may influence the observed distributions. Even then, an-

thropometric measurements alone, like any other type of biological methodologies, can only be applied as indicators of inter-and intra-population relationships and not as evidence of ethno-historic relationships.

The global distributions of the epigenetic traits can be described as population specific. Any two populations may display very similar or different frequencies for any such characters, regardless of their ethnic affiliation (Hauser and DeStefano 1989; Rösing 1990; Wiltchke-Schrotta 1992). Table 3 lists some of the observed epigenetic traits in the examined sample. These data do not permit any predictions on the distributions in the population concerned. Yet, the occurrence of ossicles at lambda, lambdaoid ossicles and infraorbital foramen indicate to be abundant. The same characters were also detected in the skeletal material from within the ancient settlement. Hence, epigenetic traits may prove to be useful in the characterisation and progression of the ancient population in Khirbat as-Samrā'.

To conclude, biological analysis on the skeletal remains from the Byzantine cemetery in Khirbat as-Samrā' indicates that the sixth century AD population of the settlement had enjoyed a relatively good living standard. Yet, health conditions were disadvantageous. The estimated high child mortality may be attributed to infectious diseases. This had kept population growth low. Some observed epigenetic traits may prove to be informative on the progression of the ancient population at Khirbat as-Samrā'. Any discussion on the population's ethnicity is momentary superfluous.

Abdalla J. Nabulsi
Institut für Humanbiologie
Universität Hamburg
Allende-Platz 2
D-20146 Hamburg
Germany

Table 1. Age estimation and sex determination of the human remains from Khirbat as-Samrā'.

Burial no.	Age Estimation		Sex Determination	
	Age	Method	Sex	Method
Tomb 1	12-18 mos	dentition	?	
Tomb 3	20-25 yr.	molars and pelvis (os pubis)	Female	pelvis (sciatic notch)
Tomb 4	17-25 yr.	molars	Female ?	skull (proc. mastoideus)
Tomb 5	18-24 mos	dentition	?	
Tomb 7	20-25 yr.	Molars and cranial sutures	Male	pelvis (sciatic notch) and bone robusticity
Tomb 8	35-45 yr.	ossification and pelvis (os pubis)	Female	pelvis (sciatic notch)
Tomb 9	adult	bone ossification	?	
Tomb 10	45 yr.	bone ossification	female?	bone robusticity and tomb artefacts
Tomb 11	7-10 yr.	bone ossification	?	
Tomb 12	10-15 yr.	os lunatum size & shape	?	
Tomb 14	25-40 yr.	bone ossification	male	pelvis (sciatic notch)
Tomb 16	35-40 yr.	dentition, pelvis and cranial sutures	female	pelvis (sciatic notch) and skull features
Tomb 17	> 45 yr.	bone (os pubis)	female	pelvis (os pubis)
Tomb 18	35-39 yr.	dentition, pelvis and cranial sutures	male	pelvis (sciatic notch) and skull robusticity
Tomb 19	25-45 yr.	bone ossification	?	
Tomb 20	25-45 yr.	bone ossification	male?	bone robusticity
Tomb 21	< 17 yr.	bone ossification	?	
Tomb 22	10-15 yr.	bone ossification and development (vertebrae)	female	pelvis (sciatic notch)

Table 2. Anthropometric measurements (Bräuer 1988) on the human bones from Khirbat as-Samrā'. Postcranial measurements are for the left side. Right side ones are between brackets c).

No.	Measurement	Individual						
		3	7	8	10	16	17	18
1	Maximum cranial length	173				186	184	174
5	Basion-nasion length					95		
8	Maximum cranial breadth	139	132			132		135
9	Least frontal breadth	100				96	91	95
11	Biauricular breadth					116		106
12	Biasterionic breadth					113		
13	Mastoid width					108		
17	Basion-bregma height					134		
26	Frontal longitudinal arc					134		138
27	Parietal longitudinal arc	138				138		142
28	Occipital sagittal arc					122		
29	Nasion-bregma chord	120						114
43(1)	Inner biorbital breadth					92		
23	Horizontal cranial cercomf.					549		
65	Bicondylar breadth	107				118		119
66	Bigonial breadth	80				102		94
69	Mandibular symphysis ht.	25				33	34	31
7	Foramen magnum length					37		
16	Foramen magnum width					32		
	Cephalic index (8/1x100)	80.34				70.97		77.59
C1	Clavicula maximal length			122		135		150
H1	Humerus maximal Länge							286
H2	Humerus total length							305
R1	Radius maximal length							232
F1	Femor maximal length							446
F2	Femor total length				398			431
P1	Patella maximal length	31	37				(37)	(41)
P2	Patella maximal width	37	38		(47)		39	(46)

Table 3. The observed epigenetic traits in the Khirbat as-Samrā' sample according to the definitions and classifications by Hauser and De Stefano (1989).

Trait	Individual				
	3	7	16	17	18
Median supraorbital foramen	- / +L	?	-	+R	+R / +L
supratrochlear foramen	- / -	?	-	+R / +L	+R / +L
Lateral suprafrontal groove	+R / -	?	-	-	- / +L
Infraorbital foramen	2 R / 3 L	?	3 R / 2 L	?	+R / +L
Ethmoid foramen	?	?	2 R / ?	?	?
Occipital foramen	-	+	+	-	-
Sagittal ossicle	-	-	+	-	-
coronal ossicle	-	-	1 L	-	-
Ossicle at lambda	3 (c)	-	1 (c)	?	-
Lambdoid ossicle	2 R / 3 L	1 R / 1 L	4 R / 4 L	?	-

+: trait observed ; -: trait not observed.
R / L: trait observed on the right /left half and their frequencies, given in numbers.
?: trait not verifiable due to missing parts.

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**SURVEY AND EXCAVATION:
A COMPARISON OF SURVEY AND EXCAVATION RESULTS FROM SITES
OF THE WĀDĪ AL-ḤASA AND THE SOUTHERN AL-AGHWĀR AND NORTH-
EAST 'ARABAH ARCHAEOLOGICAL SURVEYS**

by
Burton MacDonald

Introduction

The writer carried out two archaeological survey projects in Jordan between 1979 and 1986. The first, The Wādī al-Ḥasa Archaeological Survey (WHS), was in the field for three seasons, namely, 1979, 1981, and 1982. In 1983, infield work rechecked some of the sites of the previous seasons. This first project surveyed a total of 1074 sites (MacDonald *et al.* 1988). In 1985 and 1986, a second project, namely, The Southern Ghors and Northeast 'Arabah Archaeological Survey (SGNAS), examined a total of 240 sites to the west and southwest of the WHS territory (MacDonald *et al.* 1992).

The areas which the WHS and the SGNAS covered are both located in west-central Jordan (Fig. 1). Wādī al-Ḥasa, which begins in the eastern Jordan Desert and flows in a northwesterly direction to empty into the southeastern plain of the Dead Sea at aṣ-Ṣāfi, formed the northern boundary of the WHS. The SGNAS territory extended from the agricultural fields just to the north of aṣ-Ṣāfi southward to Wādī Faydān, a distance of approximately 40 km.

Beginning in 1984 several archaeological projects have carried out excavations and/or further investigations at 22 of the surveyed sites: 12 from the WHS (Table 1); and 10 from the SGNAS (Table 2). It is now op-

portune to compare the original survey results with those obtained by this later work. This will point out the correlation, at least as far as the WHS and SGNAS are concerned, between the results of survey archaeology and follow-up excavation and/or investigation of the same sites. It will also point out the value of surface-survey results in choosing what site(s) to excavate.¹

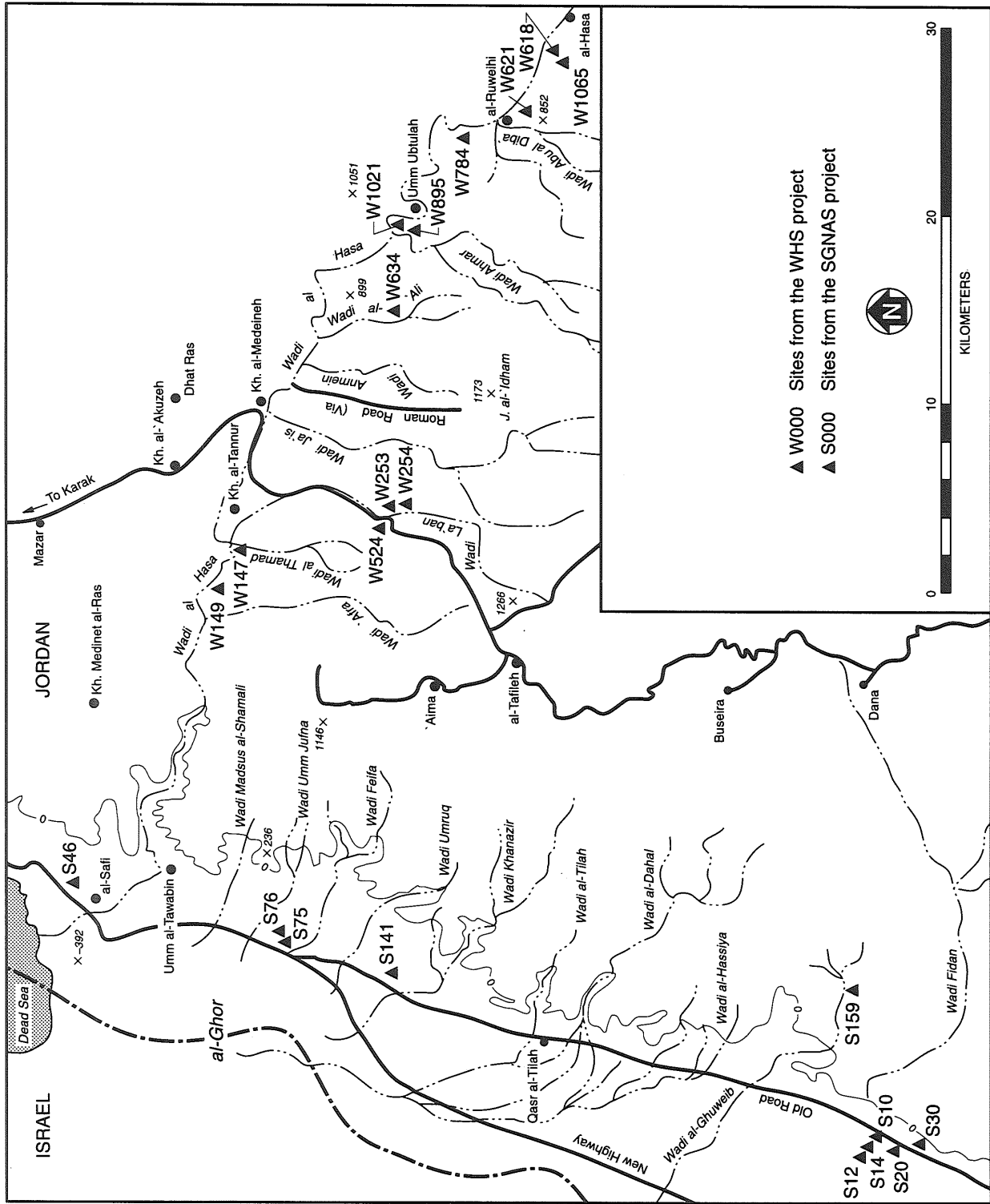
The approach will be to treat each of the sites in Table 1 and then Table 2 individually. Pertinent comments will be made relative to both the survey findings and subsequent excavations/investigations. As in the tables, the presentation will be, for the most part, numerical rather than either chronological or geographical.

The Wādī al-Ḥasa Survey Sites
(Table 1)

Ash-Shorabat, WHS Site 147, is located on a terrace next to Wādī al-Ḥasa. The site, although partially destroyed by agricultural activity, consisted, at the time of the WHS team's visits, of a stone platform measuring ca. 35 x 15 m with stone alignments occupying an area of at least 10 x 15 m on its southern half. The WHS team collected pottery from several different periods at the site (MacDonald *et al.* 1988: 169; MacDonald, Banning and Pavlish 1980: 175).

1. There is general agreement among archaeologists that the cultural debris on the surface of a site is indicative of what is buried below. In other words, a description of surface, artifact distribution will allow the archaeologist to predict what is under the surface (Redman and Watson 1970: 279-80). Flannery generally agrees with

this position. He does, however, urge caution. In his view, the above-stated position ought to be accepted with healthy scepticism since the pattern on the surface has been influenced by "erosion, gravity, monumental construction and disturbance, plowing, looting, and modern occupation" (1976: 62).



1. Selected Sites from the Wadi al-Hasa and Southern al-Aghwar and North-east Arabah Archaeological Surveys.

Table 1.*

WHS Site No. (Name, if any)	WHS Findings**	Excavation Results
147 (Ash-Shorabat)	LB-Iron;Iron IA; Byz;LIsI;Ud sherds	EB I;Iron II
149 (Kh.al-Ḥammām)	UPL;EPL-ENL;PNL; Nab;Mod;Ud sherds and lithics	Late PPNLB phases
253 (Qaṣr adh-Dhariḥ)	MPL;UPL;Late lithics***; Ud lithics;Iron II; Hell,poss;Nab;Nab/Rom; LRom;Ud sherds	Nab temple (end of 1st cent. BC-LRom); Byz;Um
254 (Kh. adh-Dhariḥ)	MPL;Late lithics;Ud lithics;Iron II,poss; Nab;Nab/Rom;LRom; Ott,prob;Ud sherds	Nab,predom.;Iron II; Rom;IsI
524	PNL sherds and lithics	PNLA (2nd half of 6th millennium BC)
618 (‘Ayn al-Buḥayra)	LPL-MPL;MPL; UPL;UPL-EPL	UPL, Ahmarian (mean age of 22,450 BP)
621	MPL;MPL-UPL;UPL	MPL (70,000 BP[?])
634 (‘Ayn ad-Dufla)	MPL;UPL;Late and Ud lithics	MPL (105,000 ± 15,000 BP)
784 (Yutil al-Ḥasa)	EPL EPL (after ca. 13.3	UPL (ca. 19 kyr BP); kyr BP; and between ca.12.5 & 11 kyr BP)
895	EPL	Natufian base camp (Tabaqa) (ca. 10,000 and 9,000 BC)
1021	EPL	Natufian
1065 (Ṭor aṭ-Ṭariq)	UPL-EPL	Kebaran (possibly 16.9-15.6 kyr BP)

* It must be kept in mind, in reading Tables 1 and 2, that the WHS and SGNAS record all collected sherds and lithics. Excavators will generally be interested in the main component(s) of a site. They will, for the most part, not record, especially in a preliminary report, all lithics and/or sherds excavated.

** Lithics and/or sherds are listed chronologically; standard abbreviations are used.

*** Refers to lithic material which is dated, without further precision, more recent among the time-stratigraphic units.

Bienkowski put down two soundings at the site in April-May 1995. Both soundings uncovered, according to the excavator, phases or levels which date to the Iron II period. Bienkowski also reports considerable amounts of EB I pottery in both excavated areas. None of this latter pottery, however, was *in situ* (Bienkowski 1995).

On its first visit to Site 149, Khirbat al-Ḥammām, which is located in agricultural fields on the slopes leading down to Wādī al-Ḥasa, the WHS team noted architectural features in a roadcut which transects the site. There was a predominance of Epipaleolithic-Prepottery Neolithic materials along with sherds from both the Neolithic and the Nabataean periods among artifacts collected at the site (MacDonald *et al.* 1988: 128). Rollefson and Kafafi carried out a more intensive examination of the site in January 1984. Their main interest was its lithic components.

During the course of their investigations, Rollefson and Kafafi collected, and subsequently drew for publication purposes, a number of chipped stone tools, a polished adze/celt, a groundstone, and other artifacts. They also examined the architectural features at the site, especially those which the roadcut exposed, and concluded that the site is a village which dates to the Prepottery Neolithic B phases (1985: 63) and that "... in general there are many technological, typological, and stylistic expressions among the artifacts and architectural remains that are shared with the late PPNB phases of Jericho, Beidha, and 'Ain Ghazal" (1985: 69).

WHS Sites 253 and 254, Qaṣr and Khirbat adh-Dhariḥ respectively, are located in the central segment of Wādī al-La'bān. The survey team judged Qaṣr adh-Dhariḥ to be a smaller version of the Nabataean temple at Khirbat at-Tannūr, WHS Site 229, which is located farther to the south at the confluence of Wādī al-La'bān and Wādī al-Ḥasa (MacDonald *et al.* 1988: 204; Glueck 1965). It viewed Khirbat adh-Dhariḥ to be the ruins of

a Nabataean village/town (MacDonald *et al.* 1988: 204-05; Roller 1983; MacDonald, Rollefson and Roller 1982: 127). The Institute of Archaeology and Anthropology of Yarmouk University and the French Institute of Archaeology of the Near East carried out its first season of excavation at both sites in 1984 (Villeneuve 1984) and its sixth season in 1993 (al-Muheisen and Villeneuve 1991; 1992; 1994; 1995). The Nabataean temple, that is, Qaṣr adh-Dhariḥ, was the principal object of the excavations. Various structures such as an official building, several houses, two cemeteries, and the agricultural character of the complex, however, were also investigated. According to the excavators, the temple was continually occupied from Nabataean times (end of the first century BC) up to the Late Roman period (al-Muheisen and Villeneuve 1991: 508). They state, furthermore, that it was reused as a church during the Byzantine period while parts of it were used as a habitation area during the Umayyad period. The official building, according to the excavators, knew two phases of occupation, namely, during the first century BC and the first century AD (al-Muheisen and Villeneuve 1992: 358).

The WHS team judged Site 524, located in the central segment of Wādī al-La'bān, to be an *in situ* village of at least a semi-permanent nature dating to the Late Neolithic period. It collected both abundant lithics and ceramics along with bone, burnt stones, and a basalt grinding-stone at the site (MacDonald *et al.* 1988: 129, 131; MacDonald, Rollefson and Roller 1982: 121). Bossut, Kafafi and Dollfus, in conjunction with the above-mentioned 1987 excavations at Khirbat adh-Dhariḥ, carried out explorations at WHS Site 524/Dhariḥ Survey Site 49 (1988). They drew one section which, for the most part, was formed by a roadcut. Moreover, they collected pottery, especially in the form of bowls and jars, several fragments of stone bowls, one very regular grooved stone, and lithics at the site. The bowls collected are similar to those "ascribed

to the second half of the sixth millennium B.C.” (Bossut, Kafafi and Dollfus 1988: 128). The lithic material which Bossut, Kafafi and Dollfus collected at the site is atypical and not very abundant. In conclusion, they state: “From the material, it seems possible to ascribe Dharīh Survey site 49 to the PNA period. However, this assumption has to be confirmed by radiocarbon dating...” (1988: 131).

Clark, director of the Wādī al-Ḥasa Paleolithic Project (WHPP), began an examination of five WHS sites in 1984. These sites, namely, 618, 621, 634, 784 and 1065, are located, for the most part, along the shores of an Upper Pleistocene lake at the eastern end of Wādī al-Ḥasa. Attention is now turned to these sites.

The WHS team collected predominantly Upper Paleolithic materials at Site 618, ‘Ayn al-Buḥayra. It judged the site to be a possible camp (MacDonald *et al.* 1988: 95-98, Table 9). The WHPP team excavated it in 1984 (Coinman 1993; 1990; Clark *et al.* 1987). With five dates clustering between 26,000 and 19,000 BP, Schuldenrein and Clark give a mean site age of 22,450 BP (1994: 39). The excavators posit two occupation loci for the site: 1) the western locus, which includes large numbers of narrow, thin microlithics, is associated with the Late Ahmarian culture (Schuldenrein and Clark 1994: 39 and 46, Table II); and 2) the second locus, located less than 40 m to the north, “registers a period of desiccation following, and perhaps accounting for, site abandonment” (Schuldenrein and Clark 1994: 40).

Site 621, according to the WHS explorers, is a large (4000 m²), scatter of predominately MPL artifacts (MacDonald *et al.* 1988: 89; 1983: 315). The WHPP excavators date the site to 70,000 BP, with a question mark (Schuldenrein and Clark 1994: 46, Table II; compare Potter 1995: 498; 1993: 4). More-

over, “a single radiometric determination at WHS 621 is a Chalcolithic hearth of Holocene age (7500 ± 130 BP), located in foot-slope deposits” (Schuldenrein and Clark 1994: 41; see also Clark *et al.* 1987: 30).

The WHS team reported Site 634, ‘Ayn ad-Dufla, located in Wādī al-‘Alī, a southern tributary of Wādī al-Ḥasa, as a medium-sized, MPL rockshelter (MacDonald *et al.* 1988: 89). It judged the site to be a basecamp (MacDonald *et al.* 1983: 315). The WHPP excavators worked at the rockshelter, which is the only one of their five sites not at the eastern end of Wādī al-Ḥasa, in 1984, 1986 and 1992 (Potter 1995; 1993; Barton and Clark 1993: 43; Clark *et al.* 1988: 226-35; 1987: 31-38; Lindly and Clark 1987). They have recovered the remains of dozens of small hearths and firepits, thousands of artifacts, and poorly-preserved animal bones at the site. Many of the artifacts show signs of having been burned (Clark 1992: 343). Surficial deposits indicate a date no later than the MPL time-span (ca. 230-45 kyr BP) (Barton and Clark 1993: 43). Moreover, Oxford University’s Laboratory for Isotope Geochemistry has dated, by thermoluminescence, the rockshelter at 105,000 ± 15,000 BP (Schuldenrein and Clark 1994: 34, Table 1 and 44).

Site 784, Yutil al-Ḥasa, is a collapsed rockshelter. The WHS team observed dense numbers of Geometric Kebaran artifacts at the site (MacDonald *et al.* 1983: 315-16). The WHPP team excavated the site in 1984 and 1993 (Clark *et al.* 1994: 50-52; 1988; 1987: 46; Coinman 1993; 1990; Olszewski *et al.* 1990) and reports three distinct episodes of use/occupation at the site: 1) late UPL Ahmarian, ca. 19 kyr BP; 2) after about 13.3 kyr BP, a probable series of Madamaghan occupation is documented; and 3) between ca. 12.5 and 11 kyr BP, an early Natufian Epipaleolithic occupation occurred at the site (Clark *et al.* 1994: 51).²

2. The WHPP excavators labelled the site WHS 784X in 1984 (Olszewski *et al.* 1990; Clark *et al.* 1988; 1987: 46). They now call it merely WHS

784, Yutil al-Ḥasa, (Clark *et al.* 1994: 50-52). See the discussion on this in Clark *et al.* 1987: 46).

The WHS explorers judged Site 1065, Tor at-Tariq, to be a predominantly UPL-EPL basecamp with characteristics of the Natufian culture (MacDonald *et al.* 1988: 103, 105). The WHPP excavators worked at the site in 1984 (Coinman, Clark and Donaldson 1989; Clark *et al.* 1987: 52-67) and 1992 (Neeley 1995; Clark 1992). Excavations revealed that the site “consists of several superimposed basecamps with intact subsurface deposits including hearths, pits, remnants of structure walls and middens more than 1.5 m thick” (Coinman, Clark and Donaldson 1989: 213). The material recovered, namely, large quantities of stone tools and animal bones, are dated, by radiocarbon means, from 16.9 to 15.6 kyr BP (Schuldenrein and Clark 1994: 38; Clark 1992: 344; Coinman, Clark and Donaldson 1989: 213). The WHPP excavators identified the site as Kebaran on the basis of the date and artifact typology (Neeley 1995; Schuldenrein and Clark 1994: 36, 38). Sediments younger than 12,000 BP give the site a possible Natufian component (Schuldenrein and Clark 1994: 36, 38 and 46, Table II).

Byrd and Rollefson, two members of the 1982 WHS team, made further visits to Sites 895, Tabaqa (MacDonald *et al.* 1983: 316), and 1021 following the termination of the WHS infield seasons. They, moreover, studied closely the lithics which the WHS collected at the sites. On the basis of this work, they classify Tabaqa as a Natufian base camp. This classification was due to “the site’s large size, the diversity of chipped stone tool types, the abundance of lunates, and the presence of groundstone tools, beads, and shell” (Byrd and Rollefson 1984: 149). Byrd and Rollefson date the site to be between around 10,000 and 9,000 BC, that is, to the early phase of Natufian. They also classify Site 1021, a much smaller site than Tabaqa and located approximately 0.50 km upstream, as Natufian. They state that “the color, patina, and morphology of the artifacts collected at the site is very similar to the

artifacts recovered at Tabaqa” (1984: 150). They think that there may be remnants of architectural features at the site (1984: 150).

The Southern al-Aghwār and North-east ‘Arabah Archaeological Survey Sites (Table 2)

Adams, a member of the 1986 SGNAS team, began the Wādi Faydān Project (WFP) in 1989 “whose long term aim is to examine the archaeological remains throughout the Wādi Faydān gorge and surrounding area, in order to understand more fully the human adaptation to and exploitation of the environment and natural resources of this area throughout the late prehistoric periods” (1991: 181). The WFP team has investigated to date five SGNAS sites.

The WFP explorers began with the examination of two areas, namely, a large cemetery complex and a small artificial mound at the western mouth of the wadi, SGNAS Sites 14 and 12 respectively. According to the SGNAS team, the former is a Chalcolithic/Early Bronze cemetery consisting of over 200 graves, some looted (MacDonald *et al.* 1992: 40, 59-60, 250-51), while the latter is a small “island”/mound. The SGNAS investigators identified Site 12 as a Neolithic settlement although other periods were represented in the form of lithics and sherds (MacDonald *et al.* 1992: 27-31). The WFP excavators investigated six graves in the cemetery, SGNAS Site 14/WFP Site 009, which they posit had two distinct periods of use (Adams 1991: 181). The first period is represented by grave circles constructed of wadi cobbles overlying, in many cases, a carefully constructed grave cist capped by large flat rocks (Adams 1991: 181). The bone remains excavated were in an extremely poor state of preservation and were accompanied by no datable grave goods. Thus, the dating of the graves, on the basis of their contents, proved to be impossible (Adams 1991: 181). The WFP team does, however, date them tentatively to the Chalcolithic/

Table 2.*

SGNAS Site No. (Name, if any)	SGNAS Findings	Excavation Results
10	Chal;Chal/EB;Ud sherds and lithics	Chal;EB I
12	NL;EB;EB IV(?); EB IVB-MB(?); Ud sherds and lithics	Late PPNLB
14	Chal/EB;EB IVB;Ud sherds and lithics	Chal/EB;EB
20	Chal;Chal/EB;Ud lithics	Chal;EB I
30 (Kh. Hamr Ifdān)	Chal;Chal/EB;EB IV; Chal;Chal-EB I; EB IVA&B;EB;Iron II; Rom;LRom;Byz;LByz; Isl;Ud sherds and lithics	EB I;EB IV;Iron Age,poss;Rom(Nab); Isl;Mod
46 (Dayr 'Ayn 'Abātā)	Nab;Rom;Byz(E & L); Byz(?);Um(?);Abb;Ud sherds	LChal-EB sherds and lithics;Byz-Abb (ca. 5th-9th cent. AD)
75 (Ancient Feifa)	PNL;NL-Chal;Chal; Chal/EB;EB I;EB IIB; EB IVA;EB;Iron I-II; Iron II painted;Rom; LByz-Um;Fatt/Ayy;Isl; Ott;Ud sherds and lithics	EB IA;Iron II (7th & early 6th cent. BC);Rom;Byz
76 (Feifa Cemetery)	PNL;NL-Chal;Chal; Chal/EB;EB I;EB IV; EB;Isl;Ott;Ud sherds and lithics	EB IA & B;PNL
141 (Kh. al-Khanāzīr/ Abu Irshareibeh)	EB IV;EB IVA & B; EB III (?); EB II-III;Byz;Ud sherds	EB IV
159 (Kh. an-Nuḥās)	Iron IA;Iron IC; Iron I-II;Iron IIA,B&C; Iron II;Iron Age; 'Negevite' ware;Ud sherds	12th-9th cent. BC; Iron II

* The notes at the bottom of Table 1 are also pertinent here.

Early Bronze Age using two criteria: 1) the grave circles are of a similar construction to those excavated at the Chalcolithic, mortuary complex at Shiqmim in the Negev to the west; and 2) the grave cists are of a similar construction to those found throughout the Southern al-Aghwār, and specifically at the cemetery at aṣ-Ṣāfi where they are dated to the EB I period (Adams 1991: 181). It thinks that the second period of the use of the cemetery is much later. The reused graves produced small fragments of iron bracelets and very well preserved, iron-stained bones, suggesting an Iron Age or later date (Adams 1991: 182). In a communication of July 21, 1995, Adams now thinks that what he has been previously calling Chalcolithic is more probably Early Bronze. This would mean that the site is dated to sometime after 3700 BC.³

The WFP excavators uncovered prehistoric graves at SGNAS Site 12/WFP Site 008 and found shell bracelets and a cache of six bifacial flaked and ground axes in one of them. Their probe on the mound revealed part of a well preserved building “dated by the flint assemblage and a C14 date (to be confirmed) from the floor debris of the structure, to the late PPNB” (Adams 1991: 183).

The WFP team, in conjunction with the Department of Antiquities of Jordan and the German Mining Museum of Bochum, also carried out excavations at SGNAS Sites 10 and 20/Wādī Faydān 4 which are located on a rocky plateau along the south bank of Wādī Faydān to the southeast of Sites 12 and 14. The SGNAS investigators noted that Site 10 is a small mound on which there appears to be domestic structures. They found basalt quern and mortar fragments at the site (MacDonald *et al.* 1992: 56, 59, 250) and thought that Site 20, which consists of a cemetery, indications of camping, wall lines, and a heavy lithic and sherd scatter could possibly be one

with it (MacDonald *et al.* 1992: 40, 56, 59, 251). They dated both sites to the Chalcolithic/Early Bronze period.

The WFP team opened a total of four areas at combined SGNAS Sites 10 and 20 which it labelled WFP 4. It identified the site “as an extended village settlement of the Chalcolithic period” (Adams and Genz 1995: 17). On the basis of the metallurgical finds and mining picks found at the site, Adams and Genz state that the community was involved in the mining and smelting of copper (1995: 17). In a communication dated July 21, 1995, Adams opts for an Early Bronze, rather than a Chalcolithic, date, that is, sometime after about 4000/3700 BC, for this site, as he does for Site 14.⁴

SGNAS Site 30, Khirbat Hamr Ifdān, is located on an “island” on the west side of Wādī Faydān around 1 km north of ‘Ayn Faydān. The site consists of a large slag area, small circles of stone which may be the remnants of hearths, and remains of what appears to be ancient building foundations. The SGNAS team judged the site to be predominantly Chalcolithic/Early Bronze in date (MacDonald *et al.* 1992: 40, 56, 59, 252). The WFP investigators began explorations at the site in 1990. They prepared a map of the remains on the surface and made a deep sondage (Adams 1992: 178). According to the WFP team, the surface of the excavated area produced Chalcolithic, EB I, EB IV, Roman (Natabaeen), Islamic and modern sherds, as well as one possible Iron Age sherd while the upper levels produced Early Bronze ceramics above a late Chalcolithic/EB I structure (Adams 1992: 178).

In summary, the WFP’s excavators uncovered “a well defined sequence of late Chalcolithic-Early Bronze Age I stratigraphy of over 2.5 m which was founded on bed-rock” (Adams 1992: 178-80). In a communication dated July 12, 1995, how-

3. Adams’ change of mind is due to recent findings resulting in the tendency to date the beginning of the Early Bronze to around 3700 BC rather than to

the traditional date of around 3300 BC.

4. See the previous note.

ever, Adams states that the site “is late EB III (literally on the cusp of EB IV).” In a more recent communication (July 21, 1995), he is even more firm on the Early Bronze Age date of the site.

Workers of the Italian Impresit Company pointed out the site of Dayr ‘Ayn ‘Abāṭā, SGNAS Site 46, to team members in 1986. From the time of the SGNAS team’s first visit to the site, there was the impression that the site was a Byzantine, church/monastery complex. This was due to the building and other artifactual remains collected at the site (MacDonald *et al.* 1992: 97, 100-04). SGNAS team members soon raised the question as to whether or not the site was indeed the “sanctuary of St. Lot” depicted on the Mādabā Map (MacDonald *et al.* 1992: 104; MacDonald and Politis 1988).

Politis began to excavate Dayr ‘Ayn ‘Abāṭā in 1988 (1989). He resumed his work in 1990 (1990) and has conducted excavations and restorations there up to the present (1995a and b; 1994; 1993a and b; 1992a, b and c). His work has uncovered evidence, in the form of pottery and lithic scatters, of the Late Chalcolithic to Early Bronze Age (1993a: 336). He dates, however, the substantial structures at the site between the Byzantine to Early Abbasid periods (around the fifth-ninth centuries AD). These structures are, in his opinion, the remnants of a monastery complex consisting of “a three-apsed basilica church built around a cave, a large arched reservoir with a water-catchment system, domestic and kitchen areas, and terraced fields surrounding the settlement” (1993a: 336). He writes: “The pottery repertoire is largely representative of the Byzantine period, with some evidence of Roman-Nabatean and Abbasid wares” (1993a: 338). He dates, on the basis of two mosaic inscriptions, the construction of the church to the seventh century. Below the mosaic floor of this church, however, he found earlier pottery belonging to the fifth and sixth centuries. This pottery, along with a number of reused,

inscribed architectural stones, leads Politis to postulate the existence of an earlier church on the spot (1993a: 338). The Abbasid pottery and glass which the excavator found on the mosaic floors of the seventh-century church are the basis for him to posit that this church ceased functioning in the late eighth century (1993a: 338). The reservoir, which Politis believes was also built in the seventh century, continued to be used for several centuries, “perhaps even after the church stopped functioning as a religious institution” (1993a: 338). Politis writes, in conclusion: “... the monastery stopped functioning at the end of the Byzantine period and that only the cave and the church, with its adjacent reservoir, were used into the Abbasid period” (1993a: 338).

Rast and Schaub, directors of the Expedition to the Dead Sea Plain (EDSP), examined Ancient Feifa and its associated cemetery in 1973 and assessed them to be Early Bronze in date (1974). Frolich and Lancaster, with several objectives related to the EDSP in mind, also examined the cemetery segment of the site in January 1985 (1985). The SGNAS team investigated Feifa in both 1985 and 1986 and divided the site into a western and eastern segment, namely, Sites 75 and 76 respectively. At the former, where there are substantial architectural remains, possibly remnants of a fort, it found sherds from several different periods. It concluded, however, that the sherds associated with the fort (?) were predominantly from the Iron Age, specifically Iron I-II and Iron II (MacDonald *et al.* 1992: 64, 73). The eastern portion, or cemetery, SGNAS Site 76, also yielded pottery from a number of periods. Nevertheless, the SGNAS team opted for a predominantly Early Bronze Age date for the cemetery (MacDonald *et al.* 1992: 64, 257).

The EDSP excavators carried out work at the SGNAS Sites 75 and 76 in December 1989-January 1990 (Lapp 1994; 1993; Schaub 1991). Their objective was to determine the date and nature of the walled

complex which comprises Site 75 and the graves, located immediately to the east, which are the major component of Site 76. In the investigation of the former, the EDSP team chose an area near the southeast corner of the walled complex as the location for its two exploratory trenches, one to the east and one to the west. The surface layers in these trenches contained Iron II pottery along with a few Roman and Byzantine sherds (Lapp 1994: 219; 1993: 482; Schaub 1991). The excavators found Iron II to be the latest pottery in the brick and sandy layers below. They reached fairly flat levels on both sides of the wall at a depth of about 1.60 m. These levels contained a few diagnostic Iron II sherds. Lapp concludes: "There is little doubt that the wall was constructed during the Iron Age, probably in the seventh century BCE" (1994: 221). She adds: "The parallel kraters, cooking pots, and jugs from good Iron II loci and further sherds from the surface material date the Feifa material to the seventh and early sixth centuries BCE, and the pottery from the stratified layers dates the construction of the wall around the site to the seventh century BCE" (1994: 225-26). Lapp also writes about burial remains at the site:

"In surface debris as well as in the Iron II levels occasional Early Bronze sherds appeared. Below the town wall and at that depth east of the wall, several disturbed EB IA tombs appeared, similar to those in the large cemetery to the east of the Feifa town site. Some of the Early Bronze sherds seem to be from domestic pottery, so there may well have been a small Early Bronze I settlement in the area" (1994: 226, n. 1).

The EDSP workers excavated 11 cist tombs, consisting of two structural types, in three widely separated areas in the cemetery, Site 76. One tomb, lined with boulders, had a large group of Early Bronze IB (ca. 3200 BC) pottery. "Artifacts in a slab-lined tomb suggest an earlier date, perhaps contemporary

with the EB IA tombs of Bab edh-Dhra' or even slightly earlier" (Schaub 1991: 262). Furthermore, the EDSP team's excavations confirmed Pottery Neolithic presence in the cemetery area since some of the EB I cist tombs cut into occupational levels from this period (Schaub 1991: 262).

The SGNAS explorers initially identified Khirbat al-Khanāzīr/Abū Irshareibeh, Site 141, as an EB IV habitation site (MacDonald, Clark and Neeley 1988; MacDonald *et al.* 1987). The excavation of the site, under the auspices of the EDSP, took place in conjunction with that of Ancient Feifa and nearby cemetery mentioned above. The EDSP team's survey of the site resulted in the mapping of 88 well-preserved, rectangular structures in a 2 km area (Schaub 1991: 262). The EDSP worker's excavation of nine of these determined conclusively that they are EB IV tombs (MacDonald 1995; Schaub 1991: 262).

Khirbat an-Nuḥas, SGNAS SITE 159, is a smelting site which has received attention from various explorers and/or archaeological surveyors over the years. The SGNAS team saw it as a predominantly Iron I-II period site (MacDonald *et al.* 1992: 73, 76-77, 266; 1987: 406-08). Hauptmann *et al.* of the German Mining Museum, Bochum, carried out explorations at the site as part of their archaeometallurgical explorations and mining-archaeological studies in the Wādī Faynān region (Hauptmann and Weisgerber 1987). Fritz put in soundings at the site in 1990. The results of this work have not been published to date. However, in a communication dated October 20, 1995, the excavator indicated that the material excavated is very meagre and is to be dated to the end of Iron Age II. In addition to Fritz's work, Engel analyzed charcoal remains from a slag heap at the site (1993). Radiocarbon calibrated dates from the charcoal range from the 12th to the ninth century BC. This indicates that this particular dump at Khirbat an-Nuḥas was in use for at least 200-300 years of copper ore smelting

(Engel 1993: 209, especially Table 3).

Conclusions

There is general agreement, as the previous discussion and Tables 1 and 2 point out, between the findings of both the WHS and SGNAS teams and subsequent excavations/investigations at common sites. This agreement points out the value of surface surveys for predicting what is under the surface of a site. It, thus, provides a guidance as to what site(s) should be excavated to obtain further data on a particular time-stratigraphic unit. Moreover, this data may be used to obtain information on settlement patterns within the surveyed areas (Redman and Watson 1970: 279-80).

There is, nevertheless, some disagreement between the findings of the surveys and excavation results at common sites. It is important to discuss areas of disagreement so that investigators may approach survey results with a healthy scepticism (Flannery 1976: 62).

There is quite a difference, as Table 1 and the associated discussion makes clear, between the WHS team's findings and Bienkowski at Site 147. Could this be due to a misreading of the pottery on the part of one or both of the projects? Or, was the excavated area too limited?

Rollefson and Kafafi emphasize the Late PPNLB phases of WHS Site 149. They would, however, have no difficulties acknowledging the WHS team's findings at the site.

Al-Muheisen and Villeneuve confirm the WHS explorers' position that Sites 253 and 254 are predominantly Nabataean. The WHS team, however, missed the Byzantine and Umayyad aspects of the site which the subsequent excavations have brought to light.

There appears to be a disagreement between the WHS and WHPP teams' findings at Site 784. Caution is necessary, however,

since the Upper Paleolithic component of the site which the WHPP excavators report came from WHS Site 784X which is located some 150 m south of WHS Site 784 (Clark *et al.* 1987: 46).⁵ Otherwise, there is agreement.

The WHPP excavators' findings indicate a Chalcolithic hearth, based on the dating of charcoal, at WHS Site 621. This would seem to indicate a divergence between the findings of the two projects. The excavators, however, found no evidence of a Chalcolithic "occupation" or "living" surface and only a handful of non-diagnostic artifacts at the site. A survey would not be able to date definitely a site on such evidence.

The SGNAS team and Politis are in general agreement on the main components of Site 46. The difference comes, however, with Politis' Chalcolithic and EB I findings at the site. The survey failed to turn up such evidence.

The SGNAS explorers initially reported Site 141 as a habitation site. The EDSP team, however, showed this to be wrong since the site is, on the basis of excavation, a cemetery. Thus, agreement on dating, namely, EB IV; there is initial disagreement on the type of site.

There is little variance between the SGNAS and the WFP teams' findings. Whereas the former generally stressed the Chalcolithic/Early Bronze dating of Sites 10, 14, 20, and 30, the latter emphasized, due to recent opinions relative to the beginning of the Early Bronze period, the Early Bronze Age date of these sites. There is agreement between both teams' findings at SGNAS Site 12/WFP Site 008.

The results of soundings at SGNAS Site 159 are not yet fully known. The radiocarbon dates from the site, however, support the SGNAS team's findings.

The WHS and SGNAS teams have focused attention on a segment of west-central

5. See n. 2.

Jordan for further and fruitful exploration. The results of work at the sites discussed in this paper have gone a long way towards drawing a more complete picture of the archaeological history of this segment of Jordan.

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Burton MacDonald,
Department of Theology
P. O. Box 5000, CP 137
St. Francis Xavier University
Antigonish, Nova Scotia
B2G 2W5 Canada

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ARCHAEOLOGICAL EXCAVATION AT RĀS AN-NAQAB - 'AQABA ROAD ALIGNMENT: PRELIMINARY REPORT (1995)

by

Mohammad Waheeb

Introduction

The Ministry of Public Works and Housing (MPWH) is conducting the construction of a road between Ma'ān and 'Aqaba. The length of the projected road is 70 km, from the village of al-Kāsimiyyah south of Ma'ān to the city of 'Aqaba.

Following a series of agreements, the MPWH provided financial help to the Department of Antiquities of Jordan (DAJ)¹ in order to conduct excavations along the road alignment, and prepare a final report with the results of the excavations, so as to evaluate their protection. Parallel research was to find evidence of the human exploitation of Rās an-Naqab through time and to check the reported gap between the Middle Bronze and Late Bronze Age occupation.

The intensive survey preceded a construction project in the area. The principal aim was to clarify the occupational history of the region's settlements along the *via nova Traiana* during the Roman and Byzantine periods. Recent investigations revealed the presence of several sites dating back from prehistory until the Late Islamic era. Among the early explorers of the area are: Savignac 1932; Glueck 1935 and 1939; Alt 1936a; 1936b; Bowersock 1971; Parker 1976; Graf 1979 and 1983; Henry 1982; Jobling 1983; Hart and Falkner 1985; Oleson 1986; Nissen *et al.* 1987; Fiema 1992; Bisheh *et al.* 1993.

Al-Kāsimiyyah

UTM coordinates 7400 33289 p.g. Co-

ordinates 196.9 941.9, stations 85+165 to 84+500.

A single Paleolithic site was found in the al-Kāsimiyyah plateau; lithic artifacts were initially discovered scattered all over the surface of the farms. A surface collection was made of the area, but a test excavation of one square was not able to clarify all questions concerning the area since the material recovered from the square was not enough and the area needs more investigations.

The collection in approximately 5,000 sq.m resulted in the recovery of tool assemblages containing bifacial blades, scrapers, blades, core flakes and Acheulean bifacial handaxes. Depending on this material the site can be dated, broadly speaking, from Lower Paleolithic to Middle Paleolithic.

Khirbat al-Ḥiyād

UTM coordinates 7394 33270/P.g. coordinates 196.3 940.1, station 83+000+0 83+070.

The main goals of the excavation at the site were:

- Studying various types of structures and installations (i.e. houses, walls, gates, water system etc).
- Dating buildings in order to sort out the various periods of inhabitation.
- Because of the extensive number of Byzantine sherds that were found in 1992, our particular goal in the 1995 season was to find the Byzantine village. Excavations included further work to the east of the

¹ The procedure is becoming a standard for all major construction projects financed directly by or through the MPWH, and allows the Department of Antiquities (DAJ) to conduct archaeological investigations and to protect important cultural her-

itage sites from destruction. This procedure is part of a more complex cooperation agreement which has been signed in 1994 by the MPWH and the DAJ through the mediation of the Cultural Resources Management Project.

present road where minor deposits are still visible.

The site consists of large ruins, with archaeological remains, found on both sides of the existing road, while the main site is to the west of road. The dimension of the site is approximately 120m north-south and 100m east-west.

Excavations conducted in the eastern part of the site reveals the presence of remains representing parts of collapsed rooms and courtyards, the archaeological deposit is not deeper than 30-50cm in this part. Excavations in the western part was conducted in Areas B and D (Fig.1).

Area B squares C2-C4

Excavations in this section uncovered three rooms built of not well-dressed stones, a gate was located in the northern wall which was used as an access to several rooms. The general shape of the rooms is square approximately 3 x 3m, and 4.80 x 4.50m.

The roof consisted of cross vaults, remains of the spring blocks still adhere to the internal walls. Stone paving and hard compact lime were used to cover the floors of the rooms but little of these stone pavements remained *in situ*.

Area D squares C2-C3

Three square-shaped rooms were discovered in square C2, approximately



1. The northern parts of al-Ḥiyād.

490 x 350m with, a corridor connecting these rooms.

The internal walls were covered by a layer of plaster. The roof also consisted of cross vaults, while the floor was covered with flagstones with traces of lime still visible on the surface covering the stone paving.

A small basin built of stones was recovered in the south-western corner of room 3; the inner sides of the walls were covered by a smooth layer of plaster. What distinguishes this room is the oven in the north-eastern corner with its chimney. Both the oven and the basin explain the daily activities in this room, which possibly served as a kitchen.

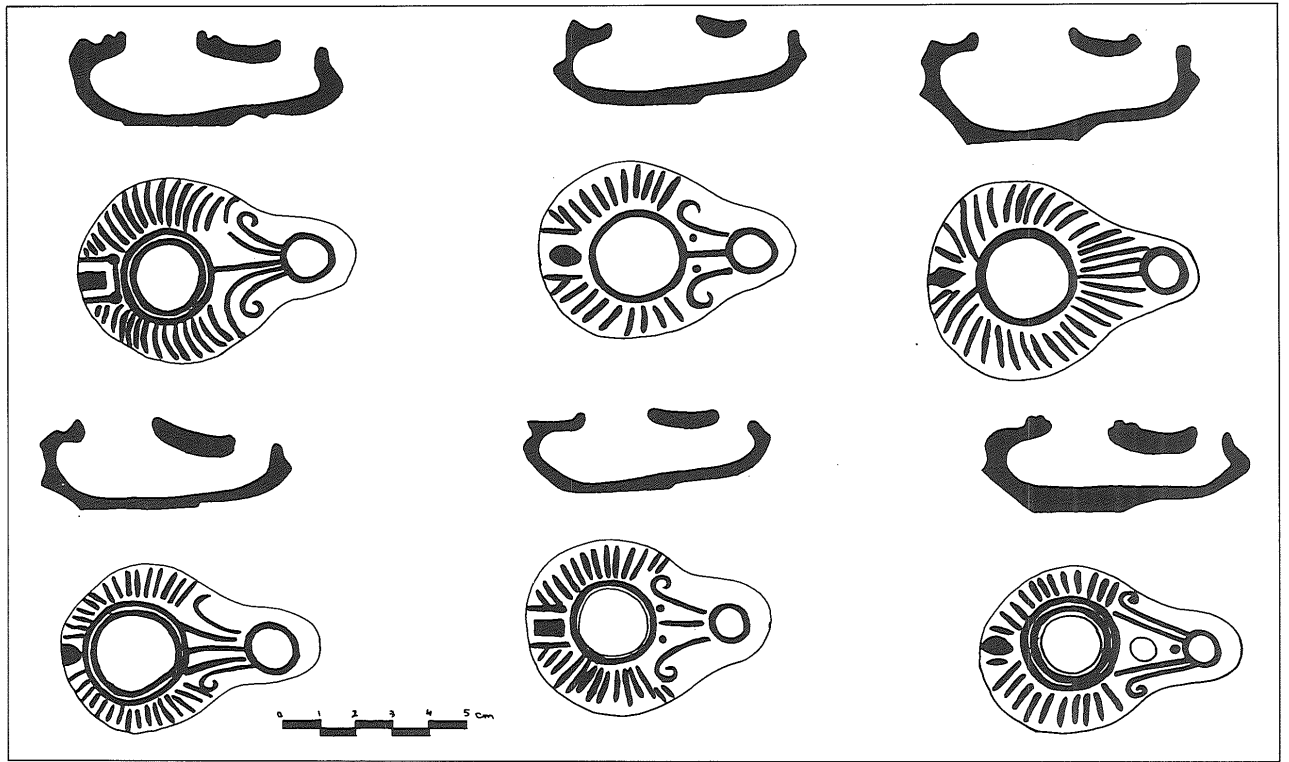
Among the several finds discovered during this season, roof tiles were common. Hundreds of pottery sherds, and several intact lamps were found, all dating to the Byzantine period. Depending on two coins the site could be dated to the period of Constantius II 337-361 AD and to Valentinus II 375-392 AD. Both coins show that the site could be dated at the earliest to the fourth century AD (Figs.2 and 3).

In addition, the recovered material during this season included grinders, crushing tools, and other objects related to agricultural purposes. The western part of the site revealed the existence of a spring, numerous garden plots, reservoirs, terraces and possibly a dam. All are indicative of extensive Byzantine agricultural activity.

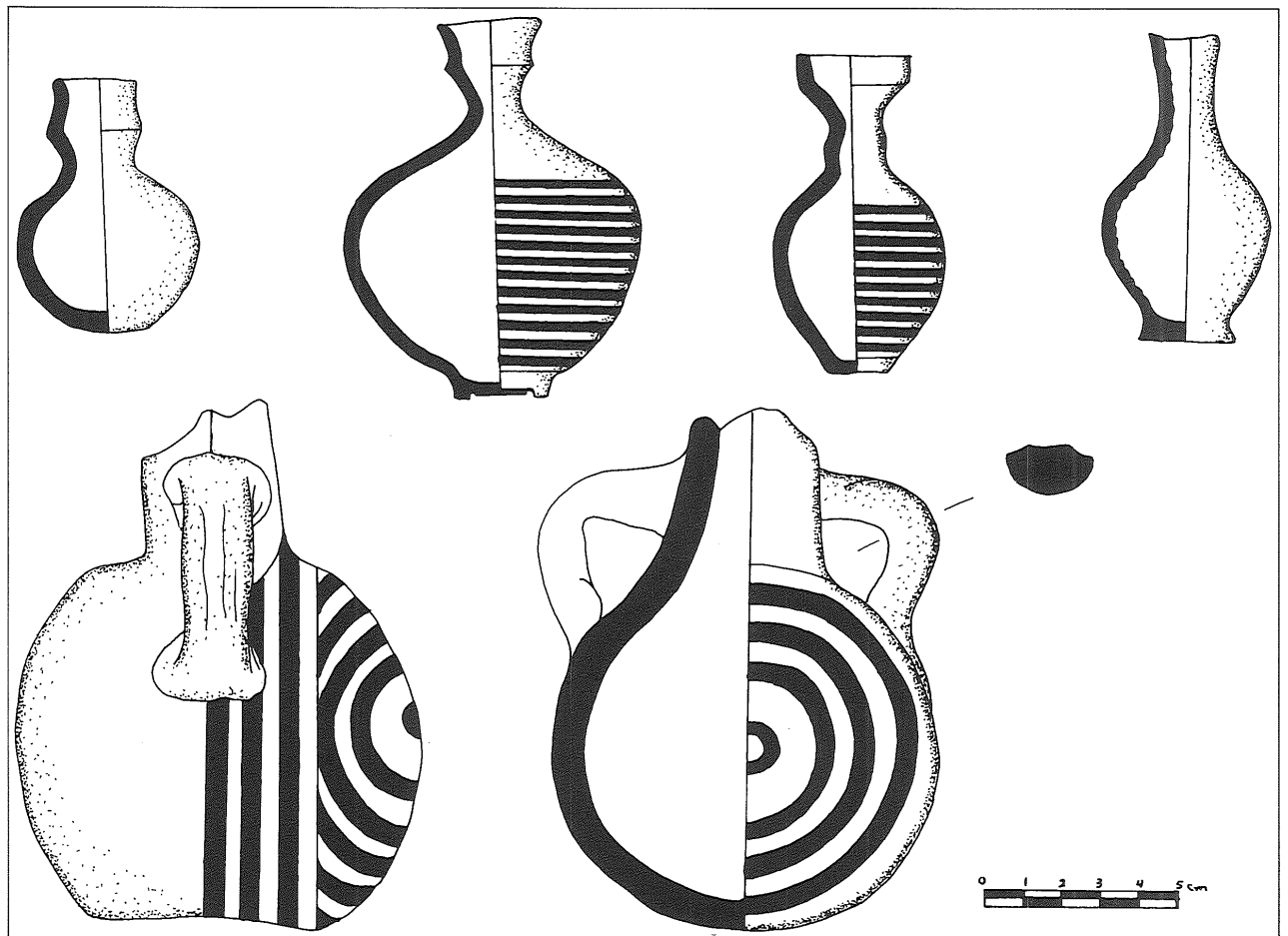
‘Ayn al-Jammām1 (Fig.4)

UTM coordinates 7376 33240/p.g. coordinations 194.4 937.1, stations 78+750 to 78+825.

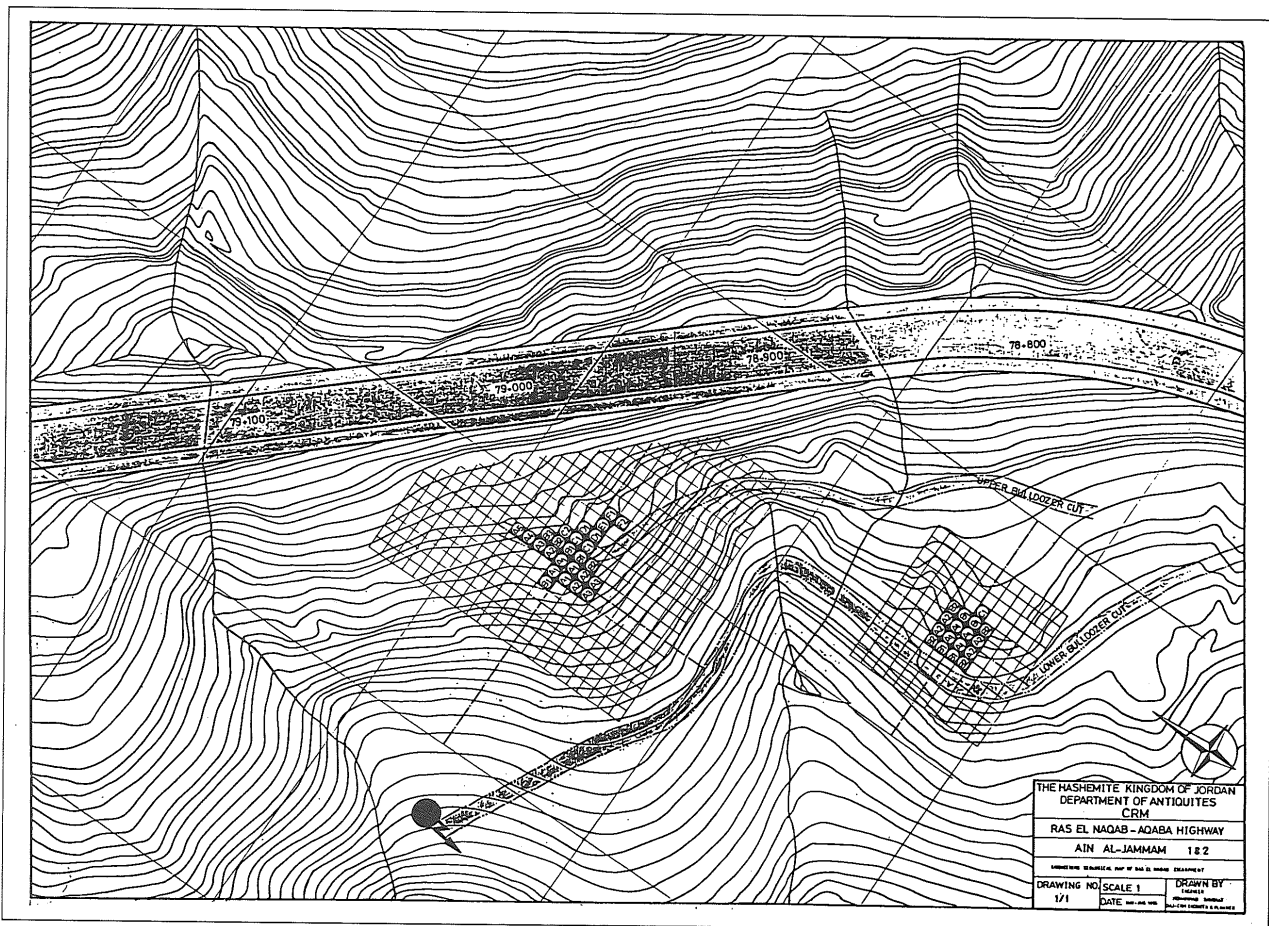
The first Season of excavation has been conducted at Neolithic ‘Ayn al-Jammām, a semi-permanent farming settlement on the slopes below the present road at the edge of the Rās an-Naqab escarpment in southern Jordan. The excavation has produced important information concerning a dis-



2. Byzantine lamps from al-Ḥiyād.



3. Byzantine pottery vessels from al-Ḥiyād.



4. 'Ayn al-Jammām 1 and 2, areas of excavation.

tinguished period of cultural development in the Near East. The site was initially discovered during the survey of Rās an-Naqab-‘Aqaba, conducted by the CRM project.

The site has severely suffered from destruction by considerable bulldozing, dumping of debris and agricultural activities. Most of our work has been oriented towards the immediate rescue of the endangered portion of the site and to document the extent and nature of the site, examining the periods of occupation and the study of technological changes.

The preliminary assessment of the architecture and material discovered in the field suggests a continuation from Late PPNB up to Late PNA .

The early builders on 'Ayn al-Jammām took advantage of the fact that the local limestone flaked off in layers of nearly equal thickness, thus providing easy building ma-

terial from the upper hills which surrounded the northern parts of the site. The rectangular and squared dressed stones were laid in mud and the joints in most cases were quoined with small flat stones.

Several constructions stand out as characteristic for the Late PPNB period at 'Ayn al-Jammām. But because of limited and restricted excavations of this phase the assessment is greatly limited of Late PPNB architectural designs and techniques which were practised on the site. Among remains of this phase was a squared room, located at the southern edge of the excavation, with its doorway at the south-east wall measuring ca 4.5m x 5m and a small opening at the northern wall which served as a window. Walls of this structure stood more than 2m high and part of the plaster floor in the northeastern part was well preserved. It was covered with a thick smear of red pigment while the lime

plaster in Area A square A2 continued from the floor up along the wall. No indication or evidence of a hearth was found above this floor (Fig.5).

None of the excavated rooms provided any evidence of post-holes, this structural aspect would have been unnecessary considering the presence of pillars (Fig.6).

Evidence of changes and alteration was numerous like the insertion of walls, blocking doors and windows or the addition of a floor within the same structure. Despite all evidence available now, it is too early to decide whether there is no broken transition from the aceramic to the ceramic Neolithic period at 'Ayn al-Jammān.

