



THE HASHEMITE KINGDOM OF JORDAN

**ANNUAL
of the
DEPARTMENT OF ANTIQUITIES
of JORDAN**

XLII

**AMMAN
1998**

Editorial Board

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Subscription Fee

15.000 Jordanian Dinars (Jordan)

50 US Dollars (Other Countries, surface mail included)

Computer Design and Layout: Majeda Ibrahim

Printing: Jordan Press Foundation - Al Ra'i

Opinion expressed in this *Annual* do not necessarily represent the policies of the Department of Antiquities.

Deadline for submission of articles is May 31 of the same year. Articles should be mailed to the following address:

The Editor,
Annual of the Department of Antiquities of Jordan,
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Amman - Jordan

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INSTRUCTIONS FOR CONTRIBUTORS TO THE ANNUAL OF THE DEPARTMENT OF ANTIQUITIES OF JORDAN

1. The Annual of the Department of Antiquities of Jordan *ADAJ* is a scientific journal primarily devoted to archaeological research in Jordan. Priority of publication is given to reports of projects and to presentations of the excavated material. Articles accepted by the editors are those which give an adequate and scholarly rendering of the rich historical and cultural heritage of Jordan and the surrounding countries. The editors of *ADAJ* reserve the right to reject articles and to inform the author(s) if the contribution does not meet the required standards of presentation .
2. *Language*: Articles may be in Arabic, English or French. Articles in French **must have an abstract** in English or Arabic. Any article, critical note or book review submitted for publication in *ADAJ* is expected to conform to the requirements stated in these Instructions for Contributors. Contributions written in English, French or Arabic will be returned to the author for correction if the text is linguistically inadequate.
3. *Preparation of the Manuscript*: The manuscript should be **double spaced** throughout, submitted in duplicate; printed on foolscap on one side of the paper only; submitted with the authors(s) name(s) on every page and illustration; name(s) and complete mailing address at the end of the text, no more than **30 pages** excluding illustrative material. Pages should be numbered consecutively, beginning with first (half-title) page and continuing throughout text to appendages of footnotes, captions, bibliography etc. The order should be text followed by footnotes, bibliography, illustrations and figures captions.
4. *Submission of the text* : should be on computer diskettes (Macintosh formatted), preferably (MS Word documents). Please include a copy of the document saved as "text only" (including footnotes and appendages) on your diskette. The manuscript should be submitted in final form, with **no substantive changes expected later**. All illustrative material should accompany the manuscript at the time of submission.
5. *Illustrative material*: This may include photographs and drawings, **Photocopies are unacceptable**. Photographs should be of high quality, black and white, and printed on smooth paper and properly focused. The format of the photographs should be 13 cm by 18 cm. Drawings should be done in black drafting ink. Large drawings should be reduced. Illustrations may be submitted larger than printable size, so long as reduction will not make features illegible. All lettering and numbering in a Figure or Plan must be 7 mm and larger if the illustration is to be reduced to printable size. If a Figure fills a whole page and includes several drawings or photographs, the author should mount the illustrations of the Figure on white bristol board and indicate on the back with blue pencil the reduction scale and the number of the Figure. Within a composed Figure every drawing should be numbered: 1, 2, 3, etc. **Folding should be avoided**.
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.

6. *Foreign words and italicized words* should be indicated by underlining in the manuscript. To avoid misleading orthography, Arabic words and archaeological site names of Jordan used in an article in another language should appear in Arabic and transcribed with diacritical signs and translated in terms of spelling according to the *ADAJ* General Index (Authors and Sites), I-XXX, (1951-1986), compiled by Rawiya Nabeel, edited by Muna Zaghoul, Amman, 1988: 47-70. Use the system of transliteration from Arabic shown on p.6.
7. *Tables*: should be submitted in final form for publication by **offset** either as originals drawn on drafting paper or as photographs (matt finish black and white). Final printing scale of numbering and lettering must be at least 7mm.
8. *Captions*: Figures, Tables and Charts must be submitted on a page or pages **separate** from the body of the article and also should **appear on the back** of the Figures .
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:
for articles:
Simmons, A. and Kafafi, Z.
1985 Preliminary Report on the 'Ayn Ghazal Archaeological Survey, 1987. *ADAJ* 32: 27-39.
Reference in text should read: (Simmons and Kafafi 1988:32).
for collective volumes, e.g. conference papers:
Helms, S.W.
1987 A Question of Economic Control during the Protohistorical Era of Palestine. Pp. 41-51 in A. Hadidi (ed), *SHAJ* III. London: Routledge and Kegan Paul and Amman: Department of Antiquities.
Reference in text should read: (Helms 1987: 41).
for monographs :
Peacock, D.P.S.
1988 *Pottery in the Roman World: An Ethnoarchaeological Approach*. London and New York: Longman..
Reference in text should read: (Peacock 1989: 118) .
11. *Abbreviations*: for abbreviations used in the bibliography, see D. Homès-Fredericq

and J.B Hennessy : *Archaeology of Jordan, I. Bibliography*. Akkadica supplementum III. 1986: 10. Peeters, Leuven.

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.

14. All authors are given 25 copies of their article free. If there is more than one author, no additional free copies are given.

15. *Deadline for submission*: is May 31 of the same year, i.e, the volume will appear in the following December. For further information contact: Editor of the Annual of the Department of Antiquities of Jordan, P.O. Box 88, Amman, Jordan. Fax 0962-6-615848.

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	ه	h
ش	sh	و	w
ص	ṣ	ي	y
ة	a or at	هـ	a or ah

Long Vowels

اى	ā
و	ū
ي	ī

Short Vowels

ا	a
و	u
ي	i

Common Nouns

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

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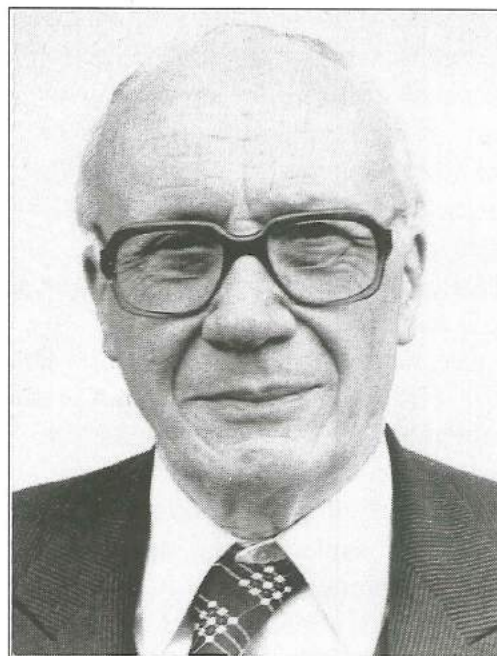
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IN MEMORIAM ERNEST WILL (1923-1997)

A distinguished authority of ancient art, history and religions of the Middle East, Professor Ernest Will passed away in Paris on September 24, 1997. He is deeply regretted by the Department of Antiquities for his productive activity in Jordan and by his personal friends in the Near East.

He was born in Uhrwiller in Alsace on April 25, 1913 and received his higher education at the Faculty of Humanities in Strassbourg and at the Ecole Normale Supérieure in Paris. He specialized in Classics, mainly in ancient Greek; during World War II, he became a member of the Ecole Française d'Athènes, a renowned research centre in Greek and Roman archaeology. With Henry Seyrig and Fr. Jean Starcky, he founded the French Archaeological Institute of Beirut in 1946 which was located in the traditional house of the family Beihum in Wādī Abū Jmil. From there, he toured the ancient sites of Lebanon, Syria and Jordan and his interest became soon attracted by the caravan city of Palmyra. His pioneer article on the Merchants and Caravan leaders in *Syria* 1967, is still the leading publication of research on the caravan trade of Palmyra. The tower tombs of this desert city were an excellent subject of his analysis of the Greco-Roman influence on the traditional funeral monuments of the East. Petra, no doubt, provided him with significant comparative material. He referred to the art and architecture of this trading centre in the desert of Jordan as a genuine creation of the Arab Nabataeans in the Late Hellenistic period, at a time when many famous scholars described them as a product of the Roman period, after the annexation of 106. His sound knowledge in Hellenistic architecture of Greece and his publication in 1955 of the *Dodekathéon or Pantheon* of Delos pro-



moted him as the foremost specialist of Syrian sacred architecture. His contribution to the monumental publication of the Temple of Bel at Palmyra with Henri Seyrig and Robert Amy (1975), is considered a landmark in the study of the history of Oriental sacred architecture. With the temples, the religion of the Middle East in the Greco-Roman period became for him a central field of interest. This is an old subject of challenge to the Hellenists: From the time of Herodotus, the myth of Egypt, Persia and Mesopotamia represented a world of confrontation between East and West.

The Greek authors were puzzled by the variety of the Oriental myths but succeeded in finding parallels within the mythology of their own gods. Isis was identified with Demeter, Allat with Aphrodite-Ourania, and, according to Herodotus, Orotalt/Ruday, the desert god with Dionysos. The best example of a western interpretation of the Oriental cults is to be found in Lukian of Samosate's treaty "*De Dea Syria*", a work of the second

century AD, superbly commented on by Ernest Will in his articles. As a good scholar on the history of religions, Will placed the Oriental cults in their original and archaeological context. Instead of confrontation between East and West, he was able to trace relationships and influences. In his analysis of cultic relief in the eastern provinces, he determined the relationships between the divine and the human in Oriental religion: Contrary to the Greek tradition, the images of the gods were exposed to the veneration of the believers (see "L'adyton dans le temple syrien").

After his productive sejour in Beirut, Ernest Will was appointed as professor at the Universities of Dijon, Lille and the Sorbonne in Paris. His learned teaching about the Oriental civilizations had a profound impact on his students who appreciated his clear perception as well as his sound judgment. His last monograph, *Les Palmyréniens: La Venise des sables*, 1992 is a good example of his ability to present a brilliant synthesis of his wide knowledge on the history and art of Palmyra.

From 1973 to 1980, Ernest Will assumed the directorship of the French Institute of Archaeology for the Near East (IFAPO). This was certainly not an enviable position for a scholar of his standard. The civil war was raging in Lebanon and the building of the Institute was at the heart of the fighting between the rival militias. He was besieged at the Institute but with courage and determination, he refused to leave the old building before he could salvage the invaluable library which contained 25000 monographs and 7500 volumes of periodicals. With the help of his assistant Georges Tate and the diplomatic intervention of Basile Aggoula, he was able to transfer this scientific treasure to a safe place. He just escaped the catastrophic heavy shelling when Emir Maurice Shehab dispatched a military tank to the Institute, before Christmas of 1975. Professor Will was not discouraged

by the Lebanese political situation and transferred his inexhaustible energy to another country of the Near East, Jordan.

In 1976, he inaugurated a new branch of IFAPO in Amman. His rich knowledge of Hellenistic architecture led his attention immediately to the site of " 'Irāq al-'Amir" in Wādī as-Sir, west of Amman.

After the untimely death of Paul Lapp, who first conducted excavations at Qaşr al-'Abd and at the village in the sixties, the site was abandoned and the ruins of the palace looked like a huge puzzle. Although Jordan proved to be a harbour of peace for Ernest Will, yet the new project of excavation and restoration was not an easy task. When we first tried to reach the site the dirt track was almost impassable for ordinary vehicles. However, this was but a minor handicap. A more serious problem was the need for heavy equipment to move the huge blocks. The old crane was not sufficient to perform the job and we had to ask for help at the Royal Palace which graciously lent us the army's heavy equipment. From the beginning, Will considered this project as a good opportunity to train the staff of the Department of Antiquities in the delicate work of restoration and make them appreciate the value of their national heritage. He invited me to participate in the excavation and to prepare the historical chapter on the Tobiad Family which I did with pleasure, following his good council. Fortunately, he had at his disposal an excellent architect, François Larché, who, for ten years, devoted his talent to the drawing of each single block, the ground plans and elevations and who created a model of technical restoration for the building of Qaşr al-'Abd. He patiently trained the crane driver Abū Ahmad to put the blocks back in their original position. The site is now being planned to be converted into a national park and to be developed as a touristic attraction. The cooperative research project resulted in a major publication (see bibliography).

Will's reinterpretation of the ruins offered what is considered its best plausible explanation. From the last century to our times, the Qaşr al-'Abd was the subject of contradictory hypotheses, which varied from a mausoleum to a sacred platform. With his knowledge of Hellenistic architecture, his retranslation and analysis of Fl. Josephus' account in *Jewish Antiquities* XII, Will established with convincing arguments that the al-Qaşr was a manor, "*birtha*" for a local lord, built under the Hellenistic influence of Alexandria in the second century BC.

In 1981, the Jerash Archaeological Project was initiated by the Department of Antiquities for the excavation and restoration of this ancient Decapolis city. In his 1983 article "Remarques préliminaires à de nouvelles fouilles à Djérash", Will offered to the international team working on the project a brilliant synthesis on the origin and urban development of Gerasa. He correctly identified the city as a "*création romaine*": The extensive excavations failed to discover any evidence of Early Hellenistic occupation from the fourth or third centuries BC and the oldest architectural remains of the lower *naos* at the Sanctuary of Zeus may date back to about 100 BC. In his description of the architectural decoration of the lower *naos* of Zeus he pointed out the local Oriental characteristics of the orders: the mixture of Doric, Ionic and Corinthian styles, the use of alternating blind and open doorways, the Doric frieze set on the Ionic capitals without the architrave—all of these

architectural anomalies are the production of local traditions which were well-rooted in Syria. As a matter of fact, it appeared that the builder of the Zeus lower esplanade was Theodoros, son of Zabda, the Gerasean. But this information was not available to Ernest Will at the time.

Ernest Will was elected member of the *Académie des Inscriptions et Belles-Lettres* in 1973. The bulk of his varied publications attests to his wide scope of knowledge of the architecture and religious cults of the Middle East. He retired from public service but continued his scientific activities by lecturing at the Sorbonne and producing numerous articles. His dedication to research did not prevent him from helping students. He was always ready to spare his time and share with them his wide knowledge. Several Jordanians profited from his wise council and I was fortunate to have him as a supervisor of my doctoral dissertation on the Architecture of Petra.

At the end of his career, a humanitarian duty fell upon him: His wife Germaine was victim of a long and consuming illness. He accompanied her sufferings day after day with faithful devotion.

The Department of Antiquities with all of his friends in Jordan present their sincere condolences to his family and to the staff members of the French Institute of Archaeology for the Near East.

F. Zayadine
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SELECTED BIBLIOGRAPHY

Most of the publications of Ernst Will are listed in the volume *De l'Euphrate au Rhin*, BAH 135. Beirut, 1995. However, we think it is useful for the readers of *ADAJ* to have at their disposal a selection of the most relevant titles.

I - Monographs

- 1955 *Le relief cultural gréco-romain. Contribution à l'histoire de l'art de l'empire romain.* Bibliothèque des Ecoles Françaises d'Athènes et de Rome 183. Paris.
- 1968-1975 *Le temple de Bêl à Palmyre* (with H. Seyrig and R. Amy). BAH 83. Paris.
- 1985 *Le sanctuaire de la déesse syrienne.* Exploration archéologique de Délos 35. Paris.
- 1955 *Le Dodektheon.* Exploration archeologique de Délos 22. Paris.
- 1991 *Iraq al-Amir, Le Chateau du Tobiade Hyrcan.* (with F. Larché, F. Zayadine, J. Dentzer-Feydy and F. Querel), BAH 132. Paris.
- 1992 *Les Palmyreniens, la Venise de sables. Civilisations.* Paris: U. Armand Colin.

II Articles

Palmyra and Funeral Monuments.

- 1949 La Tour funéraire de Syrie et les monuments apparétes. *Syria* 26, 3-4: 285-313.
- La Tour funéraire de Palmyre. *Syria* 26, 1-2: 87-116.
- 1951 Monuments funéraires syriens end-dehors de la Syrie. *Syria* 28, 3-4: 352-357.

Urbanisation

- 1983 Remarques préliminaires à de nouvelles fouilles à Djerash. *Syria* 60, 1-2: 133-145.
- 1986 L'urbanisation de la Jordanie aux époques hellénistiques et romaines, "conditions géographiques et humaines". Pp.237-241 in *SHAJ* II. Amman: Department of Antiquities.
- 1988 Les villes nouvelles des époques hellénistique et romain en Syrie, Palestine et Transjordanie. Pp. 127 - 138 in *La ville neuve: une idée de l'antiquité ?* Paris.
- 1987 Qu'est-ce qu'une baris. *Syria* 64, 3-4: 253-259.

Sacred monuments

- 1949 Le ou les sanctuaires syriens du Janicule. *Syria* 26, 1-2: 161-168.
- 1959 L'adyton dans le temple syrien de l'époque impériale. Pp. 136-145 in *Etudes d'archéologie classique II, Annales de l'Est.* Univ. de Nancy 22.
- 1986 Duôtab de Dusares au trône d'Astarté. *Syria* 63, 3-4: 443-451.
- 1991 L'espace sacrificiel dans les civilisations méditerranéennes de l'antiquité. In Pp. 259-263, *Publication de la bibliothèque Salomon Reinach.* Univ. de Lyon II.
- 1981 Les aspects de l'intégration des divinités orientales dans la civilisation gréco-romaine: Langage conventionnel et langage clair. Pp. 157-160 in *Mythologie gréco-romaine. Mythologies périphériques* (Col. intern. du CNRS, no. 593, Paris, 1979) Paris .
- 1976 Un nouveau monument de l'art grec en Phénicie: la "tribune" du sanctuaire d'Eshmun à Sidon. *BCH* 1976: 565-574.
- 1983 La fin de l'art antique dans la zone du futur Bilâd al-Shâm. Pp. 160-174 in *Proceedings of the Symposium on Bilad al-Sham during the Byzantine Period*, 1983. Amman.
- 1990 A propos de quelques monuments sacrés de la Syrie et de l'Arabie romaines. Pp. 197-205 in F. Zayadine (ed.) *Petra and the Carvan Cities* .Amman.

INVESTIGATIONS INTO THE EARLY PREHISTORY OF THE EAST JORDAN VALLEY: RESULTS OF THE 1993/1994 LA TROBE UNIVERSITY SURVEY AND EXCAVATION SEASON

by

Phillip C. Edwards, Phillip G. Macumber and Michael K. Green

Introduction

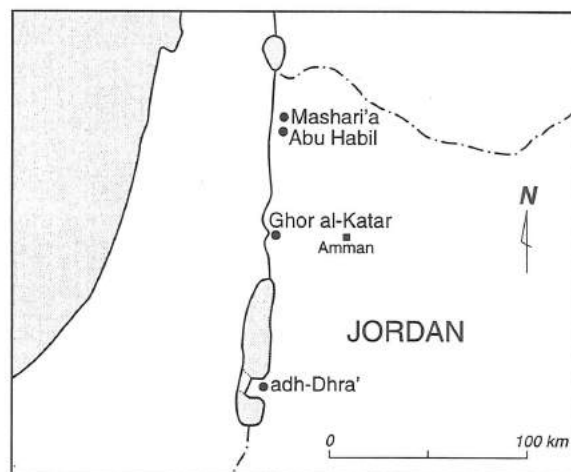
A project directed at the investigation of open-air Pleistocene archaeological sites in the East Jordan Valley was undertaken by La Trobe University between December 1993 and January 1994. The fieldwork was directed at the survey, excavation and dating of newly discovered sites, and the re-examination of other previously described but still little-known deposits attributed to both the Early and Middle Pleistocene. The work aimed to provide the basis for a comparative stratigraphy of the known East Jordan Valley Lower Palaeolithic sites and localities.

The main focus of the project and of this report is the excavation of the Acheulian site of al-Mashāri'1, located near Ṭabaqat Faḥl (ancient Pella), and stratified in the Ṭabaqat Faḥl Formation (Macumber 1992). Essential to the initial recognition of al-Mashāri'1 was the key discovery by Macumber (1992) that the 100 m thick Ṭabaqat Faḥl massif was Middle Pleistocene (from ca. 730,000 years ago) in age. The Mashari'1 site was one of five containing Acheulian bifaces occurring in the 120 m thick Ṭabaqat Faḥl formation which outcrops over an area of about 5 Km². Three of those sites (al-Mashāri'2, 4 and 5) occur in the conglomeratic member of the Ṭabaqat Faḥl Formation and the other two (al-Mashāri'1 and 3) in the limestone member. It is uncertain as to whether the sites in the conglomeratic member are *in situ*, however with the possible exception of Abū Hābil (discussed below) the two sites in the limestone member of the Ṭabaqat Faḥl Forma-

tion are the only clearly *in situ* Lower Palaeolithic archaeological sites known from the East Jordan Valley.¹

The project also targetted other Middle and Early Pleistocene open sites and geological formations at several localities along the East Jordan Valley, for example, at the Abū Hābil' and Ghawr al-Katar Formations in the central Jordan Valley, and the Dānā Conglomerate Formation located further south on the al-Lisān Peninsula, east of the Dead Sea (Fig.1).

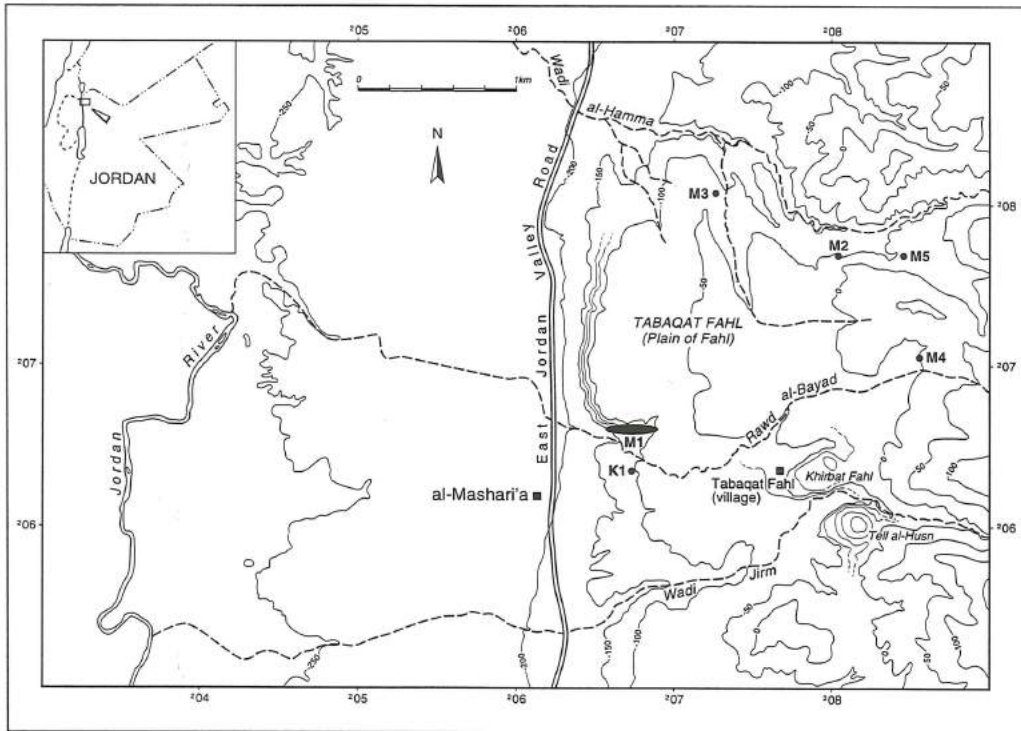
While the main focus of this season concentrated on earlier periods, a well-preserved Natufian site was investigated in Wādī al-Khawwan, a minor erosion gully lying directly opposite the towering massif of the Ṭabaqat Faḥl Formation (Fig.2). This site is named Wādī al-Khawwan 1, and consisted of a discrete band of artefacts stratified in a massive spring-deposited tufa bed. One further later period site is briefly described here: in the course of survey work



1. Sites and localities investigated in the present study.

1. Unfortunately, large-scale excavation for agricultural terracing carried out during 1990-1991

along the steep slopes of Wādī al-Himar destroyed the al-Mashāri'2 and al-Mashāri'5 sites.



2. The Tabaqat Faḥl / Wādī al-Ḥimmah region, indicating the al-Mashārī' (M) series of Lower Palaeolithic sites, and the Natufian site Wādī al-Khawwan 1 (K1).

on the Ḍānā Formation in the Plain of adh-Dhrā' a large architectural site called Zahrat adh-Dhrā' was discovered,² probably dating to the Middle Bronze II period according to the evidence of surface pottery.

Before proceeding to describe the excavations and preliminary results at al-Mashārī'1, its context and stratigraphy is better understood by a brief summary of the geology and geomorphology of the Tabaqat Faḥl Formation which contains the site.

Geology and Geomorphology of the Tabaqat Faḥl Formation

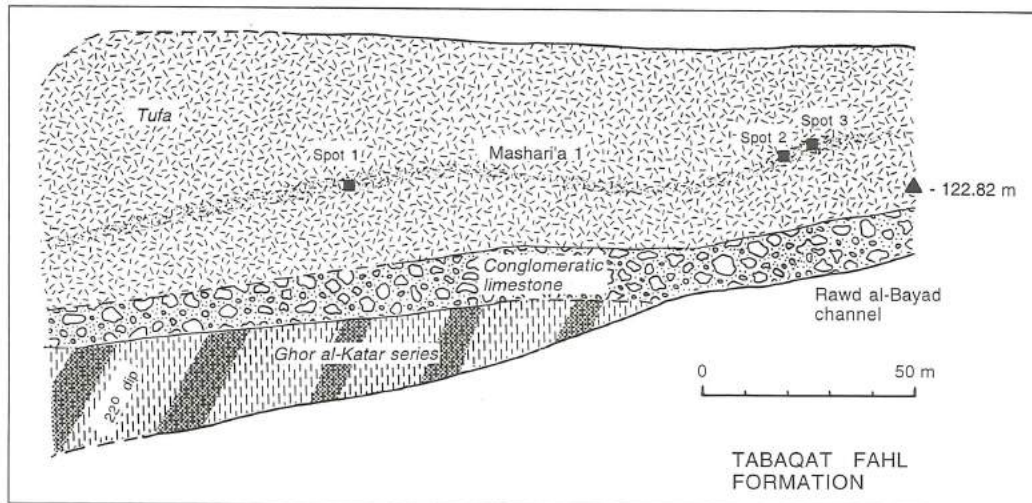
The Tabaqat Faḥl Formation rises to an altitude of 125 m above the Jordan Valley floor, which in this region lies at about 180 m bmsl (below median sea level). The town of al-Mashārī' lies at the foot of the Tabaqat Faḥl, along its western edge with the Jordan Valley (Fig. 2). In elevation, the Tabaqat Faḥl Formation surface lies between the 75 m bmsl contour at its western edge adjacent to the rift valley, and the -25 m bmsl contour where it adjoins the hills at Abū al-

Khass to the east. It is bounded to the north by Wādī al-Ḥimmah, and to the south by the stream channel of Rawḍ al-Bayad.

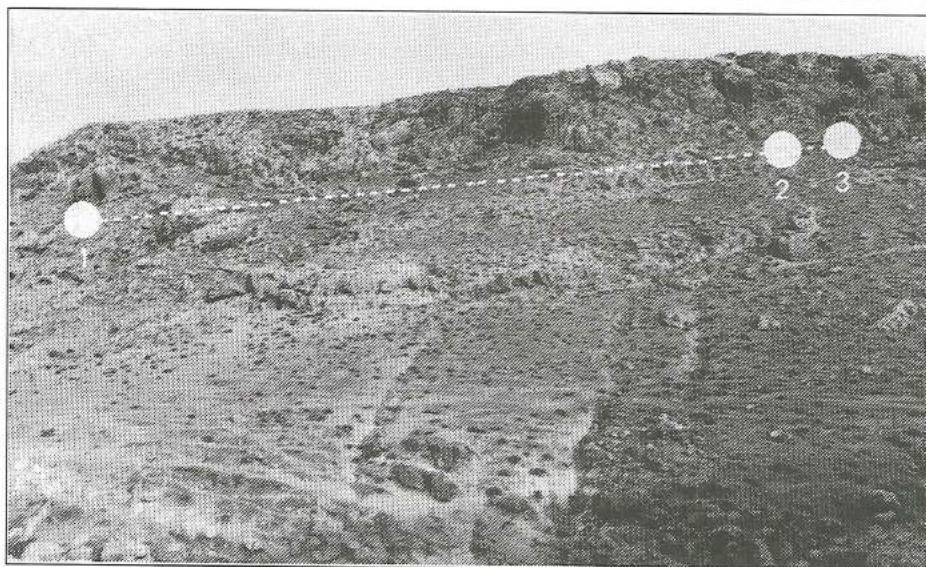
The Tabaqat Faḥl gives its name (Macumber 1992) to the sediments comprising the Tabaqat Faḥl Formation (Figs. 3 and 4). These consist of dense conglomerates, hard white and sometimes nodular limestones, and thick tufas. At the valley edge, the formation is about 120 m thick. In its more easterly outcrops under the Tabaqat Faḥl plateau, the Tabaqat Faḥl Formation unconformably overlies dipping sequences of Cretaceous/ Lower Tertiary sediments. Nearer the rift valley it overlies steeply dipping conglomerates, sandstones and pinkish limestones lithologically similar to the Ghawr al-Katar Series. The Ghawr al-Katar series is thought to be Early Pleistocene in age (Bender 1968, 1974), however, as yet it lacks absolute dating, and its age is therefore largely conjectural. The Tabaqat Faḥl sequences are tilted and gently folded in places, but elsewhere are horizontally bedded. Considering the position of the

2. All of the sites reported here, including al-Mashārī'1, Wādī al-Khawwan 1 and 2, and Zahrat

adh-Dhrā' were discovered by Phillip Macumber during survey work in the Jordan Valley.



3. Geological section of the Ṭabaqat Faḥl Formation (south elevation), also indicating the al-Mashāri' 1 site and its Excavation Spots 1 to 3.



4. The southerly face of the Ṭabaqat Faḥl Formation, indicating the Late Acheulian site of al-Mashāri' 1 and Excavation Spots 1 to 3.

Ṭabaqat Faḥl perched high in the landscape (ca. 120 m above the Jordan Valley floor), and also that its limestones (which represent a paludal, lakeside palaeoenvironment) have no lateral equivalent surviving in the Jordan Valley itself, it follows that the formation has undergone a remarkable degree of tectonic uplift since its deposition.

The basal unit in the Ṭabaqat Faḥl Formation sequence is commonly a conglomerate (Fig. 3), largely composed of chert and limestone pebbles in a calcareous and siliceous matrix. This conglomerate caps the hills to the east of Ṭabaqat Faḥl and passes beneath the Ṭabaqat, where it is overlain and partly replaced by an 80 - m thick tufa member, which comprises large numbers of fossil reeds cemented in a calcareous ma-

trix, and significant numbers of the freshwater gastropod *Melanopsis praemorsa*. The al-Mashāri' 1 site is contained within this member. The Ṭabaqat Faḥl Formation thickens on approaching the rift valley edge. Here the basal conglomerate is replaced by a uniformly dense, white limestone, with occasional bands of hard nodular concretions, varyingly flattened and distorted (not shown in Figure 3, as this occurs further west than the illustrated section). The dense limestone outcrops as an apron at the base of the Ṭabaqat, and is seen in outcrop along the highway at al-Mashāri', between the Rawḍ al-Bayad and Wādi al-Ḥimmah. Here, the conglomerate is missing and the tufa rests directly on dense nodular limestone. The latter is interpreted as representing a

paludal to lacustrine rift valley unit.

The overall pattern of facies variation within the Ṭabaqat Faḥl Formation, passing from conglomerate on the hills to predominantly tufa on nearing the rift valley is similar to that observed in the Late Pleistocene valley-fill sequence in Wādī al-Ḥimmah (Macumber and Head 1991); that is, a change from ephemeral fluvial sedimentation (represented by the conglomerates) to a zone of massive spring deposition (represented by the tufas), in a zone of groundwater outflow adjacent to a large lake (hard uniform limestone) within the Jordan Valley. The sequence represents an earlier depositional cycle to that occurring during the periods of existence of Lake al-Lisān. It also represents a very much larger and more persistent version of the occupational environment present during Middle, Upper and Epipalaeolithic times in Wādī al-Ḥimmah. The tufa member of the Ṭabaqat Faḥl Formation represents a massive version of the modern adjacent Wādī aj-Jirm spring system - now cultivated, but only recently a riparian jungle including dense stands of *Phragmites* reeds. Groundwater carbonate presently accretes around the stems of the plants as they grow in place, illustrating the processes which lead to the

deposition of the adjacent Ṭabaqat Faḥl. Clusters of *Melanopsis praemorsa* gastropods are also frequently encountered in the spring waters of Wādī aj-Jirm.

Excavations at the Acheulian Site of al-Mashāri' 1

Al-Mashāri' 1 is an open-air, *in situ* Acheulian site which extends in cliff section for several hundred metres along the southern edge of the Ṭabaqat Faḥl plateau (Figs.3 and 4). Overlooking Rawḍ al-Bayad, the archaeological horizon is stratified in the tufa member some two-thirds of the way up the 100 m high limestone cliff. At this level, and over the face below, numerous bifaces and flakes erode from the deposit, over a distance of several hundred metres. There are also artefacts embedded in solid rock, including discrete clusters of flakes (Fig. 5).

Excavations encompassed an 115 m long stretch of the site. Two excavation pits, (Spots 1 and Spot 3) spanned this distance (Figs. 3 and 4), and another one, Spot 2, was placed between them near Spot 3. The cultural stratum occurs in a cemented layer of calcareous silts. This sediment may represent a period of soil formation during a hiatus in sedimentation when artifacts were



5. Al-Mashāri' 1. Cluster of small flakes embedded in tufa deposits.

discarded at the site. This possibility is indicated by the occurrence, in the excavations, of tufa blocks with embedded artefacts found within the cemented silts.

Our optimism about the good conditions of site preservation prompted by surface exposures of *in situ* artefact clusters was borne out by the results of the excavations. The flaked chert assemblages recovered yielded a highly consistent series of flaked stone products which included a few bifaces, but numerous biface-thinning flakes, notched flakes (many of which were formed through use), invasively retouched flakes, some invasively retouched scrapers, marginally retouched flakes, and a few flake cores. The good conditions of preservation were confirmed by numerous finds of fine shatter chips and small flakes (Fig. 6a: 1), but particularly by a refitting flake core, where a single 5-cm deep spit (Spot 2, Loculus 1.9) yielded six conjoinable flakes struck from a chert core (Fig. 6b).

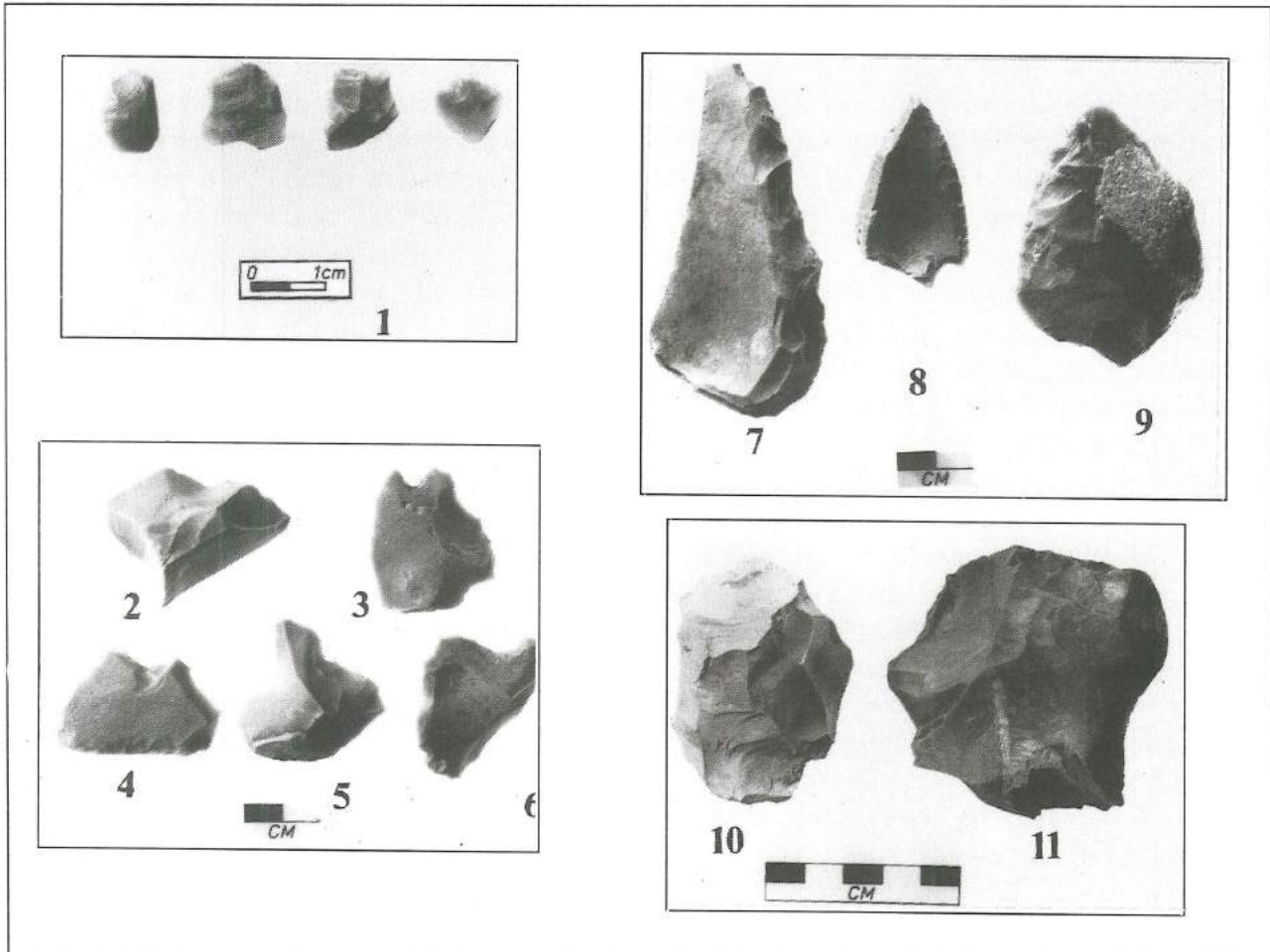
The core was embedded in a rich layer of additional knapping debris, yielding an equivalent density of 15,125 pieces / m³. According to the fragments so far conjoined, the core is a small, semi-ovoid flake core (65 mm long x 51 mm wide), with the cortex at one end of its long axis having been faceted before five small flakes were detached from this same platform. A single flake had also been struck from a cortical platform at the opposite end. The raw material is a brown chert with lighter pigmented veins, and on unflaked surfaces the cobble has developed a thick white patina. The distinctive colouring of the piece has aided in the recognition of its constituent fragments among the thousands of fragments of additional chert debitage. Several other fragments of this cobble occur in the underlying 10 cm unit, but have not yet successfully been refitted. Given the large number of flakes bearing acute platform angles and multiple dorsal scars indicative of biface reduction, the existence of this small core, and

other opposed platform and multiple platform cores from the site, (Fig. 6a: 10-11) demonstrates alternative pathways to flake production than through biface reduction.

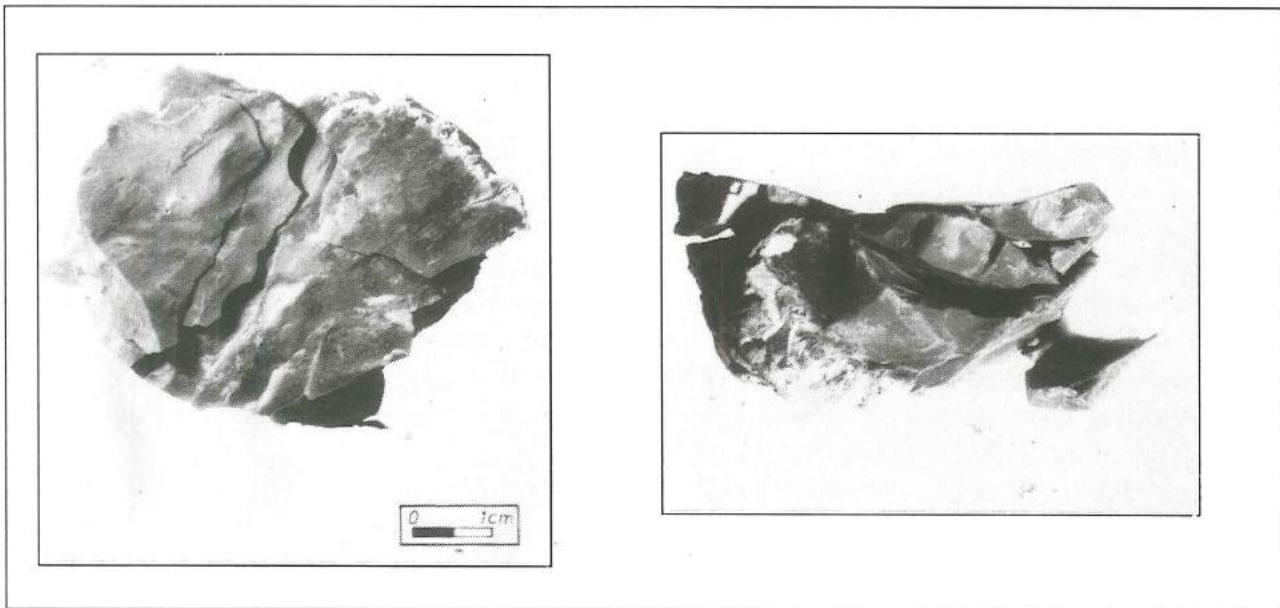
Quantitative results are given here for only the first ten of sixteen excavation units in Spot 2 (Fig. 7), as processing of material from all excavation units remains incomplete. Units 1 to 9 are all 5 cm deep, while Unit 10 is 10 cm deep. (Note that larger excavated volumes in the lower units would correspond to amplified equivalent densities per cubic metre for these units). Artefacts and *Melanopsis* gastropods consistently increase in amounts going from Unit 1 to Unit 10.

This gradual increase in finds towards Unit 10 and the coherence of this pattern overall suggests continuous sedimentation in an area repeatedly visited by tool-making hominids. Whether the vertical artefact distribution resolves itself as a sharp maximum centred on unit 10 and the adjacent ones or not must await further analysis. Our impression at this stage, in roughly judging the amounts of finds in the bags hailing from units 11 to 16, is that densities peak at unit 11 and dwindle rapidly thereafter down to Unit 16. Several possibilities may account for the vertical artefact distribution. The first is that the overlying material represents post-depositional disturbance from an originally sharply defined occupational land surface. However several lines of evidence weigh against this conclusion: the sharp, unabraded condition of the artefacts; the presence of small chips and microflakes retained in each unit; the small conjoined fragments which all derive from a single 5-cm deep unit; and finally the conditions of deposition in a zone of low-energy groundwater outflow.

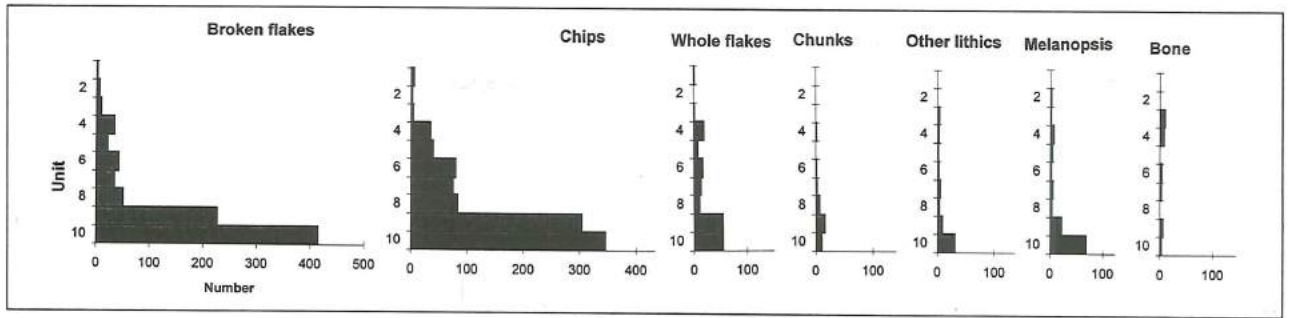
Alternatively, the higher numbers of objects of various types clustered around Unit 10 may correspond with a hiatus in sedimentation at that time, or its abatement, leaving longer periods for surface debris ac-



6a. Al-Mashāri' 1. (1) Small flakes, Spot 2, Locus 1.9. Notched flakes. (2) Spot 2, Locus 1.8, (3-4) Spot 2, Locus 1.9, (5) Spot 2, Locus 1.10, (6) Spot 3, Locus 1.6. Retouched flakes (7) Spot 2, Locus 1.10, (8) Spot 3, Locus 1.4. Invasively-retouched flake (9) Spot 3, Locus 1.5, Multiple platform cores (10) surface, (11) Spot 2, Locus 1.3. Note different scales).



6b. Al-Mashāri' 1. Spot 2, Locus 1.9. Flake core with conjoined flakes (top and side views).



7. Frequencies of artefacts and other finds in the Late Acheulian site al-Mashāri' 1, Spot 2, Locus 1.1 - 1.10.

cumulation. This would explain the larger numbers of *Melanopsis* gastropods, considered to be naturally occurring, in Unit 10.

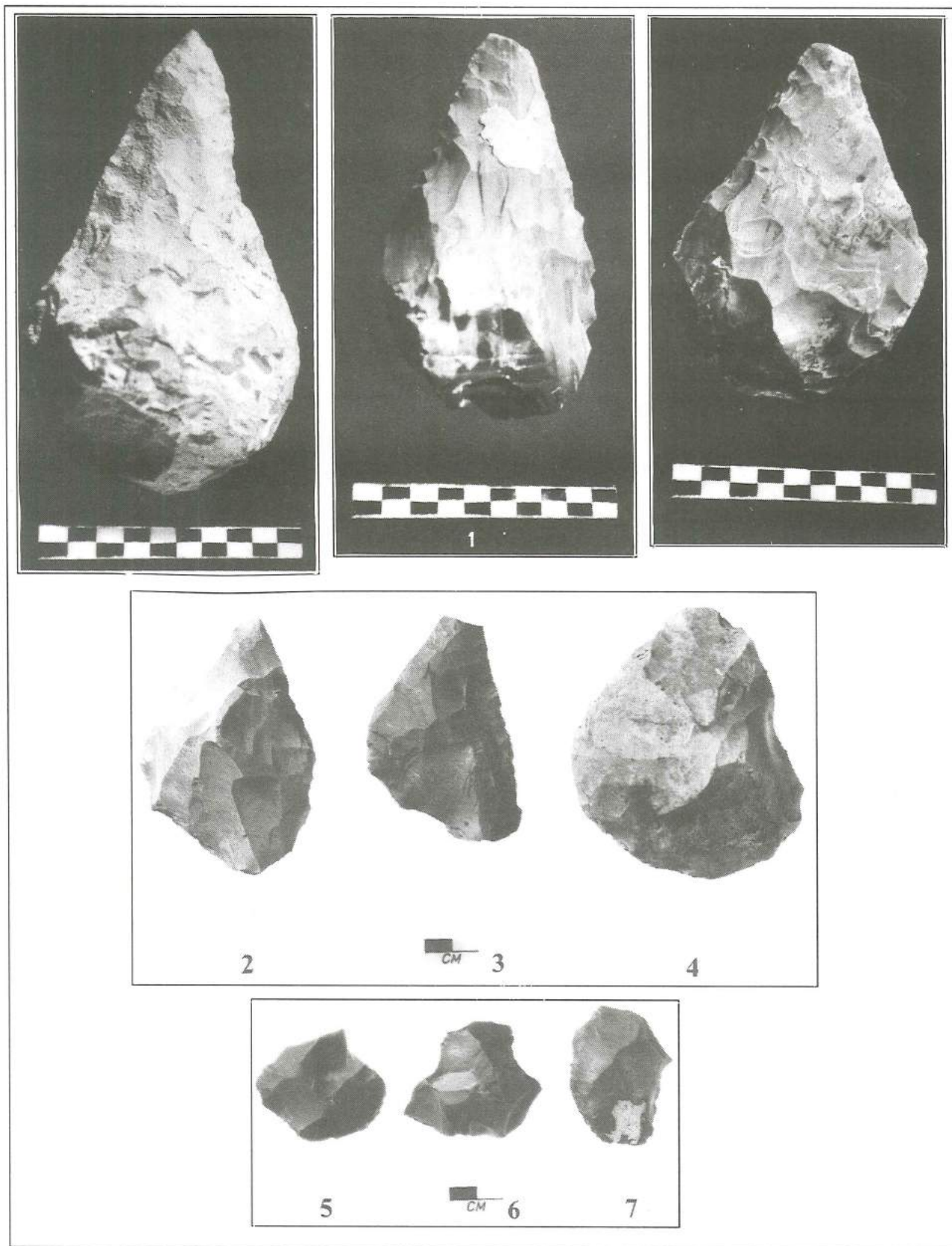
The flaked chert assemblage is numerically dominated by flakes, both broken and whole, and small pieces of chert shatter products. A few blades occur, together with a small number of retouched tools, which include notches, retouched flakes, scrapers, and a few multiple tools such as notch/scrapers, Table 1). While no bifaces were found in this particular part of the site, their presence is well attested by several biface fragments. The shallow platform angles on many of these pieces, and also on many of the small flakes in the assemblage carrying multiple dorsal flake scars, indicates their

origin as by-products of biface reduction.

Elsewhere in the site a single gracile and asymmetrically-shaped biface was found (from Spot 3, Locus 1.9, Fig. 8:3), very similar in form to a al-Mashāri' 1 surface find (Fig. 8: 2), and another found at a similar altitude in surficial sediments on the western face of the Ṭabaqat Faḥl Formation (Fig. 8:4). The excavations also yielded some diminutive bifaces (Fig. 8:5-7). A number of other bifaces were all found on the slopes just below the al-Mashāri' 1 site (but none above it), these having eroded from the sediments. They include pointed bifaces of Micoquian type and cordiform to ovate types (Fig. 8:1), and the aforementioned asymmetric 'D-shaped' bifaces.

Table 1. Al-Mashāri' 1, spot 2, Locus 1.1-1.10. Numbers of 'Other Lithics' presented in Fig. 7.

	Cores	Core trim	Broken blades	Whole blades	Biface frags	Scrapers	Multiple	Notches	Retouched flakes
Unit 1	0	0	0	0	0	0	0	0	0
Unit 2	0	0	0	0	0	0	0	0	0
Unit 3	0	0	0	3	0	0	0	0	0
Unit 4	0	0	0	1	0	1	0	0	0
Unit 5	0	0	0	1	0	0	0	0	0
Unit 6	0	0	0	0	2	0	0	0	0
Unit 7	0	0	0	2	2	0	0	1	0
Unit 8	0	0	0	0	1	0	0	2	0
Unit 9	1	2	1	0	1	0	0	1	2
Unit 10	2	1	1	0	0	5	3	11	7



8. Al-Mashāri' 1 bifaces. (1) Pointed bifaces, surface. Asymmetric bifaces from (2) Mashari' 1 surface, (3) Spot 3, Locus 1.9. (4) Ṭabaqat Faḥl Formation surface. Small bifaces from (5) Spot 2, Locus 1.11. (6) Spot 3, Locus 1.8, (7) Spot 3, Locus 1.6. (Note different scales).

They consistently bear numerous shallow, hinge-terminated flake scars, and are themselves relatively small and gracile, indicating manufacture by the soft hammer technique.

The range of retouched forms include a flake trimmed by deep, flat, invasive retouch (Fig.6a: 9), marginally retouched flakes (Fig.6a:7-8), and several notches formed on thick flakes (Fig. 6b: 2-6). Many of the notches have been formed by edge damage through use, rather than by formal patterning, and are characterised by multiple tiny, stacked step fractures.

Relationships between the Ṭabaqat Faḥl and Abū Hābil Formations

The presence of late Acheulian artefacts in the Ṭabaqat Faḥl Formation raises questions as to its relationship to the nearby Lower Palaeolithic site at Abū Hābil, located 15 km to the south of al-Mashāri‘ (see Fig. 1).

At Abū Hābil, immediately north of the village of Wādī al-Yābis, hard conglomerates and conglomeratic pebbly limestone - the Abū Hābil Formation - outcrop as low hills bordering the main road (Bender 1974). They contain pebble tools described by Huckriede (1966) as ‘Oldowan and Munzenberger’, and considered by him to be Middle Pleistocene in age. However, there is only Huckriede’s very brief description of the Oldowan occurrence at Abū Hābil, and these earlier finds have not since been reproduced. On this rather flimsy basis the Abū Hābil Formation has been equated tentatively with the Early Pleistocene Al-‘Ubaydiyya Formation, now thought from the evidence of molluscan fauna to date as early as 1.4 million years old (Tchernov 1987).

Huckriede’s claims have been repeated in the subsequent literature (e.g. Abed 1985, Horowitz 1979, Vita-Finzi 1982), so that the Abū Hābil Formation has now become correlated with the al-‘Ubaydiyya and ‘Erq

al-Aḥmar Formations, and entrenched as Early Pleistocene in age in chronostratigraphic syntheses.

Bender (1974) notes that along the eastern side of the rift valley, the hard, conglomeratic, partly pisolitic limestone of the Abū Hābil Formation overlie steeply dipping conglomerates, sandstones, clays and limestones of the Ghawr al-Katar Series. Similar sequences outcrop periodically between Abū Hābil and al-Mashāri‘, often as discrete outcrops lying westwards of the main rift valley fault. These locations include Wādī al-Ḥimmaḥ, the Ṭabaqat Faḥl Formation, and Wādī aj-Jirm. At the Ṭabaqat Faḥl Formation and in the mouth of Wādī aj-Jirm, as at Abū Hābil, the Ghawr al-Katar series underlie near horizontally-bedded limestones of the Ṭabaqat Faḥl series.

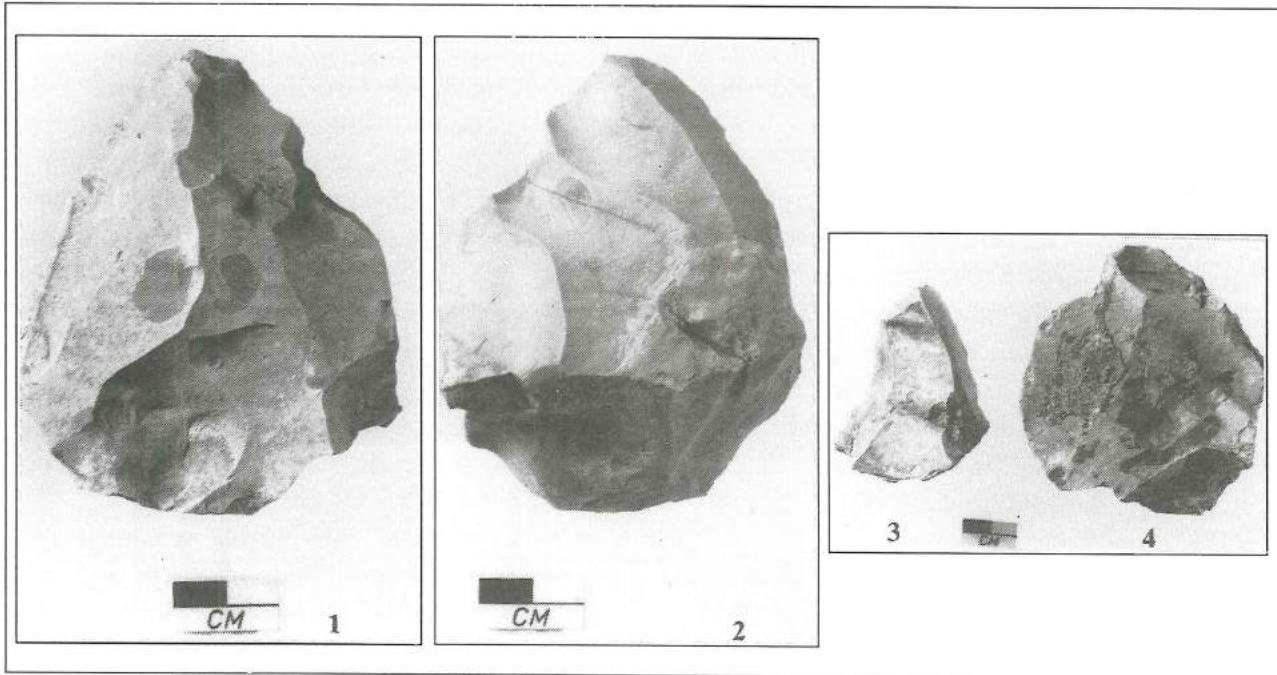
Muheisen (1988) revisited the Abū Hābil area during the 1985 archaeological survey of the Jordan Valley. He noted a Lower Palaeolithic site (Site 44), extending over a 16 m vertical interval. Two assemblages were obtained - a lower one came from the conglomerates, and the upper from a disturbed zone near the surface. The upper assemblage had a light grey to white patina, and included Levallois cores and a Levallois point. Muheisen tentatively dates the upper assemblage as Late Acheulian. In the lower zone an assemblage yellow brown in colour, included bifaces, picks and a spheroid. An age of between 0.6 and 1.8 million is given. The basis for this age is ultimately typological, however it is presumably based on earlier correlations with al-‘Ubaydiyya. Whatever the age, the assemblage seems better assigned as Acheulian rather than Oldowan in character.

During the 1993 / 1994 season we revisited the Abū Hābil Formation to inspect surface artefact exposures. Most of those encountered had the same white to light grey patina as reported by Muheisen, and observed by ourselves on surface finds from

the Ṭabaqat Faḥl Formation (though this white patina rarely occurs on excavated artefacts). Our brief survey on the slopes and across the top of the Abū Hābil Formation yielded numerous artefacts of Middle Palaeolithic character, in that flakes often exhibited thick, protuberant bulbs of percussion and bore faceted platforms. Discoidal cores (Fig. 9:4) and Levallois point cores (Fig. 9:3) were also observed. An unusual artefact, with one face formed as a Levallois point core (Fig. 9:2) but with the reverse face invasively flaked as a biface (Fig. 9:1) was embedded in limestone conglomerate on the top of Abū Hābil. The artefact singly combines characteristics found between the Late Acheulian and Middle Palaeolithic in the Levant. Our brief observations at Abū Hābil indicate the widespread distribution of artefacts of Middle Palaeolithic character. These finds and the additional existence of bifaces suggest, in our opinion, an age of ca. 250,000 BP or later for the stone artefacts issuing from the limestone conglomerates exposed on the surface of the Abū Hābil Formation, rather than an Oldowan affiliation.

In order to obtain radiometric dates for Abū Hābil, we took samples of hard, pisolitic limestones from an outcrop protruding from the lower slopes of the Abū Hābil Formation. Lithologically and sedimentologically, the hard conglomerates and pisolitic limestones at Abū Hābil are similar to the dense calcareous conglomerates and nodular limestone which form the basal sequences to the Ṭabaqat Faḥl Formation. Both the Abū Hābil and Ṭabaqat Faḥl Formations are underlain by Ghawr al-Katar sequences and protrude into the main rift valley from the steeper rises further east. Furthermore, neither formation compares readily with the steeply dipping conglomerates and lacustrine clays of the Al-'Ubaydiyya Formation, with which the Abū Hābil Formation has been commonly correlated. Lithologically and sedimentologically, the Abū Hābil Formation is better assigned to the latter part of the Middle Pleistocene than to the Early Pleistocene.

Artefactually also, its upper strata at least, seem better correlated with the late Acheulian / Middle Palaeolithic than with the Oldowan or Lower Acheulian.



9. Abū Hābil. (1) Biface with (2) Levallois point core on reverse. (3) Levallois-like point core (4) Discoidal core. (Note different scales).

The Natufian Site of Wādī al-Khawwan 1

The site of Wādī Khawwan 1 lies a kilometre due west of Ṭabaqat Faḥl village, in a small cutting known locally as Wādī al-Khawwan. It is situated on the edge of the agricultural fields, overlooking the town of al-Mashāri', where the flat, tilled plain descends to the rift valley edge (see Fig. 2). The site of al-Mashāri' 1 which is embedded in the Ṭabaqat Faḥl Formation towers over it to the north, separated by the deeply incised Rawḍ al-Bayad.

The site of Wādī al-Khawwan 1 lies exposed in section two metres from the top of the cutting. The plain comprising these deposits filled with alluvial sediments during the Late Pleistocene against the higher terrace formed by the Ṭabaqat Faḥl Formation, just as Wādī al-Ḥimmah filled with late Pleistocene sediments against its northern face.

The sediments consist of loosely cemented, pisolitic limestones, containing many *Melanopsis praemorsa*, representing deposition through fresh groundwater discharge.

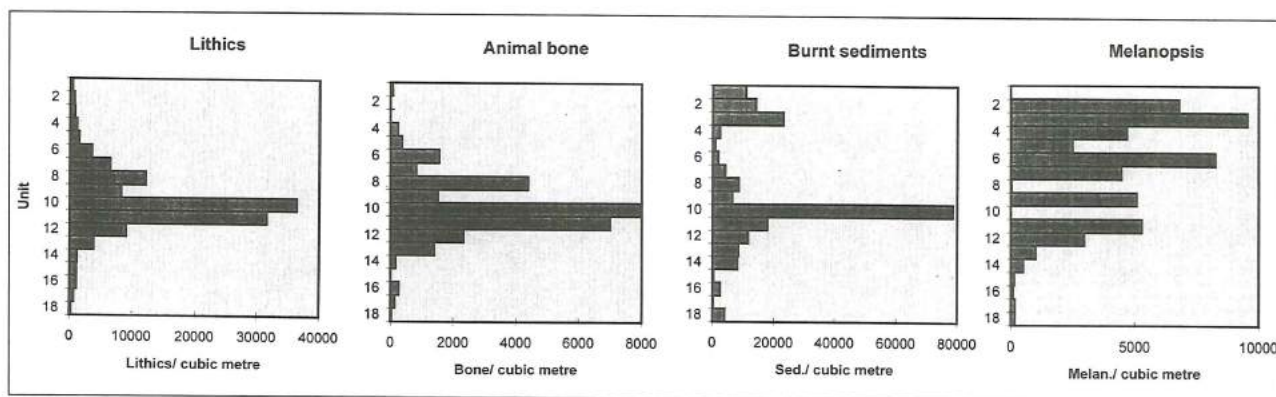
Carbon dates have not yet been obtained from Wādī al-Khawwan 1, though a collection of *Melanopsis praemorsa* shells sampled by P.G. Macumber from near the top of the same sediment body in the northern bank of the small cutting at a locality designated Wādī al-Khawwan 2 yielded a radiocarbon date of 11,620 ± 240 BP (ANU - 8470).

Besides yielding samples of many (natural) *Melanopsis* shells, Wādī al-Khawwan 2 yielded only scanty traces of human occupation, and is not further reported upon here.

Wādī al-Khawwan 1, on the other hand, is a sharply-defined, dense and horizontally-bedded band of artefacts outcropping at waist level in the shallow cutting. A one metre wide excavation was made through the exposed section, consisting of eighteen successive arbitrary units, over a depth of 1.1 m, and emplaced to intercept the rich artefact band. The nature of vertical artefact distribution is given in Figure 10, displaying the densities of lithics, animal bone fragments, burnt sediments, and *Melanopsis* shells.

The former three categories shows the same correspondent densities distributed strongly throughout a depth of thirty centimetres between units 8 and 12, and peaking in units 10 and 11. The naturally incorporated *Melanopsis* shells, however, show an independent distribution. This is unlike the situation in al-Mashāri' 1 reported above, and does not suggest, in this case, that the dense artefactual band represented a slowed or lagged phase of sedimentation. However the sediments of units 8 to 12 in which peak densities occur do consist of noticeably finer sediment particles than from above and below. This issue is far from being resolved.

The flaked chert debitage is dominated



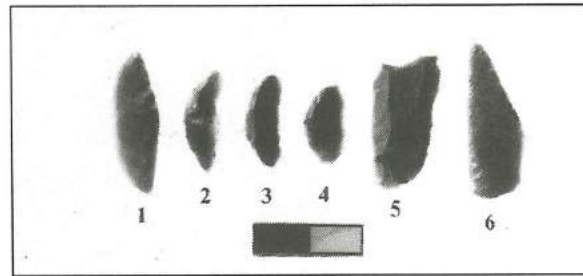
10. Densities of artefacts and other finds in the Natufian site Wādī al-Khawwan 1.

by small flakes (Mean length = 14.4 mm, SD = 9.4 mm, N = 171), but there are many more broken examples than complete. As a whole the assemblage is numerically dominated by debris, or angular chert fragments and small shattered chips (Table 2). Cores are few and consist mainly of fragments, but are distributed vertically throughout the site. Together with the abundant debris and debitage they indicate that core reduction occurred persistently.

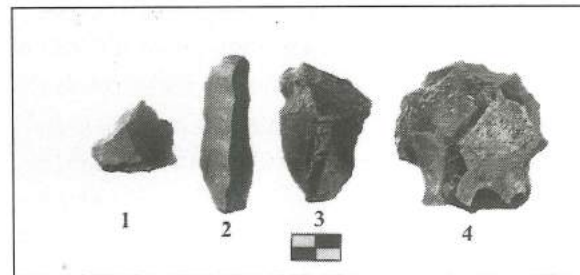
The retouched component is small but varied and typically Natufian, consisting of lunates, three of which are backed (e.g. Fig.11a:1,3) and four Helwan-retouched (e.g. Fig.11a: 2, 4); a couple of Helwan bladelets and allied forms (Fig.11a:1,6); truncated bladelets (Fig.11a:1,5), truncated flakes (Fig.11b:1) rounded scrapers (Fig. 11b: 4) and endscrapers (Fig.11b:2), and notches (Fig.11b:3). Again, these forms occur throughout the vertical extent of the site.

Few of the many small bone fragments are identifiable, but diagnostic elements include *Gazella* sp. (gazelle) phalanges, scutes of *Testudo* cf. *graeca* (Greek tortoise), and phalanges of *Potamon potamon* (Freshwater crab). Two fragments of marine *Dentalium* sp. shell had been imported, probably from the Mediterranean.

A few examples of several other artefact



11a. Retouched chert artefacts from the Natufian site Wādī al-Khawwan 1. (1) Unit 7, Helwan bladelet. (2) Unit 5, Helwan lunate. (3) Unit 11, Abrupt lunate. (4) Unit 12, Helwan lunate. (5) Unit 13, Concave-truncated blade. (6) Unit 15, Helwan retouched point.

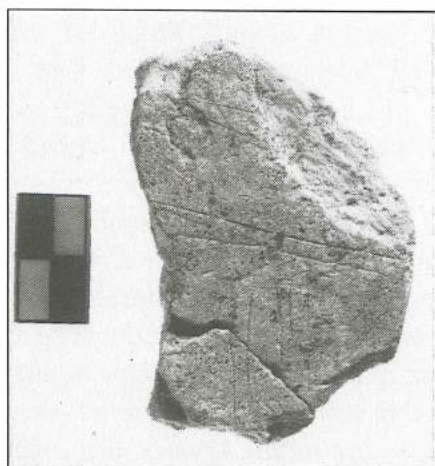


11b. Retouched chert artefacts from the Natufian site of Wādī al-Khawwan 1. (1) Unit 16, Truncated flake. (2) Unit 4, Endscraper on blade. (3) Unit 13, Flake with large notch. (4) Unit 7, Rounded scraper on flake.

types occur in or near the rich artefact band. These include four ochre fragments, two fragments of worked basalt and a small limestone fragment (Fig.12a), incised faintly but clearly with paired horizontal strokes from which are appended similar vertical strokes. The pair of horizontal strokes are

Table 2. Flaked chert artefact assemblage counts for Natufian site Wādī Khawwan 1.

		RETOUCHED	
DEBRIS (large and small angular shatter)		Scrapers	3
Chunks	40	Burins	1
Chips	2,190	Truncations	3
Sub-total	2,230	Retouched Blade	1
DEBITAGE		Retouched flake	7
Flakes	910	Awl	1
Blades	149	Notched flakes	3
Spalls	4	Microliths	3
Core-trimming	1	Geometric microliths	
Cores	12	<i>Helwan Lunates</i>	4
Sub-total	1,076	<i>Abrupt lunates</i>	3
		Sub-total	29
		TOTAL	3,335



12a. Incised limestone fragment from the Natufian site of Wādī al-Khawwan 1.

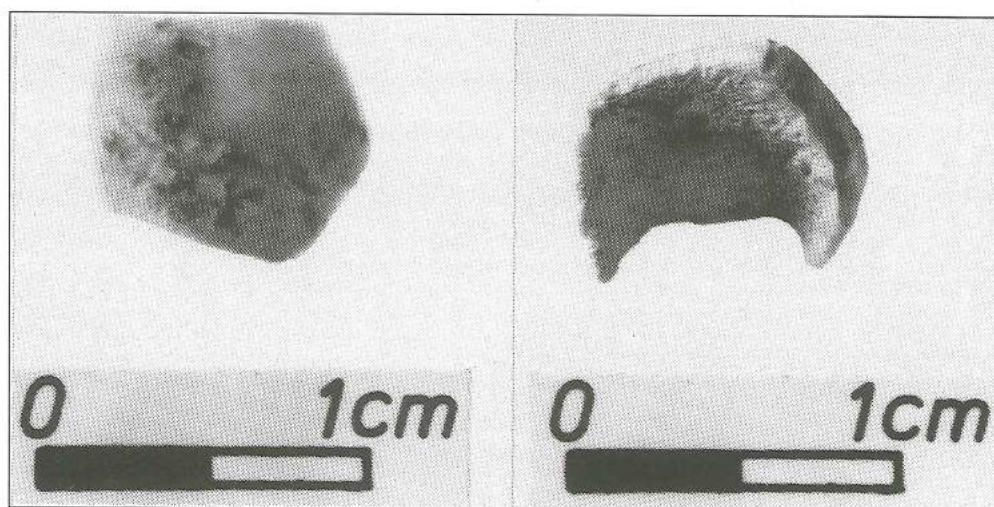
continued on to the reverse of the piece. It was found in section just to the west of the excavation area, but firmly embedded in the rich artefact band. This style of mobiliary art also recalls the varied inventory of small incised limestone plaques and fragments recovered from Wādī al-Ḥimmah 27 (Edwards 1991: Fig.8).

There was also a fragmentary human tooth modified by polishing (Fig.12b) found in the peak density region of the site (Unit 12). The fragment preserves enamel and underlying dentine representing 50 per cent of the labial surface of a single crown belonging to either a canine or first premolar (Fig.12b). The crown is not sufficiently well preserved to identify the tooth as being from the maxillary or mandibular dentition.

One of the fragment margins is oriented horizontal to the line of the crown and is likely to represent a fracture at or near the cervical margin (bottom of right picture, Fig.12b). Portions of both interproximal surfaces adjacent to the cervical margin are also preserved. None of the fracture margins indicate whether or not they were intentionally shaped. However the lack of perikymatic undulations and the high degree of gloss on the labial surface indicate deliberate polishing of the tooth. (Note that the dark area on the labial surface in [Figure 12b] is post-depositional staining and not the result of mineral encrustation).

The tooth recalls the varied Natufian repertoire of bead forms fashioned from skeletal and dental elements. In cross-section, it is worth drawing a parallel to the tubular bone-bead type found in the nearby Early Natufian site of Wādī al-Ḥimmah 27 (Edwards 1991, Fig.11:13-14).

Wādī al-Khawwan 1 presents many interesting points of comparison and contrast with the earlier Wādī al-Ḥimmah 27 (dated in its latest phase to 12,000 B.P, Edwards 1991). The latter site is one of the largest and richest of Early Natufian sites, containing several large architectural complexes rebuilt over several phases and embedded in 2 - 3 m of dark humic clay. Underneath the constructions were interred human burials. The site possesses a varied



12b. Modified human tooth from the Natufian site of Wādī al-Khawwan 1. View of the labial surface (left) and view from the occlusal plane (right).

and abundant incised limestone art assemblage, pecked and ground basalt equipment, and a rich bone tool assemblage including many sickle hafts.

On the other hand, Wādī al-Khawwan 1 is a small and thin artefact band, lacking architecture or human burials. And yet it is not similar to the many pre-Natufian Epipalaeolithic open sites found in Wādī al-Himmah (Edwards *et al.* 1996), which are invariably limited to flaked stone and animal bone assemblages, together with a few hearth stones. Wādī al-Khawwan 1 has additionally a small but surprisingly varied repertoire including specimens of incised limestone art and a modified human tooth, imported marine shells, ochre, and ground basalt artefacts. It remains to be seen whether the difference between the two sites result from their temporal distance, whereby al-Khawwan 1 represents the smaller, less complex site type known from the Late Natufian period (Bar-Yosef and Belfer-Cohen 1992, Stordeur 1992), or whether the two sites are broadly contemporaneous, but different in function.

Ghawr al-Katar

Ghawr al-Katar, the type site for the steeply dipping sequences of conglomerates, sandstones and limestones which underlie the limestones of Ṭabaqat Faḥl and Abū Hābīl, occurs as a long and narrow outcropping ridge near the Jordan River (see Fig. 1), north-west of the town of al-Karāmah (Bender 1968: 92-93, 1974: 93-94). Some 350 m of dipping rocks are exposed, consisting of 'alternating conglomerates, conglomeratic sandstones, and sandstones, marls and marly clays' (Bender 1974: 93). The contrasting colouration of the alternating beds endows the sequence with its distinctive red, white and black-striped appearance. At present the construction of the al-Karāmah Dam has resulted in the excavation of a clear section of the dip-

ping sediments, against which the onlap of the later, horizontally-bedded Late Pleistocene al-Lisān marls is clearly visible. While we found occasional rolled chert artefacts of Middle Palaeolithic character in the al-Lisān deposits here, none have so far been observed in the Ghawr al-Katar series, despite the ubiquitous natural chert constituents of the conglomerates. The Ghawr al-Katar is intruded by a major basalt dyke. Given that the cooling of the basalts could provide a minimum age for the formation, we collected basalt samples, which are currently being processed.³

Investigations in the Ḍānā Conglomerate Formation on the adh-Dhrā' Plain

The third part of the field season centred on the adh-Dhrā' Plain, between the villages of Ghawr al-Mazra'a and adh-Dhrā', on the east shore of the Dead Sea adjacent to the al-Lisān Peninsula (Figs. 1 and 13). Our interest here was aroused by the Ḍānā Conglomerate (DC) Formation, which is lithologically and structurally similar to the Ghawr al-Katar Formation, but which, unlike the Ghawr al-Katar, is littered with abundant chert artefacts including simple flaked cobbles (see below Fig.1b). While the DC Formation was named for a type sequence located further south between Ḍānā and ash-Shawbak, it outcrops most extensively in this region (Khalil 1992:40-41). Here, the formation is manifest in two major exposures extending over approximately 20 square kilometres, situated north of the village of adh-Dhrā' and east of the larger town of Ghawr al-Mazra'a (Fig. 13). The outcrops extend to the east of the al-Karak road at the rift edge, and smaller outcrops occur south of Potash City.

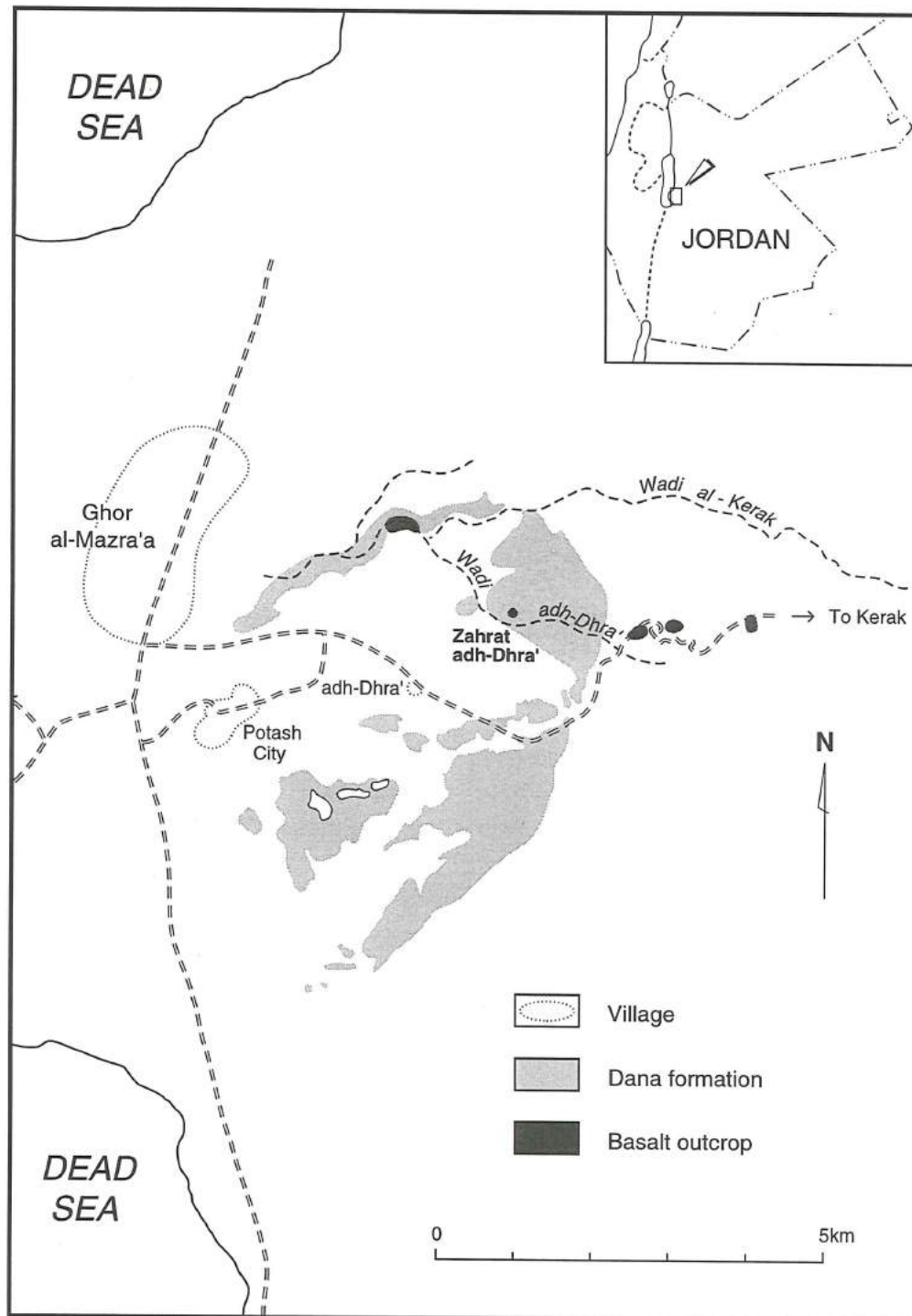
The interbedded bands of conglomerate and lacustrine limestone indicate that the sequence represents an alternation of lacustrine and fluvial/terrestrial conditions within the subsiding Rift Valley setting.