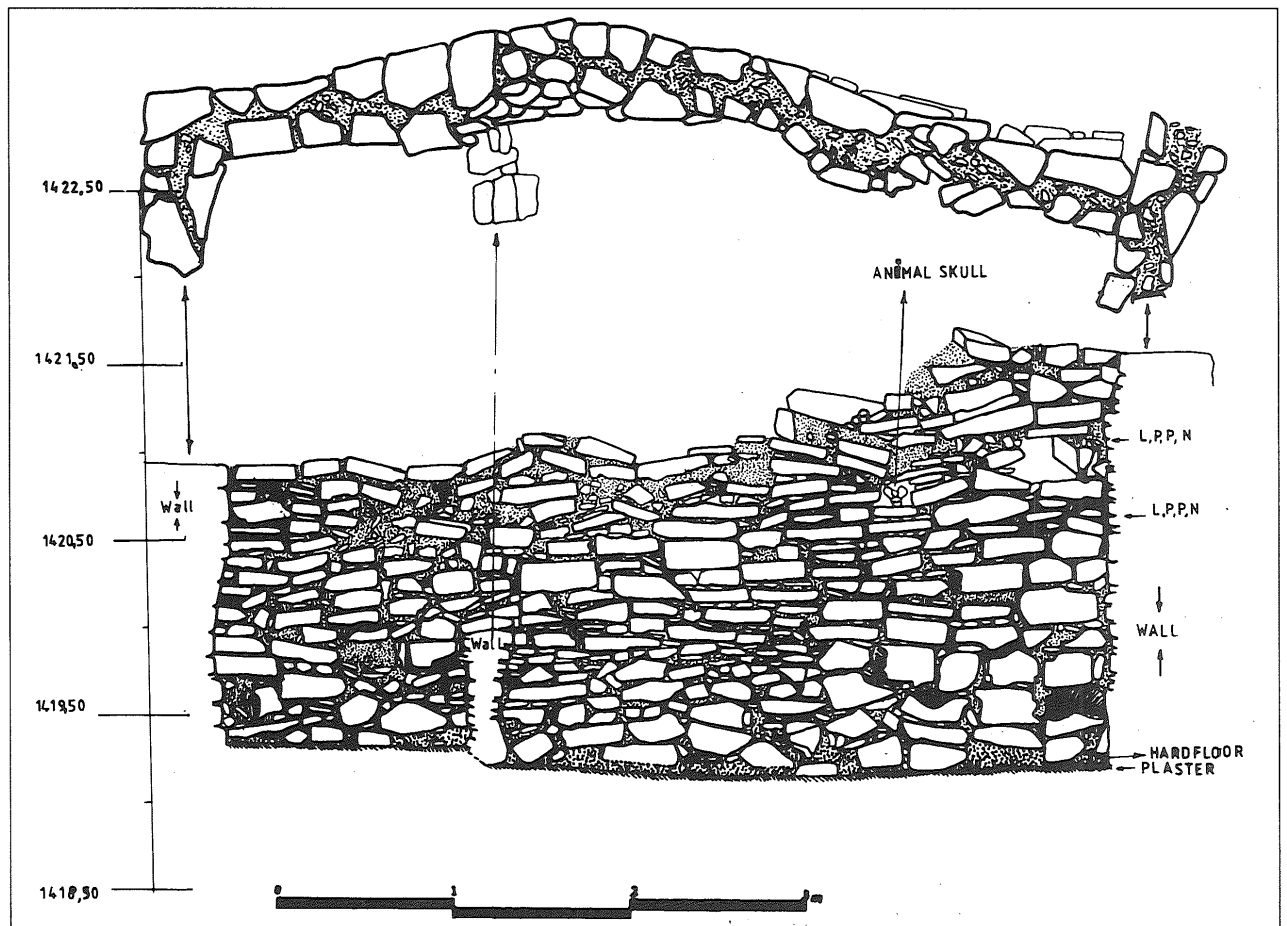
Few changes were noticed from the preceding Late PPNB to PPNC which leads to questions concerning the nature of the occupation at 'Ayn al-Jammān in the first half of the sixth millennium.

Work at the site included sampling Late PNA deposits over a much broader area. The apsidal/oval building in Area D square A2, Area B squares A2 and B2 is unique in its shape both for the Neolithic in general and for the rest of the Late PNA structures at 'Ayn al-Jammān.

Apparently most of the excavated Late PNA architecture rests on an ashy dark



6. Part of the excavated area at 'Ayn al-Jammān 1.



5. Section of northern wall of LPPN period.

layer as was noticed in the excavated areas. Since the situation of the slope and the possible manner of accumulation have been detailed above, we suggest that the late settlement lay on top of the hill.

It is clear that the construction was determined by the geographical slopy nature of the site, which explains the existence of a staircase which was discovered in Area B square D1 that links two floors at different heights.

What distinguished the architecture and was considered the most interesting feature are the free-standing pillars in the centre of the room, or attached to the inner walls of the large rooms. Both types were used at this site.

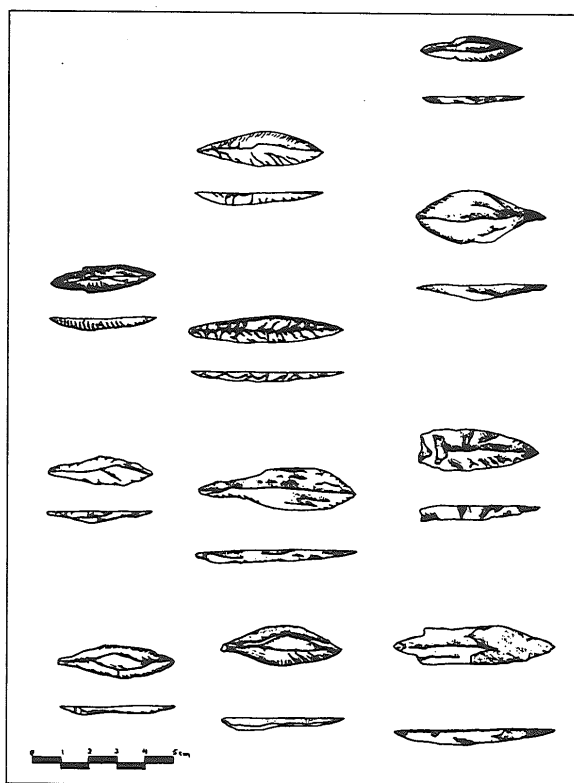
Excavation has produced an enormous amount of chipped stone tools and debitage, among them arrowheads, blades, awls, scrapers, chisels and burins. In addition to that, a large quantity of grinding stones was discovered at the site, reflecting the strong reliance on plant resources. Among these artifacts were saddle-shaped milling handstones with plano-convex, spherical flint hammerstones (Fig.7).

Human bones mixed with animal bones and bone tools were among the discoveries. Pottery sherds were found. Some of them bear the typical banded herringbone incision. Fragments of shell and sandstone rings, representing a kind of jewellery, have exact counterparts at the contemporary site of al-Baṣṭa. The building technique was nearly identical at both sites. A more detailed study of objects will reveal the importance of relations between the prehistoric sites of southern Jordan.

Khirbat 'Ayn al-Jammām 2

UTM Coordinates 7378 33239/P.0. Coordinates 194.6 937.0, stations 78+650 to 78+700.

A medium site, it is located close to the 'Ayn al-Jammām spring and just a few metres to the east of the main site 'Ayn al-



7. Arrow heads from 'Ayn al-Jammām 1.

Jammām 1. It was built in an excellent position overlooking the al-Ḥumayma plateau. The site was affected by several factors which resulted in the destruction of parts of the walls. The excavations revealed a structure built of undressed limestone consisting of two parts as follows:

The Southern Part

A unit of three rooms, representing the first phase of construction at the site, was excavated. A large rectangular-shaped room was located in the south-east part of the structure, with the entrance built in the middle of the eastern wall. The other two square-shaped rooms were located at the north-west part of the structure.

The Northern Part

Two large rectangular rooms were discovered in this part representing the second phase of construction. A doorway was situated in the middle of the northern wall. Arches were used to support the roof of the whole structure. Remains of the spring-

stones still adhere to the walls. The floors of the rooms consisted of hard compact mud, and later several different stone-lined enclosures were built on the floors with some basalt grinding stones, indicating agricultural daily activities at the site. One lamp, three small bronze arrowheads and a considerable quantity of pottery sherds were recovered at the site dating the structure to the Late Roman-Early Byzantine period.

Khirbat Abū an-Nusūr

UTM coordinates 7386 33226, P.g. coordinates 195.4 935.7, stations 77+575 to 77+650.

The site is characterized by a large number of building remains belonging to a large settlement, located on a flat area overlooking the al-Ḥumayma region. Among these remains are:

The Tower

A square-shaped structure of 4 x 4.2m was discovered in the western part of the site. It was built of well-dressed limestone blocks. The structure possibly served as a watch-tower overlooking the al-Ḥumayma plateau.

The Southern Buildings

Due to modern construction in this part which threatens the whole site the team decided to excavate this part to get information about the history of the area. Four rooms were partly excavated. They were built of dressed limestone blocks cut from a nearby quarry north of the site. Arches supported the roof of the rooms. Our preliminary assessment and investigations of the construction techniques and the study of several pottery sherds, which were discovered through the excavation, suggest a Byzantine date for the site.

The Terraces

To the north of the main site, approximately 50m away on a very steep rocky hill,

several stone terraces were noticed along a drainage line. Test soundings were made to clarify the date and function of these terraces. The system used in building these terraces showed that the function was to collect run off water by using stone walls. They could direct water to the main site for domestic use. Some scattered sherds around the terraces indicate the Byzantine period.

Dabbat Ḥānūt (1)

UTM coordinates 33174 7368 p.g. coordinates 9305 1035.

The site is located 1 km to the south of a modern village called Dabbat Ḥānūt. The site is situated on a medium sandy hill near the western edge of the old road. The main goal of the excavation was to rescue the site from threats of nearby quarries. Excavations in areas A/B/C/D revealed a rectangular building unit built of well-dressed ashlar north-south 23.60m east-west 9.35m.

The unit consists of rectangular rooms nos. 3 and 4 and square shaped rooms nos. 1 and 2. A doorway was discovered in the eastern wall of room no. 1, while room no. 4 was accessible through the doorway which is located in the north-eastern wall. What distinguishes room no. 1 is the arch used for supporting the roof, while there are no traces of an arch in the other rooms of the building. Flagstones were used as pavement for the floors of the structure (Fig.8).



8. Dabbat Ḥānūt (1), building unit in areas A-D.

Several pottery sherds and one lamp were recovered. A medium-sized stone basin and a square stone block with chisel marks on its surface were among the architectural remains. The structure could be broadly dated to the Nabataean period. Excavations have to be continued in the eastern parts of the building to identify its function.

Dabbat Sumay'ah

UTM coordinate 33160 2351 p.g. coordinates 9291 1918.

To the west of the main road on a small sand hill, a small building was recovered, a square-shaped structure of 450 x 500m built of limestone blocks. The eastern part of the structure was affected by erosion. Traces of support arches were discovered while the doorway was located from the eastern wall. The preliminary assessment of the material recovered from the site revealed that it functioned as a watch-tower to protect the agricultural fields in the al-Ḥumayma plains. Depending on quantities of pottery sherds, the site was dated to the Nabataean era.

Rujum al-Mizfar

UTM coordinates 32762 7106 p.g. coordinated 889.8 1665.

On a high spur of a rosy sandstone hill, a small structure in bad condition was located. Systematic excavations at the site revealed a square-shaped structure of 650 x 550m built of undressed lime- and sandstone. The wall thickness is 100m. In the internal north-western corner of the structure a stair case leading to the upper level was established. Three steps of this staircase were still *in situ*.

The inner and outer walls of the building were covered by white lime to prevent any water seepage. No indications were found to clarify how the roof was supported, since most of the stones had collapsed and no springstones were found in the building.

The site which could have served as a watch-tower, provided an excellent vantage point of traffic moving along the *via Nova*

Trajana (Fig.9).

Only few sherds of the Byzantine period were recovered at the site; the structure could be dated broadly to the Late Roman-Early Byzantine period.

Khirbat al-Khāldi

UTM coordinates 32830 7160 p.g. coordinates 896.5 172.0.

Due to its importance depending on early descriptions (Savignac 1932:596; Glueck 1939; Bowerstock 1971; Parker 1976; Jobling 1983; Graf 1983; Bisheh *et al.* 1993) a deep sounding was dug at the site which partly revealed the presence of a bath, aqueducts, and pool. Depending on the recovered material, the remains of the bath date to the Nabataean period, while two coins of Constantinus 307-337 AD and Constantinus II, 337-361 AD were discovered on the surface of the site during the survey.

The Survey

The aim of the survey in the area of Rās an-Naqab, beside the recording of all archaeological features, is to study rural adaptations during different time periods, and to understand the economic and political factors which may have influenced the selection of settlement areas.

The most important results of this survey season are as follows:

- The discovery of new sites, especially Nabataean sites, near Dabbat Ḥānūt vil-



9. Rujum al-Mizfar, 'watch-tower'.

lage, where no such early sites were known before.

- The identification of epigraphical sites where numerous stones with inscriptions and drawings were checked for the first time at Rās an-Naqab and near 'Aqaba.
- The location and study of water terraces near the site of Abu-an-Nusūr. Further study will help to better date this "terrace sequence" throughout the area.

The comprehensive survey should be continued during the coming seasons.

Discussion

The excavations at several sites have brought to light new buildings of different dates and functions at Rās an-Naqab down to the Wādī al-Yutum-'Aqaba area.

The discovery of several phases of occupational history can be summarized as follows: 1) Lower and Middle Paleolithic, 2) Pre-Pottery and Pottery Neolithic. 3) Nabataean, 4) Roman, and 5) Byzantine.

One important factor clearly revealed by these excavations is that the area of Rās an-Naqab was well settled after the second century AD. Numerous springs still feeding the area, the fertility of the land and favourable environment are the main reasons for the settlement in the area. Possibly the great difference in altitude of the surrounding plateau make it easier to defend the area against external threats. The majority of the pottery found at excavations and surveys belongs to the period after the third century AD. This period seems to have been one of great prosperity and the countryside was covered with farms and villages. Later material is much scarcer, whether this decline can be tied to the Muslim take-over of AD 636 (Fiema 1992:325) or whether other factors played a part still needs investigation. While the role of the political factors must be taken into consideration, especially after the fall of the Assyrian empire, the Babylonians and Persians would have held Rās an-Naqab for a period of time. Evidence brought to light

through our excavated sites has shown no continuation after the Byzantine occupation.

The cause of a general destruction in the area can possibly be attributed to the invasion of the Persians around 614 AD. The historical studies and archaeological investigations require much more application before any firm conclusions can be made.

Conservation

Particular emphasis was given to conservation work at al-Ḥiyād, al-Jammām 1 and 2 during the 1995 excavation season. The first job was to repair the damage done by erosion and earthquakes. Some stone blocks were rebuilt including cementing the frames of other stones. Some of the arches were joined back together so as to reset them in their original positions.

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The Staff

The excavation team consisted of archaeologists Ahmad 'Ajaj, Nazim Hazaymeh, Mohammad Jaradat, Yazid Elayan, Zuhair Zubi Adnan Rafaya, Ahmad Shami, Jihad Haroun, Khalid Tarawneh, Yunus Tarawneh, Shafi Tawalbeh Ahmad Tawahia, Aktham Abbadi, Nazzeh Vino; Engineers Mohammad Shweimat, Rustum Makjyan, Zeid Haddadin; draftsman Ali Dajeh; photographer Qutaybah Dasuqi; Salme Dajeh Abdul Sami Abu-Dayyeh, project liaison officer with MPWH; Mohammed Waheeb directed the fieldwork.

M. Waheeb
Department of Antiquities
Amman, Jordan

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AL-KARAK RESOURCES PROJECT 1995: A PRELIMINARY REPORT ON THE PILOT SEASON

by

Gerald L. Mattingly

Introduction

The al-Karak Resources Project (KRP) conducted intensive surface survey and environmental study on the al-Karak plateau between July 5 and August 7, 1995. This was the first of a projected three or four seasons of research; the team will resume fieldwork in the summer of 1997 and continue excavation and survey in the odd-numbered summers. By means of its multidisciplinary approach, this project builds on the important work of other surveys and excavations completed in the al-Karak district by investigating general and specific archaeological and environmental factors. The main purpose of KRP is to document ways in which inhabitants of this region have exploited available natural resources, including site location and access to local and long-distance trade goods. In addition to completing intensive surveys at 17 carefully selected sites, KRP photographed features from 20 additional sites – all of which had been located and examined briefly by the Miller-Pinkerton survey between 1978 and 1983.

Gerald L. Mattingly (Johnson Bible College), who worked with the Miller-Pinkerton team, coordinated KRP's pilot season. Team members for the 1995 season were Reuben G. Bullard Jr. (graduate student, Northern Kentucky University), Joel F. Drinkard Jr. (Southern Baptist Theological Seminary), Donald W. Garner (Carson-Newman College), James H. Pace (Elon College) [another alumnus of the Miller-Pinkerton survey], Wilbur A. Reid Jr. (Johnson Bible College), Richard A. Stephenson (East Carolina University), and John D. Wineland (graduate student, Miami University). Ahmed Ma-

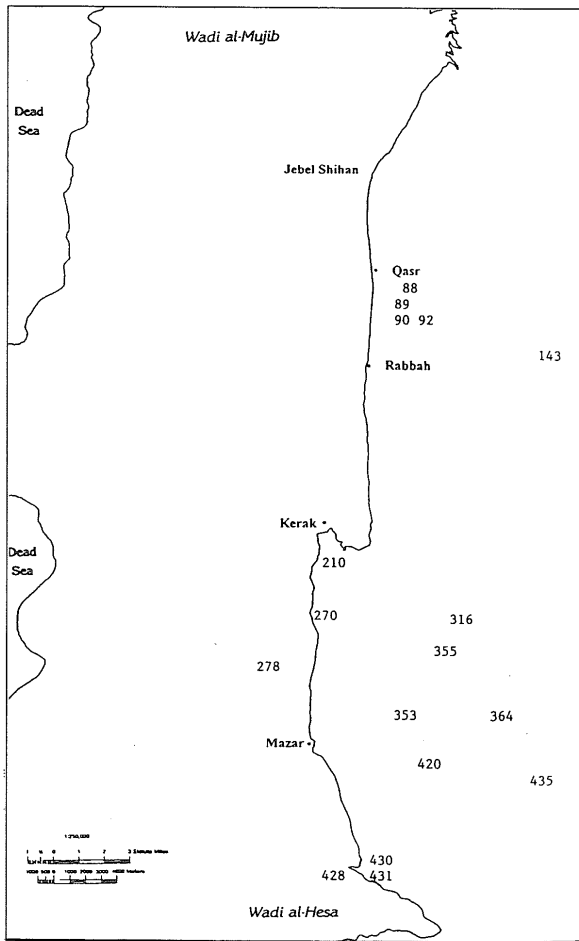
dadah, representative from the Department of Antiquities office in al-Qaṣr, and Hussein Atta Hasan, a driver from Mashrek International Schools in 'Ammān, joined the American participants and rendered valuable assistance.

Background

As defined by the "Archaeological Project of the Kerak Plateau" (Miller 1991:1), the territory around al-Karak is an 875 sq. km section of tableland that stretches from Wādī al-Mūjib in the north to Wādī al-Ḥasa in the south (Fig. 1). For much of its history, this region was part of the kingdom of Moab, and its occupants have witnessed the rise and fall of numerous cultural epochs, for example Moabite, Nabataean Arab, Roman, Byzantine, and various dynasties in the early and late Islamic periods.

Until relatively recent times, occupants of the al-Karak plateau were somewhat isolated by the al-Mūjib and al-Ḥasa canyons on the north and south, the Dead Sea escarpment on the west, and the Syrian desert to the east. In spite of its relatively dry climate, sedentary and nonsedentary inhabitants of these highlands have developed a diversified and, on occasion, a thriving economy.

The plateau's western side has a higher elevation than the "desert fringe" on the east, and the former receives more rainfall and is better suited for agriculture. The land of Moab has always been famous for its pasturage, and the symbiotic relationship between the so-called "desert and the sown" is one of the most interesting and dynamic aspects of this region's history. Archaeological remains reflect this cultural diversity, which is represented by a broad spectrum of site-



1. Sites examined by KRP 1995.

types, from large, walled towns to widely scattered campsites.

Literary references to this part of Jordan are limited in number (Miller 1991:6-14), and our knowledge concerning the details of its culture and economy is extremely limited. Fortunately, major excavations have been conducted between the al-Mūjib and the al-Ḥasa in recent years (e.g., Olávarri at Khirbat al-Mdaynah al-Mu‘arajah, Parker at al-Lajjūn, Worschech at Khirbat al-Bālū‘, Johns and McQuitty at Khirbat Faris), and several archaeological surveys have been conducted in this same region (i.e., the surveys of Jacobs, Parker, and Worschech). Naturally, all of this recent work builds on the pioneering exploration of Musil, Albright, Glueck, etc. (Miller 1991:14-17, 20-22).

A major contributor to our understanding

of the al-Karak plateau’s settlement history is the archaeological survey that was directed by J. Maxwell Miller and Jack M. Pinkerton from 1978 until 1983. This Emory University survey investigated a total of 443 sites, ranging in date from Paleolithic through Ottoman times. In 1991, Miller published his edited volume, *Archaeological Survey of the Kerak Plateau*. As noted above, the sites visited by the new al-Karak Resources Project had been examined briefly by the Miller-Pinkerton team. The published site descriptions and sherd collection from the earlier survey are, therefore, the point of departure for KRP’s new investigations in this territory.

KRP’s Research Design and Objectives

The purpose of KRP’s first season was to examine the surface remains and immediate vicinities of a small group of important sites that were documented by the Miller-Pinkerton survey and pay special attention to ways in which the ancient inhabitants of these sites utilized the available natural resources. In this pilot season, little attention was given to the modern flora and fauna of the site catchments; future seasons will consider this aspect of the environment, in terms of both the living biological communities and the ecofacts recovered during excavation. Accordingly, the team concentrated on the interrelationships between visible archaeological remains (i.e., surface architecture and artifacts and off-site features) and those aspects of their environmental contexts subject to this kind of study—primarily climatic factors, water resources, surficial geology, and geomorphology.

In an important article on Egyptian quarrying and mining, Ian Shaw (1994) observed that little systematic research has been carried out on the procurement of raw materials used by the various peoples of the ancient world. While there are many significant gaps in our understanding of the ancient history and culture of central Jordan, Shaw’s com-

ment certainly applies to the al-Karak plateau. In the absence of written records, much can be learned about ancient labor, industry, and technology by studying the ways in which people have "made a living" by using the available natural resources. A better understanding of the economic aspects of ancient life can be attained when excavated artifacts and ecofacts are seen in light of the environmental context in which ancient peoples lived, that is when we study the raw materials/natural resources from which people made/extracted what they needed to live. KRP's fieldwork and program of publication are intended to help fill the gap identified by Shaw.

This venture is especially important since the archaeological sites of the al-Karak district are, in fact, being damaged or obliterated at a rapid pace. Alumni of the Miller-Pinkerton survey, Mattingly and Pace, noted significant damage at site after site. The Department of Antiquities is well aware of this problem and has attempted to delay the destructive forces at work, though the latter are out of control in many countries around the globe. Large-scale agriculture and commercial and industrial development have accompanied the expansion of "Greater al-Karak" as a center of regional and national political, economic, and educational activities. Discussions about the mining of oil shale have been especially ominous in recent years, but it is the ordinary demographic and economic changes that explain most of the pressure put on the archaeological sites in the al-Karak district. In other words, the archaeological resources around al-Karak are endangered by what we call "progress", where ancient and modern are often in competition for the same space, and future seasons of KRP must be seen as a response to this threat.

The objectives for KRP's first field season were quite specific. First, 17 sites (listed and described below) were subjected to intensive survey. Most workdays of the field season

were consumed with this task. Sites covered by the project's 1995 permit were chosen because (1) they offer significant, even extensive, surface remains for examination; (2) they represent different topographic-environmental zones and a variety of site-types; (3) they— for the most part— yielded surface pottery from a wide range of historical periods but had no modern occupation (which would bring about a dramatic rearrangement of surface remains); and (4) they will be damaged or destroyed by agricultural, industrial, or construction activities. A modified version of the Mādabā Plains Project survey manual (used with permission of its authors, Larry G. Herr and Gary L. Christopherson), was used to collect pertinent data at each site; one of the KRP staff, Drinkard, had the primary responsibility of checking site reports and transferring this information to a computer data base. Additional insights on the detailed study of surface remains were gleaned from recent articles by J. L. Bintliff and A. M. Snodgrass (1985) and Ian Shaw and Robert Jameson (1993). In all written documentation and photographic records (discussed below), attention was given to the "residual patterns" of surface structures (e.g., fortifications, gateways, house foundations, industrial installations, cisterns) and the materials and techniques used in their construction. Specimens of raw materials used in construction were collected, along with potsherds and other surface artifacts, and technical analyses of these materials will be reported in other publications.

Second, the immediate "neighborhoods"— within a 1km radius of each site — were examined. This placed each site within a broader environmental context, in terms of surficial geology and geomorphology, and allowed team members to locate off-site features (e.g., cisterns, reservoirs, quarries, water channels) and to identify the kinds of modern activities going on around each site. This was the primary function of two team members, Stephenson and Pace, although

they were assisted in this work by other staff. Stephenson began the process of obtaining precise coordinates for important features at these sites by using a GPS unit, and he has begun to study the sites around al-Karak through the multifaceted technology called GIS. In 1995, special attention was given to features and installations that related to water management.

Third, extensive photographic records were made on most sites and in their environs. Two team members, Bullard and Reid, concentrated on photography, and a total of 4200 pictures were made, half in color slides and half in black and white prints. Contact sheets were printed in a makeshift darkroom at the al-Karak Rest House. Since most of the sites in al-Karak are threatened by future development, this photographic archive will provide a record of their "state of preservation" in 1995. As with all the artifacts and information collected by KRP, its collection of slides and negatives supplement the data collected and published by the Miller-Pinkerton project.

Fourth, the month of fieldwork allowed team members to get acquainted as they worked and traveled together, and the entire group became more familiar with the modern inhabitants, ancient sites, and countryside of the al-Karak plateau. All team members were involved in the process of choosing a site for excavation in KRP's second season, in 1997. The site of Khirbat al-Muḍaybi' was chosen because (1) it sits in an interesting part of the plateau that needs further study; (2) its excavation will contribute information concerning the utilization of natural resources (e.g., site position, building materials and techniques, access to trade, procurement of food and water), and (3) its remains are still impressive (and should be preserved for the future) but are threatened by the growth of nearby villages and the increase of agricultural activities in this region. As additional staff members are recruited and a consortium is created to

advance the purpose of the al-Karak Resources Project, the 1997 team plans to work on three fronts by: (1) opening a small-scale, problem-solving excavation at Khirbat al-Muḍaybi', (2) coordinating specialized regional and on-site research by social and natural scientists; and (3) continuing to photograph and document features on/around the 443 sites located by the Miller-Pinkerton survey.

Pottery and Artifacts Collected in 1995

The al-Karak Resources Project collected surface sherds, geological specimens, and stone implements at the 17 sites it surveyed in 1995. As noted above, the geological materials and stone implements (primarily grain-processing tools) will be published separately, but the pottery readings from the new collections are included in the site reports. The Miller-Pinkerton survey collected over 50,000 potsherds (Miller 1991:169), but KRP registered and "read" a total of only 1381 sherds, all of which are diagnostic. Some sites yielded relatively few sherds, since the earlier survey had taken such large samples, but "fresh" sherds have been exposed by human and natural activities at a few sites.

Pace directed the collection, washing, and packing of all sherds, geological specimens, and stone implements in al-Karak, and he registered all of this material singly. Pace, Garner, Reid, and Mattingly participated in the process of sawing the 1381 sherds, with the assistance of Stan Dunagan, a Ph.D. student at the University of Tennessee-Knoxville. Pace took the sherds to Canadian Union College, in College Heights, Alberta, and spent five days studying the pottery with Larry G. Herr, who provided the official readings given below.

Both Herr and Robin M. Brown, who read most of the pottery for the Miller-Pinkerton survey (Brown 1991:169-279), were trained by James A. Sauer. Therefore, the terminology and approach of Herr and Brown

are similar, though differences of opinion in the “call” for some sherds might vary. The period designations and abbreviations in the Herr-Pace report match those followed in Miller’s volume (1991:27). As in Miller, the number of sherds from a particular period are given after the period designation (e.g., “Byz 8”). A few differences in the way sherd readings are reported should be noted, however. Designations like EB3 or Ir1 = EB III and IR I, respectively. The use of a slash (as in “LB/ Ir 1”) indicates that the unstratified sherd(s) could be read either way (i.e., could be assigned to either period), and the one making the call cannot be more specific. A dash between period designations (“Rom-Byz”) indicates that the ware and/or form are/is typical to both periods, and the sherd(s) cannot be assigned more precisely. When a question mark follows a reading (“EIsl? 3”), there is some uncertainty in the call. As with Miller, UD = “unidentified.”

1995 KRP Site Reports

Both the sherd readings and the site reports are intended to supplement the information found in Miller’s 1991 volume. In other words, the following reports provide material that has not been published or, at least, was not emphasized in the same way. Because of its purpose and/or the constraints of time and space, the Miller-Pinkerton survey was not looking for this kind of information, did not have time to collect it, or did not choose to publish it.

Site 88: Umm al-Habaj (Miller 1991:60-61)

KRP collected a total of 329 sherds: Chalco-EB 1; EB 69; EB? 11; EB399; EB3/48; EB4 5; EB4? 2; Ir1 1; Ir2 3; Hell? 1; Nab 1; Rom 14; Rom? 1; Rom-Byz 11; Byz 37; Byz? 2; Byz/EIsl 12; EIsl 12; EIsl? 3; LIsl 23; LIsl? 1; UD 8; Post EB UD 1; Post-Ir body 2.

Umm al-Habaj sits right on the 880 m contour along the west side of Wādī as-Saninah, one of main tributaries of Wādī al-

Bālū’. Since sites 88-92 are all within sight of each other, it is clear that this vicinity, with its abundant water sources and good farmland, supported a number of settlements over a long period of time. Along with 328 sherds from a number of periods, KRP added only one period to what Miller-Pinkerton recovered – by finding one Ir1 sherd at site 88.

Building ruins are concentrated in an area that measures 75m (N-S) by 55m (E-W), though terrace walls extend over a 350 m by 200m area. Features include rectilinear structures, wall lines, terrace walls, and cisterns. The smaller, heavily covered space is ca. 60% archaeological sediment, with the remainder of it under cultivation or broken up by exposed bedrock. Approximately half of the vegetation on the site results from cultivation, but the rest is covered by dwarf shrub. Sherd distribution and reused building materials suggest that the archaeological deposits at Umm al-Habaj are badly disturbed, though it is possible that Early Bronze occupation was concentrated on the south side of the site.

The area around this hilltop village produces abundant crops of wheat, and cultivated plots of ground are found inside the old terrace walls, right up to the edge of concentrated archaeological debris. Limestone outcrops, piles of basalt field clearance and ancient walls, and numerous cisterns have protected Umm al-Habaj from further encroachment. Umm al-Habaj will suffer further damage because it is only 2 km east of al-Qaṣr. Four major wells/cisterns were measured and photographed.

Along with other surface artifacts made from a variety of materials, KRP collected eight fragmentary basalt bowls, mortars, and grindstones. Such ground-stone objects, most of whose forms and functions changed little over a long period of time, were found on most sites and will be the subject of a separate study. Of course, the abundance of such food-processing implements points to the major activity of the ancient population, and

the widespread availability of basalts on the al-Karak plateau makes the study of raw materials in this area all the more interesting. KRP will have more to say about the contribution that Jabal Shihān and other volcanic vents and dikes made to the inventory of available materials (Koucky 1987:37-39). And issues related to the ancient trade and transport of basalt (e.g., the recent report by Weinstein-Evron *et al.* 1995) fall within the parameters of KRP's purpose.

Site 89: al-Ḥmaymāt NW (Miller 1991:61)

KRP collected a total of 62 sherds: EB 2; MB 1; MB-LB 2; LB 1 LB? 1; LB/Ir1 1; Ir 1; Ir2 2; Hell 1; Hell? 1; Nab 2; Rom 16; Rom? 1; Rom-Byz 4; Byz 19; Byz-EIsl 1; UD 4; Pre-Classical UD 1; Post-Ir UD 1.

Al-Ḥmaymāt NW is located 200 m south of Umm al-Habaj, along the west side of Wādī as-Sanīnah. Along with 61 sherds from a number of periods, KRP added one period to what Miller-Pinkerton recovered by collecting several LB sherds.

Site 89 measures ca. 355 m (N-S) by 185 m (E-W). As at Umm al-Habaj, the ground around this site is cultivated right up to the basalt boulders that demarcate the limits of ancient debris, though there are some plowed areas on the site itself. Bedouin were camped to the east and south-east of al-Ḥmaymāt NW, and there are remains of campsites in the ruins. There would appear to be some excavation potential here, but it is likely that the frequent reuse of this knoll has disturbed the archaeological sediment. Features include rectilinear and circular structures, wall lines, terrace walls, and cisterns.

Most of the vegetation on site 89 results from cultivation on its flat surface, which is strewn with basalt boulders and chips. Three major wells/cisterns were cut into the chalk member below the cap rock of limestone and chert. As was frequently noted at wells and cisterns in July of 1995, the well on the southern end of al-Ḥmaymāt NW still had

water in it. KRP collected eight fragmentary basalt bowls, mortars, and grindstones at al-Ḥmaymāt NW.

Site 90: al-Ḥmaymāt SW (Miller 1991:61)

KRP collected a total of 11 sherds: Byz 10; LIsl 1.

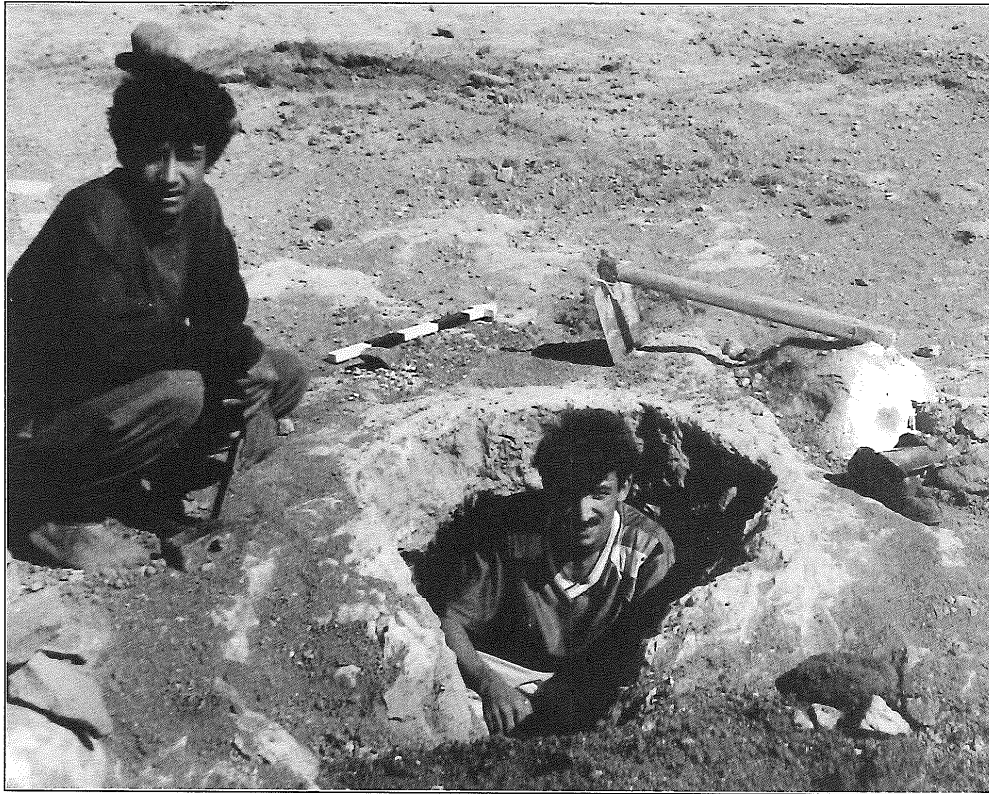
As Miller observed, few architectural remains are visible at this site, although the earlier survey found wall lines and a large number of sherds. KRP collected only a handful of Byz and LIsl sherds from this bare, eroded hillside. It is impossible to say if erosion accounts for the lack of ruins on al-Ḥmaymāt SW. Exposed bedrock and boulders cover the landscape, and there is some rubble with no discernable pattern. Nowadays the south end of this site is a regional center for winnowing and bagging wheat.

Three major cisterns were measured and photographed, the most important one identified as Feature A (Fig. 2). Its state of preservation is poor, but the mouth had been cleaned out and the shaft was being excavated when KRP arrived. Less than a meter of soil and rubble had been removed, but the youths at work indicated that it was worth the effort. In other words, the local residents –villagers and bedouin alike – still know how to access the water table after winter rains recharge/saturate the soft limestone below the cap rock.

Site 92: al-Ḥmaymāt SE (Miller 1991:61)

KRP collected a total of 119 sherds: EB 3; MB? 1; LB/Ir1 1; Ir2 1; Rom 3; Rom-Byz 3; Byz 17; Byz-EIsl 1; EIsl 1 EIsl? 1; LIsl 84; LIsl? 2; UD 1.

Al-Ḥmaymāt SE sits right on the 880 m contour along the east side of Wādī as-Sanīnah and is located immediately south of the road that connects al-Qaṣr with Ḥmūd and Smākiyyah; the site covers an area that measures ca. 350 m (N-S) by 200 m (E-W). In addition to the periods represented in the



2. Cleaning a cistern at al-Ḥmaymāt SW (Site 90).

Miller-Pinkerton collection, KRP added sherds from EB, MB?, LB/Ir1, and Ir2.

Other surface finds include basalt tools, tesserae, and glass fragments.

The area all around Site 92 is under cultivation, but the northern end of the site (next to the road) has been turned into a garbage dump, while much of the southern end was inaccessible in the summer of 1995 because of bedouin camps – and the dogs that frequent such campsites. Many of the walls from ancient or Islamic periods have been rearranged as sheepfolds, and the site holds little excavation potential. Features include rectilinear and circular structures, wall lines, and cisterns, with the outstanding feature identified as Feature A, a large, capped well. By means of a rope and bucket, it was determined that water was available – in abundance – at a depth of 5.9 m from the top of the well and its adjacent trough. The good farmland, water sources, building stone, and route along the flat floor of Wādī as-Saninah made this an attractive area for settlement over a long period.

Site 143: Khirbat al-Mdaynah al-‘Āliyah (Miller 1991:74)

KRP collected a total of 28 sherds: Ir1 26; Byz 2

This impressive, wedge-shaped site is located ca. 6.5 km E-SE of Ḥmūd, on an isolated ridge that fills a bend in the canyon where Wādī aḍ-Ḍab‘ah and Wādī al-Mukhayris flow together; north of this bend the name “Wādī al-Mūjīb” is used on the K737 map. The sparse population in this region and its topographic isolation explains Khirbat al-Mdaynah al-‘Āliyah remarkable state of preservation (Fig. 3). Indeed, the limited soundings completed here by Bruce and Carolyn Routledge in 1994 indicate that the Iron Age I living floor is only 1-1.5 m below the modern surface. Excavations here, which the Routledges hope to undertake, would call for the clearance of building rubble as much as actual digging and will result in the exposure of one of the most interesting settlements on the al-Karak plateau (Fig. 4). Its excavation potential is very high, and no



3. Western end of Khirbat al-Mdaynah al-'Āliyah (Site 143), with moat, towers, roadway, and collapsed gate.



4. Monolithic pillars from Iron I buildings at Khirbat al-Mdaynah al-'Āliyah (Site 143).

expense should be spared to protect al-Mdaynah al-'Āliyah and include it among the sites visitors choose to see when they pass through this region.

Like the Miller-Pinkerton team, KRP recovered almost all Ir1 sherds from Site 143;

with the recovery of 2 Byz sherds, however, the team added another period to those represented at al-Mdaynah al-'Āliyah. The very small number of sherds from MB, ERom, and Byz make it probable that most of the visible remains at this fortified town are

from Iron Age I; Routledge confirms that his excavated sherds are almost exclusively from this period.

The general appearance of this well preserved ruin is enhanced by the fact that its surface is almost bare of vegetation, since this eastern side of the plateau is so dry. A specially adapted type of wheat is grown in the fields just west of al-Mdaynah al-‘Āliyah, but the productivity of a given plot in this region is still small. Bruce Routledge has disagreed with Miller’s reference to the site as serving “a primarily military function” (1991:74). The former claims that the presence of charred grain, domestic pottery, and grain-processing tools identifies the site as an ordinary village, as opposed to a military outpost. But the massive fortifications almost certainly point to a defensive purpose – though not necessarily ruled by a central bureaucracy – but it is likely that domestic life was carried on here as well.

While the Iron II military site of Khirbat al-‘Akkūzah (Site 428), discussed below, offers some parallels, the similarities between al-Mdaynah al-‘Āliyah and the Iron II site of Khirbat al-Marjamah (located in the hills northwest of Jericho) are even more instructive (Mazar 1995). Both sites are located on isolated ridges, cut off from the adjacent hill by a moat or fosse which is protected by a tower. Occupants at al-Marjamah had access to a fertile valley and a copious spring at the foot of a steep slope; the position of al-Mdaynah al-‘Āliyah provided its occupants with arable land on the plateau and in the wadi floor, along with the perennial wadi which surrounds the site on three sides. Three KRP team members spent a day recording natural features and remnants of human activity in the wadi floor, where modern farmers have established an extensive irrigation system. [Spending time along the stream in the bottom of Wādī al-Mūjib – around so much water, fish, and luxurious vegetation – adds a new dimension to any fieldworker’s experience of Moab!] Though isolated and located

in relatively dry areas, both of these positions (al-Mdaynah al-‘Āliyah and al-Marjamah) were selected to take advantage of available resources, and their locations also called for the construction of significant defenses to safeguard occupants from enemy attack.

By means of photographs and written records, KRP documented a number of features at Site 143, including several complexes of buildings and walls on top of the ridge (Fig. 5), the rock-cut moat, towers, collapsed gate complex, the roadway, and quarries. The dry moat, which is visible in the upper right on Fig. 3, separates the spur on which the site is located from the “mainland” of the plateau. This moat runs N-S and measures ca. 44.5 m long x 18.7 m wide x 4.5 m deep. Even more interesting is the road that runs from the crest of the hill west of the site, down through the a low “saddle,” and up to the collapsed gate complex (visible in the center and upper left of Fig. 3). The roadway ran for ca. 145 m and was ca. 4 m wide; it was paved with large, flat slabs that are ca. 30 cm thick. These slabs and the blocks and monoliths required to build al-Mdaynah al-‘Āliyah houses, walls, gateway, towers, etc. came from the excavation of the moat and terraces and quarries along the ridge’s upper slopes, like the one seen in Fig. 6.

Site 210: Khirbat al-Qaryatayn (Miller 1991:91)

KRP collected a total of 44 sherds: Ir 2; Ir1 2; Ir2 4; Ir2? 1; Rom 4; Rom-Byz 1; Byz 10; Byz/EIsl 1; EIsl? 1; LIsl 16; UD 2.

This prominent ruin on a ridge S-SE of al-Karak has been damaged by bedouin activity, especially the rearranging of stones for sheepfolds. A number of illegal excavations on the site indicate that local residents hope to discover tombs or “treasure” in such ruins, but an even bigger threat is posed by the expansion of al-Karak, whose suburban neighborhoods and roads for future development already cover much of this ridge.



5. Ruins of buildings and walls on south side of Khirbat al-Mdaynah al-'Āliyah (Site 143).



6. Quarry at east end of Khirbat al-Mdaynah al-'Āliyah (Site 143).

Ancient inhabitants chose this location for strategic purposes; the rounded slopes of the ridge descend to steep, nearly vertical, slopes to the wadis on either side. Outcrops of limestone with chalk deposits directly below them made for good water catchment and storage, and four well preserved cisterns were measured and photographed, including one with a large bell-shaped interior on the site's south end. A terrace and debris from working the cap rock into building stone are

evident on the E-NE corner of the hill, below which are small cultivated fields and vineyards. It is worth noting that viticulture seems to be increasing in the al-Karak area, but the number of presses is quite small, especially when compared to the large quantity of such installations found by the Mādabā Plains Project.

Site 270: Khirbat al-Ḥawiyyah (Miller 1991:111)

KRP collected a total of 121 sherds: EB 3; EB? 2; LB? 1; Rom 5; Rom-Byz 5; Rom-EIsl 1; Byz 19; Byz/EIsl 8; Byz-EIsl 1 EIsl 6; EIsl? 2 LIsl 56; LIsl? 7; UD 5.

A heavy buildup of debris and abundant sherds from many periods on the west side of Wādī al-Ḥawiyyah indicates that this location has been settled and used extensively through the centuries. When the Miller-Pinkerton survey visited this site, which sits just above the confluence of two wadis, there was no modern occupation. Now several

large buildings, which incorporate ancient materials, indicate some kind of “industrial” activity at this location. The rocky site is covered by dwarf shrubs, but the damage that al-Ḥawiyyah has suffered is quite visible. Structures have been built in front of several large caves on the south to provide good protection for sheep, and the eastern side of the site has been turned into a garbage dump. While the excavation potential at Khirbat al-Ḥawiyyah is low, the occupational history of this site is impressive. Nine major cisterns were measured and photographed. Though the dominant building stone is chert, the typical fragments of basalt mortars and grindstones were collected, and KRP recovered a coquina grinder and pieces of scoria from the jumbled remains.

Site 278: al-Kfarāz (Miller 1991:114)

KRP collected a total of 53 sherds: Chal? 1; Rom 7; Rom/Byz 6; Byz 14; Byz/EIsl 8; Byz/EIsl? 1; EIsl 1; LIsl 14; LIsl? 1.

KRP found this site essentially as Miller described it, though the dimensions should be increased (to ca. 400 m N-S by 320 m E-W) to include the Turkish buildings and ruins west of the road. The remains represent a mass of rectilinear structures and walls that were reused/rebuilt over a long period of time, and the modern use of the site has damaged it along the western side. The road cuts through the site and local farmers use its western side to thresh and winnow wheat and process other crops before they are bagged and trucked away. Intensive cultivation of the large plain in which al-Kfarāz sits has encroached along the edges of the ruins, where several walls still stand up to six courses high. Site 278 was undoubtedly one of the major farming communities on this section of the plateau, whose gently undulating surface falls abruptly into the Wādī Iraq ca. 1.5 km to the west. Although the archaeological sediment of al-Kfarāz is badly disturbed, there is some excavation potential

here, but the modern activities will continue to damage standing ruins. Seven major cisterns were measured and photographed. Fragments of ceramic roof tiles were included with the normal range of surface artifacts.

Site 316: al-Mraygha (Miller 1991:123-24)

KRP collected a total of 213 sherds: Ir 2; Ir1 1; Ir2 4; Ir2? 1; Hell 2; Hell? 1; Nab 13; ERom 1; Rom 49; Rom? 3; Rom-Byz 6; Byz 33; Byz? 1; Byz/EIsl 64; EIsl 4; EIsl? 2; LIsl 13; LIsl? 2; UD 11.

Miller suggested that this major site “cries out for more intensive investigation,” but the two days that KRP gave to the site did not eliminate the need for further work. This important, walled town should be excavated as soon as possible, since it is seriously threatened by future development in this area. A paved road leads almost to the base of al-Mraygha itself, and large-scale bedouin encampments have already damaged the northern and eastern sides of the city walls, including its northern gate. Residents of al-Karak said there were plans to establish a settlement of farmers at al-Mraygha to open up more land for commercial purposes.

When the Miller-Pinkerton team conducted their survey of this area in 1982, the Roman-Byzantine cemetery to the east of al-Mraygha was being robbed – as Miller put it – “systematically, tomb by tomb . . .” The 1995 KRP participants walked across the fields which contain the ancient cemetery and estimate that over 800 tombs have been opened and ransacked. It is impossible to say how many undisturbed tombs remain, but the clandestine diggers have recently broken new ground outside the large field where most of the tombs were located. If the local grave robbers are aware that the al-Mraygha neighborhood will be settled in the near future, the looting has probably reached a frantic pace.

Al-Mraygha was a large, walled town that

dominated the northern end of the al-Fajj al-'Usaykir, a prominent graben that extends over 20 km (north-west to south-east) across the southeastern quadrant of the al-Karak plateau (Koucky 1987:30). As the Glueck, Parker, and Miller-Pinkerton observed in their surveys, the rims on either side of the al-Fajj are lined with watchtowers and fortified sites. Sitting on a barren hilltop at the al-Fajj's northern end (on its eastern side), al-Mraygha is the counterpart of al-Muḍaybi' (Site 435), which sits near the al-Fajj's southern end (on the western side) of the al-Fajj. Both positions were heavily fortified, and both commanded access to this broad valley which must have served as a thoroughfare for traders and travelers across the centuries. Al-Mraygha is oriented to the north and probably controlled traffic coming toward al-Karak from the east, toward the "Desert Highway". Excavations at al-Mraygha would uncover interesting architectural remains,

and it is likely that the inventory of objects found would include a number of trade goods. Along with pottery sherds, basalt grindstone fragments, bits of glass, and broken roof tiles, KRP found pieces of worked marble and a 7.5 x 10cm block of alabaster.

At least two of the "foxholes" that Miller mentions on page 124 are industrial installations of some kind, perhaps lime kilns. These stone-lined chambers, whose interior diameters measure ca. 5 m, have flues that open toward the west, and pieces of slag-like residue were found around their edges. The age and function of these installations need further investigation.

The northern gate is moderately well preserved, but its stones are being hauled away for use elsewhere. The rectilinear gate complex is ca. 19.4 m long by 17.0 wide. Looking out of al-Mraygha toward the north, Fig. 7 shows the inside face of the eastern tower and the gateway itself in the upper left; most



7. Interior of north gate at al-Mraygha (Site 316).

of al-Mraygha's interior is covered by large blocks and building rubble, including the circular structure in the right center. Several large structures were built just outside and adjoining the city wall on al-Mraygha's south end; some of these additions display interesting features, including stones with a raised boss (Fig. 8).

Outside the city gate, to the north of al-Mraygha, KRP measured and photographed six large cisterns; these cisterns range in depth from 3.6 m to 6.75 m. All were dry in July of 1995, and bedouin were watering sheep from large tanks filled periodically by trucks.

Site 353: Khirbat al-Inshanish (Miller 1991:131-33)

KRP collected a total of 47 sherds: Rom 14; Rom-Byz 8; Byz 8; Byz/EIsl 1; EIsl 3; LIsl 8; LIsl? 2; UD 3.

This hilltop site offers a good view in all directions, and is located in a region with many archaeological sites. Wheat fields and bedouin camps stand out against the bare hills, and the new buildings of Mū'ta University are clearly visible ca. 6 km to the west. Four major cisterns were documented on this ridge, which is situated between two wadis.

Bedouin camps cover the eastern side of al-Inshanish, while the entire northern side



8. Building stones with raised boss at al-Mraygha (Site 316).

has been turned into a huge complex of sheepfolds – all built out of stones taken from the upper part of the site. Numerous caves on the south and east are also used for barns. Building stone was obtained from terraces on the eastern and western sides of the hill, and heavy archaeological sediment covers the top of the ridge and its slopes. Individual buildings are discernable amidst the rubble, but much of the ancient material has been removed for use elsewhere. Two column drums were noted, though one was discovered recently by someone digging on the site; the ones noted by the Miller-Pinkerton team seem to have disappeared. Surface finds were meager, and the recent damage done to Khirbat al-Inshanish makes it an unlikely candidate for further study.

Site 355: Khirbat al-Batrā (Miller 1991:133)

KRP collected a total of 83 sherds: Ir 2; Ir1 1; Ir1? 1; IR2 8; Hell 1; Nab 38; Rom 18; Byz 8; LIsl 2; LIsl? 1; UD 3.

This prominent site is located at an elevation of 1000 m, and it has a commanding view of the Fajj and the region between the latter and the al-Karak-al-Qatrāna road. Its wide chronological range of diagnostic sherds indicates that the natural advantages of this position were well recognized from the Middle Bronze through the Late Islamic periods. Water was obtained from cisterns which cut into the ridge's silicified limestone, chert, and chalk; five major cisterns were measured and photographed.

Like al-Mraygha, which is located ca. 2.5 km to the N-NE, the economy of Site 355 was probably linked in some way to the al-Fajj traffic, and residents at both sites farmed the floor of Wādī al-Batrā and surrounding hillsides. It is likely that al-Mraygha and Khirbat al-Batrā were inhabited at the same time during several periods through the centuries, and it is interesting to imagine the view that occupants of both sites had of their counterparts, especially at night.

KRP participants drove to Khirbat al-Batrā along a heavily used track which approaches the site from the south-east. Although there is still – in Miller’s words – “a massive tumble of stones,” it is obvious that this ancient settlement has become a modern quarry, and much of the well dressed masonry has been trucked away. Much of the heavy debris is scattered down the eastern slope of Jabal al-Batrā, though a considerable amount of this building stone has been reused for walls in front of the sheepfolds noted by Miller. The “large square building” which Miller mentions (p.133) and is illustrated in photograph 35 (p.135) has been dismantled and removed.

Site 364: Nameless Site (Miller 1991:136-37)

KRP collected a total of one sherd: Ir? 1.

KRP visited this site, a compact and unfinished fort along the Jabal al-Batrā ridge, to see if more partially worked stones, like the one in Miller’s photograph 38 (p. 137), could be located. No other building stones in this condition were found, though quarry sites are located on both sides of the ridge. It is unlikely that the massive limestone blocks, some which are 2 m long, have been looted from Site 364, since there is no track leading to this place and such large stones would not be in big demand for modern usage. Glueck described Site 364 as “the very large foundation stones of a strongly built blockhouse,” and it appears likely that this nameless ruin was never more than that—a foundation, a fortified position that was begun but never finished. It would have been just one more in a series of forts and watchtowers on the al-Fajj rims, and it is difficult to understand why so many were built so close to each other in the first place. Perhaps the builders realized that the large scale of their foundation walls was impractical, even though the quarries were nearby. So the partially worked stone in Miller’s photograph 38 probably symbolizes the point at which

construction stopped.

Pottery collected by the Miller-Pinkerton survey comes from a wide chronological range, which probably means that the site was used for a variety of purposes over a long period of time. Interestingly enough, Glueck lamented the fact that he found one sherd (at least one “fine Nabataean-Roman sherd”), and KRP also recovered a single sherd from Site 364. The Miller-Pinkerton team probably gave the area a more thorough examination than Glueck and (obviously!) made a fairly exhaustive collection.

While there are no cisterns on this site, a water catchment system with channels and a large cistern was documented by KRP on the lower slope of this ridge, just northeast of Site 364. As Koucky (1987:30) has observed, the al-Fajj is a dust bowl in the summer, but its floor is a muddy, fertile plain in the winter and spring, and the lack of rainfall in the dry months (when most archaeological fieldwork is done) is not an insurmountable problem. In fact, it is likely that the al-Fajj will be developed for even more agricultural activity, as the word about a modern settlement at al-Mraygha would seem to indicate. More ominous is the construction of a major road in the pass that cuts through the Jabal al-Batrā ridge, just north of Mahri (Miller site 366). This road will help with regional economic growth, but it will also make remote sites in this southeastern section of the al-Karak district more accessible to stone robbers.

Site 420: Nakhl (Miller 1991:154-56)

KRP collected a total of 150 sherds: Ir2 2; Hell 1; Nab 16; Hell/ERom 1; Rom 24; Rom/Byz 1; Rom-Byz 7; Byz 36; Byz? 3; Byz/EIsl 8; Byz-EIsl 2; EIsl 3; LIsl 42; LIsl? 1; UD 1; Post-Ir UD 2.

Nakhl is another impressive site, though it does not fall into the same category as Khirbat al-Mdaynah al-‘Āliyah, al-Mraygha, or al-Muḍaybi’. Its state of preservation does

not equal these three sites that were studied by KRP in 1995, but its impressiveness results from its size and remarkable position. Miller does not provide dimensions but includes the comments of Musil (among others) who observed that Nakhl is “one of the most extensive ruins in the area. . . .” Indeed, the heavy concentration of ruins on this prominent hill extend to the measure of ca. 500 m (N-S) by 300 m (E-W), at its longest and widest parts.

On this site, which is far removed from other archaeological sites in al-Karak’s southeastern quadrant, a long history was played out, from the Early Bronze Age through Late Islamic times. Other scholars are certainly correct in their assertion that most of the debris at Nakhl dates to the Nabataean, Roman, and Byzantine eras. Like several sites examined by KRP, Site 420 calls for more careful study and merits an article of its own. [In fact, two KRP team members plan to publish a paper on the distinctive features of Nakhl’s water system.] And, responding to the appeal offered by Miller on pages 154 and 156, the Department of Antiquities, Mu’ta University, and Robert Schick have conducted excavations at Nakhl’s rectilinear Nabataean temple and triapsidal Byzantine basilica, though the results of their work are not available yet. KRP also documented these important features, the special work of Garner and Wineland (both of whom were usually involved in collecting information on architecture).

Nakhl dominates a large wheat-producing region that centers upon the modern village of Umm Ḥamāṭ. At an elevation of ca. 1090 m, the site is the watershed of at least three significant drainage areas. With sufficient precipitation, this territory’s red, rocky soils produce bumper-crops of high quality grain.

Some 75% of the site is covered with archaeological sediment, and the balance is exposed bedrock. Limestone and marl were the dominant materials used by the ancient builders, most of which was quarried on the

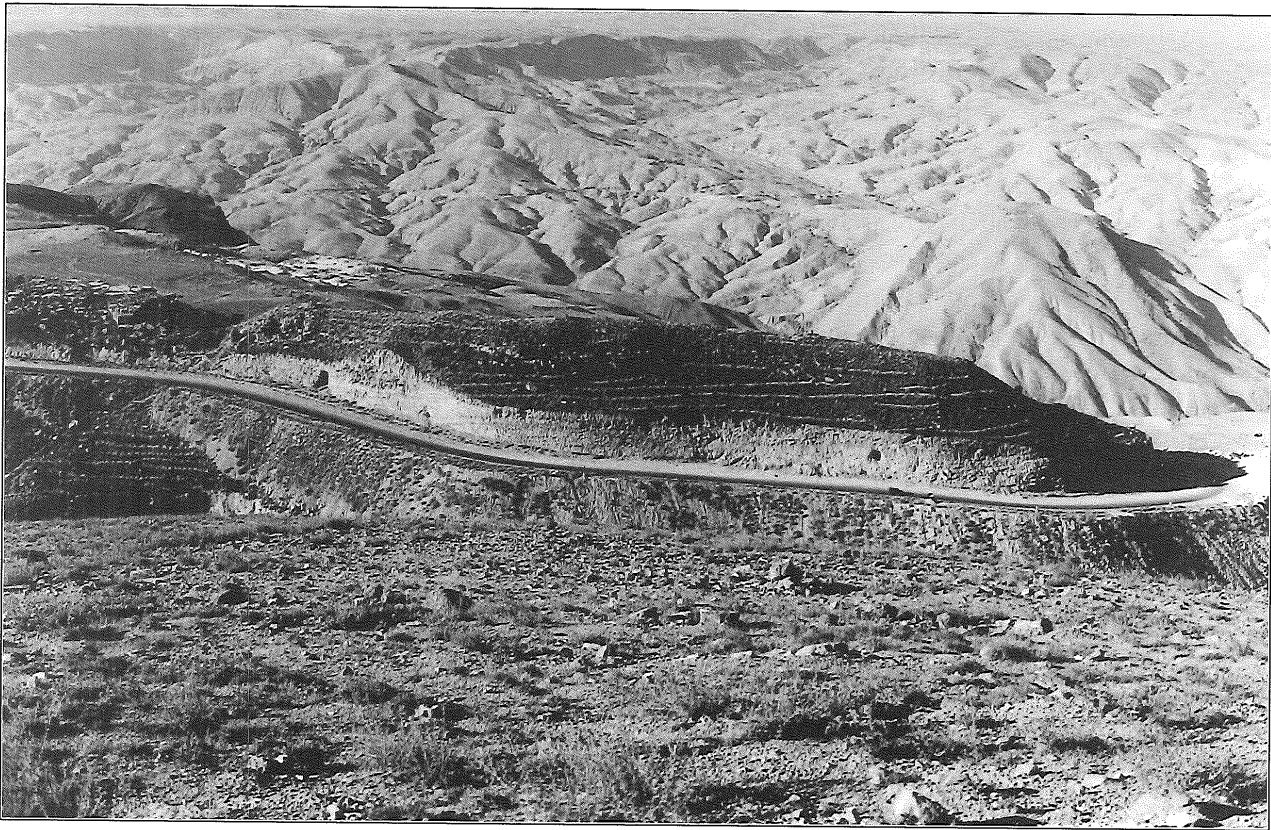
site; these quarried and shaped stones have been used over and over through the centuries. Making sense of construction sequences would be a demanding job at Nakhl, though the excavation potential is high.

Nine of Nakhl’s major cisterns were measured and photographed by KRP, and special attention was given to a series of dams which were important in water retention. Surface remains included tesserae, numerous fragments of basalt grindstones, and glass fragments; samples of cistern plaster were also collected.