3. By David Foster of the La Trobe University School of Earth Sciences.

This sedimentary pattern is similar to that occurring further to the north in the Rift Valley, both within the Ghawr al-Katar Formation and at al-'Ubaydiyya (Bar-Yosef and Goren-Inbar 1993) where the earliest archaeological sites in southwest Asia have been found. Nearer to the edge of the rift and the adh-Dhrā' monocline, the Dānā For-

mation is composed of steeply-dipping, vertical and overturned fault blocks (Powell 1988: 93). Further west the dip is shallower, and tectonic activity has resulted in back-tilted blocks still further west in the adh-Dhrā' plain (Fig.14).

The age of the Dānā Formation is still unclear. The formation is divided in to an



13. The adh-Dhrā' / Ghawr al-Mashāri' region.



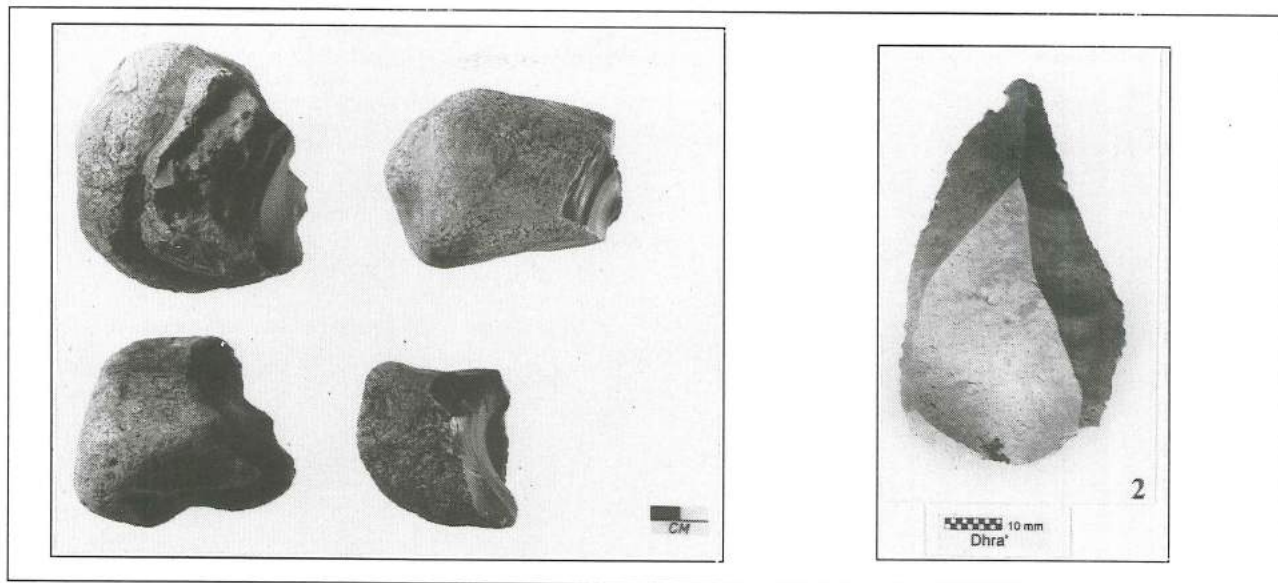
14. Back-tilted sediments of the Ḍānā Formation on Wādī adh-Dhra', capped by horizontally - bedded Late Pleistocene gravel. View to east.

earlier, lower member (DCL), and a later upper member (DCU). Doleritic basalts intrude the DC along the lower course of the Wādī al-Karak (Fig. 13). These have not been radiometrically dated, but are considered to be petrologically similar to samples from several kilometres north dated at 18 ± 3 million years (Barberi *et al.* 1980). Fossils have not been discovered in the DC in this area, though the calcarenites contain burrows considered similar to *Thalassinoides*. Fossil collections from the adh-Dhrā' area have also produced *Globigerina officinalis subbotina*, *G. senilis* and *G. tripartita*, thought to be Oligocene in age. By analogy then, the DCL is considered to be Oligocene to Miocene in age. On the other hand, the latest age for DCU is given by Bender (1974) as Middle Pleistocene, because in the Ḍānā area it is overlain by gravels containing flint implements diagnosed by him as Middle Pleistocene (Bender 1974, Powell 1988). In this connection it is worth noting that we have found several, white-patinated Levallois points (i.e., Middle Palaeolithic or Late Pleistocene) in the adh-Dhrā' plain (Fig.15), associated with the Pleistocene gravels which unconformably overlie the DC (Fig.14).

The barren plain of adh-Dhrā' has a sur-

prisingly rich archaeology, which has been the subject of numerous archaeological surveys. R. Raikes (1984) has observed that, in the past as now, the apparent barrenness of the area is somewhat misleading. While rainfall is extremely low, the area is well-watered by numerous springs, including 'Ayn as-Sikkīn, 'Ayn al-Mughra, and 'Ayn al-Ḥammām al-Ḥamra. Indeed the name of the largest town in the plain - al-Mazra'a - translates as 'the Farm'. At present the groundwaters are locally utilised to irrigate extensive vegetable gardens in the area. While illegal excavations in the region are rife, so that most encountered sites have been substantially damaged, fewer sites have undergone systematic excavations. Perhaps the best known of these is the Early Bronze Age town of Bāb adh-Dhrā', with its associated necropolis (Rast and Schaub 1981, Schaub and Rast 1989). Others also exist, for example the adh-Dhrā' Neolithic site excavated by Bennett (1980), and more recently by Kuijt and Mahasneh (n.d.). Nearby to this the 'Monumental Pillar' site has been excavated by Körber (1992).

Like ourselves, many researchers have found numerous artefacts typologically datable to the Middle Palaeolithic and Acheulian (Rollefson 1985). Numerous flaked



15. (1) Flaked cobbles, adh-Dhrā' quarry (Spot 7); (2) Levallois point, Pleistocene gravel cap, adh-Dhrā'.

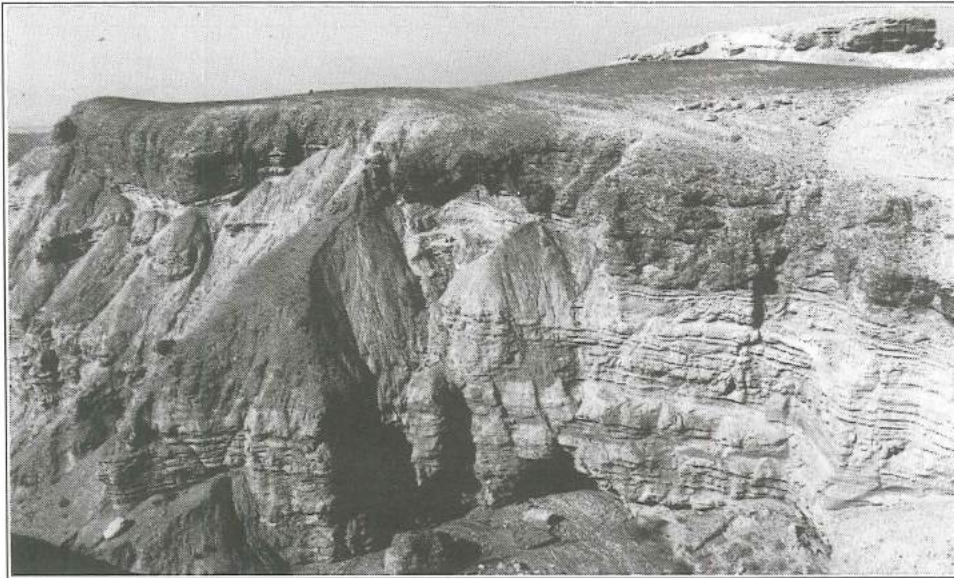
cobbles or 'choppers' (Fig.15) also present pose more of a problem. Not only could they be diagnostic of every period from the Oldowan onwards, but as we shall see, they are particularly common on flint quarry sites, where they may represent the initial stages of core reduction, or merely the testing of chert cobbles by itinerant knappers. Also, despite the likely attribution of points and handaxes to the Middle Palaeolithic and Acheulian, these artefacts like the choppers point to the pressing need for a stratigraphic framework for the Lower Palaeolithic of the adh-Dhrā' Plain.

Nevertheless, many simple flaked cobbles were strongly associated with the outcropping chert conglomerates of the DC, and there still remained the possibility that these artefacts were issuing from the Upper DC. If so, on archaeological grounds the rock beds could only date from the Early Pleistocene. This would be in line with the clear lithological similarities with the Ghawr al-Katar and perhaps the al-'Ubaydiyya sequences.

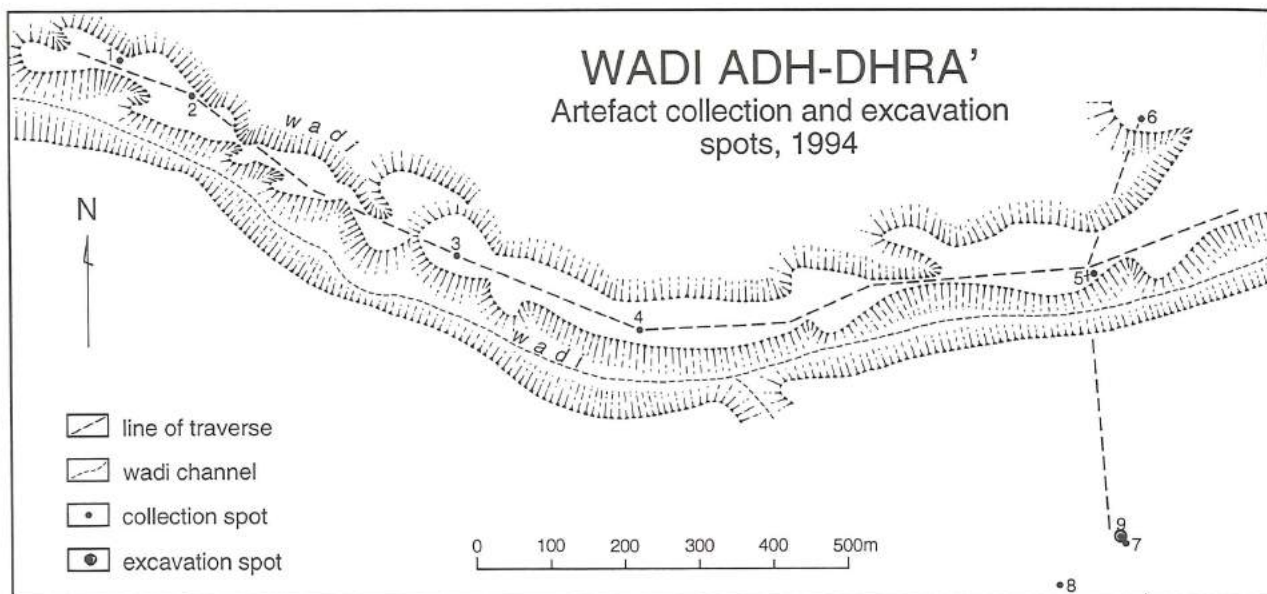
Given the possibility that the Upper DC might date to the Early to Middle Pleistocene, interest centred on the large number of flaked chert artefacts, including the flaked cobbles, which are distributed over

its thick chert beds (Fig.16). On flat surfaces, the naturally-rounded chert cobbles weather loose from the conglomerate and lie intermingled with prodigious numbers of flaked chert artefacts. The crucial question which needed to be resolved here was whether the artefacts were eroding *from* the conglomerate, and so dated from the Early/ Middle Pleistocene or earlier, or whether they were merely surficial, resulting from surface quarrying for chert well after the deposition of the DC.

Excavations at 'Spot 9' (Fig. 17), located on a broad, shallow slope of the chert-rich conglomerate, proved conclusive. Artefacts were distributed on top of the deposit, and filtered down some 30 cm though the upper five units of a 90 cm deep excavation pit (Fig. 18), but were not embedded within the conglomerate. The verdict must be that these are not among the earliest sites in Southwest Asia. Had artefacts been found in the Dānā Formation's alluvial chert-rich beds, they would have been rolled by water transport. In a few cases, yellow sandstone deposits exist which provide possible find-spots. Although we clambered up and down considerable areas of these rugged outcrops, both in this area and south of Potash City, no luck was had in finding *in situ* artefacts



16. Dānā Conglomerate Formation outcrop in Wādī adh-Dhrā', showing thick chert conglomerate (dark capping layer). Note human scale.

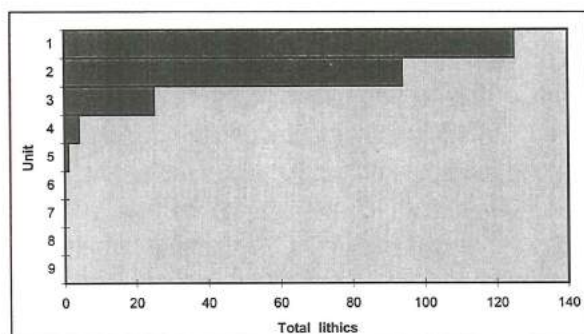


17. Artefact collection and excavation areas on the adh-Dhrā' Plain.

despite the numerous bands of thermally shattered flint present. We hope that the basalt samples from the Wādī al-Karak will settle whether the DC in this area antecedes the Plio-Pleistocene, and is thus earlier than the hominid lineage.

The Flint Quarries of the adh-Dhrā' Plain

Nevertheless, the millions of artefacts distributed across the chert conglomerates include handaxes and Levallois point cores, indicating the use of this barren place as a quarry over hundreds of thousands of years. While previous surveys in the adh-Dhrā' re-



18. Excavation of adh-Dhrā', Spot 9. Numbers of flaked chert artefacts according to depth.

gion have emphasized the many discrete sites present, it is also important to stress that these sites are overprinted (and often,

in chronological terms, 'underprinted') by the more or less continuous scatters of flaked stone artefacts that carpet much of the plain.

The chert beds produce countless rolled cortical cobbles, a form that serves as an immediately useful flake core (e.g. Fig.15). While flakes, cores and retouched tools are most abundant on the quarry, these items were also widely distributed in the surrounding region. Rather than accent discrete findspots, our sampling strategy was designed to capture any pattern in the lateral distribution of stone artefacts in relation to the major chert bands and on a variety of geological substrates across the plain. In order to sample this distribution, we made total artefact collections at points successively further away from the sources of the flat-topped Ḍānā chert conglomerates concentrated near the al-Karak road.

The scope of the survey was limited by time and local topographic features. To the east the al-Karak road immediately borders the vertical slopes of the rift valley edge. To the south, extensive vegetable gardens obscure and have silted over the ground surface. Immediately north of the gardens, the flat-topped ridges of Ḍānā Conglomerate and their overlying sediments are dissected by the deeply incised, westward-trending gorges of Wādī adh-Dhrā', Wādī al-Karak,

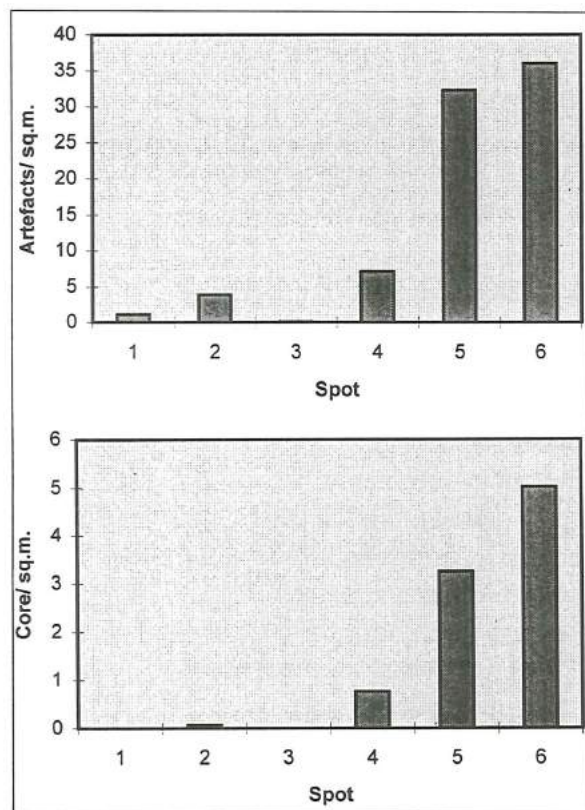
and their tributaries.

Therefore, four collection circles (of 3 m diameters) were effected at successive distances to the west of the conglomerates along a ridge overlooking the Wādī adh-Dhrā' (Fig. 17). Three collections (half this size) were also made on the conglomerates which served as the quarries (Fig. 19), of which Spot 5 and Spot 6 are reported here. The results reveal 'fall-off' curves in terms of artefact numbers and numbers of cores with distance (Fig. 20), as well as degree of reduction of the cobbles as indicated by cortex coverage, and also decreases in the average size of artefacts with distance. The pattern of transported artefacts indicate that the great majority of them emanate from the chert quarries, an additive process exacerbated over hundreds of thousands of years.

These patterns of distribution are usually associated with the transport of stone materials considerable distances (hundreds of kilometres) from the source (eg. Torrence 1986). Here we stress that we do not intend to explain the similar patterns encountered here, given the short distances involved, as resulting from exchange patterns, but as the casual, serial use of a raw material carried away over long periods from its source. Analogous to Renfrew's 'law of monotonic decrement', many scenarios of raw materi-



19. Artefact sampling at adh-Dhrā' chert quarry (Spot 6).



20. Flaked stone artefact distribution across adh-Dhrā' collection points. Artefacts / square metre (top) and cores/ square metres (bottom), according to sampling spot.

al procurement can ensure that “effective distance from a localised source will be a monotonic decreasing one” (Renfrew 1977: 72).

In the adh-Dhrā' Plain, the coherent fall-off patterns are not so much to be explained as a ‘distance-decay’ phenomenon, but rather, the massive amounts of flaked cobbles and chert cores on the conglomerate bands simply dwarf those numbers adjacent to it. Furthermore, the major practice of initial core reduction in this vicinity results in much higher cortex frequencies than away from it. There is some indication that re-touched artefacts are more common as distance from the quarry increases. While the dark brown chert cobbles of the Dānā conglomerate are distinctive, the geology of the region further complicates the distribution pattern. For example, one of the sampled areas consisted of barren lacustrine silts (Spot 3). Another (Spot 4) was located on a

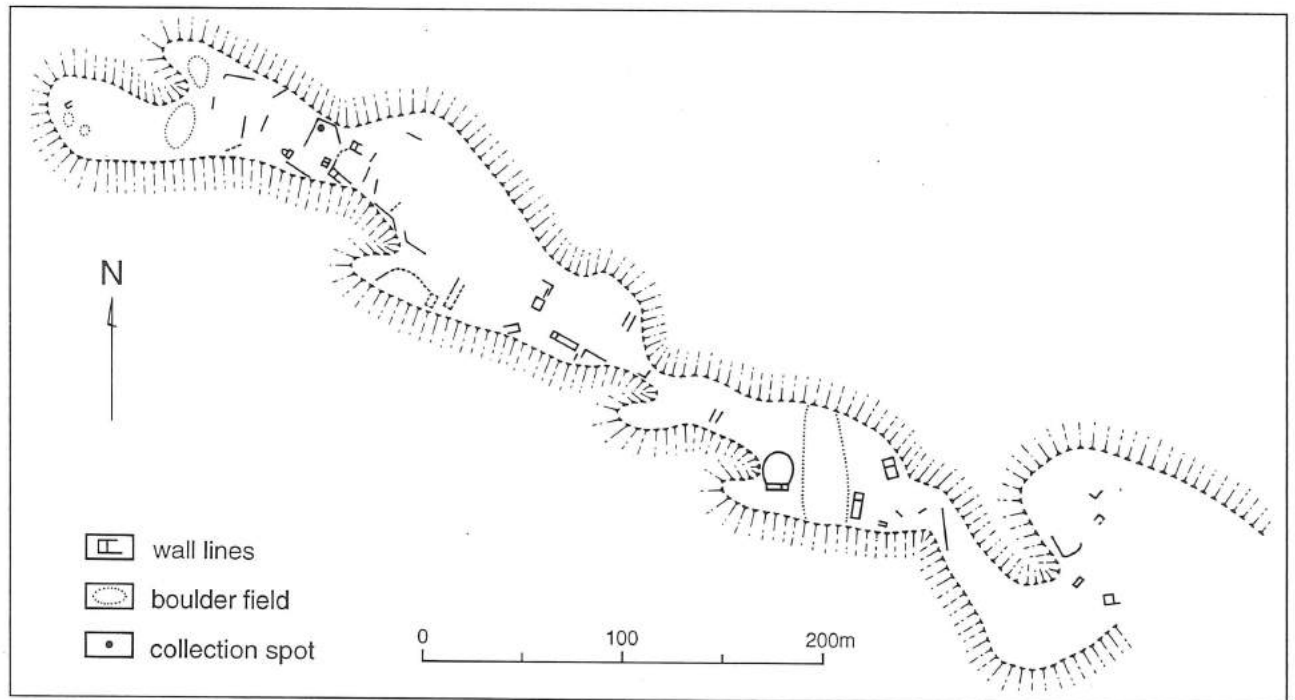
Late Pleistocene gravel cap (see Fig.14), with its secondary source of alluvial chert and rolled chert artefacts, and still another collection point (Spot 1) coincided with a major Middle Bronze Age town site (see below). While raw material origins cannot be vouchsafed for any single artefact in the adh-Dhrā' Plain, overall the coherent pattern of distribution indicates long-term use of the Dānā Conglomerate as a quarry for tool making.

The Middle Bronze Age Site of Zahrat adh-Dhrā'

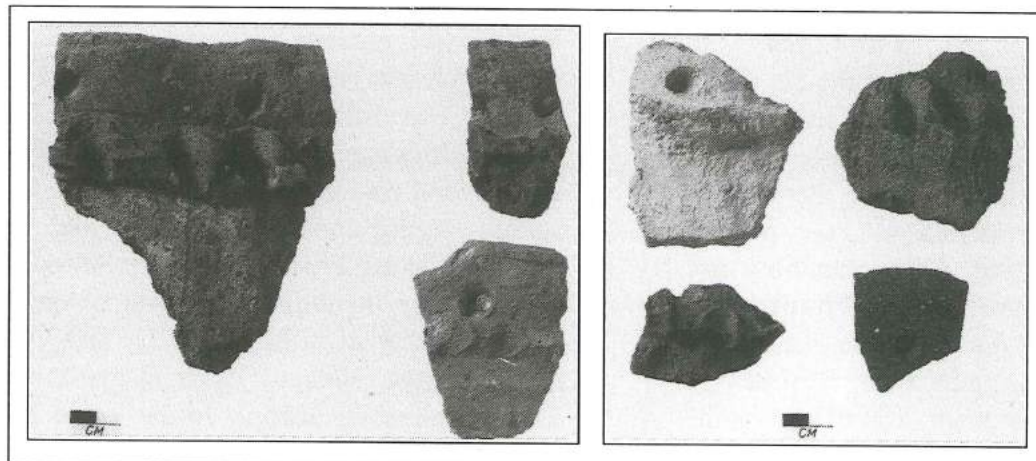
Our investigations of the Wādī adh-Dhra' flint quarry sites, described above, involved the sampling of surface artefacts at several collection points placed successively farther away from the quarries along the inter-fluvial ridge that runs between Wādī adh-Dhrā' to the south and a feeder gully to the north (see Fig. 17).

‘Spot 1’ and ‘Spot 2’ were placed in the middle of a large archaeological site located at the extreme western end of the ridge, which had been discovered by Phillip Macumber during earlier survey work in the area. This area is known as Zahrat adh-Dhrā' and this name we give to the site discovered here which has apparently not been described before. Many other surveys have been carried out in the region but appear to have been located outside of this specific area. To the north of Wādī al-Karak, Worschch (1985) discovered numerous sites of many periods. To the west, McConaughy (1981) located prehistoric sites in the fan of the Wādī al-Karak. However, survey reports do not appear to have reviewed the ridge under discussion.

In the context of our Pleistocene investigations at Dhrā', we did not have time to extensively investigate this large site, though plans of the major exposed buildings (Fig. 21) and collections of the distinctive surface ceramics were made (Fig. 22).



21. Surface architectural remains at Zahrat adh-Dhrā'.



22. Middle Bronze II pottery sherds from Zahrat adh-Dhrā'.

The site is characterised mainly by the remains of rectilinear buildings as well as a few curvilinear ones, built of stone boulders and cobbles. Many of the larger stones are composed of 'beach rock', which is a compressed and lithified sedimentary rock that is derived from a former Lake al-Lisān beach. Deposits of this soft and comparatively light stone lie only a short distance away from the eastern end of the site, over the gully to the north. The rock erodes out of section in large, squarish blocks extremely convenient for extensive building programs. Some of the eroded blocks here

exceed several metres in length but many come in smaller sizes.

Similar outcrops of rock occur on the steep rift edge slopes, three kilometres to the east, that rise up sharply at the edge of the Jordan Valley near the place where the adh-Dhrā' spring emerges. The stone was also utilised here as a building material in extensive and ambitious building programs from Chalcolithic times onwards, exemplified by Körber's (1992) 'Monumental Pillar' site and associated cross-country wall.

The most common building plan at Zahrat adh-Dhrā' is a one or two-roomed struc-

ture, located along the minor axis of a rectangular circuit wall (presumably enclosing a courtyard). Building units are free-standing, scattered widely over the ridge and extend back eastwards to its termination for some 600 m. At the eastern end of the site, huge blocks of beach rock have been dragged up on to the ridge top from the nearby quarry source. It is notable that the largest stones, well over two metres in length are distributed in a rough line at the eastern end of the site, some still standing upright, but with one large flat stone embedded in the ground, giving the impression of the remains of an entry gate within a fortified town wall.

On the southern face, several buildings have clearly been truncated by the deep incision of Wādī adh-Dhrā', and several similar buildings are to be found across the chasm to the south. This is an extraordinary occurrence, since it implies that the ca. 60 m deep channel of Wādī adh-Dhrā' has cut into the surrounding sediments only after the settlement was built, and every evidence suggests that this happened in the Middle Bronze Age II period. An explanation may lie in the model developed by Frumkin and colleagues (1994) of a 60 m rise in the level of the Dead Sea during the Early Bronze Age period and the subsequent drop in level at the end of this period, after which massive incision by the adjacent wadis such as Wādī al-Karak and Wādī adh-Dhrā' occurred in Holocene terraces (Donahue 1985). This proposition remains to be tested in the case of Zahrat adh-Dhrā'.

As described in the previous section, Zahrat adh-Dhrā' is covered with flaked chert artefacts - undiagnostic flakes for the most part. But the most relevant finds concerning the age of the site occur in the form of the many coarse ware pottery sherds which litter the site.

The most distinctive type is a cooking-pot rim shed characterised by a design of thumb-impressions applied to a raised clay

band, surmounted by a pattern of circular indentations. A second type bears a band of indented decoration, and a third has a band-combed decorative scheme (Fig. 22). These types are familiar Middle Bronze II ceramic types from northern Palestinian and Jordanian sites with examples found, *inter alia*, at Megiddo XV (Loud 1948: Pl. 22:6), Tall Beit Mirsim D (Albright 1933: Pl. 5:1) and Pella (Smith and Potts 1992, Pls 36-37).

Ceramic traditions and site types of the Middle Bronze Age have hitherto been unknown in the Plain of adh-Dhrā'. Thus far, similar pottery has been reported regionally from the Middle Bronze cairn tombs at Dayr 'Ayn 'Abātā, some thirty kilometres to the south (Politis 1993). In its setting in the Plain of adh-Dhrā', Zahrat adh-Dhrā' emerges as a unique and important settlement site.

Acknowledgements

This project was funded by an Australian Federal Government Large Central Starter Grant, administered through La Trobe University, and co-directed by the authors. Personnel largely consisted of staff and students of the La Trobe University School of Archaeology, including Richard Cosgrove (field director at al-Mashāri' 1), and students Allyson Halsey, Tania Hardy-Smith, Tracey Johnston, Joanne Jordan and Jennifer Tulloch. Julia Cusack assisted with the laboratory analysis of archaeological materials. Other Australian staff included geologist Richard Lakey (Oman) and John Head (ANU Quaternary Dating Research Centre). The surveyor was George Findlater (University of Edinburgh). We thank Dr Safwan Tell, then Director-General of the Department of Antiquities of Jordan, for approving and supporting the work. Our warmest thanks go to our Jordanian project members Abū Isa, Abū Sami, Abū Fawzi and Allahadin. Special thanks are due to Department of Antiquities Inspector, Ali al-Khayyat, for expediting every facet of our progress. We thank the people of Ṭabaqat

Fahl and al-Mashāri' for their welcome during our stay in their communities, and the excavation staff from those two villages who included Mishrif Abdullah, Abū Afif, Hassan, Mohammad and Musa'ad Khashan.

Many thanks are also due to Professor Em. Basil Hennessy and the University of Sydney for the use of their Pella dighouse as our operational base while we worked in Ṭabaqat Fahl. In al-Mazra'a, we were very grateful to Ahmad al-'Adwan, director of the Jordan Valley Authority, for the generous offer of JVA premises as project accommodation, and we also thank Konstantinis (Dino) Politis for his assistance in guiding us to them. We thank William Lancaster, then director of the British Institute at Amman for Archaeology and History, and its staff for their general welcome, assistance, and loans of equipment. Thanks are due to Robin Torrence for discussion on the adh-Dhrā' chert quarries. Finally, many thanks are due to La Trobe Archaeology

staff members Rudy Frank for photography and Wei Ming for drafting the maps.

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Bibliography

Abed, A.M.

- 1985 Paleoclimates of the Upper Pleistocene in the Jordan Rift. Pp. 81-93 in *SHAJ II*. Amman: Department of Antiquities of Jordan/ London: Routledge & Kegan Paul.

Albright, W.F.

- 1933 The Excavation of Tell Beit Mirsim, IA. *AASOR* 13: 55-127.

Barberi, F., Capaldi, G., Gasperini, P., Marinelli, G., Santacrose, R., Scandone, R., Treuil, M. and Varet, J.

- 1980 Recent basaltic vulcanism of Jordan and its implications on the geodynamic history of the Dead Sea shear zone. *Accademia Nazionale dei Lincei - International Meeting 47*. Rome: Accademia Nazionale del Lincei.

Bar-Yosef, O. and Belfer-Cohen, A.

- 1992 From foraging to farming in the Mediterranean Levant. Pp. 21-48 in A.B. Gebauer and T.D. Price (eds) *Transitions to agriculture in prehistory*, Madison: Prehistory Press.

Bar-Yosef, O. and Goren-Inbar N.

- 1993 *The lithic assemblages of Ubeidiya: a Lower Palaeolithic site in the Jordan Valley*. Jerusalem: Hebrew University of Jerusalem.

Bender, F.

- 1974 *Geology of Jordan*. Berlin: Gebruder Borntraeger.

- Bennett, C.-M.
 1980 Soundings at Dhra', Jordan. *Levant* 12: 30-39.
- Donahue, J.
 1985 Hydrologic and Topographic Change During and After Early Bronze occupation at Bab edh-Dhra and Numeira. Pp. 131-140 in *SHAJ* II. Department of Antiquities of Jordan. London: Routledge & Kegan Paul.
- Edwards, P.C.
 1991 Wadi Hammeh 27: an Early Natufian site at Pella, Jordan. Pp. 123-148 in O. Bar-Yosef and F.R. Valla (eds), *The Natufian Culture in the Levant*. Ann Arbor: International Monographs in Prehistory.
- Edwards, P.C., P.G. Macumber and Head M. J.
 1996 The Early Epipalaeolithic of Wadi al-Hammeh. *Levant* 28: 117-132.
- Frumkin, A. I. Carmi, Zak, I. and Margaritz M.
 1994 Middle Holocene environmental change determined from the salt caves of Mount Sedom, Israel. Pp. 315-332 in O. Bar-Yosef and R.S. Kra (eds), *Late Quaternary chronology and Paleoclimates of the Eastern Mediterranean*. Tucson: RADIO CARBON, University of Arizona.
- Horowitz, A.
 1979 *The Quaternary of Israel*. New York: Academic Press.
- Huckriede, R.
 1966 Das Quartär des Arabischen Jordan-Thales und Beobachtung über "Pebble Culture" und "Prae-Aurignac". *Eiszeitalter Gegenwart* 17: 211-212.
- Khalil, B.
 1992 *The Geology of the ar-Rabba area. Map Sheet no. 3152 IV*. Amman: Bulletin 22, Geology Mapping Division, Geology Directorate. Ministry of Energy and Mineral Resources / Natural Resources authority, Jordan.
- Körber, C.
 1992 Edh-Dhra' survey 1992. *ADAJ*36: 550-553.
- Kuijt, I. and Mahasneh, H.
 n.d. The early neolithic occupation of Dhra , Jordan: implications for the Jordan Valley as a social, economic and ritual focus. *JFA* (in press).
- Loud, G.
 1948 *Megiddo II. Seasons of 1935-39*. Chicago: University of Chicago Oriental Institute Publications 42. Chicago.
- McConaughy, M.A.
 1981 A preliminary report on the Bab edh-Dhra site survey. Pp. 187-190 in W.E. Rast and R.T. Schaub (eds), *The Southeastern Dead Sea Plain Expedition: an interim report of the 1977 season*. Cambridge, M.A.: ASOR.
- Macumber, P.G.
 1992 The geological setting of Palaeolithic sites at Tabaqat Fahl, Jordan. *Paléorient* 18/2: 31-44.
- Macumber, P.G. and Head, M. J.
 1991 Implications of the Wadi al-Hammeh sequences for the terminal drying of Lake Lisan, Jordan. *Palaeogeography, Palaeoclimatology, Palaeoecology* 84: 163-173.
- Muheisen, M.
 1988 A survey of prehistoric sites in the Jordan Valley. Pp. 503-522 in A.N. Garrard and H.G. Gebel (eds), *The Prehistory of Jordan: the state of research in 1986*,

- BAR Int. Ser. 396 ii. Oxford: British Archaeological Report.
- Politis, K.D.
1993 The 1992 season of excavations and 1993 season of restorations at Dear 'Ain 'Ab-ata. *ADAJ* 37: 503-520.
- Powell, J.H.
1988 *The Geology of the Karak area. Map Sheet no. 3152 III*. Amman: Bulletin 8, Geological Mapping Division, Geology Directorate. Ministry of Energy and Mineral Resources / Natural Resources Authority, Jordan.
- Raikes, R.
1984 *Water, weather and prehistory*. R.L. Raikes: Wales / New Jersey: Humanities Press.
- Rast, W.E. and Schaub, R.T.
1981 The 1977 expedition to the southeastern Dead Sea Plain, Jordan. Pp.1-6 in W.E. Rast and R.T. Schaub (eds), *The Southeastern Dead Sea Plain Expedition: an interim report of the 1977 season*. Cambridge, M.A.: ASOR.
- Renfrew, C.
1977 Alternative models for exchange and spatial distribution. Pp. 71-90 in T.K. Earle and J.E. Ericson (eds), *Exchange systems in prehistory*. New York: Academic Press.
- Rollefson, G.O.
1985 Description of the chipped stone artefacts from the Moab survey (Worschech), 1983. Pp. 78-85 in U.F.Ch. Worschech (ed.), *Northwest Ard al-Kerak 1983 and 1984: a preliminary report*. München: Beiheft 2: Biblische Notizen.
- Schaub, R.T. and Rast, W. E.
1989 *Bab edh-Dhra': excavations in the cemetery directed by Paul W. Lapp (1965-67)*. ASOR. Winona Lake: Eisenbrauns.
- Smith, R.H. and Potts, T.
1992 The Middle and Late Bronze Ages. Pp. 35-81 in A.W. McNicoll *et al.* (eds), *Pella in Jordan 2: the second interim report of the Joint University of Sydney and Colledge of Wooster excavations at Pella 1982-1985*. Sydney: Medit. Arch.Suppl. 2.
- Stordeur, D.
1992 Change and cultural inertia: from the analysis of data to the creation of a model. Pp. 205-222 in J.-C. Gardin (ed.), *Representations in Archaeology*. Bloomington: Indiana University Press.
- Tchernov, E.
1987 The age of the 'Al-'Ubeidiya Formation, an Early Pleistocene Hominid site in the Jordan Valley, Israel. *Israel Journal of Earth Sciences* 36: 3-30.
- Torrence, R.
1986 *Production and exchange of stone tools: prehistoric obsidian in the Aegean*. Cambridge: Cambridge University Press.
- Vita-Finzi, C.
1982 The Prehistory and History of the Jordanian Landscape. Pp. 23-27 in *SHAJ* I. Amman: Department of Antiquities.
- Worschech, U.F. Ch.
1985 *Northwest Ard al-Kerak 1983 and 1984: a preliminary report*. München: Beiheft 2: Biblische Notizen.



AR-RASFA, A STRATIFIED MIDDLE PALEOLITHIC OPEN-AIR SITE IN NORTHWEST JORDAN: A PRELIMINARY REPORT ON THE 1997 EXCAVATIONS

by

John J. Shea

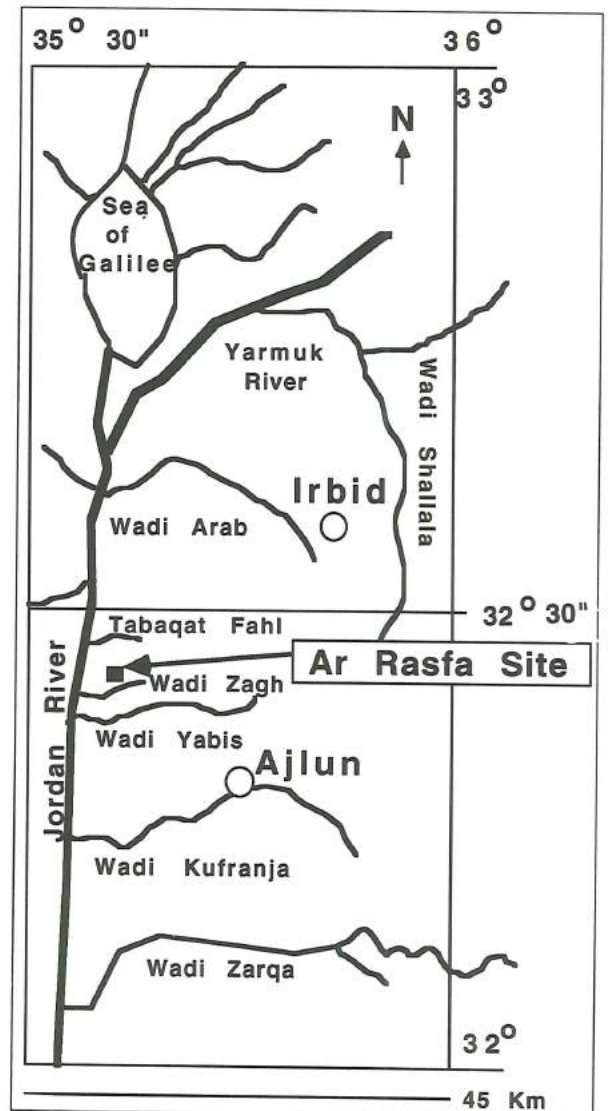
Abstract

Even though geographic and paleoclimatic evidence suggest that northwest Jordan was a favorable habitat for human settlement during Middle Paleolithic times, surprisingly little is known about the Levantine Mousterian archaeological record in this area. Survey and excavations in 1997 revealed, ar-Rasfa, a stratified Middle Paleolithic site in the Wādī az-Zagh (Fig. 1). Superficially similar to other Jordanian Middle Paleolithic sites in representing an "early" variant of the Levantine Mousterian, the lithic assemblage from this site actually presents a more complex pattern of industrial variability.

Introduction

Paleoanthropologists are increasingly interested in the Middle Paleolithic Period in Southwest Asia. This period has the potential to shed considerable light on several of the most important issues in human evolution, such as the origin of modern humans, behavioral differences among Late Pleistocene humans, and the fate of the West Eurasian Neanderthals.

The principal Middle Paleolithic archaeological entity in Jordan and adjacent countries is called the "Levantine Mousterian." Levantine Mousterian assemblages have been dated by a variety of methods (radiocarbon, thermoluminescence, electron-spin resonance, uranium-decay series, and amino acid racemization) with most contexts dating to between 45,000-240,000 BP. (Mercier *et al.* 1995). Levantine Mousterian lithic assemblages differ from European Mousterian assemblages in several key respects, high percentages of Levallois tools



1. Map of northwest Jordan showing the location of the ar-Rasfa site.

and laminar debitage (blades) and typically low proportions of intensively retouched flake tools, handaxes, and foliate bifaces. The distribution of Levantine Mousterian sites within the Levant is closely correlated with the Mediterranean *Quercus-Pistachia* woodland.

From a paleoanthropological standpoint,

the most important aspects of the Levantine Mousterian are its human fossil associations. Unlike Europe and Western Asia, where the Middle Paleolithic is associated solely with Neanderthals, the Levant appears to have had a more diverse human population. To most researchers, these Levantine Mousterian human fossils are to be divisible into two groups, one consisting of modern-looking humans from the sites of Skhul and Qafzeh, and another consisting of more Neanderthal-like humans from the sites of Tabun, Amud, and Kebara (Rak 1993. Trinkaus 1984; Vandermeersch 1991). Because the morphological differences between these Neanderthals and early modern humans have often been attributed to profound bio-behavioral differences between these hominids, their joint association with the same Levantine Mousterian archaeological complex in the Levant constitutes a major evolutionary paradox (Binford 1968; Clark and Lindly 1989; Trinkaus 1992). Several recent studies have sought evidence for significant behavioral differences between Neanderthals and early modern humans within the Levantine Mousterian (Lieberman 1993; Lieberman and Shea 1994; Shea 1989, 1993, 1998), but these efforts have been constrained by a dearth of Middle Paleolithic sites at which archaeological residues have been recovered by controlled scientific excavations.

In order to increase the sample of well-excavated Levantine Mousterian sites, the author started a project to investigate the Middle Paleolithic archaeological record in the 'Ajlūn District of northwest Jordan. Our initial focus in the 1997 season was to evaluate surface localities identified by previous surveys in the lower reaches of the Wādī az-Zagh and Wādī al-Yābis (Muheisen 1988; Palumbo *et al.* 1990). Sixteen localities were examined in this area, and test excavations were conducted at one of them. This site, ar-Raṣfa, contained stratified Levantine Mousterian lithic artifacts whose character

suggest the Middle Paleolithic record of northwest Jordan has unique properties not apparent in the sites thus far known from southern Jordan or from adjacent parts of northern Israel.

Regional Background

Physiographically northwest Jordan is bounded to the north by the Yarmuk River, to the west by the Jordan River, and to the south by the Wādī az-Zarqā'. The eastern boundary is somewhat arbitrary at roughly 36° (east longitude, but corresponds roughly to the ecotone between the hilly woodland flanks of the Jordan Valley and the level steppe-desert of interior Jordan. Elevations in this part of Jordan range from more than 100 m bsl on the Jordan Valley bottom to about 900 m in the highlands. The bedrock geology of this region is composed of Senonian-Paleocene and Cenomanian-Turonian (Cretaceous) limestones up-thrust and faulted by the formation of the Jordan Rift Valley. Cenomanian-Turonian limestone predominates in the 'Ajlūn District and in the project area. (Bender 1974: 27-28,115) These chalky limestones feature numerous caves/dissolution cavities and contain abundant nodular deposits of high-quality flint. Numerous seasonal and permanent rivers cross-cut these limestone hills, exposing a variety of Quaternary deposits. The most conspicuous Pleistocene formations are a series of Middle Pleistocene conglomerates overlain at lower altitudes by the al-Lisān marls, residues of the eponymous lake that filled the Jordan Valley until early Holocene times (Macumber and Head 1991).

Geographic considerations suggest northwest Jordan would have been relatively densely populated during Late Pleistocene times. Even today, northwest Jordan is the most humid part of the country, enjoying mean annual rainfall between 400-800 mm over the last several decades (Bender 1974:10). (This is essentially the

same as the present rainfall for the Mediterranean watershed of Israel north of the Beersheva Basin.) Comparable levels of present-day rainfall occur in Jordan only in isolated peaks of the Transjordanian Plateau, such as the Mādabā Plains. The decomposition of the limestone under humid conditions creates a nutrient-rich terra rosa soil that is today intensively cultivated.

Even under modern hyper-arid climate, scrub Mediterranean oak-terebinth vegetation predominates throughout those parts of northwest Jordan that are not under cultivation (Zohary 1973). From the standpoint of human hunter-gatherer subsistence opportunities, the Mediterranean woodland is the most resource-rich of Levantine phyt zones (Naveh 1984). There are more species of edible plants, higher population densities of most vertebrate species, and thus greater potential for pre-agricultural human subsistence in the Mediterranean woodland than there are in the adjacent Irano-Turanian steppe (Danin 1995). The most common large mammal remains from Levantine Mousterian sites are ibex, mountain gazelle, aurochs (wild cattle), red deer, fallow deer, and wild boar, all species endemic to Mediterranean woodland habitats (Kingdon 1990, Qumsiyeh 1996, Shea 1998, Tchernov 1988).

Pollen cores from the Jordan Valley, most notably the Amazyahu borehole, south of the Sea of Galilee, indicate that the Late Pleistocene climate of the Levant was considerably cooler, and episodically wetter, than it is at present (Horowitz 1987). Cooler and/or wetter temperatures would have expanded the southward and down-slope extent of the Mediterranean woodland beyond its restricted present-day distribution (Weinstein-Evron 1990). Consequently, it is likely that, unlike much of the rest of the country, northwest Jordan may have remained a permanent refugium for Mediterranean woodland biota. If this was the case, then northwest Jordan was probably a major focus for

human settlement during Late Pleistocene times. Support for this hypothesis can be seen from the numerous finds of open-air sites Middle Paleolithic sites in Ṭabaqat Faḥl (Macumber 1992; Macumber *et al.* 1997), Wādī Ziqlāb (Banning and Fawcett 1983), Wādī az-Zarqā' (Baubron *et al.* 1985), and Wādī al-Yābis (Palumbo *et al.* 1990), and in the al-Ghawr (Muheisen 1988).

Our ultimate research goal is to identify a series of Middle Paleolithic sites arrayed along an altitudinal transect running west-east across northwest Jordan graben. In 1997, our work focused on sites at lower elevations. Of the sixteen sites examined in the lower reaches of Wādī al-Yābis and adjacent parts of the Wādī az-Zagh, ar-Raṣfa was the most promising locality, and therefore the logical focus for test excavations.

The ar-Raṣfa Site and Its Setting

The ar-Raṣfa Middle Paleolithic site occurs on a rocky outcrop on the southwestern side of the eponymous hill approximately N 32°24'15" by E 35°36'30" at an elevation of -37 m bsl. The nearest prominent architectural landmark is a hospital located about half-way between Merazza and ash-Shaykh Muhammed along the al-Ghawr highway (Fig. 1). The site was identified by tracing surface finds of rolled Middle Paleolithic tools upslope to their source on the summit of a bluff overlooking the lower reaches of the Wādī az-Zagh basin. Ar-Raṣfa is a natural basin approximately 100 m (N-S) by 60 m (E-W) on the southeastern slope of a limestone headland at an elevation of -37 m bsl. The northern and western margin of the site marks the articulation of limestone and conglomeratic deposits, while the eastern and southern margins are defined by steeply-eroded limestone escarpment featuring two prominent limestone pillars. The surface of the site appears relatively free of the large blocks that cover most other surfaces in the area, but there is no evidence of recent cultivation on the site.

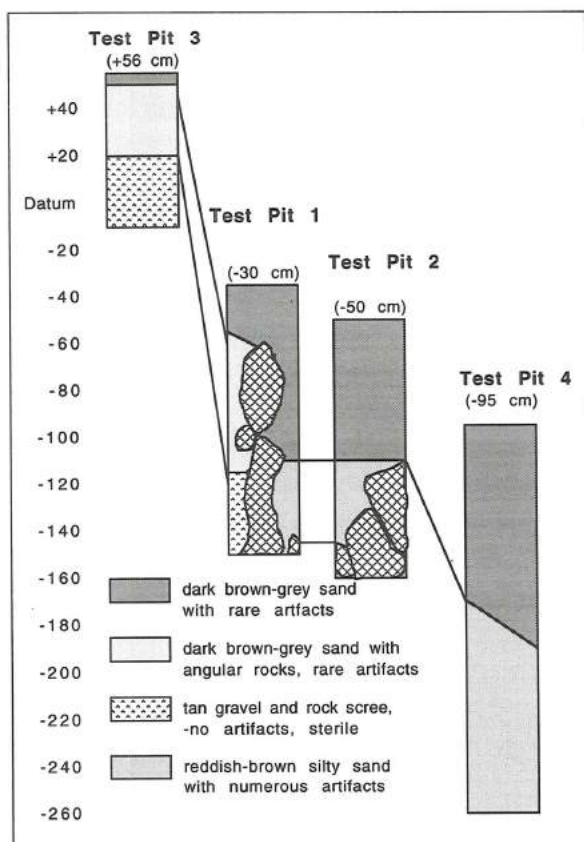
Test excavations at ar-Raşfa were carried out between 28 June-10 July, 1997, by a crew comprised of the author, Patricia Crawford (SUNY Stony Brook), and Yacoub Maryoud Oweis, Department of the Antiquities Representative from the 'Ajlūn Office. A systematic surface collection recovered more than a hundred lithic artifacts from ar-Raşfa, of which the only typologically-diagnostic forms were those referable to the Levantine Mousterian (Levallois cores, retouched Levallois points). Our excavation strategy involved a West-East transect of four test pits, each of which was excavated by natural stratigraphy subdivided into 10 cm thick arbitrary levels (Fig. 2). Although bedrock was not reached in test pit 4, the stratigraphic similarities among these pits allows some general inferences to be made about the formation of the site. If the large boulders at the bottom of test pits 1 and 2 are bedrock, then this surface ap-

pears to be covered by a thin layer of gravel and angular rock scree. This scree is loosely consolidated and was probably exposed briefly before being buried by colluvial and alluvial deposits. The overlying reddish-brown (Munsell 5YR 5/4) sand/silt levels can be divided into a lower, more silty, unit of varying thickness that contains angular rock fragments and an upper, more sandy, unit with rounded cobbles and pebbles. Stone tools in the upper unit exhibited a mixture of fresh and semi-abraded surface conditions, as well as the characteristic white blanching that signifies prolonged exposure to sunlight. The lower unit, however, contained the overwhelming majority of stone artifacts, most of which were in fresh condition and unblanched, although many tools reacted visibly to exposure to sunlight during cleaning and labeling.

In test pit 4, at about -120 below datum, a series of tan lenses were encountered. These lenses do not contain macroscopic carbon residues, but their association with burnt flints suggests these are diagenetically-altered hearths. Lithic artifacts were more densely concentrated in these levels than in overlying strata (60 per 10 cm unit, versus. 30 per 10 cm unit in overlying strata), but the sediment became increasingly hard with greater depth, slowing the pace of excavation, and resulting in the pit having to be closed before reaching bedrock. It is expected that future work at the site involving more extensive exposures will shed additional light on these levels. Unfortunately, neither bones nor macroscopically visible carbon residues were recovered by our excavations. Thus, lithic artifacts comprise the sole evidence of Levantine Mousterian activity.

The Lithic Assemblage

All of the lithic raw materials recovered from the site were made of flint. The most common lithic raw material is a distinctive tan/brown flint with red concentric rings



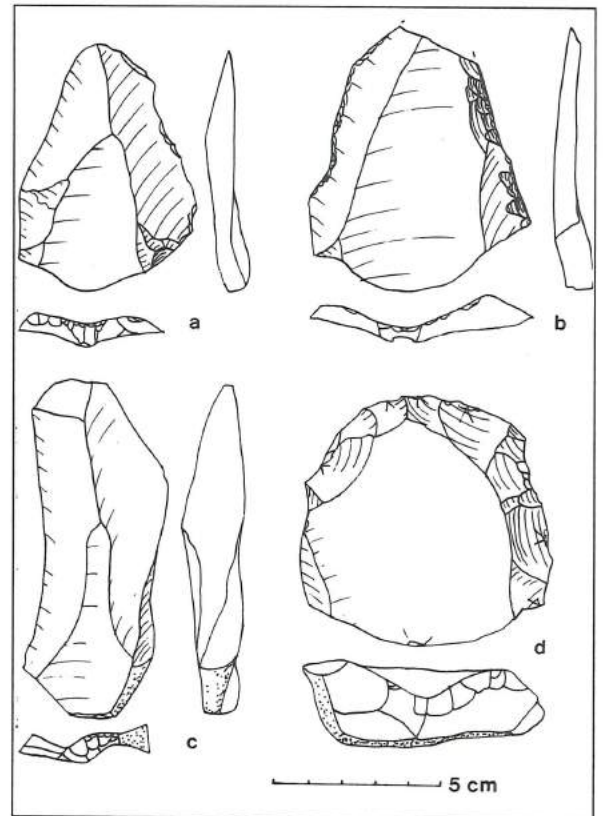
2. Schematic north profiles of test pits 1-4 arranged horizontally in relationship to datum.

and superior flaking qualities. This material outcrops from Middle Cenomanian limestone near the site and can be found in the local conglomerate as well. Preservation conditions at the ar-Raşfa site are excellent. The overwhelming majority (96%) of the 1238 artifacts recovered from excavation exhibit fresh, unabraded surfaces. That several sets of refitting stone tools have been found in the same and adjacent stratigraphic units, indicating a high degree of site spatial integrity.

Table 1 summarizes the frequencies of the major artifact categories for the ar-Raşfa assemblage (see also Fig. 3). The lithic assemblage from ar-Raşfa is essentially homogeneous, with no major techno-typological contrasts among the test pits or between stratigraphic levels, and thus, it is described

Table 1. Composition of the ar-Raşfa assemblage.

Artifact category	N	% of total	% of subtotals
Cores	200	16	100
Levallois cores	116	9	58
Pebble-cores	50	4	25
Discoidal cores	35	3	18
Prismatic blade cores	13	1	7
Cores-on-flakes	20	16	10
Battered cobble	1	0.001	0.5
Whole flakes	789	64	100
>50% cortical flakes	256	21	25
<50% cortical	344	28	33
Non-cortical Flakes	186	15	18
Flake	485	39	47
Blade	211	17	20
Point	93	8	9
Levallois debitage	228	18	22
Levallois point	42	3	5
Levallois blade	26	2	3
Levallois flake	144	12	18
Retouched flakes	44	4	6
Flake fragments	249	20	100
Retouched fragments	30	2	12
Total artifacts	1238	100.0	



3. Selected lithic artifacts from ar-Raşfa (a. Levallois point, b. Levallois point, c. Levallois blade, d. Levallois core).

here as an undifferentiated whole. (Only those whole flakes and flake fragments longer than 2.5mm are tabulated here.)

Most cores are Levallois cores, that is, they exhibit a hierarchical division of surfaces into an upper flake release surface and a lower unexploited volume and the characteristic faceted eminence on their worked edge(s). Like many other Levantine Mousterian assemblages, the ar-Raşfa assemblage contains a small number of prismatic blade cores. Although these are technologically prismatic blade cores, most are rather simple, single-platform cores that contrast typologically with the multi-platform blade cores typical of Levantine Upper Paleolithic assemblages. Ar-Raşfa also features a sizeable proportion of pebble-cores. Commonly termed “choppers” or “core-scrapers”, most such tools are too small to have been effective hand-held tools, and they are more realistically viewed as aborted attempts at

core reduction. No handaxes or handaxe fragments were recovered from excavation.

Although ar-Raşfa was clearly the site of considerable flintknapping, no unequivocal hammerstones were recovered. The single battered cobble we recovered could be a hammerstone that was abandoned after a single large flake was detached, rendering it difficult to grip, or it could be a cobble that was "tested" for use as a core and rejected. Numerous rounded cobbles were excavated from the same levels as the stone tools, and it is possible that limestone and flint hammerstones that were used briefly may not differ morphologically from chert and limestone cobbles in the geological "background".

Among whole flakes, cortical flakes are about twice as abundant as non-cortical flakes, indicating a high incidence of primary lithic reduction on site. Oval and sub-rectangular shapes predominate among whole flakes, but blades are notably common as well. Many of the latter are "naturally backed knives" whose steep and asymmetrical dorsal cross-section suggest they are core-trimming flakes. Levallois debitage amounts to 22% of whole flakes, but only a small percentage of flakes are retouched (6%), characteristics that are consistent with a local abundance of lithic raw material (Rolland and Dibble 1990). A somewhat larger percentage of flake fragments exhibit retouch than do whole flakes, and in numerous cases, it is clear that the retouched fragment is part of a larger retouched tool. Two such tool fragments feature transverse burinations similar to those on chamfered end-scrapers from early Upper Paleolithic contexts. The fragmentary character of retouched tools at this site could suggest ar-Raşfa was a locality where use-exhausted tools were replaced with freshly-knapped replacements.

Table 2 summarizes the relative frequency of retouched tools from ar-Raşfa. Retouched tools are relatively rare at ar-

Table 2. Retouched tool typology.

Retouched Tool Types	n	%
Scrapers	20	27
Transverse Scrapers	8	11
Side Scrapers	12	16
Denticulates	14	19
Truncated-Faceted Pieces	10	14
Combination Tools	7	9
Notches	6	8
Awls	4	5
Burins	3	4
Backed Knives	3	4
Other Retouched Tools	7	9
Total	74	100

Raşfa, accounting for only 7% of the debitage. Scrapers are the most common category (27%), followed by denticulates (14%) and truncated-faceted pieces. The truncated-faceted pieces listed here differ from cores-on-flakes in that they do not feature any secondary flake scars larger than 25mm. Most of these truncated-faceted pieces are faceted in such a way as to remove the flake bulbar eminence, a feature that may be related to fitting them into a handle.

Table 3 lists selected Bordian technological indices, the Levallois Index (IL), the Facetting Index (IF), and the Blade Index (I Lam) for ar-Raşfa and three other Jordanian

Table 3. Bordian technological indices.

Site	IL	IF	I Lam
Ar Rasfa	30.5	49.0	26.7
Tor Faraj	9.3-13.8	46.5	5.4-26.4
Tor Sabiha	4.4	37.5	37.1
Ain Difla	7.0	64.7	41.8

Middle Paleolithic sites, Ayn ad-Difla/WHS 643 (Lindly and Clark 1987:286), and Țor Şabihā and Țor Faraj (Henry 1995: 60). Levallois preparation is markedly more common at ar-Raşfa, but in other respects, the ar-Raşfa assemblage does not differ markedly from the other Levantine Mousterian sites in Jordan.

Discussion

To what extent is the assemblage from ar-Raşfa similar to other Levantine Mousterian assemblages? In Middle Paleolithic research in the Levant, two metric indices have traditionally been used to establish the cultural affinities of Levantine Mousterian assemblages.

The two metric indices are (1) the variance of the midpoint width/midpoint thickness ratio (W/Th) for whole flakes and (2) the mean value of length to width (L/W) at the midpoint of Levallois points (Jelinek 1982). At Tabun Cave, and for the assemblages listed in Table 4, the variance of the midpoint width/midpoint thickness ratio for whole flakes differs markedly between Early ("Tabun D") and Late ("Tabun B/C") phases of the Levantine Mousterian. The corresponding variance statistic for ar-Raşfa (2.82) is among the lowest known for a Levantine Mousterian assemblage, suggesting affinities the "Early Levantine Mousterian". This finding is not particularly surprising because assemblages with similar W/Th values are also known from sites in the central and lower Jordan Valley, such as WHS 634 and Abū Sif. However, the mean L/W value for Levallois points from ar-Raşfa is relatively low (1.65), is uncharacteristically low for an "Early" Levantine Mousterian assemblage, and is instead comparable to those for "Late" Levantine Mousterian assemblages, such as Skhul B, Tabun I, Qafzeh, and Kebara. Thus, the ar-Raşfa assemblage appears to combine in the same assemblage properties from opposite ends of the Levantine Mousterian cultural succes-

Table 4. Comparison of ar-Raşfa to other Levantine Mousterian samples.

	Variance of W/Th for Whole Flakes	Mean L/W for Levallois points
Ar Raşfa	2.82	1.65
Early Levantine Mousterian		
Abu Sif C	1.73	2.69
Tabun IX	3.13	2.45
WHS 634 (Ain Difla)	3.24	3.07
Abu Sif B	3.34	2.70
Nahal Aqev 3	3.90	2.48
Tabun II	4.05	2.17
Rosh Ein Mor	4.24	2.41
Mean of "Early Mousterian"	3.38	2.57
SD	0.84	0.29
Late Levantine Mousterian		
Tabun I	5.05	2.16
El Wad G	5.69	1.92
Sukhba D	6.30	2.29
Tabun Chimney I-III	7.10	1.80
Kebara F (3)	7.13	2.12
Kebara F (5)	7.60	1.94
Qafzeh I	7.97	2.17
Kebara F (8)	8.17	2.07
Skhul B1	8.26	1.99
Qafzeh L	9.51	2.18
Skhul B2	11.41	2.10
Mean of "Late Mousterian"	7.65	2.07
SD	1.77	0.14

Sources: Jelinek (1994, 1982).

sion.

Recently, a third, non-metric, typological method has been proposed for assessing Levantine Mousterian cultural variability. This method focuses on the alignment of dorsal scar patterns on flakes. Different methods of recurrent core preparation leave correspondingly-different scar patterns on flake's dorsal surfaces. Because a competent flintknapper can produce points, blades, or flakes using any one of several recurrent core-preparation methods, modalities of scar patterns are thought by some analysts to reflect culturally-conditioned choices by prehistoric human knappers (Meignen and Bar-Yosef 1988: 82). Excluding so-called "primary elements" (n = 427 cortical flakes and core-trimming

flakes), the predominant dorsal scar patterns in the remainder of the ar-Raşfa assemblage are unidirectional-parallel (34%) and bidirectional-opposed (30%). A predominance of unidirectional-parallel and bidirectional-opposed dorsal scar preparation typifies "Early" Levantine Mousterian assemblages, such as Tabun D and Hayonim E, Abū Sif, Nahal Aqev 3, and Rosh Ein Mor (Bar-Yosef 1995). Unlike these assemblages, however, ar-Raşfa features high percentages of faceted striking platforms and relatively few elongated Levallois points and blades. Moreover, radial/centripetal and unidirectional-convergent patterns are present in substantial frequencies, 22% and 13%, respectively. This last observation, in particular, suggests that the ar-Raşfa Levantine Mousterian assemblage exhibits considerably more variability than can be summarized merely by noting its affinities to one or another Levantine Mousterian assemblage group.

Conclusion

The 1997 excavations at ar-Raşfa established that there are substantial and intact Middle Paleolithic sites in Northwest Jordan. The first of these to be excavated, ar-Raşfa, appears to represent an "Early" phase of the Levantine Mousterian, although this characterization is complicated by the apparent late survival of "Early" Levantine Mousterian flintknapping traditions in the interior and southern parts of the Levant. At present, it is impossible to tell if ar-Raşfa is chronologically-equivalent to such "Early" Levantine Mousterian assemblages from Mount Carmel and the Galilee as Tabun D and Hayonim E, which date to between 200,000-240,000 BP (Mercier *et al.* 1995), or if it is instead more closely related to sites from southern Jordan and the Negev, for which dates suggest an antiquity of 45,000-100,000 BP (Schuldenrein and Clark 1994; Schwarcz *et al.* 1979). Future work planned at this site will employ either radio-

metric methods to estimate its antiquity with precision.

What was the nature of the human occupation at ar-Raşfa, and how was it related to regional patterns of human adaptation? Today, ar-Raşfa is perched on a bluff overlooking the intersection of the Wādī az-Zagh and the al-Ghawr and the heavily-cultivated floor of the Baysān basin of the Jordan Rift Valley. During Late Pleistocene times, the Baysān basin would have been part of the Lake al-Lisān, an enormous, and probably brackish, body of water that filled much of the Jordan valley to a maximum elevation of -180 m bsl (Begin *et al.* 1974). Wādī az-Zagh and Wādī al-Yābis, which are now seasonal streams, would then probably have flowed perennially, charging the brackish lake edge environment with fresh water, and creating a highly-productive plant and animal communities analogous to marine estuaries. (Probably the nearest modern analogues for such conditions would be those in the Jordan River Nature Park, located at the northern end of the Sea of Galilee or the 'En Gedi Park, located on the western side of the Dead Sea.) Such trophically-rich micro-environments would have obvious attractions to human hunter-gatherer groups. Situated on a south-facing slope at least 140 m above the highest lake stand, and thus far above the insect "cloud", ar-Raşfa would have been a favorable place from which to monitor game movements near the lake edge, and a convenient place at which to produce stone tools.

The occupation of the ar-Raşfa site itself, and other sites nearby, may also have been related to the high quality of the Cenomanian flint outcropping near the site. The al-Lisān marls in the al-Ghawr contain rather small and low-quality flint nodules, mostly pebble-sized clasts near dry wadi courses. While suitable for microlithic tools, these nodules are poor media for the production of Middle Paleolithic tools. Moreover, a high lake stand would have

concealed many of the raw material sources near the lower reaches of wadis and in the al-Lisān marls. Groups frequenting the lake margins, and/or groups making seasonal residential movements between lowland and upland foraging areas may have visited sites like ar-Raşfa to "stock up" on tools and tool materials. Future research in this area will need to examine other sites from similar altitudes as ar-Raşfa as well as sites from higher altitudes in order to obtain a more complete picture of Levantine Mousterian lithic raw material economy.

General ecological and geographic considerations suggest that northwest Jordan should have been a major focus for human settlement during the Middle Paleolithic period. In terms of the Middle Paleolithic "cultural" landscape, northwest Jordan also occupies a key position between the more humid Mediterranean coastal lowlands and the steppic interior of the Transjordanian plateau. Ar-Raşfa is but one of several other prospective sites in the Wādī al-Yābis and in other parts of the 'Ajlūn District. Future in-

vestigations of the Middle Paleolithic in this area will doubtless shed much-needed light on the character of Neanderthal and early modern human activities in Jordan.

Acknowledgements

The research described in this report was supported by a grant from the L.S.B. Leakey Foundation. The author is profoundly grateful to the staff of ACOR and the staff of the Department of Antiquities in the 'Ammān and 'Ajlūn offices. This project was improved substantially by the advice and assistance of our Antiquities Representative, Yacoub Maryoud Oweis. Patricia Crawford assisted the author in all stages of this project.

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Bibliography

- Banning, E. B. and Fawcett, C.
 1983 Man-Land Relationships in the Ancient Wadi Ziqlab: Report of the 1981 Survey. *ADAJ* 27: 291-309.
- Bar-Yosef, O.
 1995 The Origins of Modern Humans. Pp. 110-123 in T. E. Levy (ed.), *Archaeology of Society in the Holy Land*. New York: Facts on File.
- Baubron, J.-C., Besançon, J., Copeland, L., Hours, F., Macaire, J.-J. and Sanlaville, P.
 1985 Évolution de la moyenne vallée du Zarqa (Jordanie) au Néogène et au Quaternaire. *Revue de Géologie Dynamique et de Géographie Physique* 26: 273-283.
- Begin, Z. B., Ehrlich, A. and Nathan, Y.
 1974 Lake Lisan, the Pleistocene Precursor of the Dead Sea. *Bulletin of the Geological Survey of Israel* 63: 1-15, 19-28.
- Bender, F.
 1974 *Geology of Jordan*. Berlin: Gebr. Borntraeger.
- Binford, S. R.
 1968 Early Upper Pleistocene Adaptations in the Levant. *American Anthropologist* 70: 707-717.
- Clark, G. A. and Lindly, J.
 1989 Modern Human Origins in the Levant and Western Asia: The Fossil and Archeolo-

- gical Evidence. *American Anthropologist* 91: 962-985.
- Danin, A.
1995 Man and the Natural Environment. Pp. 24-39 in T. E. Levy (ed.), *Archaeology of Society in the Holy Land*. New York: Facts on File.
- Henry, D. O.
1995 The Middle Paleolithic Sites. Pp. 49-84 in D. O. Henry (ed.), *Prehistoric Cultural Ecology and Evolution: Insights from Southern Jordan*. New York: Plenum.
- Horowitz, A.
1987 Subsurface palynostratigraphy and paleoclimates of the Quaternary Jordan Rift Valley Fill, Israel. *Israel Journal of Earth Sciences* 36: 31-44.
- Jelinek, A. J.
1982 The Tabun Cave and Paleolithic Man in the Levant. *Science* 216: 1369-1375.
1994 Hominids, Energy, Environment, and Behavior in the Late Pleistocene. Pp. 67-92 in M. H. Nitecki and D. V. Nitecki (ed.), *Origins of Anatomically-Modern Humans*. New York: Plenum Press.
- Kingdon, J.
1990 *Arabian Mammals: A Natural History*. New York: Academic Press.
- Lieberman, D. E.
1993 The Rise and Fall of Seasonal Mobility among Hunter-Gatherers. *Current Anthropology* 34: 599-631.
- Lieberman, D. E. and Shea, J. J.
1994 Behavioral differences between archaic and modern humans in the Levantine Mousterian. *American Anthropologist* 96: 300-332.
- Lindly, J. and Clark, G. A.
1987 A Preliminary Lithic Analysis of the Mousterian Site of 'Ain Difla (WHS Site 634) in the Wadi Ali, West-Central Jordan. *Proceedings of the Prehistoric Society* 53: 279-292.
- Macumber, P. G.
1992 The Geological Setting of Palaeolithic sites at Tabaqat Fahl, Jordan. *Paléorient* 18: 31-43.
- Macumber, P. G. and Head, M. J.
1991 Implications of the Wadi al-Hammeh Sequences for the terminal drying of Lake Lisan, Jordan. *Palaeogeography, Palaeoclimatology, Palaeoecology* 84: 163-173.
- Macumber, P. G., Edwards, P. C., Head, M. J. and Lakey, R. C.
1997 Physical environment and occupation in the Tabaqat Fahl Region, Jordan, over the last half million years. Pp. 87-92 in *SHAJ VI*. Amman: Department of Antiquities.
- Meignen, L. and Bar-Yosef, O.
1988 Variabilité Technologique au Proche Orient: l'Exemple de Kebara. Pp. 81-95 in M. Otte (ed.), *L'Homme de Néanderthal, Vol 4: La Technique*. Liège: Université de Liège.
- Mercier, N., Valladas, H., Valladas, G. and Reyss, J.-L.
1995 TL Dates of Burnt Flints from Jelinek's Excavations at Tabun and Their Implications. *Journal of Archaeological Science* 22: 495-509.
- Muhsen, M.
1988 A Survey of Prehistoric Sites in the Jordan Valley (1985). Pp. 503-523 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan: The State of Research in 1986*. BAR Series 396 (ii). Oxford.

- Naveh, Z.
 1984 The vegetation of the Carmel and Nahal Sefunim and the evolution of the cultural landscape. Pp. 23-63 in A. Ronen (ed.), *Sefunim Prehistoric Sites, Mount Carmel, Israel*. BAR, Int. ser. 230(i). Oxford.
- Palumbo, G., Mabry, J. and Kuijt, I.
 1990 The Wadi el-Yabis Survey: Report on the 1989 Field Season. *ADAJ* 34: 95-118.
- Qumsiyeh, M. B.
 1996 *Mammals of the Holy Land*. Lubbock, TX: Texas Tech University Press.
- Rak, Y.
 1993 Morphological Variation in Homo Neanderthalensis and Homo Sapiens in the Levant: a Biogeographic Model. Pp. 523-536 in W. H. Kimbel and L. B. Martin (eds), *Species, Species Concepts, and Primate Evolution*. New York: Plenum.
- Rolland, N. and Dibble, H. L.
 1990 A New Synthesis of Middle Paleolithic Variability. *AA* 55: 480-499.
- Schuldenrein, J. and Clark, G. A.
 1994 Landscape and Prehistoric Chronology in West-Central Jordan. *Geoarchaeology* 9: 31-55.
- Schwarcz, H. P., Blackwell, B., Goldberg, P. and Marks, A. E.
 1979 Uranium-series Dating of Travertine from Archaeological Sites, Nahal Zin, Israel. *Nature* 277: 558-560.
- Shea, J. J.
 1989 A Functional Study of the Lithic Industries Associated with Hominid Fossils in the Kebara and Qafzeh Caves, Israel. Pp. 611-625 in P. Mellars and C. Stringer (eds), *The Human Revolution*. Edinburgh: Edinburgh University Press.
 1993 Lithic use-wear evidence for hunting by Neandertals and early modern humans from the Levantine Mousterian. Pp. 189-197 in G. L. Peterkin, H. M. Bricker and P. Mellars (eds), *Hunting and Animal Exploitation in the Later Palaeolithic and Mesolithic of Eurasia*.
 1998 Neandertal and Early Modern Human Behavioral Variability: A Regional-scale Approach to the Lithic Evidence for Hunting in the Levantine Mousterian. *Current Anthropology* 39: S45-S78.
- Tchernov, E.
 1988 The Paleobiogeographical History of the Southern Levant. Pp. 159-250 in Y. Yom-Tov and E. Tchernov (eds), *The Zoogeography of Israel*. The Hague: W. Junk.
- Trinkaus, E.
 1984 Western Asia. Pp. 251-293 in F. H. Smith and F. Spencer (ed.), *The Origins of Modern Humans*. New-York: Alan R. Liss.
 1992 Morphological Contrasts between the Near Eastern Qafzeh-Skhul and Late Archaic Human Samples: Grounds for a Behavioral Difference. Pp. 277-294 in T. Akazawa, K. Aoki and T. Kimura (eds), *The Evolution and Dispersal of Modern Humans in Asia*. Tokyo: Hokusensha.
- Vandermeersch, B.
 1991 Contemporaneity of Homo Sapiens and Neandertals in the Near East? *Am. J. Phys. Anthropol. Supplement* 12: 177.
- Weinstein-Evron, M.
 1990 Palynological History of the Last Pleniglacial in the Levant. Pp. 9-25 in J. Koz-

ADAJ XLII (1998)

lowski (ed.), *Les Industries à pointes foliacées du Paléolithique supérieur européen*. ERAUL, No. 42. Liège.

Zohary, M.

1973

Geobotanical Foundations of the Middle East. Stuttgart: Gustav Fischer Verlag.

THE EASTERN AL-ḤASA LATE PLEISTOCENE PROJECT A PRELIMINARY REPORT ON THE 1997 SEASON

by

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The first field season of the Eastern al-Ḥasa Late Pleistocene Project (EHLPP)¹ was conducted from 1 June to 12 July 1997. There were four major objectives for this season: (1) Relocation and assessment of sites located previously by the Wādī al-Ḥasa Survey (WHS) (MacDonald *et al.* 1980, 1982, 1983) and by the Wādī al-Ḥasa North Bank Survey (WHNBS) (Clark *et al.* 1992, 1994); (2) Test excavations at four sites, including Ṭor Ṣadaf (WHNBS 8), Ṭor Ṣageer (WHNBS 242), the Multaqa al-Widyān site complex (WHNBS 192-196), and Ṭabaqa (WHS 895); (3) Block excavations and further testing at 'Ayn al-Buḥayra (WHS 618); and (4) Geoarchaeological investigations concentrating on new work on Ṭor Ṣadaf, Ṭabaqa, and the Wādī al-Ḥasa and Wādī al-Aḥmar confluence, as well as continuing investigations at 'Ayn al-Buḥayra and at the juncture of the Wādī al-Ḥasa and Wādī al-Khasra² (Fig. 1).

These goals relate to the modelling of settlement patterning associated with the lacustrine and marsh ecology that typified areas of the Wādī al-Ḥasa during the interval from about 25,000 -11,000 bp. As detailed elsewhere (Olszewski and Coinman in press; Schuldenrein and Clark 1994), the eastern al-Ḥasa basin contained a Pleistocene lake which was present at least as late as about 20,000 bp. Local conditions fa-

vored extended visits by hunter-gatherers. Subsequent to this, during the approach of the Last Glacial Maximum (LGM), about 18/17,000 bp, it is likely that Pleistocene Lake al-Ḥasa shrank in extent or disappeared. During the LGM, hunter-gatherers probably were highly mobile, although the eastern al-Ḥasa would have remained attractive because of the many springs and ponds or small marshes. After the LGM, climatic conditions ameliorated, and the marsh and pond system became more extensive. This again favored longer stays at basecamps in the eastern al-Ḥasa basin. These favorable conditions persisted until at least 11,000 bp and the advent of the cooler and drier Younger Dryas climatic interval during which the marsh system in the eastern al-Ḥasa likely disappeared.