Site 428: Khirbat al-‘Akkūzah (Miller 1991:158-60)

KRP collected a total of 40 sherds: LB/Ir1 1; Ir 6; Ir1 16; Ir2 17.

Along with Khirbat al-Mdaynah al-‘Āliyah, Khirbat al-‘Akkūzah is a case study in strategic site location. This fortified position, whose pottery dates almost exclusively to the Iron Age, offered its occupants/defenders a spectacular panorama of Wādi al-Ḥasa (to the south) and a more focused, but functional, view of Wādi Falqa (to the north). In addition to a number of grindstones (whole and fragmentary), KRP collected 16 sherds that date to Ir1, a significant addition to the collection made by the Miller-Pinkerton survey. Many of the Iron Age walls have tumbled down the slopes of this fortified ridge that sits in a hairpin curve in the modern “King’s Highway”, and some of the ancient walls on the north slope were recently cut away when this roadbed was widened. If the dimensions of al-‘Akkūzah’s northern slope, visible in Fig. 9 (the dark area with goat paths above the light-colored road cut), are compared with Miller’s photograph 45 (p. 159), it is obvious that the site was seriously damaged. Khirbat al-‘Akkūzah’s main tower can be seen in Fig. 9, at the east (left) end of the site, just west (right) of the rock-cut moat. The new road cut comes right up to the base of this heavily fortified tower, whereas Mill-



9. Looking south at Khirbat al- 'Akkūzah (Site 428).

er's photograph 46 (p. 159) shows that the ancient walls extended far below the person standing in the center of the photo; the wall immediately below the human scale has been destroyed.

A number of caves along the upper slope of the site's southern side provided access to water trapped in the chalk. By cutting a moat, the ancient builders added considerably to what nature had provided, since this defensive feature (which is 16.8 m long x 35 m wide x 8 m deep) made the narrow ridge even less accessible from the east. In the process of cutting the moat through silicified limestone, chert, and chalk, the defenders of al-'Akkūzah obtained much of the stone they needed to construct their hilltop fortification. The Miller-Pinkerton team found slingstones (hammered chert nodules) in the rubble on the summit, and KRP recovered a disproportionate number of thick body sherds from large storage vessels, which probably reflects the military (i.e., non-food producing) nature of this site.

Site 430: Rujum al-'Abdah
(Miller 1991:160-61)

KRP collected a total of 26 sherds: Ir? 1; Nab 2; Byz 4; LIsl 19.

As Miller observes, there is not much left at this site, since it sits on the edge of a cultivated field and has been heavily damaged. Some fragmentary wall lines, five cisterns, and ashy soil distinguish this small plot from the surrounding field. Apart from a small number of sherds, no other surface finds were collected. One sherd might date to the Iron Age, which would be an additional period beyond what Miller-Pinkerton found.

Site 431: Kfeir/Khirbat al-'Abdah
(Miller 1991:161)

KRP collected a total of 33 sherds: Pers? 1; Hell 1; Nab 3; ERom 1; Rom 3; Rom? 2; Byz/EIsl 13; EIsl 1; LIsl 6; UD 2.

Because of its location on the northern rim of Wādī al-Ḥasa, this site has suffered

considerably since the Miller-Pinkerton survey. Farmers from Dhat Rās and other thriving villages have pushed the line of cultivation right to the edge of the plateau and have begrudgingly bypassed spaces covered with tumbled walls, cisterns, etc. There is, in fact, a thin layer of widely scattered debris (covered by dwarf shrub) on this 75 x100m site, along with caves (just below the rim of the canyon) and seven major cisterns. Soft limestone and chalk – into which cisterns were cut – were quite accessible here, since the harder cap rock has been stripped off for building stone. Many of the ancient building blocks have been removed for modern construction, but the rocky soil and patches of exposed bedrock have protected Kfeir/Khirbat al-‘Abdah from being plowed away. While the farmers might have spared the site, this position was chosen for the construction of a large transmission tower and a substantial protective fence, a project which did further damage to site 431. A possible Persian sherd is the only addition to the periods represented in the sherd collection made by the Miller-Pinkerton team at this site. [It should be noted that the numbers for Site 429 and Site 431 are reversed on the large folding map in the Miller volume.]

Site 435: al-Muḍaybi‘ (Miller 1991:163)

KRP collected a total of 21 sherds: Ir2 7; Byz 7; Byz? 1; LIsl 5; LIsl? 1.

The impressive site of al-Muḍaybi‘ occupies a strategic position in the southeastern section of the plateau, just south of the road that comes out of the Fajj al-‘Usaykir and passes below the southern end of Jabal al-Batrā. While this region appears somewhat inhospitable, at least in the summer months, its advantages were clearly recognized in ancient times, from the Early Bronze through the Late Islamic periods. During the Iron Age, a tremendous amount of effort was made to fortify a bare ridge that was protected on three sides by wadis; limestone was quarried from nearby outcrops, and basalt was carried in from the volcanic dike in the wadi on the site’s north side (Fig. 10). This substantial but compact fortress, which measures ca. 60 m x 90 m, has been occupied, repaired, and remodeled until modern times, when many of its internal walls were rearranged for sheepfolds. Water was obtained from caves and cisterns near the site and in the al-Fajj; a modern reservoir in the wadi on the north side of al-Muḍaybi‘ has replaced an ancient dam, remnants of



10. Looking south toward al-Muḍaybi‘ (Site 435), with modern reservoir to the right.

which were reported by Glueck.

KRP gave considerable attention to the two gates of Site 435, one in the eastern wall and one in the western wall, and a more detailed study will be provided in the future. Both were built entirely of semihewn or dressed limestone blocks, some of which were quite large. The plan of the western gate is similar to the eastern gate, though the former was smaller. The east gate of al-Muḏaybi‘ has received more attention because of its view to the al-Fajj and because of the so-called proto-Aeolic capitals found in its proximity, the largest of which is seen in Fig.11 – and nicely illustrated in Miller’s photograph 48 (p. 165). This kind of monumental architecture is well known from six ancient Israelite sites, where these capitals were always “uncovered near administrative buildings and palaces” (Kempinski and Reich 1992:212). When Negueruela (1982) published his study of the al-Muḏaybi‘ capitals, there were four known on this site. Unfortunately, the KRP team must report that one of the smaller fragments has been taken

from the site. And, as will be reported in more detail in a separate article, a proto-aeolic capital has turned up at yet another site in Jordan. Because al-Muḏaybi‘ needs to be examined more carefully – and preserved for the future, KRP hopes to continue its long-term study of resource exploitation by conducting excavations here and by co-ordinating other research that will place this important site in its historical and environmental contexts.

Conclusion

The main purpose of this article is to summarize the work accomplished during the 1995 season of the al-Karak Resources Project and to identify some of the highlights of this pilot season.

In many instances, the KRP team compared the 1995 state of preservation for a given site with the way things were when Miller and Pinkerton directed their survey between 1978 and 1983.

A secondary purpose for providing the preceding synopsis is to announce a be-



11. Looking out the eastern gate of al-Muḏaybi‘ (Site 435), with large proto-Aeolic capital in the foreground and al-Fajj al-‘Usaykir in the background.

ginning for this new phase of research in the al-Karak region. KRP hopes to continue its multidisciplinary research in the odd-numbered summers for two or three more seasons. As in most of the Middle East (and in many parts of the world), this kind of investigation represents a race against the clock. Traditional culture and the residual patterns of ancient societies are disappearing quite rapidly in the Hashemite Kingdom of Jordan – because of economic growth and sociocultural change. Such progress is, of course, a cause for celebration, since it normally results in an improved standard of living. In terms of the survival of archaeological sites, progress usually means that sites will be damaged or destroyed, and scholars will have less access to information concerning the past. KRP intends to collect such data while it is still available in this interesting region.

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G. L. Mattingly
7900 Johnson Drive
Knoxville, Tn 37998
U.S.A.

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THE CISTERNS OF THE AL-KARAK PLATEAU

by

James H. Pace

There is a growing interest among archaeologists to investigate the ways in which ancient people of the Middle East exploited the natural resources of their environment. This effort is motivated not only by antiquarian interests but out of a concern to contribute to the future development of the natural resources of the growing nations of this area. Since water is and has been the crucial natural resource underlying life in this part of the world, it is understandable that a great deal of attention is beginning to be directed toward the role that water management has played in the daily lives of the inhabitants of the Middle East throughout history. In a sense archaeology is becoming equally as interested in viewing the physical remains of the ancient world as a key to understanding more about the reciprocal relationship between people and their environment as it all along has been in reconstructing historical events of the past.

Lawrence Stager's study of the role of water management systems in the Judean desert represents a pioneering effort in this sort of research in Israel. He describes evidence where "floodwater farmers" in the Buqe'ah basin in the northeastern part of the Judean desert harvested water in catchment areas consisting of a series of stone walls for distribution to individual plots (Stager 1976: 157). The experimental research of Evenari, Shanan, and Tadmor in the Negev has become a model for integrating the study of water usage with the life systems of the people of a particular area. Their project actually simulated ancient runoff agriculture by reconstructing water diversion systems. They were thus able to observe the flow of water and measure the amounts

produced for irrigation.

In Jordan, we have reports from Jāwā (Helms 1981), al-Ḥumayma (Oleson 1995), the Mādabā Plains Project (Lacelle 1986; Cole 1989), Gadara/Umm Qays (Weber 1991), Abila (Mare 1995), and al-Lajjūn (De Vries 1987) that offer new insight into what archaeology has to tell us about the use of water among the ancient people of those areas. Most recently David Kennedy has shed light on water management in the Southern Ḥawrān at Dayr al-Kahf and Umm al-Quttayn. Kennedy draws attention to how much can be found about the "variety and sophistication" as well as the "considerable success attainable" in ancient water collection methods (Kennedy 1995: 288).

Except in the case of al-Lajjūn, little effort has been made to advance our understanding of the water management systems of the al-Karak Plateau. Of course the existence of cisterns and other structures for water storage was noted in the journals of early explorers in that area. Glueck (1933-39) and more recently the Miller-Pinkerton survey of the al-Karak Plateau (1978-82) have called our attention to the continued existence of such facilities. However there is a need for more detailed studies of water management on the plateau, and it is to this task that the al-Karak Resources Project focused much of its attention in its survey of 1995.

In modern and surely in ancient times a major source of water must have been the peripheral wadis delineating the plateau, especially al-Mūjib, which forms the north and northeast boundary of the territory. The western side of the plateau receives the

most rain, an average of 350 mm a year. Since the plateau slopes downward toward the al-Mūjib, much of the runoff eventually drains there (Koucky 1987: 30). The water that percolates into the karstic limestone of the area flows horizontally when it meets less porous strata and reappears as springs on the wadi slopes (Mattingly 1983: 604; Miller 1991: 3). Today there is a sufficient supply of water in al-Mūjib during the summer to provide irrigation for tomato crops on the terraces above the stream. Water is pumped to plastic lined reservoirs where it is distributed to cultivated rows through plastic pipes. In ancient times, however, the distance between the plateau and the wadi floor undoubtedly made this source less practical than it is today. Survival on the plateau in the dry summer months depended primarily upon the population's ability to collect, store, and distribute the abundant water of the winter rains. Their ability to do this became evident immediately during the survey of the al-Karak Resources Project.

The al-Karak Resources Project focused its survey on seventeen sites previously recorded by the Miller-Pinkerton survey (see G. Mattingly, in this volume): Umm al-Habaj, al-Hmaymāt NW, al-Hmaymāt SW, al-Hmaymāt SE, Khirbat al-Mdaynah al-‘Āliyah, Khirbat al-Qaryatayn, Khirbat al-Hawiyiyah, Kfarāz, al-Mraygha, Khirbat Inshanish, Khirbat al-Batrā, a nameless site (Miller Site 364), Nakhl, Khirbat al-‘Akkūzah, Rujum al-‘Abdah, Khirbat al-‘Abdah/Kfeir, and al-Muḍaybi‘. On these sites we took the time to study and record 63 well preserved water storage facilities or cisterns.

These structures vary in size and appearance, and consistent terminology to describe them has yet to be developed. The categories offered by R. Abujaber are the most useful and will be adopted here (Abujaber 1995: 742). They are the *qi’* or “ditch,” the *bi’r* or “well,” and the *khazzān*

or “reservoir.”

The *qi’* or “ditch” is an open excavation or a natural cave which was adapted to hold water (Fig.1). One *qi’* at Khirbat al-‘Abdah/Kfeir was constructed with steps leading down to the water level (Fig. 2). The fact that these cisterns were unroofed made them subject to pollution (Abujaber 1995: 743). Undoubtedly they had to be protected against livestock which could easily fall into them as evidenced by the carcass of a donkey that we observed in one at al-Muḍaybi‘.

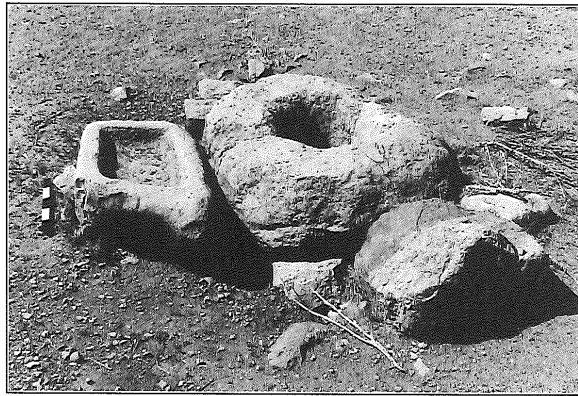
A *bi’r* or “well” is bottle or pear-shaped cistern cut into the rock. These are capped by wellheads or “collars” with circular openings about 1-1.5 m in diameter. Often watering troughs still lie beside them (Fig. 3). Some of these wellheads must have been ornate as evidenced by the beautiful example of workmanship on one at ar-Rabbah (Fig. 4). Low stone walls channelled water



1. Cave cistern at Khirbat al- ‘Akkūzah.



2. Stepped cistern at Khirbat al- ‘Abdah/Kfeir.



3. Cistern with collar and trough at Khirbat al-'Abdah/Kfeir.



4. Ornate basalt collar at ar-Rabbah.

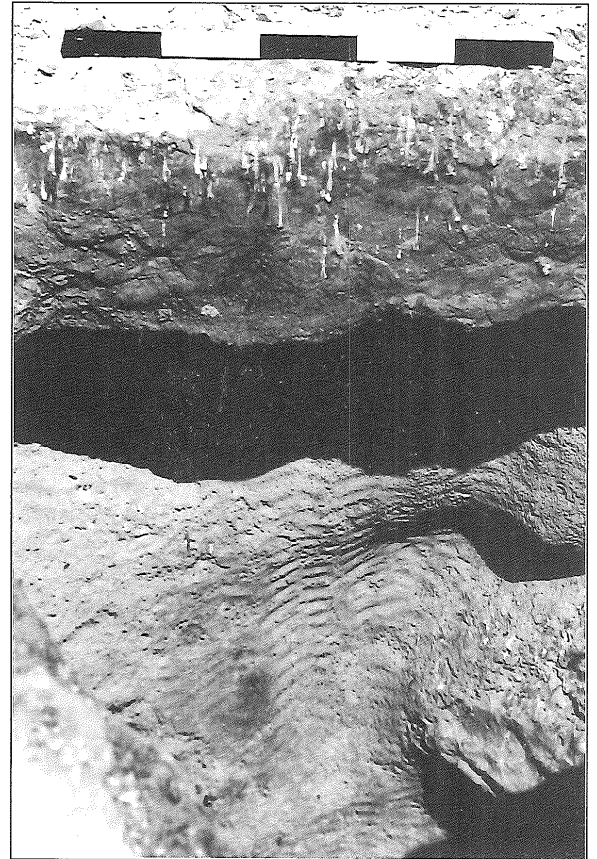
to inlets at the base of the collars which allowed runoff to enter and replenish the cistern. Collapsed cisterns continue to collect water and can easily be detected by the undergrowth around them and sometimes even trees growing in them. Many cisterns remain in use, having been capped in concrete and fitted with steel doors as covers. Wellheads could be reused for other purposes. One can be seen at the abandoned village of Sul serving as a window of a house.

It is not unusual to find several layers of plaster lining these rock-cut cisterns (Fig. 5). The workmen who plastered them often used designs such as dot impressions or "herringbone" patterns (Fig. 6). Apparently these patterns resulted from different techniques of applying plaster so that it would adhere to the interiors of the cisterns.

A third type of water storage facility is the *khazzān* or "reservoir" sometimes called a *birka* or "pool". These were usually the



5. Layers of plaster in cistern neck at al-Ḥmaymāt NW.



6. Herringbone pattern in plastered cistern at Kfarāz.

result of a communal effort (Abujaber 1995: 743). They were often constructed by building dams in low areas to collect runoff from surrounding hills. The al-Karak Resources Project survey recorded a modern *khazzān* in the wadi beside al-Muḏaybi'. No ancient ones were noticed, and it is likely that they were replaced by the modern structures or lie beneath them. The quality of water contained in this kind of storage facility is ques-

tionable. Abujaber notes that it “became unfit for human consumption in April or May of every year and therefore ended up being used for building requirements and watering of animals” (Abujaber 1995: 743). It appears, therefore, that of the three types of cisterns the *bi’r* or “well” served as the major source for human drinking water.

The modern inhabitants of the plateau are well aware of the location and potential of these cisterns. Many continue to be used today. “What the older generations of antiquity provided, was put to good use indeed by farmers of the same system a few thousand years later” (Abujaber 1995: 744). At al-Ḥumaymāt SW we came across a group of local youths reclaiming an ancient cistern (Mattingly, *infra* Fig. 2).

Two conclusions are clear from this initial survey. First, water was not scarce on the plateau. We were surprised by the number of cisterns that we found. Certainly there was an equal number that we did not see because they either appeared simply as depressions or were totally concealed by the debris of the ruins. Only excavation will reveal more about them. Second, the inhabitants, particularly in Nabataean and Byzantine times knew where to locate water, and this determined where they lived. Water storage facilities are located in karstic limestone formations, and this is precisely where the population settled. Dora Crouch in her study of water management

in ancient Greek cities points out that the Greeks intentionally considered the water retaining properties of the terrain when they selected sites for their cities. She calls this “geological determinism” (Crouch 1993: 341). It appears that the settlers of the plateau also knew the value of karst formations, and we should consider this when we explain the location of occupied sites in that area. The relationship between geological setting and urbanization is an area crying out for further study.

One productive application of archaeological research is to use this information to revive the ancient technology of water management, and “wed” it to current technology to produce what Øystein LaBianca calls a “blended technology” that may help solve the water problems of the future (LaBianca 1995: 771). This is being done in the Mādabā Plains by “Project Rainkeep” (LaBianca 1995: 775). This project will excavate and restore ancient cisterns so that their water can be used for irrigating crops. It is “just one way in which ancient archaeology can benefit modern life” (Hendrix 1995: 4). The al-Karak Resources Project has merely begun to delve into such matters in its territory. Much remains to be done.

James H. Pace
Elon College
North Carolina 27244
U.S.A.

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**THE WĀDĪ AZ-ZARQĀ' / WĀDĪ AD-ḌULAYL EXCAVATIONS
AND SURVEY PROJECT:
REPORT ON THE OCTOBER-NOVEMBER 1993 FIELDWORK SEASON**

by

Gaetano Palumbo, Massimiliano Munzi, Sarah Collins, Fouad Hourani,
Alessandra Peruzzetto and Martin D. Wilson

Introduction

The following report outlines the activities conducted in the area of the Upper az-Zarqā' valley between October 19 and November 19, 1993 by a team of archaeologists of the University of Rome, Italy. Fieldwork was made possible thanks to two grants, one from the Cultural Office of the Italian Ministry of Foreign Affairs and the other from the Consiglio Nazionale delle Ricerche (CNR; National Research Council, Italy).¹

The team was directed by Gaetano Palumbo (Università di Roma) and included Sarah Collins (British Museum), Mohammed Daire (Yarmouk University), Khaled Douglas (Yarmouk University), Fouad Hourani (INA -PG, France), Massimiliano Munzi (Università di Roma), Alessandra Peruzzetto (Università di Torino), Stefania Sofra (Università di Roma) and Martin Wilson. Department of Antiquities representative was Ibrahim Haj Hassan, from the 'Ammān office.

The fieldwork included the following:

1. Analysis of aerial photos and location of archaeological sites with structures;
2. Intensive surface collections and soundings at Jabal ar-Raḥīl (site JR1);
3. Surface exploration of previously known sites and of a selected sample of sites located on the aerial photos;
4. Intensive survey of selected areas for the

1. We would also like to thank the Italian Embassy in 'Ammān, in the persons of HE Romualdo Bettini, Ambassador of Italy, Mr Giovanni Benenati, and Mr Emanuele Minardo for their support, and the American Center of Oriental Research in 'Ammān, in the persons of Drs Pierre and Patricia

identification of sites not visible on the aerial photos;

5. Topographic survey of Khirbat al-Mak'hūl (site JR4).

Aims and Methodology

(M. Munzi and G. Palumbo)

The present article is a preliminary report of the first season of archaeological explorations in the Upper az-Zarqā' and Wādi ad-Ḍulayl valleys; none of the statements contained in this report can be considered conclusive: they are rather a first assessment of the type of archaeological features found in this area and of the periods of occupation they represent. Statistics that deal with the occupation of the area during different periods should also be considered a first attempt to identify trends in this occupation: they will be certainly modified as our knowledge of the history of this region progresses, but we do not expect future findings completely reversing the picture that is emerging after our first studies in the area.

Simply stated, the aim of the project is to reconstruct phases of human occupation in the region, by identifying the relationships between man and his environment during different historical periods, broadly identified according to traditional divisions.

In more detail, this research will try to
- understand the evolution of Pleistocene

Bikai, Dr Zbigniew Fiema, and Mr Glen Peterman for logistical and moral support. Our thanks also to Dominic Powlesland for producing the Raḥīl base maps used for Figs. 16 and 17, using his GIS software G-Sys, version 2.5.

landscapes in the region, in order to reconstruct the prehistoric human occupation and the relationships between site location and exploitation of natural resources;

- study the evolution of settlement from the Early Bronze to the Late Iron Age, both in terms of settlement hierarchy, land use, and intra-site organization at selected locations;
- study the Roman, Byzantine, and Islamic occupations and investigate the reasons behind the selection of settlement location; study the spatial organization of settlements and their rural counterparts;
- study the function and date of cairns and towers, the most common site type in the az-Zarqā' basin;
- understand land use and relationships between contemporary ethnic groups, in particular Bedouin (pastoral nomads) and Chechen (farmers), immigrated from Caucasus at the turn of the 20th century, fleeing Russian persecution, and founding the village of as-Sukhna and the city of az-Zarqā' ;
- reconstruct farmers-nomads relationships through the ages in this region, and the position of this "rural" element against the "urban" or centralized power components.

Our approach to the study of the region consists of 4 steps:

1. Analysis of the aerial photos and identification of "visible" sites;
2. Intensive archaeological and geomorphological survey and identification of periods of occupation at "visible" and "invisible" sites (sherd, flint scatters, buried sites, etc.), the latter found as a result of the ground survey;
3. Soundings at selected sites for the establishment of a stratigraphic record and the recovery of paleoenvironmental data;
4. Reconstruction of environmental and historic trends for the occupation of the re-

gion.

Tools for the achievement of these objectives include detailed survey forms, which describe the archaeological remains found (*site*, defined as an artificial anomaly in the natural landscape, due to the past use by man of a circumscribed area), as well as the larger environmental contexts where the "sites" are located (described as "survey units"). Retrieved data are organized into databases, and a full Geographic Information System (GIS) has been developed, which includes cartographic data and archaeological site location, and will soon contain environmental and geomorphological data.

After a complete analysis of the 1:10,000 aerial photos available for the area, which brought to the identification of 275 previously unknown archaeological sites (see below), a program of intensive archaeological surveys was organized, not only to check the periods and types of occupation of the sites identified on the aerial photos, but also to have a better understanding of the topography and environment of the region, and to identify sites that, because of their ephemeral nature or other reasons, could have escaped the analysis of the photos. The intensive survey, that already this year brought to the identification of numerous sites, some of which extremely important for the understanding of the history of human occupation and the evolution of historic landscapes, will continue in the future campaigns of the project.

At the same time the GIS which is being developed will help our team to identify patterns in the historic occupation of the region, but also, by applying statistical "predictive" models, to identify areas that may hide an archaeological presence. While the application of these models has not been attempted until now on the data set, the use of the GIS will help in identifying possible relations between sites and their environment, and, possibly, trends in the occupation of the region across periods.

The advantage of using high definition aerial photos for the identification of archaeological sites was enhanced, in our case, by the scarce vegetation cover of the region. In this context, the smallest ruin can be easily identified on the photos. This however, also introduces a biasing element, since almost all sites with structures are identified by simply scanning the photos, while most of the other sites (sherd or flint scatters, camps, deeply buried sites, or sites in alluvial deposits) have to wait for intensive surveys to be located.

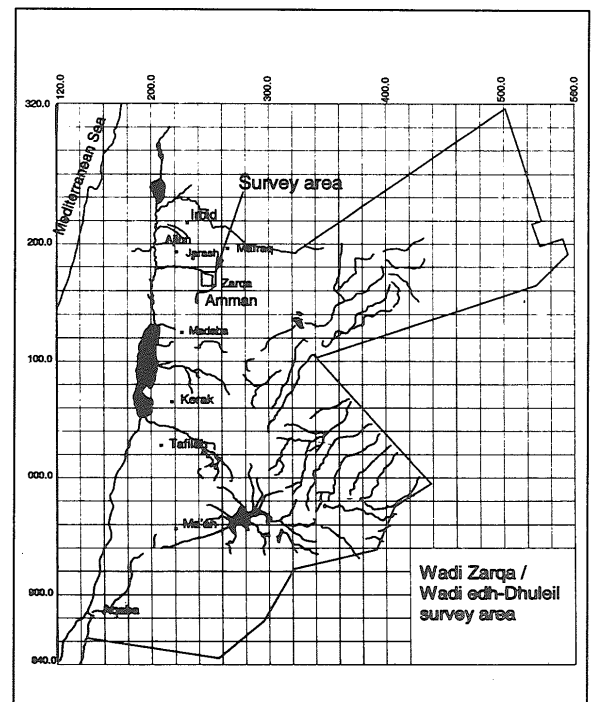
It can already be anticipated that after several campaigns of intensive surveys these "invisible" sites will characterize a more important slice of the overall record than it is possible to do today.

The first season of survey, however, already identified a possible methodological problem in the treatment of Paleolithic sites, since the area is strewn with a constant "background noise" of lithic material, to the point that is difficult to separate site from site, and to establish the boundaries and extensions of sites. This also introduces other problems: how much of the present surface is the ancient one, especially for the most ancient periods? How much of the surface remains are derived from deflation and erosion of hill slopes? The geomorphological studies will help to answer, partially at least, these questions, and a model will be developed in our GIS to compare data derived from direct observations with that inferred from similar land forms identified in the cartography and aerial photos. Further study may involve the analysis of multispectral imagery (Landsat and SPOT) and of radar data (SIR-C) obtained from the Jet Propulsion Laboratory in Pasadena. This analysis will be useful in the identification of macrophenomena, such as environmental episodes which may have affected the presence of human activity in the landscape, as well as more localized features which may escape attention while only analyzing panchromatic analogue imagery.

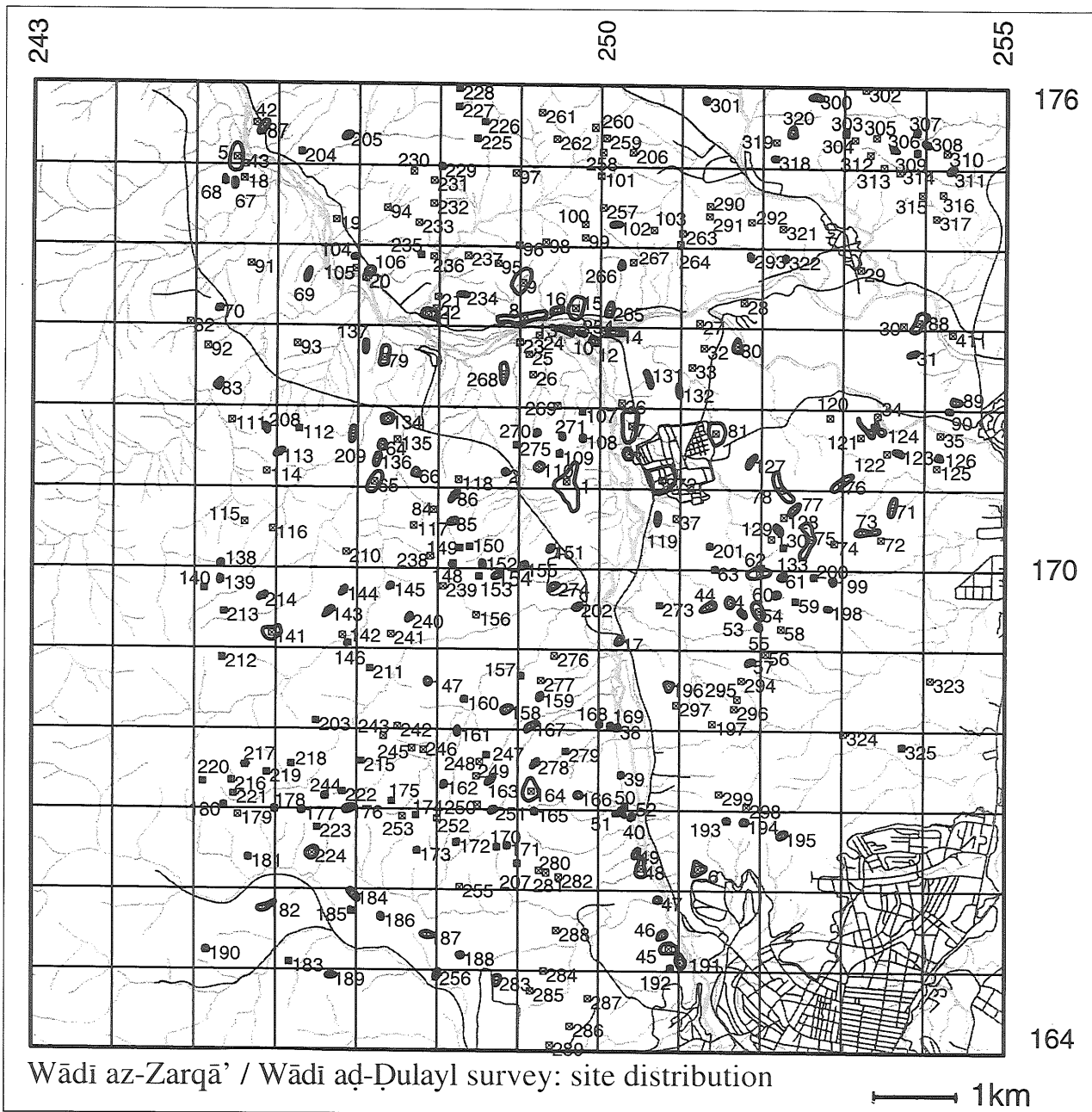
The soundings, as exemplified in the present article by the work conducted at Jabal ar-Raḥīl, will serve to identify stratigraphic and pottery sequences that will help to understand occupational sequences at other multi-period sites and in correctly dating other sites based only on their surface evidence. They will also serve the need to identify depth of occupations and functions of the sites tested, a useful result, especially for sites threatened by development.

Description of the Area (G. Palumbo)

The survey area is comprised between coordinates 243E 164N and 255E 176N of the Palestine grid, covering an area of 144 km² (Fig.1) Its limits are approximately the northern periphery of the city of az-Zarqā', to the southeast, the village of al-Hāshimiyya and its refinery, to the east, the crest of the hills on the right bank of the az-Zarqā' river and Wādī aḍ-Ḍulayl, to the north, and the area of Tall al-Bīrah, to the west. Because of



1. Location of Wādī az-Zarqā' / Wādī aḍ-Ḍulayl survey area. The grid values are those of the Palestine grid. On this map, each square represents a 20x20 km area.



2: Site distribution. For site names, coordinates, and periods of occupation see appendix.

the recent expansion of the survey area 2 km towards the west, aerial photos could not yet be “read” for the area comprised between coordinates 243E 164N and 245E 176N (a total of 24 km²): this explains the absence of sites on the left side of the area maps (Fig. 2).

Detailed maps are available for the area: 1:10,000 (sheets 51/70, 51/64, 43/70, and 43/64 of the 1950 az-Zarqā' basin series produced by the Jordan Department of Lands and Survey), and 1:25,000 (sheets 3254-III-

NW and 3254-III-SW of the 1991 K737 series produced by the Royal Jordanian Geographic Center). Both these map series have been used for the production of the GIS (above). The old (1961) K737 series map of the area (sheet 3254-III, at a scale of 1:50,000) was not used because the scale could not allow the precision required.

The area is characterized by the presence of a semi-permanent water course (the az-Zarqā' river), which today is dry for most of

the year south of the confluence with Wādī aḍ-Ḍulayl. This, however, is a recent phenomenon due to the use of the springs in the area between 'Ammān and az-Zarqā' for direct human consumption and agriculture. Wādī aḍ-Ḍulayl today discharges into the az-Zarqā' the waters treated in the nearby sewage plant ponds of as-Samrā', about five kilometers to the east of the survey area, together with other highly polluted waters from the industrial area of al-Hāshimiyya.

The average rainfall in the area, between the years 1950 and 1980, was 166 mm, with a minimum of 58 mm (1950/51) and a maximum of 313 mm (1966/67). During those 30 years, 7 years had a rainfall of less than 100 mm, 14 years a rainfall between 100 and 200 mm, 6 years between 200 and 300, and only 2 years had a rainfall above 300 mm. Only in two circumstances there were two years in a row with a rainfall above 200 mm (Rainfall in Jordan: 218-219). The region can barely support, today, rainfed agriculture, and as a matter of fact only few patches around pastoral Bedouin camps are cultivated with this method, while more intensive agriculture is practiced on the banks of the az-Zarqā' river pumping water from the river bed and by irrigation, using water channeled from reservoirs filled from water pipes.

The soils can be classified as belonging to the xeric-aridic with transitional moisture regime and aeolian influence. Soil temperatures vary between 15 and 22C. Because of the strong erosion of the hill slopes, the lithic component is extremely high. In many circumstances, soil cover is completely absent, or reduced to a shallow sheet overlying the bedrock. On the terraces above the az-Zarqā' alluvial bed, soils are of the Xerochreptic Camborthid type, containing a high percentage of clay (25%) and calcium carbonate (25%); in the area of Tall al-Bīrah they are of Xerochreptic Calciorthid type, containing an even higher percentage of calcium carbonate (30%). In over 80% of the area, soils are of the lithic subtype, un-

suitable for rainfed or irrigated agriculture (Soils of Jordan 1994). Overgrazing of the area and the extensive use of tractors on the lower slopes of the hills have caused the destruction of the typical steppic vegetation of the area, composed of two main species (*Poa sinaica* and *Carex pachystylis*). With a shallow rooting turf and a dense root mat, these two grasses are effective against erosion. Unfortunately, their destruction, coupled with their extremely slow recovery rate, is causing accelerated erosion of the hill slopes in most of the area under investigation.

Geomorphologically, the area is characterized by deeply incised wadis converging into the az-Zarqā' river basin. They create a very dissected landscape of rounded steep hills, especially in the western sector of the survey area, while to the northeast the landscape is characterized by more gentle hills, and flat topped basalt outcrops. Elevations range from 410m, in the az-Zarqā' river bed near Tall al-Bīrah, to 880m on the high hills in the southwestern sector of the survey area. The geology is characterized by Cretaceous limestone with marine fossils, and, in Wādī aḍ-Ḍulayl, by Upper Tertiary and Quaternary basalt layers which overlay the older limestone. The upper layers are characterized by Quaternary loess-like deposits.

Several terraces in the az-Zarqā' river basin have been recognized by Besançon and Hours in their survey: the highest at 45m above the present river bed, and containing in many cases Lower Paleolithic artifacts. The formation, named ad-Dawqara from a village in the area, is followed, at a lower elevation (about 30/35m) by another terrace (al-Bīrah formation), also containing Lower Paleolithic artifacts, generally Late Acheulean. Middle Paleolithic artifacts have been found in the as-Samrā' formation, at about 25m above the present river bed. Finally, the lower terrace (as-Sukhna formation) was found to contain Kebaran and PPN deposits (Besançon *et al.* 1984; Besançon and Hours

1985). During our fieldwork, this sequence will be tested and possibly refined, following stratigraphic soundings at representative sites.

The Survey (G. Palumbo)

A complete set of aerial photos at the scale 1:10,000 was available to the archaeologists, with the exception of a strip 2 km wide by 12 long, between coordinates 243E 164N and 245E 176N. New photos will be retrieved for this area and examined for the presence of archaeological features. On the basis of the aerial photos and survey conducted on the ground, 294 archaeological sites were located. This number, added to the 9 sites known from Glueck's explorations and 26 sites from Besançon's study of the az-Zarqā' river terraces in the 1980's, brings the total of the sites known in the area to 329. This increase in site number shows how much still needs to be recorded of Jordan's national heritage.

The sites known in the area from Glueck's study (1951) are presented in Table 1.

With the exception of an-Nimrah, they were all visited during this year's survey (Khirbat as-Sil was destroyed 10 years ago during some terracing of the az-Zarqā' river bank). 26 sites are known from Besançon and Hours survey of the az-Zarqā' basin and

as-Samrā' area (Besançon *et al.* 1984; Besançon and Hours 1985). They are mainly Paleolithic and Neolithic sites on alluvial terraces along the az-Zarqā' river. Table 2 correlates the site numbers as given by Besançon and Hours with those of the present survey (key: LP=Lower Paleolithic; MP=Middle Paleolithic; Keb=Kebaran; PPN=Pre-pottery Neolithic; UD= undetermined; the names and codes of the geologic formations containing the sites are those given by Besançon and Hours)

Of the 294 new sites located so far (275 of these were identified with the help of the aerial photos), most are cairns and tumuli on hill tops, but there are some major sites which need extensive explorations. Almost every single ridge and hilltop has one or more cairn, stone piles which often conceal a small cist tomb. Their common identification as "towers" is generally to be discarded. Only 2 out of several dozens of structures recorded so far can be certainly identified as towers.

69 sites were explored on the ground (11 known from previous surveys, 39 located with the help of the aerial photos, 19 located by intensive survey). Other 24 sites known from previous surveys and 236 identified on the aerial photos could not be visited during this fieldwork season. The sites so far recognized in the survey area can be classified

Table 1.

Site name	JR (*) site n.	Glueck site n. and reference
Jabal ar-Raḥīl	site 1	Glueck site 314; 1951:210-212
Khirbat aj-Jāmūs	site 2	Glueck site 315; 1951:211-212
Tall as-Sukhna	site 3	Glueck site 316; 1951:212
Khirbat al-Mak'ḥūl	site 4	Glueck site 312, called by him Khirbat al-Breitawi; 1951:209,212
Tall al-Bīrah	site 5	Glueck site 320; 1951:213-214
Khirbat al-Wad'ah	site 9	Glueck site 318; 1951:213
Khirbat Zuqm al-Ghurāb	site 10	Glueck site 317; 1951:212
an-Nimrah	site 11	Glueck site 319; 1951:213
Khirbat as-Sil	site 17	Glueck site 313; 1951:212).

* JR stands for Jabal ar-Raḥīl, site 1 of the survey; originally the survey was named from this site.

Table 2.

R n.	Besançon <i>et al</i> 1984: pages, site n.	Date	Geol. Formation
18	97, 131; site 124	LP	ad-Dawqara (Qf3)
19	98, 131; site 118	LP	al-Birah (Qf2)
20	98, 131; site 116	LP	al-Birah (Qf2)
21	98, 131; site 29	LP	al-Birah (Qf2)
22	99, 131; site 115	MP	as-Samrā' (Qf1)
23	110; site 32	UD	?
24	94; site 27	Keb.+PPN (?)	as-Sukhna (Qf0)
25	97, 131; site 31	LP	ad-Dawqara (Qf3)
26	94, 100, 131; site 30	LP, MP	surface
27	110; site 28	UD	?
28	110; site 17	UD	?
29	110; site 16	UD	?
30	100, 131; site 14	LP, MP	surface
31	110; site 15	UD	?
32	110; site 18	UD	?
33	97, 131; site 19	LP	ad-Dawqara (Qf3)
34	98, 131; site 106	LP	al-Birah (Qf2)
35	99, 131; site 107	MP	as-Samrā' (Qf1)
36	97, 131; site 110	LP	ad-Dawqara (Qf3)
37	98, 131; site 24	LP	al-Birah (Qf2)
38	97, 98, 131; site 22	LP	al-Birah (Qf2)
39	110; site 23	UD	?
40	97, 131; site 21	LP	ad-Dawqara (Qf3)
41	99, 131; site 13	MP	as-Samrā' (Qf1)
42	97, 98, 131; site 119	LP	al-Birah (Qf2)
254	99, 131; site 109	MP	as-Samrā' (Qf1)

as seen in Tables 3 and 4.

Periods at survey sites were recognized by identifying artifacts found on the surface. 1,786 pottery fragments were "read" in the field, and 946 of these were collected for further study. Particular attention was paid in our collection and sampling strategies, in order to avoid deflating the sites of their surface remains.

The breakdown by period of the diagnostic pottery "read" at the 40 sites which yielded this type of artifact is as follows (this calculation does not include the pottery collected at site 1, Jabal ar-Rahil; the percentages are calculated on a total of 1449, which excludes the undiagnostic pottery found at several sites) (see Table 5):

In very raw terms, this distribution re-

Table 3.

Settlements	Industrial/rural	“Military”	Cairns	Other structures
21 settlements (6%) 3 isolated buildings (1%)	1 mill 5 farms/hamlets (2%)	2 towers 3 forts (1%)	60 groups of cairns (18%) 108 isolated cairns (33%)	2 cemeteries 4 cave areas (1%) 37 stone circles (11%) 46 enclosures (14%) 26 unidentified structures (8%) 38 surface scatters (12%)
24 (7%)	6 (2%)	5 (1.5%)	168 (51%)	153 (46%)

(total is 356 and over 100% because some sites have more than one feature).

Table 4.

As regards the periods of occupation of the 69 sites explored this year, the following are represented:

Prehistoric	Bronze-Iron	Hell.-Byzantine	Islamic
5 Lower Pal. (7%) 5 Middle Pal. (7%) 3 Upper Pal. (4%) 6 Epipal. (9%) 5 PPN (7%) 1 Pottery Neol. (1%) 3 Chalcolithic (4%)	2 EB I (3%) 8 EB II (12%) 1 EB III (1%) 3 EB IV (4%) 1 MB (1%) 1 LB (1%) 9 Iron II (13%)	1 Hellenistic (1%) 17 Roman (25%) 20 Byzantine (29%)	6 Umayyad (9%) 3 Abbasid (4%) 20 Ayyubid/ Mamluk (29%)
28 (39%)	25 (35%)	38 (55%)	29 (42%)

Sites with unidentified flints or pottery only: 16 (23%)

Sites with structures but no artifacts: 5 (7%)

(Total is over 69 and 100% because some sites have more than one period of occupation)

Table 5.

Prehistoric	Bronze-Iron	Roman-Byzantine	Islamic
Pottery Neol.: 51(4%) Chalcolithic: 14(1%) Chal/EBI: 11(1%)	EB: 318 (22%) MB: 11 (1%) LB:38(3%) Iron II: 152 (10%) Iron: 4	Roman: 171 (12%) Rom.-Byz.: 68(5%) Byzantine: 291 (20%)	Umayyad 34 (2%) Abbasid: 3 Ayyubid/Mamluk: 198 (14%) Mamluk: 85 (6%)
76 (6%)	523 (36%)	530 (37%)	320 (22%)

Undetermined: 337

flects the intensity of human occupation in this region, with “peaks” in the Roman-Byzantine periods (37% of all the diagnostics), followed by the Early Bronze Age (22%), the Early and Middle Islamic periods (22%) and the Iron Age (13%).

This pattern of human presence in the az-Zarqā’ basin reflects similar situations found elsewhere in northern Jordan: prehistoric sites are generally obscured by later occupations or heavy colluvial deposits, or largely deflated. A series of wadi terraces along the river az-Zarqā’ were identified by Besançon and Hours (above). These terraces are dated by prehistoric artifacts found *in situ*. Lower Paleolithic Acheulean sites are quite common in the basin. Middle Paleolithic artifacts were found in bulldozer cuts in apparently sterile layers below EB II occupational remains at sites JR7 and JR79. Epipaleolithic pre-Natufian sites were also found as surface scatters, and their relatively common presence is suggestive of quite an intensive occupation during the Late Pleistocene. Chalcolithic sites are also relatively common. While no dolmen fields were found (large dolmen fields are found only a few kilometers downstream along the river az-Zarqā’), some Chalcolithic villages were located near the confluence of the river az-Zarqā’ and Wādi aḍ-Ḍulayl. Early Bronze Age, and especially EB II represents the first intensive “colonization” of the area. Over 20% of the sites have an Early Bronze Age component, which is quite often the dominant one. Of the 8 EB II sites, 3 are fortified settlements. The MB and LB periods are not well represented, a pattern very common east of the Jordan river. Iron Age II sites are quite common, and some of them are important settlements (such as site 45), forts (such as site 2), or large fortified towns, such as site 5.

Site 87 is of potential major importance since is a relatively short-lived site dated between the fifth and the third century BC.

Roman occupation is found at 25% of the sites, and Byzantine presence is clear at al-

most 30% of the sites explored this year. Roman presence is higher than in other regions of Jordan, but this is not a surprise, given the presence of Khirbat as-Samrā’ few kilometers to the east and of Jarash only 20 kilometers to the west. The intensive use of the land in the Byzantine period is also a pattern reflected in other locations in Jordan, especially in the north of the country. The scarce Umayyad presence might be due to a bias in the sample, but it is quite interesting to observe that many Byzantine sites do not seem to have a presence after the sixth and early seventh century. It is a surprise, instead, to note a sharp increase in the number of sites during the Ayyubid and Mamluk periods, which equals the number of the Byzantine sites. Some of these Middle Islamic sites are quite substantial, such as Khirbat al-Mak’hūl (site 4) or Khirbat Abū az-Zayghān (site 147). It is also possible, however, that what we call “Mamluk” pottery is a local manufacture of pottery which continued well into the Ottoman period, which appears to be under-represented in our sample. Following is a more detailed description of the results of the survey, by period.

Paleolithic to Chalcolithic Periods (G. Palumbo)

Settlement in the Paleolithic period seem to be strongly associated with the presence of permanent water supply in the az-Zarqā’ and aḍ-Ḍulayl rivers. Lower and Middle Paleolithic sites are a relatively common occurrence, but their stratigraphic sequence, well described by Besançon and Hours (1984; 1985) still needs to be tested. In several areas, especially in middle and lower slopes, and near outcrops of chert and flint nodules, the presence of debitage and stone tools is almost constant, making it difficult to distinguish between a general “background noise” of prehistoric artifacts and the presence of true “sites”. New sites identified during our survey include surface scatters

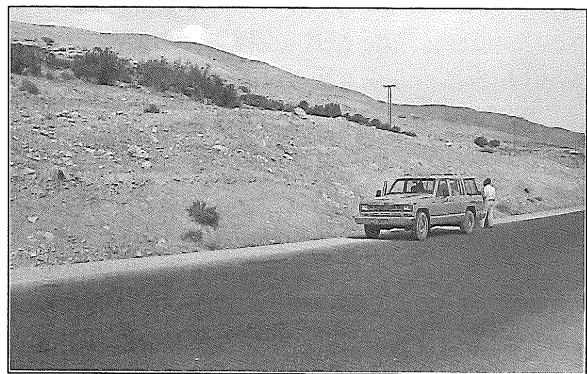
that “adjust” the original impression, derived from the fact that Besançon and Hours concentrated their survey on the banks of the az-Zarqā’, that the hills far from permanent water sources were uninhabited. Site 62 (JADIS 2516.033; grid ref. 251.98E 169.98N) is a vast Lower and Middle Paleolithic flint scatter at the confluence of two small wadis, while site 89 (JADIS 2517.053; grid ref. 254.40E 172.11N) is a Late Acheulean site on the top of a basalt plateau strewn with Paleolithic artifacts.

While Upper Paleolithic sites are not rare, several Epipaleolithic sites have been identified in the area, with quite distinct assemblages. Site 90 (JADIS 2517.054; grid ref. 254.24E 171.95N), is a potentially important site, since it could mark the location of a pre-Natufian settlement with circular structures and an extremely dense artifact concentration, of up to 160 artifacts per m². The assemblage is characterized by great quantities of burins, also on retouched flakes and truncations. Site 70 (JADIS 2417.047; grid ref. 245.28E 173.21N), on a slope overlooking the az-Zarqā’ from a distance of 1.5 km, is an Early Natufian site. Artifact density is high, and the assemblage includes many *helwan* lunates with sheen, indicating their use as sickles.

While traces of Pre-pottery Neolithic use of the region have been found, the only settlement identified so far was unfortunately destroyed 2 years before our survey. The site covered a large area (approximately 4 hectares) on a low spur at the confluence of Wādī az-Zarqā’ and aḍ-Ḍulayl (site 13, Zuqm at-Taht, JADIS 2417.027; grid ref. 249.56E 172.96N). Only stone artifacts were found at the site, which has been recently bulldozed, according to some informants, to make way to orchards. The same informants spoke about the presence of a large number of dry stone walls removed during the bulldozing; this, and the material found by us, point towards the presence, at this location, of a typical medium-sized PPNB settlement. It

should be remembered here that a vast PPNB site was discovered a few years ago by Hanbury-Tenison on the right bank of the az-Zarqā’ only 3.5 kilometers downstream from Tall al-Bīrah, a site at the edge of our survey area (Kharaysin -JADIS 2417.001- grid ref. 244.0E 179.3N; Hanbury-Tenison 1978: 155, site 27; Edwards and Thorpe 1986: 85-87).

One of the most important discoveries of this survey was certainly the identification of one of the largest Pottery Neolithic Yarmoukian sites in Jordan, extending for almost a kilometer on a wide terrace on the right bank of the river az-Zarqā’, and overlooking from the north the confluence of the az-Zarqā’ and aḍ-Ḍulayl rivers (Fig. 3). The site, named Wad‘ah from the general toponym of the area, was initially located observing a bulldozer cut along the recently paved road serving the farms and small villages on the north bank of the az-Zarqā’. The site (JR8, JADIS 2417.025; grid ref. 249.16E 173.14N) was originally over 8 hectares in size (extensive road works in the area have destroyed much of the site, and its original extension cannot be determined). Stone foundations and other features are visible in the road sections and agricultural terraces, while the entire area is covered with typical Yarmoukian chipped stone tools, including highly polished knives on tabular flint. Pottery sherds, while relatively rare, were also found, and they have very strict parallels with pottery found at other Yarmoukian sites

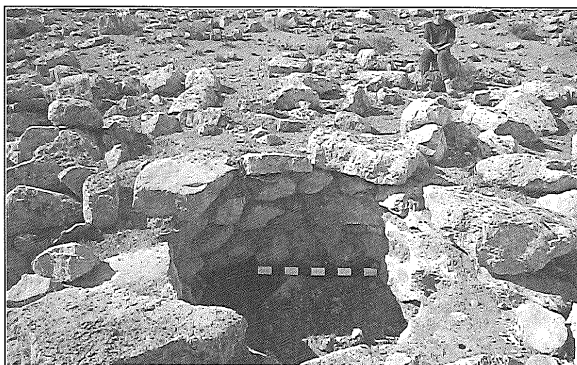


3: Al-Wad‘ah (site 8): bulldozer trench along modern road. View towards north-east.

(see pottery figures). Soundings at the site will be conducted in order to clarify the depth of the remains and the existence of a stratigraphic sequence within the Yarmoukian occupation of the site.

The Chalcolithic occupation does not seem to be represented by extensive villages such as those found in the Jordan Valley and the highlands of northern Jordan. The remains found at some of the sites, such as al-Ḥasiyya 1 (site 15, JADIS 2417.028; grid ref. 249.66E 173.23N), or site 80 (JADIS 2517.050; grid ref. 251.72E 172.82N) are quite limited in extent, and represent, perhaps, seasonal encampments. Given the nature of landscape use and occupation in the EB I and II periods in the same region, however, it cannot be excluded that a larger and more permanent site may have existed here during the fifth and early fourth millennium BC.

To conclude this brief summary of prehistoric occupation in the Upper az-Zarqā' basin, the presence of a number of stone structures should be mentioned, which might have originated in the Neolithic or Chalcolithic periods. One of them is a kite, probably the westernmost occurrence in Jordan of this type of hunting device (site 124, JADIS 2517.062; grid ref. 253.40E 171.75N), which is generally dated to the Neolithic. Other structures include stone circles, long walls, and cist tombs and tumuli, which could have originated in the Chalcolithic period (Fig. 4). While no dolmens are found in the survey area, this type of mortuary structures, as-



4. Site 54: cist tomb.

sociated with a large settlement, are found less than 5 km to the north, on a hill above the az-Zarqā' (Jabal al-Mutawwaq -JADIS 2418.011- grid ref. 244.2E 180.3N; Hanbury-Tenison 1987: 156-157, site 45). It is possible that this region marks the border between two different mortuary traditions in the Chalcolithic cultures of northeastern Jordan, with the prevailing, east of the az-Zarqā' river, of cist tombs and tumuli, possibly linked to a less permanent, more mobile element of the population.

Bronze and Iron Ages (G. Palumbo)

Several Chalcolithic sites may contain a late fourth millennium component, but only excavations will help in establishing a stratigraphic sequence for the transition between Chalcolithic and Early Bronze Age in this region. No clear EB I sites have been found in the survey area, and this might be due to a limited occupation, possibly mostly pastoral, of this region. Site 65 (JADIS 2417.042; grid ref. 247.24E 171.10N) could be one of these ephemeral "villages", or rather camps, located on a ridge, and probably frequented for a long period of time, since it seems to extend into the EB II, as confirmed from a type of rough pottery with basalt temper found in the ar-Raḥīl soundings in clear EB II contexts. While the "pastoral" component is still very visible during the EB II, the change in settlement patterns between EB I and II is stunning: not even during the Iron Age so many settlements populated the region as it happened during the EB II, and only during the Roman period the settlement density surpassed that achieved 30 centuries before.

The villages are all situated on hilltops or promontories, surrounded by enclosure walls or true fortifications: Jrayyah (site 6, JADIS 2516.011; grid ref. 251.24E 166.28N), Jebel ar-Raḥīl (site 1, JADIS 2417.022; grid ref. 249.62E 171.00N), as-Sukhna North (site 7; JADIS 2517.027; grid ref. 250.33E 171.86N) (Fig. 5), Site 79 (JADIS 2417.048;

grid ref. 247.37E 172.64N) (Fig. 6), Tall al-Bīrah (site 5; JADIS 2417.021; grid ref. 245.50E 175.06N) (Fig. 7) are all located along the *az-Zarqā'*, in defensible positions (with the exception of sites 7 and 79, which, however, were surrounded by fortifications or enclosures), and each in sight of at least one other site. This string of sites does not stop here, since the entire basin of the *az-Zarqā'*, from the 'Ammān Citadel to the confluence of the river in the Jordan (one of the largest EB sites found in Transjordan is located here, dominating the access from the Jordan to the *az-Zarqā'* valley: Tall Alla, or Tall Handaqūq south: JADIS 2117.032; grid ref. 210.85E 177.30N) is dotted with fortified EB II villages, some of considerable size, indicating a somewhat fragmented and unstable political condition. The soundings at ar-Raḥīl revealed relatively shallow deposits, and mainly EB II domestic occupations, while bulldozer cuts at sites 7 and 79 have shown over a meter of deposits with architectural remains of well preserved mud-



5. Site 7: bulldozer cut. The stone foundation of a structure and mudbrick remains are visible.

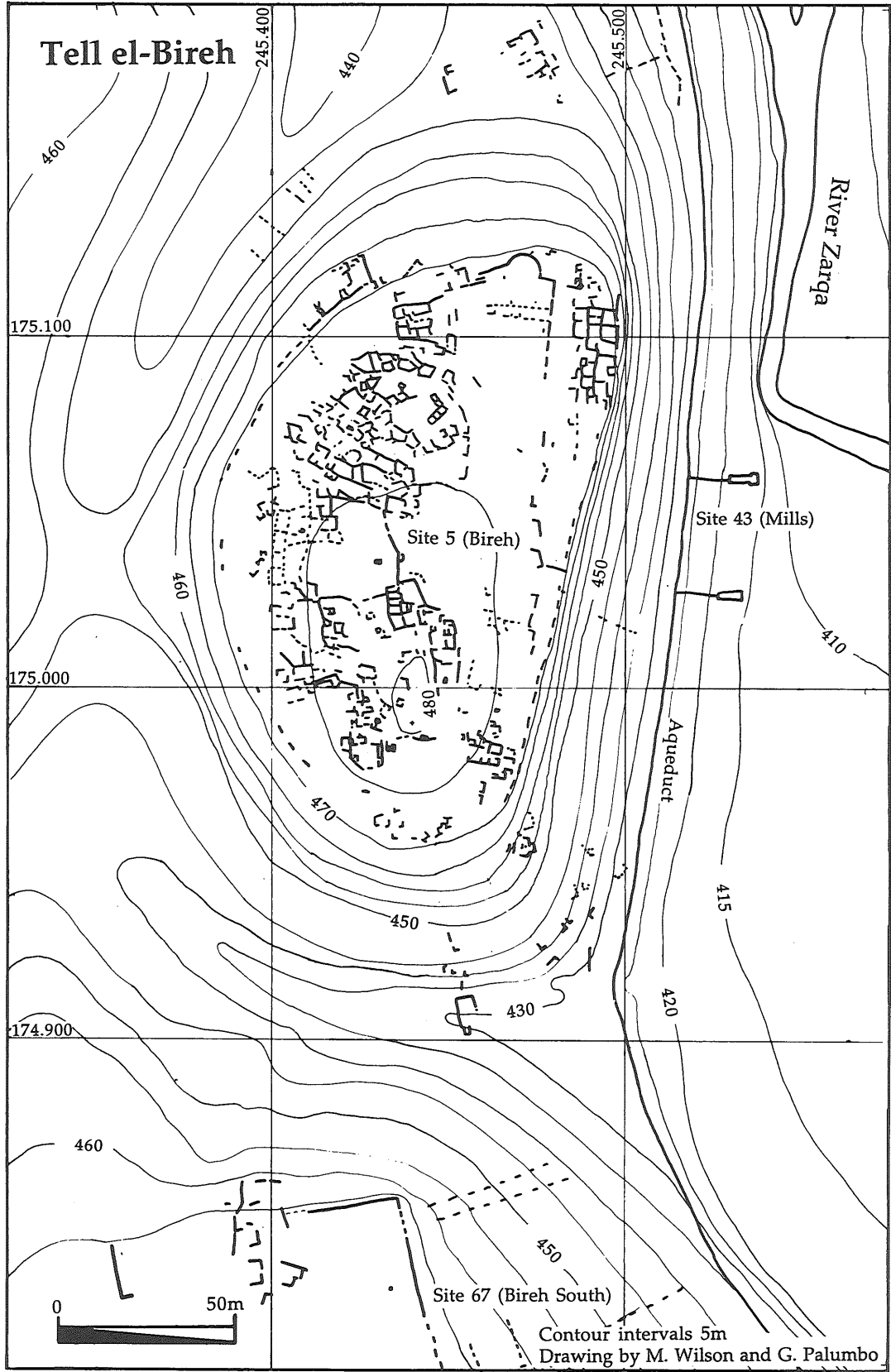


6: Site 79: EBII remains of mudbrick structures on stone foundations, visible in a bulldozer cut.

brick over stone foundations (at site 79 a wall is preserved for four courses of mudbricks above two courses of stone foundations). A microstratigraphic study conducted by Fouad Hourani on a series of layers sampled from the section exposed at as-Sukhna North (site 7), presented below, has revealed a series of uses associated with outdoor activities, alternating with phases of abandonment. At the same site a stamped jar neck with spiral motifs paralleled at other sites of the same period in Northern Jordan (Khirbat *az-Zarāqūn*) as well as on the Golan and Upper Galilee was found, being the easternmost occurrence of stamp seals identified in Jordan so far. Of all these sites, only Jrayyah (site 6) shows the presence of EB III material, which is very rare elsewhere in the survey area, reflecting a trend common throughout the highlands of Jordan. EB IV sites are slightly more numerous, and occupations both at Jrayyah and Jabal ar-Raḥīl may indicate the presence of a sedentary element in an otherwise predominantly pastoral and mobile environment.