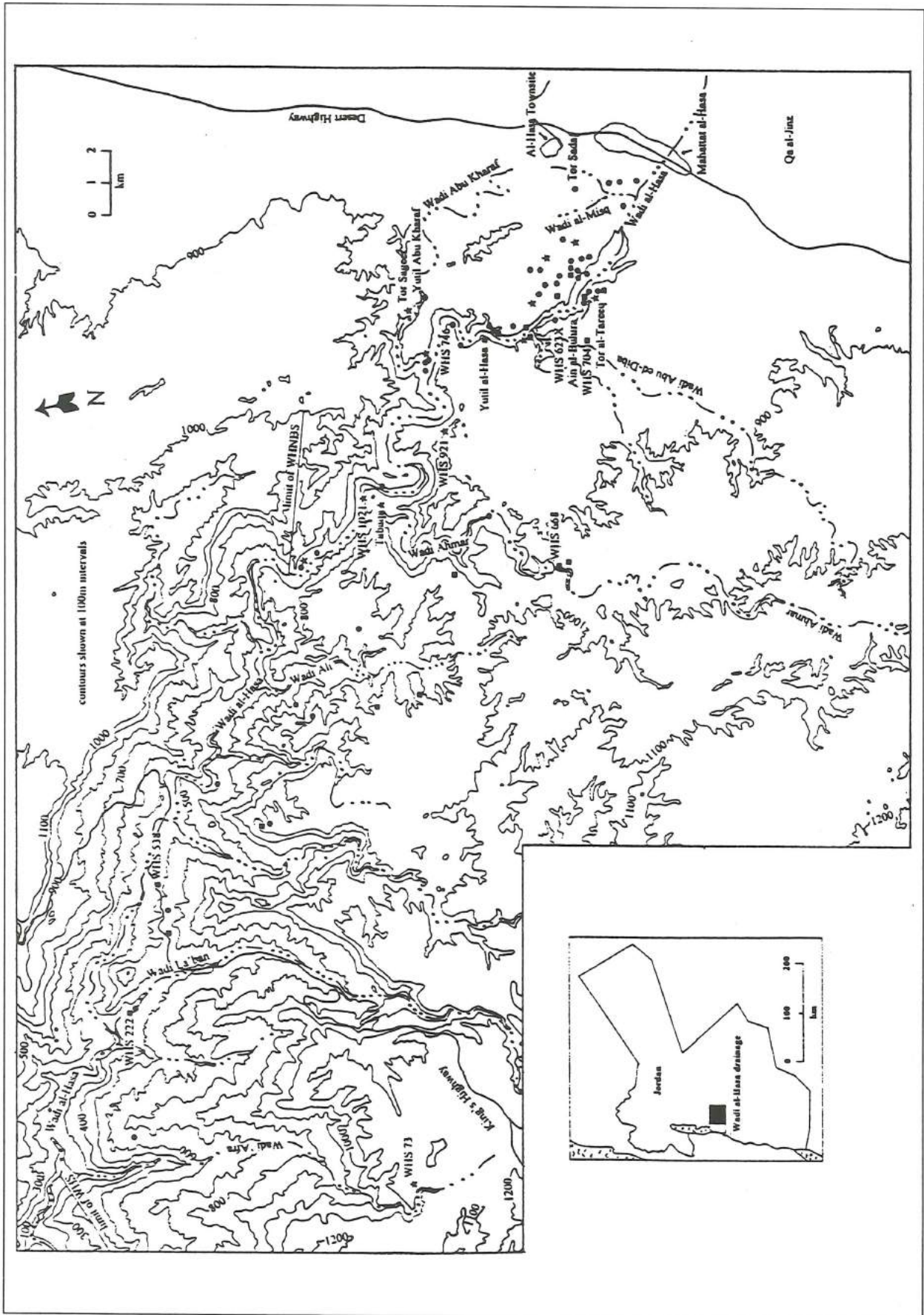
Relocation and Assessment of WHS and WHNBS Sites (D. I. Olszewski and N.R. Coinman)

Of the 13 sites chosen for relocation, assessment, mapping, and surface collections during the 1997 EHLPP, these tasks were successfully completed for nine of the sites. The selected sites were described by WHS and WHNBS personnel as primarily Upper Paleolithic and/or Epipaleolithic based on surface collections made at those sites during the various survey seasons. The selected

1. The EHLPP team was directed by Nancy R. Coinman (Iowa State University) and Deborah I. Olszewski (Bishop Museum, Honolulu), and included J. B. Cooper (University of Nevada-Las Vegas), M. al-Nahar (Arizona State University), J.B. Hill (ASU), T. Clausen (ISU), J. Fox (ISU), and J. Williams (Southern Methodist University). Also participating were J. Schuldenrein (GeoArchaeology Associates, Inc.), Nabil Ali (Yarmouk Uni-

versity), and Jihad Darwish (Department of Antiquities representative). Funding was provided by Grant No. SBR9618766 from the National Science Foundation. This is EHLPP Contribution No. 1.

2. The Wādī al-Khasra was previously identified by us as the Wādī Abū Kharaf. We have corrected this to reflect the terminology used by local inhabitants.



1. Location of sites.

sites include WHNBS 15, WHNBS 17, WHNBS 38, WHNBS 49, WHNBS 54, WHNBS 68, WHNBS 135, WHNBS 518, WHS 222, WHS 540, WHS 704, WHS 746, and WHS 921. All but 5 sites (WHNBS 518, WHS 222, WHS 540, WHS 746, and WHS 921) are within 4 km of Pleistocene Lake al-Ḥasa in the eastern basin of the al-Ḥasa drainage. WHNBS 518 is about 2 km downstream from the confluence of the Wādī al-Ḥasa and al-Aḥmar, and more than 15 km from Pleistocene Lake al-Ḥasa. WHS 222 is in the Wādī al-La'bān, not far from its confluence with the Wādī al-Ḥasa, while WHS 540 is along the King's Highway where it crosses the Wādī al-Ḥasa. WHS 746 is in the Wādī al-Ḥasa about 5 km downstream from Pleistocene Lake al-Ḥasa, and WHS 921 is on the plateau above the Wādī al-Ḥasa, not far from the confluence of the Wādī al-Ḥasa and Wādī al-Khasra. We were unable to relocate WHS 704, which is in the Wādī Abū ad-Diba, in the immediate vicinity of Pleistocene Lake al-Ḥasa. One new site (EHLPP 2) was discovered east of the area surveyed by MacDonald during 1982.

EHLPP 2 is a new Upper Paleolithic site that was located during reconnaissance of the remnant marls that lie along the southwestern margins of the al-Ḥasa lake bed. The site consists of a dense scatter of lithics that are primarily Upper Paleolithic, although there are Middle Paleolithic and some later Epipaleolithic pieces present. The site is extensive, minimally covering an area of some 100 by 50 m. The most diagnostic elements are eroding from the upper 0.30 m of the marl crust and consist of dense fossilized large mammal bone and teeth. In association with these faunal remains are long narrow bladelets and bladelet cores. Two K'sar Akil denticulated scrapers were recovered. The technological features of the long narrow blades and bladelets suggest an early rather than late Upper Paleolithic occupation.

WHNBS 17 was relocated at the northern end of a primary tributary to the Wādī al-Ḥasa where there are three major south-facing rock-shelters. It is situated at an elevation of 870 masl. Although this site was attributed to the Upper Paleolithic, few lithics were recovered that would suggest the site was occupied during this time period. The site measures some 70 m wide in front of the rock-shelter and 40 m deep. The interior of the rock-shelter is very deep, and a shovel test pit was initiated inside the drip-line to determine if any buried deposits remain. Approximately 40 cm of modern dung and ash were found directly overlying bedrock.

Surface lithics were extremely rare on the terrace in front of the rock-shelter while naturally decomposing flint was abundant along with a few ceramic sherds. However, at the smaller, neighboring rock-shelter to the east (WHNBS 15), a number of more typically Upper Paleolithic blades were found on the sloping terrace in front of the rock-shelter. It is unclear whether any of the three rock-shelters were occupied during the Upper or Epipaleolithic time periods.

WHNBS 38 was described as primarily Upper Paleolithic and includes two areas of cultural materials. One of these is on top of the marls and includes a few lithics, bone and a ground stone fragment. The primary concentration of lithics, however, is about 20 m southwest, and is eroding out of the marls several meters below the modern surface of the marls. We have designated this area as WHNBS 38X to distinguish it from the unrelated concentration on top of the adjacent marl finger. WHNBS 38X is about 10 by 11 m in size and was collected in two separate concentrations. There are a total of 185 lithics. Debitage is dominated by flakes, with some examples of blades and a couple of bladelets. Tools are rare and include burins and retouched pieces. The overall assemblage is not especially diagnostic, but the general character of the as-

semblage suggests that it may be Middle Paleolithic in age, with a few Upper Paleolithic elements.

WHNBS 49 is on the side of a ridge, just above the marls, and adjacent to a small erosional channel. It was described as an Upper Paleolithic locale. Our surface collection resulted in a total of 47 artifacts. These were very undistinguished and included primarily flake debitage with some examples of blades, a few cores, and a couple of retouched pieces. This collection may be Upper Paleolithic in age; possibly the most diagnostic pieces were collected during the 1992 WHNBS season.

WHNBS 54 is a rock-shelter located high above the surrounding terrain. It is in a tertiary drainage system, but can be seen from the Wādī al-Ḥasa drainage. WHNBS 54 was described as containing a mostly Epipaleolithic lithic assemblage. A pit with an associated backdirt pile appears to have been excavated at this site since the 1992 WHNBS season. Lithics are present in the backdirt. They contain no evidence of patination and are primarily a flake debitage assemblage with rare blades.

Based on the character of the lithic assemblage, which did not appear to be Epipaleolithic in age, we decided against surface collection. Additionally, it has been our experience that sites of Upper Paleolithic/Epipaleolithic age are situated no higher elevationally than immediately above the 12-30 m terrace throughout the wadi system. WHNBS 54 is considerably above this "marker boundary".

WHNBS 68 was relocated in a small northern tributary of the Wādī al-Ḥasa near the confluence of the Wādī ar-Ruwayḥi and the al-Ḥasa. This is an Upper Paleolithic site situated at an elevation of approximately 815m asl on a narrow eroding ridge sloping to the southwest where it intersects with the lacustrine marls. Surface lithics are dense

and consist of long narrow bladelets with three el-Wad points collected, suggesting an early to middle Upper Paleolithic occupation period. The lithic assemblage is in very fresh condition with artifacts visible on the surface as well as eroding out of subsurface deposits along the edges of the site. The preserved area of the site is comprised of an area approximately 8 by 20m but narrows to about 1.5m in width where the ridge is eroding.

WHNBS 135³ was originally scheduled to be test excavated during the 1997 EHLPP field season. Our visit to the site, however, revealed that the majority of the cultural deposits were confined to a spoil pile in front of the rock-shelter. This had been excavated out of the rock-shelter most probably when the mud brick wall was constructed across the front of the rock-shelter. Mapping and surface collection were chosen as an alternative strategy. A total of 61 artifacts were recovered; these include a flake and blade debitage and a few cores. No tools were found. Although this lithic assemblage is relatively nondiagnostic, when taken in conjunction with the lithics found during the 1993 WHNBS collection of this site, it is probable that the site is Upper Paleolithic in age. Of additional note are the presence of petroglyphs within the rock-shelter. Some of these are recent, but at least three have a darker patina suggesting some antiquity. The darker petroglyphs appear to include two animals and a "lizard". It is unlikely that the darker petroglyphs are Paleolithic in age.

WHNBS 518 is a lithic concentration that is eroding out of the marls about a meter or so below the current top of the marl finger. There are also natural pieces of flint. This site was described as Epipaleolithic in age during the 1993 WHNBS season. A total of 182 lithics were surface collected by us. These include a flake and blade de-

3. This site was named Yutil Abū Kharaf by us in previous publications (e.g., Olszewski and Coin-

man in press). We have discontinued use of this name.

bitage, several cores, a couple of endscrapers, and several retouched pieces. A number of the lithics are rolled, suggesting transport over some distance. The lithic assemblage contains no specific temporal diagnostics, and could be either Upper Paleolithic or Epipaleolithic in age.

Two reported Upper Paleolithic and Upper/Epipaleolithic sites in the lower al-Ḥasa region were relocated (WHS 222 and WHS 540). Neither were clearly defined sites, consisting of very limited surface scatters lacking definitive diagnostic lithics. Both illustrate the fact that few Upper or Epipaleolithic sites occur on the plateau or in the lower regions of the al-Ḥasa. No surface collections were made at either of these sites. Site WHS 540 was relocated on a north-facing terrace at an elevation of 525 masl overlooking the Wādī al-Ḥasa with steep eroding gullies on both sides. The cut-bank for the modern highway may have cut off a portion of this site on the northern boundaries. The site consists of a very light scatter of lithics in an area approximately 55 by 60 m. The surface is comprised of small gravel on which only a limited number of flakes were observed. However, Middle Paleolithic cores and flakes were present at WHS 540, as well as on the two higher terraces above.

WHS 222 is located on a terrace directly above the Wādī al-La'bān at an elevation of 390m asl and faces northeast. There was a light scatter of lithics but little that clearly defined this site as Upper and/or Epipaleolithic. The terrace is approximately 60 by 45 m and contains at least 4 burials in the form of rock piles. The site probably has been impacted by a bulldozer cut along the northwestern slopes. Middle Paleolithic cores and flakes are also present on this site and occur in greater numbers on the slopes and higher terraces above Site 222. Today, a spring can be seen in the very upper reaches of the tributary wadi that lies to the southwest.

WHS 746 is situated on a marl above the Wādī al-Ḥasa, in an area where the al-Ḥasa is relatively narrow. There are a series of eroding marls that are covered with a mantle of decomposing bedrock flint. WHS 746 consists of a very light scatter of lithics which are not clearly Upper Paleolithic. There are some Middle Paleolithic flakes and blades as well. Most of the lithics collected are heavily retouched and have considerable damage to their edges.

WHS 921 is also located on the higher land surfaces at an elevation of 906 masl. This site is situated on a northeast facing slope on the high plateau above the Wādī al-Ḥasa, just west of where the Wādī Abū al-Khasra meets the Wādī al-Ḥasa. It was reported to be an Epipaleolithic base camp. Lithics are moderately dense in an area approximately 60 by 40m but lack clear diagnostics of the Epipaleolithic. Middle Paleolithic artifacts are also present in limited numbers. No surface features are visible.

Test Excavations at Ṭor Ṣadaf (WHNBS 8) (J. B. Cooper and D.I. Olszewski)

Ṭor Ṣadaf, a rock-shelter in an oyster bed formation, was located during the 1992 WHNBS season (Clark *et al.* 1992). It is in a tertiary drainage to the Wādī al-Ḥasa, and a secondary drainage to the Wādī al-Misq. The rockshelter is south-facing and was identified in 1992 as Upper Paleolithic in age based on lithics collected from the surface.

The 1997 EHLPP tested Ṭor Ṣadaf over an eight-day period from 5 to 14 June. Two 1 by 1m units (K2 and K5) were excavated. Preliminary analysis of the lithics recovered from both test units indicates an early to middle Upper Paleolithic occupation of Early Ahmarian affiliation. Other cultural materials were less abundant, although a low to moderate density of fragmented bone was recovered from the units, in particular, from Unit K2. A total of 5,158 lithic artifacts were recovered during testing (Table 1).

Table 1. Lithic assemblages from Țor Şadaf (WHNBS 8) (in percentages).

	UNIT K2	UNIT K5
TOOLS	1.1	2.3
CORES	0.9	0.8
DEBITAGE	78.6	84.0
SHATTER	19.3	12.8
TOTAL N	3404	1754

Unit K2 was placed beneath the dripline of the rockshelter so that a portion of the unit was inside the dripline with the rest of the unit outside the dripline. A total of 19 arbitrary levels corresponding to four natural layers were excavated to an average depth of 0.95m below ground surface. Excavation in K2 was terminated when a sterile compacted silty clay deposit was reached. Natural Layer I (Arbitrary Levels 1-2) is a thin layer of light brown sediment just below the goat dung on the surface. Natural Layer II (Arbitrary Levels 3-12) is a thick layer of yellowish brown sediment distinguished from lower sediments by its position above a cobble/boulder lens. Natural Layer III (Arbitrary Levels 13-17) is a more compact dark yellowish brown sediment with intermixed large rocks. Natural Layer IV (Arbitrary Levels 18-19) contained a compacted silty clay with roof spall and limestone debris inclusions.

Artifact density was variable throughout the levels. It was moderately high in Levels 1-8, but somewhat less dense in Levels 9-11. Density of lithics rose steadily from Levels 12 to 17, and dropped considerably in Levels 18-19. Preliminary analysis of the tools shows that endscrapers in this unit are the most common tool (36%), followed by microliths (33%), which are primarily el-Wad points, and by retouched pieces (20%). Notch/denticulates and burins comprise the remainder of the tools. Trimming flakes comprise about 44% of the debitage, and the blade/bladelet to flake ratio is 1.5:1.

Unit K5 is three meters east of Unit K2

and five meters east of the back of the rockshelter. This unit is on the talus slope outside the dripline. Eleven arbitrary levels were excavated to an average depth of 0.55 m below ground surface. These correspond to four natural strata. Excavation in K5 terminated in an extremely compact silty clay. Lithic density was extremely low at this depth in the unit. Natural Layer I (Arbitrary Level 1) is a thin, loose silty loam which was present in the western and southern portions of the unit. Natural Layer II (Arbitrary Level 2) was present only in the southwestern quad of the unit. It is a dark, silty loam with calcium carbonate inclusions. Natural Layers III (Arbitrary Levels 3-5) and IV (Arbitrary Levels 6-11) are a very compacted silty to silty clay loam. A faint sulphur smell, indicative of water seepage, was detected during the excavation of these two layers.

One feature (Feature 1), a hearth, was located during the excavation of Unit K5. It is a pit excavated from near ground surface through Levels 1 and 3-4, and is capped by either a decomposing limestone rock or a calcium carbonate deposit. It extends east into the unexcavated Unit K6. Charcoal was abundant and consisted of many small twigs and twig fragments. The proximity of the hearth to the surface and the character of the charcoal suggest that it is not Paleolithic in age; it may be a recent to modern intrusion.

Levels 2-5 provided the bulk of the artifacts recovered from K5, with lithic density dropping considerably as the sediment became increasingly more compact. Field laboratory analysis of the tools indicates that microliths, principally el-Wad points, were the most common tool class (66%), followed by endscrapers (12%). Other tools such as burins, truncations, notch/denticulates, retouched pieces, multiple tools, and varia were rare. Within the debitage class, trimming flakes comprised about 40% of the assemblage; the blade/bladelet to flake ratio

is 1.9:1.

In addition to the main rock-shelter ("north rock-shelter") tested at Țor Șadaf, a smaller rock-shelter ("south rock-shelter") about 10 to 15 m south of the main rock-shelter was investigated. The stratigraphy of this secondary rockshelter is discussed by Schuldenrein in this report. A total of three to four separate hearth lenses were discovered in the highly brecciated profile of the remaining deposits. Two of these hearths were sampled for radiocarbon dating. Seven lithic artifacts also were recovered; these are primarily nondiagnostic debitage, with one core. The lithics are probably Upper Paleolithic in age, as they do not have a Middle Paleolithic morphology/technology.

Initial investigations at Țor Șadaf have resulted in the discovery of a set of Early Ahmarian occupations. This is the first definite record of early Upper Paleolithic settlement in the Wādī al-Ḥasa drainage system. The proximity of Țor Șadaf to Pleistocene Lake al-Ḥasa is of some interest as it documents the importance of this ecological context in the earlier ranges of Upper Paleolithic times.

Test Excavations at Țor Șageer (WHNBS 242) (M. al-Nahar and D.I. Olszewski)

The rockshelter of Țor Șageer is in the tributary drainage of Wādī al-Khasra, about 2 km from its confluence with the Wādī al-Ḥasa. It was located during the 1993 WHNBS season (Clark *et al.* 1994), and described as a probable Epipaleolithic site. Țor Șageer faces south-southeast and is about 17m above the al-Khasra channel which runs immediately below it. A total of eight days between 15 and 26 June, 1997, were spent testing this site.

Two 1x1 m contiguous units (C4 and D4) were excavated to bedrock, about 0.70-0.75 m below ground surface. Both units are under the existing rock-shelter roof, inside the dripline, and about 0.50 m south of one

portion of the rock-shelter back wall. The rockshelter extends farther back (ca. 2 m or so) immediately to the northwest of Units C4 and D4. A total of 4,847 lithic artifacts were recovered from the two units (Table 2). These are Early Epipaleolithic in morphology/technology. A moderate density of bone also was recovered; many are identifiable pieces. The bone assemblage includes several small polished fragments which may be fragments of awls or points; one specimen might be a needle fragment. Two probable human teeth were recovered from Unit D4 (Level 12).

Table 2. Lithic assemblages from Țor Șageer (WHNBS 242) (in percentages).

	UNIT C4	UNIT D4
TOOLS	4.6	4.0
CORES	1.6	2.1
DEBITAGE	82.5	80.3
SHATTER	11.2	13.5
HAMMERSTONES	>0.1	0.1
TOTAL N	2732	2165

A total of 17 and 16 arbitrary levels were excavated in Units C4 and D4, respectively. These correspond to six natural strata which were identified in the north face profiles for the two units. The west face profile of Unit C4 is somewhat more complicated due to rodent activity, which was extensive in this portion of C4.

The natural strata in the north face profiles slope downward from east to west. Because of this, the correspondence of the arbitrary levels to natural strata within each unit varies somewhat. Natural Layer I (Arbitrary Levels 1-2 in C4 and Level 1 in D4) is a very pale brown, loose silty sand with rootlets and angular clasts. Level 2 in C4 contained the Feature 1 hearth stain. Natural Layer II (Arbitrary Levels 3-9 in C4 and Levels 2-4 in D4) is a light yellowish brown sediment. It is a lightly compacted, silty

sand which includes gravel, roots, twigs, and angular clasts. Natural Layer III (Arbitrary Levels 8-9 and 14-15 in C4 and Levels 5-9 in D4) is a light yellowish brown sediment that is somewhat more compact than upper strata. It is silty sand that includes ashy spots mixed with charcoal flecks. This stratum includes a higher quantity of diagnostic lithics, as well as large-sized debitage. Natural Layer IV (Arbitrary Levels 10-13 in C4 and D4) is contained within Natural Layer III in both units. It is a very pale brown sediment with a high density of lithics, ashy material, charcoal, and friable bone fragments. It also contained the Feature 2 hearth. Natural Layer V includes portions of Arbitrary Levels 15-17 in C4 and Levels 14-16 in D4. It is a very pale brown, compacted silty sand that includes pebbles and cobbles. Natural Layer VI was present only in Unit D4, where it included portions of Arbitrary Levels 14-15. It is a very pale brown, compact sediment with limestone fleck inclusions.

Unit C4 sustained relatively heavy rodent disturbance, particularly throughout the western portion of the unit in Levels 1-10. The upper levels (Levels 1-6) of both C4 and D4 appear to be a mixture of both late/recent and ancient materials as they include Epipaleolithic lithics, ancient fauna (mineral speckled), non-mineral speckled fauna (probably recent?), a pottery sherd, a piece of woven material, and a Bedouin shepherd's reed recorder (Level 5 in C4). The Feature 1 hearth stain found in Level 2 is probably late/recent in age given its proximity to ground surface and the *in situ* presence of late/recent artifacts in lower levels.

A probable "occupation zone" is coincident with Levels 11-14 in both units. These levels yielded a high density of lithic artifacts and fauna, as well as the Feature 2 hearth. There are preliminary indications of spatial differentiation in activities between the two units in this "occupation zone." These consist of a higher frequency of end-

scrapers (32% compared to 20%) in C4 and of cores (2.6% compared to 1.3%) and hammerstones in D4.

Overall, the tool assemblage from Tor Şageer is dominated by narrow microliths of various types (60%). These include La Mouillah points, and numerous examples of arched backed bladelets and backed and truncated bladelets. There are also a small number of "tanged" microlithic points which we have tentatively named "Şageer points." Many of the microliths are manufactured using the microburin technique. Endscrapers are the second most frequent tool type (12%). Other tools are rare, but include burins, backed pieces, notch/denticulates, retouched pieces, and varia. Of special interest are three tools in the Varia class; these resemble small adze or chisel tools reminiscent of larger such tools occasionally found in Natufian assemblages, for example at Wādī al-Ḥimmah 27 (Edwards 1991).

The Early Epipaleolithic occupation at Tor Şageer is interesting for several reasons. First, it appears to register an Epipaleolithic locale without an emphasis on the manufacture of microlithic tools. This is indicated by the relative paucity of microburins and by the large-sized debitage and few bladelet cores. Second, within the space of a 1 by 2 m tested area, there are preliminary indications of spatial differentiation in activities that were probably associated with the Feature 2 hearth. These activities included core reduction (cores, hammerstones, an untested flint nodule, numerous debitage) in one area and the more frequent use of endscrapers in another area. Third, the narrow backed microliths present in the tool assemblage appear to be slightly more robust than those found in the Early Epipaleolithic occupation at Yutil al-Ḥasa (Olszewski *et al.* 1994), perhaps indicating a slightly later period within the Early Epipaleolithic (following suggestions made by Garrard *et al.* (1987) for increasing robusti-

city of microliths with time in the al-‘Azraq region). The assemblage also includes a variety of tools not previously documented for Epipaleolithic sites in the Wādī al-Ḥasa region (e.g., the “adzes” and the “Ṣageer points”).

Test Excavations at Multaqa al-Widyān (WHNBS 192-196) (J. B. Hill)

On 26 and 27 June 1997, four lithic scatters (WHNBS 192-195) located in the dissected marls at the confluence of the Wādī al-Ḥasa and Wādī al-Khasra were evaluated for the presence of *in situ* archaeological remains. Because of the location of these “sites” as a series of lithic artifact concentrations along and at the bottoms of adjacent erosional gullies, the originating deposit or deposits were unknown. The goal of the testing procedure was to determine the location(s) of the originating deposit(s) and assess their integrity and temporal affiliation for possible future excavation work. The method employed was the shovel excavation of stepped section cuts next to and above the uppermost elements in each lithic artifact concentration, aimed toward identifying in section the stratum from which the artifacts had eroded. WHNBS 196, which is along the sloped face of one of the marl fingers adjacent to WHNBS 194, was not tested because the lithic concentration appeared to derive from much lower elevations within the marl, and may predate the Upper Paleolithic period. No surface collections were made of the lithic scatters (WHNBS 192-196) currently exposed on the surface of these marls; this will allow easy relocation of these sites in the event of future work.

The area around these sites also was mapped using an EDM/electronic theodolite mapping station situated at the northwest corner of a rectangular masonry building (WHNBS 180) on the ridge to the southeast of the sites. The mapping datum was assigned North and East values of 1000 m,

and an elevation of 850 m asl, based on interpretation of the topographic map. All locations given here are from this mapping datum; the m asl in each case must be taken as an approximate value because of the arbitrary assignment of 850 m asl to the mapping datum.

WHNBS 192 was tested with a trench 1.2 by 0.5 m in a single 0.4 m step. This trench is on the northeast side of a small marl knoll at approximately N1078, E935, 837 m asl. Nine lithic artifacts were recovered from loose surface sediment and no *in situ* deposits were identified in this section cut.

WHNBS 193 was tested with two trenches, an upper and a lower, in the proximity of two discrete lithic scatters in the same erosional gully. The upper trench was 2.2 by 0.6 m in three steps of 0.3-0.4 m depth each. This trench is at approximately N1064, E888 and ranged in elevation from 838.43-839.44 m asl. The lower trench was an L-shaped cut measuring 1.1 m on each long side with two steps of 0.2 m depth. It is about N1068, E904, with an elevation of 836 m asl. A total of 17 pieces of shatter were recovered from these two units, all of which are derived from loose surface sediments. No intact cultural strata were identified.

WHNBS 194 was tested with four section cuts; two are near the top south side of a low marl ridge (Section Cuts 1 and 1A); one is midway down the same slope (Section Cut 3) and one at the slope bottom (Section Cut 2). Section Cuts 1 and 1A measured 2.0 by 0.8 m and 0.8 by 0.9 m, respectively, and were both 0.25 m deep in one step. Section Cut 1 is at N1058, E 905, and Section Cut 1A at N1060, E908. Both are at 836.6 masl. Section Cut 2 is at N1056, E912, at an elevation of 835.1 masl, and Section Cut 3 is at N1045, E914, at an elevation of 836 masl. No artifacts were recovered from any of these section cuts and no cultural strata were identified.

WHNBS 195 was tested with a single 1 by 1 m cut that was 0.35 m deep in one step. This trench is at N1033, E904, at an elevation of 836 masl. This site was the only area tested that produced *in situ* cultural deposits. A total of 595 lithic artifacts were recovered from a dark organic stratum 0.15-0.20 m thick. Among these artifacts were endscrapers, notch/denticulates, and several nondiagnostic retouched pieces, as well as 210 flakes and 92 blades. Preliminary assessment of this assemblage indicates an Upper Paleolithic affiliation, probably in the earlier range of this period.

At least two sites are represented by this series of lithic scatters in the Multaqa al-Widyān complex of sites. A partially intact, probable Upper Paleolithic component is at WHNBS 195 at an elevation of approximately 836 masl. Although several other section cuts were excavated at the same elevation in adjacent erosional gullies, none resulted in the identification of an extension of this component. WHNBS 195 currently lies about 4 m below the highest remaining element of the marls in which it is contained and was probably buried much deeper within the 30 m terrace prior to its erosion to present levels.

The other lithic scatters represent the remains of at least one site component that probably existed at a higher elevation within the marls. This stratum has since been completely removed by erosional processes that deposited the coarser fraction, including lithic artifacts, along the gully sides and in the gully bottoms. Nothing appears to remain *in situ* from this (these) upper component(s).

Test Excavations at Ṭabaqa (WHS 895) (D.I. Olszewski and J.B. Hill)

The site of Ṭabaqa is an extensive Early Natufian occupation on the east bank of the Wādī al-Aḥmar near the confluence of the Wādī al-Ḥasa and al-Aḥmar. It is about 16 km downstream from the eastern al-Ḥasa

Basin. The Early Natufian occupation is on the 30-35 m terrace, which is heavily dissected by erosional channels; it is buried below marl sediments which range from 0.5 to 2.0 m in thickness, depending on the degree of erosion to which various areas of the site have been subjected. Numerous lithics are eroding from the slopes of the dissected marls; preliminary examination of the distribution of the eroding lithics suggests that the Early Natufian occupation occurs over at least 1200 m². A total of 9 field days between 28 June and 10 July, 1997, were spent at the site.

In 1986, Byrd cut a section into a marl slope at Ṭabaqa, locating a 0.30 m thick "cultural zone" from which he recovered chipped stone, bone, and macrobotanical remains (Byrd and Colledge 1991). We relocated Byrd's section cut and placed two of our test units (TUs 1 and 2) adjacent to this locale; these units were contiguous. We also placed an additional two test units (TUs 3 and 4) about 20 m to the south of this area, where a particularly dense concentration of surface lithics occurs. Test Unit 4 is about 4 m east and 1 m south of TU 3. The sediments of all four units were a very pale brown, silty marl with little internal stratigraphy. The most common change was greater sediment compaction with depth. In general, we found that the densest concentrations of cultural materials occurred in a "cultural zone" about 0.30 - 0.35 m in thickness. Lithic artifacts, however, continued to be recovered for at least an additional 0.10 m. A total of 7,246 lithic artifacts were recovered.

Test Unit 1 was placed immediately south of the section cut made by Byrd, while TU 2 adjoined TU 1 to the south (upslope). A small baulk was left between Byrd's section cut and TU 1. Level 1 in both units was essentially sterile overburden which was removed as a single excavation level (0.50 to 0.85 m in thickness). All other levels were excavated in 0.05 m increments.

Following our first day at the site, looters tore out this baulk and also excavated a large pit in both test units. This pit measured 1.45 by 0.85 by about 0.65 m deep. It was most extensive in TU 2 where Level 2 was present only in a 0.05 to 0.15 m "border" around the pit. Subsequent levels were gradually larger in area. Back-dirt from the looters' pit was screened and all artifacts collected. Further damage to TUs 1 and 2 was incurred when vandals collapsed the upper walls of the units. Fortunately, as these were sterile deposits, the damage was minimized. Profiles of these two units, however, were not drawn nor was a pollen column series collected. Pollen samples were taken from levels during excavation as an alternative strategy.

A total of 10 and nine arbitrary levels were excavated in TUs 1 and 2, respectively. This represents a depth of about 1.11 m in TU 1 and 1.25 m in TU 2. Neither unit was excavated to sterile; excavation ceased when the density of cultural materials dropped considerably. The quantity of artifacts recovered was greater from TU 1 than from TU 2; this is not surprising given that the looters' pit removed much of the deposit from most levels within TU 2.

Test Unit 3 was excavated to a depth of 0.40 m below ground surface (eight arbitrary levels), while TU 4 had six arbitrary levels (0.30 m below ground surface). Test Unit 4 is elevationally lower than TU 3 and was placed on an area thought to represent eroded/deflated deposits; it is probable that the cultural materials from TU 4 represent the basal portion of the "cultural zone" at Ṭabaqa.

The lithic assemblages from Ṭabaqa are similar proportionally in each of the tested areas (Table 3). Tools include Helwan lunates (28%) and other microliths (29%), followed by retouched pieces (ca. 13%), notch/denticulates (12%), endscrapers (10%), and various other tools such as rare burins, backed pieces, truncations, and side-

scrapers. Microburin technique is relatively common, being predominantly oriented to the manufacture of Helwan lunates. A few examples of unfinished Helwan lunates (exhibiting microburin scars and remnant notches, but no formal finishing retouch), as well as Helwan lunates with remnant microburin scars are present in the assemblages.

Table 3. Lithic assemblages from Ṭabaqa (WHS 895) (in percentages).

	TU 1	TU 2	TU 3	TU 4	LOOTERS' PIT
TOOLS	2.6	2.9	2.4	3.1	3.0
CORES	0.7	0.9	1.2	0.5	1.7
DEBITAGE	75.6	72.6	73.2	68.7	74.0
SHATTER	21.0	23.6	23.2	27.7	21.3
HAMMERSTONES	>0.1	-	-	-	0.1
TOTAL N	2353	1561	2059	546	727

Other cultural materials were rare. We recovered at least two small marine shells, small amounts of highly fragmented bone, and noted the presence of dispersed fire-affected rock and rare charcoal flecks in all test units.

Geomorphological reconnaissance of the site context at Ṭabaqa has revealed a number of quite interesting aspects of the paleo-environment. The information recovered thus far has important implications both for understanding the local environment during the period of site occupation, and for understanding the environment of the Wādī al-Ḥasa in general during the late Pleistocene and early Holocene.

The marl deposits in which Ṭabaqa is situated appear to be part of an ancient oxbow lake in which a meander of the al-Aḥmar channel was isolated by the incision of a more direct channel. The isolation of this meander led to a much lower energy fluvial environment. Fluctuations in the hydrologic situation in this low energy environment led to the deposition of fine marl sediments with several strata of dark organic deposits,

probably representing ancient marsh environments (see Schuldenrein, this report). One of these marsh deposits is visible in section at approximately the same elevation as the Early Natufian artifact deposits at the site, and may be an indication of the environment during the occupation of the site. In any event, the site is associated with a slack water basin off of the main wadi channels.

While it is probable that the site was so located because of the presence of a slack water environment, the fact that the site is buried under further low energy alluvial deposits provides confirmation that there was slow moving water at a much higher elevation and a much later date than has been previously suspected for this area (e.g., Schuldenrein and Clark 1994).

Low energy alluvial deposits at this elevation suggest that the 30-35 m terrace, ubiquitous in the lower portions of the al-Ḥasa drainage system, was still an active floodplain in the Early Natufian, and long enough afterward to bury the site under 1 to 2 m of alluvial deposits. Such a situation has important implications for models of Pleistocene Lake al-Ḥasa and its disappearance (Schuldenrein in press; Schuldenrein and Clark 1994). The marl sediments located along the Wādī al-Ḥasa, and cited as evidence for the lake extending far down the wadi, may indicate a fluvio/limnic environment (Schuldenrein, this report) later than the proposed 15 kyr Lake al-Ḥasa breach.

Furthermore, if there was an active floodplain at the elevation of the 30-35 m terrace postdating the Early Natufian, the floodplain and subsequent terrace would have provided an early Holocene land surface extending several hundred meters across the al-Ḥasa valley bottom. Much of this valley bottom surface may have existed at least into Neolithic times and would have been an ideal setting for early agriculturalists. This former land surface was subsequently

almost completely removed by erosion, leaving only small terrace remnants along the present wadi sides. The former presence of such an extensive and hospitable surface and its removal may be relevant to the notable lack of documented Neolithic sites in this area. These preliminary indications from the geomorphological setting of Ṭabaqa require confirmation from more detailed and refined analyses, and merit considerable further research.

Expanded Excavations at 'Ayn al-Buḥayra (WHS 618) (N.R. Coinman, T.G. Clausen, J. Fox and J. Williams)

Investigations at 'Ayn al-Buḥayra in 1997 focused primarily on the Spring Area of the site. This area was tested in 1984 (Clark *et al.* 1988) and was found to have an *in situ* Late Ahmarian occupation (Coinman 1993). Research efforts in 1997 concentrated on broad exposures in order to define potential activity areas that would help characterize the nature of the late occupation at the site, allow us to recover spatial information on site activities and delineate the duration of occupation. We were particularly interested in corroborating the presence of the Late Ahmarian in the eastern deserts of the Levant, especially at large open-air sites in a lacustrine/marsh environment. In addition, we were seeking information that would further define the technological and typological features of this late Upper Paleolithic site. The 1984 excavations and subsequent analyses indicated a somewhat unique lithic assemblage with strong similarities to contemporaneous sites in the Negev, as well as containing fossilized faunal remains and rare examples of worked bone (Coinman 1997). In all, this area of the site was suggested to have excellent potential for the recovery of a well-preserved assemblage of bone and lithics.