The presence of only one MB and one LB site is not a complete surprise, but the progress of the survey may fill this gap, as it may fill also the surprisingly lack of Iron I sites, especially considering the consistent presence of Iron II villages, forts, and fortified settlements.

The MB IIB site of Tall as-Sukhna (site 3) is partially destroyed by bulldozing, but the MB deposits should still be partially preserved below the cultivated fields and remaining tall area. The newly discovered site of aṭ-Ṭuwayfiriya (site 87, JADIS 2417.054; grid ref. 245.80E 175.42N) is particularly important, because it is one of the few sites with a LB component located so far in north-eastern Jordan. The site, located on a terrace above the *az-Zarqā'* river, is unfortunately reduced to one large structure, visible in bulldozer sections created when the hill was almost flattened to widen some agricultural fields. The presence of some relatively re-



7. Topographic plan of Tall al-Birāh.

cent tombs of a Bedouin cemetery stopped the bulldozers. The section today shows approximately 2 m of archaeological deposits, and a 4-courses wall, visible mostly in the east section (Fig. 8). In future campaigns soundings will be conducted at the site to clarify the existence of a MB-LB or LB-Iron I transition.

While the two main Iron II sites of the area, Khirbat aj-Jāmūs and Tall al-Bīrah, were known since the explorations of Glueck (1951:211-214, sites 315 and 320), new sites have been added by the surface survey: site 45, for example, (JADIS 2516.016; grid ref. 250.88E 165.25N) is a large village, not fortified, unfortunately threatened by the expansion of the city of az-Zarqā'. The site lies on a flat promontory on the left bank of the az-Zarqā' river.

Khirbat aj-Jāmūs (site 2, JADIS 2417.007, grid ref. 248.84E 171.20N) (Fig. 9), now largely deflated and obscured by bulldozing, agricultural works, and the construction of the az-Zarqā'-Jarash highway, is a large tower surrounded by a perimeter wall. In the 1978 aerial photos the entire structure appears virtually intact, with many later stone circles and animal pens built in and around it (Fig. 9). While certainly originated in the Iron Age, the site was also frequented during Roman, Byzantine, and Islamic periods.

The main Iron Age II site of this region is certainly Tall al-Bīrah (already named for its EB occupation, see Fig. 7). Tall al-Bīrah is



8. Aṭ-Ṭuwayfiriya (site 87): remains of structures in a bulldozer cut.

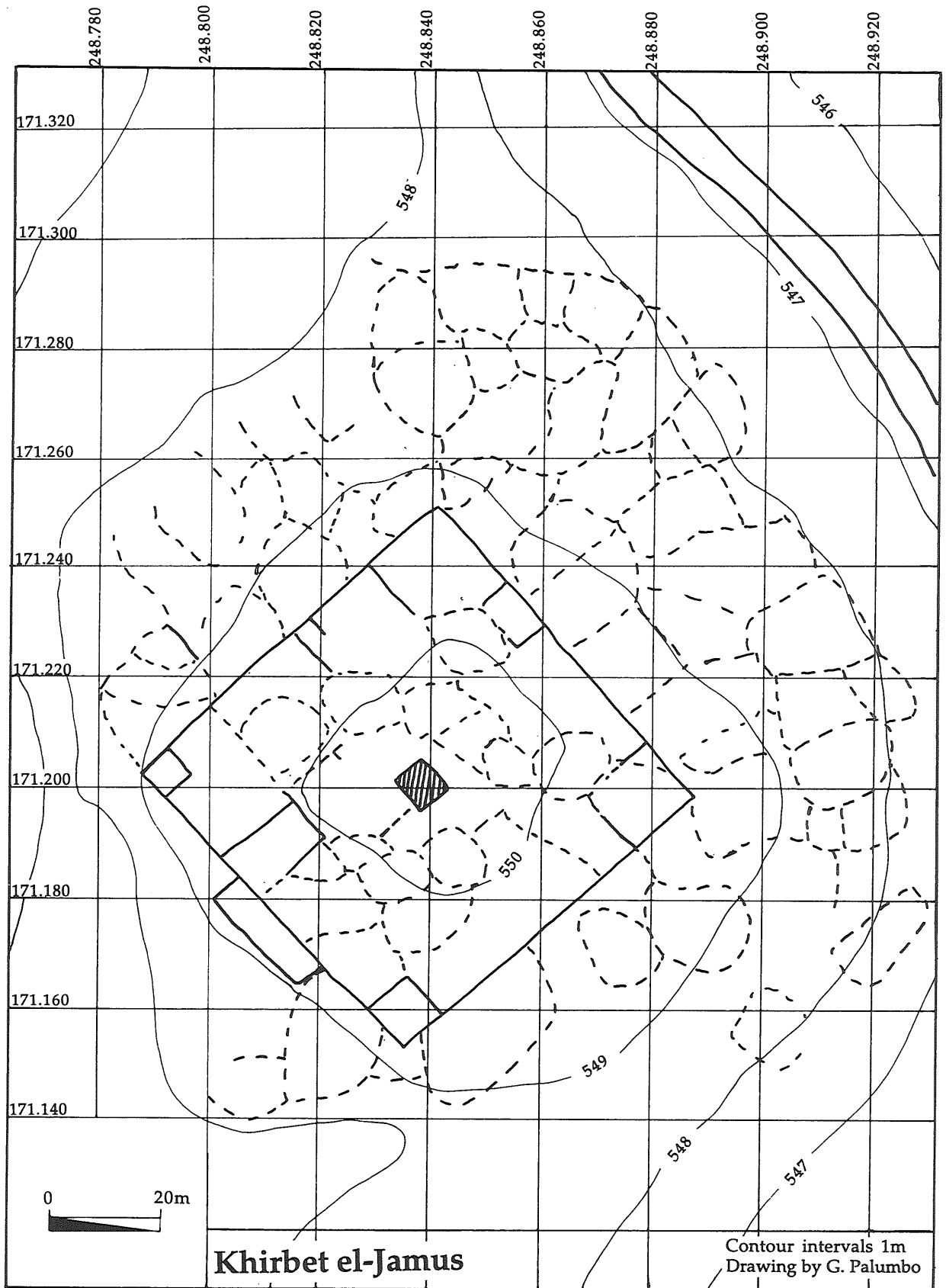
the only true "tall" site found in this part of the Upper az-Zarqā' valley. The Iron Age remains are impressive, consisting of massive fortifications built in huge basalt blocks, up to 2.5 m in length. The fortifications are especially well preserved in the north-east side of the hill, where a semi-circular tower also exists. On the hilltop, later remains, mostly Byzantine and Islamic, obscure the earlier remains. Clandestine excavations, up to 4 m in depth, have reached Iron Age layers, judging from the large amount of typical Iron Age jar sherds lying on the ground.

Tall al-Bīrah must have played an important role in the control of communication routes between the Jordan Valley and the eastern fringes of the Ammonite kingdom, and the fort of Khirbat aj-Jāmūs, only 5 km to the south-east, and dominating the wide bend of the az-Zarqā', must have supported al-Bīrah in its role of "sentinel" along the river.

Hellenistic, Roman, and Byzantine Periods (M. Munzi)

The Hellenistic period, even if possibly under-represented because of pottery identification problems, represents the lowest point in the occupation of the area. Already at the end of the Hellenistic period and at the beginning of Roman influence, and, later domination (second-first century BC), with the introduction of *sigillata ware*, this situation changes. This growth, also found in other regions of Jordan (Ibach 1987:168; MacDonald 1988:190; Parker 1992) is represented by 6 sites. Of these, three were already occupied during the Iron Age II, possibly indicating a continuity still not identified in the field.

The intensification of settlement is even better represented during the Roman Imperial period (first to third century AD). The number of sites which can be dated to this phase is 17 (25% of all datable sites: sites 1 (?), 2, 3, 5, 9, 10, 12, 46, 47, 49, 66, 67, 68,



9. Topographic plan of Khirbat aj-Jāmūs.

80, 82, 84, 147), with a growth coefficient of 2.83 compared to the Early Roman sites, which all survive in the Late Roman period. In the context of a rural landscape virtually unchanged, another slight increment can be observed during the Byzantine period, when there are 20 sites in the region that can be dated to the period (29% of all datable sites: sites 2, 3, 5, 8, 9, 10, 12?, 15?, 46, 47, 49, 50, 51, 55, 67, 68, 80, 84, 147, 161?), 14 of which were already occupied during the Roman period, and with a growth coefficient of 1.17 from the previous period. During this period, and in particular during the V and VI c. AD, rural occupation reaches its all-time maximum, as it happens almost everywhere in the Byzantine East (Cameron 1993:154, 162, 177-182).

The similarity in the rural landscape between the Roman and Byzantine period is also found in the continuity of the settlement patterns between the two periods. The majority of the sites (11 Roman, and 15 Byzantine) are located on the lower slopes of the hills overlooking the az-Zarqā' river, while only one is found along Wādī al-Ḥasiyya. All are within 1 km from the river. The differences, very subtle, but perhaps indicative of a change, are found with the sites located at more than 1 km distance from the az-Zarqā'. During the Roman period 4 sites (2, 66, 82, 84) are found on the hills at a distance between 1 and 2 km from the river az-Zarqā', while only one site is a "mountain top" site (147, at 747m as), and at only a little over 2 km distance from the river. During the Byzantine period, instead, only 2 sites are in the "intermediate" area (between 1 and 2 km from the river), while the mountain sites are now 3 (55, 147, 161), at around 2 km from the river. If this increase of the number of "mountain top" sites from the Roman to the Byzantine period is confirmed by future research, an explanation could be found in the needs for defense of the population towards the end of the Byzantine period.

The settlement patterns of the Roman and

Byzantine periods, then, is strongly associated with the topography of the area and the presence of the az-Zarqā' river. It is possible that, during those periods, cultivation was limited to the valley floor and lower slopes of the hills along the wadis az-Zarqā' and aḍ-Ḍulayl. This landscape is very different from other regions, such as Ḥisbān (Ibach 1987: 174) and Wādī al-Ḥasa (Mac Donald 1988: 232, 248), where settlements were mostly located on plateaus, a feature almost totally missing in this area.

The Roman and Byzantine sites are almost all relatively small, and without particularly interesting or abundant pottery associated with the ruins. The exception is found at sites 5, 9, and 67 (sites 5 and 9 already identified by Glueck 1939: 213, sites 320 and 318, respectively), which stand out for their dimensions and conservation of structures. Sites 5 (already described for the Bronze and Iron Age occupations) and 67 were probably related, and dominate from two high hills a meander of the az-Zarqā' (Fig. 10). Site 5, Khirbat al-Birah, is located on an almost completely isolated hill. It covers an area of almost 6 hectares, and its sequence of occupation is almost completely uninterrupted from the Early Bronze Age to the Islamic periods. The fortified village, which still shows part of the massive fortifications, could be dated at least partially to the Iron Age II, but it was almost certainly renewed and reinforced during the long Ro-



10. Al-Birah south (site 67): Roman camp and barracks. Tall al-Birah (site 5) is visible in the background.

man and Byzantine settlement. The general fortifications are still quite visible, built in megalithic technique using huge basalt blocks, over 2.5 m in length, and provided with circular towers (one, on its west side, has a diameter of 14.5 m). On its north side one possible gate is visible. Several buildings are recognizable within the fortifications. One of them, with an apse 9.7 m in diameter, could be a church. In another sector of the village a limestone block with simple cornice could be a small altar (Fig. 11). No inscriptions are visible on the block. Site 67 (JADIS 2417.044; grid ref. 245.46E 174.75N), located on a promontory 100m south of Tall al-Bīrah, has a much smaller size, and could be interpreted as a small military camp, probably for a garrison based at Tall al-Bīrah. The site is characterized by two buildings, well separated, on a north-south axis, that can be possibly interpreted as barracks. Their dimensions are close to a round 100 by 250 roman feet. The northernmost is directly in sight of Tall al-Bīrah, and has a dimension of 74.50 m (252 feet) north-south, by 27.50 (93 feet) east-west (see Fig. 10). There are no internal walls, but a single, large cistern towards the northern edge of the promontory. The second structure, few dozen meters to the south, and on the same general alignment, could only be measured on its length: 28.20 m (96 feet), while the width could not be determined. Three rooms, little more than 6 m wide, and perhaps a court are still visible, while the



11. Tall al-Bīrah (site 5): small altar.

wall are between 0.6m (2 feet) and 0.9m (3 feet) thick. In the area immediately to the west, three square structures, possibly towers, are aligned. Their sides are between 5 and 6 m in length.

The second village is site 9, Khirbat al-Wad‘ah (JADIS 2417.005; grid ref. 248.96E 173.56N). It is located on a gradual slope above the river az-Zarqā’, at about 400 m from the river, and covers an area of approximately 7 hectares. The site was probably never fortified. There are several buildings, however, that were certainly monumental, perhaps performing a public function, such as for example a 60m long structure which dominates the village from the eastern hill (an acropolis?). The presence of monumental buildings is also testified by the discovery of several architectural fragments, unfortunately removed by local treasure hunters after our visit (Fig. 12). To avoid its disappearance, a fragment of a basalt door, with bas-relief decoration, has been retrieved and documented. An inscription, perhaps in pre-Islamic Arabic, could indicate the presence at the site of Arab *foederati* (see below). The village shows the presence of a number of private structures, and numerous cisterns. It seems that each house had its own cistern, or was built above or besides a cave.

Other two sites, 2 and 147, are characterized by defensive structures. Site 2, Khirbat aj-Jāmūs, already identified by Glueck (1939: 211-212, site 315) is a fort, almost square in plan, originally built during the



12. Khirbat al-Wad‘ah (site 9): architectural element.

Iron Age II (see coordinates above), and situated in the valley floor. Traces of late Hellenistic to Umayyad pottery may indicate that the site continued to be frequented during those periods, and that perhaps even its function did not change.

The second site (147), Khirbat Abū az-Zighān (JADIS 2416.001; grid ref. 247.88E 168.60N), is located on a high hill dominating the az-Zarqā' valley, and it is characterized by an articulated complex of structures, with a central structure, roughly square in plan, in well-built limestone blocks. The presence of Iron Age, Roman, and Byzantine pottery, together with a prevailing presence of Mamluk and later pottery (see below) witnesses the use of the site since at least the eighth century BC. Some of the structures still visible could be certainly linked to the pre-Islamic occupation of the site.

The trend observed in the increasing number of sites between the end of the Hellenistic period and the Late Roman and Byzantine periods is a consequence of the political and economic stability and the widening of the trade relations following the conquest of Syria and Judaea and the organization of the Decapolis by Pompeus in 64-63 BC.

This area of the Wādī az-Zarqā' was probably part of the territory of Gerasa, situated at about 20 km to the northwest. The border between the territory of Gerasa and Philadelphia ran along the Jabbok river, the ancient name of the az-Zarqā', according to Eusebius (*Onomasticon*. 102.21), or perhaps further south as highlighted by the IX milestone of the road Gerasa-Philadelphia (Avi-Yonah 1966: 175-177; on the milestone see Thomsen 1917: 63 n. 204). The agricultural production of this region, therefore, must have found its market into the important metropolis, in continuous expansion until the Severian period (Browning 1982: 36-52; Seigne 1992; Bejor 1993: 564-566). The region, close to but not on the front line of the *limes arabicus*, does not seem to have been provided with defenses during the Roman

and Byzantine rule. The few sites with defenses identified so far seem to have inherited these from the Iron Age period. The rural landscape, instead, was characterized by a number of small centers, around few larger villages. The latter could have had a status of *metrokomía*, in analogy with the Syrian system (Tchalenko 1953: 377-403; Bowersock 1991: 427-430; Kaplan 1992: 89-134). This landscape of farms, hamlets, and villages was not eliminated by the Arab conquest. This conquest was preceded by an increasing presence of Arab *foederati* since the fourth century AD (Parker 1986: 143-147; Shahid 1984a: 62-63, 160-161; Shahid 1984b: 500-503), which does not seem to have had a negative influence on the population growth of the area. As we will see (Islamic periods, below), the rural landscape lost importance along with the strong decline of the nearby urban centers.

Islamic Periods (A. Peruzzetto)

The Islamic period presents in the az-Zarqā' Valley common problems with other regions of Transjordan. The survey revealed fewer sites of Umayyad date than those of the Byzantine period. These are eleven: no. 2-5, 9, 44, 50, 51, 67, 68, 147. Unfortunately this datum is still temporary for the scarce quantity of pottery of the Umayyad period found during the survey which, however, certifies the presence of settlements in the valley in this phase.

The Abbasid period is equally problematic for the almost complete absence of diagnostic pottery. The continuity of ware tradition between Late Umayyad and Early Abbasid has been recognized in recent studies of Early Islamic pottery from excavation in southern (Aqaba: Whitcomb 1989: 273-275) and central Jordan (Muwaqqar: Najjar 1989: 311-312).

For this reason at present the extent of the Abbasid settlement in the valley has not been ascertained.

By contrast the later Islamic periods are well represented in the recovered material as in other parts of Jordan (King *et al.* 1987: 439-459; Mabry and Palumbo 1988: 275-305).

21 sites have been recorded: no. 1, 2, 4, 5, 9, 10, 12, 16, 43, 44, 46, 49-51, 55, 60, 67, 68, 70, 147, 161.

It is noted that there is similarity of ware and decoration between Ayyubid/Mamluk and Ottoman pottery at this moment of the research. The later sites are located near or upon earlier structures, often overlaying a part of the area of the old settlement, most probably as a result of convenience for building materials, existing water supplies, and resources (more evident in sites no. 2, 5, 9, 147).

One of the well preserved sites, characterized by an unbroken occupation in all the Islamic phases (based on the recovered material), is Khirbat al-Mak'hūl (JR4, JADIS 2516.005; grid ref. 251.62E 169.60N), situated on a hill top south of as-Sukhna (Fig. 13).

The settlement, however visible, consists of two concentric rows of one-room houses, built one against the other, arranged in an oval shape which turn toward an inner courtyard (Fig. 14). The outer wall of these rooms, characterized by different shapes and dimension, appears to be the curtain wall of the complex. To date no openings have been documented towards the outside, while each "room" has a door or an opening towards the "courtyard" (Fig. 15). Outside of the central court, to the east, there is another range of rooms.

In the center of the court there is an L-shaped arrangement divided into five rooms. In the same court there are cisterns for the water supply of the settlement. The extraordinary state of preservation of the site and its life span are an important element for the establishment of a stratigraphic sequence for the Middle and Late Islamic periods of northeastern Jordan. In future campaigns the

survey of al-Mak'hūl will be completed, and soundings will be conducted to establish its chronological sequence. The documentation of this unique example of rural Islamic settlement will possibly help to protect it.

The second significant late Islamic site is Khirbat Abū Zeighan (no.147), in which an earlier occupation than Khirbat Mak'hul, from the Iron to the Ottoman period, with an apparent lack in the Early Islamic phase, has been documented. A description of this site is in the Roman/Byzantine report of this survey.

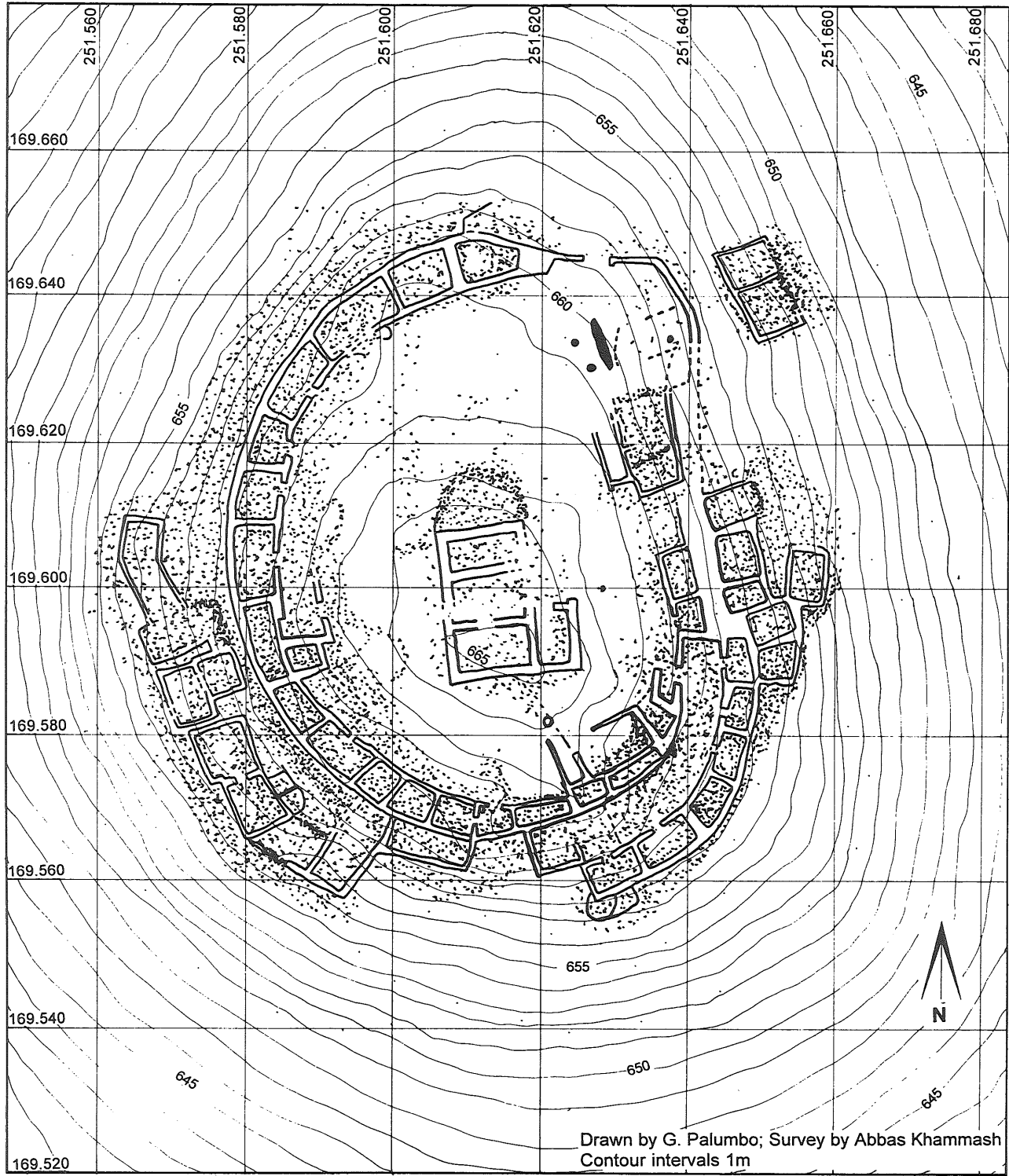
Soundings at Jabal ar-Raḥīl

(G. Palumbo and S. Collins)

Jabal ar-Raḥīl (site JR1) is located at Palestine grid coordinates 249.69E 171.00N (JADIS 2417.022). The site was recorded for the first time by Glueck in 1935 (1939: 210-212, site 314), but was not visited again by other scholars until 1988, when a surface collection was conducted there by Palumbo during a survey of EBIV sites in Jordan. The site is located on a high hilltop west of the village of as-Sukhna, at an elevation of 647 m asl. It is covered by an extensive mass of ruins (Fig. 16). Many walls and structures belong to a Mamluk village, concentrated especially on the north-west slopes of the site, but the main periods of occupation were EB II and EB IV. The project had the aim to clarify the relations between the EB II and the EB IV occupations, and the depth of the archaeological deposit. In order to reach these aims, three soundings were opened in different areas of the site. Before the soundings, however, an intensive surface collection was conducted in several areas, in order to understand possible variations in the distribution of artifacts and periods of occupation across the site.

The collection, as well as the soundings, were conducted in controlled areas according to Palestine grid locations, verified during the preparation of the 1:500 topographic plan of the site. 10x10 m squares

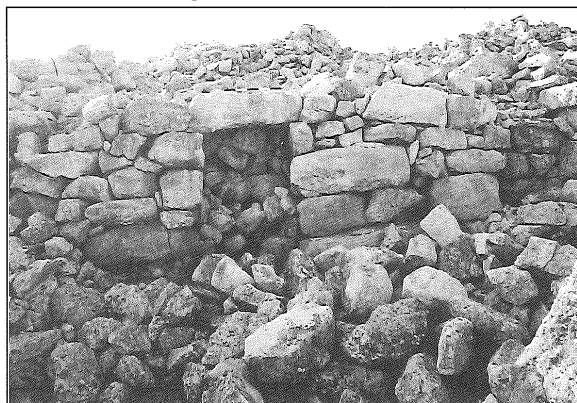
Khirbat al-Mak'hūl



13. Topographic plan of Khirbat al-Mak'hūl.



14. Khirbat al-Mak'hul. (site 4): aerial view of the ruins, looking east.



15. Khirbat al-Mak'hul. (site 4): particular of a ruined house on the hilltop.

are defined by two couples of numbers, being the fourth and fifth digit of the East and North Palestine grid coordinates, respectively. These two numbers identify the southwestern corner of each square. Square 62-92, for example, is located between Palestine grid coordinates 249.62 and 249.63 East and coordinates 170.92 and 170.93 North. Each 5x5 m excavation unit is identified by its relative position within a 10x10 m square, according to the four quadrants: NE, SE, SW, and NW. Total surface collections were conducted at twenty 10 x10 m squares (totaling a 2,000 m² area):

65-88 / 64-89 / 60-90 / 62-90 / 61-91 / 63-91 / 60-92 / 62-92 (square and robber's spoil heap) / 60-93 / 61-93 / 62-93 (robber's spoil heap) / 63-93 (square and robber's spoil heap) / 56-98 / 58-98 / 56-99 / 57-99 / 59-99 / 57-00 / 59-00 / 56-01 / 58-01 (Fig. 17)

A total of 7608 sherds for a total weight of 48.65 kg were collected in the squares. Of

the 251 diagnostics found, 117 are EB II, 99 EBIV, and 35 Mamluk. The fact has to be mentioned, however, that 40 EB II diagnostics come from one of the robber's spoil heap, in 62-92, where Trench 2 was eventually opened (below). Flints were also collected in each square, for a total weight of 29.8 kg. The soundings had the following dimensions and location:

Trench 1: 5x3 m near topographic point 16

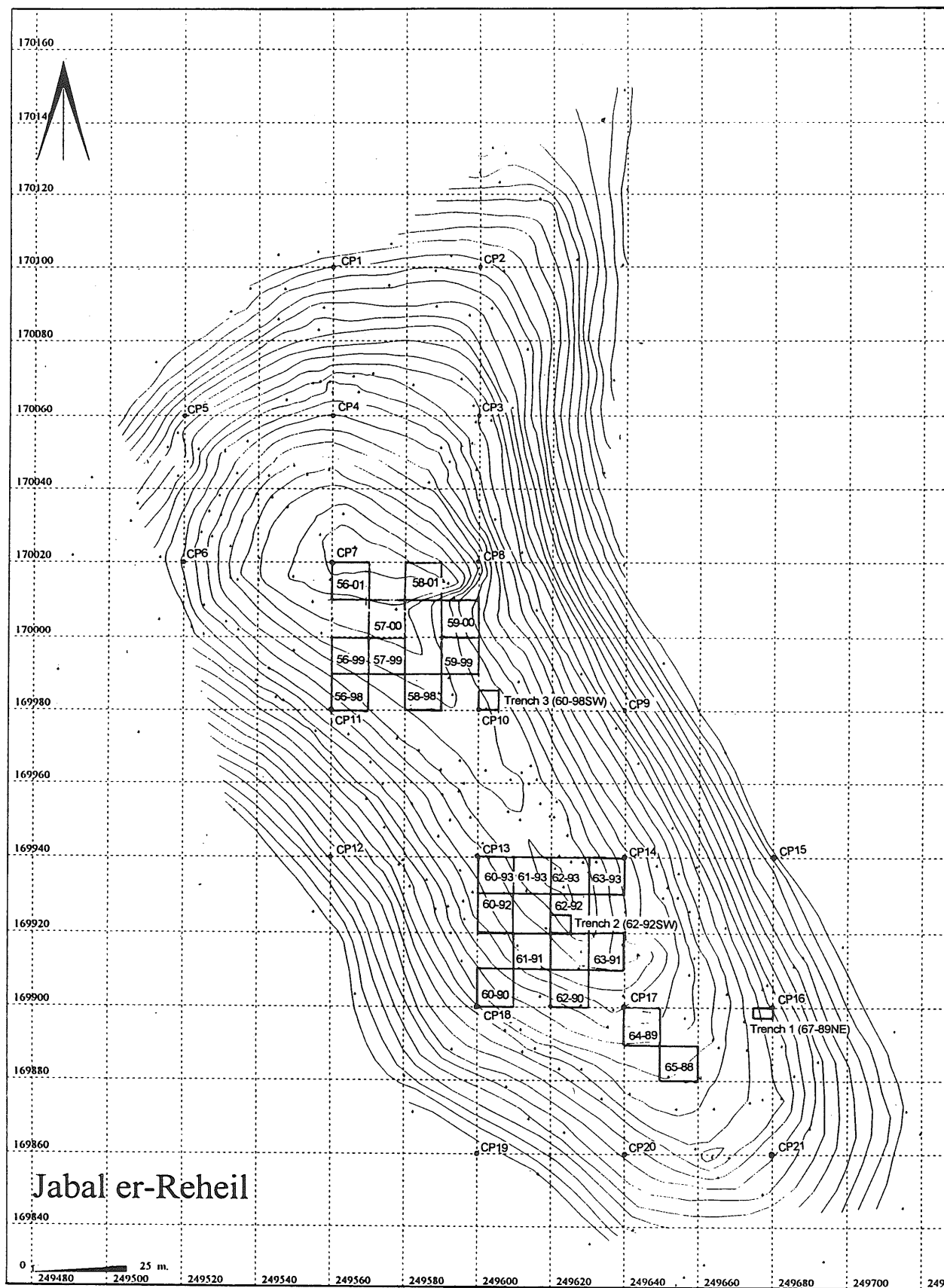
Trench 2: 4x3 m in 62-92 SW

Trench 3: 4x4 m in 60-98 SW

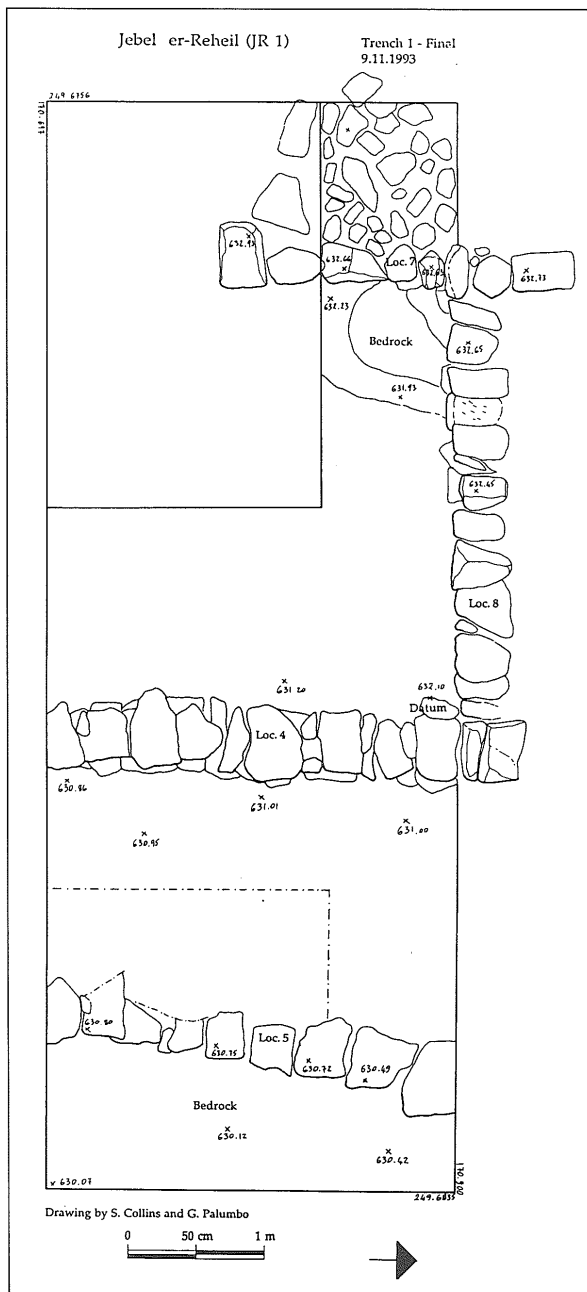
Trench 1 (Figs. 18-20): This trench was opened near topographic point 16, across a possible fortification wall, clearly seen on the surface along the eastern slope of the hill. The deposits here resulted to be between 30 cm and 1 m deep, with two parallel walls, approximately 2 m apart, resting on bedrock and without traces of foundation trenches. The lower wall (locus 5) was only one course high and one row wide, while the upper one (locus 4) was only one row wide, but three to five courses high. The fact that similar deposits of stone chips and packed earth were found between the two walls and above the upper wall, as well as the fact that no internal face could be distinguished in the upper wall suggested the fact that a third wall could be located uphill. An extension was then opened, 1 m wide and 3 m long, and a third wall was located 3 m above wall 4 (locus 7). A perpendicular wall, only one row wide, was also found connecting the two upper walls, locus 4 and locus 7. Unfortunately this upper wall also was only one row of stones wide and 4-5 courses high, founded on bedrock. It is then possible that a series of terrace walls exists on this side of the hill, rather than a well-defined fortification. While the perpendicular wall may suggest a casemate wall type of structure, we feel that in this case its function was to reinforce a series of terrace walls along this steep slope. This problem will have to be clarified with a longer and wider trench in the next season of ex-



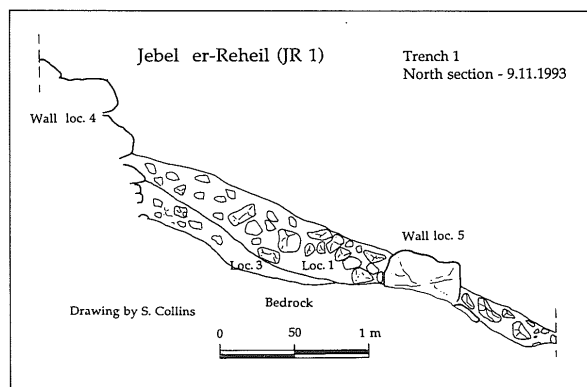
16. Topographic plan of Jabal ar-Rahil.



17. Jabal ar-Rahil: location of the intensive collections (IC) and soundings (TR).



18. Jabal ar-Rahil: Top plan of trench 1.



19. Jabal ar-Rahil: North section of trench 1.



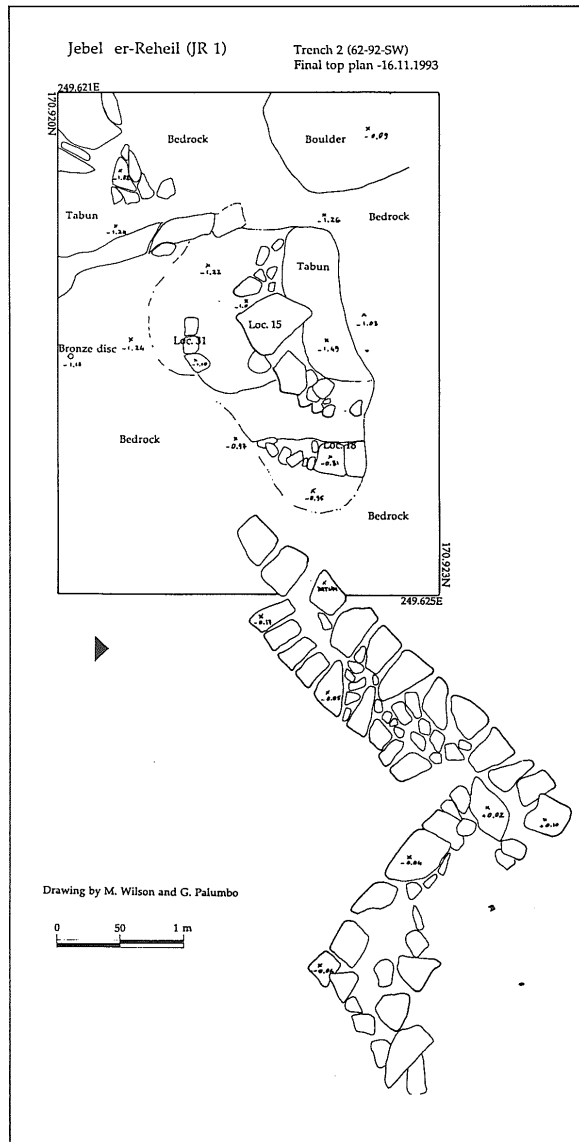
20. Jabal ar-Rahil (site 1): the EB IV enclosure wall in trench 1, looking west.

cavations.

A total of 715 pottery sherds were found, 110 of which were diagnostics. Of these, 35 are dated to EB II, 74 to EB IV, and 1 to the Mamluk period. Every single locus, from surface to bedrock showed a marked predominance of EB IV material, which helps in dating the construction of the fortifications or terracing on this side of the Khirbat to the late third millennium BC.

Trench 2 (Figs. 21-23): This trench, in square 62-92 SW, was excavated in order to understand the stratigraphic sequence of a 1 m deep robber's trench, which had exposed a large quantity of sherds and mudbricks. The trench was cleaned and intact deposits were found. Two major strata were located: the upper one, associated with a wall (locus 1) visible on the surface, should be dated to EB IV. The lower stratum, resting on bedrock, is to be dated to EB II. In EB II this area was probably a courtyard, partially cut into bedrock: a wall was found in the east balk, sitting directly on bedrock, two ovens were located near the north and the west balk, and a refuse pit full of pottery sherds and ashes, dug in a Cretaceous limestone bedrock with sea orchids fossils. Ashes from the ovens (rich in botanical remains) and from the pit were taken for analysis.

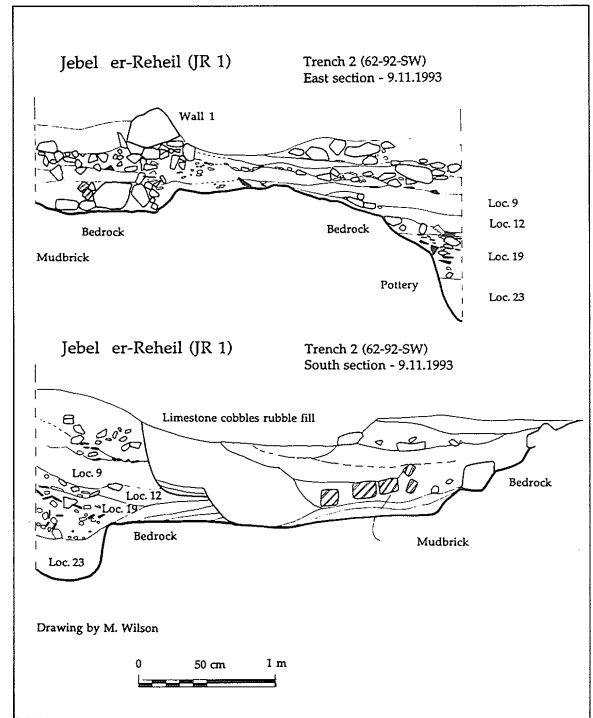
A total of 1035 pottery sherds were found during the excavations of trench 2. Of these, 119 are diagnostics (92 EB II, 26 EB IV, and 1 Mamluk). With the exception of the up-



21. Jabal ar-Raḥīl: Top plan of trench 2.

permost layers, almost all the loci were exclusively EB II. Besides pottery, basalt, and chipped stone artifacts, a copper disc was found in a clear EB II context. The disc (reg. no. JR1-93-2-1) is 7.68 cm in diameter, 1.29 cm thick, and weighs 347.96 g. The disc is possibly a small copper ingot. The analysis of its chemical composition will be done, in order to identify its origin.

Trench 3 (Figs. 24 and 25): This trench is located near topographic point 10 in square 60-98 SW. Two wall lines (loci 3, to the south, and 5, to the west) were visible at the present ground level in the southern half of the square. They meet, forming a right angle

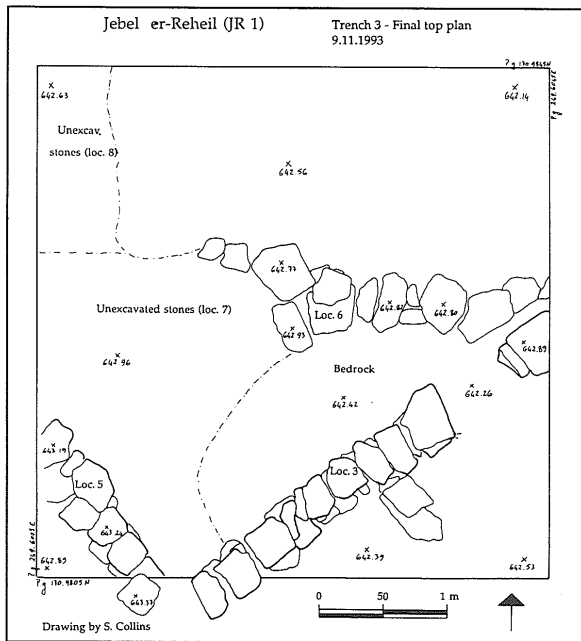


22. Jabal ar-Raḥīl: East and South sections of trench 2.



23. Jabal ar-Raḥīl (site 1): view of trench 2, looking to the southwest.

just outside the south balk of the square. The sounding here had the purpose to clarify the depth of the deposit and the relationship of the wall structure with its archaeological deposit. Here, bedrock was found only 30 cm below topsoil. The walls visible on the surface were both founded on bedrock. There was no evidence of a foundation trench. Both walls are only one row wide and preserved for two to three courses. They are both built with large boulders and some smaller “fillers”. An opening through the southern wall (locus 3) was revealed after the removal of several blocking stones (locus



24. Jabal ar-Rahil: Top plan of trench 3.



25. Jabal ar-Rahil (site 1): view of trench 3, looking east.

13), which, unlike wall locus 3, were not positioned on bedrock. A possible floor surface associated with these walls and above bedrock was revealed in the excavated area to the north of wall 3, and in the entranceway, beneath the blocking stones. This floor surface was covered by a mass of fallen stones. No other deposits within the square seemed to be indicative of any evidence of habitation. The angle of collapse of the fallen stones suggest that they were originally part of walls 3 and 5. Time constraints did not allow the expansion of the trench towards the north and the east, where the rest of the structure is still buried. As for the date, it is possible that the original occupation is to be dat-

ed to EB II, and that the large quantity of EBIV sherds found, even at lower levels, represents a reoccupation of the EB II structure.

426 pottery sherds were found in the trench. Of these, only 32 are diagnostic (7 EB II, 25 EB IV). One of the diagnostics is an almost complete EB II juglet, found on bedrock south of wall 3.

Discussion

A study of the EB II and EB IV wares from the surface collection and the soundings is in progress. As a preliminary indication, EB II wares are mostly plain, with limestone and basalt grit tempers (basalt is available at a short distance from the site, approximately one kilometer to the north). In trench 2 large quantities of cooking pot sherds were also found. EB IV wares can be divided into three major classes: gray (very high fired), cream/brown (medium/high fired), and red (low/medium fired). The first and the third are quite typical of the EB IV complex of the 'Ammān-az-Zarqā' area, as already recognized by Palumbo (1991) and Palumbo and Peterman (1993). The analysis of these classes of pottery from a stratified context will be useful to understand differences in pottery production and possibly goods circulation. Further excavations are however needed, in order to find more and better EB IV stratified deposits. As a matter of fact, all three trenches failed to reveal clear EB IV contexts: the fill in trench 1, while possibly EB IV in date, is apparently deliberate, the clandestine excavation in trench 2 severely disturbed the uppermost layers, leaving intact only the EB II deposits on bedrock, and the shallow deposit in trench 3 did not help in separating occupational layers, which are possibly to be dated to EB II, considering the presence of an almost intact juglet close to bedrock.

During fieldwork, robbing operations were conducted on the site. Another trench was dug by treasure hunters near trench 2.

The section exposed by the robbers, over one meter high, was cleaned and drawn. A wall built of relatively small stones was exposed on the west side of the trench (called "Trench 4"). The wall was faced with daub, which also showed impressions of reeds and small tree branches (Fig. 26).

Micromorphological Analysis of Site 7 (as-Sukhna North) (F. Hourani)

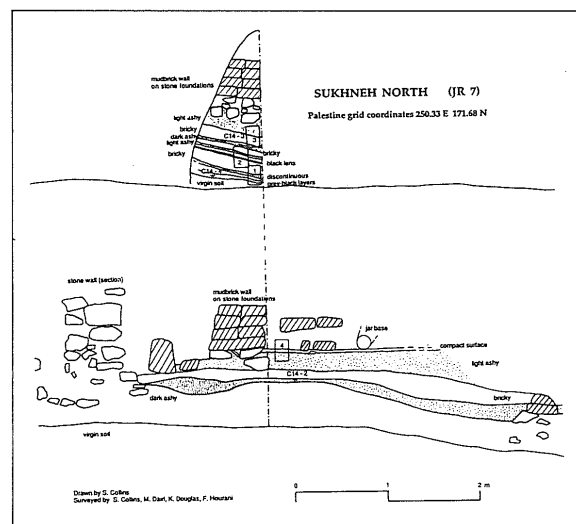
A test of four undisturbed soil samples were collected from site 7 (as-Sukhna North), from an exposed section of the tall (Fig. 27). The section is visible along the paved road immediately to the north of the village of as-Sukhna. The maximum depth of occupation is approximately 2 m, and structural remains are visible, consisting of mudbrick walls on stone foundations. Several layers of what appear to be floors separated by sediment are also visible in the section. The site seems to be contained within



26. Jabal ar-Rahil (site 1): Trench 4, daub on wall face.

the EB II period (29th-27th century BC). The purpose of the sampling was to clarify the nature of the possible phases of occupation identified at the site. While 15 to 20 samples are usually needed for this kind of analysis, the scarcity of time did not allow us to obtain a more extensive sampling. Thus, lateral variations of the sedimentary units remain unknown, and some of the following interpretations should be considered preliminary.

The samples were taken from the exposed section, after cleaning and straightening of the section itself, for a width of approximately 1 m. In order to understand the sequence of occupation, the first three samples were cut in a continuous column running from the virgin soil upward, to the bottom of a stone wall foundation. Since the sediment between the top of sample 3 and the floor of the structure above is homogeneous, the fourth sample was taken in front of the wall's base, a few centimeters to the right of the preceding sample column. The floor belonging to the structure is included in the middle of this sample 4. As for the fill between the floor and the surface, this is also homogeneous, and is represented on the upper part of sample 4. Each sample is between 22 and 25 cm high.



27. Bulldozer section at JR7, as-Sukhna North, and profile of the trench where the 4 samples for the microstratigraphic studies were taken.

Samples were treated and prepared at the *Laboratoire de sciences des sols et d'hydrologie*, INA P-G, in Thierval-Grignon, France.

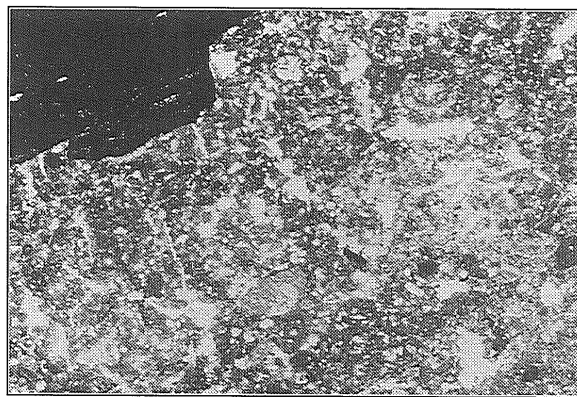
The micromorphological approach consisted in studying thin sections of the soil samples, to identify the nature and the organization of the mineral and organic fraction of the samples, and the relationships between this fraction and the voids in the same matrix. The aim is to identify features derived from natural and man-made actions. Following is a condensed report on the results of the study.

Sequence of occupation

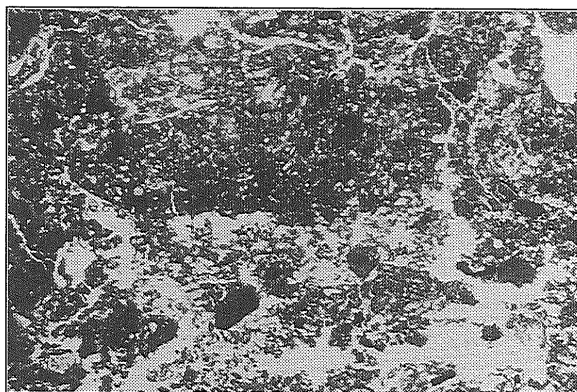
A sequence of more than 20 thin layers of occupational deposits have been identified. They reveal a rhythmical range of phases of occupation and abandonment. The occupational sequence of the first three samples (first occupational phase, below the foundations of the large structure exposed in the cut) shows that the space had been used in different ways:

- the lower units (1.1.2 - non-prepared floor) and 1.2.1 show characters which indicate short open space activities, with abundant anthropic elements, gypsum lenses, intermediate compacted horizons, and a small thickness of the residual accumulation (2-5cm) (Figs. 28 and 29).
- Unit 1.3.1 and probably 2.5.1 are constructed floors underlying the occupational units 2.1.1, 2.2.1 and 2.6.1, of similar character to the previous (1.1.2 and 1.2.1); thus they might be interpreted also as derived from activities in an open space (courtyard or verandah).

The occurrence of small aggregates (1-20mm) of purged sediment with vegetal pseudomorphs and with vesicular microstructure, qualified as detrital mudbrick material, occurs in small amounts in the first units, it becomes gradually more important in the upper units, starting particularly from



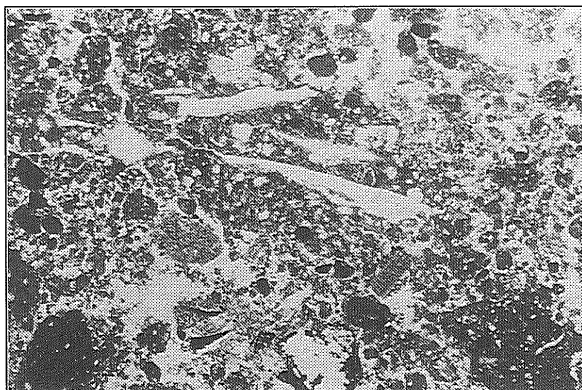
28. As-Sukhna North (site 7): microstratigraphic view of the transition between virgin soil and occupation level, micro unit 1.1.2



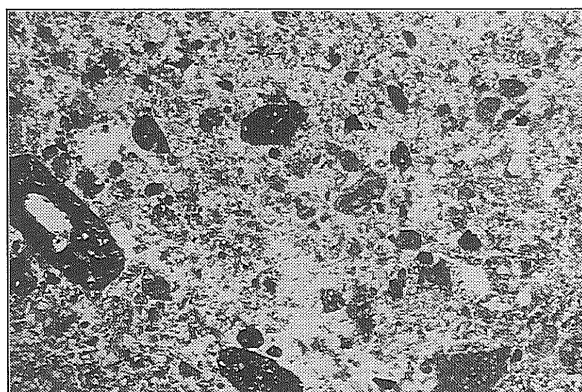
29. As-Sukhna North (site 7): microstratigraphic view of the transition between micro unit 1.2.1 and 1.3.1: constructed floor overlaying occupation level.

unit 2.7.1 (Fig. 30). That means constructions were scarce at that moment, or perhaps they were located far from the sampled sector. The upper units, on the contrary, show that construction activities were more intense, or closer to the sampled unit (Fig. 31).

We suggest that the mode of occupation in the lower layers might have been a camp. The rhythm of occupation and abandonment as evidenced in the sample area can indicate either repeated occupations during short periods of time or a continuous occupation with ephemeral structures and with modifications of the use of the space. In any case, between the two main phases of occupation and at the end of the upper one there are two obvious facies of abandonment which are much longer than the previous ones, judging from the accumulated de-



30. As-Sukhna North (site 7): microstratigraphic view of a facies of abandonment with fragments of construction material (mudbrick), micro unit 2.7.1.



31. As-Sukhna North (site 7): microstratigraphic view of a facies of abandonment, micro unit 3.3.1.

posits.

While the samples are insufficient to obtain final evidence about climate, gypsum crystallization and the high intensity of biological activity, particularly by insects in the units of abandonment of the four samples suggest a rather dry climate.

Mudbrick material

None of the samples was taken directly out of a mudbrick context, but the following interpretation is obtained from some detrital fragment or aggregate which was identified in the matrix.

This material, except the fourth sample, is similar in the different units where it occurs. It is composed of calcitic loam, obtained at the site itself since it contains many anthropic elements, well mixed with a high quantity of dry vegetal stalks. In sample 4 the materi-

al seems better sorted: anthropic elements in the mudbrick are found in smaller quantities, and the calcitic loam is purer.

Floors and trampled surfaces

They can be divide in two main types: constructed floors (A) and trampled surfaces (B). Each can also be divided in two sub-types:

A1. Selected material: this type is found in unit 4.2.1. The prime material used here is composed of calcitic loam (same as in the virgin soil), mixed with chalky sediment. Some fine fragments of charcoal are well integrated into the purged material; vegetal stalks were used in small quantities.

A2. Rough material: found in units 1.3.1 and 2.5.1. The material used in this type of floor is the anthropic sediment itself: fine fragments of charcoal, bones, mudbrick material, and flint are integrated in the matrix. Vegetal stalks were not used in these floors.

B1. Topped by an ashy accumulation: units 1.1.2, 3.1.1, and 3.5.2; these units are characterized not only by compaction but also by the integration of ash and fine fragments of charcoal as a transition to the occupational unit. This kind of accumulation suggest a surface were activities were performed.

B2. Without occupational accumulations: units 2.4.1 and 3.7.1; here the upper parts of the units are more compacted than the lower ones and incorporate some anthropic material. Those units are overlaid by units of sediment which do not find a parallel in the typical facies of occupation. The absence of occupational accumulation and the occurrence of trampling indicate the use of this space as a passage.

Other

Virgin soil: the substrate of the site consists of clayey calcitic loam. The very well sorted quartz grains incorporated in the matrix indicate that the sediment is of primary eolian origin; it was eroded from surrounding

mountains and then transported and deposited by the az-Zarqā' river.

Pottery: Two fragments of pottery, big enough to be studied, are incorporated into the samples 1 and 3. The ware is made of red clayey sediment, very well purged and compacted; quartz is almost absent, temper consists of crushed shells. This clay does not seem to be found in the vicinity of the site. Other small fragments are of a different nature (calcitic loam with small fragments of charcoal and grains of quartz of a more important size relatively to those found in the virgin soil). The subrounded outline and the small size of these fragments does not allow us to consider them as pottery, unless they were strongly altered by fire or other causes. They might also be detritic fragments of construction materials, not mudbrick, but perhaps an oven.

Flint: Many small angular and sub-angular fragments of flint are found in the samples, and especially in 1 (unit 1.2.1). They are probably debitage, suggesting flint knapping activities.

The attached chart includes brief macro and micro scale descriptions of the sedimentary units and their micromorphological interpretations. Sample 1 is the lower one, and the micro units in each sample are presented from the lower to the upper ones (see Table 6).

A Sculptured Basalt Fragment from Khirbat al-Wad'ah (Site 9) (M.D. Wilson)²

A fragment of sculptured basalt was recovered during the preliminary survey of Khirbat al-Wad'ah (site 9, grid ref. 248.96E 173.56N). This is presumed to be the upper portion of a door and probably of a funerary context (Fig. 32).

It is doubtful whether the stone was in its original resting place of antiquity, but most

probably transported to its place of discovery, (lying upon the ceiling material of a collapsed natural limestone cavern) at a recent time. However, in view of its weight the former location may not be any great distance.

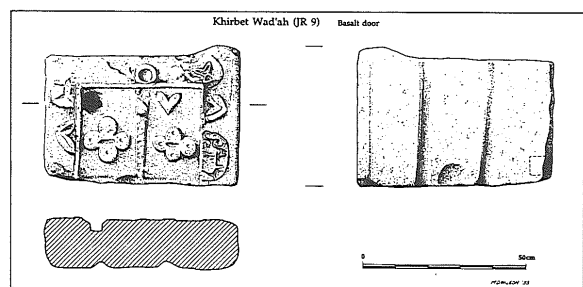
Description

The surviving fragment, measuring approximately 60 x 40 x 15 cm, probably represents roughly one third of its original size, and there is the possibility that it was originally one of a pair. There is evidence of a pivot joint having existed at the far side of the top (assuming correct orientation) of the stone.

One side of the stone, presumably the front, or outer surface displays an arrangement of crudely carved and rustic looking symbols, all in low-relief. Horizontal and vertical, square-profiled bars which form a frame with internal divisions, separate the symbols into two groups; those inside the framework or panels and those bordering. A small ring occupies a central position at the top exterior of the framework. Accompanying the bordering symbols is an inscription.

Each of the internal symbols (three) have a floral appearance, whilst those around the outside (five), in a poorer state of preservation, appear to display both floral and zoomorphic characteristics.

The rear of the door has two vertical v-shaped grooves, approximately 5 cm wide by



32. Basalt door from Khirbat al-Wad'ah, site 9.

2. I would like to thank Dr Ibrahim Surty of the Department of Islamic Studies, Selly Oak Colleges,

Birmingham, for his examination and comments on the inscription.

Table 6. Site JRS 7 (Sukhne North): microstratigraphic sequence (samples 1-2)

Sample	Macrolevel. Description	Microlevel. Units	Interpretation
1	1.1 - Virgin soil. Hard granular red soil with prismatic structure	1.1.1: Fluvial calcitic loam with 5-8% of very well sorted quartz grains.	Original loessic deposition transported from mountains by water
	1.2 - Gray-green mixed with some charcoal	1.1.2: Same components of 1.1.1, more compacted, integration of some fine anthropic elements, mainly charcoal	Contact with the occupation surface and trampling
	1.3 - Light brown loam with small pebbles	1.2.1: Occupation surface: fragments of charcoal, bones, flint, pottery, and some detritic aggregates of construction material; very rich in gypsum lenses and strongly disturbed by insects; compacted horizons in intervals. 1.3.1: Compacted calcitic loam; contains a very small quantity of fine fragments of charcoal. Towards the top there is more charcoal, associated with sub-horizontal pores and cracks.	Domestic activity in open installations and dry conditions. Reorganization of the space; constructed floor without vegetal incorporation
2	2.1 - 3cm. Slightly compacted brown-gray loam with charcoal fragments	2.1.1: See 1.3.1	See 1.3.1
	2.2 - 1cm. Powdered gray ashy sediment	2.2.1: Similar to top of 1.3.1	See 1.3.1
	2.3 - 4cm. Powdered gray-brown sediment	2.3.1: Micro aggregated, pulverulent at the base and a bit compacted on the top; here it contains some sub-horizontal voids and a few charcoal fragments 2.3.2: Repeated sequence of 2.3.1	Break in use and sporadic trampling
	2.4 - 1cm. Light gray ash	2.4.1: Calcitic loam mixed with small fragments of charcoal and silex	Same
	2.5 - 3cm. Brown-gray slightly compacted loam with some pieces of charcoal	2.5.1: Calcitic loam compacted in a wet state with rare anthropic elements. More compacted on its upper part with more abundant anthropic elements.	Sediment derived from other nearby areas, possibly by trampling
	2.6 - 4cm. Gray-black sediment	2.6.1: Micro-aggregated unit very rich in ash and charcoal, and completely disturbed by biological activities. A very thin sorted quartz unit is present in its upper part	Roughly prepared floor or trampling in humid or wet conditions
	2.7 - 5cm. Light brown granular loam	2.7.1: Unit of physical disaggregation. Rich in mudbrick aggregates, strongly pulverized by gypsum crystals and insect activities	Abandoned occupation surface in open space, subsequently eroded by rain Abandonment

Cont. Table 6.