The Spring Area is atypical of the rest of the site in that it consists of a lacustrine marl formation capped by a spring tufa. The

Late Ahmarian occupation rests on top of the tufa, which is dated to 20,300 +/- 600 bp (UA-4395), while an earlier occupation in another area of the site dates to ca. 25,000 bp (Beta-55928) (Clark *et al.* 1988: 240; Schuldenrein and Clark 1994: Table 1). The eroding remnant "tufa knoll" measures approximately 6 m (N-S) by 15 m (E-W) with the surface sloping away to the east. The white marl and tufa formations intersect a limestone bedrock that is covered with rocky colluvial debris and significant reddish alluvial sediments. The marl and tufa events appear to overlie the reddish deposits and demarcate both the high lake stand and spring activity at this location on the shores of Pleistocene Lake al-Ḥasa.

Excavations during the 1997 season included opening sixteen contiguous 1 x 1 m units to a depth of about 0.30 m below the surface. The Late Ahmarian occupation is best described as a relatively homogeneous, discrete "occupation zone" varying in thickness from 15 to 30 cm and sitting directly upon uneven consolidated tufa. The assemblage is striking in that it consists of enormous quantities of rather well-preserved large mammal bone and teeth, most likely *Bos* and equids. Other fauna are represented in the assemblage in small quantities and include a large lower canine (*Felis?*) and ostrich egg shell. Some examples of worked bone in the form of awls and points were recovered, and butchering cut marks were visible on many of the

specimens.

Lithics in all of the units were quite dense, consisting of cores, debitage, utilized pieces and retouched tools (Table 4). A preliminary analysis of the lithics from the Spring Area (n=12,183) reflects a full spectrum of reduction activities, including large numbers of very small trimming pieces. Cores comprise 0.8%, debitage 71.6%, shatter 25.2% and retouched tools 2.4%. By far, the most interesting of the retouched lithics are the small finely retouched pointed bladelets, previously referred to as Ouchtata bladelets because of the characteristic graded fine retouch that consistently occurs on the right obverse from the proximal end grading toward the pointed tip (Coinman 1993). A surprising 49% of all of the retouched pieces recovered from this area in 1997 are Ouchtata pointed bladelets – incongruously small tools in association with dense quantities of large mammal bones.

Of some significance is the preliminary evidence for discrete distributions of various artifact classes. Concentrations of artifacts were noted in most of the contiguous units. Two remnant hearths were uncovered: one was comprised of a concentration of fine charcoal (Feature 3) and the other a windbreak of rocks associated with charcoal (Feature 2). In another area, there is a very clearly defined distribution of Ouchtata bladelets, dentalium shell, and hematite. Further analyses will examine more closely the discrete spatial distributions of these ar-

Table 4. Lithic assemblages from 'Ayn al-Buḥayra (WHS 618) and from WHS 618X (in percentages).

	WHS 618 Spring Area	WHS 618 E61 N40	WHS 618 No.&So. Slopes	WHS 618 Test F Extension	WHS 618 Other Tests	WHS 618 TOTALS	WHS 618X
TOOLS	2.4	1.1	1.7	0.7	4.3	2.1	1.2
CORES	0.8	0.6	1.8	-	4.5	1.1	0.5
DEBITAGE	71.6	76.1	63.0	80.5	67.6	70.8	76.1
SHATTER	25.2	22.2	34.0	18.8	23.6	26.0	22.2
TOTAL N	12,183	2436	3561	765	791	19,732	5411

tifacts and specific densities of bone, skeletal elements, and worked bone tools in order to characterize more clearly the nature of the activities during the Late Ahmarian occupation.

The recovery of such a rich *in situ* assemblage of artifacts in an open-air site in the deserts of the eastern Levant underscores the uniqueness of the site. As a result of subsurface tests in 1984 and a series of test units across the site in 1997, it is now apparent that limited *in situ* cultural deposits may be preserved at this exceptionally large site and those appear to be in the Spring Area.

Some 7 m upslope from the spring, we initiated a deep stratigraphic test in order to define the geomorphological relationship between the western slope deposits associated with the limestone bedrock and the marl and tufa formations.

A single 1 x 1 m unit (E61N40) was excavated to a depth of 1.3 m below the surface in 12 arbitrary levels. This test was extremely informative in illustrating a different geomorphology juxtaposed to the marl and tufa downslope. The natural strata consisted of reddish and yellowish red alluvial sediments over an underlying marl. The lowest marl deposits would correlate with deep consolidated marl formations, registering earlier lake bed sediments. These underlie later lacustrine marl and tufa deposits that formed downslope to the east. The lithics recovered from this test unit also varied significantly from those at the Spring in being a dark translucent brown flint and reflecting different techno-typological attributes.

A very limited number of backed or finely retouched bladelets were recovered in the upper levels while multifaceted platforms were uncovered in the lowest levels, suggesting an earlier component in this area of the site that preceded the latest phase of marl and tufa formation and the subsequent Late Ahmarian occupation at ca. 20,300 bp.

Other Tests at 'Ayn al-Buḥayra

Extensive testing in other parts of the site during 1984 and 1997 have highlighted the rather rare preservation of the Spring Area. It now seems clear that there remains little *in situ* outside the Spring Area and that extensive occupation surfaces have simply eroded away while a thick deflated mantle of lithics remains across the site. Surface artifacts in the far northern part of the site on both the colluvial slopes and eroding out of the shoreline marls suggested a technological sequence extending from the late Middle Paleolithic, through the transitional Middle/Upper Paleolithic, and Early Ahmarian. Diagnostic artifacts recovered from the surface included an Emirah point, Levallois cores, Levallois points with multifaceted platforms, transitional points with single platforms, long, narrow blade cores, and al-Wad points. Unfortunately, all five test units were unsuccessful in locating any buried deposits associated with such a local cultural sequence.

In all cases, the sediments were essentially sterile, suggesting that the earlier cultural periods represented by what must have been significantly higher occupational land surfaces have long since deflated into a palimpsest of cultural debris.

WHS 618X

Reconnaissance around the site of WHS 618 revealed a dense surface assemblage approximately 50 m south of the Site 618 boundaries. The lithics consisted of long narrow blades and el-Wad points and suggest an Early Ahmarian occupation separated from the larger site of WHS 618. This site has not been recorded previously, and for the sake of convenience, we designated it WHS 618X during the testing phase. A 4 x 0.5 m trench was initiated to investigate the subsurface deposits. Four natural levels were identified, consisting of sloping reddish brown alluvial and colluvial sediments. The varying slope of the sediments and the

orientations of the artifacts suggest cultural deposits that have been affected by post-depositional processes. The lithic assemblage recovered consists of 5,411 pieces with a technology dominated by an emphasis on the production of bladelets (43%) and el-Wad points (25%). A substantial number of smaller, finely retouched bladelets (12%) were also recovered, primarily in the upper levels. However, the stratigraphic distribution of different temporally-sensitive Ahmarian pointed bladelets suggests a widely-varying temporal span within the long-lived Ahmarian techno-complex.

Geo-archaeological Research for the 1997 EHLPP Fieldseason (J. Schuldenrein)

Geo-archaeological field investigations for the EHLPP were undertaken between 12 and 19 June 1997. Efforts focused on examinations of baseline stratigraphic contexts at the rockshelter of *Ṭor Ṣadaf* (WHNBS 8) and the open air site of *Ṭabaqa* (WHS 895). Field work was not performed at the site of *Yutil al-Ḥasa* (WHS 784), scheduled for further excavations during the 1998 EHLPP field season, because previous work and geo-archaeological sampling at the site had been done in 1993.

Additionally, general observations of landscape relations and geomorphology were made at *Multaqa al-Widyān* (WHNBS 192-196), at the confluence of the *Wādī al-Ḥasa* and *Wādī al-Khasra*. These observations were geared to help develop the chrono-stratigraphy of the *al-Khasra* marl and fluvio-limnic terrace system, initially explored in earlier phases of *Wādī al-Ḥasa* research.

The third focus of the research was detailed geo-chemical sampling at *'Ayn al-Buḥayra* (WHS 618). Here, the objective was to document the changes within Pleistocene *Lake al-Ḥasa*, and specifically to test variability in the sedimentation patterns and salinity of lake and site related spring waters over the past 40,000 years (Schul-

denrein and Clark 1994). A slope terrain transect was performed at *'Ayn al-Buḥayra* to examine the extent and pattern of surface erosion since initial excavations at the site in 1984. At all locations, extensive radiocarbon samples were taken to index the sedimentary history of the upper *al-Ḥasa* basin.

Ṭor Ṣadaf (WHNBS 8)

The rockshelter is situated along a tributary to the *Wādī al-Misq*, a low order feeder of the *al-Ḥasa*. *Ṭor Ṣadaf* is a south-southeast facing rock-shelter with an extensive talus that slopes ca. 12 degrees toward the wadi. The overhang is about 2 m above the surface and two test pits (K2 and K5) were under excavation at the time of the geo-archaeological investigations. The surface gradient running parallel to the overhang is relatively steep (7 degrees S; 15 degrees W). The rock-shelter has been formed in fossiliferous and cemented oyster shell limestone. The facies is highly localized and is underlain by a softer, tabular member, which has been locally undermined by lateral migrations of the older – possibly Pleistocene – antecedent of the *Wādī al-Misq*. The undermining has created a strath bench 3-4 m above the channel floor in the immediate vicinity of *Ṭor Ṣadaf*.

Cultural deposits have been identified at two primary loci. The two excavation units along the “north rock-shelter” feature a dominantly Early Ahmarian lithic assemblage. Excavation unit K2, preserving the more intact archaeological deposits, is characterized by a complex stratigraphy that indicates intermittent episodes of calcification and variable moisture over the past 25,000 or more years. These are probably related to broader climatic trends, pending assessments of the site microenvironment and the history of rockshelter evolution. Unit K5 exposed generally colluviated deposits, although evaluations of the integrity and contexts of deposits await further study.

The “south rock-shelter” contains up to

1.8 m of brecciated sediment that was separated into four primary facies, based largely on bedding, sedimentology, and morphology of the larger clasts. Both alluvial and colluvial vectors of sedimentation are represented. At least three lenticular hearths capped by consolidated ash deposits were collected and have potential for producing radiocarbon dates. Significantly, the lowermost hearth is at least 4.5 m below the surface of excavation Unit K2 in the "north rockshelter," offering the possibility of an Early Upper Paleolithic and/or Middle Paleolithic occupation.

Considerable effort was focused on assessing the stratigraphic context of the "south rock-shelter." The overhang has collapsed and shorn off the parent bedrock in one or two episodes. Three massive collapsed blocks are in evidence. The rear wall of the shelter is inclined ca. 60 degrees in the direction of the wadi and vertical displacements of 0.7 to 1.17 m were measured. Further, the disposition of the alluvial sediments is concave and it is not possible to determine whether this is a function of settling of fines in the former (i.e., pre-collapsed) shelter, or whether the concavity is post-depositional and may be attributed to events accompanying the collapse. Sedimentological samples were taken from all strata and gravel morphometric specimens were also collected to determine the source and processes of rockshelter evolution. Together with the radiometric data, it should be possible to link the sequence of occupations to primary environmental events along the Wādī al-Misq and greater al-Ḥasa drainage net.

Multaqa al-Widyān (WHNBS 192-196)

The significance of these sites, associated with the Wādī al-Ḥasa and Wādī al-Khasra, is that they verify the critical function of ponding environments at primary wadi junctures. In 1993, initial documentation of the landscape demonstrated the presence of a 6-

7 m high fluvial terrace outcropping along the upper reaches of the Wādī al-Khasra. The most prominent feature near the confluence with the al-Ḥasa is a 30 m high marl terrace whose exposure revealed chemical sedimentation in the form of laminar detrital and aragonite facies. At this stage of the research it is not yet clear whether or not the 30 m terrace is a unique feature exclusively associated with the confluence of major wadis or whether it represents the downstream variant of the 6-7 m high alluvial terrace. Because the Multaqa al-Widyān site complex preserves lithics of a yet indeterminate "Early Upper Paleolithic" association (Coinman and Olszewski, pers. comm.), it is not yet possible to classify the age of terminal sedimentation; moreover, specific stratigraphic associations between the marls and the depositional contexts of the assemblages remain to be verified.

Only generalized landscape observations were recorded at these sites. However, site-landform associations of the al-Ḥasa-Wādī al-Khasra terraces with Upper Paleolithic and Epipaleolithic occupations at parallel confluences and microenvironments will enable us to project more detailed geoarchaeological reconstructions at Ṭabaqa and 'Ayn al-Buḥayra to these less intensively investigated locales.

Ṭabaqa (WHS 895)

Ṭabaqa is an Early Natufian site dated to ca. 12,500-11,000 bp B. Byrd's test section isolated *in situ* archaeological deposits whose stratigraphic contexts were not defined over the course of exploratory excavation (Byrd and Colledge 1991). Initial field observations revealed that the site is associated with a series of incised knolls. The gully that produced the knoll complex has exposed a series of stratified fluvio-limnic sediments at the confluence of the Wādī al-Aḥmar and Wādī al-Ḥasa. These are the local manifestation of the more extensive Lake al-Ḥasa marls, probably re-

cording the later phases of sedimentation. Four discrete marl strata were exposed, each indicative of a unique Pleistocene Age depositional environment. The present investigations disclosed that the Natufian site of Ṭabaqa articulates stratigraphically with the basal portion of the uppermost marl deposition.

A 50 m SW to NE geo-archaeological transect was designed to link stratigraphic observations across the test section excavated by Byrd to an 8 m high marl exposure that preserved all four marl units. The exposure is linked to an extensive 30 m lacustrine terrace originally recognized by the investigator in 1993. While this terrace has not been dated, preliminary indications are that its formation dates to the late Pleistocene and it is probably at least 40,000 years old. Ongoing gullying during the Holocene has created a "badlands" environment at the al-Aḥmar-al-Ḥasa and all key confluences along the al-Ḥasa.

In general, the four marl units trend to progressively more fluvial, and less limnic, up the sequence. Accordingly, massive to stacked organic sediments occur near the base (i.e., at ca. 6-8 m). Overlying deposits consist of alternating beds of brown silty alluvium and standing water organic clays. These are ultimately displaced by low energy blocky silts to within 4 m of the surface. Preliminary indications are that the Natufian occupation occurred at the transition from the organic marls to the alternating fluvial and marsh beds immediately underlying the blocky alluvium.

Additional field work included a more extensive north-south stratigraphic transect bisecting the Wādī al-Ḥasa and incorporating the marl sequences on both sides of the drainage. The purpose of this section was to document the end of marl sedimentation, the onset of Holocene erosion, and the initial aggradation of the contemporary 5 m high al-Ḥasa alluvial plain.

A significant discovery along this tran-

sect was the preservation of what appears to be an extensive peat-like lens capping the basal marl facies. This provided an optimal radiocarbon specimen to complement an extensive battery of radiocarbon samples for both sections. Collectively, these dates should register key points in the sedimentological history of the drainage and the marl sequence at this critical confluence.

Finally, observations along the Wādī al-Aḥmar disclosed massive boulder gravels in the contemporary wadi bed. These are absent within the al-Ḥasa east of the confluence with the al-Aḥmar, but line the channel bed downstream. Indications are that these are high energy, earlier Pleistocene gravels almost certainly precedent to the Upper Paleolithic occupation of the basin.

The sequence at the al-Ḥasa-al-Aḥmar juncture suggests that the lacustrine basin was gradually transformed into a more paludal setting with the passage of time and that the Natufian clays and silts may document the last major phase of this transformation. Recent research (Macumber and Head 1991) has suggested that a "backing up" effect characterized the greater Jordan Valley, effectively marking the end of the Pleistocene, ca. 11,000 bp. This phenomenon is potentially analogous to the onset of paludal environments in the al-Ḥasa at this time.

'Ayn al-Buḥayra (WHS 618)

This is a complex Upper Paleolithic site (Coinman 1993) whose depositional context has been discussed in some detail in earlier studies (Schuldenrein and Clark 1994; Schuldenrein, in press). 'Ayn al-Buḥayra is perhaps the al-Ḥasa's best stratigraphically documented site because of its unique setting along the Pleistocene lake. The occupation is linked directly to terminal events in the history of the lake and explanations of the changing Ahmarian occupations may be correlated with the shift from peak lake levels to the transformation of the al-Ḥasa into a series of paludal sub-basins.

Accordingly, research in 1997 focused on exploring the stratigraphic significance of the tufa, thought to be the remnant spring feeding the lake at the time of the occupations. It now appears that the source of the spring may have been an aquiclude at a bedrock facies break in the parent limestone. Because archaeological excavations were ongoing at the time of the stratigraphic study, it was possible to demonstrate that the gray-black discoloration of the archaeological deposits at Test F represents the effects of ponding along the lake margin at the time during which the spring was active. The black colors represent the cumulative effects of humic enrichment by plant disaggregation, reduction of subaqueous sediments, and the impacts of human activity. Micro-stratigraphic analysis will facilitate detailed reconstruction of site formation and should enable isolation of the loci of occupation from a sedimentological perspective.

'Ayn al-Buḥayra also furnished an opportunity to examine the changing sedimentology of the lake basin near the end of the lake's duration. Geo-chemical sampling was performed at two marl outcrops in the lake interior, 150 m east of the site proper. A series of 30 specimens were taken which can be indexed stratigraphically by facies changes in the al-Ḥasa marls as well as by radiometric specimens; four of the latter were taken. Trace element analysis of cations, specifically examinations of changing vertical trends in cation ratios, should furnish indications of the shifting balance in fresh water to salt water supply. This type of analysis has been undertaken successfully in the al-Lisān Basin and should be applicable to the al-Ḥasa as well. It may then be possible to determine if the influx of fresh water into the al-Ḥasa influenced settlement trends during the Upper Paleolithic and whether or not this contributed to the creation of optimal microenvironments during the Ahmarian.

A third objective of the 'Ayn al-Buḥayra research was examination of the erosional gradients at the site. Since the initial investigations in 1984, nearly 35% of the tufa outcrop has eroded and slope backwearing has resulted in general attrition of the site. A terrain texture study of the surfaces verifies ongoing colluviation and scree sedimentation along the upper site slope and the midslope. Gullying has intensified, essentially splitting the site between Tests H/I to the south and Test Areas C, D, F, and G to the north. The mouth of the gully is migrating westward and headcutting has accelerated as well.

Remaining Tasks

Field work for the 1997-98 EHLPP has concluded. Analysis efforts will begin in August of 1997 and will consist of sedimentological analysis geared to a reconstruction of late Paleolithic environments and to an examination of formation process at the principal sites examined. The core of the environmental reconstructions will be the evolution of the lake basin, beginning with the dating of the initial lacustrine deposits and synthesis of the evolution of the feeder drainages and their role in the formation of the micro-environments in which Upper Paleolithic and Epipaleolithic populations thrived.

Specific analysis tasks include the following: (1) sedimentological analysis at Ṭor Ṣadaf; (2) detailed examination of micro-stratigraphy of the marls at Ṭabaqa and their relationship to the Natufian site; (3) reconstruction of the terrace chronology along the Wādī al-Ḥasa and Wādī al-Khasra with emphasis on the evolution of paludal environments at the confluences; (4) identifications of the Ahmarian spring environments at 'Ayn al-Buḥayra, keying on documentation of hydrology, geochemistry, and hydrography of the later stages of the lake; (5) micro-stratigraphy at 'Ayn al-Buḥayra; (6) landscape reconstruction at

Yutil al-Ḥasa; and (7) detailed stratigraphy at Yutil al-Ḥasa.

Concluding Remarks

The 1997 EHLPP field season resulted in the accomplishment of several of the major goals of the project and in the discovery of sites which fill in some of the chronological gaps in the Upper Paleolithic and Epipaleolithic sequence for the Wādī al-Ḥasa region. Our relocation and assessment of a number of the WHS and WHNBS sites has confirmed the sparsity of Upper Paleolithic and Epipaleolithic sites in areas away from the lake/marsh system of the eastern al-Ḥasa basin, and particularly on the plateaus surrounding the Wādī al-Ḥasa. This highlights the importance of the lake/marsh ecological context during these chronological periods, especially in the context of modelling ancient settlement systems.

Two newly discovered sites (EHLPP 2 and WHS 618X), as well as testing at Ṭor Ṣadaf (WHNBS 8) and at the Multaqa al-Widyān site complex (WHNBS 192-196) led to the recognition of a substantial Early Ahmarian (early to middle Upper Paleolithic) presence in the eastern al-Ḥasa basin. In conjunction with Late Ahmarian assemblages from 'Ayn al-Buḥayra (WHS 618) (Coinman 1993; and results of the 1997 EHLPP season) and Yutil al-Ḥasa (WHS 784)(Olszewski *et al.* 1990), this affords great potential to study responses over time within the Upper Paleolithic period to fluctuations in the lake/marsh ecology, and to document the technological continuity and change within the Ahmarian.

Testing at Ṭor Ṣageer (WHNBS 242) revealed an occupation during the Early Epipaleolithic that appears to have emphasized activities that were not oriented to the production of microlithic tools. This adds considerable dimension to our understanding of site activity differentiation during this period of time. Additionally, the lithic assemblage from this site, which includes a

small number of unusual types ("adze/chisels" and "Ṣageer points"), as well as relatively narrow backed microliths including La Mouillah points, may represent an interval of the Early Epipaleolithic that closes the gap between the nongeometric and geometric Early Epipaleolithic occupations at Ṭor aṭ-Ṭariq (WHS 1065) (Neeley *et al.*, in press; Olszewski, in press).

Testing at Ṭabaqa (WHS 895) yielded Late Epipaleolithic assemblages (Early Natufian period) that augment preliminary work at the site by Byrd (Byrd and Colledge 1991). Perhaps the most significant observations in this regard are those related to the geomorphology of the Ṭabaqa locale, where a probable oxbow lake/marsh was in existence at the time of the Early Natufian occupation there. This occupation is buried beneath 1-2 m of marl deposits, indicating that the 30-35 m terrace in the lower portions of the al-Ḥasa drainage continued in existence at least as late as the advent of the Younger Dryas ca. 11,000 bp, and that this region was considerably wetter than previously believed.

The 1997 excavations at 'Ayn al-Buḥayra (WHS 618) have emphasized the existence of a well-developed Late Ahmarian technocomplex in the eastern Levant that is comprised of a distinct bladelet technology focused on the production of "Ouchtata points". A study of the typological and functional attributes of these rather unique artifacts is on-going, and this season's collection will greatly augment our sample. The recovery of such great numbers of faunal remains, including whole teeth and ostrich egg shells add significantly to our understanding of subsistence patterns in a lacustrine/marsh ecological setting. Spatially discrete artifact distributions provided one of the first have provided one of the first opportunities to examine *in situ* activities in the Ahmarian (e.g., see Phillips 1991). And most importantly, the excellent condition and preservation of the fauna,

worked bone, and other non-lithic artifacts substantiates the presence of organic technologies in open-air Upper Paleolithic sites outside the Mediterranean zone of northern Israel and Lebanon (e.g., the Levantine Aurignacian at Hayonim Cave [Belfer-Cohen and Bar-Yosef 1981] and particularly in sites where unusual conditions of preservation have acted to differentially preserve some types of organic remains [Coinman 1997]).

During the testing phase at three sites (Ṭor Ṣadaf, Ṭor Ṣageer, and Ṭabaqa) and the expanded excavations at 'Ayn al-Buḥayra, including excavations at WHS 618X, numerous flotation, phytolith and pollen samples were taken. Analyses of these samples will begin immediately after shipment to the specialists associated with this project (Marci Donaldson, macrobotanical remains; Arlene Miller Rosen, phytoliths; and Suzanne Fish, pollen). Additionally, analysis of the faunal remains will be undertaken by Margaret Glass, and geo-archaeological sediments will be processed and analyzed by Joseph Schuldenrein.

This extensive sampling strategy was undertaken to aid in the reconstruction of the paleoenvironment, paleoecology, and geomorphology of the Wādi al-Ḥasa region, and in certain aspects of subsistence/seasonality. Radiocarbon samples were more limited in number; the best samples are from 'Ayn al-Buḥayra and Ṭor Ṣageer.

A second season of the EHLPP is planned for the summer of 1998. Archaeological investigations will be undertaken more extensively at Ṭor Ṣadaf and Ṭor Ṣageer during this second season. Other plans include initial testing at EHLPP 2, and further work at Yutil al-Ḥasa in the areas of

the site which previously yielded Early and Late Epipaleolithic occupations.

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Bibliography

- Belfer-Cohen, A. and Bar-Yosef, O.
 1981 The Aurignacian at Hayonim Cave. *Paléorient* 7: 19-42.
- Byrd, B.F. and Colledge, S.
 1991 Early Natufian Occupation along the Edge of the Southern Jordanian Steppe. Pp. 265-276 in O. Bar-Yosef and F. Valla (eds), *The Natufian Culture in the Levant*. Ann Arbor: International Monographs in Prehistory.
- Clark, G.A., Lindly, J. Donaldson, M. Garrard, A. Coinman, N. Schuldenrein, J. Fish, S. and Olszewski, D.
 1988 Excavations at Middle, Upper and Epipaleolithic Sites in Wadi al-Hasa, West-Central Jordan. Pp. 209-285 in A. Garrard and H.G. Gebel (eds), *The Prehistory of Jordan*. Oxford: BAR Int. Ser. 396(i).
- Clark, G.A., Neeley, M. MacDonald, B. Schuldenrein, J. and 'Amr, K.
 1992 Wadi al-Hasa Paleolithic Project-1992: Preliminary Report. *ADAJ* 36: 13-23.
- Clark, G.A., Olszewski, D.I. Schuldenrein, J. Rida, N. and Eighmey, J.
 1994 Survey and Excavation in the Wadi al-Hasa: A Preliminary Report of the 1993 Season. *ADAJ* 38: 41-55.
- Coinman, N.R.
 1993 WHS 618 - Ain el-Buhira: An Upper *Paleolithic* Site in the Wadi al-Hasa, West-Central Jordan. *Paléorient* 19(2): 17-37.
 1997 Worked Bone in the Levantine Upper Paleolithic: Rare Examples from the Wadi al-Hasa, West-Central Jordan. *Paléorient* 22(2): 113-121.
- Edwards, P.
 1991 Wadi Hammeh 27: An Early Natufian Site at Pella, Jordan. Pp. 123-148 in O. Bar-Yosef and F. Valla (eds), *The Natufian Culture in the Levant*. Ann Arbor: International Monographs in Prehistory.
- Garrard, A.N., Betts, A. Byrd, B. and Hunt, C.
 1987 Prehistoric Environment and Settlement in the Azraq Basin. An Interim Report on the 1985 Excavation Season. *Levant* 19: 5-25.
- MacDonald, B., Banning, E. and Pavlish, L.
 1980 The Wadi al-Hasa Survey 1979: A Preliminary Report. *ADAJ* 24: 169-183.
- MacDonald, B., Rollefson, G. Banning, E. Byrd, B. and D'Annibale, C.
 1983 The Wadi al-Hasa Survey 1982: A Preliminary Report. *ADAJ* 27: 311-324.
- MacDonald, B., Rollefson, G. and Roller, D.
 1982 The Wadi al-Hasa Survey 1981: A Preliminary Report. *ADAJ* 26: 117-131.
- Macumber, P. and Head, M.
 1991 Implications of the Wadi al-Hammeh Sequences for the Terminal Drying of Lake Lisan, Jordan. *Palaeogeography, Palaeoclimatology, Palaeoecology* 84: 163-173.
- Neeley, M.P., Peterson, J.D. Clark, G.A. and Fish, S.K.
 in press WHS 1065 (Tor al-Tareeq), an Epipaleolithic Site in the Wadi al-Hasa, West-Central Jordan. In N.R. Coinman (ed.), *The Archaeology of the Wadi al-Hasa West-Central Jordan, Vol. 2: Archaeological Excavations in the Wadi al-Hasa Tempe: Anthropological Research Papers*, Arizona State University.
- Olszewski, D.I.
 1997 From the Late Ahmarian to the Early Natufian: A Summary of Hunter-Gatherer Activities at Yutil al-Hasa, West-Central Jordan. Pp. 171-182 in H.G. Gebel, Z.

Kafafi and G. Rollefson (eds), *The Prehistory of Jordan II. Perspectives from 1996*. Studies in Early Near Eastern Production, Subsistence, and Environment. Berlin: ex oriente.

Olszewski, D.I., Clark, G.A. and Fish, S.

1990 WHS 784X (Yutil al-Hasa): A Late Aḥmarian Site in the Wadi al-Hasa, West-Central Jordan. *Proceedings of the Prehistoric Society* 56: 33-49.

Olszewski, D.I. and Coinman, N.R.

in press Late Pleistocene Settlement Patterns in the Wadi al-Hasa, West-Central Jordan. In N.R. Coinman (ed.), *The Archaeology of the Wadi al-Hasa West-Central Jordan, Vol. 1: Surveys, Settlement Patterns, and the Paleoenvironments of the Wādī al-Ḥasa*. Tempe: Anthropological Research Papers, Arizona State University.

Phillips, J.

1991 Refitting, Edge-Wear and Chaînes Opératoires: A Case Study from Sinai. Pp. 305-317 in *24 Ans d'Études Technologiques en Préhistoire. Xle Recontres Internationales d'Archéologie et d'Histoire d'Antibes*. Juan-les-Pins: Editions APDCA.

Schuldenrein, J.

in press Geomorphology and Stratigraphy of Prehistoric Sites Along the Wadi al-Hasa. In N.R. Coinman (ed.), *The Archaeology of the Wadi al-Hasa West-Central Jordan, Vol. 1: Surveys, Settlement Patterns, and the Paleoenvironments of the Wadi al-Hasa*. Tempe: Anthropological Research Papers, Arizona State University.

Schuldenrein, J. and Clark, G.A.

1994 Landscape and Prehistoric Chronology of West-Central Jordan. *Geoarchaeology* 9(1): 31-55.

ARCHAEOLOGICAL EXCAVATIONS AT LATE PPNB BA'JA A PRELIMINARY REPORT ON THE 1997 SEASON

by

Hans-Dieter Bienert and Hans Georg K. Gebel

Introduction

The excavations were carried out by the German Protestant Institute of Archaeology in Amman (DEI) in collaboration with *ex oriente* e.V., a research association at the *Seminar für Vorderasiatische Altertumskunde* of the *Freie Universität Berlin* (Germany) and the *Deutsches Archäologisches Institut, Orient-Abteilung* (Prof. Dr Ricardo Eichmann) in Berlin (Germany). Funding came from the *Evangelische Kirche in Deutschland* (EKD), the *Deutsche Forschungsgemeinschaft, Bonn* (DFG), the *Deutsches Archäologisches Institut, Orient-Abteilung, Berlin* (DAI) and *ex oriente, Berlin*. The Department of Antiquities in Amman (DAJ) substantially supported the project by covering work force needs. Logistic help was also provided by the *Conservation and Restoration Center in Petra* (Dr Helge Fischer). This campaign was co-directed by the authors.

The excavations lasted from June 16th until July 20th, 1997. The first week of work concentrated on basic topographical reconnaissance conducted by a team of surveyors. As well as starting with mapping the site topography, it included the layout of a grid system from which ten squares, measuring 5 x 5 m, in Area C were selected for excavation. The excavation area extended over part of a spur and the adjacent steep western slope of the main Neolithic occupation Area C (Fig. 1). Here, work concentrated on the exposure of the architectural remains down to the first floor of the upper occupation. Squares C1 - C2, C11 - C12, C21 - C22 and C 31-32 yielded well-preserved structures immediately below the

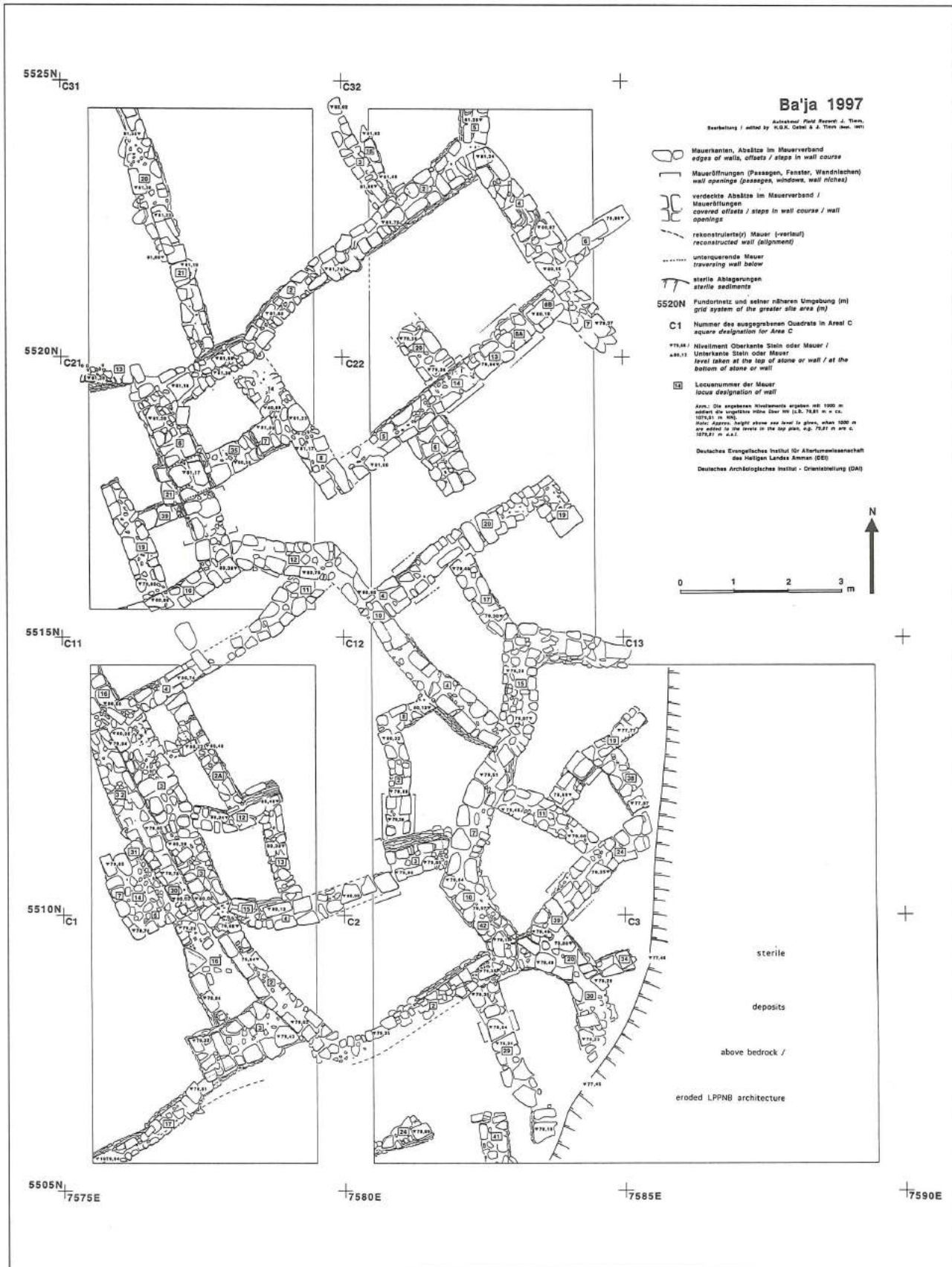
surface (Figs. 2-5). To our surprise, Squares C3 and C13 (Fig. 1), situated in the central steep slope of Area C, did not contain any architecture. Instead, they revealed the sterile sandy layers of a Pleistocene intramontane basin fill, sharply separated from the lowermost occupational layers.

Further on, two test units were excavated in order to follow specific goals: test unit 1 (TU1) is a step-trench situated at the edge of the cliff that forms the northern wall of the Siq Ba'ja. The aim was to investigate the sterile layers and their contact zone with the Neolithic occupation.

Test unit 2 (TU2) was situated in the wadi bordering the site to the north, in which ashy garbage deposits were found. These deposits yielded huge quantities of animal bones and chipped lithics, which were sampled in order to obtain a large collection of these find classes.

Apart from the excavation a site survey was carried out, plotting all surface archaeological features. This included the recording of the different categories of walls as well as grinding slabs and *manos* preserved to at least half of their original size.

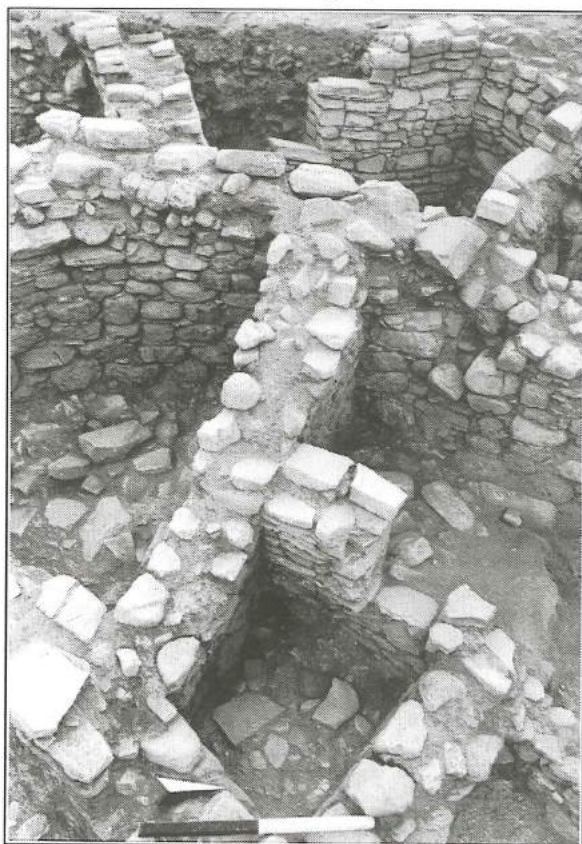
Also, a survey in the vicinity of Ba'ja was conducted up to approximately 1 km radial distance. The aim of the survey was to detect possible outliers of the Neolithic occupation. According to preliminary results of this survey it seems that there was no further Neolithic occupation in the near vicinity of Ba'ja. The many small basins, partially, filled with sediments in the direct surrounding of Ba'ja did not show any surface or buried traces of settlement. However, remains of later - possibly Iron Age



1. Architecture of main building phase excavated in Squares C1-3, C11-13, C21-22 and C31-32 (top plan by J. Timm).



2. Excavated architecture in area C, view from north (photo: S. Fengler/N. Höffgen).



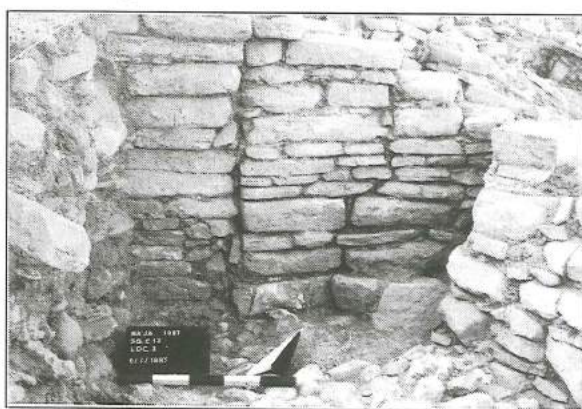
3. Remains of excavated rooms/courtyards of the main building phase in Square C12 (photo: S. Fengler/N. Höffgen).

and Nabataean - settlement activities could be detected and documented an several spots. Furthermore a number of possibly Nabataean terraces have been found north and northwest of the Early Neolithic site of Ba'ja.