Site JRS 7 (Sukhne North): microstratigraphic sequence (samples 3-4)

Sample	Macrolevel. Description	Microlevel. Units	Interpretation
3	3.1 - 3cm. Light brown slightly compacted loam	3.1.1: Mostly disaggregated mudbrick material, with compaction	Trampled detritic elements.
	3.2 - 2cm. Loose brown-gray loam mixed with charcoal and ash, mainly on the top	3.2.1: residual micrometric to millimetric fragments of charcoal mixed with detritic mudbrick material	Elements of compaction redistributed by trampling
	3.3 - 5cm. Grayish-brownish loam with few pebbles and ash	3.3.1: Detritic aggregates of mudbrick material strongly altered by insects	Abandonment
	3.4 - 2cm. Light brown ashy unit.	3.4.1: Vegetal pseudomorphs, discontinuous bed associated with detritic mudbrick material	Collapsed roof?
	3.5 - 4cm. Mixture of ash and dark brown loam	3.5.1: Similar to 3.3.1	Abandonment
	3.6 - Discontinuous centimetric ashy unit	3.5.2: Very fine fragments of charcoal well incorporated in recompacted detrital mudbrick material	Trampling
	3.7 - 4cm. Dark brown layer	3.6.1: Truncated accumulation of about 2cm of ash	?
4	4.1 - Brownish-grayish fairly loose sediment	3.7.1: recompaction of disaggregated mudbrick material	Trampling
	4.2 - 3cm. Beige-whitish compacted unit (floor)	4.1.1: Microaggregated unit with some detrital mudbrick material. Very impregnated of gypsum microcrystals	Abandonment
	4.3 - Dark-brown slightly compacted sediment	4.2.1: Unit composed of calcitic loam with high quantity of calcareous fragments and little charcoal	Constructed floor
		4.3.1: Disaggregation with strong alteration by insects	Abandonment

2.5 cm deep and equally spaced across its width. These may have been for supportive battening. A square shaped slot of ca. 8 cm in depth and width on the inner side of the door is probably inserted as a means of securing the closure of the door. A further, smaller, rectilinear slot with chamfered edges is located in the upper left-hand corner of the left interior panel on the front of the door; its function is unidentified.

Interpretation and dating

Despite the inferred function of the carved basalt lending itself to comparison with apparently better crafted versions of 'Roman' date (e.g. Umm Qays), the unusual and un-Romanlike character of the decoration suggests an idiosyncratic emulation. The door is likely to be the product of an alien concept of a monument of official or institutionalised inspiration.

During the fourth and fifth centuries there was undoubtedly a large *foederati* presence between Philadelphia and Bostra (Parker 1986), and a strong argument supports the maintenance of Arab cultural identity within these groups (Shahid 1989b: 412-4). It is reasonably inferable that the craftsmanship of this stone belongs to a member of one of such groups. The ceramic evidence of Khirbat al-Wad'ah indicates site utilisation from the third century AD until the sixth century AD.

The script, which is accepted as pre-Islamic in character (pers. comm. I. Surty), may also support the proposed *foederati* association with the site.

Although the art of the peoples of Oriens may be sometimes interpreted as operating within extremely difficult constraints (e.g. Avi-Yonah 1945: 78), it is questionable as to the extent that individual groups of the *foederati* conformed to the eccles and the law (Shahid 1989b: 164), in spite of their 'institutionalised' representation (Shahid 1989a: 331-345).

The arrangement of the internal divisions and symbols on the Khirbat al-Wad'ah stone

may have significance in the development of religious and funerary symbolism in the early Roman-Christian period of the region. It is plausible that the internal divisions are formed by the upper part of a cross, the arms only partially surviving. The upward and outward increase in thickness of the vertical bar may therefore, denote more than a mere crude carving of the internal division, but a deliberate cruciform.

The 'floral' motifs which flank the upper arm may be feasibly interpreted as conceptual forms of the petalled rosette. In the Christian period the rosette is denied its former symbolic value as it is either replaced by the cross, or moved to a flanking, and more ornamental position (Avi-Yonah 1945: 67-72).

However, it is arguable that the symbols represent a form other than 'floral', given the enigmatic circular indentation in the centre of each 'petal' and the horizontally positioned slit which passes through the centre of each of the two symbols.

Whilst the contemporaneity of the carvings is indeterminable, it is observed that the inscription, which does not respect the alignment of the framework (the latter terminating short of the inscription), may indicate a reuse. Alternatively, this may be due to an inadequate allowance of space in the execution of the work. The meaning of this inscription is at present unknown.

POTTERY

Neolithic to Iron Age periods (G. Palumbo)

The pottery found at the Pottery Neolithic site of Wad'ah (site 8) is the first occurrence of this period found in eastern Jordan. The pottery forms, surface treatment, and decoration assign the material found to the Yarmoukian period of the Pottery Neolithic. Very coarse bowls or vats (the one represented in Fig. 33:1 is at half the scale than the rest of the illustrated fragments) are accompanied by relatively fine, cream slipped

and red painted jugs and cups, often decorated with incised oblique lines and fishbone patterns, set between two parallel incised lines. The variety of forms and the quantity of materials found suggest the presence of a well-established settlement at the location of al-Wad'ah.

While Chalcolithic pottery was found at several sites, none of it is illustrated here, due to the fact that no diagnostics have been found, with the exception of some small rim fragments of marginal significance. The wares are usually coarse, tempered with small basalt grits, and sometimes cream-slipped; no paint or other decoration has been observed on the fragments found.

No clear EB I material has been found, even though some Chalcolithic material could in fact be assigned to the EB I after more detailed study still to be performed. EB II material is found at several sites, including of course excavation layers at Jabal ar-Raḥīl (site 1). The most common types are hole-mouth jars and large necked jars. A piriform juglet was found *in situ* in Trench 3 at Jabal ar-Raḥīl, and fragments of small cups and juglets have been found both at this site and at Jrayyah (site 6), as-Sukhna North (site 7), and at site 79. Interestingly enough, pottery found on the surface at site 66, which could not initially be dated, because of the absence of diagnostics, was assigned to the EB II on the base of similar wares found sporadically but consistently in other all-EB II contexts, such as site 79, or in stratigraphic layers, such as at Jabal ar-Raḥīl. This ware, not recognized elsewhere so far, is characterized by a cream to light brown color and by the presence of a thick temper of small basalt grits. We are perhaps in presence of a local "nomadic" manufacture that does not follow the trends of more sedentary communities, and carries on a tradition of a rough handmade pottery more similar to the wares of the Late Chalcolithic and Early Bronze Age I than to the more refined types and wares of the early third millennium BC. At as-Sukhna North a

jar neck was found with a stamp seal impression representing a spiral motif. The impression is very similar to other found at Khirbat az-Zarāqūn and in the West Bank and at Hazor. This particular fragment is discussed by Chesson *et al.* (1996).

The EB III is probably represented only at Jrayyah, site 6, but its separation from late EB II types will require more study. The Early Bronze Age IV pottery is characterized by the presence of relatively few hole-mouth jars compared to other regions, and especially by the presence of a large number of jars and amphoriskos. As discussed already by Palumbo (1991) and Palumbo and Peterman (1993) the EB IV materials of this region suggest the presence of a separate "group" or style, which has contacts with the Jordan Valley, but is differentiated by the presence of very characteristic types, such as the jar with vertical strap handle and folded-envelope ledge handles, and wares, such as the red-brick wares, very common at ar-Raḥīl. The survey finds and the soundings at ar-Raḥīl are confirming this pattern and the extremely localized nature of this pottery "family".

Middle Bronze Age material was only found at one site, Tall as-Sukhna (site 3). The four fragments represented here are very important, not only because they confirm a pattern of MB occupation at the margin of the desert, emerging from the surveys of Betts in the regions east of Umm aj-Jimāl, but also because they are an indirect indication of the fact that small rural villages could exist during this period in remote areas, and perhaps not necessarily under the control of an urban center.

Aṭ-Ṭuwayfiriyya (site 87) an assemblage possibly dated to the LB II period has been collected. This assemblage is represented here by a large carinated cup with one vertical handle, straight sides and convex base, for which we could only find generic parallels (Fig. 36:19).

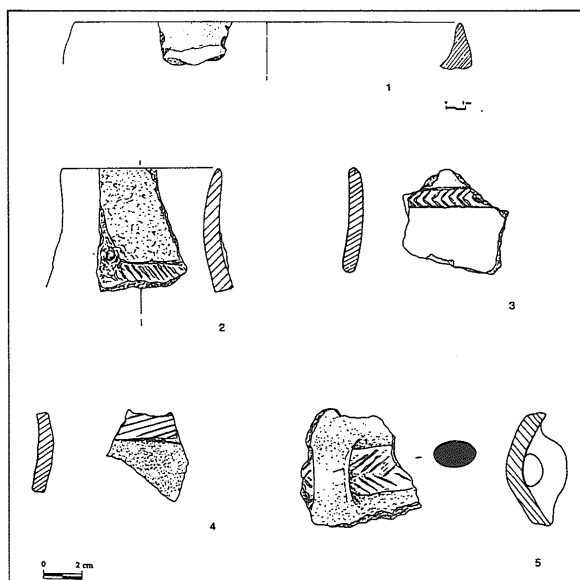
The Iron Age pottery found is quite typ-

ical and does not present particular problems: all the most common forms are represented: bowls, cups, cooking pots, pithoid jars, grooved necked jars. These types are mostly found in this combination at several sites in northern Jordan.

Fig. 33 - Pottery Neolithic

All wares have a coarse temper, coarser in the non-decorated pottery. Decorated pottery is cream-slipped, with the frequent presence of a red-brown trickle paint, usually between the incised decorative band and the rim of the juglet or cup.

1. Bowl or vat, cream ware, very coarse temper, scale is half of the other illustrated fragments .
2. Juglet, cream slip, red paint between incised band and rim, coarse temper; handle attachment below rim.
3. Fragment of juglet (?), cream slip, coarse ware, incised herringbone pattern.
4. Fragment of juglet or cup, cream slip, red paint, incised herringbone or oblique lines pattern.
5. Fragment of juglet or amphoriskos, vertical handle, cream slip, coarse ware, incised herringbone pattern and red paint , mainly above incised decoration.

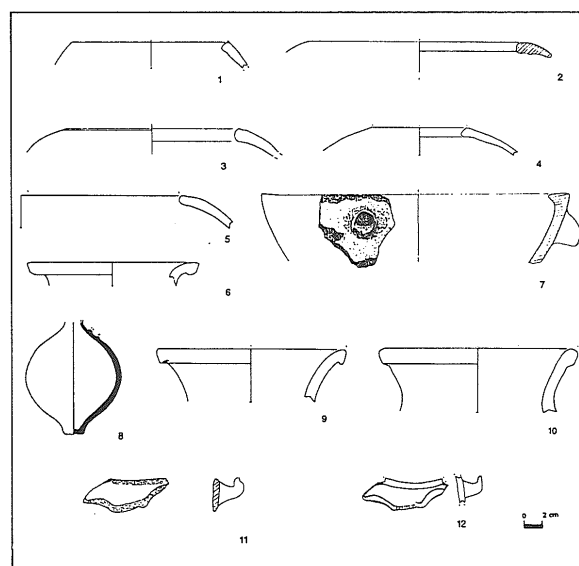


33. Yarmoukian pottery from al-Wad'ah (site 8).

Fig. 34 - EB II

Wares are coarser for the holemouth jars, and vary from light to very dark brown. Some reddish to brown-red wares exist, mainly in jars and juglets. Cream slip is frequent, while painted decoration was not found in our sample. The illustrated material shows the most common types found during the survey. The fact that the illustrated jars are both from as-Sukhna North and most of the holemouth from Jrayyah does not mean that these are necessarily the types prevalent at those sites.

1. Tall al-Birah (site 5) Holemouth jar, coarse temper, brown ware, recessed rim.
2. Tall al-Birah (site 5) Holemouth jar, semi-coarse temper, light brown ware, rounded rim.
3. Jabal ar-Rahil (site 1) Holemouth jar, semi-coarse temper, light brown ware, rounded rim, small groove below rim.
4. Jrayyah (site 6) Holemouth jar, fine temper, reddish ware, recessed rim.
5. Jrayyah (site 6) Holemouth jar, semi-coarse temper, brown ware, rounded rim
6. Jrayyah (site 6) Jar neck and rim. Everted rim, light brown ware, cream slip, fine temper.

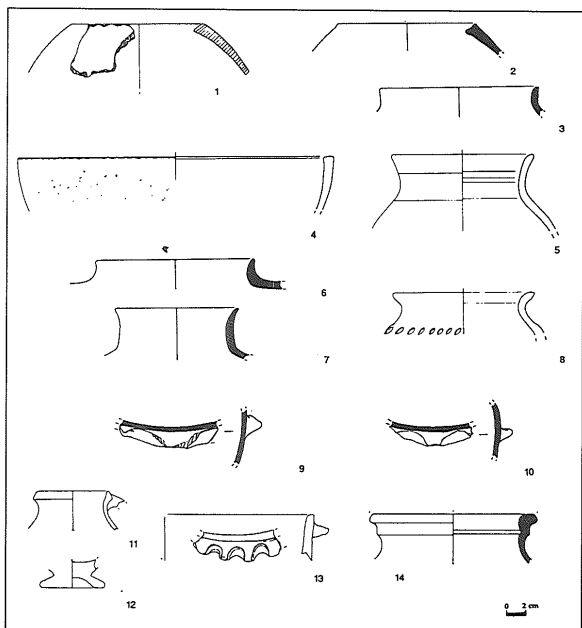


34. EB II pottery from Jabal ar-Rahil (site 1: nos. 3, 8); Tall al-Birah (site 5: nos. 1-2); Jrayyah (site 6: nos. 4-7, 11-12); as-Sukhna North (site 7: nos. 9-10).

7. Jrayyah (site 6) Spouted vat, flat rim, slightly inverted, brown ware, cream slip.
8. Jabal ar-Raḥīl (site 1) Piriform juglet, neck, rim, and handle missing. Fine temper, brown to red-brown ware, cream slip. From excavation: Trench 3.
9. As-Sukhna North (site 7) Jar neck and rim, everted rim, semi-fine temper, reddish ware, cream slip
10. As-Sukhna North (site 7) Jar neck and rim, slightly everted rim, semi-coarse temper, brown ware, traces of cream slip.
11. Jrayyah (site 6) Pushed-up ledge handle, reddish ware, fine temper, cream slip.
12. Jrayyah (site 6) Pushed-up ledge handle, brown ware, semi-fine temper, traces of slip.

Fig. 35 - EB IV (1-10) and MBIIB (11-14)

EB IV wares are mostly reddish in color, relatively fine tempered, especially for the smaller pottery forms such as juglets and cups. Larger jars, however, are still relatively fine-tempered. The folded envelope ledge-handles are small, with flaps not overlapping, a distinct type from that prevailing



35. EB IV (1-10) and MBIIB (11-14) pottery from Jabal ar-Raḥīl (site 1: nos. 2-10), Jrayyah (site 6: no. 1), and Tall as-Sukhna (site 3: nos. 11-14).

in the Jordan Valley where the handles are wide and the flaps overlap.

The four diagnostic MBIIB fragments found at Tall as-Sukhna belong to four different pottery types: jars, cooking pots, dipper juglets, and pedestaled bowls or cups. Even if four fragments are not statistically significant, this range of types is possibly an indication of a site with more or less permanent occupation, rather than a nomadic encampment, which would probably exhibit a more restricted pottery assemblage. Given the fact that the site is presently threatened by agricultural expansion, soundings will have to be conducted soon in order to establish its significance in our still limited knowledge of the Middle Bronze Age in the eastern fringes of the "sown".

1. Jrayyah (site 6) Holemouth jar, recessed rim, finger impressions on rim, fine temper, red-brick ware.
2. Jabal ar-Raḥīl (site 1) Holemouth jar, recessed rim, grit temper, brown ware.
3. Jabal ar-Raḥīl (site 1) Jar, short vertical neck and rim, fine grit temper, brown ware, cream slip.
4. Jabal ar-Raḥīl (site 1) Large bowl, flat rim, impressed finger decoration on rim, grit temper, reddish ware, traces of creamy slip.
5. Jabal ar-Raḥīl (site 1) Jar, short neck and everted rim, incised parallel lines on body, fine grit temper, light brown ware, cream slip.
6. Jabal ar-Raḥīl (site 1) Jar, very short neck and rim, wide shoulder, fine grit temper, reddish ware.
7. Jabal ar-Raḥīl (site 1) Jar, vertical neck, slightly everted rim, grit temper, brown ware, cream slip.
8. Jabal ar-Raḥīl (site 1) Jar, short neck, everted and thickened rim, nail impressions on shoulder, fine grit temper, reddish ware.
9. Jabal ar-Raḥīl (site 1) Folded envelope ledge handle, grit temper, reddish ware.

10. Jabal ar-Rahil (site 1) Folded envelope ledge handle, grit temper, red-brown ware, traces of cream (?) slip.
11. Tall as-Sukhna (site 3) Dipper juglet, short neck, missing handle from rim to shoulder, fine temper, cream ware, cream slip.
12. Tall as-Sukhna (site 3) Cup or bowl foot, fine temper, cream ware, cream slip.
13. Tall as-Sukhna (site 3) Cooking pot or vat, rounded rim, large band below rim, with deep finger impressions, grit temper, brown ware.
14. Tall as-Sukhna (site 3) Jar, large everted rim, fine temper, brown-reddish ware, cream slip.

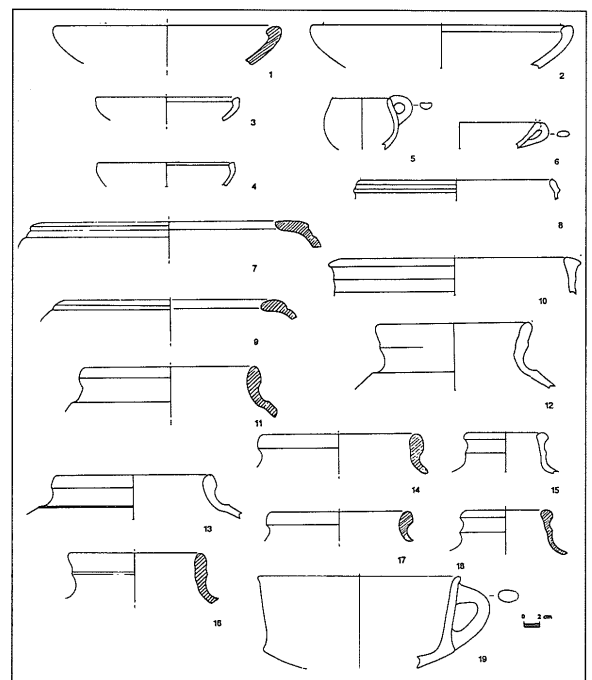
Fig. 36 - Iron Age II (1-18) and LB II (19)

The Iron Age pottery found at several sites in the survey area shows a wide range of forms and wares, which are generally reddish, but can also be light to dark brown, with small to medium grit tempers. Bowls, pithoid jars, jars are all known types.

1. Site 45; Bowl, inverted rim, small grit temper, reddish ware, traces of red slip.
2. Site 45; Bowl, inverted rim, medium grit temper, brown ware, traces of red slip.
3. Site 45; Bowl; vertical rim, small grit temper, brown ware.
4. Site 45; Bowl, recessed rim, small grit temper, reddish ware.
5. Site 46; Cup, vertical rim, handle from rim to mid-body, medium grit temper, brown ware.
6. Site 45; Cup, rounded rim, small vertical handle; medium grit temper, reddish ware.
7. Tall al-Birah (site 5) Pithoid jar, grooves below rim, fine grit temper, reddish ware, cream slip.
8. Khirbat aj-Jāmūs (site 2) Cooking pot, rounded rim, medium grit temper, dark brown ware.
9. Tall al-Birah (site 5) Pithoid jar, grooves below rim; fine grit temper, reddish

ware.

10. Site 45; Jar, small grit temper, reddish ware.
11. Site 45; Jar, rounded rim, fine grit temper, red brick ware.
12. Tall al-Birah (site 5) Jar, rounded, slightly everted rim, small grit temper, brown ware, cream slip.
13. Site 45; Jar, rounded rim, medium grit temper, reddish ware.
14. Tall al-Birah (site 5) Jar, rounded rim, small grit temper, brown ware.
15. Site 45; Jar, rounded rim, fine grit temper, red ware.
16. Tall al-Birah (site 5) Jar, rounded rim, fine grit temper, reddish ware
17. Tall al-Birah (site 5) Jar, rounded, slightly everted rim, fine grit temper, brown ware.
18. Site 45; Jar, fine grit temper, reddish ware.
19. Aṭ-Ṭuwayfiriyya (site 87) Carinated cup, vertical walls with everted rim, convex base, medium grit temper, brown ware, cream slip. LB IIB?.



36. Iron II pottery from Khirbat aj-Jāmūs (site 2: no. 8), Tall al-Birah (site 5: nos. 7, 9, 12, 14, 16-17), site 45 (nos. 1-4, 6, 10-11, 13, 15, 18), site 46 (no. 5); LB pottery from aṭ-Ṭuwayfiriyya (site 87: no. 19)

Hellenistic to Byzantine period³

(A. Peruzzetto and M.D. Wilson)

The report concentrates primarily upon three main sites of the az-Zarqā' Valley. The sites were selected by reason of substantial indications of the periods of settlement being made available from the recovered ceramics.

Also included are sites where fairly close ceramic dating has been established, though less substantial in quantity, and therefore perhaps not entirely representative of the periods of settlement.

The ceramics represented in the report are the results of surface surveys and the dating methods comprised comparative analysis. The ceramic chronology of the region is an area of study which requires more closely dated indices made available through excavation. Good dating indices are indeed both few and exceptional; only a few published excavation reports are available where accurate stratigraphic dating sequences have been established. Reports very often give only the broad and approximate chronological parameters (e.g. Hellenistic - Roman).

Some of the vessel types represented may in fact reflect local stylistic developments and responses in the az-Zarqā' Valley region.

Some imported wares such as amphorae, where wider and more detailed studies have been made, enable fairly good indicators of the periods of occupation.

The main sites are Tall al-Birah (site 5), Khirbat al- Wad'ah (site 9) and al-Birah South (site 67). Site code numbers are been used consistently throughout the ceramic report.

Fig. 37

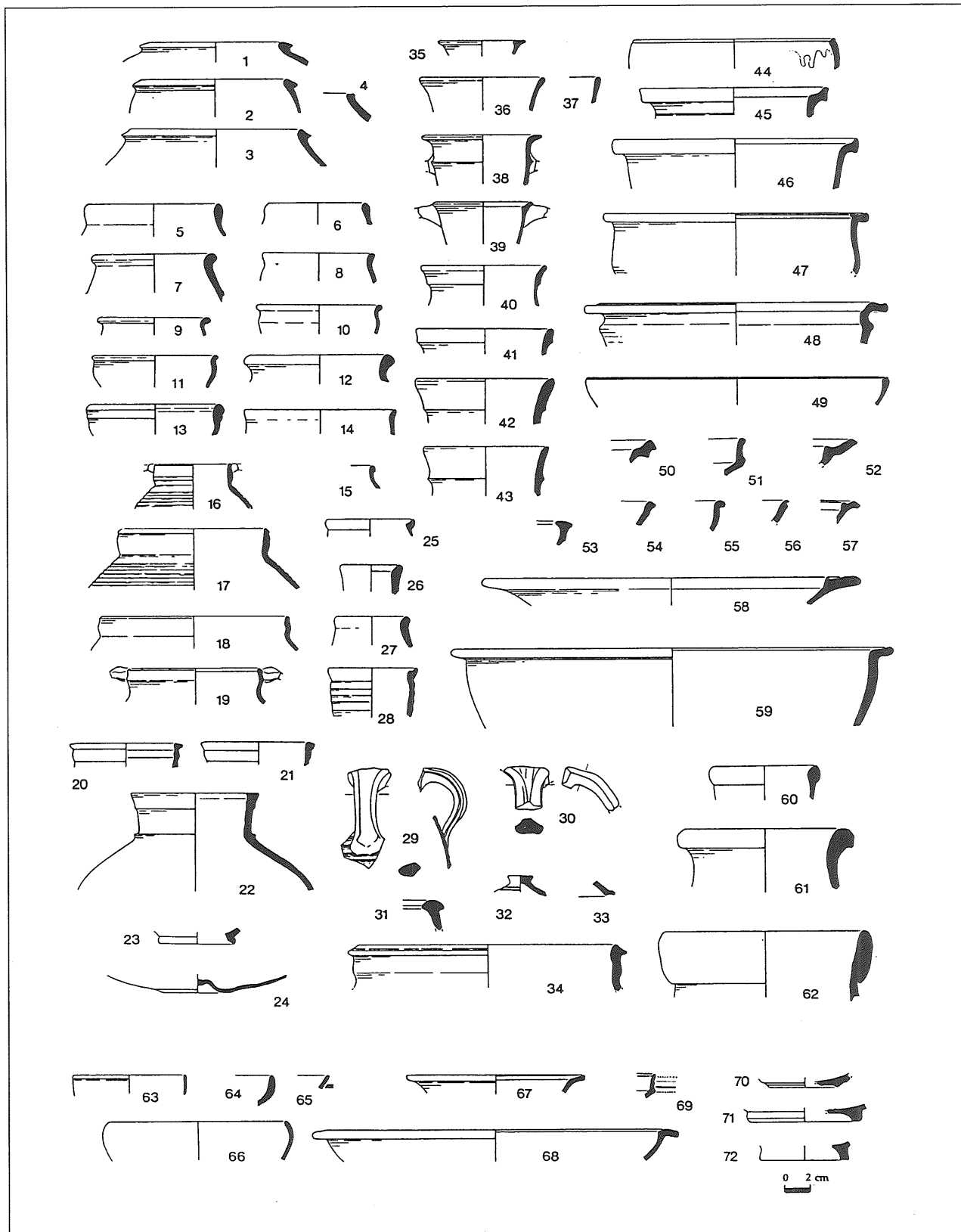
All diagnostic and potentially diagnostic sherds from the three main sites have been illustrated. Coarse wares are numbered 1 to 62 (including amphorae, 60 to 62); fine wares 63 to 72. Munsell color numbers are given

where possible to fine wares and amphorae.

Coarse ware fabric colors range widely from pale yellow/buff to reddish yellow and pale reds to reddish browns and grays, and as also noted at Jarash (Falkner 1983: 3), tend to vary considerably on individual vessels. Where this is the case, the colors of surface and surface treatment are given only. Site code number precedes the description of each vessel.

1. Site 9, red-brown, hard with fine calcite, quartzite and basalt inclusions, neckless jar/cooking pot.
2. Site 67, light red (int), red-gray (ext), hard with fine calcite, quartzite and basalt inclusions, neckless jar/cooking pot. Ca fourth century AD. Parallels: Parker 1987: fig. 94: 36.
3. Site 5, pinkish gray, semi-hard, with frequent fine basalt inclusions, neckless jar/cooking pot. ? sixth century AD. Parallels: poss. Parker 1987: fig. 113: 181-183.
4. Site 5, pink, hard with fine calcite, quartzite and basalt inclusions, neckless jar/cooking pot with indented rim.
5. Site 9, light reddish brown, semi hard and compact, jar.
6. Site 9, reddish yellow with pink slip on rim, hard, compact with minute calcite and basalt inclusions(?), jar.
7. Site 67, light red, hard with frequent calcite and basalt inclusions(?) jar/cooking pot.
8. Site 9, red, hard, compact with minute calcite and basalt inclusions, jar with rounded rim.
9. Site 9, reddish yellow (int), gray (ext), hard and compact, jar with slightly everted rim.
10. Site 9, red, hard, compact, with minute calcite and basalt inclusions, jar.
11. Site 9, reddish yellow, hard, compact with fine calcite and basalt inclusions, jar. Late fifth to early sixth century AD.

3. Many thanks to Pamela Watson who provided valuable advice for the analysis of the pottery.



37. Roman and Byzantine pottery from Khirbat aj-Jāmūs (site 2: nos. 26), Tall as-Sukhna (site 3: nos 43, 53), Khirbat al-Mak'hūl (site 4: nos. 24), Tall al-Bīrah (site 5: nos.3-4, 16-17, 22, 29-30, 32, 40, 42, 46-48, 64, 66-72), Khirbat al-Wad'ah (site 9: nos.1, 5-6, 8-13, 15, 18, 20-21, 27-28, 31, 33, 35-39, 45, 50-52, 54, 56-60, 62), Khirbat Zuqm al-Ghurāb (site 10: no.65), al-Bīrah South (site 67: nos 2, 7, 14, 19, 23, 25, 34, 41, 44, 49, 55, 61, 63).

12. Site 9, reddish yellow (int), gray (ext), semi-hard, jar, diam. approx.
13. Site 9, reddish yellow (int), pinkish gray (ext), hard, compact with fine calcite and basalt inclusions, jar.
14. Site 67, reddish yellow, hard, compact, with frequent calcite, quartzite and basalt inclusions, jar.
15. Site 9, red, semi-hard and compact, jar with rounded rim, diam. indeterminate.
16. Site 5, reddish yellow with red slip, compact, brittle with fine calcite and basalt inclusions, jar. Mid third to early fourth century AD.
17. Site 5, pink with dark brown slip, compact, brittle with fine calcite and basalt inclusions, jar. Prob. mid-third to early fourth century AD. Parallels: Parker 1987: 82-83, fig.100.
18. Site 9, light red, compact, brittle with fine calcite and basalt inclusions, jar.
19. Site 67, reddish yellow (int), light red (ext), hard with occasional fine inclusions of calcite, quartzite and basalt, cooking pot. Parallels: Parker 1987: fig.94: 33-35. late third-fourth centuries AD.
20. Site 9, hard, compact with occasional calcite and basalt inclusions, jar. Early fourth century / early sixth century AD. Parallels: Parker 1987: 63, fig.98; Parker 1987: 190; fig.115.
21. Site 9, hard and compact with occasional calcite inclusions, jar. Date as fig. 20. Parallels: as fig. 20.
22. Site 5, pink with dark brown slip (outer), hard, compact, with occasional basalt inclusions, jar. Parallels: Parker 1987: fig.109,154. Fourth - fifth centuries AD.
23. Site 67, light red, semi-hard and compact, base.
24. Site 4, pink (int), reddish gray (ext), fine, hard and compact, jar with omphalos base. Parallels: Parker 1987: fig. 119,215. Byzantine - first half sixth century AD.
25. Site 67, light red (int), reddish gray (ext), hard, compact with occasional calcite inclusions, small jar with ledge on interior.
26. Site 2, red, semi-hard with frequent basalt inclusions, large jug/amphora. Parallels: Piazza 1983-1984: fig.G, 24. common type in Byzantine period.
27. Site 9, very pale brown, hard, compact with calcite and quartzite inclusions, jar.
28. Site 9, light red, compact, hard, with frequent calcite and occasional red/brown (ceramic?) inclusions, jar with plain rim, internal ledge, ribbed wall. Parallels: Falkner 1983: fig.17, 224 (rim characteristics), third century AD.
29. Site 5, dark gray, brittle and compact, handle of ribbed jar. ? sixth century AD - Byzantine.
30. Site 5, fine pale brown terracotta, light red slip, hard and compact, handle of cooking pot. Parallels: Parker 1987: fig. 100, 82. Mid-third to early fourth centuries AD.
31. Site 9, red, semi-hard and compact, large bowl/basin, diam.approx. 390mm.
32. Site 5, creamy orange, semi-hard, compact with rare and fine basalt inclusions, lid with indented knob and incised bands around outer surface. Late fourth - fifth centuries AD.
33. Site 9, reddish yellow, compact and hard, fine basalt inclusions. Lid. Parallels: Parker 1987: 151; fig. 109. Late fourth - fifth century AD.
34. Site 67, light red, brittle and compact, (water pitcher?).
35. Site 9, red, hard and compact, jug, diam. indeterminate.
36. Site 9, pink (int), reddish yellow (ext), semi-hard, jug.
37. Site 9, red, hard, compact with frequent calcite, quartzite and basalt inclusions, jar. Parallels: McNicoll and Hennessy 1982: pl. 129: 4: first quarter of first century AD; pl. 127: 3: Antiochus III - early first century BC.
38. Site 9, reddish yellow, semi-hard with frequent calcite inclusions, jug with ev-

- verted rim and ridge on exterior wall.
39. Site 9, light red, hard, brittle, with fine basalt inclusions, jug with ledge on interior of rim.
 40. Site 5, pink very pale brown, hard, brittle, fine basalt inclusions, jug. Parallels: McNicoll and Hennessy 1982: pl. 127: 8: "Hellenistic" to c. early first century BC.; Kenyon and Crowfoot 1957 fig.71, 2 and 3: "Roman 3a" (third centuryAD).
 41. Site 67, reddish yellow, hard and compact with occasional fine calcite, quartzite, and basalt inclusions, jar/jug. Poss. Byzantine.
 42. Site 5, pink, hard with occasional calcite and quartzite inclusions, jug. Parallels: McNicoll and Hennessy 1982: pl. 127: 8: "Hellenistic" to early first century BC.; Kenyon & Crowfoot 1957: fig.71: 2 & 3: "Roman 3a" (third centuryAD).
 43. Site 3, reddish yellow, semi-hard, jar. Parallels: Kenyon and Crowfoot 1957: fig.71,3. Poss. third century AD.
 44. Site 67, reddish yellow with yellow slip, semi-hard with infrequent calcite and basalt inclusions. Poss. late fourth to fifth century AD.
 45. Site 9, light reddish brown (int), gray (ext), hard and compact, with frequent fine calcite and basalt inclusions, Site cooking pot/pitcher. Parallels: Kenyon and Crowfoot 1957: fig.71: 4, "Roman 3a Period" poss. third centuryAD.
 46. Site 5, pink, semi-hard, infrequent inclusions, ? water pitcher. Period: until the turn of the first century.
 47. Site 5, hard, compact, no visible inclusions, large carinated bowl/basin with everted and ledged rim. Parallels: Kenyon and Crowfoot 1957: fig.39: 41. Poss. second century AD.
 48. Site 5, semi-hard, light red, carinated bowl. Parallels: Falkner 1983: figs. 15, 18, 19 and 20 (typological). Prob. third to late fourth centuries AD.
 49. Site 67, light red, semi-hard and compact with frequent fine calcite, quartzite and basalt inclusions, bowl with incised line immediately below rim on exterior. Parallels: Falkner 1983: fig.7: 76-78 (rim).
 50. Site 9, reddish yellow (int), gray (ext), hard and compact with occasional calcite and quartzite inclusions, bowl. Parallels: Krealing, fig.41, Tomb 8. (Roman).
 51. Site 9, hard, with frequent basalt inclusions, carinated bowl. Parallels: Falkner 1983: fig.7, 67-69 (typological). Prob. early third centuryAD; Orssaud 1986: pl. 3: 3, Roman to Byzantine.
 52. Site 9, reddish yellow, semi-hard, occasional calcite and quartzite inclusions, dish. Poss. Hellenistic.
 53. Site 3, light red, semi-hard, bowl. Parallels: Orssaud 1986: pl.1: 3 and poss. pl.2: 29-36, Hellenistic to Roman; McNicoll and Hennessy 1982: pl.140: 3 (p.161); pl.145: 6 (p.170); pl.149: 2 (p.178). First half of eighth century AD.
 54. Site 9, reddish yellow, semi-hard, bowl.
 55. Site 67, red, hard and compact with frequent fine calcite and quartzite inclusions ? bowl, diam. indeterminate.
 56. Site 9, pink (int), light red (ext), hard, occasional inclusions, bowl with incised band immediately below rim on exterior, diam. indeterminate. Parallels: Falkner 1983: fig. 7: 74 (rim). Prob. third century AD.
 57. Site 9, semi-hard and compact with frequent fine calcite, quartzite and basalt inclusions, dish. Diam. indeterminate.
 58. Site 9, large bowl, Parallels: Watson fig.4, ware C, 34 - 7th centuryAD; Falkner 1983: fig. 3: 24-26 - "possibly into early sixth century".
 59. Site 9, reddish yellow, semi-hard with infrequent fine calcite and basalt inclusions, basin. Parallels: Falkner 1983: fig.12. ? third centuryAD.
 60. Site 9, light red 2.5YR 6/8 (ext), pink 5YR 8/3, hard, compact, very fine calcite and quartzite inclusions, large jar/amphora. Parallels: Orssaud 1986: pl. 7:

2. Hellenistic - Roman.
61. Site 67, very pale brown 10 YR 8/3, hard, amphora. Parallels: Keay 1984: type XXVP, 10, provenance Tunisia. last quarter. third century until mid-fifth century.
 62. Site 9, reddish yellow 5YR 7/6, semi-hard, amphora. Parallels: Carandini, Pannella 1969-1972: fig.29, provenance Tunisia, Africana II-III Agay (Var). Second-fourth centuries AD.
 - 63 Site 67, red 10R 4/8, hard, compact, cup/bowl. ? imitation sigillata.
 64. Site 5, pink 7.5YR 7/4, reddish brown 2.5YR 4/4 (surface), hard and compact, wall-sided bowl. Sigillata A. Parallels: Kenyon and Crowfoot 1957: fig.65: 3. "Pre-Herodian" (57-55 BC).
 65. Site 10, hard and compact, bowl with rounded rim and two fine horizontal grooves below rim on exterior. Sigillata A.
 66. Site 5, very dark gray 10YR3/1, semi-hard, compact with occasional fine calcite inclusions, bowl. ? imitation black glazed ware. Parallels: Kenyon and Crowfoot 1957: fig.49:10. Third century BC.
 67. Site 5, very pale brown 10 YR 3/3, red 10YR 5/8 (inner surface), red 2.5YR 5/8 (outer surface), semi-hard and compact, bowl. Sigillata A. Parallels: Orssaud 1986: pl. 8: 7. Hellenistic/ Roman.
 68. Site 5, light red 2.5YR 6/8, semi-hard, compact with very fine occasional black inclusions, dish. ? imitation sigillata. Parallels: Kenyon and Crowfoot 1957: fig.37 (p.221). Poss. Hellenistic to mid-second century AD.
 69. Site 5, red, carinated bowl with rouletting on rim and three fine incised bands on wall. Sigillata Italica. Parallels: Kenyon and Crowfoot 1957: fig. 81: 27. 30 BC-30 AD. Atlante Forme Ceramiche vol I, Formel X, 5-10. 12 BC - Tiberius (undecorated).
 70. Site 5, gray 7.5YR 6, reddish yellow slip

7.5YR 7/6, base of jar. Sigillata A. Parallels: Atlante Forme Ceramiche vol II, Tav.III, 3. Prob. mid-second centuryAD.

71. Site 5, reddish yellow 7.5YR 2/6, red 2.5YR 5/8 (surface), base of dish. ? imitation sigillata. Parallels: poss. Kenyon and Crowfoot 1957: fig.37 (p.221). Hellenistic - mid-second century AD.
72. Site 5, pink 5YR 8/4, light red 2.5 YR 6/8 (surface), base. Imitation sigillata. Poss. Hellenistic - mid-second century AD.

The Early Islamic Periods. (A. Peruzzetto and M.D. Wilson)

An insufficient retrieval of diagnostic material at the present level of survey work precludes the study of ceramics of the Umayyad and Abbasid periods. Whilst body sherds form the bulk of collected material purported to be of the Early Islamic period there is also the possibility of overlap, to some degree, in some of the locally manufactured forms with those of the Byzantine period of occupation. The application of a stratigraphic dating mechanism in the az-Zarqā' Valley would greatly enhance the study of locally produced wares in the early Umayyad period.

Ayyubid/Mamluk Wares. (A. Peruzzetto and M.D. Wilson)

Four main groups have been defined:

- I. Hand made undecorated coarse ware (Fig. 38: 73-76);
- II. Hand made coarse ware with linear-banded decorations (Fig. 38: 77-82);
- III. Hand made coarse ware with geometric decorations (Fig. 38: 83-100);
- IV. Monochrome glazed ware (Fig. 38: 101-105). Fig. 38: 106 is of the same fabric type as the majority of vessels in groups II and III.

The chronology is based upon that suggested by Brown (Brown 1989), the styles and forms are seen as typical products of

Transjordan between the 12th century and the Ottoman Period and as Brown stresses, accurate dating may only be established from stratigraphical contexts.

Group I: 12th century (see Brown 1989, phase IA).

Group II: possibly the antecedent of Group III.

Group III: typical products of the 13th- 15th centuries.

Group IV: typical products of Transjordan from 12th to 15th centuries.

Fig. 38

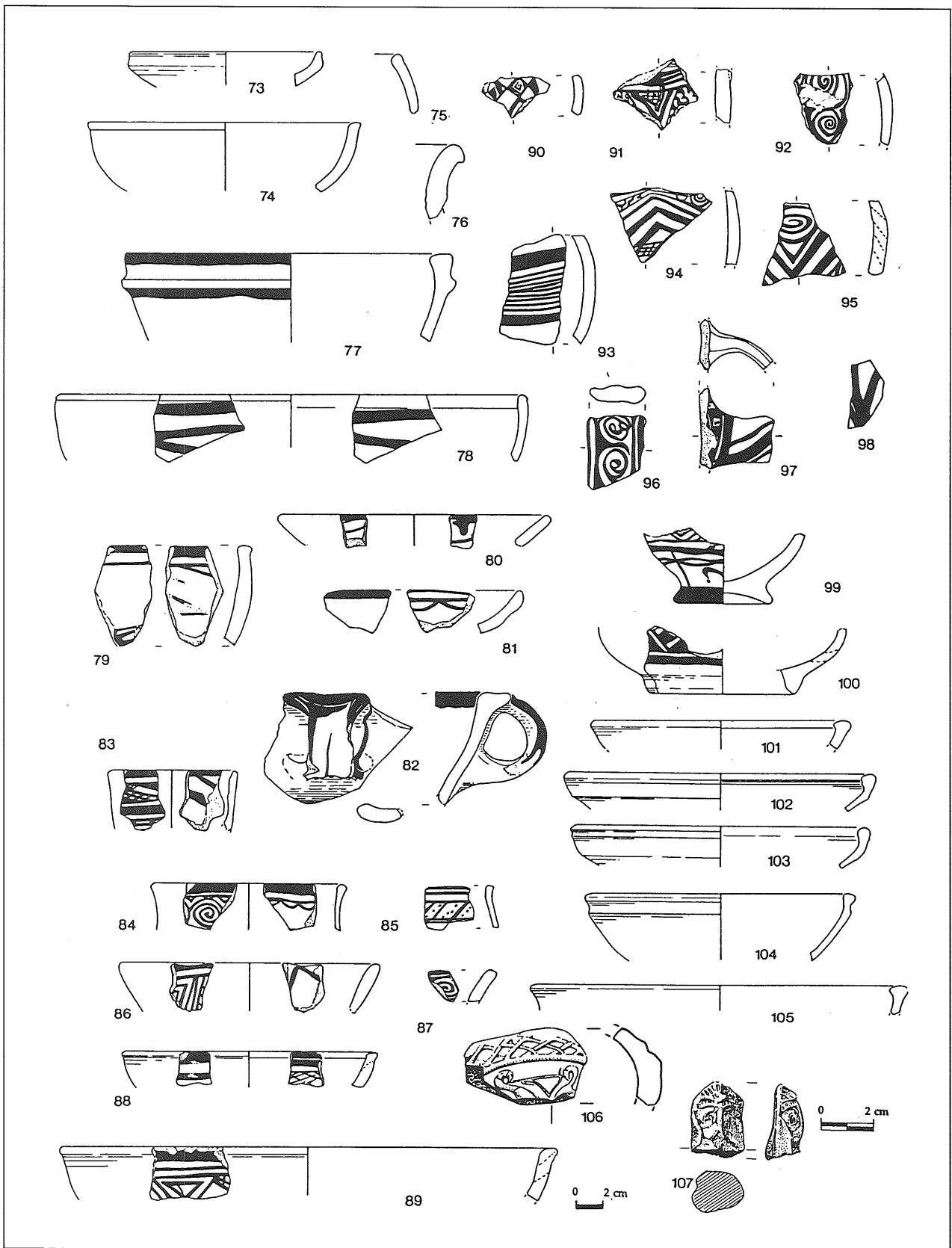
The majority of sherds represented are from Site 4, Khirbat al-al-Mak'hūl, where substantial indications of the periods of settlement were retrieved. Unless otherwise stated (e.g. 101-105), all vessels have been produced by slow-wheel method, many displaying build marks. Fabric color is generally of a pale yellow-brown but ranging to light red and gray depending upon firing. Fabric of Groups I - III is coarse, porous, with frequent inclusions of basalt, quartzite and calcite, and temper of crushed calcite/shell and grass. Fig. 38: 101- 105 are wheel thrown.

Please note that numbers 106 and 107 are represented at a scale twice than the other illustrated pottery.

- 73. Site 4, very pale brown, wall-sided shallow bowl with rounded rim.
- 74. Site 4, light red outer slip, light gray inner slip, bowl.
- 75. Site 4, light reddish brown outer slip, white inner slip, neckless jar.
- 76. Site 5, reddish brown slip, large jar with rolled over rim. diam. indeterminate.
- 77. Site 10, pinkish red with reddish yellow inner slip and pale red outer slip, basin/?cooking pot with inverted rim and ridge/ledge below rim on exterior. linear banded painted decoration (light brown).
- 78. Site 60, cream slip, light brown paint, large bowl with rounded rim and incised

line immediately below rim on exterior, approx. 360 mm, linear-banded decoration int. and ext.

- 79. Site 4, very pale brown slip, reddish brown paint, bowl/basin with beaded rim, diam. indeterminate, linear-banded decoration int. and ext. (NB: decoration is worn and very faint).
- 80. Site 4, light red slip, dark reddish brown paint, shallow bowl/dish with rounded rim, linear banded decoration int. and ext.
- 81. Site 4, pale yellow slip, pale red paint, shallow bowl/ dish with rounded rim, linear-banded painted decoration int. and ext. diam. indeterminate.
- 82. Site 5, very pale brown, pale yellow slip, brown paint, basin with everted rim and handle(s), linear-banded painted decoration.
- 83. Site 4, very pale brown slip, reddish black paint, ? drinking vessel with ridged rim, linear-band and geometric painted decoration int. and ext.
- 84. Site 4, creamy inner slip, very pale brown outer slip, light red paint, ? jar, linear-band and spiral painted decoration.
- 85. Site 49, cream slip, light brown paint, ? jar, linear-band and geometric painted decoration.
- 86. Site 4, light red inner slip, pink outer slip, light brown paint, dish/bowl with rounded rim, linear-band and geometric painted decoration int. and ext.
- 87. Site 4, pale yellow brown slip, dark reddish brown paint, dish/bowl with rounded rim, linear-band and spiral painted decoration.
- 88. Site 5, cream slip, brown paint, bowl with slight indentation below rim on exterior, linear band and geometric painted decoration int. and ext.
- 89. Site 5, cream slip, brown paint, large bowl with beaded rim, linear band and geometric painted decoration on ext.
- 90. Site 5, white, pale yellow slip, pale red



38. Islamic pottery from Khirbat al-Makh'ul (site 4: nos. 73-75, 79-81, 83-84, 86-87, 106), Tall al-Birah (site 5: nos. 76, 82, 88-90, 92, 94-97, 99-100, 102-104), Khirbat al-Wad'ah (site 9: no. 107), Khirbat Zuqm al-Ghurab (site 10: nos. 77, 101), site 46 (nos. 91, 93), site 49 (n. 85), site 50 (nos. 98, 105), site 60 (no. 78).

- paint, body sherd (vessel type indeterminate), painted geometric pattern on ext.
91. Site 46, reddish gray inner slip, pink outer slip, body sherd with trace of handle (vessel type indeterminate), linear-band and geometric painted decoration.
 92. Site 5, cream slip, dark brown paint, body sherd of ? jar/? cooking pot, spiral painted decoration.
 93. Site 46, cream slip, light red brown paint, body sherd of ? jar/? cooking pot, linear-band decoration.
 94. Site 5, light red ,white slip, reddish brown paint, body sherd (vessel type indeterminate), geometric painted decoration.
 95. Site 5, creamy slip, light red brown paint, body sherd of carinated vessel, geometric and spiral painted decoration.
 96. Site 5, yellow slip, black paint, handle, linear-band and spiral painted decoration.
 97. Site 5, light yellow, white slip, light red paint, handle, linear-band and geometric painted decoration.
 98. Site 50, light red inner slip, white outer slip, pale red paint, body sherd (vessel type indeterminate), linear-band and geometric painted decoration.
 99. Site 5, pinkish white slip, brown paint, low-pedestalled base of ? jug/ ? beaker, linear-banded and geometric painted decoration.
 100. Site 5, reddish yellow slip, red paint, base of bowl, geometric painted decoration.
 101. Site 10, monochrome glazed ware, fine fabric, light red, creamy outer surface, traces of green glaze on inner surface, carinated bowl/dish with beaded rim swelling inwards.
 102. Site 5, monochrome glazed ware, fine fabric with frequent fine basalt inclusions, inner surface white with green glaze, outer surface dark brown with green glaze, carinated bowl/dish with beaded rim swelling inwards.
 103. Site 5, monochrome glazed ware, fine fabric, light red, fine basalt inclusions, green glaze, carinated bowl with beaded rim swelling inwards.
 104. Site 5, monochrome glazed ware, fine fabric, pink, fine basalt inclusions, green glaze on interior, carinated bowl with beaded rim.
 105. Site 50, monochrome glazed ware, fine fabric, green glaze, large bowl/basin with beaded rim swelling inwards and outwards.
 106. Site 4, lamp, molded, relief depicting two birds bordered by interwoven lattice work.
 107. Site 9, fine, gray-brown, clay head/? part of lamp, ? sculptured anthropomorphic design.

G. Palumbo
M. Munzi
S. Collins
F. Hourani
A. Peruzzetto
M. Wilson

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Appendix: Survey Site List

(* = Approximate location; G = Glueck; B = Besançon and Hours; A = located on aerial photos; S = surveyed)

Site JRS	Site Name	P.G.E.	P.G.N.	Periods of occupation and Type of site
1 (G314)	Jabal ar-Raḥīl	249.62	171.00	UPal?, UD flints, EB II, EB IV, Rom?, Byz, Ay/Maml (settlement)
2 (G315)	Khirbat aj-Jāmūs	248.84	171.20	IrII, LR?, Byz, Um, Ay/Maml, UD (fort)
3 (G316)	Tall as-Sukhna	250.45	171.41	MBA, Rom, Byz, UD (tell)
4 (G312)	Khirbat al-Mak'hūl	251.62	169.60	IrII, Um, Abb, Ay/Maml, UD (settlement)
5 (G320)	Tall al-Birah	245.50	175.06	Chal?, EB?, EBII, IrII, Rom, Byz, Um, Ay/Maml (settlement)
6 (S)	Jrayyah	251.24	166.28	EBII, EBIII, EB IV (settlement)
7 (S)	as-Sukhna North	250.33	171.86	EBII (settlement)
8 (S)	al-Wad'ah	249.16	173.14	PNeol (Dom), Byz, UD (settlement)
9 (G318)	Khirbat al-Wad'ah	248.96	173.56	Rom, Byz, Maml, UD (settlement)
10 (G317)	Khirbat Zuqm al-Ghurāb	249.74	172.94	LPal, UD flints, Rom, Byz, Maml, UD (fort?)
11 (G319)	an-Nimrah	248.2	173.1	Not visited (settlement)
12 (S)	Zuqm ash-Sharqi	249.90	172.88	MPal, PPN?, UD flints, Rom, Byz?, Abb?, Maml (scatter)
13 (S)	Zuqm at-Taḥt	249.56	172.96	PPNB? (settlement)
14 (S)	No name	250.22	172.94	UD flints (scatter)
15 (S)	al-Ḥasiyya 1	249.66	173.23	Chal/EB I, Byz, UD (settlement)
16 (S)	al-Ḥasiyya 2	249.44	173.20	Maml, UD flints (scatter)
17 (G313)	Khirbat as-Sīl	250.25	169.12	Destroyed (settlement)
18 (B124)	No name *	245.6	174.8	Not visited (scatter)
19 (B118)	No name *	246.7	174.3	Not visited (scatter)
20 (B116)	No name *	247.1	173.6	Not visited (scatter)
21 (B029)	No name *	247.9	173.4	Not visited (scatter)
22 (B115)	No name *	247.9	173.2	Not visited (scatter)
23 (B032)	No name *	249.0	172.8	Not visited (scatter)
24 (B027)	No name *	249.2	172.9	Not visited (scatter)
25 (B031)	No name *	249.1	172.6	Not visited (scatter)
26 (B030)	No name *	249.1	172.4	Not visited (scatter)
27 (B028)	No name *	251.2	173.0	Not visited (scatter)
28 (B017)	No name *	251.7	173.3	Not visited (scatter)
29 (B016)	No name *	253.2	173.7	Not visited (scatter)
30 (B014)	No name	253.74	173.05	LPal (Late Acheulean; scatter)
31 (B015)	No name	253.86	172.73	UPal?, UD flints (scatter)
32 (B018)	No name *	251.2	172.7	Not visited (scatter)
33 (B019)	No name *	251.1	172.5	Not visited (scatter)
34 (B106)	No name *	253.4	171.9	Not visited (scatter)
35 (B107)	No name *	254.1	171.7	Not visited (scatter)
36 (B110)	No name *	250.3	172.0	Not visited (scatter)
37 (B024)	No name *	250.9	170.6	Not visited (scatter)
38 (B022)	No name *	250.2	168.0	Not visited (scatter)
39 (B023)	No name *	250.3	167.5	Not visited (scatter)
40 (B021)	No name	250.44	166.93	LPal, UD flints (scatter)
41 (B013)	No name *	254.3	172.9	Not visited (scatter)
42 (B119)	No name *	245.7	175.5	Not visited (scatter)
43 (S)	No name	245.62	175.00	Ott (water mills)
44 (S)	No name	251.38	169.55	Ir, Um, Maml, UD, UD flints (tower, scatter)
45 (AS)	No name	250.88	165.25	IrII (settlement)
46 (AS)	No name	250.80	165.42	IrII, Rom, Maml (building)
47 (AS)	No name	250.75	165.87	Rom, Byz, Mod (farm)
48 (S)	No name	250.54	166.28	Epipal?, Mod (scatter)
49 (S)	No name	250.50	166.47	Rom/Byz, Maml (caves)
50 (AS)	No name	250.24	167.06	Byz, Um, Abb?, Maml (building)
51 (AS)	No name	250.23	166.98	Byz, Um, Maml, UD (hamlet)
52 (S)	No name	250.30	166.98	MPal? (scatter)
53 (AS)	No name	251.78	169.47	(structures)
54 (AS)	No name	251.86	169.64	UD flints (stone circles, cairns)
55 (AS)	No name	252.00	169.30	UD flints, Byz, Maml, UD (stone circle)
56 (AS)	No name	252.08	168.96	UD flints (cairn)
57 (AS)	No name	251.88	168.86	Epipal? (cairn)
58 (AS)	No name	252.26	169.38	UD flints, pottery (cairn)
59 (AS)	No name	252.43	169.64	MPal? (cairn)
60 (AS)	No name	252.20	169.70	Maml, UD flints (stone circles)
61 (AS)	No name	252.28	169.92	UD flints (stone circles)
62 (S)	No name	251.98	169.98	LPal, MPal (scatter)
63 (AS)	No name	251.45	170.01	UD flints (cairns)
64 (AS)	No name	247.29	171.53	Epipal?, UD flints (stone circles)

Site JRS	Site Name	P.G.E.	P.G.N.	Periods of occupation and Type of site
65 (AS)	No name	247.24	171.10	UD flints, EB I/II, UD (cairns, stone circles)
66 (AS)	No name	247.74	171.20	EB II?, Rom, UD (stone circles)
67 (AS)	al-Birah South	245.46	174.75	UD flints, Ir?, Rom (Dom), Byz, Maml, UD (fort)
68 (S)	No name	245.35	174.78	Rom/Byz, Maml, UD (caves)
69 (S)	No name	246.39	173.62	Mpal?, UD flints (scatter)
70 (AS)	No name	245.28	173.21	Epipal (Natuf), Maml, UD (tower)
71 (AS)	No name	253.59	170.80	(cairn)
72 (AS)	No name	253.46	170.40	UD flints (enclosure)
73 (AS)	No name	253.30	170.50	UD flints (cairns)
74 (AS)	No name	252.93	170.24	UD flints (cairns)
75 (AS)	No name	252.58	170.60	UPal, Epipal (cairns)
76 (AS)	No name	253.10	171.20	(cairns)
77 (AS)	No name	252.40	170.76	(cairns)
78 (AS)	No name	252.20	171.18	(cairns)
79 (AS)	No name	247.37	172.64	EB II, UD flints (settlement)
80 (AS)	No name	251.72	172.82	Chal (Dom), EBIV, Rom/Byz, Mod, UD (settlement)
81 (AS)	as-Sukhna East	251.48	171.70	IrII, Mod (camp)
82 (AS)	No name	244.94	173.04	Rom, UD flints (cairns)
83 (AS)	No name	245.27	172.27	PPNB, UD flints (stone circle)
84 (AS)	No name	247.96	170.74	UD flints, EBII?, Rom/Byz, UD (stone circle)
85 (AS)	No name	248.24	170.57	UD flints (cairn)
86 (AS)	No name	248.20	170.90	UD flints (cairn)
87 (AS)	at-Tuwayfiriyya	245.80	175.42	LB II? (settlement)
88 (AS)	No name	253.35	173.10	UD flints, UD pottery (cairns, circles)
89 (S)	No name	254.40	172.11	Lpal (Acheulean; scatter)
90 (S)	No name	254.24	171.95	Epipal (settlement?)
91 (A)	No name	245.68	173.77	Not visited (cairn)
92 (A)	No name	245.15	172.72	Not visited (structure)
93 (A)	No name	246.25	172.78	Not visited (stone circle)
94 (A)	No name	247.35	174.48	Not visited (stone circle)
95 (A)	No name	248.74	173.79	Not visited (cairn)
96 (A)	No name	248.99	174.01	Not visited (cairn)
97 (A)	No name	248.93	174.95	Not visited (cairn)
98 (A)	No name	249.33	174.06	Not visited (cairn)
99 (A)	No name	249.80	174.11	Not visited (cairn)
100 (A)	No name	249.80	174.28	Not visited (cairn)
101 (A)	No name	250.00	174.90	Not visited (cairn)
102 (A)	No name	250.20	174.29	Not visited (cairn, stone circle)
103 (A)	No name	250.67	174.23	Not visited (cairn)
104 (A)	No name	246.95	173.87	Not visited (enclosure)
105 (A)	No name	246.96	173.72	Not visited (small tell)
106 (A)	No name	247.10	173.68	Not visited (cemetery)
107 (A)	No name	249.78	171.95	Not visited (enclosure)
108 (A)	No name	249.78	171.63	Not visited (hamlet, stone circles)
109 (A)	No name	249.50	171.45	Not visited (stone circles)
110 (A)	No name	249.35	171.28	Not visited (stone circles)
111 (A)	No name	245.45	171.82	Not visited (cairn?, stone circle)
112 (A)	No name	246.29	171.73	Not visited (enclosure)
113 (A)	No name	246.01	171.42	Not visited (cairns)
114 (A)	No name	245.88	171.20	Not visited (cairn)
115 (A)	No name	245.60	170.56	Not visited (cairn)
116 (A)	No name	245.97	170.49	Not visited (rect. structure)
117 (A)	No name	247.69	170.55	Not visited (cairn)
118 (A)	No name	248.26	171.10	Not visited (cairn)
119 (A)	No name	250.72	170.65	Not visited (structures)
120 (A)	No name	252.83	171.90	Not visited (cairn)
121 (A)	No name	253.23	171.66	Not visited (cairn)
122 (A)	No name	253.54	171.48	Not visited (cairn)
123 (A)	No name	253.68	171.48	Not visited (enclosure)
124 (A)	No name	253.40	171.75	Not visited (enclosures)
125 (A)	No name	254.14	171.30	Not visited (cairn)
126 (A)	No name	254.16	171.43	Not visited (enclosure)
127 (A)	No name	251.87	171.35	Not visited (terrace wall?)
128 (A)	No name	252.29	170.68	Not visited (structure)
129 (A)	No name	252.20	170.50	Not visited (cairns)
130 (A)	No name	252.13	170.60	Not visited (cairn)
131 (A)	No name	250.58	172.38	Not visited (structure)
132 (A)	No name	250.98	172.22	Not visited (circles)
133 (A)	No name	252.30	170.28	Not visited (circle)
134 (A)	No name	247.38	171.84	Not visited (cairn)

Site JRS	Site Name	P.G.E.	P.G.N.	Periods of occupation and Type of site
135 (A)	No name	247.48	171.60	Not visited (enclosure)
136 (A)	No name	247.25	171.35	Not visited (cairns)
137 (A)	No name	247.10	172.75	Not visited (structures)
138 (A)	No name	245.31	170.04	Not visited (enclosure)
139 (A)	No name	245.30	169.84	Not visited (enclosure)
140 (A)	No name	245.12	169.74	Not visited (cairn)
141 (A)	No name	245.94	169.20	Not visited (cairns)
142 (A)	No name	246.28	169.30	Not visited (enclosure)
143 (A)	No name	246.65	169.45	Not visited (cairns)
144 (A)	No name	246.84	169.72	Not visited (cairns)
145 (A)	No name	247.42	169.76	Not visited (stone circles)
146 (A)	No name	246.86	169.06	Not visited (enclosure)
147 (AS)	Khirbat Abū az-Zayghān	247.88	168.60	PPNB, UD flints, Ir, Rom/Byz, Ay/Maml, UD (settlement)
148 (A)	No name	248.18	170.05	Not visited (structure)
149 (A)	No name	248.26	170.23	Not visited (enclosure)
150 (A)	No name	248.37	170.25	Not visited (cairn)
151 (A)	No name	249.40	170.25	Not visited (stone circles)
152 (A)	No name	248.54	170.05	Not visited (cairn)
153 (A)	No name	248.50	169.90	Not visited (circular structure)
154 (A)	No name	248.72	169.92	Not visited (cairn)
155 (A)	No name	249.05	170.04	Not visited (cairn)
156 (A)	No name	248.48	169.42	Not visited (enclosure)
157 (A)	No name	249.03	168.67	Not visited (structure)
158 (A)	No name	248.85	168.25	Not visited (cairns)
159 (A)	No name	249.29	168.45	Not visited (cairn)
160 (S)	No name	248.35	168.38	UD flints, pottery (stone circles)
161 (S)	No name	248.26	167.96	PPNB?, UD flints, Byz, Ay/Maml, UD (enclosures)
162 (A)	No name	248.10	167.34	Not visited (cairn)
163 (A)	No name	248.66	167.40	Not visited (cairns)
164 (A)	No name	249.15	167.25	Not visited (cairns)
165 (A)	No name	249.20	166.97	Not visited (cairn)
166 (A)	No name	249.75	167.20	Not visited (cairns)
167 (A)	No name	249.20	168.07	Not visited (structures)
168 (A)	No name	250.02	168.08	Not visited (enclosures)
169 (A)	No name	250.15	168.05	Not visited (circular structure)
170 (A)	No name	248.76	166.54	Not visited (enclosure)
171 (A)	No name	248.90	166.55	Not visited (enclosure)
172 (A)	No name	248.26	166.58	Not visited (cairn)
173 (A)	No name	247.74	166.48	Not visited (cairns)
174 (A)	No name	247.73	166.93	Not visited (cairn)
175 (A)	No name	247.45	166.11	Not visited (cairn)
176 (A)	No name	246.92	166.02	Not visited (cairn)
177 (A)	No name	246.33	166.98	Not visited (enclosure)
178 (A)	No name	246.00	167.03	Not visited (enclosure)
179 (A)	No name	245.55	166.98	Not visited (structure)
180 (A)	No name	245.38	167.07	Not visited (enclosure)
181 (A)	No name	245.67	166.40	Not visited (enclosures, structures)
182 (A)	No name	245.90	165.76	Not visited (cairns)
183 (A)	No name	246.18	165.10	Not visited (cairn)
184 (A)	No name	247.00	165.88	Not visited (cairns)
185 (A)	No name	246.94	165.72	Not visited (structure)
186 (A)	No name	247.32	165.65	Not visited (enclosures)
187 (A)	No name	247.90	165.44	Not visited (cairn, enclosure)
188 (A)	No name	248.34	165.18	Not visited (cairn)
189 (A)	No name	246.70	164.92	Not visited (cairns)
190 (A)	No name	245.14	165.26	Not visited (enclosure)
191 (A)	No name	251.00	165.10	Not visited (structures)
192 (A)	No name	250.90	165.02	Not visited (enclosure)
193 (A)	No name	251.59	166.88	Not visited (cairn, structure)
194 (A)	No name	251.81	166.86	Not visited (cairn)
195 (A)	No name	252.30	166.70	Not visited (cairn)
196 (A)	No name	250.86	168.57	Not visited (cairns)
197 (A)	No name	251.43	168.08	Not visited (cairns)
198 (A)	No name	252.85	169.52	Not visited (cairns)
199 (A)	No name	252.89	169.85	Not visited (enclosure)
200 (A)	No name	252.65	169.90	Not visited (structure, cemetery)
201 (A)	No name	251.39	170.29	Not visited (cairn)
202 (A)	No name	249.74	169.54	Not visited (caves, structures)
203 (A)	No name	246.48	168.12	Not visited (cairn)
204 (A)	No name	246.29	175.18	Not visited (enclosure)
205 (A)	No name	246.84	175.38	Not visited (cairn, enclosures)
206 (A)	No name	250.30	175.25	Not visited (cairns)

Site JRS	Site Name	P.G.E.	P.G.N.	Periods of occupation and Type of site
207 (A)	No name	249.00	166.35	Not visited (cairn)
208 (A)	No name	245.90	171.72	Not visited (enclosures)
209 (A)	No name	246.94	171.65	Not visited (stone circles, cairns)
210 (A)	No name	246.84	170.20	Not visited (cairn)
211 (A)	No name	247.16	168.76	Not visited (cairn)
212 (A)	No name	245.33	168.90	Not visited (cairn)
213 (A)	No name	245.36	169.47	Not visited (cairns)
214 (A)	No name	245.82	169.65	Not visited (cairns)
215 (A)	No name	247.06	167.61	Not visited (enclosure)
216 (A)	No name	245.47	167.39	Not visited (enclosure)?
217 (A)	No name	245.64	167.58	Not visited (cairns)
218 (A)	No name	246.19	167.58	Not visited (cairn)
219 (A)	No name	245.89	167.49	Not visited (cairn)
220 (A)	No name	245.12	167.38	Not visited (cairn)
221 (A)	No name	245.49	167.22	Not visited (cairn)
222 (A)	No name	246.83	167.22	Not visited (stone circle)
223 (A)	No name	246.52	166.74	Not visited (cairn)
224 (A)	No name	246.46	166.45	Not visited (cairns)
225 (A)	No name	248.46	175.35	Not visited (cairn)
226 (A)	No name	248.55	175.55	Not visited (cairns)
227 (A)	No name	248.23	175.71	Not visited (cairn or structure)
228 (A)	No name	248.24	175.94	Not visited (cairns)
229 (A)	No name	248.03	175.00	Not visited (cairns)
230 (A)	No name	247.67	174.91	Not visited (cairns)
231 (A)	No name	247.93	174.80	Not visited (cairns)
232 (A)	No name	247.92	174.54	Not visited (cairn)
233 (A)	No name	247.73	174.30	Not visited (cairn)
234 (A)	No name	248.30	173.40	Not visited (cairns)
235 (A)	No name	247.74	173.91	Not visited (cairns)
236 (A)	No name	247.92	173.88	Not visited (cairn)
237 (A)	No name	248.36	173.88	Not visited (cairn)
238 (A)	No name	247.88	170.15	Not visited (cairn)
239 (A)	No name	248.05	169.76	Not visited (cairn)
240 (A)	No name	247.64	169.40	Not visited (cairns)
241 (A)	No name	247.42	169.19	Not visited (cairn)
242 (A)	No name	247.51	168.04	Not visited (cairn)
243 (A)	No name	247.33	167.90	Not visited (cairn, stone circle)
244 (A)	No name	246.61	167.16	Not visited (circular structures, enclosures)
245 (A)	No name	247.68	167.76	Not visited (cairn)
246 (A)	No name	247.83	167.74	Not visited (cairn)
247 (A)	No name	248.63	167.68	Not visited (circular structures, enclosures)
248 (A)	No name	248.54	167.60	Not visited (cairn)
249 (A)	No name	248.51	167.44	Not visited (cairn)
250 (A)	No name	248.52	167.06	Not visited (cairn)
251 (A)	No name	248.70	167.00	Not visited (circular structures, enclosures)
252 (A)	No name	247.99	166.89	Not visited (cairn)
253 (A)	No name	247.59	166.91	Not visited (cairn)
254 (B109)	No name	250.04	172.92	Not visited (MP scatter)
255 (A)	No name	248.27	166.03	Not visited (cairn)
256 (A)	No name	247.99	164.94	Not visited (animal pen)
257 (A)	No name	250.02	174.50	Not visited (cairn)
258 (A)	No name	250.02	175.19	Not visited (cairns)
259 (A)	No name	250.07	175.38	Not visited (cairn)
260 (A)	No name	249.91	175.48	Not visited (cairn)
261 (A)	No name	249.26	175.66	Not visited (cairn)
262 (A)	No name	249.43	175.35	Not visited (cairn)
263 (A)	No name	250.99	174.18	Not visited (cairn)
264 (A)	No name	250.98	174.05	Not visited (cairn)
265 (A)	No name	250.13	173.20	Not visited (settlement?)
266(A)	No name	250.26	173.78	Not visited (cairn)
267 (A)	No name	250.41	173.81	Not visited (cairn)
268 (A)	No name	248.83	172.46	Not visited (animal pen / stone circle)
269 (A)	No name	249.47	172.02	Not visited (animal pen / stone circle)
270 (A)	No name	249.22	171.70	Not visited (animal pen / stone circle)
271 (A)	No name	249.53	171.65	Not visited (animal pen / stone circle)
272 (AS)	as-Sukhna (modern village)	250.75	171.15	modern village (Late Ottoman, Modern)
273 (A)	No name	250.74	169.56	Not visited (animal pen / stone circle)
274 (A)	No name	249.43	169.80	Not visited (animal pen)
275 (A)	No name	248.96	171.54	Not visited (animal pen)
276 (A)	No name	249.44	168.94	Not visited (cairn)

Site JRS	Site Name	P.G.E.	P.G.N.	Periods of occupation and Type of site
277 (A)	No name	249.28	168.63	Not visited (cairn)
278 (A)	No name	249.23	167.58	Not visited (cairn)
279 (A)	No name	249.60	167.75	Not visited (animal pen)
280 (A)	No name	249.26	166.24	Not visited (cairn)
281 (A)	No name	249.35	166.20	Not visited (cairn)
282 (A)	No name	249.50	166.18	Not visited (cairn)
283 (A)	No name	248.75	164.85	Not visited (cairns)
284 (A)	No name	249.33	165.97	Not visited (hut and animal pen)
285 (A)	No name	249.16	164.72	Not visited (animal pen)
286 (A)	No name	249.66	164.31	Not visited (cairn)
287 (A)	No name	249.88	164.65	Not visited (cairn)
288 (A)	No name	249.49	165.49	Not visited (cairn)
289 (A)	No name	249.41	164.06	Not visited (cairn)
290 (A)	No name	251.34	174.53	Not visited (cairn)
291 (A)	Jabal Abū al-Ḥulwah	251.33	174.40	Not visited (cairn)
292 (A)	No name	251.84	174.33	Not visited (cairn)
293 (A)	No name	251.86	173.92	Not visited (cairn)
294 (A)	No name	251.77	168.64	Not visited (cairn)
295 (A)	No name	251.71	168.40	Not visited (cairn)
296 (A)	No name	251.70	168.28	Not visited (cairn)
297 (A)	No name	250.97	168.31	Not visited (cairn)
298 (A)	No name	251.81	167.05	Not visited (cairn)
299 (A)	No name	251.49	167.21	Not visited (cairn)
300 (A)	No name	252.65	175.90	Not visited (animal pen/stone circles/huts)
301 (A)	No name	251.40	175.84	Not visited (cairn)
302 (A)	No name	253.26	175.99	Not visited (cairn)
303 (A)	No name	253.02	175.46	Not visited (modern house, animal pen, cairn)
304 (A)	No name	253.13	175.37	Not visited (cairn)
305 (A)	No name	253.39	175.41	Not visited (cairn)
306 (A)	No name	253.60	175.25	Not visited (cairn, long wall)
307 (A)	No name	253.89	175.48	Not visited (modern hamlet)
308 (A)	No name	254.00	175.35	Not visited (animal pen / stone circle)
309 (A)	No name	253.89	175.23	Not visited (animal pens)
310 (A)	No name	254.25	175.21	Not visited (cairn)
311 (A)	No name	254.32	174.00	Not visited (animal pen, modern hamlet)
312 (A)	No name	253.32	175.19	Not visited (cairn)
313 (A)	No name	253.48	175.04	Not visited (cairn)
314 (A)	No name	253.68	174.98	Not visited (cairn)
315 (A)	No name	253.95	174.71	Not visited (cairn, long wall)
316 (A)	No name	254.21	174.72	Not visited (cairn)
317 (A)	No name	254.12	174.42	Not visited (cairn)
318 (A)	No name	252.18	175.13	Not visited (cairn, animal pen)
319 (A)	No name	252.18	175.34	Not visited (cairn)
320 (A)	No name	252.38	175.44	Not visited (animal pen / stone circle)
321 (A)	No name	252.26	174.26	Not visited (cairn)
322 (A)	No name	252.29	173.90	Not visited (cairns)
323 (A)	No name	254.07	168.64	Not visited (cairn)
324 (A)	No name	253.03	167.99	Not visited (cairn, animal pen)
325 (A)	No name	253.75	167.83	Not visited (animal pen / stone circle)
326 (A)	Rujum at-Tāj	250.80	176.00	Not visited (animal pen / stone circle)
327 (A)	No name	248.52	166.14	Not visited (cairn)
328 (A)	No name	248.97	165.22	Not visited (cave shelters, walls)
329 (A)	No name	249.00	165.33	Not visited (animal pen)

Note: sites 326-329 are not displayed on the site distribution maps.

ARCHAEOLOGICAL SURVEY OF THE EAST COAST OF THE DEAD SEA PHASE 1: SUWAYMA, AZ-ZĀRA AND UMM SIDRA

by

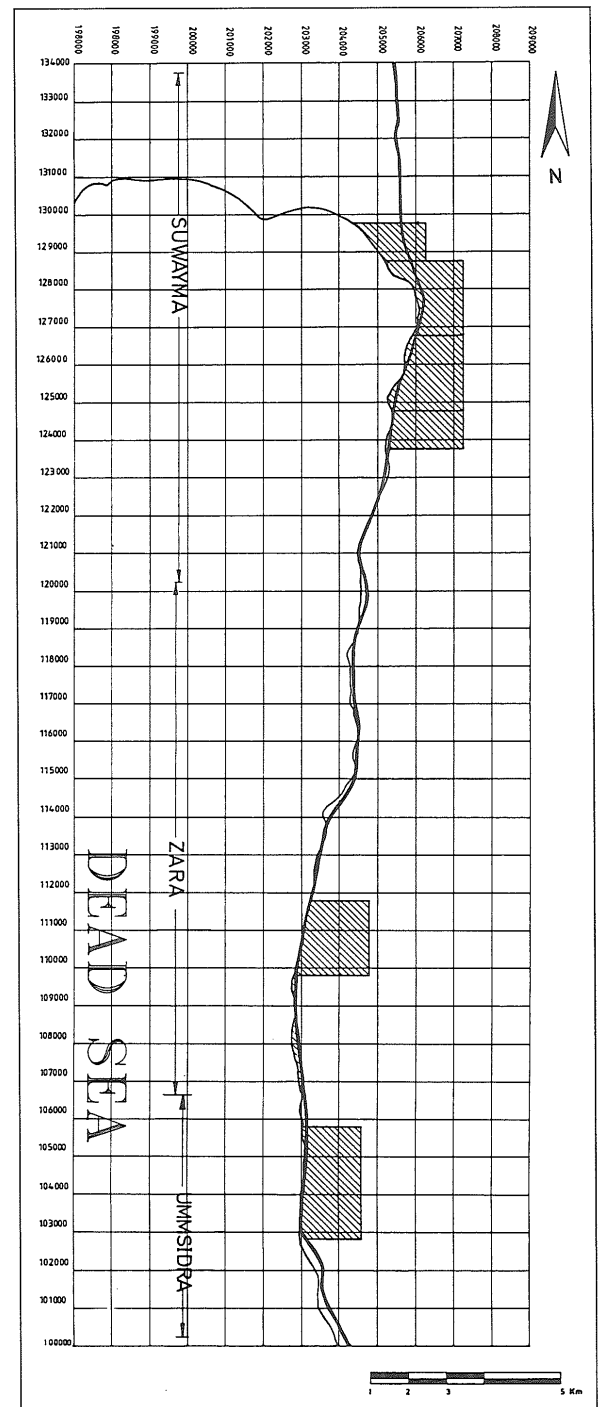
Khairieh 'Amr, Khalil Hamdan, Svend Helms and Luay Mohamadieh

Introduction

A master plan for the touristic development of the east coast of the Dead Sea is currently being prepared by Sigma Consulting Engineers, under contract from the Jordan Valley Authority (Sigma Consulting 1996). Two priority areas at Suwayma and az-Zāra were chosen as sites for development.

Due to the military nature of the area up till almost a year ago, as well as the scarcity of occupation and development activities, much of the northern east coast of the Dead Sea has never been properly surveyed for archaeological remains, with previous surveys concentrating on the areas close to the northern tip of the sea or south of and including Ghawr Ḥaditha (see for example Mallon 1924; Glueck 1945; Rast and Schaub 1974; Ibrahim *et al.* 1976; Raikes 1979; Worschech 1985a, b; King *et al.* 1987; Yassine 1988; MacDonald 1992; Kaliff and Holmgren 1995; Prag *et al.* 1995); the major excavated sites being Tulaylāt al-Ghassūl, az-Zāra, Bāb adh-Dhrā', Numayra, Dayr 'Ayn 'Abāta and an-Naq'. Of these sites, only az-Zāra is in the area covered by this present survey (Strobel and Clamer 1986; Strobel 1989a; b; Clamer 1989).

As part of the Environmental Impact Study of the region, an archaeological survey was conducted at the Suwayma development area on 2-5 and 25 September 1995, by Khairieh 'Amr and Khalil Hamdan, and on 15 and 19 October by Khalil Hamdan and Luay Mohamadieh. The az-Zāra area was surveyed from 6 to 20 September 1995, by Khairieh 'Amr and Khalil Hamdan. The Umm Sidra (South Zara) area was surveyed from 19 to 21 November 1995 by Svend Helms, Khalil Hamdan and Luay Mohamadieh (Fig. 1).



1. Map of the survey areas.

The archaeological survey benefited greatly from the support and cooperation of

the Sigma Consulting Engineers planning team, especially Dr Akram al-Attar and Dr Khaled Momany. The contour survey was carried out by the Modern Surveying Offices (Mohammad Khalil Ahmad) under sub-contract from Sigma.

THE SUWAYMA DEVELOPMENT AREA

The area proposed for development at Suwayma is divided into three sections: the first (northern) section is situated directly to the south of the modern town of Suwayma. It covers 100 dunums to the east of the present highway. The area is comparatively flat with lush vegetation and limited agricultural activity. No archaeological remains were found in this section.

The two other sections are situated approximately 1.5km to the south of the modern town of Suwayma. The second (middle) section covers an area of 1.6km², mostly on the hill slopes to the east of the modern highway. The terrain of this section is very rough, being cut by several wadis. Most notable are outcrops of columnar basalt on the upper slopes to the east and tufa in the centre and west. It was noted during the survey that the tufa outcrops are a refuge area for birds, mostly quail. Animal dens were also noted in the area, and the remains of many carnivorous animal meals were encountered. The plant cover of this section is very scarce, and only one fresh water stream to the north of this section was noted during the survey. Limited farming using piped water is carried out on the upper slopes to the east of this section. Only one shepherd with a small flock of sheep and goats used a small modern pool on the fresh water stream during the four days of the initial survey. The only real disturbance to this section occurs next to the modern highway.

The third (southern) section is on the beach to the west of the modern highway. This section is a somewhat flat terrace above

the shore, cut by the large Wādī Mukhayriş and by several tributary wadis. Other than the highway disturbance, the area directly to the north and south of the existing "Dead Sea Spa Hotel" is greatly disturbed by bulldozing and dumping.

Methodology of the Archaeological Survey

The survey was conducted on foot, with the two archaeologists walking north-south transects approximately 50-100m apart, depending on the topography of each transect, starting at the upper slopes to the east of the development area. Due to the scarce plant cover in the area, this distance between the transects allowed for good detection of remains. Still the distance between the surveyors had to be reduced to only a few metres when walking among the tufa outcrops. Special attention was also paid to the sections formed by the wadi cuts. Pottery was read at the sites and only diagnostic sherds were collected (no flint tools were found in the area).

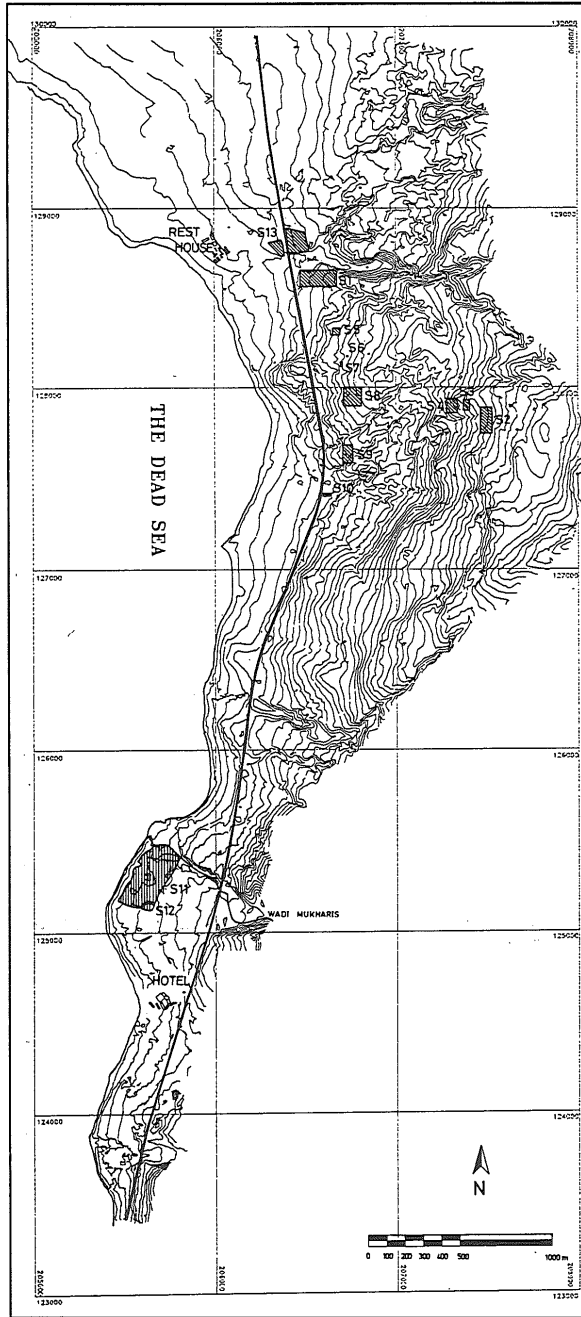
The sites were plotted on a 1:5000 topographic map provided by Sigma Consulting. The Palestine Grid coordinates and altitudes denote the estimated centre of the site. Thirteen sites were recorded in the Suwayma area (Fig. 2).

List of Sites

Suwayma 1

P.G. coordinates: 128.615N; 206.583E. Altitude: -369m. Dimensions: 90m N/S x 200m E/W.

Cemetery. Tombs defined by oval outlines of medium sized tufa and basalt stones. One tomb was found disturbed (Fig. 3). Also probable wall outlines at the western edge. Located on a flat ridge at the hillside. A fresh water stream runs just to the north of the site. The site is cut by a modern track and disturbed by bulldozing at the western edge (near the modern highway). A few Late Byzantine body sherds were noted at the site. It



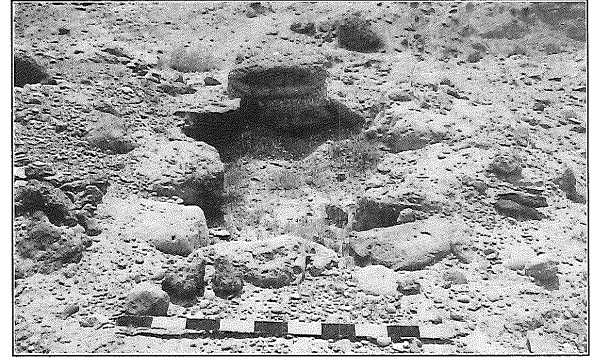
2. Archaeological sites in the Suwayma area.

is thought that these are not connected with the date of the establishment of the site.

Dating: Uncertain, probably Chalcolithic/ Early Bronze Age.

Suwayma 2

P.G. coordinates: 127.828N; 207.497E. Altitude: -264m. Dimensions: 150m N/S x 65m E/W.



3. Disturbed burial at Site Suwayma 1.

Cemetery. Tombs defined by oval outlines of medium sized basalt stones. Located on a flat ridge below outcropping columnar basalt formation. A few pottery sherds were noted at the site. One wheel-made base of probable Late Roman date was collected. Like the Late Byzantine sherds of Suwayma 1, this is not thought to be an indicator of the date of the site.

Dating: Uncertain, probably Chalcolithic/ Early Bronze Age.

Suwayma 3

P.G. coordinates: 127.914N; 207.387E. Altitude: -279m. Dimensions: 58.5m N/S x 37.5m E/W.

A complex series of corrals among a tufa rock outcrop. Low walls formed by rough basalt and tufa stones spanning the gaps in the tufa outcrop, as well as stone semi-circles on the flat ledge to the south of the outcrop. A few non-diagnostic and very worn pottery sherds were noted at the site, probably of Early Bronze Age and Roman/ Byzantine date.

Dating: Modern, although the semi-circles to the south may of older date.

Suwayma 4

P.G. coordinates: 127.908N; 207.308E. Altitude: -296m. Dimensions: 80m N/S x 60m E/W.

Cemetery. Tombs defined by oval outlines of medium sized basalt and tufa stones. Lo-

cated on a flat ridge below outcropping tufa formation. Cut by a wadi on the south and west. No pottery sherds or flint tools were noted at the site.

Dating: Uncertain, probably Chalcolithic/ Early Bronze Age.

Suwayma 5

P.G. coordinates: 128.323N; 206.680E. Altitude: -352m. Dimensions: 40m N/S x 40m E/W.

Cemetery. Tombs defined by oval outlines of medium sized tufa stones, one tomb was found disturbed, only one small bone fragment was noted on the surface of the disturbed soil. Located on a somewhat flat ridge below outcropping tufa formation, with a small wadi to the north. No pottery sherds or flint tools were noted at the site. One small carnelian bead was found on the surface.

Dating: Uncertain, probably Chalcolithic/ Early Bronze Age.

Suwayma 6

P.G. coordinates: 128.188N; 206.735E. Altitude: -342m. Dimensions: 0.67m N/S x 1.70m E/W.

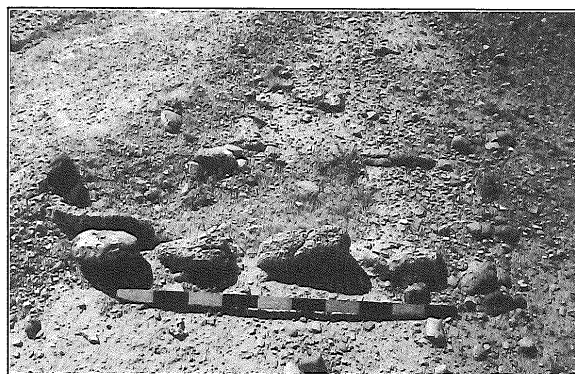
One isolated burial defined by a rectangular outline of relatively small stones (tufa, sandstone and one basalt), oriented at 80/260° (Fig. 4). Construction markedly different from the tombs in Suwayma 1, 2, 4 and 5. Located on a flat ridge below outcropping tufa formation. No pottery sherds or flint tools were noted at the site.

Dating: Early Bronze Age (?).

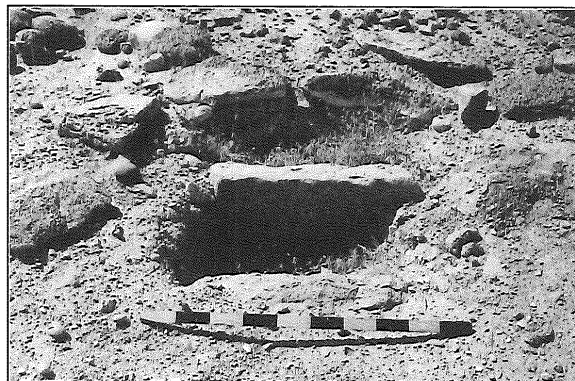
Suwayma 7

P.G. coordinates: 128.142N; 206.707E. Altitude: -344m. Dimensions: 35m N/S x 10m E/W.

Small cemetery. Tombs defined by oval outlines of medium sized tufa stones. One tomb was found disturbed (Fig. 5). Located on a



4. Burial Site Suwayma 6.



5. Disturbed burial at Site Suwayma 7.

narrow ridge below outcropping tufa formation. No pottery sherds or flint tools were noted at the site.

Dating: Uncertain, probably Chalcolithic/ Early Bronze Age.

Suwayma 8

P.G. coordinates: 127.961N; 206.762E. Altitude: -340m. Dimensions: 100m N/S x 100m E/W.

Cemetery with three stone circles. Tombs defined by oval outlines of comparatively large basalt stones, the tombs being larger than in any of the other cemeteries in the area. Three well-defined stone circles were noted: SC1 in the middle of the field, measuring 12m in diameter with a probable entrance facing north (Fig. 6); SC2 in the eastern part of the field, measuring 10.50m E/W x 12.80m N/S; and SC3 in the southern part measuring 20m in diameter. The site is located on a slope with tufa outcrops to the north and south. Four pottery sherds belonging to one vessel



6. Stone circle SC1 at Site Suwayma 8.

dating to the Late Byzantine-Early Islamic period were collected at the surface.

Dating: Uncertain, probably Chalcolithic/Early Bronze Age.

Suwayma 9

P.G. coordinates: 127.642N; 206.737E. Altitude: -358m. Dimensions: 100m N/S x 57m E/W.

Cemetery. Tombs defined by oval outlines of medium sized basalt and tufa stones. The field includes one stone circle of 7.50m diameter. The site is located on a flat ridge above outcropping tufa formation to the west, with wadi cuts to the north, south and east. No pottery sherds or flint tools were noted at the site.

Dating: Uncertain, probably Chalcolithic/Early Bronze Age.

Suwayma 10

P.G. coordinates: 127.420N; 206.621E. Altitude: -383m. Dimensions: 16m N/S x 40m E/W.

Cemetery. Tombs defined by oval outlines of relatively small basalt, tufa, sandstone and flint stones. Located on a flat ridge with a tufa outcrop to the south. The field is much disturbed by bulldozing to the north, bulldozing and dumps to the west near the modern highway, and is cut by four rows of recently planted shrubs. It is also cut by a water course to the south. No pottery sherds or flint tools were noted at the site.

Dating: Early Bronze Age (?).

Suwayma 11

P.G. coordinates: 125.150-.450N; 205.550-.700E. Altitude: -395 - -385m. Dimensions: 300m N/S x 150m E/W.

An extensive site on a terrace above the Dead Sea shore, on the south bank of Wādi Mukhayriş. The site exhibits many low "field" walls of rough stones, less than 1m high, forming complexes of corrals and rectangular structures. There are also many stone piles dotted throughout the site. A single one-room house with walls preserved ca. 1.50m high is evident in the northern part of the site. The house measures 6.90m N/S x 3.60m E/W, built of rough stones with mud/ash/reed mortar, doorway to the west facing the sea, has four small niches in the interior west, south and east walls. The site is cut by three tributaries of Wādi Mukhayriş, one of which cuts directly next to the southern wall of the house. No cultural remains or habitation stratigraphy were noted in the cuts. The surface has the remains of numerous recent fires and is obviously a favoured picnic area.

A few modern pottery sherds, one single Late Byzantine storage jar body sherd, and numerous modern glass bottle fragments were noted at the site. The site is associated with a cemetery (site Suwayma 12).

Dating: Modern.

Suwayma 12

P.G. coordinates: 125.160N; 205.570E. Altitude: -390m. Dimensions: 49m N/S x 60m E/W.

An Islamic cemetery at the southern end of site Suwayma 11. Tombs defined by oval piles of rough stones oriented east-west (estimated around 30 burials). The cemetery is bound by a low winding wall of rough stones to the east and south, while the west and north boundaries are not clear. The site is cut by a modern track to the north and a water

course to the southwest. No pottery sherds or flint tools were noted at the site.

Dating: Modern.

Suwayma 13

P.G. coordinates: 128.820N; 206.450E. Altitude: -380m. Dimensions: 108m N/S x 170m E/W.

Cemetery and stone-built structures. Tombs defined by oval outlines of relatively small stones. Wall lines are also apparent in the western part of the site. Located on a flat ridge. The field is cut by the modern highway, and much disturbed by bulldozing to the south and west. No pottery sherds or flint tools were noted at the site.

Dating: Early Bronze Age (?).

Comments

All but one of the sites in the northern section of the development area are cemeteries. A feature they share in common is their situation on flat areas below steep slopes or rock outcrops, still there are variations in their structures, probably indicating varying dates. The scarcity of pottery sherds and flint tools, even in the dumps from the disturbed burials, makes it very difficult to date the structures without excavation. Dates in the Chalcolithic or Early Bronze Age are postulated based on surface similarities with excavated cemeteries further south, such as at Bāb adh-Dhrā' (Schaub and Rast 1989), Khirbat Khanāzir (MacDonald 1995) and an-Naq' (Waheeb 1995), as well as the proximity of the Suwayma cemeteries to Tulaylāt al-Ghassūl and Tall Iktanū. It cannot be confirmed that the few Roman, Byzantine and Early Islamic sherds noted in the area are associated with the use of the cemeteries. Due to the undisturbed nature of the Suwayma section, and the low visibility of the tombs, the existence of more cemeteries in the area cannot be ruled out.

THE AZ-ZĀRA DEVELOPMENT AREA

The area proposed for development in the az-Zāra sector starts at approximately 20km to the south of the northern tip of the Dead Sea, covering an area of over 3km².

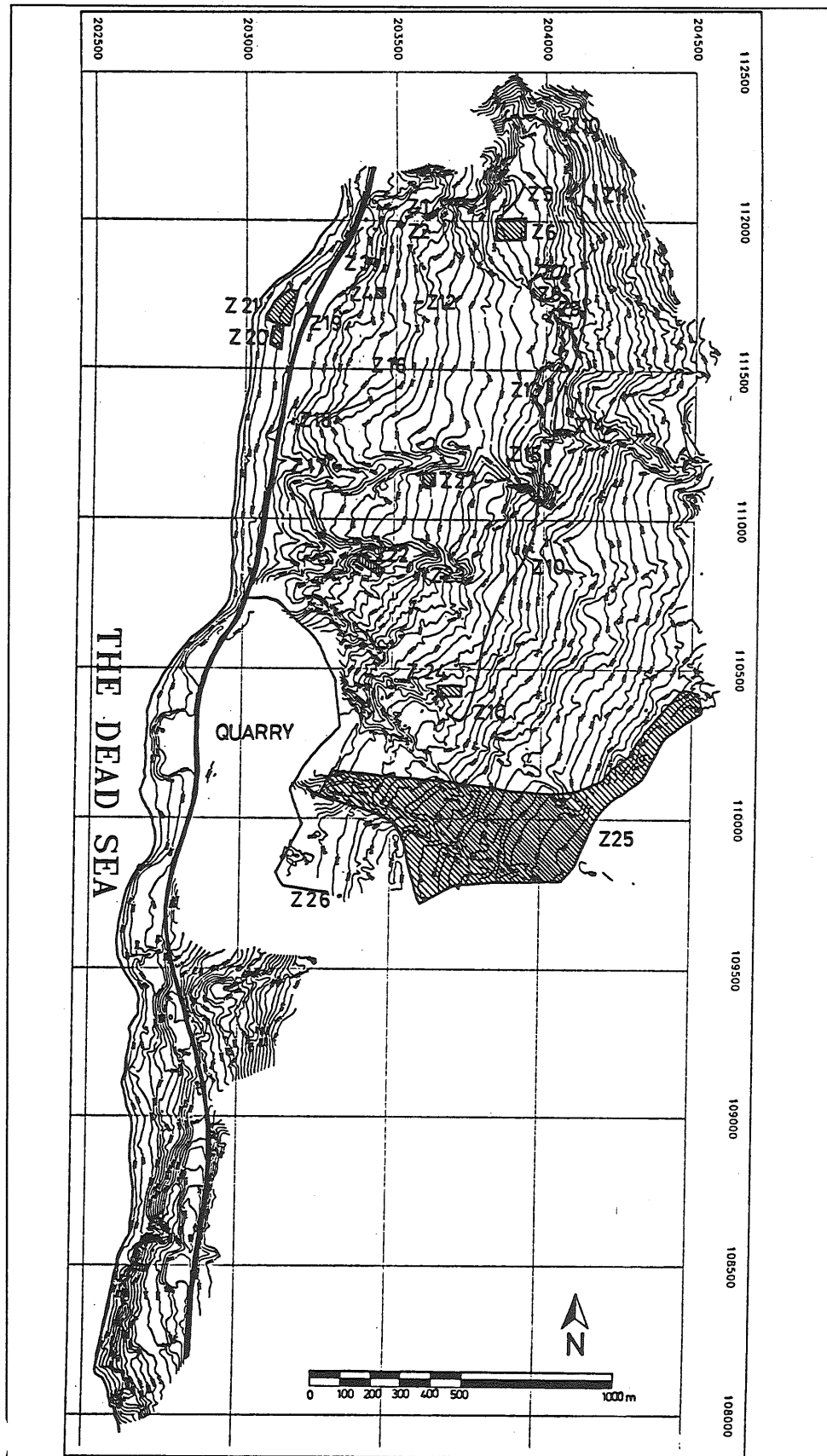
The region is surrounded by high, rough terrain in the north, east and south, with the sea to the west. The northern 2km² are dominated by concentrations of hot water springs and streams, the courses of which are covered with lush vegetation of tall grasses and palm trees. Some of the stream courses are deep-cut wadis with sheer banks. The relatively flat areas in the north and centre are divided into private farms, mostly fenced with small farm houses. The southern section is cut by a modern quarry next to the highway and is quite arid. The eastern section is the source of most of the springs, it is also home to many wild birds such as doves, rock pigeons, quail and partridge.

Methodology of the Archaeological Survey

Due to the many streams and fences around farms, the area was divided up into sections. The survey was conducted on foot, with the two archaeologists walking north-south transects within the sections. Because of the richness of the area, the thick plant cover and disturbance by agricultural activities, the distance between transects rarely exceeded 20m. Pottery sherds were read at the sites and only diagnostics were kept.

The survey was greatly aided by an unpublished map of an archaeological survey conducted by the Deutschen Evangelischen Instituts für Altertumswissenschaft des Heiligen Landes (Palästina Institut) and kindly provided by Prof. Dr A. Strobel, the director of the survey (Strobel 1989a).

The sites were plotted on a 1:5000 topographic map provided by Sigma Consulting. The Palestine Grid coordinates and elevations given in this report denote the approximate centres of the sites. Twenty seven sites were recorded in the az-Zāra area (Fig.7).



7. Archaeological sites in the az-Zāra area.

List of Sites

Zara 1

P.G. coordinates: 112.014N; 203.611E. Altitude: -350m. Dimensions: 38m N/S x 20m E/W (actual orientation 50/230°).

Strobel 1989a site VI (Gebäudefundament). A complex of rooms which seem to belong to more than one phase. Wall lines barely showing above the surface, built of various sized stone blocks (limestone, sandstone and tufa). Located on a ledge defined by a travertine outcrop, above stream course. The higher (eastern) part of the structure is disturbed by an okra field, while the lower (northern and western) parts may not be preserved to a considerable height, as bedrock is showing at the surface there. Wild bushes also cover some of the northern part. A few Roman sherds were found at the site (Fig. 8:1).

Dating: Roman.

Zara 2

P.G. coordinates: 111.980N; 203.514E. Altitude: -355m. Dimensions: 16m N/S x 16m E/W (actual orientation 20/200°).

Structure with wall lines barely showing at the surface, built of various sized stone blocks (sandstone and limestone). One apparent corner in the southwest. Located on a relatively steep slope. The structure is much disturbed by a modern agricultural field. The slope, however, indicates good preservation of at least the eastern part, which is covered by deep soil deposits. Wild trees are growing in the western part. A few Early Roman sherds were noted on the lower (western) part of the site.

Dating: Early Roman.

Zara 3

P.G. coordinates: 111.852N; 203.434E. Altitude: -375m. Dimensions: 20m N/S x 12.5m E/W (actual orientation 40/220°).

Strobel 1989a site III (Wohnzeile). A rec-

tangular structure with several cross-walls. Built of medium sized stone blocks (sandstone and tufa/travertine). One excavation trench was noted in the northeast corner. Located above a travertine outcrop, overlooking the sea to the north of the main excavation site (Zara 4). Early Roman sherds were noted at the site (see also Strobel 1989b: 638; Clamer 1989: 223-224).

Dating: Early Roman.

Zara 4

P.G. coordinates: 111.750N; 203.450E. Altitude: -375m.

This is the main excavated area, Strobel 1989a site II (Herodianische Villa). Accounts of the excavations are given in Strobel and Clamer 1986; Strobel 1989b; Clamer 1989: 217-223. The site is currently fenced within private land.

Dating: Early Roman and Byzantine.

Zara 5

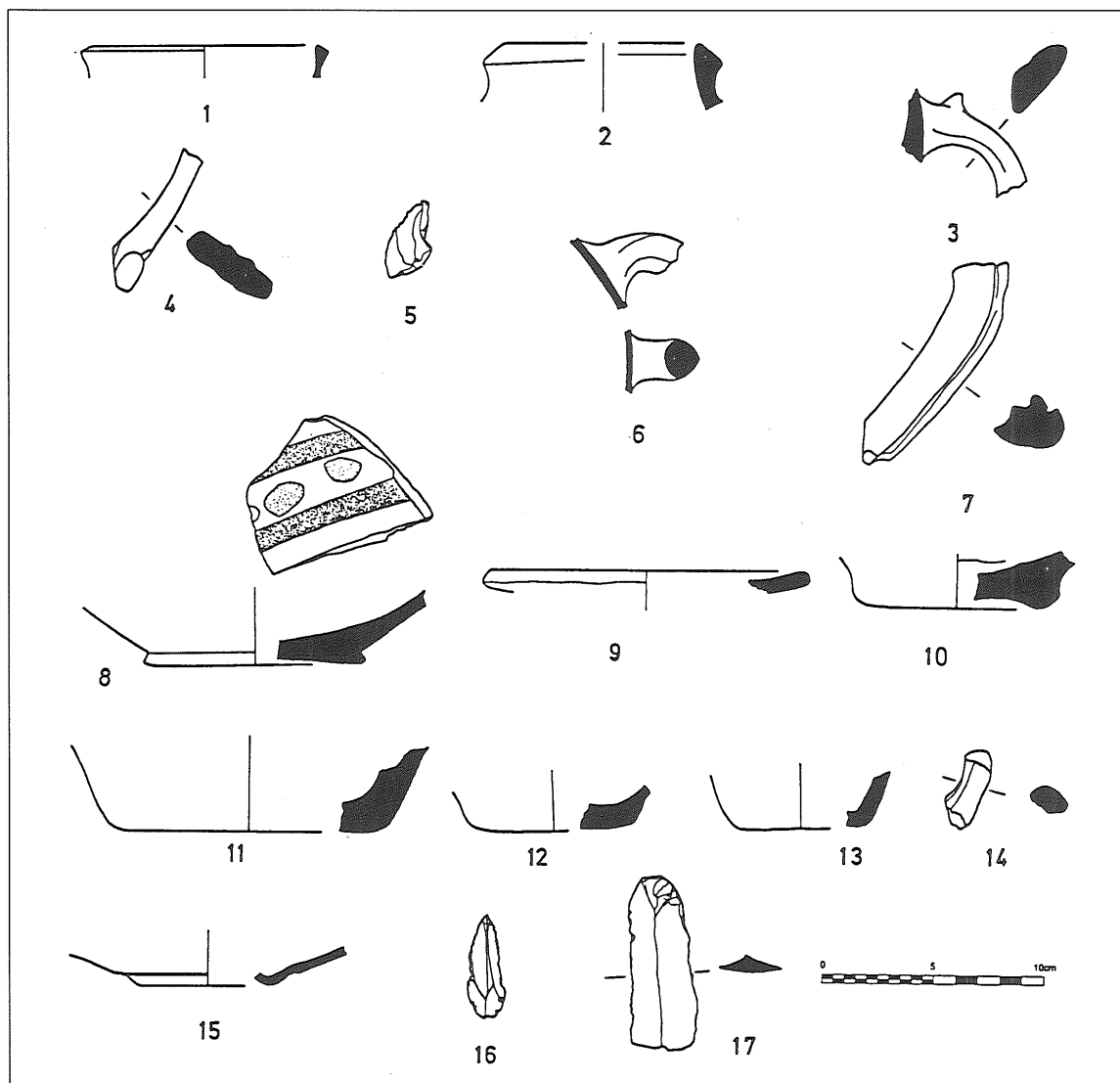
P.G. coordinates: 112.075-112.115N; 203.842-203.915E. Altitude: -290m. Dimensions: wall with total preserved length of 139.50m, western 85m oriented at 44/224° then curves to 0/180° orientation; width 1m. Strobel 1989a site XI (Kanal). A wall of comparatively large limestone boulders, two stones wide, only one course showing at the surface. Located at the edge of a slope, above stream course. The site is disturbed by a threshing floor, modern agricultural field and water channel. It also has several wild trees growing and covering parts of it. No pottery sherds were found at the site.

Dating: Roman (?).

Zara 6

P.G. coordinates: 111.968N; 203.878E. Altitude: -290m. Dimensions: 72m N/S x 95.60m E/W (actual orientation 84/264°).

A large structure, only parts of the south



8. Pottery and flint tools from az-Zāra: **1. Zara 1**; wheelmade cooking pot rim; 2.5YR 4/6 red, few small calcite inclusions; Early Roman. **2. Zara 7**; wheelmade jar rim; ware 10YR 4.5/3 brown, ext. 2.5Y 7/4 pale yellow, int. 2.5Y 5/2 greyish brown, numerous mineral white and grey inclusions; Iron Age II. **3. Zara 7**; handle, 7.5YR 6/6 reddish yellow, numerous mineral white, grey and grog inclusions; Late Islamic. **4. Zara 10**; jar handle; ware 2.5YR 6/8 light red, surface 2.5Y 8/4 pale yellow, numerous sand inclusions; Late Byzantine-Early Islamic. **5. Zara 15**; denticulated tool, light brown chert. **6. Zara 18**; wheelmade casserole handle, 2.5YR 5/6 red, some mineral white, grey and grog inclusions; Late Byzantine-Early Islamic. **7. Zara 18**; amphora handle; 10YR 7/4 very pale brown, numerous mineral grey inclusions; Late Byzantine-Early Islamic. **8. Zara 18**; glazed bowl base; ware 2.5Y 8/2 white, stripes deep green and dots 5Y 7/3 pale yellow painted under clear glaze; Fatimid. **9. Zara 25W**; handmade bowl rim; 5YR 6/6 reddish yellow surface with wide dark grey core, numerous calcite, chert and grog inclusions, very rough; Late Chalcolithic. **10. Zara 25W**; handmade base; 2.5YR 7/4 pink with slight light grey core, numerous calcite, chert and grog inclusions, very rough; Late Chalcolithic. **11. Zara 25W**; handmade base; 10YR 6/4 light yellowish brown with slight light grey core, numerous calcite, chert and grog inclusions, very rough; Late Chalcolithic. **12. Zara 25W**; handmade base; ext. 10R 5/8 red, int. 10YR 5/4 yellowish brown, with wide medium grey core, numerous calcite, chert and grog inclusions, very rough; Late Chalcolithic. **13. Zara 25W**; handmade base; ext. 2.5YR 5/6 red, int. 5YR 5/3 reddish brown, with very wide dark grey core, numerous calcite, chert and grog inclusions, very rough; Late Chalcolithic. **14. Zara 25NE**; handle; 5YR 6/6 reddish yellow with very wide medium grey core, numerous calcite and grog inclusions, rough; Neolithic(?). **15. Zara 25NE**; wheelmade base; ware 5YR 5/4 reddish brown, ext. slip N3/0 very dark grey, int. as ware with horizontal bands of 5YR 4/1 dark grey, wide grey core toward int., some small calcite and sand inclusions; Late Byzantine. **16. Zara 25NE**; arrowhead, of pinkish grey chert, Chalcolithic-Early Bronze Age. **17. Zara 25SE**; Canaanite blade, of very light brown chert; EBIV.

and west walls showing at the surface, the southern wall could be traced almost all the way north to site Zara 5 (Fig. 9). A section of the southern wall can be seen standing over 1m high next to a tree. Walls built with mainly sandstone blocks, 70cm wide. The site forms a flat terrace, currently an agricultural field. The structure is disturbed by the modern agricultural field and track. It is filled up with deep soil deposits and covered with manure for fertilizing the agricultural field. No pottery sherds were found at the site.

Dating: Roman (?).

Zara 7

P.G. coordinates: 111.805N; 204.060E. Altitude: -270m. Dimensions: 34.70m N/S x 13.70m E/W (actual orientation 160/340°).

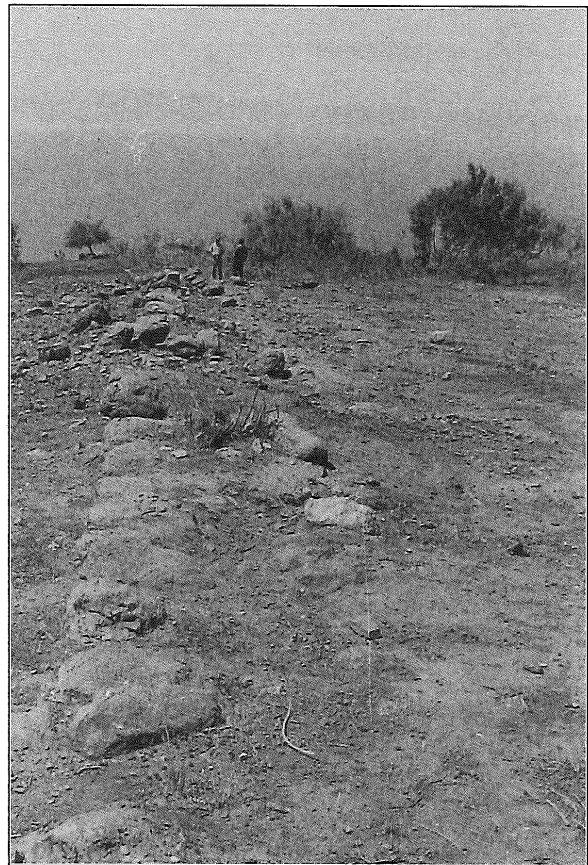
A rectangular structure with internal cross walls. Walls built with medium sized stone blocks, the external walls being 1m wide. Also probable wall lines to the south. Two stone piles at the surface may be recent burials, there is also some limited clearing of stone blocks into piles to the west. The site is located on a flat ridge above a sandstone outcrop to the west, below a spring to the north. Pottery sherds dated to the Iron Age II, Late Byzantine and Late Islamic periods were found at the site (Fig. 8:2, 3).

Dating: uncertain, most probably multi-period.

Zara 8

P.G. coordinates: 111.771N; 204.058E. Altitude: -275m. Dimensions: wall length 40m, width 75cm (orientation 0/180°).

Wall built with dry laid sandstone boulders, most probably a terrace wall. Located at the edge of a flat area, on sandstone outcrop to the west. The wall is cut by shallow dry water courses to the south. One small marble fragment was found a few centimetres to the east of the wall. No pottery sherds or flint



9. Western wall of Site Zara 6.

tools were found at the site.

Dating: uncertain.

Zara 9

P.G. coordinates: 111.742N; 204.201E. Altitude: -275m. Dimensions: 6m N/S x 4.80m E/W (actual orientation 140/320°).

A cairn, of medium and large rough sandstone blocks. Located within a sandstone outcrop at the edge of a flat ridge. No pottery sherds or flint tools were found at the site.

Dating: uncertain.

Zara 10

P.G. coordinates: 110.600-112.450N; 203.750-204.450E. Altitude: -340 - -230m. Dimensions: approximately 2.5km long, width >1m (varying orientations).

Strobel 1989a site XII (Grenz -und Schutzmauer). This was identified by Strobel as the

boundary and protection wall of Kallirrhoe (Strobel 1989b: 639). The wall is built of dry-laid rough stone boulders, extending on the slopes overlooking the area from the north and east (Fig. 10). The structure, as preserved, is not continuous. It is disturbed by modern agricultural fields and tracks, and cut by wadis. The southernmost section mapped in Strobel 1989a was not found, most probably collapsed at the northern edge of Sayl 'Ayn Umm Hudayb. Few pottery sherds were found along the long stretch of this wall (Fig. 8:4), but it is difficult to determine its date.

Dating: Roman (?), but would have been in use during other periods as well.

Zara 11

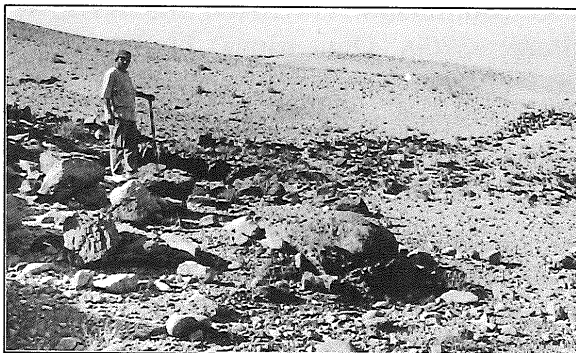
P.G. coordinates: 112.066N; 204.161E. Altitude: -220m. Dimensions: length 85m, width uncertain (orientation 0/180°).

Strobel 1989a site XIII (Sgaße). Remains of a road, the western curb of which is defined by a line of mainly small stones, and larger stones where it spans slight depressions in its course. Located on a flat ridge above a segment of boundary wall Zara 10. Most of this road had been eroded away, only 85m could be traced at the surface. No pottery sherds were found at the site.

Dating: Roman.

Zara 12

P.G. coordinates: 111.666N; 203.629E. Al-



10. Southern section of boundary wall Zara 10.

titude: -330m. Dimensions: length 5.80m, width 1m, max. preserved height 2.20m (orientation 130/310°).

Strobel 1989a site VII (Mühl mit Kanalzuführung). Remains of a water mill built with small stones and mortar (Fig. 11). Channel paved with small pebbles and plaster leading to a vertical shaft at the western edge. Located on a travertine outcrop at the edge of a flat ridge. No pottery sherds were found at the site.

Dating: Islamic (?).

Zara 13

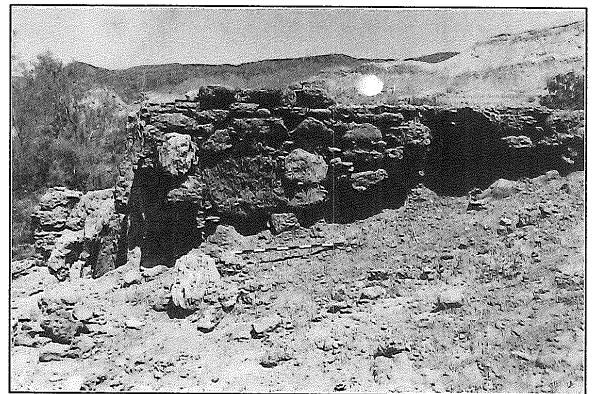
P.G. coordinates: 111.433N; 204.014E. Altitude: -260m. Dimensions: 71m N/S x 15m E/W.

Cemetery. Tombs defined by oval outline of medium-sized stones (mainly sandstone) oriented almost due north-south (Fig. 12). Around ten tombs could be discerned, some in the southern part may be communal. Located on a flat ridge above a sandstone outcrop, with sandstone outcrops also above to the east. Some Chalcolithic/Early Bronze Age I pottery sherds were found at the site.

Dating: Chalcolithic/Early Bronze Age I.

Zara 14

P.G. coordinates: 111.292N; 204.058E. Altitude: -255m. Dimensions: 17.5m N/S x 40m E/W.



11. Southern face of the channel leading to water mill Zara 12.



12. Tombs at Site Zara 13.

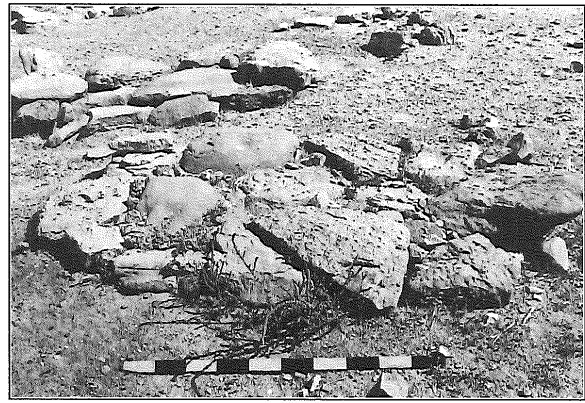
Cemetery. Tombs defined by oval outline of small stones (mainly sandstone), of a different structure to those of Zara 13. Around ten tombs could be discerned. Located on a narrow ledge above wadi to the south (above a segment of boundary wall Zara 10). No pottery sherds or flint tools were found at the site.

Dating: Early Bronze Age (?).

Zara 15

P.G. coordinates: 111.218N; 204.008E. Altitude: -265m. Dimensions: 29.80m N/S x 16.50m E/W.

Probable cemetery. Tombs (?) of different orientations defined by oval flat-piled stones, similar to modern bedouin "milk platforms", however the proximity and distribution of the oval forms preclude this identification (Fig. 13). Around twelve such structures could be discerned. Located on a flat ridge above a sandstone outcrop, directly



13. Stone platforms at Site Zara 15.

below a segment of boundary wall Zara 10. One worked flint tool was found at the site (Fig. 8:5).

Dating: uncertain.

Zara 16

P.G. coordinates: 111.508N; 203.560E. Altitude: -335m. Dimensions: 14.50m N/S x 9m E/W.

Strobel 1989a site VIII (Kanal- und Fundamentreste). Only some wall lines seen, of differing construction and orientations, barely showing at ground level. One wall is built of two rows of large, well-cut ashlar. Located on a flat ridge above a stream to the south. The site is much disturbed by modern agricultural activity. Not much may be preserved as travertine outcrops on all sides. No pottery sherds were found at the site.

Dating: Roman (?), may be multi-period.

Zara 17

P.G. coordinates: 111.167N; 203.311E. Altitude: -370m. Dimensions: 11.10m N/S x 20m E/W.

Possible remains of a camp. Sandstone and limestone pebbles in circular or oval formations. Located on a long knoll of light grey soil (stream deposit), with wadi to the south. No pottery sherds or flint tools were found at the site.

Dating: uncertain, probably recent.

Zara 18

P.G. coordinates: 111.326N; 203.310E. Altitude: -335m. Dimensions: 10m N/S x 5.40m E/W (actual orientation 10/190°).

Rectangular structure. Wall lines showing at surface, built with large sandstone and tufa/travertine blocks. Located at the edge of a travertine outcrop. There is a late corral built above the structure, thus obscuring any internal divisions. The north and west boundaries are eroding down the slope, while the east and south are disturbed by modern agricultural activity. The height of the slope, however, indicates that the walls of the ancient structure may still be preserved to a considerable degree. Some Late Byzantine/Early Islamic and Middle Islamic pottery sherds were found at the site (Fig. 8:6-8).

Dating: Late Byzantine/Umayyad-Late Abbasid/Fatimid.

Zara 19

P.G. coordinates: 111.650N; 203.330E. Altitude: -365m. Dimensions: 29.90m N/S, E/W not certain (orientation 20/200°).

Strobel 1989a site IV (Fundamente). Wall outline of comparatively large stone blocks. Located on a travertine outcrop. The eastern part of the structure is covered with thick soil deposits and disturbed by modern agricultural activity. Many scattered pottery sherds (none diagnostic) were found at the northern edge of the site. These are most probably dumps from the nearby excavations and not related to this structure.

Dating: Roman (?).

Zara 20

P.G. coordinates: 111.650N; 203.110E. Altitude: -395m. Dimensions: not taken.

Large piles of dump on the beach, obviously from a Classical archaeological site. Ashy soil containing many worked stones and some pottery. Fragments of Roman/Byzantine amphorae were collected.