It seems possible that numerous sediment traps may have been used by the Neolithic settlers of Ba'ja for cultivating and/or herd-



4. The compound/terrace wall which was found in Squares C1 and C11. This wall was stabilized by two succeeding reinforcements (photo: S. Fengler/N. Höffgen).

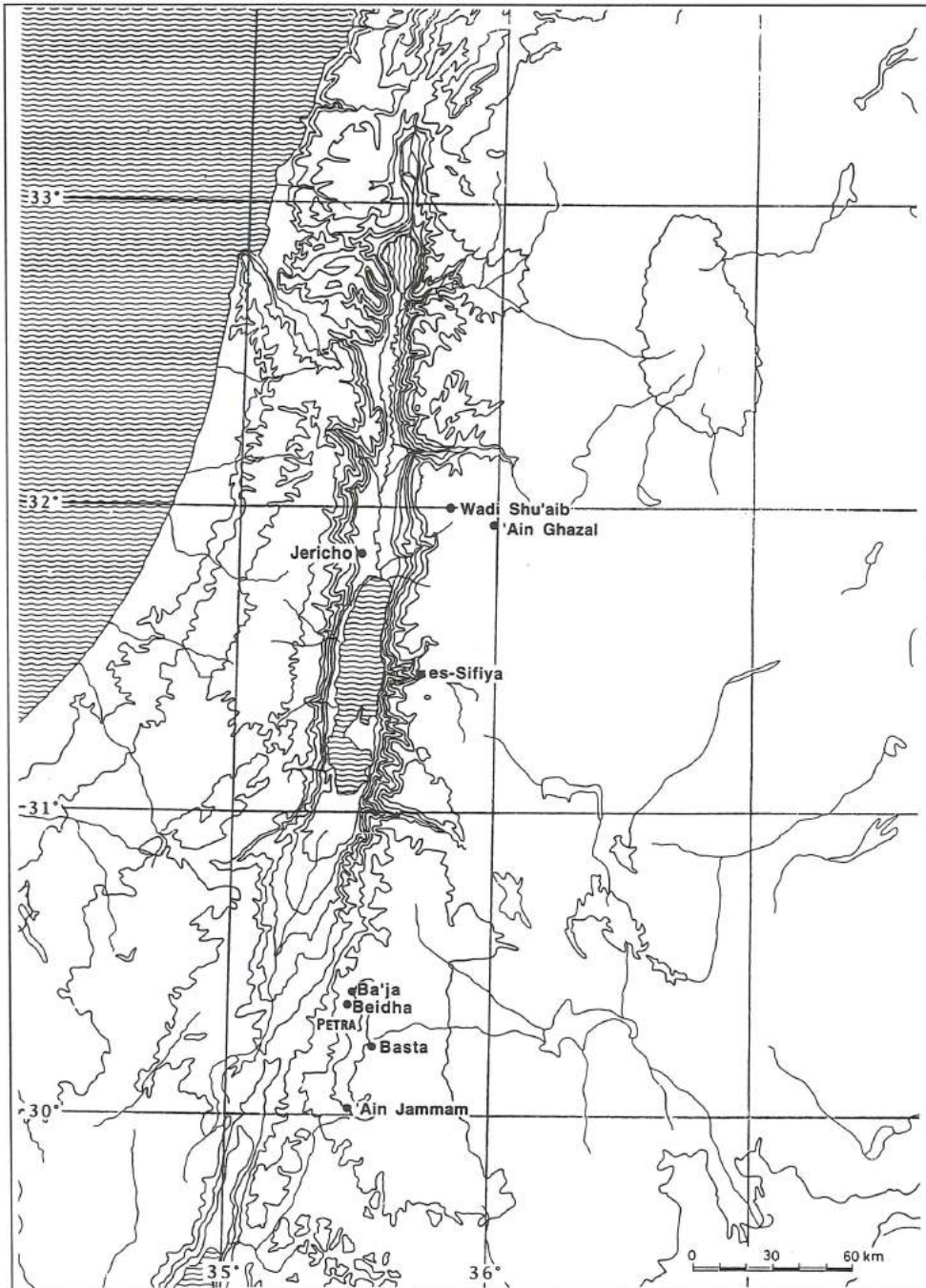


5. The blocked passage in Square C12 (photo: S. Fengler/N. Höffgen).

ing purposes. However, proper evidence for this hypothesis is still lacking. No traces of springs which may have supplied the Neolithic villagers of Ba'ja with fresh water have been located in the near vicinity of the settlement, so the water supply system is still unknown (Müller-Neuhof 1997).

Site Setting

Ba'ja is located at 35° 27' 45" E / 30° 24' 55", ca. 1060-1095 m asl, some 11 km straight distance north of Wādī Mūsā / Petra in the lands of the al-'Amārīn tribe (Figs. 6 and 7). The MPPNB-LPPNB/C site of Baydā (Kirkbride 1966; 1967; 1968) is situated only ca. 6 km to the south (Fig. 7: a and b). The mean annual precipitation in this region reaches approximately 200 mm. Some local Beduin refer to the immediate site area as "al-Mehmad". The site rests on

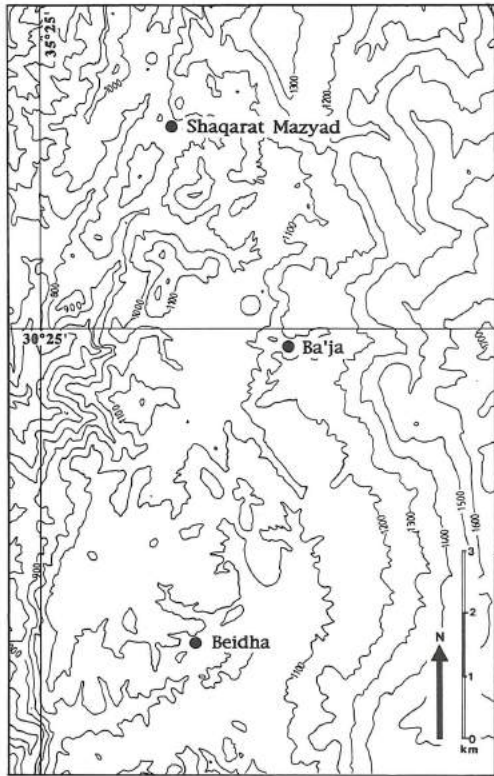


6. Topographical map showing PPNB sites in Jordan.

topographically very differentiated intramontane steep slopes and is bordered by the Siq Ba'ja to the south and nearly vertical rock formations to the north (Fig. 8). Today the site can only be reached through the Siq Ba'ja, which is blocked at certain spots by huge fallen rocks and often bears a dense vegetation of oleander, juniper, pistachio and especially the thorny stone oaks. The fallen sandstone blocks created barriers of up to 5 m height (Fig. 9), behind which

gravel accumulations raise the as-Siq's bottom level. The as-Siq itself has vertical walls of up to 70 m high, and is as narrow as 1.5 m.

The site was discovered in the late summer of 1983 by mountaineering members of Manfred Lindner's team from the *Naturhistorische Gesellschaft Nürnberg* (Germany) (Lindner 1996: 264, 267-270). They presented chipped lithics to H. G. Gebel (Lindner 1996: 268, fig. 21) and among

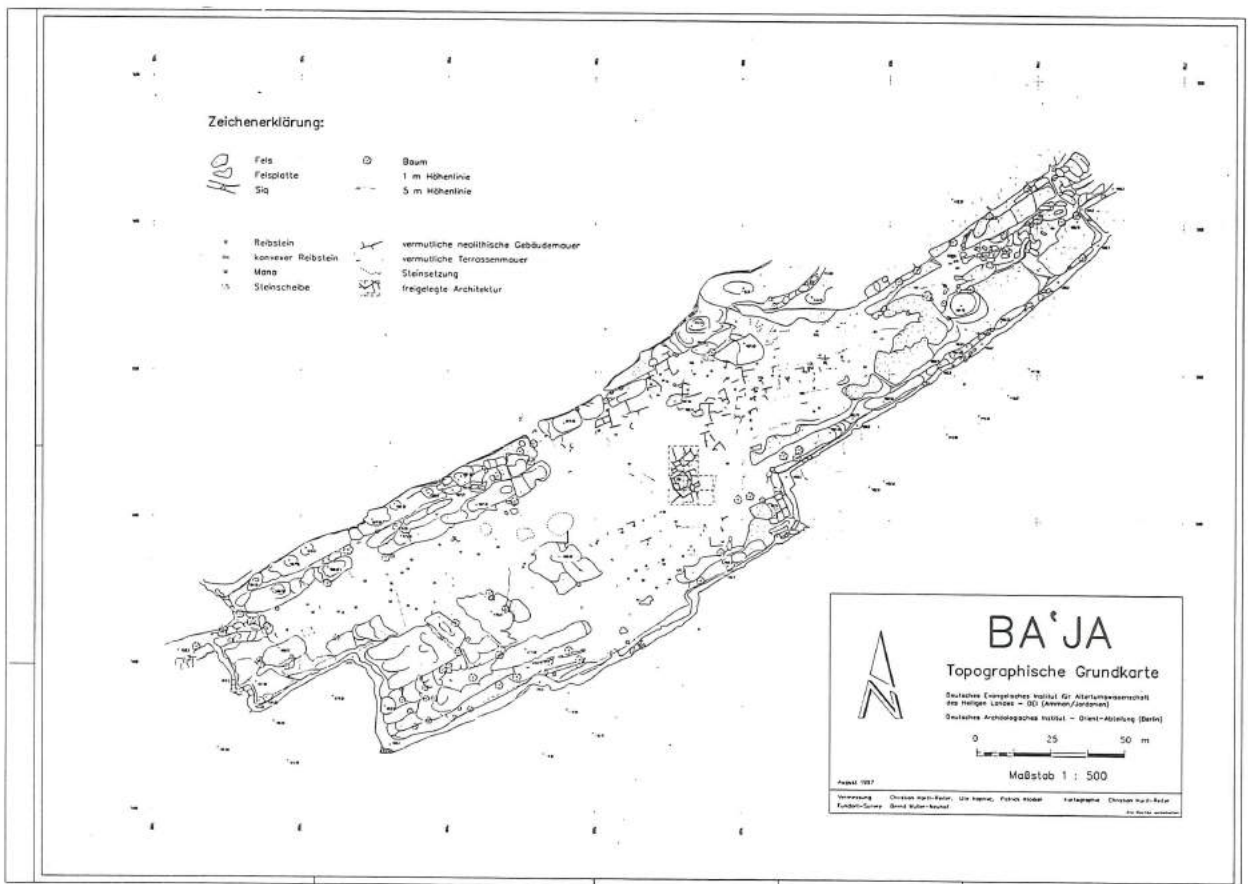


7a. Geographic setting of Ba'ja in the Greater Petra area.

these finds some diagnostic LPPNB material could be detected. After visiting the site in autumn 1984, three soundings were made that year (Gebel and Starck 1985; Gebel 1988). These investigations aimed to retrieve palaeobiological samples from appropriate deposits, while the visible architectural structures were commented on but left untouched.

Site Extent and Preservation

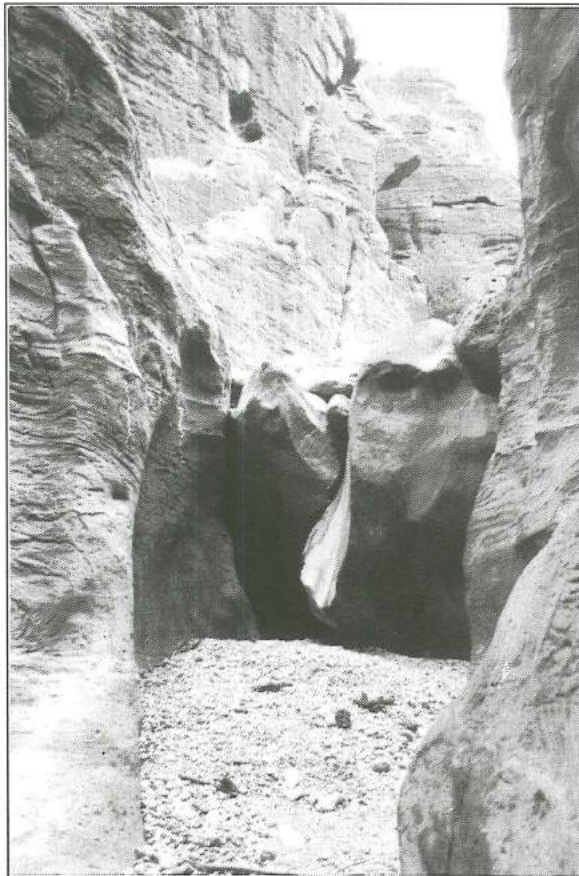
According to the topographical survey and surface distribution of the LPPNB artefacts, the site extends over the complete intramontane surface enclosed by the Siq Ba'ja and the northern rock formations (Fig. 10). Its SW - NE oriented longitudinal axis is some 290 m long, its width varies from ca. 20 m at the western and eastern accesses to about 90 m in the central parts. The area was occupied in the later seventh mil-



7b. Site topography with area of excavation (topographical plan by C. Hartl-Reiter).



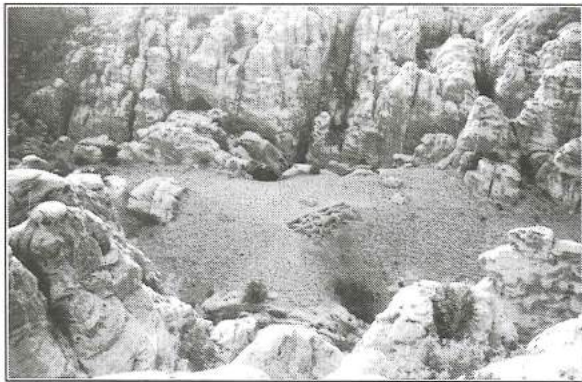
8. View from the east towards the location of LPPNB Ba'ja, before the excavation (photo: H.-D. Bienert).



9. One of the huge rock blockanges in the as-Siq of Ba'ja (photo: H.-D. Bienert).

lennium bc and is roughly estimated to have covered some 11,500 sq.m. This would be ca. 5,000 sq.m larger than the preserved part of the site of Bayḍā, mentioned above (Gebel and Bienert 1997b: 15).

From both surface and the excavation evi-



10. The setting of Ba'ja and the excavation area in the midst of mountains, view from south-east (photo: S. Fengler/N. Höffgen).

dence it is obvious that we are dealing with well-preserved and dense terraced housing, probably comparable to that of some present-day villages in areas with similar settings (e. g. Ḍānā, aṭ-Ṭayyiba, Baṣṭa, etc.). The site survey, carried out by Bernd Müller-Neuhof, revealed that the densest concentration of near-surface LPPNB walls occurs on the highest parts of the site (areas D and upper parts of area C), while no such evidence comes from the as-Siq bordering lower areas A and F. LPPNB grinding slabs and *manos* cover all parts of the site in varying densities. Their reuse by later visitors of the area cannot be excluded. In parts of the site, most likely due to field clearance activities of the post-PPNB until (or only in) Nabataean times, the stones from eroded LPPNB walls were thrown down the slopes. In other areas, the densely concentrated eroded wall stones created a natural pavement protecting the cultural sediments underneath. The later, most probably Nabataean, use of the site (judging from the pottery finds) exhibits activities related to the building of stone piles, field terrace walls, wall alignments, surface levelling, etc. (Müller-Neuhof, unpub. M.A. thesis).

It appears necessary to reconsider earlier assumptions on intensive spatial use within the boundaries formed by the bordering as-Siq and rock formations: While TU1 and a step trench at the eastern preserved fringe in Square C3 indicate that at least in the lower

third to half of the sloping area C, the architecture and cultural layers are not preserved or did not exist, the sterile layers in TU1 and the aforementioned C3 trench clearly prove that the site here was founded on Pleistocene water-laid fills of a formerly closed intramontane basin, similar to the *playa*-like sedimentary environments exposed at the eastern edge of the plain of the Wādī al-Jabu. The question of domestic structures in the lower parts of this main occupation area (area C) remains the subject of discussion with several possible explanations. It seems that between the western and eastern retaining/compound walls of C1 - C11 and C2 - C12 stratified architecture exists, while to the east only single-phased rooms were built. This would imply that in this extreme sloping setting, building activities were restricted by impacts which were possibly caused by the danger of seasonal floods. This could explain the total absence of settlement activities, including architectural remains, in the easternmost part of Squares C3 and C13, as well as the sharp erosional cut through both the sterile layers and rooms dug into these layers in Squares C2 and C12. However, two other explanations remain. First, colluvial processes caused the removal of the lower architecture. Second, there may not have existed architecture in the steep lower parts.

Architectural Remains and Stratigraphical Evidence

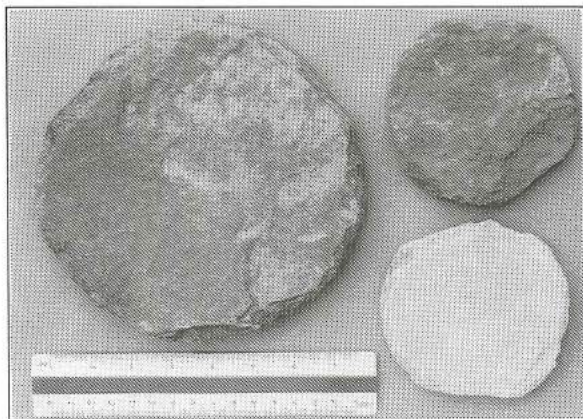
Apart from the situation in Squares C3 and C13, well-preserved and mostly dense double-faced recti- and sometimes curvilinear walls occur in all other excavated squares, forming rectangular or polygonal rooms (see Figs. 1-5). Although the ground-plan matches the known LPPNB architecture (Bienert in press; Mahasneh 1996, 1997; Najjar 1992, 1994; Nissen *et al.* 1987, 1991; Rollefson 1984; Rollefson *et al.* 1992; Waheeb 1996) characterized by very small rooms, there is clear evidence for

large rooms and/or courtyards in the northern squares of the excavated area.

The walls resemble the building techniques of the other known LPPNB sites (e. g. Baṣṭa, aṣ-Ṣifiyya, 'Ayn Jammām): double-faced walls (see Fig. 3) made of local tabular sandstone slabs were erected and the individual courses were stabilized by smaller "wedging" stones (see Fig. 5). The faces of most slabs were roughly dressed. Although the wall faces were built with great care, they lack headers and thus stability. This is clearly visible in Squares C1 and C2, where the southern walls are barely preserved on one face. There is also evidence for less well-built, cobble-faced walls, which were perhaps built due to functional changes and/or increasing the heights of walls.

As of yet, functional units cannot be isolated within the excavated layout (see Fig. 1). Communication between rooms is attested by wall openings and some of these were found blocked, indicating functional changes of the layout. Pre-planning or an intended ground-plan is expected to have existed, but must have been subject to topographical adaption and influence. It is clear from the site survey that the directions of walls did not necessarily follow contour lines. Most probably long-used, major walls served as compound and terrace/retaining walls for the terraced architecture (see Fig. 4). Apart from the cobble and lime plaster paved floors (Fig. 11) dug directly into the sterile soil (Squares C2 and C3), no evidence of initial foundation techniques has yet been identified at Ba'ja.

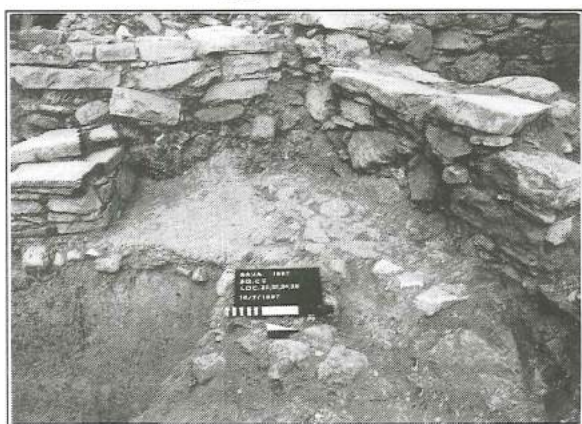
The long wall running from NNW to SSE in Squares C1 and C11 (see Figs. 1 and 4) was obviously too weak as it was stabilized by two succeeding reinforcements. First, a second wall was built adjacent to the western base of the long wall. Afterwards both of those walls had to be further stabilized by two buttresses, partly built over the first reinforcement wall.



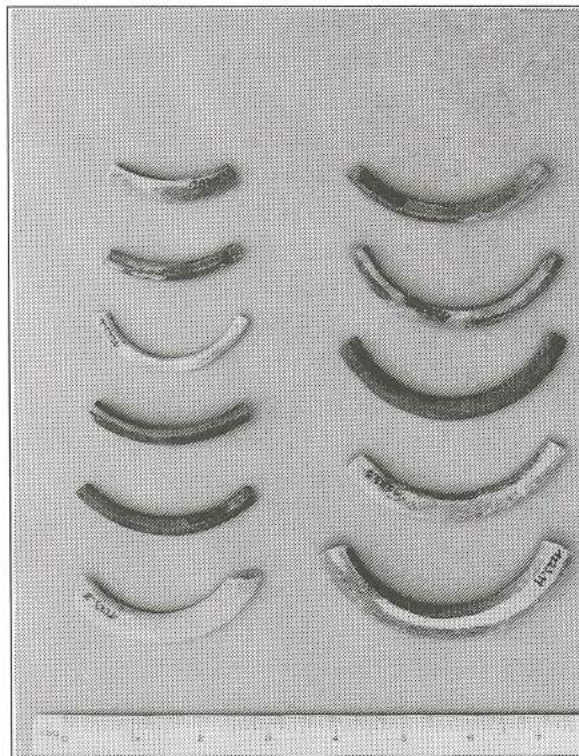
11. Remains of a plaster floor in Square C2 (photo: S. Fengler/N. Höffgen).

Within the architecture, three major activity zones could be indentified: In the eastern fringe of the excavated area almost all rooms bore remains of ovens associated with ashy layers, often rich in animal bones. In the space largely covered by the north-eastern part of Square C11, food processing activities had taken place, as evidenced by large numbers of grinding slabs and *manos*. This activity may also indicate that this area was not roofed but functioned as a courtyard. One grinding slab was found in its original position, set into a circular stone alignment. In the same area and the nearby vicinity, a high concentration of stone discs was found together with partially formed products, indicating a manufacturing area for sandstone rings (Figs. 12 and 13).

Figure. 1 illustrates walls related only to the main building phase of the settlement in



12. Flaked sandstone discs of different sizes used for the production of bracelets (photo: S. Fengler/N. Höffgen).

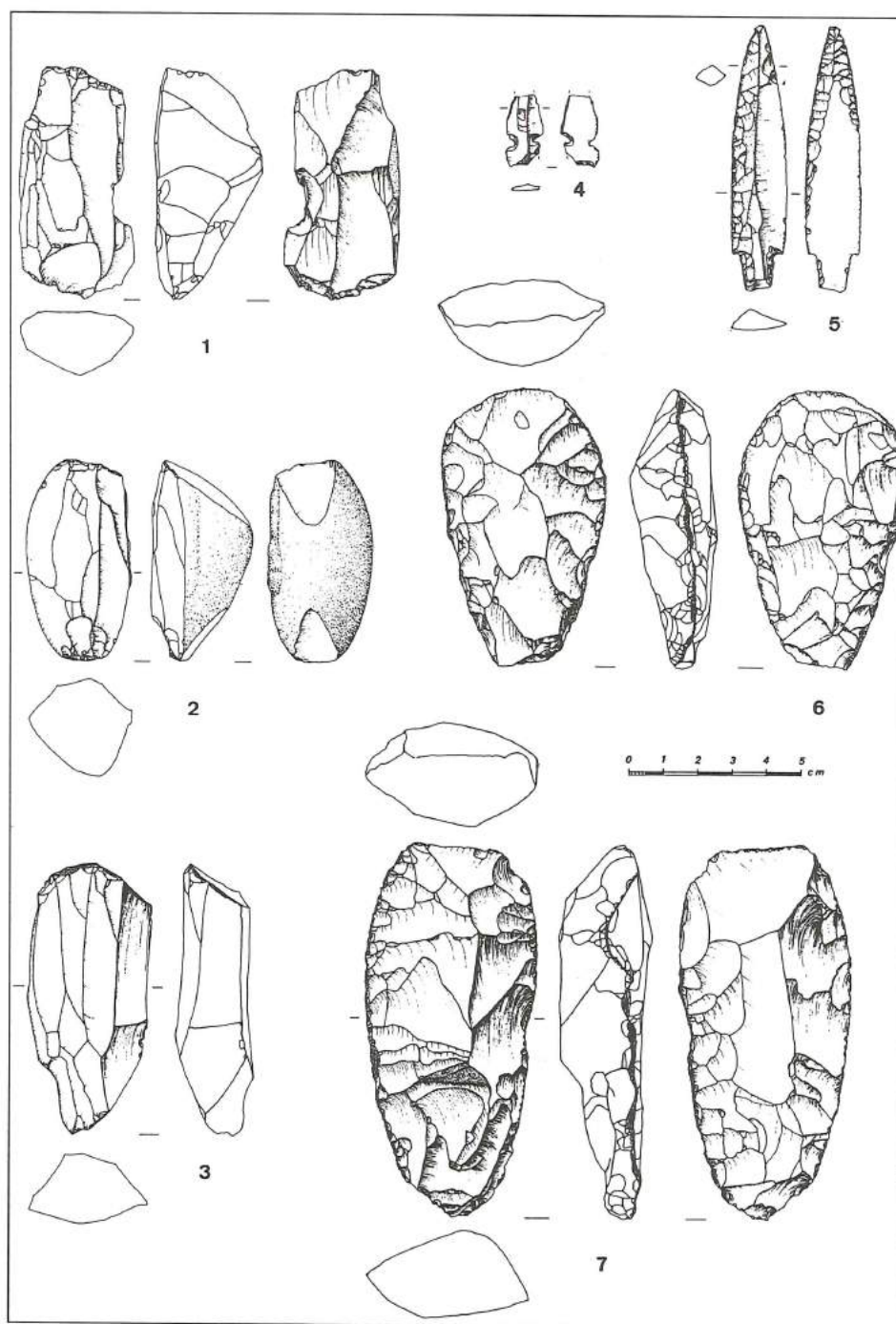


13. Examples of sandstone bracelets (photo: S. Fengler/N. Höffgen).

area C. Wall alterations and blockages indicate locally restricted changes, most probably representing subphases. An interesting succession of subphases came from the western room in C21. Here, a lower lying wall with an opening was blocked before its height was increased by a superimposed wall, leaving a step between both faces. This step might have supported a second floor, representing evidence of two-storeyed building units. This assumption is further supported by the fact that the top of the western partition wall and the top of a buttress interlinking with the above-mentioned two-phased wall are on the same level as the wall step, which supports wooden beams. Small and very fragile remains of red painted wall plaster were retrieved from the wall of the western room in C21.

Ground and Chipped Stone Industries

Both the ground stone and the chipped lithic industries are well represented and reflect the spectra of types known from other late PPNB sites (Fig. 14). However, some



14. LPPNB chipped lithic artefacts: 1-3 bidirectional (pse-udo-naviform) cores, 4-5 arrowheads atypical for the industry (Khiam Point, tanged arrowhead), 6 celt, 7 adze (pre-1997 surface finds, by H. G. K. Gebel).

peculiar aspect can already be mentioned. Although the stone vessels and abundant grinding tools are attested as classes, the variety of sub-classes – by means of types – seems to be less developed, when compared with other sites such as Baṣṭa and ‘Ayn Jammām.

The primary production of the flint industry does not contain the typical naviform cores and their preparation waste, although

rare bi-directional cores (Fig. 14:1-3) do resemble this specific reduction technique. Characteristic of these cores is that they have been reduced to the utmost; the average length of debitage blades being considerably smaller than those of Baṣṭa. An explanation for that must be sought in the fact that tabular flint was rarely used at Ba‘ja, and that mostly wadi pebbles of greyish flint were exploited. Behind that fact, a pre-

dominantly household-level based production must be expected.

In the excavated areas, and from the surface we have no evidence yet for specialized workshops on an industrial scale for either primary or secondary production. TU 2 clearly yields the material of such a workshop, exhibiting both primary production (few cores only), as well as (denticulated) arrowhead and borer manufacture. The tool kit seems somewhat restricted to arrowheads (Fig. 14:4-5), celts (Fig. 14:6) borers, adzes (Fig. 14:7), hammerstones; retouched or ad hoc implements do not seem to be abundant.

Also the grinding tools and stone vessel fragments resemble the classes characteristic for the LPPNB (Wright 1992). A huge mortar (Fig. 15) was found in Square C1 west of the long compound wall running from NNW to SSE.

The flint and ground stone industries of Ba'ja reflect the tool kits of a self-relying regional centre rather than that of a centre involved in large-scale surplus production and exchange, which allows a distinction to be made between a "manufacture" and "industrial" mode of lithic production.

Bone Industry

The worked bone industry is almost exclusively represented by tools and tool fragments belonging to the classes of piercers and spatulae (Fig. 16). One piece is an in-

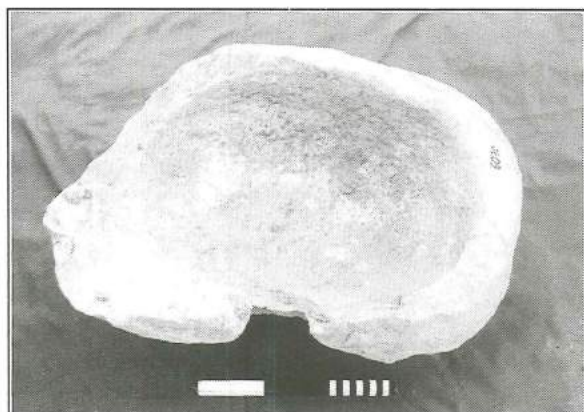


16. Examples of bone implements from LPPNB Ba'ja (photo: S. Fengler/N. Höffgen).

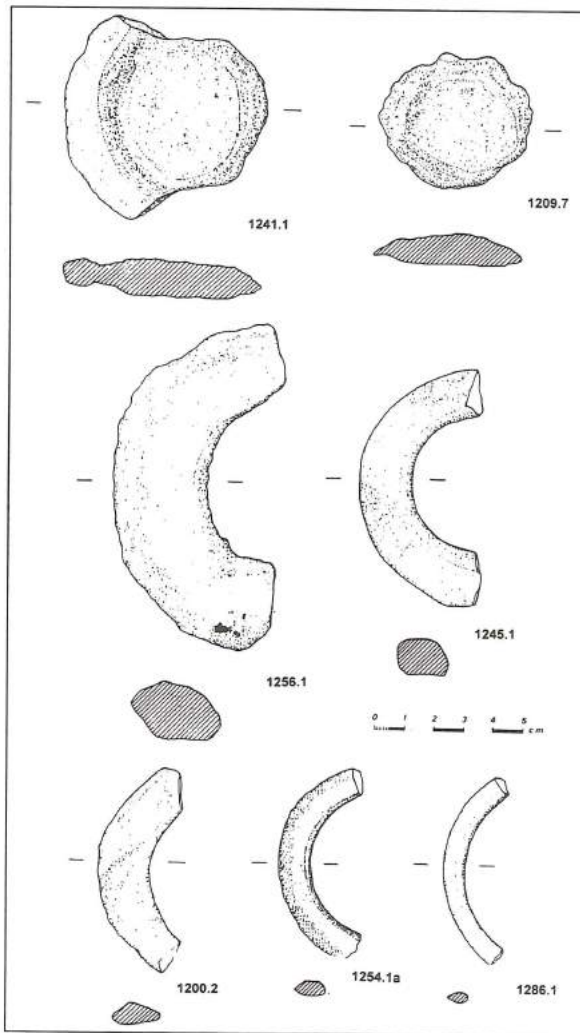
cised tubular bone blank from which bone beads were cut off. The bones used for the production of tools belong to cattle (Fig. 16:5403), sheep/goat (Fig. 16:5404.1-2) and small - not identifiable ruminants (Fig. 16:5402 and 14:5404.2) (von den Driesch, pers. comm.). A detailed study of the animal bones as well as the bone tools is under way.

Sandstone Ring Manufacture

The site was obviously a centre for the production of sandstone rings, probably on an industrial scale (cf. also Starck 1988). Certainly the amount of finished products seems to far exceed the local demands of a site like Ba'ja. Based on the archaeological context. Several areas within the village seem to have been reserved for the production of these rings. Pointing to this interpretation are the abundant tabular raw materials of the Cambrian sandstone which is available locally. Sandstone rings are known from other PPNB sites, such as Basa (Nissen *et al.* 1987: 114, fig. 17.1-4; Starck 1988) and aş-Şifiyya (Mahasneh 1996: 140, fig. 9.10; 1997: fig. 8). In Ba'ja all of the production stages could be found and documented for the first time (Fig. 17). They are represented by the semi-, unfinished and broken elements of the "chaîne opératoire" and are attested as follows: After selection of the tabular material the sandstone was flaked bifacially into a disk



15. Huge mortar found in Square C1 (photo: S. Fengler and N. Höffgen).



17. The different production stages (from top left to bottom right) of the sandstone bracelets as documented in Ba'ja (drawing: S. Shraydeh).

shape, varying in diameter from 4 to 16 cm (average: 8-9 cm). From this disc an inner disc was removed (Fig. 17:1209.7). Work traces (Fig. 17:1241.1) indicate a concentric graving and possibly a low-pressure chiselling process from both sides until a raw ring was produced (Fig. 17:1256.1). While the inner discs may have been transformed into other artefact types (perforated and surface-smoothed stone discs of 4-5 cm in diameter) (Fig. 18:0406.4 and 1231.3), the raw torus for the intended sandstone ring was ground in various stages (Fig. 17:1245.1; 1200.2 and 1254.1a) until final grinding brought it the finished shapes (Starck 1988) (Figs. 13 and 17:1286.1). Back staining of

the rings is an often observed procedure. Bicolour decoration can result from the later removal of the stain by grinding it from interior or obverse surfaces.

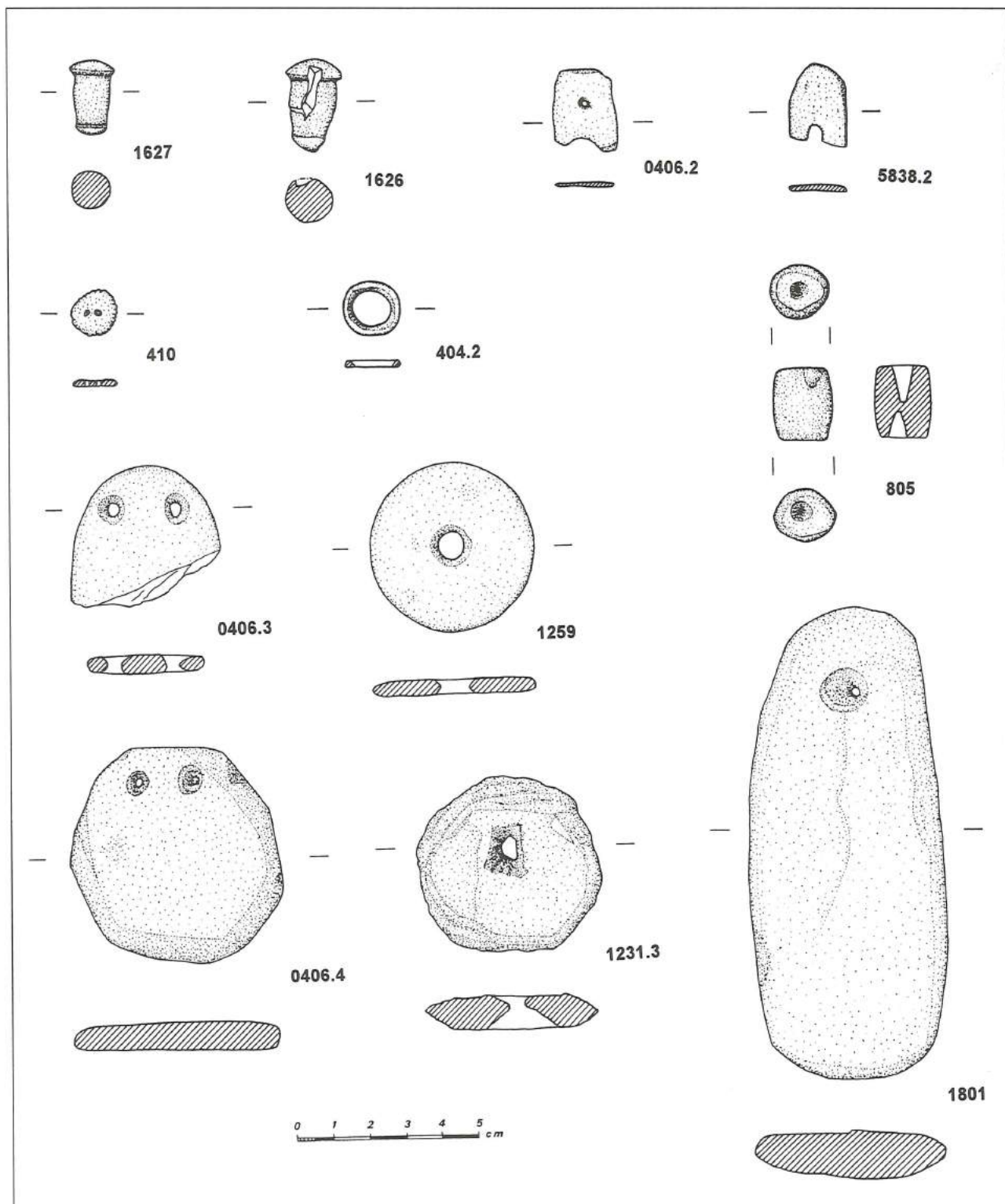
Other Prestige Goods

Evidence of other prestige goods is rather rare at Ba'ja. Apart from the sandstone rings only a few items have been found that are worth discussing. As mentioned above, some of the inner discs which were by-products of the sandstone ring production were transformed into other objects, such as sandstone pendants (Fig. 18:0406.4 and 1231.3). However, stone pendants were also produced separately. They are of an elongated shape (Fig. 18:1801 and 0406.3) or round with a concentric hole (Fig. 18:1259). Marine molluscs - most probably coming from the Red Sea and/or the Mediterranean were transformed into pendants, too.

Some other objects are made of mother-of-pearl. The function of two fragments is not identifiable (Fig. 18:0406.2 and 5838.2), although they may have been parts of pendants. One object is of button shape (Fig. 18:410). A number of rings and ring fragments are also made of mother-of-pearl. One complete ring seems too small to have been used as a finger ring, unless applied to babies or children. The inner diameter of this object is just 1 cm (Fig. 18:404.2).