This is not an *in-situ* archaeological site. The dumps may have originated from the opening of the track leading up to Zara 4 and/or the levelling of the area below Zara 3 and 4, next to highway. They may include remains of the site of *Qaşral-Baħr*, described in Donner 1963: 78-79 and reported as having been destroyed in Strobel and Clamer 1986: 381-382.

Zara 21

P.G. coordinates: 111.750N; 203.150E. Altitude: -395m. Dimensions: >150m N/S x 80m E/W (orientation 25/205°).

Strobel 1989a site I (Kaianlage). Harbour with five or six long walls built with large limestone ashlar, of around 1.20m width, and several cross-walls (Figs. 14 and 15). There is also a square anchorage installation



14. Foundations of the walls of the harbour at Zara 21.



15. Construction of a wall of harbour Zara 21.

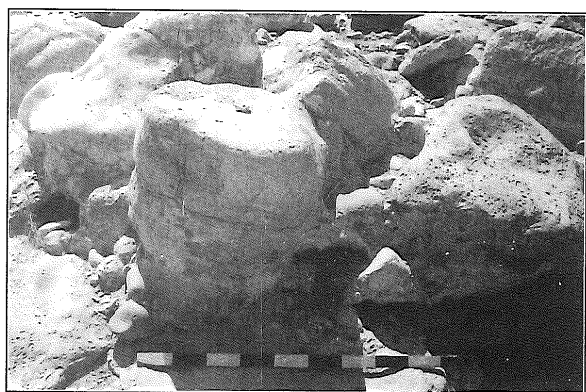
(?) cut in the bedrock (may also be a “rock-cut house” as described by Clamer 1989: Pl. XXXIX:2). There are scattered worked stones, including column drums and bases, on the beach directly to the west of the structure. Many of these architectural elements are cemented together with salt formations, indicating that they were submerged for a lengthy period of time (Fig. 16). Two column drums were also found on the beach approximately 500m to the north, and several column drums said to come from the beach were recorded in private farms in the area. A small archaeological sounding was seen in the centre of the structure. It revealed ashlar on top of a vertical cut in the bedrock, and much fallen plaster. For descriptions of this harbour see Strobel 1989b: 639; Clamer 1989: 224-225. Schult 1966 and Hadas 1993 also describe the harbour and give further information on sailing in the Dead Sea.

The eastern part of the structure is covered with soil and pebbles and seems to have been partly destroyed by the road work (Strobel 1989b: 639). The northern part is disturbed by bulldozing, while a section of the southern part may be covered by the Zara 20 dumps. No pottery sherds were found at the site.

Dating: Roman.

Zara 22

P.G. coordinates: 110.841N; 203.426E. Al-



16. Column drums cemented together with salt formations to the west of harbour Zara 21.

titude: -350m. Dimensions: 23.50m N/S x 68m E/W.

An Islamic cemetery. Tombs defined by oval piles of stones oriented east/west. Located on slopes of two adjoining hills to the south of wadi.

Dating: Modern.

Zara 23

P.G. coordinates: 110.810N; 203.604E. Altitude: -305m. Dimensions: wall length 3.50m, width 40cm (orientation 35/215°).

Strobel 1989a site X (Gebaufundamente). Only one wall line, of eight unhewn sandstone blocks, is apparent (as opposed to three walls plotted by Strobel). Located on a flat ridge with wadis to the north, south and west. There is also a probable (badly disturbed) stone circle approximately 18m to the east of the wall line. No pottery sherds or flint tools were found at the site.

Dating: uncertain.

Zara 24

P.G. coordinates: 110.427N; 203.697E. Altitude: -280m. Dimensions: 80m N/S x 40m E/W (actual area very difficult to define).

Remains of ancient agricultural fields. Scattered winding wall lines, most probably defining agricultural boundaries, and stone piles from ancient field clearance can be seen, as well as some probable tombs (badly disturbed?). Located on a flat area below sandstone outcrops. Few Early Bronze Age I pottery sherds were found at the site.

Dating: uncertain.

Zara 25

P.G. coordinates: 109.700-110.500N; 203.300-204.600E. Altitude: -220 - -340m. Dimensions: ~ 1km E/W x 100-800m N/S.

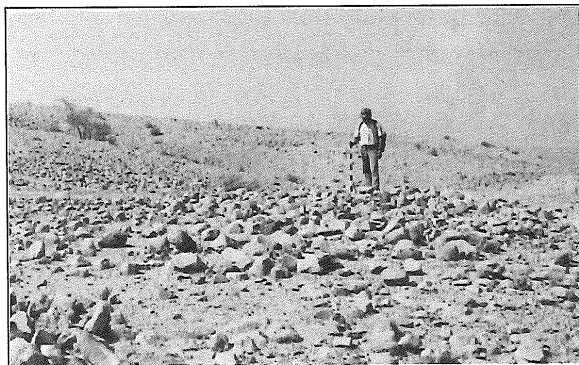
This is an enormous site, by far the largest in the area. Located on the long flat east-west ridge above the modern quarry, extending all

the way to the basalt outcrops in the east, bound by Wādī Abū Khushayba to the south and going slightly beyond the spring feeding Sayl 'Ayn Umm Hudayb in the northeast. Luckily, the modern quarry was stopped directly west of the (steep) slope on which the site starts.

The site contains many complexes and structures, starting with a 100m wide cemetery in the west, tombs defined by oval outlines of small-medium stones, the area widens towards a ridge above a slope in the centre. Below the ridge there are wall lines of varying orientations. Some on the edge overlooking Wādī 'Ayn Umm Hudayb may be aqueducts. A complex structure of fine though small masonry in the southeast of this western area has a tomb on it obscuring its outline (Fig. 17). This western part of the site is slightly disturbed by a few shallow bulldozer pits. The most frequent pottery is Late Chalcolithic (Fig. 8: 9-13. Thanks to Dr Geneviève Dollfus for confirming our initial reading of the Late Chalcolithic material).

The central section, starting with a north-south ridge in the middle of the site going towards a shallow wadi further east, also has complex wall lines and cemeteries, including several stone circles (Fig. 18). The structures in this section are generally more crude and built of larger stone blocks than the structures to the east and west.

The eastern section goes all the way to the basalt outcrops in the east, widening to the maximum of ~800m in the far east, thus



17. Structure disturbed by a later burial in the western section of Site Zara 25.

spanning the area above the springs. Again this part has several structures, circular and square, built with double rows of relatively small stone blocks similar to the structures in the western section of the site (Fig. 19). There are basalt stone circles and a cemetery in the southern part of the section. In none of the sections was there a clear defining area separating cemeteries from other structures. The eastern section of the site is disturbed by a few illicitly excavated pits.

Probable Neolithic, Chalcolithic, Roman and Byzantine pottery sherds were collected in the eastern section (Fig. 8:14, 15), in addition to one finely worked flint arrow head (Fig. 8:16) and a fragment of a Canaanian blade (Fig. 8:17).

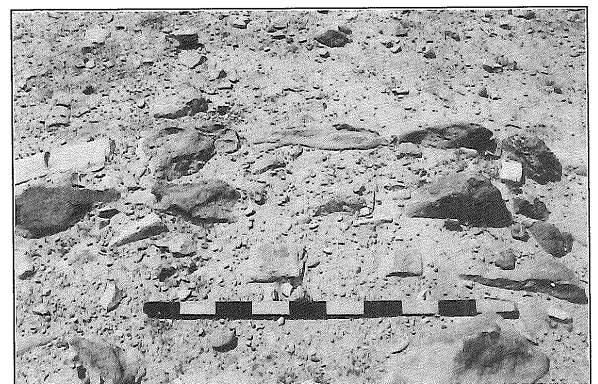
Dating: multi-period, Late Chalcolithic and Early Bronze Age being the most abundant.

Zara 26

P.G. coordinates: 109.750N; 203.342E. Al-



18. Stone enclosure in the central section of Site Zara 25.



19. Detail of the wall of a circular structure in the eastern section of Site Zara 25.

titude: -270m. Dimensions: 1.40m N/S x 2.40m E/W; standing 55cm above ground (actual orientation 110/290°).

One isolated tomb, oval outline defined by standing large stone (tufa and sandstone) slabs. Located on a flat ridge at the bottom of slight hillock. The tomb was robbed out in antiquity (Fig. 20).

Late Byzantine pottery sherds, all belonging to the same vessel, were found at the site. These were obviously left after the burial, probably by the robbers?

Dating: Bronze Age (?).

Zara 27

P.G. coordinates: 111.120N; 203.610E. Altitude: -317m. Dimensions: 40m N/S x 40m E/W.

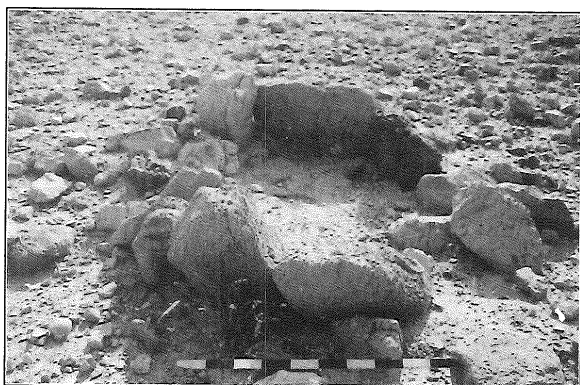
Square structure defined by walls of two rows of dressed stones, approximately 1m wide (Fig. 21). Located on a flat area overlooking deep wadi to the north. Much disturbed by field clearing and cut by dirt tracks, one of which reveals a substantial ash layer at the northern edge of the structure; the wall there is preserved to a height of 90cm.

No sherds were detected at the site. We are grateful to Mrs Christa Clamer for pointing out this structure to us.

Dating: Roman (?).

Comments

The az-Zāra sector is obviously rich in ar-



20. Tomb Site Zara 26.



21. Northern wall of structure Site Zara 27, cut by modern track.

chaeological remains. It should be noted that the previous archaeological survey (Strobel 1989a) recorded 13 sites, 11 of which were re-recorded by the present survey. One site (cemeteries no. IX) could not be seen any more due to recent agricultural disturbance of the area. Sites Zara 25 and 26 are to the south of the area surveyed by Strobel.

Due to the extensive disturbance by modern agriculture, the thick vegetation around the streams and the depositions by the springs, *it is highly probable that several archaeological remains at az-Zāra are currently totally buried or too disturbed to be recognised at the surface.* A visit to the area after the first winter storm in November 1995 surprised us with dramatic changes in the landscape, especially changes in water courses and landslides. Site Zara 19 got totally covered up with deposits and was no longer visible at the surface.

The sites recorded at az-Zāra give the im-

pression that the situation in the past (especially during the Roman to Medieval Islamic periods) was similar to the present situation. The fertile northern and central sections were divided up into farms with farmhouses and villas. Wall Zara 10 defines this fertile part of the area, and would have served as a boundary wall for the "village" as well as for protection against rock-fall and slides from the very steep slopes to the east. Road Zara 11 may have connected az-Zāra with Makāwir (as suggested by Strobel, we are grateful to Mrs Juliette Jabajy for translations of unpublished reports on this route). Unlike the modern cemetery Zara 22, burial grounds seem to have been restricted to the steep rock outcrops in the east, which are useless for agriculture.

The special importance of az-Zāra, however, is illustrated by the presence of the villa Zara 4, and especially the harbour Zara 21. This harbour is too large and elaborate for small rowing boats, and may have received small sailing ships carrying cargo such as the one depicted (with folded sails) on the mid-sixth century AD mosaic map of Mādabā next to what looks like a harbour at ΘEPMAKAAAIPHC (see for example Piccirillo 1993: folded illustration opp. p. 80). More research needs to be done to determine whether such cargo included the famous precious products of the area, e.g. bitumen (Hammond 1959) and balsam (see for example Patrich and Arubas 1989: esp. 50-55; Zayadine 1995: 72). The large structure Zara 6, dominating the area in the north is strategically located and may be the remains of a fort guarding the harbour, the routes along the coast as well as the routes going up to the plateau (including Zara 11).

The southern arid section is mostly occupied by the extensive and complex Site Zara 25. This large site may have started as two distinct (Chalcolithic?) sites in the extreme east and west, the area between which got later "filled up" with structures over several centuries. This hypothesis is based on the

similarities between some of the structures in the southeast and west edges of the site, and the distinctly different architecture in the centre and northeast. Of course this hypothesis can only be verified after excavation.

Due to the high concentration of archaeological remains, as well as the rich natural flora and fauna of the az-Zāra sector, it was decided that the area be kept as a natural and archaeological park, and development be moved south to the Umm Sidra sector.

The zone between az-Zāra and Umm Sidra, to the west of the modern highway, was also surveyed. This zone consists of a narrow strip of land next to the sea. The northern end is disturbed by modern road works and levelling. Part of the area is presently fenced off and could not be surveyed. No ancient remains were found. All along this zone, the area immediately beneath the modern road consists of stone scree from road construction and erosion as well as steep natural cliffs.

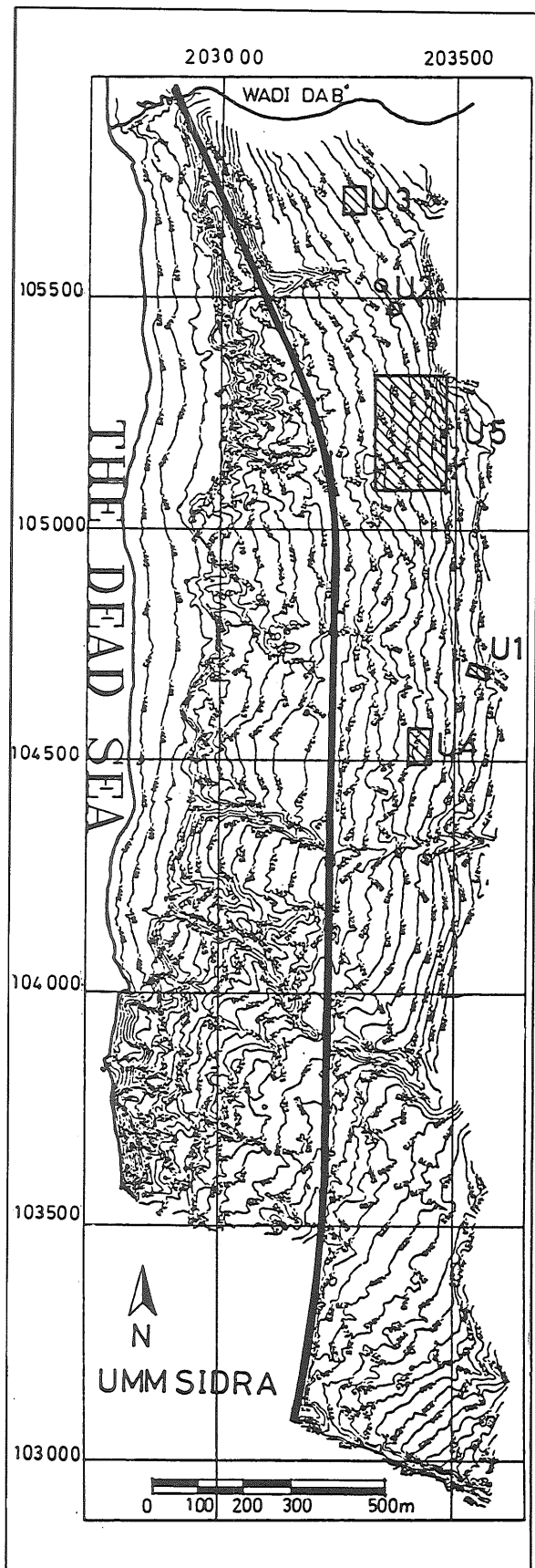
THE UMM SIDRA DEVELOPMENT AREA

The Umm Sidra sector consists of a narrow strip of land cut by deep wadis draining off the mountains to the east. A clear cliff face marks most of the eastern boundary of relatively flat land. Wadis and ground water seepage now support a small plantation near the northern end of the sector. The area to the west of the modern road is heavily eroded, making a steep cliff above the Dead Sea. Quarrying and road building have disturbed much of the part of this area. Survey, however, revealed no signs of any ancient occupation west of the highway, while five sites were recorded to the east (Fig. 22).

List of Sites

Umm Sidra 1

P.G. Coordinates: 104.695N; 203.559E. Altitude: -283m. Dimensions: 40m N/S x 20m E/W.



22. Archaeological sites in the Umm Sidra area.

The site is located on a rock shelf against a cliff face beside a deep wadi. Probably a camp site, it overlooks a plantation area and is presently used by bedouins. A stone revetment several courses high revets the western side of the terrace (c. 40 metres) and appears to return towards the rock face in the north, the south side being made by the natural cliff of the wadi. The revetment consists of a least three sections and there are signs of cross walls, suggesting a series of building and occupation phases. Flint scatter may indicate a Chalcolithic/ Bronze Age date. One Roman/ Byzantine(?) ribbed sherd was found.

Dating: Chalcolithic/Early Bronze Age; reused in modern times.

Umm Sidra 2

P.G. coordinates: 106.500N; 203.341E. Altitude: -311m.

A camp site built around a natural rock outcrop in open relatively flat land some distance from the cliff face in the east. The southwest side consists of a stone semi-circle (c. 8m in diameter) made of one to two courses and set against the rock outcrop. Flint scatter suggests a date in the prehistoric periods (Fig. 23:1); very small-scale debitage may indicate a possible Natufian attribution (we are grateful to Dr Alison Betts for comments on this debitage and other flint scatters at Umm Sidra). The site may be associated with a low terrace wall which begins c. 50m to the southeast and meanders for c. 100m to the south and east.

Dating: Natufian (?).

Umm Sidra 3

P.G. coordinates: 105.710N; 203.286E. Altitude: -311m. Dimensions: 60m N/S x 60m E/W.

Cemetery, tombs defined by oval layout of stones. A stone circle in the northwest, perhaps one of several, made of one (re-

maining) course and with a diameter of c. 10m. There may be a tomb in one side. Flint scatter indicates a possible Bronze Age date (Fig. 23:2).

Dating: Bronze Age (?).

Umm Sidra 4

P.G. coordinates: 104.631N; 203.432E. Altitude: -309m. Dimensions: 80m N/S x 50m E/W.

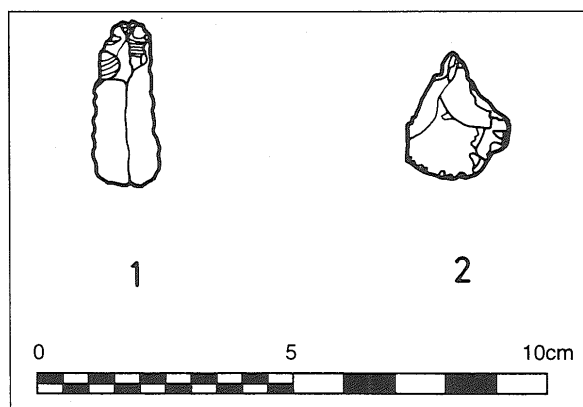
The site is situated beside a wadi. About 50 stone heaps, some rectangular in shape, are set out in nearly regular rows running north-south. These heaps may be graves. Un-diagnostic sherds may belong to the Bronze Age.

Dating: Bronze Age (?).

Umm Sidra 5

P.G. coordinates: 105.208N; 203.411E. Altitude: -321m. Dimensions: 250m N/S x 150m E/W.

The site is situated on the south bank of a wadi with steep sides toward the west; it is presently cut by erosion, making a northern and southern spur. Both northern and southern flanks are eroded. Two well-built stone circles are visible in the west and east ends of the site, measuring about 5m in diameter. The western circle has at least two stone courses. The west end of the northern spur



23. Flint tools from Umm Sidra. 1. Umm Sidra 2; blade fragment of light brown chert. 2. Umm Sidra 3; burin of pale brown chert.

consists of a series of low single-course stone terrace walls running north-south, about 10m apart. There are remains of other sub-circular structures (Fig. 24). The site is very shallow.

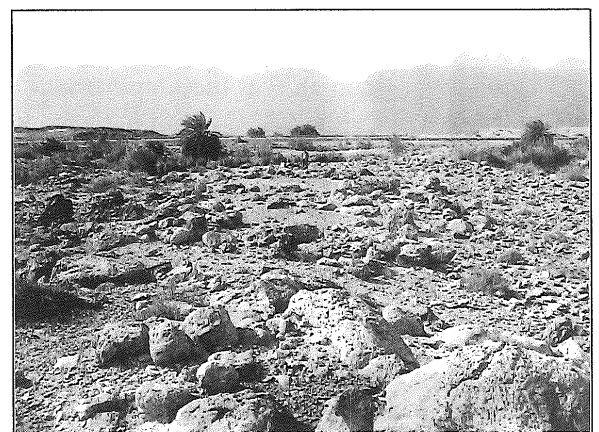
Dating: uncertain.

Comments

The area east of the modern road was never built up in any way but, as now, would have been used by bedouins for grazing and small-scale agriculture. As in other areas of the Dead Sea coast, and similar to the Suwayma area in this survey, many of the slopes overlooking the sea were used for burials, both in isolation and in 'cemeteries'.

CONCLUDING REMARKS

The signing of the Peace Treaty between the governments of Jordan and Israel in October 1994 has affected several aspects of life in the region. One of the more immediate results was an increase in the volume of tourism which promoted investment in this sector. The archaeological survey of the east coast of the Dead Sea is part of the environmental impact assessment for a project through which archaeologists and developers are now entering an undeveloped and very interesting area simultaneously. This new experience is still in its early stages but



24. Sub-circular structures in the centre of Site Umm Sidra 5.

is already producing significant results affecting both development and archaeological conservation in Jordan.

Since the presentation of the first archaeological report on the Suwayma development area, on 7 September 1995, a new master plan was prepared for Suwayma, restricting the tourist village to the southern part of the area where no archaeological remains were recorded and utilising more of the beach area (hence the survey on 15 and 19 October). The results of the survey at az-Zāra lead to the designation of the whole area as an "archaeological and natural park" in the master plan, and the developers decided to move further south to Umm Sidra. The sites discovered at Umm Sidra are to be

within open park areas of the development. Archaeological excavations at the Umm Sidra sites are planned to start prior to the initiation of any construction in the area –including infrastructure layout. These sites will be presented as a cultural experience within the development.

K. 'Amr
K. Hamdan
L. Mohamadieh
Department of Antiquities
Amman, Jordan

S. Helms
BIAAH
Amman, Jordan

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Archaeological Notes and News

NOTES AND NEWS ON THE EXCAVATIONS AT GHAWR AN-NUMAYRA

by

Mohammad Waheeb

The Ministry of Public Works and Housing (MPWH) is constructing a new road parallel to the existing highway from Ghawr Ḥaditha to Ghawr aṣ-Ṣāfi in order to improve the existing road.

Following a series of discussions, the MPWH provided financial help to the Department of Antiquities of Jordan (DAJ) in order to conduct an emergency survey and excavations along the road alignment, and prepare a final report with the results of the survey excavations and recommendations.

For a preliminary cultural resources impact assessment, the site was visited on December 4, 1995 by CRM Archaeologist Mohammad Waheeb, and engineers of the MPWH staff. Several solutions were discussed and appropriate measures for protection of the archaeological sites were adopted.

Assessment

Two main sites were located as a result of a visit to Rujum an-Numayra and Tall an-Numayra, but the presence of more archaeological remains can be inferred by some alluvial terraces which may hide some small and medium sized sites like site no.4 which was discovered later during the survey of the area.

The damage to the sites had already occurred and has continued over the last years at the same rate.

1. Alluvial debris resulted from running water partly covering and cutting the cultural layers. The extent of the disturbed cultural layers cut by the water is difficult to determine especially at the northern part of the site.
2. A bulldozer cut of the existing road at the central area of the site resulted in separ-

ating the archaeological deposits into two parts (east and west of the existing road) and exposing cultural layers in section up to 2m high. The length of this cut is 50m. Several Byzantine tombs were exposed as a result of this bulldozing.

3. Modern bulldozer terracing below the Main Section revealed stone walls, tombs and other installations.
4. Pits dug by robbers in the central settlement area: the pits were dug by local people and it is reported that several small pottery vessels were sold in the nearby towns.

Recently, the Ghawr an-Numayra highway has been planned to be widened, endangering the upper and lower parts of the site by digging into its cultural layers over a considerable length (estimate: 5-10m) as well as covering large parts to the west of the existing road. The Director-General of the Department of Antiquities, Dr Ghazi Bisheh, quickly organized an excavation team to protect the site, without delaying or interfering with the construction work.

Such a rescue excavation requires one month. It was strongly suggested, then, that fieldwork at an-Numayra should start before construction, in order to conduct excavation with adequate time, and to avoid delays for the construction project. The MPWH agreed to allocate the sum required by the DAJ to conduct the archaeological rescue project.

Several factors have been considered in a work plan for an-Numayra:

1. The size of the area to be examined (possibly over 150m).
2. The depth of the archaeological deposit (up to 3m).
3. The complexity of the architectural remains which may be found.

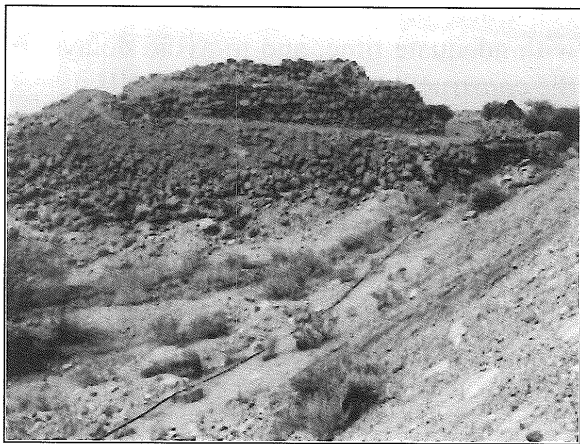
4. The fact that the site was surveyed and investigated by Glueck (1935) and Rast and Schaub (1974).
5. The limited time available before construction.

Excavation Results

Rujum an-Numayra (Fig.1)

The team of the DAJ tried to salvage the site and to study all remains along the road alignment in the an-Numayra Area. The Rujum an-Numayra was located beside the main road, so the eastern edge of the site was totally excavated. The material recovered from the excavation was analysed and studied.

One architectural unit was uncovered consisting of several walls and representing small rooms which were built on a flat area. A system of terraces was established at the site to raise the level of the ground and to avoid any erosion in the Wādī an-Numayra area. According to our preliminary assessment, the structure possibly represented a watch-tower overlooking the eastern part of the Dead Sea shore during the Nabataean period. This date is based on two lamps and one juglet of Nabataean type mixed with several pottery sherds. The site was re-inhabited during the Byzantine era. Quantities of pottery sherds and traces of foundation walls were discovered on the surface of the site, showing that a large Byzantine set-



1. The south-east part of Rujum an-Numayra.

tlement occupied the area during the sixth century AD (Fig.2).

A large Byzantine cemetery was noticed surrounding the site in the east and west; part of the tombs are disturbed by robbers.

Excavations should continue to cover the western parts of the site to contribute to the study of the whole area.

Tall an-Numayra

The site is located on a sandy hill to the left of the road alignment. Four squares were opened at the site to assess the archaeological deposits and to check whether there was any relation with the nearby sites like Rujum an-Namayra and an-Numayra "4".

The field results revealed interesting features of stratification and architecture which date to the Bronze Age, especially EBI-III (Fig.3).

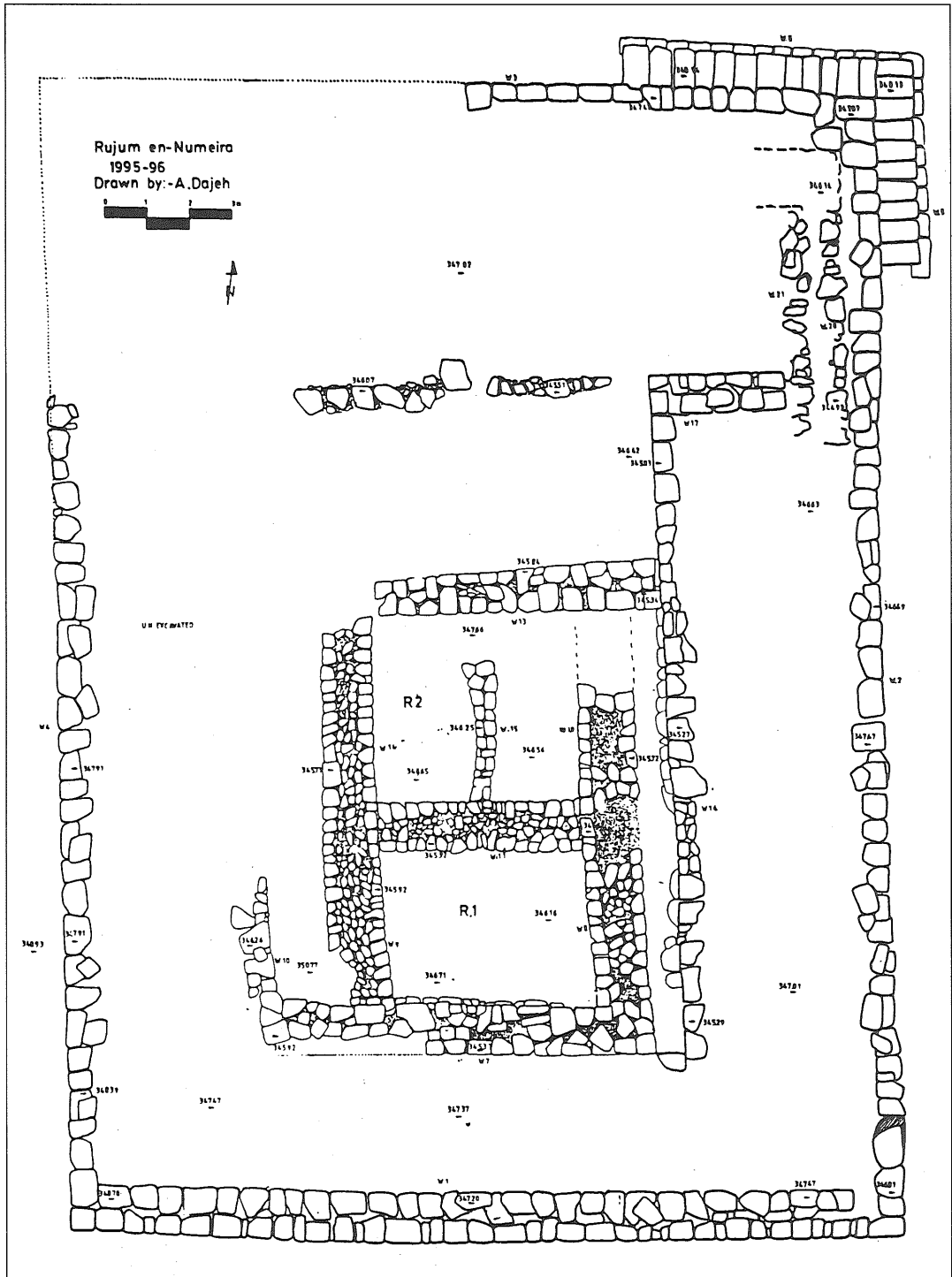
Part of the defensive wall at the north-western corner was uncovered and some other related walls of different directions were investigated. Through our limited work at the site we were unable to follow a full architectural unit. What distinguishes the site is the layer of destruction which was noticed everywhere in the excavated sections. The material recovered from the site revealed different kinds of material among them pottery, bones, seeds, bronze lumps, charcoal mud brick fragments, etc.

More work is needed, due to the importance of the site and also building a fence is urgently needed to protect the deposits.

An-Numayra "4"

Survey of the area along the road alignment north-west of the Rujum an-Numayra site revealed the presence of an important site called an-Numayra "4".

The site was covered by small and medium stones mixed with pebbles and sand—the result of seasonal erosion in the Wādī an-Numayra area. The team tried to salvage the site and reduce the immediate threats which affect the site. Excavations revealed archi-



2. Excavated area at Rujum an-Numayra.

tectural remains of several rooms built of undressed sand - and limestone. The site is that of a considerable workshop consisting of a basin, a well, waterducts and a pottery kiln located at the western side of the site. Analysis and studying the recovered material at the site showed that the workshop could be part

of a sugar press.

Quantities of sugarpot fragments and painted pottery sherds of the Ayyubid-Mamluk period were the common finds at the site. This strong evidence suggests that the workshop belongs to the Ayyubid-Mamluk period. A survey of the western part

along the Dead Sea shore showed some collapsed walls and arches in the modern quarry area of the Potash Company. Pottery fragments of Byzantine and Ayyubid-Mamluk date were recovered in the area indicating a relationship with the sugar press. More investigations are suggested for further studies so as to assess the early history of Wādī an-Numayra.

All these activities show the need for an even better organized system of intensive surveying of the southern Ghawr which can provide immediate information on the presence of archaeological sites in areas of possible modern constructions. This informa-

tion, properly evaluated, can allow the DAJ to coordinate with the development agency the appropriate type of intervention necessary for these sites. The understanding is that while it is not always possible to save archaeological sites from destruction, their study and recording is an important contribution of the DAJ in the study of the ancient heritage of Jordan, and, of the continuing effort to actively contribute in the development of Jordanian society.

M. Waheeb
Department of Antiquities
Amman-Jordan

A SHORT NOTE ON THE EXCAVATIONS OF YĀJŪZ 1994-1995

by

Emsaytif Suleiman

The site of Yājūz occupies an entire hillside directly east of the modern cemetery of Shafā Badrān about one kilometre north of the Šūwayliḥ–az-Zarqā' road. The site is registered in the files of the Department of Antiquities as a Roman-Byzantine ruin (Dept. of Antiquities 1973: site no.411) and has been visited by a number of scholars (Merrill 1883; Condor 1889; Mecown 1930; Glueck 1939).

They described an extensive Roman-Byzantine city which served as a mile station 7 miles out of Philadelphia ('Ammān) on the way to Gerasa (Jarash), some 23 miles away. The ruins include at least two churches and other public buildings, plus two cemeteries, one on the north slope and one on the south slope. In 1972 H.O. Thompson excavated a Roman tomb at the site of Khirbat al-Kom which is the east part of the site of Yājūz (Thompson 1972: 37-41). During the summer of 1994 and 1995 the Department of Antiquities conducted two long seasons of excavations at the site under the supervision of the author.

The first season of excavation extended from April 2 until September 15, 1994. A large basilican church and adjacent building complex (Figs.1 and 2), a compound of several rooms, were uncovered. The church measures 28 x 17 m and comprises a central hall with two aisles and an apse at the east end (Fig.3). It is similar in plan to the Hisbān church (Lawler 1980: Fig.4). The entire floor of the church was covered in mosaics, except for one room at the south-east side that had slab-flooring. The mosaics all seem to have had geometric designs (Fig.4) similar to those of the church of Shūnat Nimrīn (Piccirillo 1982:336). The mosaic floor which was mostly destroyed,

was repaired in antiquity, as two distinct levels of mosaics can be identified.

The church was entered through a side doorway 3.40 m wide (see Fig.2) with three steps that gave onto a paved courtyard (9 x 9 m) and at the north-west side of it there was a bell-shaped cistern that held up to 30 cubic litres of water. The gateway, the paved courtyard and the cistern served the church and the adjacent building complex. The walls of the church and the building complex were plastered and painted, evidenced by some remains of red paint, and long benches ran along the base of the main halls. Both the church and the building complex had vaulted roofs covered with roof tiles, the walls having been built of reused capitals, drums, bases, architrave, altars and dressed stones of former Roman buildings (Fig.5). The reused stones suggest the presence of a Roman temple in the area. Some Byzantine pottery juglets, bronze coins, basalt stonetools and a lot of roof tiles were found. The church and the building complex date from the middle of the fifth to the end of the seventh century AD.

The second season of excavations extended during the period of June 15 to September 15, 1995. A large part of the huge building complex (Fig.6:a and b) consisting of a number of houses, were uncovered immediately south-east of the church. The structure of the rooms of these houses looks like the Byzantine rooms at the citadel of 'Ammān (Bennett 1977:Pls.62:1,64:1,72:1). The roofs of these rooms were vaulted and the walls were plastered but the floors were made of hard yellow clay (*Hūwwār*) over the bedrock or of plaster, besides slab-flooring in some cases. Several complete Byzantine pottery lamps, some pottery

bowls, juglets, jars, a bronze pot , some bronze coins and basalt stone vessels and tools were found. The finds of this building complex make it contemporary with the church.

During this second season of excavations, a team of students of the Archaeology Division of the Jordan University, directed by Lutfi Khalil, excavated the north-west

side of the site. They uncovered a chapel and some rooms north of it. West of the chapel is a room with four internal arches and an eight-line Greek inscription dating to the middle of the seventh century.

Emsaytif Suleiman
Department of Antiquities
Amman, Jordan

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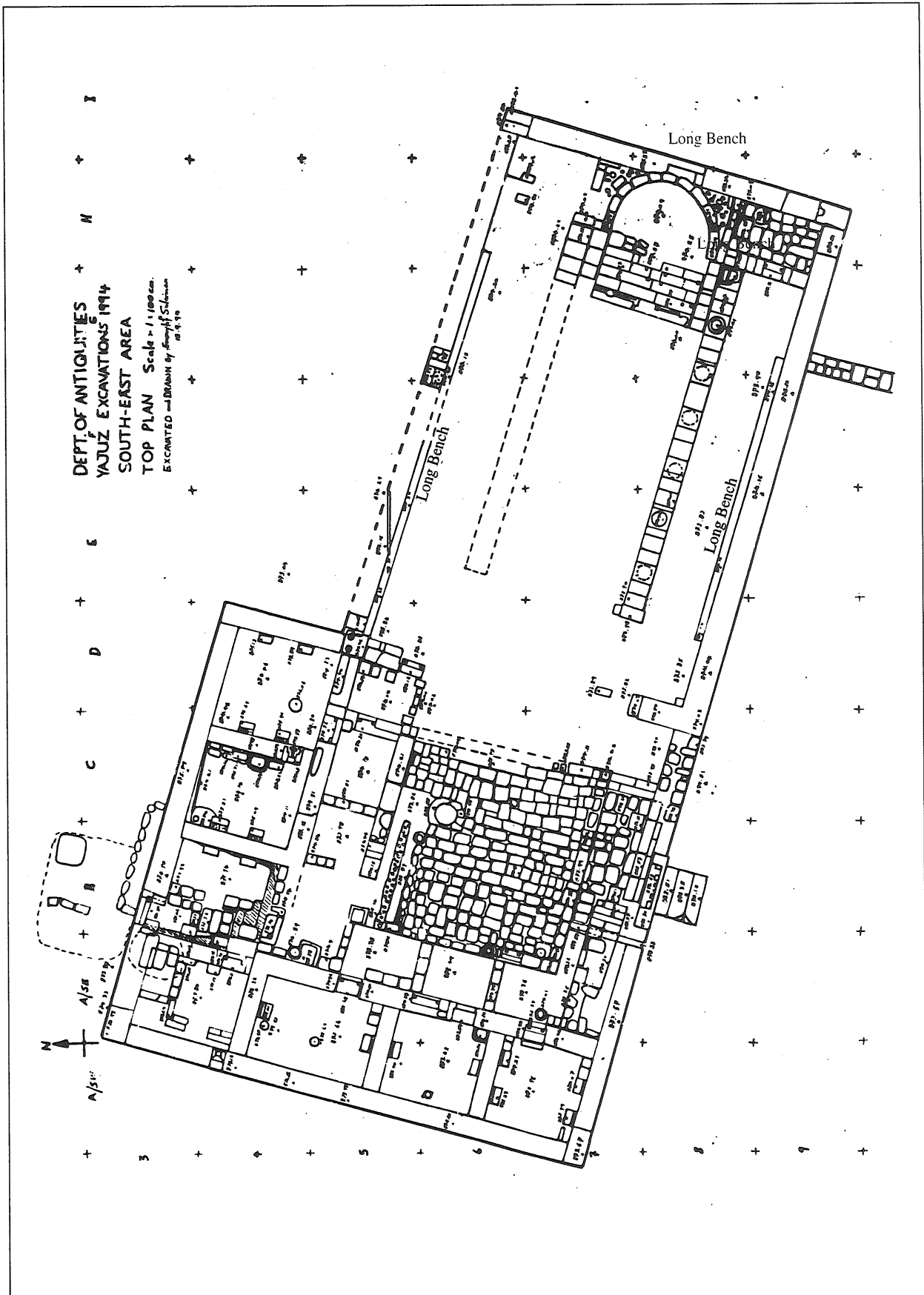
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1. Plan of Yajuz excavations 1994. South-east area.



2. Adjacent Building Complex and the main side doorway.



3. East Side of the Church of Yājūz.



4. Part of the Mosaic Floor of the Church.



5. Reused Roman Architraves, Capitals and Bases in the Church.



6 a. West Side of the Building Complex. House A, Room 1.



6 b. North-east Side of the Building Complex. House A, Room 3.

A NABATAEAN GRAFFITO
A SHERD FROM THE SWISS-LIECHTENSTEIN EXCAVATION
AT AZ-ZANṬŪR, PETRA (1994)

by

Yvonne Gerber and Hanna Jenni

Archaeological Remarks

A team of archaeologists from the Archaeological Institute of Basel University, Switzerland, has been working, since 1988, under the direction of R.A. Stucky on two terraces on the slope of az-Zanṭūr in Petra. This year we would like to present a sherd with a Nabataean graffito which is, of all the small finds, of particular interest.

The fragment was uncovered outside the wall running north-south in square 116/L,¹ just under the modern surface level, during cleaning work. No other pieces of the same vessel were found despite careful further excavation. The sherd is not from a closed find-complex. Other finds and the pottery from the area of the structures in squares 115/L and 116/K-L are, without exception, dated to the first century AD. This suggests that the sherd with the Nabataean inscription may well also belong to this period. It has, however, to be re-emphasized that the sherd belongs neither to a datable context, nor to a recognizable building complex.

Description

The wall of the fragment is 6-7 mm thick; the colour is very pale brown (Munsell 10YR 7/3), the colour of the core tends to pink (Munsell 5YR 7/3). No slip appears to have been used. The clay is fine, the ware is solid and well fired. The graffito was in-

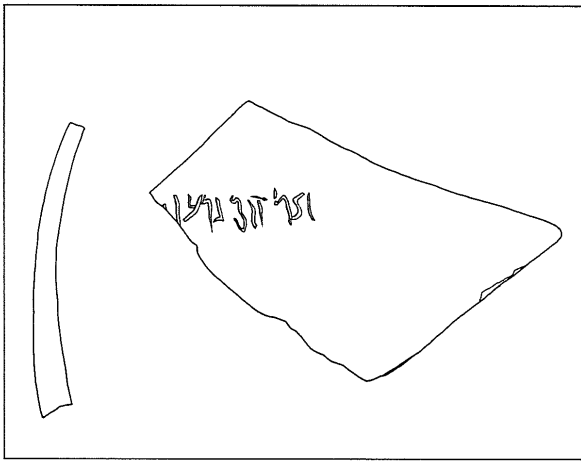
cised in the clay before firing but after drying – when the clay was already leather hard. The sherd (for orientation see Fig.1) is slightly thicker at the lower edge so we assume that the inscription was incised on the shoulder of the vessel and that just below the inscription the shoulder-body join would have begun, as indicated by the slight increase in thickness. It is unfortunately impossible to say what kind of vessel we have here; neither its exact size nor its form are determinable. The shoulder area has an inner diameter of somewhat more than 30 cm, which implies that it was rather large. Before any discussion as to the function of the vessel is possible a few points have to be made.

That the vessel was not produced in Petra or Southern Jordan can be deduced from the colour and fabric of the clay.² The vessel was transported to Petra with its inscription already in place from a manufacturer outside the 'ceramic province' of Southern Jordan. It, therefore, seems reasonable to suggest that the vessel served as the container of a product coveted in Petra, in other words, that it was an amphora. However its wall is unusually thin when one considers its large size – especially, if it served as a transport vessel.

The origin of the vessel can only be guessed at – the inscription itself (see below) gives no indication as to where the

1. R.A. Stucky *et al.*, 'Swiss-Liechtenstein Excavations at az-Zanṭūr in Petra 1994. The Sixth Campaign', *ADAJ* 39 (1995): Fig.1.
2. A clay analysis made by ED-XRF (Tracor/Spectrace 5000) supports this observation. According to W.B. Stern from the 'Mineralogisch-

Petrographisches Institut' of Basel University the significant proportion of the elements aluminium, iron, magnesium, calcium, sodium and calcium are very different to those found in Nabataean pottery but correspond better to those found in ESA.



1. Sherd from az-Zanṭūr with a Nabataean graffito.

vessel was made. About its content equally little is known. One would expect wine but oil, fish sauce (*garum*) and dried fruits have also been proved to have been imported by the Nabataeans.

The clay analysis and the fact that the route between Petra and Palestine was a well trodden one suggest the possibility that the sherd with the inscription comes from a vessel which was manufactured in the Syro-Palestinian area.

The Graffito

The reading of the graffito (Fig. 2 a-b) is not without difficulties. On the one hand the scribe seems to have incised the letters into the clay which contained small particles of chaff and had already dried prior to firing. This obviously may have made it more difficult for him to apply his writing instrument. On the other hand some of the letters are of an unusual shape which is not caused by technical factors. The inscription seems to have consisted of a single line, beginning with *zyd?m br c'///*, “?, the son of ?”; more than this is not left.

The letter *z*, to begin with, can be read

clearly, just like *y*, even though it is written comparatively big and with rather distinct curves. The letter *d* follows closely and is of rather angular shape. It shows a long vertical stroke with a short interruption in the upper part; in the lower part the writing instrument seems to have been driven to the left by a small particle of chaff. The reading of the following letter is not clear at all. Neither *h* nor *t* are satisfying,³ whereas *h* or *ʔ* seem more likely, as John Healey, Manchester, who was kind enough to consider the problem and whom we thank very much for his correspondence, has suggested. As for *h*, Healey refers to the form found in the contract of Nahal Hever,⁴ whereas for *ʔ* to several tomb inscriptions of Hegra (مدائن صالح), especially H 37.⁵ The following letter *m* is quite clear, though it has the context form and not the expected final form. The letter *b* turned out rather angular, *r* rather curved, but with a marked vertical stroke at the top. The letter *c* is broad, *l* is not completely preserved. Between the third and fourth letter there is a minimal space, between *m* and *b* a small one. Both of them make sense as word separators – rare in Nabataean –, though there is no space between *br* and the following name. Considering the shortness of the present inscription and the lack of a sufficient number of comparable pieces (inscribed pottery) we prefer to refrain from dating the inscription based upon its palaeography.

Whatever might be suggested as the reading of the first personal name (see above for the fourth letter), it is not attested otherwise and – except for the first element (*zyd* “increase of ...”) – not fully explainable. As for possible *zyd ʔm*, Healey con-

3. Nor even *q*, though one might think of the personal name *zydqwm*, well attested in Nabataean. See Avraham Negev, *Personal Names in the Nabataean Realm*. Jerusalem, 1991: no. 388.

4. J. Starcky, ‘Un contrat nabatéen sur papyrus’, *RB* 61 (1954): 162; John Healey, ‘Nabataean to Ar-

abic: Calligraphy and script development among the pre-Islamic Arabs’, *Manuscripts of the Middle East* 5 (Leiden 1990-1991): 50, col. C.

5. John Healey, *The Nabataean Tomb Inscriptions of Mada'in Salih*. Oxford, 1993.



a



b

2. a-b: Sherd from az-Zanṭūr with a Nabataean graffito.

siders a hypocoristic form of *zyd ʿlhy*, the latter being attested in Nabataean.⁶ Concerning other possible readings of this name there would be but vague speculations so that the problem has to be left at that. The name of the father is not complete; there are several possibilities of completing *ʿl///*.⁷

Interpretation

What could be said about the meaning of the text on the vessel is as vague, particular-

ly because comparable Nabataean objects seem to be lacking. One plausible suggestion would be that the name inscribed on the vessel indicated either the producer of the content or the potter, whether the text continued after the filiation or not. The speciality of the ware (see above), that is, its origin might justify the latter. It is less probable that the name meant the addressee, particularly as there is no *l*, “to/for” before the name and as it had been written before fir-

6. See Negev (n. 1), no. 383. Healey indicates the hypocoristic form *ʿwdw* and *ʿwdm* (*ibid.*, nos. 851 and 852). He alternatively considers the Sabaic Suffix *-m* (Beeston A.F.L., *Sabaic Grammar*.

Louvain, 1984: 31), indicating the Nabataean personal names *hlzm* and *rgšm* (the reading of which should be re-examined).
7. See Negev (n. 1): 51f.

ing. Another plausible interpretation would be that the content of the vessel was for a dedication to some sanctuary or for the purpose of a cultic feast. In this case, the name could have been incised alone so that the dedicator himself was honoured by the mere presence of his name, or the text could have continued by a verb or a verb and an object, that is 'N.N. dedicated (it)' or 'N.N. dedicated ...'.

Regarding all the problems mentioned

above it is hoped that future research will produce elucidating finds.

Yvonne Gerber
Hanna Jenni
Archäologisches Seminar
der Universität Basel
Schönbeinstrasse 20
CH-4056 Basel
Switzerland

METHODOLOGY FOR THE CONSERVATION OF THE FAÇADES IN PETRA

by

Zaki Aslan and May Shaer

Introduction

Within the scope of the Petra Stone Preservation project, which is jointly implemented by the Department of Antiquities and GTZ (German Technical Cooperation), Tomb 825 (Tomb of Fourteen Graves) was the first rock-hewn façade chosen to undergo conservation measures, since it is representative of the Petra façades in its construction techniques and weathering forms.

The methodology implemented in the conservation of Tomb 825 includes investigative steps that are necessary for the understanding of the monument in terms of its architecture, history and condition, in order to arrive at the appropriate execution measures. Investigation can be effectively achieved by incorporating it in the recording process. The pre-execution conservation steps include recording the existing condition, architectural analysis, condition assessment and preparation of the execution plans. In this article the recording methodology and the condition assessment will be discussed.

Recording of Monuments in Petra

Article 16 of the Venice Charter refers to the importance of recording (ICOMOS 1964). However, it is important to understand that the purpose of recording and documentation is not simply pertained to the drawing, photograph or record which emerges, but also to the meaning or understanding it provides.

Although documentation on archaeological excavations of traditional architecture and monuments in Petra has often been conducted, a well defined methodology for the selection of the appropriate scope, level and

recording methods has not been established. As part of the main objectives of the ongoing preservation project in Petra, developing such a methodology for recording and documenting the monuments is at the heart of the conservation process.

Both traditional and digital recording tools and techniques are used in Petra. In fact, different methods can be combined based on the required scope of recording, and, vector and raster heritage records are produced accordingly. Table 1 illustrates these methods.

Condition Assessment

The weathering forms found on Tomb 825 are representative of the general condition of the Petra façades and monuments (Figs. 1 and 2). The mapping scheme of the weathering forms of the façade shows that about one third of the stone surface can be considered intact, and original stone surfaces can be found in protected areas where masons' toolmarks can still be clearly seen. Moreover, the overall state of this monument typically consists of the main weathering forms which vary in type, intensity, location and distribution.

Taking into consideration the above mentioned weathering forms, three major groups of stone decay can be identified. These include the detachment of stone material, the loss of stone material and the formation of deposits on stone surfaces. Two other categories might be added: one of these is the cracking process that occurs in the rock and includes different forms that differ in size and geological formation, while the other category constitutes the decay of mortars and

Table 1.

Recording level	A	B	C
Results	Reconnaissance record	Preliminary record	Detailed record
Purpose of recording	<ul style="list-style-type: none"> initial inventory initial planning reference data 	<ul style="list-style-type: none"> planning initial condition investigation stabilization reference data 	<ul style="list-style-type: none"> "as found" condition restoration/intervention monitoring posterity
"Traditional" tools used	<ul style="list-style-type: none"> 35 mm photography sketches 	<ul style="list-style-type: none"> hand recording 35 mm rectified photography 	<ul style="list-style-type: none"> hand recording large format rectified photography stereo-photogrammetry
"Digital" tools used	CAD	<ul style="list-style-type: none"> digitization of images 	<ul style="list-style-type: none"> digital photogrammetry "Total Station" surveys
	images	<ul style="list-style-type: none"> scanning rectification 	<ul style="list-style-type: none"> vectorization of images
Results	<ul style="list-style-type: none"> photographic report photo key plan initial condition - description sketches 	<ul style="list-style-type: none"> measured drawings description - condition observations photographic report 	<ul style="list-style-type: none"> measured detailed drawing description - condition assessment
	<ul style="list-style-type: none"> low-cost electronic product (text, image, drawing) 	<ul style="list-style-type: none"> electronic product (text, image, drawing) 	<ul style="list-style-type: none"> desktop product (text, image, drawing)

plasters. The classification scheme was developed to include weathering types peculiar to Petra, and will be used for future investigations that will be conducted on the monuments. Furthermore, the detailed mapping requires direct accessibility to the whole structure which can be provided by scaffolding construction. The investigation should also include measurements of the salt content and water uptake rates that would be useful in giving additional information concerning the state of deterioration.

Classification Scheme of the Weathering Forms

A) Detachment of Stone Material

1. Granular Disintegration Sanding: Existence of granular or powdery particles in






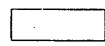



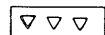

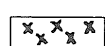

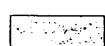





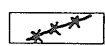

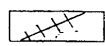



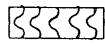
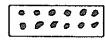
the stone.

2. Flaking: Detachment of small, flat, thin pieces of the outer layers of the masonry surface.
3. Scaling: Detachment of large flat layers of uniform thickness which follow the profile of the masonry surface.
4. Exfoliation: Is the detachment of the outer surface of masonry into thin layers which occurs parallel to the masonry beds, sometimes referred to as the "bedding problem".

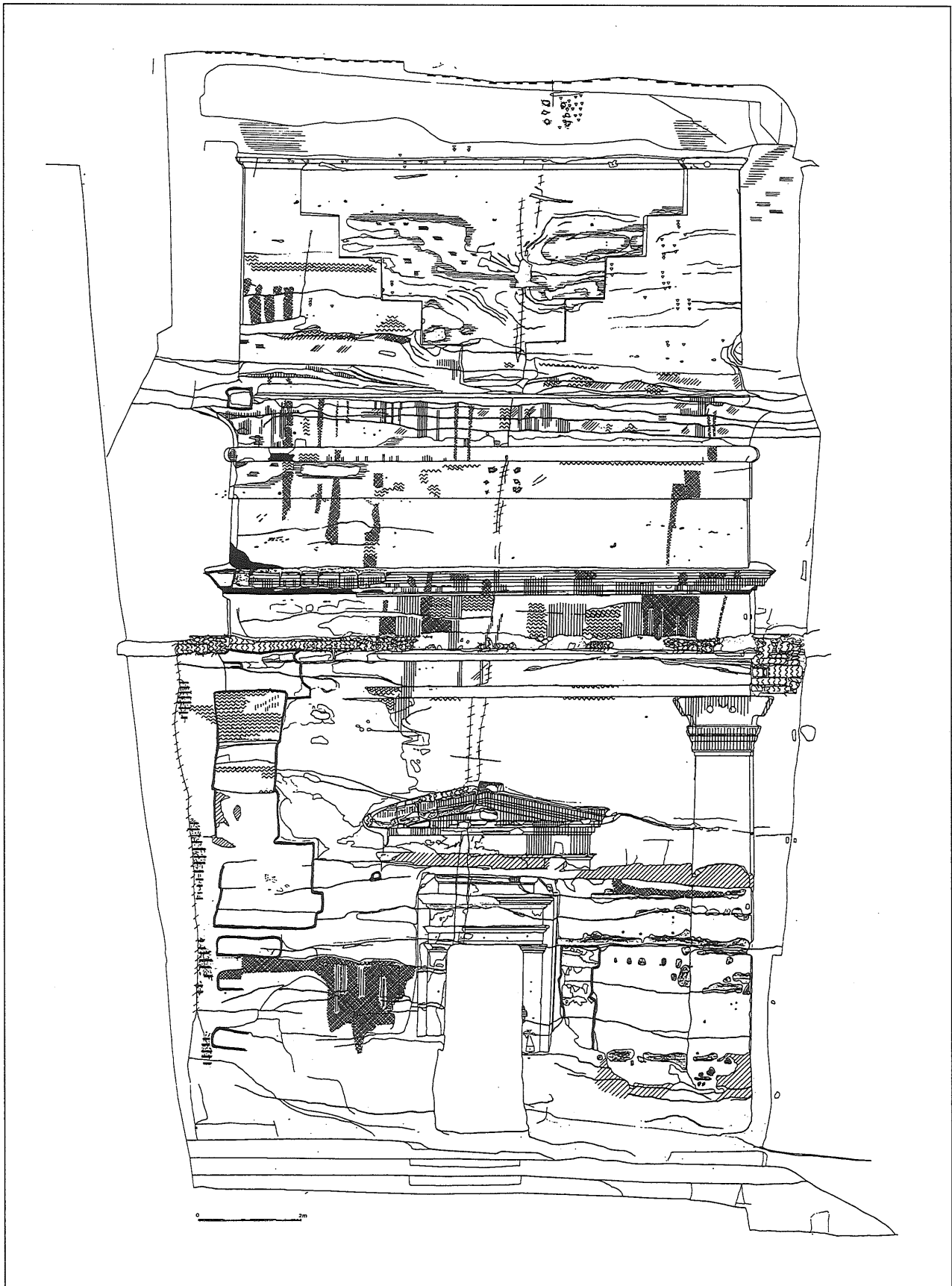
B) Loss of Stone Material

1. Pitting: Presence of small cavities in the non-homogeneous stone surface, which is a result of different rates of erosion of single particles of stone.

LEGEND - Weathering Forms

Granular Disintegration/Sanding		Salt Crust	
Flaking		Vegetation	
Scaling		Insectile Colonization	
Exfoliation		Soot	
Pitting		Bird Droppings	
Alveolar Weathering		Paint	
Outbreaks		Soiling	
Spalling		Slight Crack	
Backweathering		Severe Crack	
Washouts		Joint	
Missing Insets		Fault	
Salt Efflorescence		Plaster Detachment	
Surface Crust		Mortar Disintegration	
		Mortar Infestation	

1. Weathering Forms.



2. Mapping of the weathering forms of tomb 825.

2. Alveolar Weathering: Existence of alveoli (cavities) which are created in a honeycomb pattern.
3. Outbreaks: Breaking away of stone pieces or compact fragments in different sizes. They occur due to mechanical causes, vandalism, gunshots, etc.
4. Spalling: Is the breaking away of stone pieces or chunks in the masonry surface due to natural weathering in a localized area.
5. Backweathering: Loss of stone material parallel to the stone surface or profile, and sometimes following the limonite veins.
6. Washouts: Eroded parts of masonry surface of soft sandstone material or sand pockets which are regularly washed and etched by rain.
7. Missing Insets: Original stone insets of the carved façade that have been lost leaving a cavity.

C) *Formation of Deposits on the Stone Surface*

1. Salt Efflorescence: Existence of whitish deposits of loosely attached soluble salts on masonry surface.
2. Surface Crust: Formation of a hard thin skin which is strongly attached to the masonry surface due to the leaching out of the internal components of the stone (cementing material, salts or other substances within the stone).
3. Salt Crust: Is a type of a surface crust in the form of a solid layer of colorless or white salt.
4. Vegetation: Growth of plants in joints or cracks of masonry due to a high moisture content.
5. Insectile Colonization: Formation of small nests by insects formed on stone corners or infestations in the sandstone.
6. Soot: Compact black colored layer

1. Preservation: Retention of an existing form, material and integrity of a structure; Restoration: Recovery of an earlier form, material and in-

caused by pollutants.

7. Bird Droppings.
8. Paint: Non-original paint or graffiti caused by vandalism or modern reuse.
9. Soiling: Accumulation of dust and mud.

D) *Cracking*

1. Crack: Identifiable fracture in the stone material which occurs as a result of weathering action such as temperature changes within the stone. There are two types of cracks:
 - a) Slight Cracks: Identifiable narrow slight lines (less than 1.5 mm) of fractures at the stone surface.
 - b) Severe Cracks: are cracks that are more than 1.5 mm wide.
2. Joint: A rather plane surface of parting produced by strains imposed on the rock. In a joint there is no displacement of the sides of the fracture. Joints can form under tension or compression produced by the bending or folding of strata strains that are released along fractures.
3. Fault: A fractured surface or zone in the rock, in which one wall of the fracture is displaced relative to the other wall. Faults are produced by stresses in the earth's crust that either compress or extend rocks and cause them to shear.

E) *Deterioration in mortar / plaster*

1. Plaster detachment.
2. Mortar disintegration.
3. Mortar infestation due to biogenic growth.

Intervention Approach on Façade 825

Three levels of intervention can be implemented according to the priorities of each case. These levels include preservation, restoration and reconstruction.¹ Considering the concept of minimal intervention on the archaeological remains of Petra, major execution work will only be conducted

integrity of a structure; Reconstruction: Recreation of vanished or irreversible deteriorated resources.

on deteriorated areas of the upper half of the façade to assure the necessary protection. Moreover, the lower part would be preserved in its "as found" condition without the addition of new elements; this is partly due to the lack of evidence and is an attempt to avoid reconstruction when it does not provide further protection. On the other hand, along the upper parts of the Tomb 825 façade, it would be necessary to introduce new compatible materials in order to be able to repair the deteriorated protective architectural elements and cornices. The treatment of such details would provide protection for the plane surfaces underneath. In particular, the upper cornice should preferably be completed and "reconstructed" in its original form.

The new material which will be introduced would consist of natural raw materials available in the area. Sand, therefore, will be used for compatibility reasons with a silica-based binding material (silica sol). Mortars are being tested in the field to decide on the suitability of their components and proportions, and to observe the long term impact on their appearance and color.

On the other hand, consolidants will only be used when architectural details become very friable. Therefore, consolidation techniques are also being tested in the field and include commercially available formulas of ethyl silicates [Wacker (OH) and Remmer (OH)]. The testing of consolidants considers the application mode, as well as their application prior and after introducing the new mortar. A silica sol based wash is also being considered for stabilizing areas where sanding and flaking take place on the stone material.

Additionally, samples from the monument were used in the laboratory investigations for the determination of stone characteristics that are relevant to weathering. The laboratory investigations targeted the determination of mineral components, compressive strength and porosity characteristics.

Z. Aslan
M. Shaer
Department of Antiquities
Amman, Jordan

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THE MONASTERY OF SAINT AARON

by

Glen Peterman and Robert Schick

Introduction

In the spring of 1990 during a helicopter-borne photographic reconnaissance of the Petra area, Kenneth Russell recognized the outline of a ruined structure on the top of Jabal an-Nabī Hārūn (the mountain of the Prophet Aaron) to the west of the ancient city of Petra. This structure is located at 1255 m asl on the small plateau just below and to the west of the mountain peak where the Muslim shrine, the traditional burial place of the Prophet Aaron is located (Palestine grid coordinates: 188.64 E x 969.667 N; UTM coordinates 731200 E x 3356470 N). The site was photographed from the helicopter (Fig.1), and later that summer, K. Russell, Carol Palmer and the authors inspected and mapped it.

Although the ruins had been noted before in passing, for example by Wiegand (1920: 141) and Savignac (1936: 261), they had not been formally described. After Russell's untimely death in 1992, the current plans and photographs were retrieved from his research notes; his ceramic collection and any associated notes, however, were not found.

The Architectural Remains

The remains reveal an architectural complex some 60 m N-S x 50 m E-W (Fig. 2). Distinct wall lines are barely visible in a field of rubble which appears to extend up to 2 m above the natural surface of the ground. This rubble, presumably from the collapsed upper courses of the walls, forms a gentle slope extending some 10 m in all directions. The walls of the complex are carefully constructed of ashlar of the local sandstone and most are approximately 0.75-1.00m in width. Only a single course of stone from any wall is visible because of the extent of

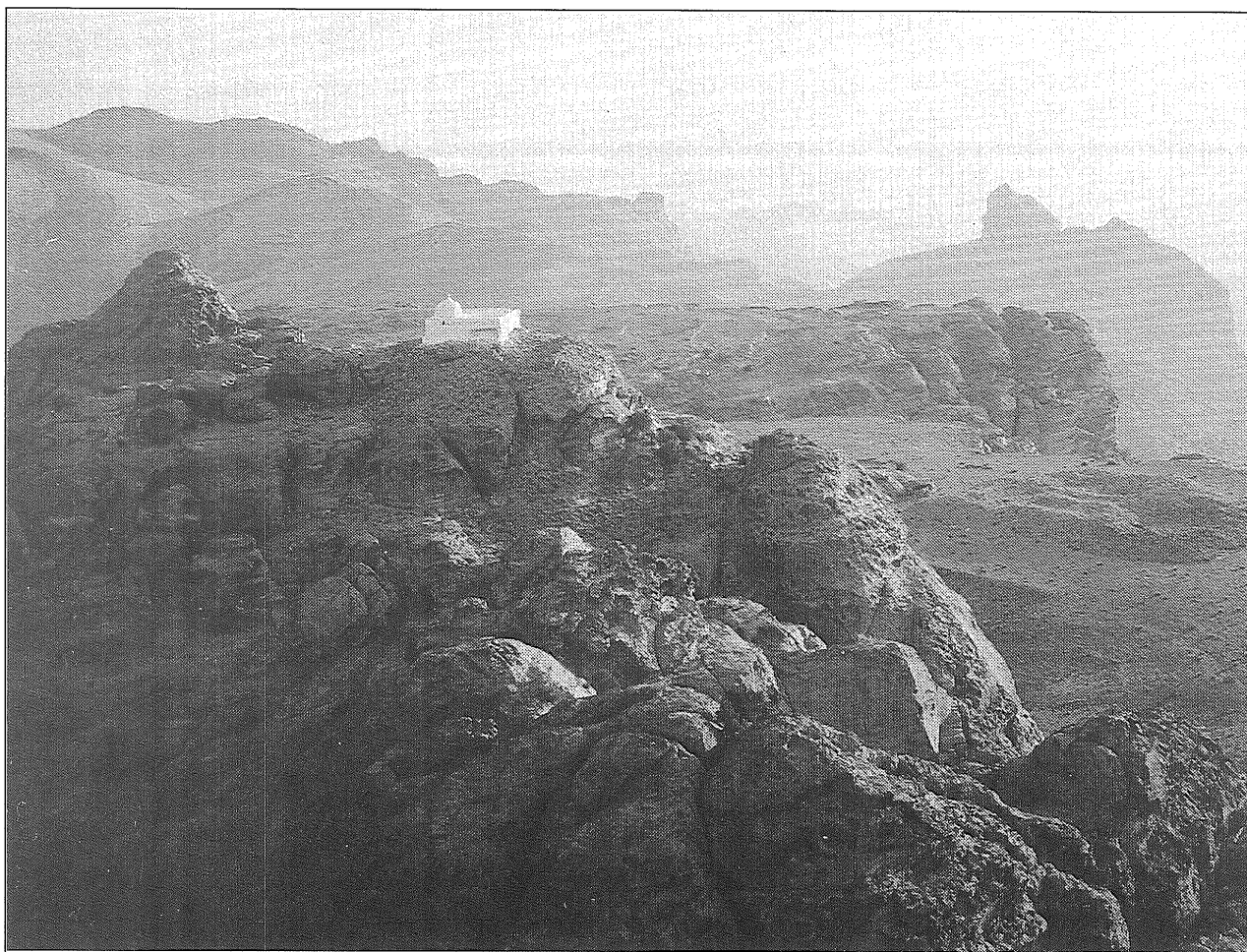
the rubble collapse.

The architectural complex is comprised of a series of rooms surrounding a cistern cut into the bedrock (Fig. 3). The cistern is filled with rock debris, but is accessible through an irregular opening some 6.00 m long and 1.00 m wide. The lateral extent and depth of this cistern can not be known prior to clearance. Near the cistern are walls with apparently *in situ* column drums nearby. The southern and western extents of the complex are delineated by walls forming a number of rooms; one room is clearly defined at the southwestern corner. Adjacent to this room a large number of loose large white limestone tesserae can be seen.

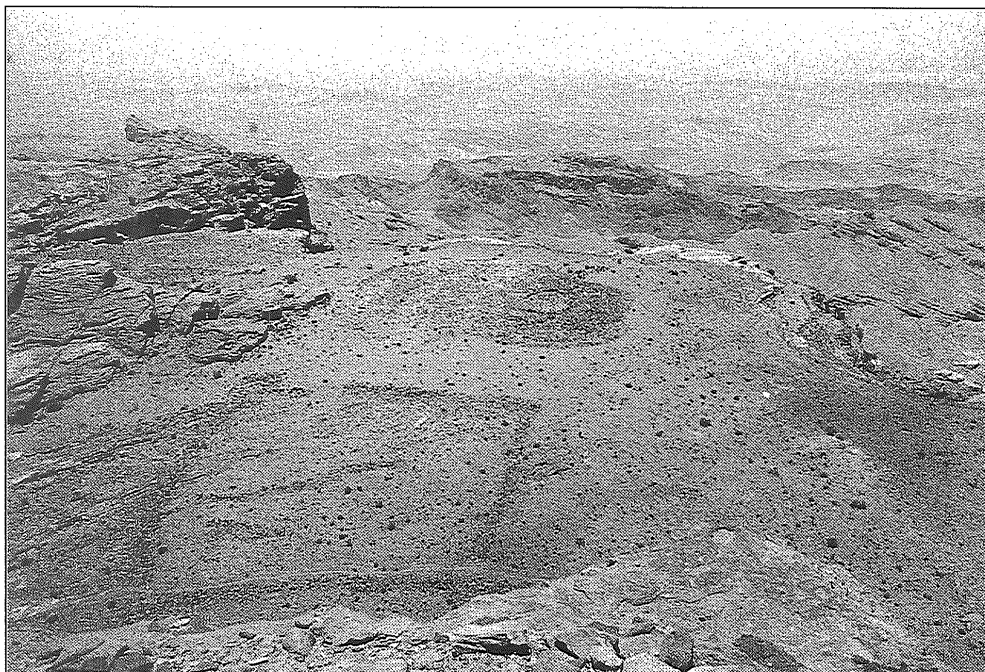
The northern part of the complex is formed by 14 small rooms built around a courtyard some 20.00 sq m. This courtyard area is relatively free of debris, and is presumed to have been cleared and used for tents in recent times. The rooms vary in size from 5.00 x 4.00 m to 5.00 x 2.00 m. Attached to and forming the southeastern corner of this courtyard complex, is one larger structure (21.00 x 16.00 m), which is subdivided into two rooms. The larger room to the south is some 16.00 sq m.

A column drum, apparently *in situ*, was mapped in its northern third. The smaller northern room is 16.00 x 7.00 m, and the inner face of its eastern wall forms an apse. It thus appears to be a small church. The longitudinal (E-W) axis of this room is oriented almost due east towards the highest point of the nearby mountain peak on which the Muslim shrine is built.

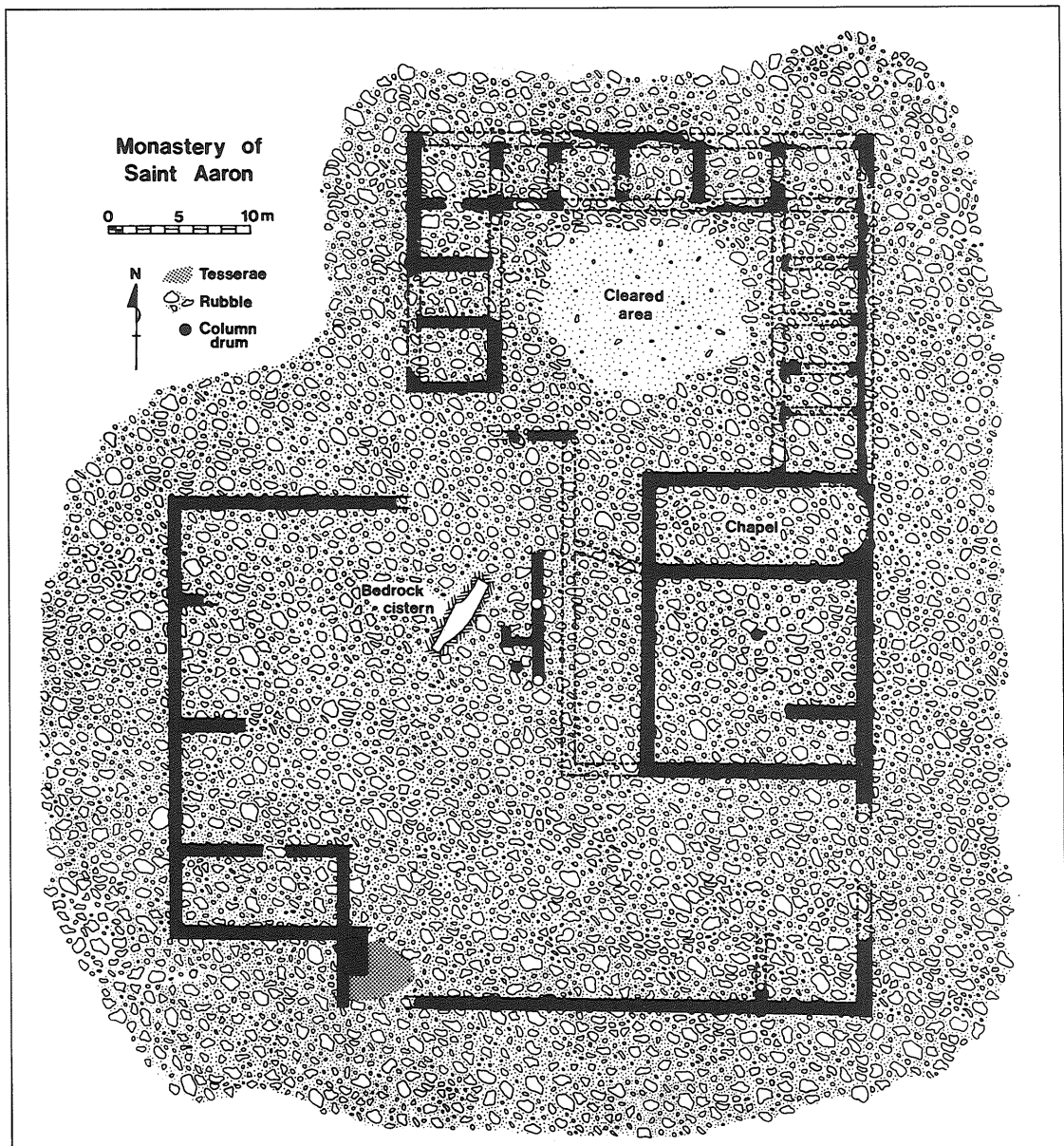
The site is marked by a striking absence of ceramics. Only a few fragments were found (Fig. 4) dating to the Byzantine and later periods. Additionally, a roof tile with



1. View (towards the south-west) of Jabal Hārūn. The Muslim shrine is at the summit in the center of the photograph. The remains of the monastery on the plateau below are visible in the center-right of the photograph. (Photo by Jane Taylor©).



2. View (towards the west) of remains of the monastery and associated structures below the summit. (Photo by Kenneth W. Russell).



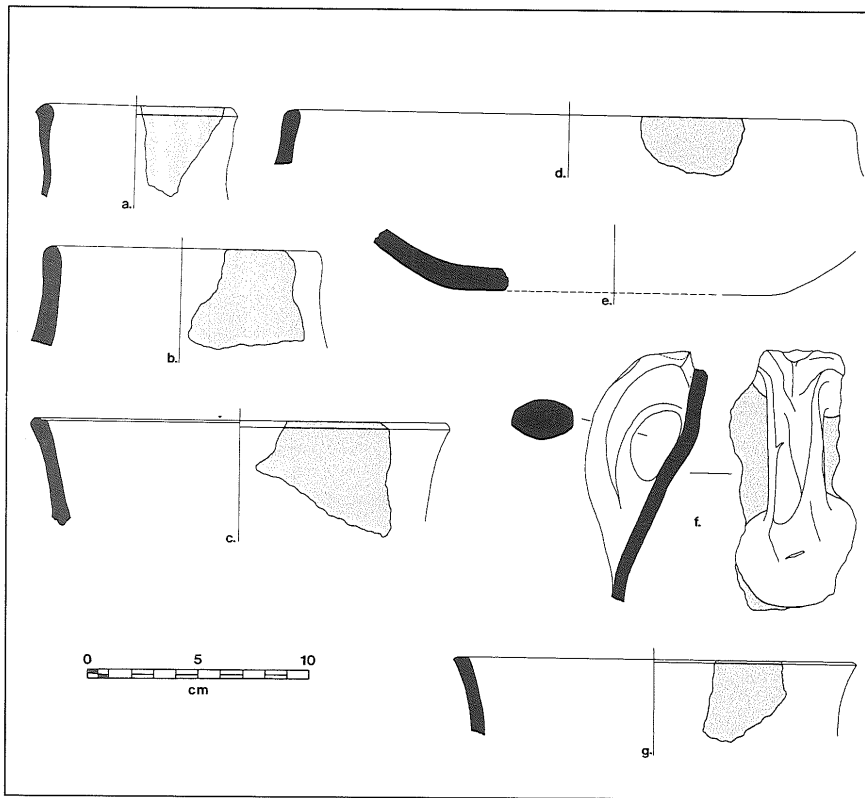
3. Plan of the remains of the monastery of Saint Aaron.

an inscribed cross was found. Savignac reports finding Nabataean and Byzantine pottery (1936: 261).

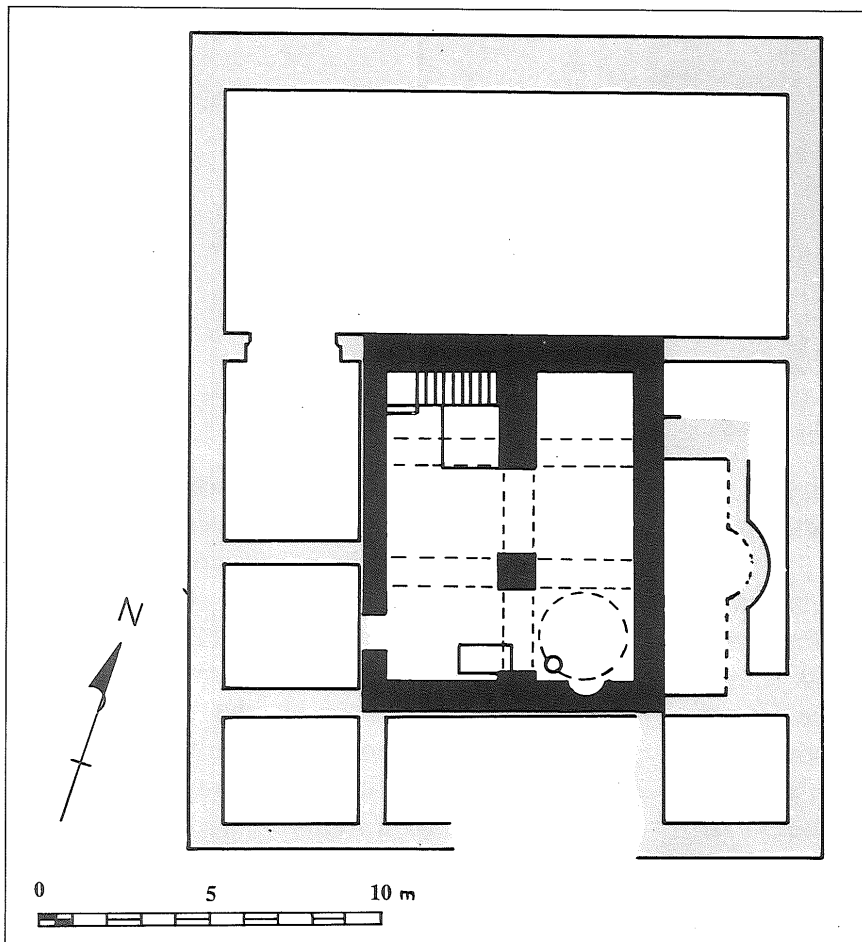
To the east of this complex, between it and the shrine, are the remains of a stone wall with a square installation at its southwest corner, enclosing an open space devoid of any walls or other installations, some 100 x 100 sq m. It appears to have been a corral for animals. Some distance to the south-east are standing stone-built walls forming a few rooms of a small house, probably of recent date. At the start of the path up to the summit

is a large water reservoir some 18 x 5 m, spanned by a row of fifteen arches supporting its roof. Its construction date is unknown.

At the summit Wiegand (1920: 136-145) noted the remains of a centrally planned church, built over by the Muslim weli shrine, which now is difficult to trace (Fig. 5). Jewish graffiti, marble fragments, mosaic cubes, and a multi-colored marble *opus sectile* floor below the carpet of the weli have also been reported (Savignac 1936: 259-261; Brünnow and von Domaszewski



4. Ceramics recovered from the monastery.



5. Plan of the well (in black) and remains of the underlying structure (in gray), following Wiegand (1920).

1904-1909:1: 419-424; Lindner 1970a: 314-328). On the roof of the *weli* are five pieces of marble colonnettes, which would have once been part of a chancel screen. A marble chancel screen post is reused in the Muslim cenotaph. It contains a few letters in Greek that can be read as "for the salvation of " (Sartre 1993:71, no.43). Wilson reported another Greek inscription on a pavement slab in the tomb face upwards and worn away by the feet of pilgrims (Wilson 1900: 73; Sartre 1993: 105-106, no. 69).

Among other evidence for Christians at Jabal Hārūn, short Greek inscriptions, crosses, and outlines of pilgrims' feet can be seen pecked into the rock along the path up the mountain.

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The identification of the structures as the Byzantine period Monastery of Saint Aaron is secure. Christians in the nearby city of Petra are well known from a variety of written sources (Schick, forthcoming) and there are a number of texts that directly mention not only Jabal Hārūn, but also a monastery and church there.

In the Byzantine period, Eusebius lists Mount Aaron, but without any explicit reference to Christianity (1904: 176 - Jerome: 177). Thomas the Syrian, the presbyter and archimandrite of the monastery of Aaron, presumably but not necessarily here, is attested for the 536 synod in Jerusalem (Schieffer 1982-1984: 4.3.2, Thomas no.2: 483). The church may be mentioned in the Petra scrolls discovered in excavations in the Byzantine church in late 1993. At least one scroll, currently being translated by a team from the Academy of Finland mentions the "Church of Saint High Priest Aaron" (Fiema and Frösén 1995: 532).

The church may well have continued throughout the Early Islamic period up through the Crusades. The *Vita* of Saint Stephen the Sabaite reports that the monks who walked around the Dead Sea during Lent in

the mid-eighth century stopped at Mār Hārūn (Leontios of Damascus 1991: 16.2: 96-97). Mār Hārūn could be Jabal Hārūn, although Jabal Hārūn is far enough south that it would have been a detour of several days for anyone walking around the Dead Sea. Al-Mas'ūdī, writing in 344-345/955-956, lists Jabal Hārūn as a holy mountain of the Christians in the possession of Melkite Christians (1894: 143-144).

The monastery was still in existence when the Crusaders first arrived. Fulcher of Chartes mentions it during Baldwin's expedition in 1100: "Furthermore we found at the top of the mountain the Monastery of St Aaron where Moses and Aaron were wont to speak with God. We rejoiced very much to behold a place so holy and to us unknown" (1913: book 2, chapter 5:381;1969:147; Runciman 1951-1954: 2:71-72). Gilbert the Abbot (1879: 255), the *Gesta Francorum* (1866: chapter 45: 523), and the *Historiae Hierosolimitanae* (1866: 556) both mention an oratory here, while Albert of Aquitaine also mentions the expedition but not specifically a monastery (1879: book 7, chapters 41-42: 535-536; 1923:2:44-45).

Magister Thetmarus mentions it during his visit to Petra in 1217: "At length I came to Mount Or, where Aaron died, on whose summit is built a church in which live two Greek Christian monks. The place is called Muscera" (xvi, 1-3; Laurent 1857: 38; Musil 1907-1908: 161, n.10.; Lindner 1970a: 102; 1970b: 314; Pringel 1993: 251-252). Muscera could either be a transliteration of the Arabic word *Mazār* (shrine) or a reference to Moserah (Deut 10:6). The monastery would have gone out of use soon thereafter, certainly no later than the construction of the Muslim *weli* shrine at the summit.

The Muslim Shrine

The construction of the Muslim *weli* is recorded by an Arabic inscription above the entrance. Its text has been reported variously. According to Palmer, it states that

“the building was restored by esh- Shim’ani, the son of Mohammed Calaon, sultan of Egypt by his father’s orders, in the year 739 of the Hijrah” [1338-1339 AD] (1871: 435), while according to Peake it “states that the shrine was built by Shimaani, son of Nasir Muhammed Kalauni in AH 728” [1327-1328 AD] (1958: 82, 135). Philby says that “an Arabic inscription over the doorway on the south side gives the date of the construction of the building as AH 900 (the last figure is, however, scarcely legible, and it may be anything from 900 to 909)=A.D. 1495 approximately” (1925: 9). The well was built reusing architectural elements from the church. The cenotaph inside the shrine includes a second Arabic inscription, its last lines with the date are unclear. According to Clermont-Ganneau it records the construction and renewal of the tomb to the time of the sultan an-Nāṣir Muhammad ibn Qalāūn (1898) (see also new readings of these and other inscriptions in Petra by Suleiman Farajat, forthcoming).

Medieval Jewish pilgrims also record Jabal Hārūn, but mention nothing about any evidence for a Christian presence. Rabbi Jacob (1238-1244) records, “it is three days’ journey on the road thence [from Sodom and Gomorrah] to Mount Hor where Aaron is buried” in a list of tombs outside the Holy Land (Adler 1966: 127). An anonymous au-

thor in 1537 included it in a list of places where Jewish patriarchs are buried outside of the holy land, “Le mont Hor. Là est enseveli le grand prêtre Aaron, dans un caveau fermé; on a élevé au-dessus une belle voûte; les juifs vont à son tombeau pour s’y prosterner et y prier, et personne ne les en empêche. Les ismaélites mêmes traitent ce lieu avec respect.” (Carmoly 1847: 457 and n. 216 on p.488). Rabbi Yehezkel came in 1851 and in his travel diary he refers to earlier visits by Jewish pilgrims in 1624 and 1732 (Shalem 1981).

Summary

The ceramic evidence, the design of the architecture, the location on Jabal Hārūn, and associated remains, present the picture of a Byzantine period monastery with accompanying facilities for pilgrims at the foot of the summit, with another church at the top of the mountain. The situation is analogous to Mount Sinai, with the Monastery of Saint Catherine at its foot.

G. Peterman
R. Schick
ACOR
P.O. Box 2470
Amman-11181
Jordan

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THE RIDGE CHURCH AT PETRA

by

Patricia M. Bikai

This Byzantine church is located approximately 160 m NNW of the church uncovered by ACOR during excavations begun in 1992. For ease of reference, that church, the one with the spectacular mosaics and where the Petra Papyri were found, is referred to here as the Petra Church. This second church has been dubbed the Ridge Church because of its location.

The Ridge Church is located at the north-western edge of the Byzantine-era city and is just inside the city walls that run along the ridge overlooking Wādī Abū al-'Ullayqa. Its location on a sandstone ridge that rises to 924 m has subjected the structure to severe erosion. Most of the stones of the walls and the other architectural elements have disappeared; many have been washed down the slopes around the structure. The church may have been noticed by A. Musil in the early part of the century (*Arabia Petraea II: Edom*, Vienna, 1907: 105-6, 108, Fig. 76). He described two churches in the general vicinity, but matching his descriptions to either of the two known churches is difficult. The Ridge Church definitely appears on A. Kammerer's map (*Pétra et la Nabatène*, Paris 1929: Carte III). It was noticed again by Thomas Dailey and Pierre Bikai on January 2, 1994, and they encouraged documenting it before it deteriorated further. Excavations were conducted in October 1994, October 1995, and March 1996.

In the 1994 season, preliminary trenches were opened that indicated that at least the floor of the structure was preserved.¹

The objectives of the next two seasons were:

1) to clear the structure and document it;

- 2) to restore as much as is necessary in order to prevent further erosion of the monument;
- 3) to locate architectural fragments on the surrounding slopes and, when possible, move them up to the church where they should be safer.

Ecclesiastical Phases

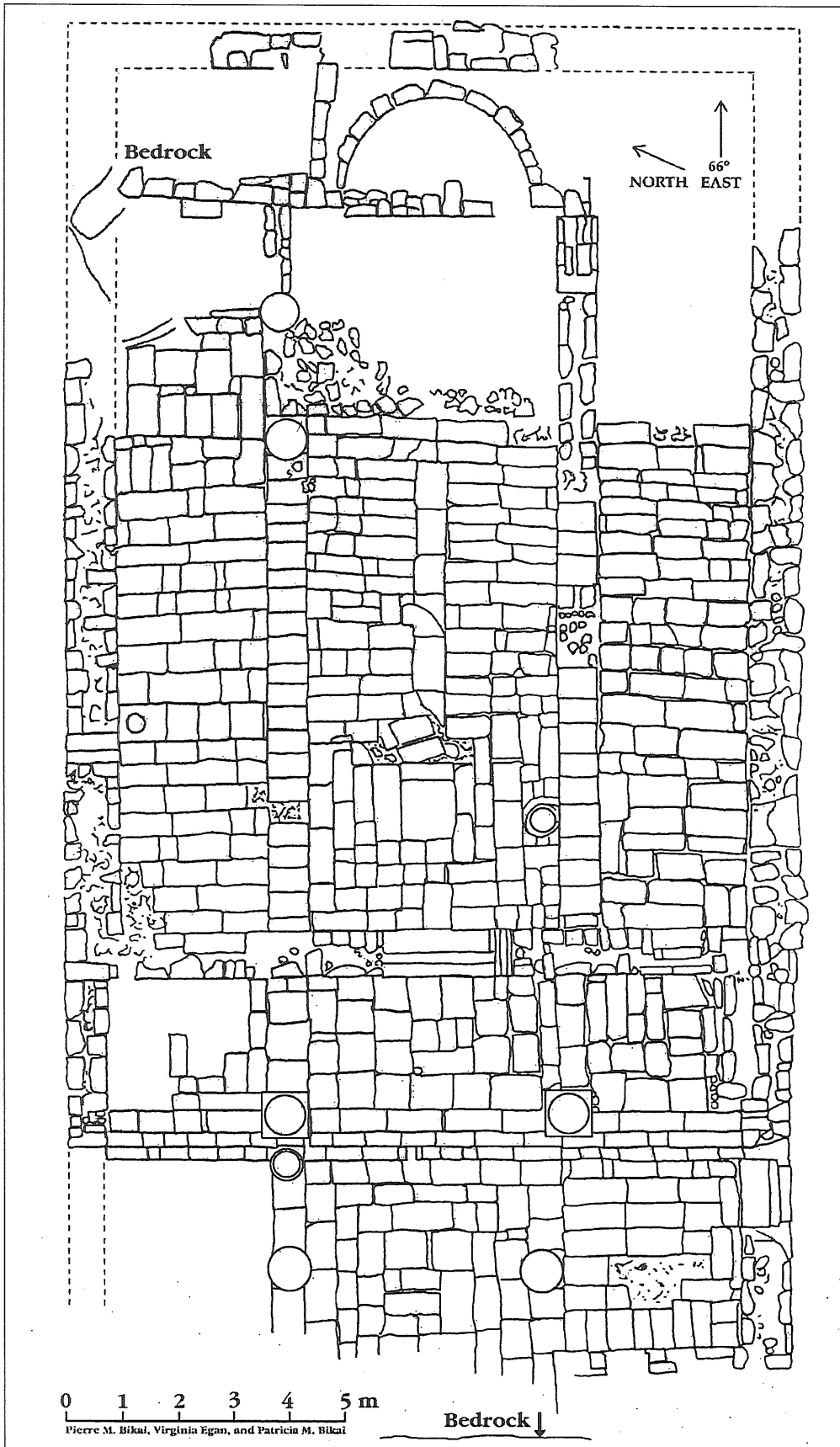
The building itself measures 18.1m in length and 13.5 m in width (interior: 16.55 m x 11.75 m). The church itself has a nave and two side aisles. At the eastern end of the northern aisle, the construction was adapted to the rising bedrock by the insertion of a step at the line of the chancel and again between the aisle proper and the pastophorium. The southern aisle has been cleared only to the line of the apse of the church. The area of the southern pastophorium is badly eroded. The side aisles are separated from the nave by stylobates that once carried five columns on each side. At the eastern and western ends, there were pilasters. Considering that almost all of the superstructure has disappeared, the stone floor in the aisles and nave is in surprisingly good condition (Figs. 1 and 2).

In the course of the excavation of the nave it was discovered that there is a cistern under its western end. This measures 2.8 m x 3 m and is cut into bedrock, which is plastered, on all four sides. The roof is supported by three arches above which is the subfloor of the church. The cistern's only entrance is by a round mouth located next to the southern stylobate. The cistern would, of course, have been inside the building.

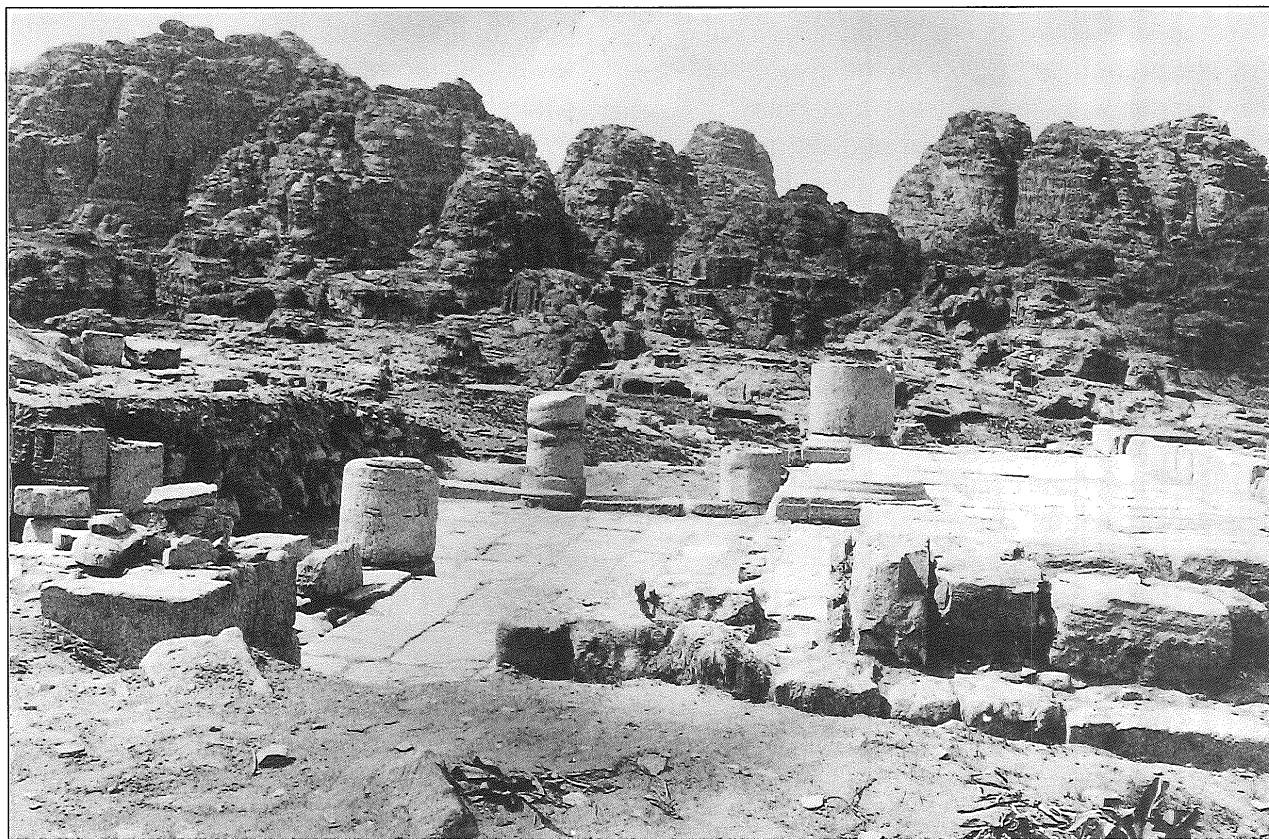
No flooring was recovered in the chancel or apse areas, but remnants of what appears

1. See Patricia and Pierre Bikai, 'ACOR Excavations at Petra' *LA* 44 (1994): 634-636; Patricia Bikai

'The Ridge Church in Petra' *SHAJ* VI in press.



1. Plan of the Ridge Church (drawn by Pierre and Patricia Bikai and V. Egan).



2. View from the south across the narthex and lower court.

to be the underlayment of the floors of those areas were found, and it is now almost certain that at one time those areas were covered with a mosaic consisting in the main of white cubes measuring ca. 2.5 cm on a side. The chancel area measures 18.8 m² and the apse 5.6 m², for a total of 24.4 m². 6500 mosaic cubes were recovered from the debris; these would have paved an area of approximately 4 m². Since there does not appear to be any other area of the structure that would have been paved with mosaics, it can safely be assumed that these cubes are the remnants of the chancel and apse flooring. A very few brown and black mosaic cubes were also recovered, indicating that a small part of the mosaic had a pattern. In any case all that remains at present is part of the underlayment on the north side of the chancel.

In the rest of the chancel area only earth fill was found. A sounding was made on the south side to determine the history of the modifications to this area. The stone paving

of the nave does not continue under the raised chancel, but at a level slightly below that of the stone paving of the nave and aisles, a yellow rubble subfloor was found. It may be that this once had a marble floor above it. In a subsequent stage, the area of the chancel was raised with earth fill. Thus, like the chancel of the Petra Church, the chancel of the Ridge Church was raised during one of its modifications.

Three doors at the western end of the church lead to a 3 m deep narthex that is approached by steps leading up from a courtyard. Set into the narthex floor is a column base that is in line with the northern stylobate of the church proper; a second, identical, column base is set slightly to the north of the line of the southern stylobate. West of this are three steps that go down 1.18 m to another pavement, called here the courtyard, only part of which was cleared. The steps extend across the whole width of the church. A stone with a Latin inscription was found

used up-side-down as one of the steps (Fig. 3). The preliminary report on the inscription (by Zbigniew T. Fiema) says that Latin inscriptions are rare in Petra, and the paleography of the text would indicate a date not later than the third century AD, and possibly earlier. The text follows a typical commemorative formula, and the preserved (lower) part notes the later stages of the career of the person honored by this dedication. It was seemingly commissioned by a Lucius who was the signifer (standard bearer) for a praefectus (commander) of Ala II Ulpia Auriana, an army regiment stationed in Cappadocia. Since the dedication was set up in Petra, the praefectus, who is not named in the preserved part of the inscription, may have been a native of that city.

Below the steps is a courtyard. A door was found leading into this from the south and a second door was found in the south of the western wall of the courtyard. The paving of the southern area of the courtyard is about 8 cm higher than that of the central area. In the central area of the court, a column base and drum were found *in situ* to the south. On the northern side of this central area, there is a stylobate on which another column base with a drum above were found *in situ*. Also on that stylobate a column drum 71 cm high was found. The top of this had

been hollowed out. There is a similar hollowed-out drum in the atrium of the Petra Church. No floor for the northern section of the court has been located.

Because of the eroded condition of the building, very little has been recovered that can aid in dating it. On the basis of the mosaic fragments and the general form, it is preliminarily dated to the fifth - sixth centuries AD.

Pre-Ecclesiastical Phases

As noted above, a large cistern of Nabataean construction was found under the nave of the church. It most likely was in the courtyard of a Nabataean building. No traces of a floor of the Nabataean period have been found, however, in probes below the floor of the church. One probe, above the cistern, reached the roof of the cistern with no intervening level between the roof and the church floor. It is possible that when the church was built an earlier floor was removed. In the area of the south pastophorium, which is eroded below the floor level of the church, what appear to be purely Nabataean deposits have been located and will be explored in future seasons. Some of the Nabataean building materials reused in the church may have come from a building at the site, but can just as well have come from structures anywhere in Petra.



3. Latin inscription reused in the steps of the church.

Post-Ecclesiastical Phases

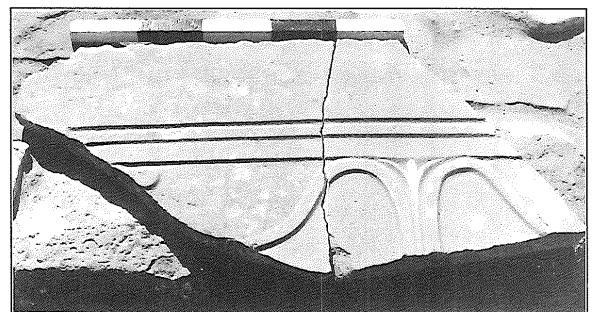
The post-abandonment history of this structure may be quite complicated. The depredations that it has suffered cannot all be due to erosion. Almost no architectural elements were found in the fill of the interior of the structure itself. Indeed, compared to the post-abandonment history of the Petra Church that is down the slope, the absence of materials attributable to the superstructure is striking. Thus far the evidence consists of the following:

- 1) On the southern side of the narthex an area of about 2 m x 2 m of burned material was found above the floor. Mixed with the ash were a number of nails and pieces of lead. Some of the stones of the paving of the southern side of the court had been removed and in and around the removed stones, quantities of burned materials were also found. These may indicate an occupation of the site not long after its ecclesiastical function ceased as the stone floors had not yet been covered by wind-blown debris.
- 2) On the northern side of the lower court, a layer of hundreds of water-washed cobbles was found mixed with wind-blown sand. These stones can only have come from the wadis below the structure. They were located at a point that looks almost straight down into the Wādī Abū 'Ullayqa (the least defensible entry to Petra) and raise the possibility that they and perhaps some of the now missing architectural elements of the structure were used as missiles against enemies approaching from below. A local informant stated that at a site farther to the east, and also above Wādī Abū 'Ullayqa, there is another point where the route can be cut; quantities of such stones are also found there. We may here be seeing only the faintest glimpse of an incident or series of incidents during the long dark age of Petra.
- 3) Large quantities of mosaic cubes were found in concentrations at the western end

of the northern aisle and in the fill above the steps to the west of that. Additionally, a partially restorable marble chancel screen (Fig. 4) was found in the same area of the concentration of mosaic cubes in the western end of the northern aisle, indicating deliberate displacement of materials from the chancel area. It is now thought that when the ridge was cleared for agricultural use in relatively recent times, the area of the courtyard was probably still a depression and thus elements were dumped into it to level the area. It is likely that this leveling activity also led to the destruction of the mosaic in the raised chancel. The consequent debris was shifted to the west to fill the lower area.

The fill in the lower courtyard produced numerous architectural fragments that may or may not have formed part of the church. Among them were eight parts of an engaged column (or a pair of them), including a base and a fragmentary capital. These may originally have been part of a door or a niche in the as yet unexcavated western wall of the central part of the lower courtyard. Two parts of a carved Nabataean entablature with triglyphs and circles in the metopes were also recovered. It is possible that the engaged column(s) framed a doorway over which was this entablature. The rest of the entablature has not been identified. Another find was a miniature sandstone cornice (51 cm x 59 cm), again in the Nabataean style; traces of red paint are still visible on it. These elements are safely dated to the first century AD.

Thus the destruction of the building may



4. Part of a marble chancel screen.

have been due to a combination of erosion, deliberate dismantling, and agricultural clearing.

Restoration

Much of the southern wall of the structure was already eroded below floor level. Towards the western end, two courses above the floor remained in a few places. Almost the whole length of the southern wall was consolidated to the line of the pastophorium. Stones that had fallen from it to the south were replaced to bring the whole wall up to two courses above the floor level. This was then consolidated with lime and sand to prevent further erosion. The displaced column base that was found at its probable original location at the western end of the northern stylobate was also set back in place. Two stones identified with certainty as belonging to the southern stylobate were restored as the fourth and sixth stones from the east on that stylobate. One drum and a capital found on the southern slope were restored above the *in situ* second column base from the east of the northern stylobate. These are most likely not their original locations but they are safe where they are. One column drum was restored above the *in situ* column base with an *in situ* drum above it on the northern stylobate of the lower court. This drum was found adjacent to the *in situ* features and is most likely restored to its original location.

Finally, a large column drum (H: 66.5 cm; W: 78 cm) found on the northern side of the central part of the lower court was restored above the *in situ* column base on the northern side of the narthex. The drum is slightly wider than the top of the column base (W: 72 cm) and thus does not appear to fit over that base. However, given the random nature of the reuse of older elements in this structure,

and given that the drum was found less than 2 m from that base, and, finally, given that there is no other possible place for that drum, it likely did come from the column of the north side of the narthex.

Finally, the area surrounding the structure was surveyed to a distance of approximately 30 meters. Forty-two architectural elements were located on a plan and most were moved up to the Ridge Church, many to a lapidarium on the consolidated southern wall of the structure. While it is not at all certain that all of these elements formed part of the original building, they are safer where they are now than they were on the slopes.

Acknowledgments

Excavations were directed by Patricia M. Bikai of ACOR. Virginia Egan was assistant director, Pierre M. Bikai architect and Nayif Zaban conservator. Other participants included Peggie Abujaber, Aysar Aqrabi, Karen Asfour, Nasri Atalla, Amparo Bettini, HE the Ambassador of Italy Romualdo Bettini, Elaina Coyne, HE the Ambassador of the United States Wesley Egan, Don McCrea, HE the Ambassador of Switzerland Gian Frederico Pedotti, Maria Pedotti, Paula Williams-Brown, and Maroussia Zimmermann.

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Patricia M. Bikai
ACOR
P.O.B. 2470
Amman, Jordan

PETRA CHURCH PROJECT, PETRA PAPYRI

by

Pierre M. Bikai

The publication of the Byzantine documents found in 1993 in the church at Petra is being undertaken jointly by the University of Helsinki and University of Michigan, under the leadership of Jaakko Frösén and Ludwig Koenen respectively. The following information has been provided by them, by Clement A. Kuehn, and by Zbigniew T. Fie-ma, historical consultant to the project.

Between September 1994 and May 1995, the conservation work on the carbonized Petra papyrus rolls was carried out by the Finnish conservation team in the ACOR lab. In most cases, the outer layers of the rolls were destroyed, but the internal parts, often containing the beginning of the roll were better preserved. From the 152 rolls that have been opened, about 23 rolls will yield partially continuous text segments and about another 20 rolls will provide us with fragments of substantial information.

With the conservation phase completed, the publication phase began and work was conducted by the University of Michigan team in the summer of 1995. In the fall of 1995, the Finnish team began their work on the scrolls in Finland and arrived in Jordan to work with the original documents at the beginning of 1996. In all 22 persons from the two groups worked on the transcription and interpretation of the scrolls. It will be recalled that all parties involved had signed an access/publication agreement and the final division of the scrolls for publication purposes between the two groups was agreed to in late 1995.

All 152 rolls, some written on both sides, contain documentary texts written mainly in Greek. There are two lines of text in Latin in one of the scrolls and Latin 'loan-words' are used more often and differently in the Near

East than in Egypt. The papyri are economic documents dealing with possessions, dispositions and acquisitions of real estate and other types of property. There are sworn and unsworn contracts, agreements and settlements of disputes concerning loans, sales, divisions of property, cessions, registrations, marriages and inheritance. The various handwritings used by the scribes are almost identical with those found in Egypt, but the phraseology of the documents is somewhat different.

The texts cover a period of some 50 years between AD 528 and 578 (or perhaps AD 582), that is, during the reign of the Emperor Justinian and his successors. Many of the documents refer to Petra as Augustocolonia Antoniana Hadriana Metropolis of the Province Palaestina Tertia Salutaris. Names of other settlements, such as Augustopolis (identified with Udhruh), Eleutheropolis (Beit Jibrin), Zadakathon (Sadaqa) are mentioned, together with numerous places around Petra. Churches and other buildings are also mentioned, that is, the Chapel of the Saint and Glorious Martyr Kyrikos in Zadakathon, the Church of the Saint and Glorious Martyr Theodoros in Augustopolis, the Church of our All-Holy Mistress the Glorious God-bearing (n.b.) Ever Virgin Mary in Petra, the Hostel or Hospital of the Saint and Gloriously Triumphant Martyr Kyrikos in Petra, and the Church of our Lord the Saint High-Priest Aaron. The latter may refer to the extant remains at Jabal Hārūn near Petra, where, according to tradition, Moses' brother was buried.

Among the key figures in the texts are men of administrative ranks: ecclesiastic, civilian, and military, who bear typical Byzantine honorific titles. Almost every man

bears the status name of the upper class, Flavius, and once, we find also a woman named Kyra signing a marriage contract in her own hand. Some slaves have been identified, not only as property, but also as farmers.

Although their identity cannot be always certain, seemingly the same persons appear over and over again in the texts. One of the main figures is one Theodoros, son of Obodianos, grandson of Obodianos who became an archdeacon of the “most holy church of ... in the metropolis.” He also was a landowner and participated in extensive business transactions. Another important figure is one Bassus who, at first, seems unrelated to Theodoros and his clan, but he has a son named Patrophilos who had a daughter called Stephanous. One text (Inv. 68 , Papyrus Petra Thomas and Francesca Bennett), dated to May 23, AD 537, involves a marriage which joins the two families: Stephanous has recently married Theodoros who seems to be a minor (under the age of 25) and is represented by a curator. The subject of this settlement is, first, the inheritance of the dowry of a deceased mother; the dowry includes immovable property, such as a house or land. Because of damage to the text, it cannot yet be determined whose mother—that of Theodoros or that of Stephanous—originally owned the dowry. If it was the mother of the bride, then it seems that the father of the bride used the maternal dowry as a dowry once again when his daughter got married. The document also directs who inherits the dowry if this or that person dies. The scroll then progresses into a second subject, Patrophilos’s will. It specifies that if he dies, his daughter Stephanous inherits all of his property. The combination of these two subjects makes the document unique among papyri found in the Middle East and Egypt.

Another roll (Inv.10, Papyrus Petra Khaled and Suha Shoman) reports a division of property among three brothers, Bassus, Epiphanius, and Sabinus, grandsons of the Bassus mentioned above. The same types of

property are always listed in the same order: vineyards, sown land, slaves, housing complexes with orchards. In the extant parts of the roll, the brothers divide 85 iugera among themselves; taking the lost third of the papyrus into account, this should mean a minimum of 127 iugera or 85 acres. As in Egypt, each field is described by its neighboring fields. The fields that border the fields subject to the division are usually owned by one or two of the brothers or by other relatives. Altogether, the members of the family owned about 75 neighboring fields, each being the size of at least one iugerum, that is, an absolute minimum of 202 iugera, or about 134 acres owned by this family, possibly in addition to other lands not mentioned here. The nature of the archive therefore presents a somewhat one-sided picture, the group of rich landlords: their fields, houses, and slaves, with only passing mention of animals and husbandry. Further research will probably show that all or most of the primary actors of this archive are related to Theodoros, and that this is a family archive whose last owner was Theodoros the archdeacon. Presumably, upon his death, the archive was left in the storage room of the church in which he and his father had served.

It is noteworthy that in roll Inv. 10, as well in some other rolls, districts, fields, orchards, houses, and even parts of houses have Greek transcriptions of Semitic, mostly Arabic or Aramaic, names. For example, one of the papyri refers to a dry-orchard called gannath al-salam, most likely translated as “Garden of Peace.” Significantly, these people, while using Greek in their documents, named their houses and fields in their own tongue. This fact also points to the people’s self-identification, far beyond the parameters of the written language.

One of the texts (Inv. 83, Papyrus Petra H.M. King Hussein and H.M. Queen Noor) concerns, among other things, a question about rights to the water from a spring at Za-

dakathon. That document also contains the historically known name of Abū Karib ibn Jabala (Abū Kherebos). The historian Procopius says that Abū Karib, the Ghassanid, ceded some tribal areas (probably in northern Ḥijāz) to the Emperor Justinian and was appointed by him as a phylarch (ruler) of the local Arab foederati in 528/29. The date is fragmentary in inv. 83, but sufficiently preserved to indicate that the document was written after Justinian's Novella 47 (AD 537) which ordered the mention of the emperor's regnal year at the beginning of dating formulae.

Previous understanding of the history of Byzantine Petra has been based on scattered pieces of information, and on a series of arguments *ex silentio*. Undoubtedly, both the ACOR excavations of the Petra Church, and the scrolls will make it necessary to reassess the history of Petra and southern Jordan. In the texts, the previously postulated economic decline cannot be traced, and there is no

evidence for the earthquake of 9 July 551 which is often thought to have caused the final demise of the city. Instead, the texts reveal the active and rich social and economic life of the city and its agricultural hinterland. As opposed to earlier times when Petra's wealth was generated by long-distance Oriental trade, the archives indicate that land-ownership was the backbone of Byzantine Petra's society. Significantly, the dating formulae in some dated Petra texts strongly imply that imperial orders reached the everyday praxis in the Near East more quickly than they reached Egypt. This confirms the continuing status of Petra as an important regional administrative center of the Byzantine empire in the sixth century AD.

Pierre M. Bikai
ACOR
P.O. Box 2470
Amman, Jordan

EXCAVATIONS IN THE BYZANTINE CEMETERY AT KHIRBAT AS-SAMRĀ' Site B - 1995

by

A.J. Nabulsi and J.B.Humbert

Preliminary excavations at the Byzantine cemetery in Khirbat as-Samrā' 1993 (site A) gave some information on the regional sixth century AD inhabitants. To cover different periods of population and to increase the osteological sample size to a statistically reliable degree, other parts of the cemetery were to be excavated. For the 1995 season,¹ an eastern part of the Byzantine cemetery was excavated in an area that was expected to represent the Christian-Moslem transitional period, that is late seventh to eighth century AD (site B).

Depending on the nature of the top soil, the upper 15-50 cm of 19 squares (5x5 m) were cleared to locate burials. In this process, 8 tombstones and fragments of ceramic oil lamps, datable to the late seventh century AD, as well as other pottery fragments were found. By the end of the campaign 67 tombs were located, an average of 3.35 tombs in each 25m², and 64 tombs were excavated and numbered from Tomb 23 to Tomb 86 (Fig.1).

The burials were mostly in a west-east direction though few were markedly tilted to the south-east and with lines of stones or gravel pilings appearing to provide a sort of walling or demarcation between tomb clusters. Greater variability in the length, width and depth of the tombs was also observed (107 x 45 x 125 cm to 250 x 55 x 185 cm). The tombs are constructed as trenches, dug in the virgin soil with 5-10 cm wide shelves, 30 to 60 cm from the bottom, serving as shoulder for the tomb slabs to rest upon. The slabs are usually 5 -10 cm Basalt flagstones

whereby those of burial 39 were of rose quartzite stones. In tomb 36 three whitish slabs were found with crosses as well as Greek and probable Syrian inscriptions engraved on them. The excavated part confirmed previous reports of tomb robberies, as indicated by their disturbed structure.

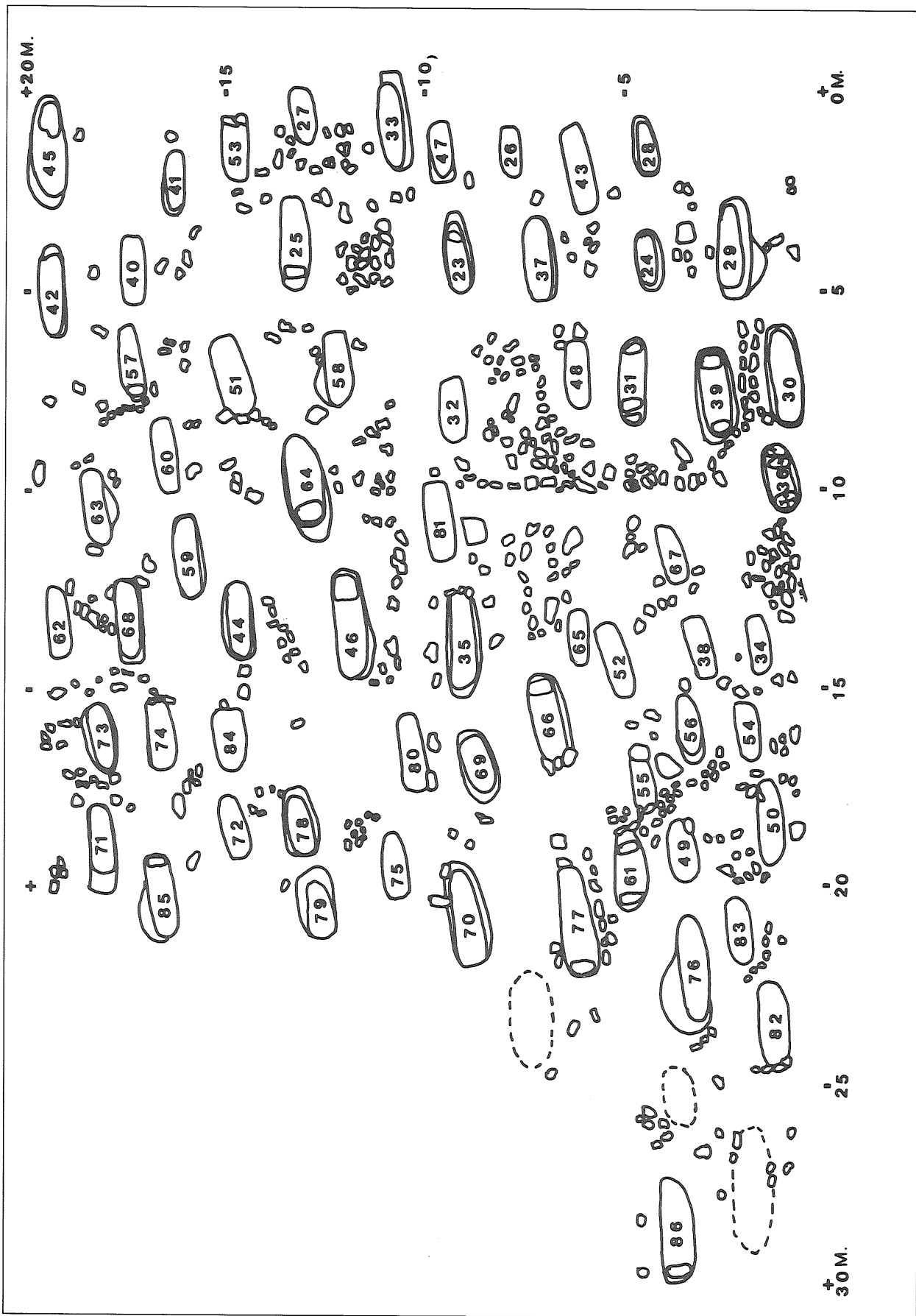
Human bones were obtained from 48 of the the 64 excavated tombs only, two of which were *in situ*, that is not opened before excavations. The condition of the osteological material was generally poor and in most cases only 30% or less of it was preserved. Preliminary analysis indicated that 14-16 of the tombs were for adult burials: 7 were identified as females and 6 as males. The remaining material belongs to non-adult burials, mostly infants or children less than 5 years old (Table 1). The fact that 31 of the excavated tombs were definitely child burials was reflected in the estimated low mean mortality age (11.53 y) based on the material available.

Table 1. Age distribution of the obtained human skeletal material from site B of the Byzantine cemetery of Khirbat as-Samrā'.

Age group in years	Observed number
0-02	8
3-05	14
6-10	4
11-15	5
16-20	3
21-25	4
26-30	5
30-35	1
> -45	1

1. With the participation of Inga Johannsen, Gitta Rüscher, Friedrich Wolfram Schleif and Natali

Wiencke, anthropology students at the Inst. f. Humanbiologie - Uni. Hamburg.



1. The excavation plan of site B of the Byzantine cemetery at Khirbat as-Samrā' 1995.

Alongside the osteological material, various numbers of objects were salvaged from the burials. These included metal and bronze crosses, rings, earrings, bracelets and amulets together with various types of beads (glass, shells, bone and wood). Four bronze coins were also found attached as part of a necklace with two of the coins covered in a leather mantel. Furthermore, painted and unpainted gypsum frames of mirrors, stone spindles, strap buckles, (metal and bronze), hair and cloth pins, a broken spearhead, two intact ceramic vases (10 cm high) and other, presently unidentifiable, metal objects were salvaged.

Though very similar in the layout of burials, the excavated site B differs in many respects from site A of the 1993 season. The obtained human bones were less abundant not only as a result of repeated tomb disturbance or shallower burials but also because most tombs are child burials that are more susceptible to bone deterioration. Including small burials, which lacked human

skeletal remains, two thirds of all excavated tombs are very probably child burials. Thus, a greater part of site B can be seen to represent a type of child cemetery so that demographic parameters, for example mortality rate, based on this part may lead to biased information on the population concerned. Another aspect is the great abundance of objects and particularly those with religious connotations, like the crosses. This may be related to the transitional late seventh century, the period of introduction of Islam to the region.

A.J. Nabulsi
Institut für Humanbiologie,
Hamburg University,
GERMANY

J.-B. Humbert
École Biblique et Archéologique
Français
Jerusalem