Beads, which are still very rare at Ba'ja, are either made of stone or marine molluscs. One bead was found unfinished (Fig. 18:805) with the drilling not fully executed.

The function of two almost identical objects (Fig. 18:1626 and 1627) is not yet clear. They have been made - as it seems after a first superficial examination - of a soft limestone. Objects of similar and exactly the same shape have been found at LPPNB Basta (Nissen *et al.* 1987: Fig. 17.5; Nissen *et al.* 1991: fig. 6.6-7). Hermansen interprets these objects at Basta as "tokens" or "counters" (Nissen *et al.* 1991: 29).



18. Selection of small finds from Ba'ja (drawing: S. Shraydeh).

Subsistence Evidence

A first on-site scanning of the bone sample from TU2 by Cornelia Becker (*Freie Universität Berlin, Germany*) revealed the following species: wild and domestic goat,

domestic sheep?, aurochs (*Bos primigenius*), *Equus africanus*?, a small and a large type of gazella, wild boar, hare, hedgehog, hyrax and small carnivore (fox?).

A first analysis of the botanical remains

has been undertaken by Reinder Neef (*Deutsches Archäologisches Institut - Eurasien Abteilung*) who also joined the excavation and collected some of the samples. Preliminary results indicate that botanical remains at Ba'ja were only preserved in a carbonized form, the main category being charcoal. Most of the charcoal belonged to a juniper species, most probably the Phoenician juniper (*Juniperus phoenicia*), which is still the main component of the woody vegetation in the surroundings of Ba'ja. All the excavated wood identifiable as construction wood belonged to juniper. The rest of the charcoal belonged to pistachio, most probably *Pistacia atlantica* or *Pistacia khinjuk*. Nowadays both pistachio species are also still common in the Ba'ja region.

Remains of fruits which could be collected belonged to wild pistachio, hawthorn (*Crataegus azarolus/aronia*) and fig (*Ficus sp.*). Remains of cultivated plants were rarely found, suggesting that crop plant cultivation was less important in LPPNB Ba'ja. Only a few remains of the processing of emmer wheat (*Triticum dicoccum*), the so-called glume bases and spikelet forks, were retrieved (Neef, pers. comm.)

Human Remains

So far, no human burials have been encountered in the excavated squares; although a few human remains were found among the animal bones and flint artefacts concentrated in the ashy deposits of TU2. This evidence is quite striking since it occurs in a very homogeneous deposit related to habitation clearance, such as removal of chipping debris, food remains and ashes.

Due to the fact that the floor level was not reached in most rooms during the excavation campaign, the possibility still remains that human burials might have been placed under the floors of rooms, a habit very common in the PPNB (Bienert in press; 1995; Rollefson 1983; 1986). Neither the site, nor the vicinity survey revealed any

traces of burials.

Conclusions

The results of the 1997 campaign can be summarized as follows:

- 1) The occupational level of the architecture and the associated material culture are of Late Pre-Pottery Neolithic date (second half of the seventh Mill. bc); occupational layers within the room fills are most likely related to the same culture, representing the use of the ruins after sedentary habitation came to an end or after a shift from the (excavated) area.
- 2) The type of architecture resembles in all respects exactly what has been found in Bašta (Nissen *et al.* 1987; 1991), 'Ayn Jammām (Waheeb 1996), Ghwair 1 (Najjar 1992; 1994) and aṣ-Ṣifiyya (Mahasneh 1996; 1997). The architecture represents a multi-roomed rectangular association of roofed rooms and open spaces. Connections between the rooms existed through passages built into the groundplan via wall-openings and via possibly roof-tops. Architectural sub-phases existed and altered the groundplan within the framework of three major compound/terrace walls. Whenever topography required it, the groundplan of the smaller rooms became curvilinear or polygonal. Room sizes may vary from 1.5 - 15 sqm. Subphases can be well distinguished by additions onto existing wall tops, as well as additions to the ground plan. Reinforcement measures by buttresses and secondary walls to stabilize the terrace and room walls are well attested.
- 3) Unexpected was the fact that the lower third of the south side had eroded away, may be due to a much higher level of wadi floods in the post occupational period. Further investigations of this aspect of the site preservation is necessary, as well as an evaluation of whether or not the lower part and the steep part towards

the edge of the as-Siq had ever been built upon.

- 4) Contact zones of the cultural layers with the sterile substrate are attested and show that the area on which the site rests was once a closed intramontane basin filled with water-laid sandy sediments (playas). At one spot it was obvious that the rooms were dug into these sterile layers. Lime plaster floors were placed on this sterile foundation, with a cobble surface between.
- 5) For the chipped lithic industry, it is striking that the site seems not to have had specialized naviform workshops. This element known from other LPPNB central settlements is missing, but a nonnaviform bidirectional blade technology exists as shown by cores with detachments from all around the (round) platform.
- 6) The ornament industry is poor in comparison to other contemporary sites, although the site was a fabrication centre for sandstone rings, probably on an scale which did serve the whole region: all stages of manufacturing of these goods is attested and we can expect that it played a major role for the wealth of the settlement (trade).
- 7) No burials were encountered so far despite the occurrence of human bones within the cultural debris.
- 8) Subsistence relied on emmer wheat, wild pistachio and the exploitation of juniper and pistachio wood as well as a diet of animal protein which made use of the following species: wild goat, domestic sheep/goat, gazelle, wild boar, aurochs (*Bos primigenius*), African wild ass, hare, hedgehog, equid (*Equus africanus?*), hyrax, and various birds.

Acknowledgements

With deep appreciation we thank our excavation team for their splendid work under very hard conditions: Christian Hartl-Reiter and Ute Koprivc (topographical surveyors); Bernd Müller-Neuhof (archaeological sur-

veyor); Tobias Krämer (sedimentologist), Jan Timm (architect); Abd al-Nassar Hussein al-Hindawi, Benjamin Jeffs, Muhammad Fadel Khatatbeh, Christiane Meckseper, Sandra Schatz-Härle (square supervisors); Salaheddin al-Abbasi, Annalisa Alvrus, Ulrika Andersson, Jessica Anderson, Brian Conn, Lena Gebel (assistant square supervisors); Stephan Fengler and Nina Höffgen (photographers), and Philipp Rassmann (registrar). The latter third of the project we were joined by Reinder Neef, who carried out the palaeobotanical sampling. Part-time participants gave considerable support: Patrick Kloiber (topographical surveyor), Johannes Meier, Julia Littmann (dig assistants) and Sonja Striegl (reporter). During the final weeks we received the well-appreciated help of Bo Dahl Hermansen and Ghattas Savej.

In addition to the previously mentioned organizations and their principal funding of the project, we thankfully acknowledge further financial and material support from Manfred Lindner, Nürnberg (Germany); Foto Wegert, Berlin (Germany); Konica Deutschland, Panasonic Deutschland GmbH, Joost Hazenbos and Agfa-Gevaert AG, Leverkusen (Germany). Logistical help was also provided by Wendy Botham, Eid Nawafleh, and their team (Petra Moon Tourism Services).

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Bibliography

- Bienert, H.-D.
 in press Kult und Religion. Eine Studie anhand von Fundmaterial epipaläolithischer und frühneolithischer Gesellschaften/Kulturen Südwestasiens (12.-6. Jt. v. u. Z.). Wiesbaden: Harrassowitz.
- 1995 The Human Image in the Natufian and Aceramic Neolithic period of the Middle East. Pp. 75-103 in W. H. Waldren, J. A. Ensenyat and R. C. Kennard (eds), *Ritual, Rites and Religion in Prehistory*, 3rd Deya International Conference in Prehistory BAR Int. Ser. 611. Oxford: Tempus Reparatum.
- Bienert, H.-D. and Gebel, H. G. K.
 1997a Ba'ja - Investigations into one of the earliest settlements in Jordan. *Occident & Orient* (Newsletter of the German Protestant Institute of Archaeology in Amman) 2/ 1: 13-14.
- 1997b Ba'ja - Early Neolithic Settlers in the Petra Mountains. *Occident & Orient* 2/ 2: 2-4.
- Gebel, H. G.
 1986 Die Jungsteinzeit im Petra-Gebiet. Pp. 273-308 in M. Lindner (ed.), *Petra. Neue Ausgrabungen und Entdeckungen*. München: Delp.
- 1988 Late Epipalaeolithic-Aceramic Neolithic sites in the Petra-area. Pp. 67-100 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan. The State of Research in 1986*. BAR- Int. Ser. 396.(i). Oxford.
- 1990 *Vorderer Orient. Neolithikum. Beispiele zur Fundortökologie. Petra-Region. (Near East. Neolithic. Examples of the Ecological Setting of Sites. Petra Region)*. Map of the Tübinger Atlas des Vorderen Orients B I 15. Wiesbaden: Ludwig Reichert.
- 1992 Territories and palaeo-environment: locational analysis of Neolithic site settings in the Greater Petra area, southern Jordan. Pp. 85-96 in S. Kerner (ed.), *The Near East in Antiquity* 3. Amman: Al Kutba Publishers.
- Gebel, H. G. K. and Bienert, H.-D.
 1997a Excavating Ba'ja, Greater Petra area, Southern Jordan. *Neo-Lithics*. Berlin, *ex oriente* 1: 9-11.
- 1997b The 1997 Season at Ba'ja, Southern Jordan. *Neo-Lithics*. Berlin, *ex oriente* 3: 14-18.
- 1997c Ba'ja Hidden in the Petra Mountains. Preliminary results on the 1997 investigations. Pp. 221-262 in H. G. K. Gebel, Z. Kafafi and G. O. Rollefson (eds), *The Prehistory of Jordan, II. Perspectives from 1997. Studies in Early Near Eastern Production, Subsistence, and Environment* 4. Berlin: *ex oriente*.
- Gebel H.G., and Starck, J. M.
 1985 Investigations into the Stone Age of Petra Area (Early Holocene Research). A Preliminary Report on the 1984 Campaigns. *ADAJ* 29: 89-114.
- Kirkbride, D.
 1966 Five seasons at the pre-pottery neolithic village of Beidha in Jordan. A summary. *PEQ* 98: 8-72.
- 1967 Beidha 1965: An interim report. *PEQ* 99: 5-13.
- 1968 Beidha 1967: An interim report. *PEQ* 100: 88-96.
- Lindner, M.
 1989 Ba'ja. Pp. 184-190 in D. Homès-Fredericq and J. B. Hennessy (eds), *Archaeology of Jordan. II.1 Field Reports, Surveys and Sites. Akkadica Suppl.* Peeters: Leuven.

- 1996 9000 Jahre Siedlungsgeschichte der Ba'ja-Region in Jordanien - ein Forschungsgebiet der Naturhistorischen Gesellschaft Nürnberg. *Das Altertum* 41: 245-278.
- Mahasneh, H. M.
 1996 As-Sifiyya: A Pre-Pottery Neolithic B Site In Wadi El-Mujib, Jordan. *Dirast* (Journal of the University of Jordan) 23, 1: 135-151.
 1997 A PPNB Settlement at aş-Şifiyya in Wādi al-Mūjib. Pp. 227-234 in *SHAJ VI*. Amman: Department of Antiquities.
- Müller-Neuhof, B.
 1997 Site survey and vicinity survey. Pp. 228-231 in H. G. K. Gebel, Z. Kafafi and G. O. Rollefson (eds), *The Prehistory of Jordan, II. Perspectives from 1997. Studies in Early Near Eastern Production, Subsistence, and Environment* 4. Berlin: *ex oriente*.
- Najjar, M.
 1992 Tell Wadi Feinan/Wadi Araba: a new Pottery Neolithic site from Jordan. Pp. 19-28 in S. Kerner (ed.), *The Near East in Antiquity III*. Amman: al-Kutba Publishers.
 1994 Ghwair I, a Neolithic site in Wadi Feinan. Pp. 75-85 in S. Kerner (ed.), *The Near East in Antiquity IV*. Amman: al-Kutba Publishers.
- Nissen, H. J., Muheisen, M., Gebel, H. G., Becker, C., Neef, R., Pachur, H.-J.; Qadi, N. and Schultz, M.
 1987 Report on the First two Seasons of Excavations at Baṣṭa (1986-1987). *ADAJ* 31: 79-119.
- Nissen, H. J., Muheisen, M. and Gebel, H. G.
 1991 Report on the Excavations at Baṣṭa 1988. *ADAJ* 35: 13-40.
- Rollefson, G. O.
 1983 Ritual and ceremony at Neolithic 'Ain Ghazal (Jordan). *Paléorient* 9: 29-38.
 1984 'Ain Ghazal: An early neolithic community in highland Jordan, near Amman. *BA-SOR* 255: 3-13.
 1986 Neolithic 'Ain Ghazal (Jordan): Ritual and ceremony, II. *Paléorient* 12: 45-52.
- Rollefson, G. O., Simmons, A. H. and Kafafi, Z.
 1992 Neolithic Cultures at 'Ain Ghazal, Jordan. *JFA* 19, 4: 443-470.
- Starck, J. M.
 1988 Comparative analysis of stone-ring artefacts from Baga and Baṣṭa. Pp. 137-174 in A.N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan. The State of Research in 1986*. BAR Int. Ser. 396.(i).Oxford: British Archaeological Reports.
- Waheeb, M.
 1996 Archaeological Excavation at Rās an-Naqab-'Aqaba Road Alignment: Preliminary Report (1995). *ADAJ* 40: 339-348.
- Wright, K.
 1992 A Classification System for Ground Stone Tools from the Prehistoric Levant. *Paléorient* 18,2: 53-81.

AL-GHUWAYR I, A PRE-POTTERY NEOLITHIC VILLAGE IN WĀDĪ FAYNĀN, SOUTHERN JORDAN: A PRELIMINARY REPORT OF THE 1996 AND 1997/98 SEASONS

by

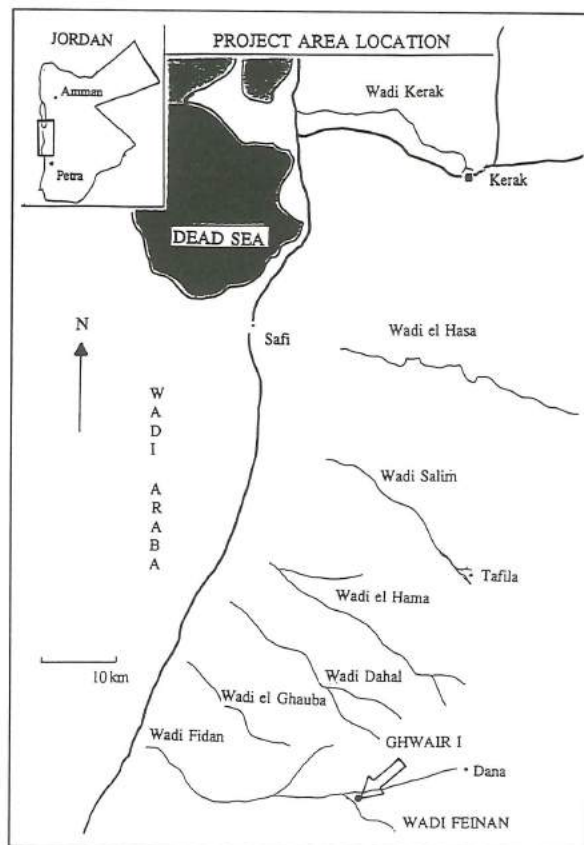
Alan H. Simmons and Mohammad Najjar

Introduction

The Wādī Faydān, which drains to the larger Wādī Faydān, has only recently come under systematic archaeological investigation (e.g., Barnes *et al.* 1995; Levy and Adams 1997), despite early hints of its richness (e.g., Raikes 1980). The most intensive studies thus far have been conducted by the Archaeometallurgical Investigation Project, which demonstrated that the Wādī Faydān/Faydān region was a major copper source that figured prominently in trade networks from perhaps as early as the Chalcolithic onward (Hauptman 1990). While this study focused on metallurgy of later period sites, it also revealed the incredible wealth of well-preserved archaeological materials in the region, with occupation from at least the Epipaleolithic (Finlayson and Mithen 1996) through the Islamic period. This included the recording of al-Ghuwayr I (Fig. 1), a Pre-Pottery Neolithic B (PPNB) settlement, the subject of this report.

In the Wādī Faydān and the adjacent Wādī Faydān, both Pre-Pottery and Pottery Neolithic villages are known (Adams 1991; Najjar 1992, 1994; Raikes 1980). These, including al-Ghuwayr I, appear to be relatively small settlements, although the Pottery Neolithic site, Tall Wādī Faydān, is believed to be quite large (Najjar *et al.* 1990; Najjar 1992).

Al-Ghuwayr I is an exceptionally well-preserved Pre-Pottery Neolithic B village that was first test excavated in 1993 (Najjar 1994). In 1996, a limited season was conducted to assess the site's potential for additional investigation; this was a joint project between the University of Nevada at Las Vegas and the Department of Antiquities

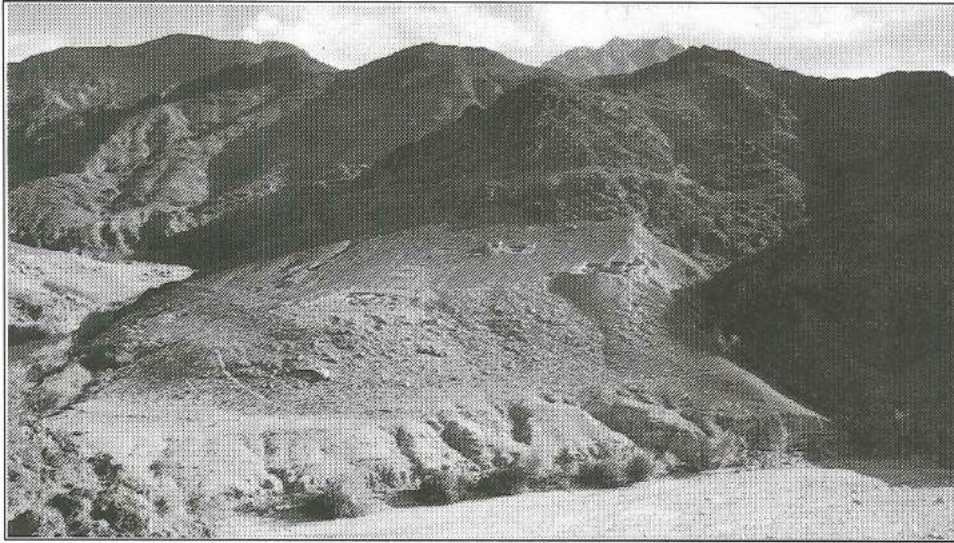


1. Map of southern Jordan, showing the location of al-Ghuwayr I.

(Simmons and Najjar 1996). The results of that brief season were positive, leading to the first field phase of more detailed studies. This was completed in December 1997 and January 1998.

Summary of 1993 Excavations at Al-Ghuwayr I

Al-Ghuwayr I is located on a hillslope at an elevation of 290-320 m asl with a commanding view of Wādī al-Ghuwayr/Faydān (Fig. 2). A limited study in 1993 (Najjar 1994) excavated at what we now call Areas I and IV, and cleaned an exposed section in Area III. Rich findings indicating a PPNB



2. Overview of al-Ghuwayr I, facing south. Photograph shows excavated areas.

affiliation demonstrated the site's potential for more intensive investigation.

The site is small, covering an estimated 1.5 acres. In 1993, at least four architectural phases were present in over 3 m of deposit. The well-preserved architecture, especially in Area I, where a wadi has cut through the western portion of the site, is certainly the most spectacular aspect of the site, with walls containing windows and doorways preserved to over 2 m high. Structures are generally typical of the PPNB, although many are irregular. Rooms, often sub-divided and grouped around a courtyard, have red plastered floors enclosed by rectangular, oblong, or rounded stone walls. Reuse has obscured precise architectural techniques. Most of the exposed rooms are small, and some may represent storage "basements." A few larger rooms (ca. 4 x 4.5 m) in Area IV were later converted into smaller units; at least one of these had a flagstone pavement instead of a plastered floor. Due to this later construction, no complete rooms were uncovered.

Some of the exposed walls give the impression of tower structures. One small circular structure in Area I contains a niche with a flat, polished granite slab, possibly an altar. A stone figurine was found on the floor not far from the niche and may indicate that this structure was a special pur-

pose room (Najjar 1994:79). No burials were encountered, but the plastered floors were not removed—burials commonly occur beneath the floors as well as outside of structures at PPNB sites.

The abundant artifacts that were recovered included a large chipped stone assemblage that is typical of the PPNB. Ground stone also was abundant, and small finds included spindle whorls, beads made of bone, stone, anthropomorphic and zoomorphic figurines, and marine shells. Significantly, five potsherds were recovered, suggesting either a later Pottery Neolithic component or early experimentation of ceramic manufacture.

Summary of the 1996 Test Season

During the fall of 1996, a brief (ca. one month) project was undertaken (Simmons and Najjar 1996). The goal was to complement data retrieved in 1993 and to better formulate precise research questions in anticipation of a larger-scale project. In particular, we wished to determine the settlement's boundaries, investigate a large ash pit on the eastern boundary, and determine if large structures were present in addition to the numerous small rooms exposed in 1993. To achieve these goals, we excavated at three separate areas of the site. One area was particularly promising in that a partial-

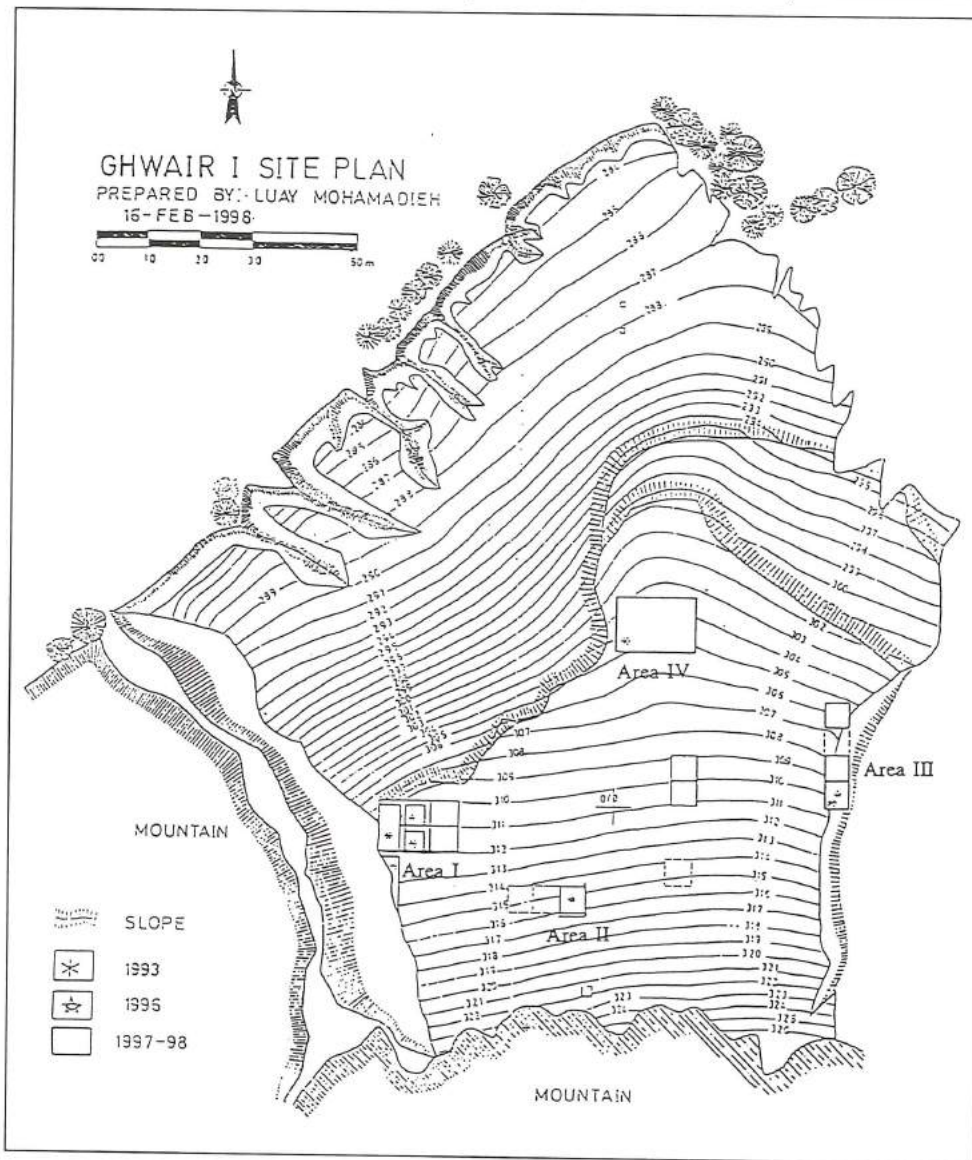
ly excavated room, containing several niches, hinted at a ritual or ceremonial function. In addition, we made a detailed contour map using a total distance station supplied by the Department of Antiquities; this was completed during the 1997/98 season (Fig. 3).

These investigations set the stage for more intensive excavations conducted in 1997/98. This report summarizes the preliminary results of both the 1996 and the more extensive study.

Research Strategy

One of the project's major goals is to investigate Neolithic "core/periphery" relationships (cf. Algaze 1989). In particular,

we wished to examine whether al-Ghuwayr I, located in the periphery of the Neolithic world, functioned as a "frontier outpost" with minimal amenities, or if it was an elite, but small center. We wanted to compare small settlements such as al-Ghuwayr I with larger Neolithic core centers, such as 'Ayn Ghazāl, Wādī Shu'ayb, or Baṣṭa. Another project objective was to initiate paleo-environmental and paleoecological reconstruction, and determine if the occupants of al-Ghuwayr I contributed to environmental degradation. Finally, we wished to better determine the site parameters of al-Ghuwayr I, seeking to well define its boundaries, architectural layout and possible so-



3. Contour map of al-Ghuwayr I, showing excavated areas.

cial indicators, material culture, and chronology.

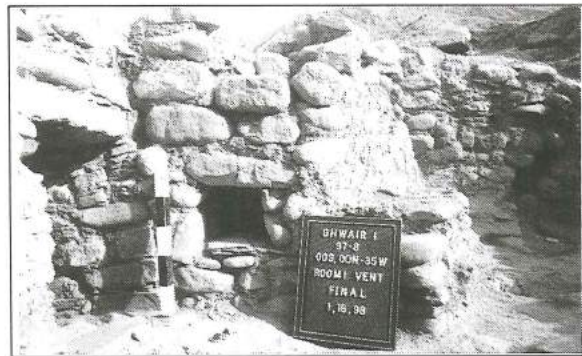
Areas Investigated

The 1997/98 excavations concentrated in four major areas of the site that had been previously defined; we also opened up new areas for future study. The preliminary results of our investigation are discussed below.

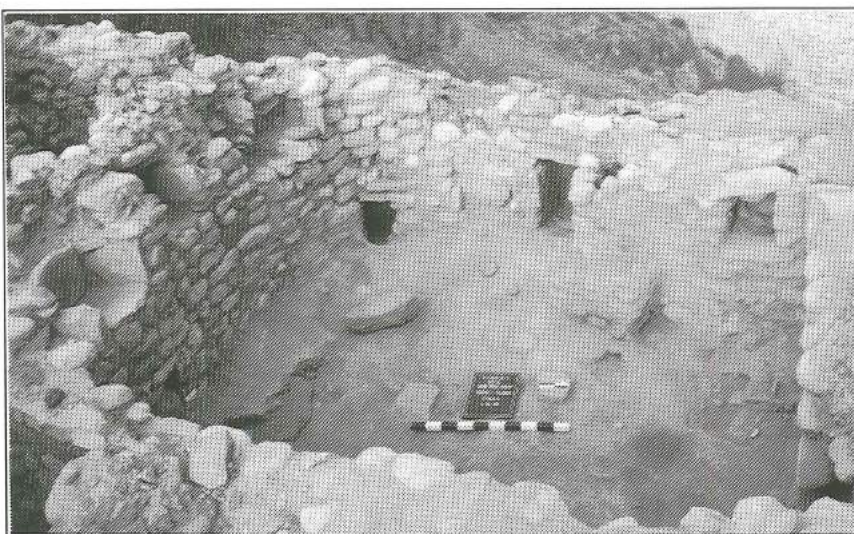
Area I

This is the principal area of the site, where architectural remains exceeding a depth of three metres have been previously defined. In 1996, a large room containing several niches was partially excavated, and a major goal of the 1997/98 season was to complete this room, designated as "Room 1". Room 1 was completely excavated down to the first clear plaster floor level. We now know that this is an unusually shaped structure, roughly square, but with a "jog" in the western wall (Fig. 4). Some remodelling is suggested. The southern wall contains at least 3 niches, the western wall has a blocked-in doorway with a passage leading to the west that was later inserted into the blockage. The western wall also has a small niche, a plastered bench, and a window-like feature. Preliminary indications suggest that at least two of the "niches" may

in fact have functioned as vents, as they are "hollow" up the length of the walls (Fig. 5). Immediately in front of the bench and directly on the floor was a group of four projectile points, three long blades, and a ground stone bowl, suggesting a primary use context. Unfortunately, most of the interior of the room's plastered floor has been damaged by roof fall, thus there are few intact features. Despite this, we know that Room 1's main plaster floor was replastered at least four times. The wall was plastered as well, although this is poorly preserved. Along the southern wall were the remnants of a subfloor feature in the form of a partially slab-lined pit. Excavation of this revealed it to be empty, but did indicate the presence of additional, earlier walls under the plastered floor. Finally, in the upper fill of the room were the remnants of a burial.



5. Room 1 in Area I. Close-up of one of the possible vent features.



4. Room 1 in Area I. Note niches (left and right), possible vent (left-centre), and entry (centre).

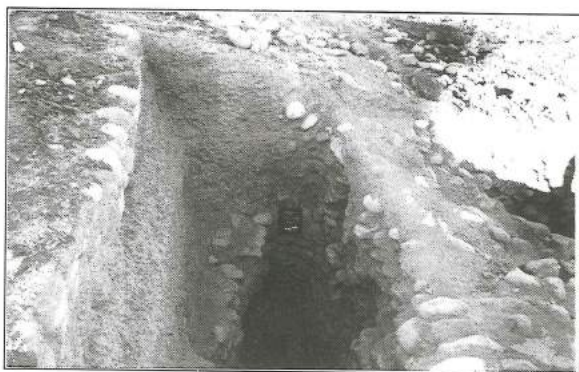
Unfortunately, this has been badly disturbed and is in poor context. Thus, we cannot tell if it is Neolithic or intrusive.

In summary, we know that Room 1 was an unusually complex structure for the PPNB period. The presence of several niches and other wall features suggests a special-use function of the room. Additional study in the vicinity of Room 1 during the next season should clarify its function.

In addition to Room 1, two adjacent 5x5 m units were partially excavated. Architectural features were apparent only a short distance below the present ground surface. These will be additionally investigated in subsequent seasons.

Area II

In 1996, a 5x5 m unit revealed a complex series of walls, many of which were massive and parallel, running laterally across the site (east-west). In 1997/98, these were further investigated. Water erosion also exposed a portion of wall that was partially visible on the surface. We excavated between this wall and the previously exposed one, and to our surprise, the depth here was considerable. A large layer of ashy deposits was exposed, and beneath this is another series of walls. This adds up to a total depth of over four metres below the present ground surface (Fig. 6). These results indicate a much more complex stratigraphy and building sequence in this area than expected.



6. 1997/98 excavations in Area II, showing depth of cultural deposits.

The large east-west wall exposed in 1996 was further followed to the west for ca 10 m. To the north of this wall is a series of additional walls or buttresses, but we did not expand upon these.

Finally in Area II, we expanded a small sounding excavated in 1996. This is nearly adjacent to the base of the mountain forming the southern edge of the site. Initially we felt that deposits here were sterile, but the new excavation revealed the presence of artifacts, but not architecture, at a depth of ca. 2 m.

Area III

In 1996, this area, near the eastern end of the site, was tested, revealing a large ash deposit but no architecture. In addition, an al-Khiyām type projectile point, suggesting the Pre-Pottery Neolithic A period, was recovered, as were a large number of bladelets. Available radiocarbon determinations, however, indicate a contemporaneity with the rest of the site (see below). This posed an interesting question, thus we continued to investigate this area, expanding upon the previous excavation. As with the rest of the site, this area is more complex than anticipated. The ashy deposits continue, but a stratified series of at least three plastered floors, in very bad condition, was also exposed, as were fragments of walls. The function of these is as yet unclear.

There also appear to have been some erosion "gullies" that may have been intentionally cut into this area, perhaps to channel water. Small walls also occur in what may be a natural erosion channel, suggesting attempts to block water. This channel cut through the previously mentioned plastered floors.

Immediately to the north of this area some additional architectural elements are visible on the surface, including one that appears to be ovoid in morphology. A 5x5 m unit was started here, better defining some of the walls visible on the surface. Here

another partial burial was recovered, but this was even in worse shape than that in Area I, consisting primarily of portions of a skull. This human material appears to not be *in situ*, and we cannot at this point determine if the individual was Neolithic or not.

Area IV

Area IV was initially excavated during the 1993 season and is located near the northern edge of the site. It consists of five 5x5 m units that have revealed a complex series of architectural remains, as well as one intrusive Roman burial. In 1997/8, we removed a series of balks that had been left in place since 1993. Material here was extremely rich, and once the balks were removed, the architectural plan was much clearer. As with other portions of the site, there appear to have been at least three building phases. What is striking here is that the earliest phase seems to have included a very large room, approximately 10 m on each side. This was subsequently reduced during the second phase into a much smaller room, and finally, during the third phase, was further divided into small units that may have been the lower storage units of a two story building.

New Areas

Several new areas of the site also were gridded out for subsequent investigation. This included a portion on the north-west slope of the site, where abundant architectural remains are visible on the surface. We also laid out two 5x5 m units between Areas II and IV (labeled Area V) and excavated these down through the first level of fill. Finally, on the northern low terrace of the site, where some Roman remains are visible, we excavated two 1x1 m units as geological test pits. These were over a metre deep and assisted the site geomorphologist in determining the deposition sequence of wadi deposits.

ARTIFACTUAL REMAINS

Chipped Stone

The original 1993 excavation at al-Ghuwayr I recovered a considerable chipped stone assemblage typical of the PPNB. Blades and blade-based tools, including projectile points (primarily Byblos-types), borers, and sickle blades, predominated in this collection, and points were abundant; naviform cores also were noted. Najjar (1994:80) felt that the closest parallels are to Bayḍa IV-V, but the assemblage also resembles materials from the Neolithic sites in nearby Wādī Fayḍān (Adams 1991; Raikes 1980).

During the 1996 and 1997/98 excavations, a huge quantity (exceeding 30,000 pieces) of chipped stone material was systematically recovered, as expected (Table 1). These are presently undergoing a tho-

Table 1. Chipped stone summary from 1996-1997/98 seasons at al-Ghuwayr I.

Class	Number	%	R%*
Tools	1,140	3.6	6.7
“Massive Tools”--blades	167	0.5	--
“Massive Tools”--flakes	30	0.1	--
Debitage--			
primary flakes	572	1.8	3.4
secondary flakes	2,088	6.6	12.3
tertiary flakes	3,580	11.	21.1
primary blades	123	0.4	0.7
secondary blades	1,133	3.6	6.7
tertiary blades	4,285	13.6	25.2
bladelets	2,421	7.7	14.2
core trimming elements	159	0.5	0.9
core tablets	45	0.1	0.3
Microflakes	1,157	3.7	6.8
Burin Spalls	99	0.3	0.6
Cores	198	0.1	1.2
Debris--chunks	6,406	20.3	--
Debris--chips	7,940	25.1	--
Hammerstones	38	0.1	--
Total	31,581	100.0	100.1

* Excludes debris (chips and chunks), hammerstones, and “massive tools--blades and flakes.”

rough typological and technological analysis following parameters established by Gebel and Kozłowski (1994), and the following comments should be considered as initial impressions of this assemblage.

Based on our sample, it is likely that all stages of chipped stone reduction occurred on-site. This is suggested by both the high number of debris, or shatter, often indicative of initial reduction, as well as by the large number of tertiary elements and microflakes, usually indicating final reduction stages and tool manufacture and/or re-sharpening. What is apparent, and somewhat unusual, is that there is a large number of microlithic elements present at the site, not in the form of tools, but rather as bladelets. This could suggest an earlier (Pre-Pottery Neolithic A?) occupation, a proposition supported by the presence of an al-Khiyām PPNA-like point (see above), as well as an apparent PPNA (WF 16) site located nearby (Finlayson and Mithen, in press). However, bladelets occur frequently in all areas of the site, not just in Area III where the al-Khiyām point was recovered. Thus, the high number of bladelets may more likely be related to the specialized blade technology utilizing naviform cores, where Wilke and Quintero (1994:40) have demonstrated that bladelets are a by-product.

The assemblage is clearly blade-oriented, although flakes also occur in abundance. By and large, the blades are well-made, long, and thin. Metric analyses, however, have not yet been completed. The ratio of flakes to blades is 1.13:1, indicating a nearly 50% proportion of these types of debitage blanks. If, however, bladelets are added to blades in the formula, blades actually predominate, with a proportion of flakes to blades of 0.79:1.

Another aspect of the assemblage relates to the amount of cortex on debitage, as reflected in primary and secondary blades and blades (i.e., those containing some cortex)

as opposed to tertiary elements. This variable may well relate to reduction stage and/or reduction efficiency. When all debitage (excluding specialized forms such as core trimming elements, core tablets, and bladelets [most of which are tertiary]) is examined, 33.2% contains cortex, while 66.8% is tertiary. This figure may, however, mask some technological variation. When debitage is divided into blades and flakes (again excluding those elements noted previously), the percentage of blades with cortex is only 22.7%, while for flakes this figure is 42.6%. This suggests that tertiary blades were perhaps a desired end product. As analysis progresses, it will be interesting to see the preference of debitage blanks for tools.

Cores are not overly abundant at al-Ghuwayr I. Although the typology has not yet been completed, there are several naviform types. This may, as suggested above, account for the high number of bladelets. The ratio of all debitage to cores is a very high 72.76:1. If our sample is representative, it suggests a relatively high degree of blank production per core, and an implied technological efficiency. Given that so little of the site has been investigated, however, these figures may be misleading. A few very massive "cores" (not tallied in Table 1) also were recovered. The function of these is not known, although they could have served as raw material tests.

The tools have not yet been analyzed, but are consistent with materials previously recovered. The range of tools is typical for a PPNB assemblage, and includes projectile points, burins, scrapers, retouched pieces, and drills/perforators. A large number of both drills and projectile points was recovered. While many of the points are Byblos types, a variety of other types also is represented, including some very small forms (including the al-Khiyām point).

One somewhat unusual class of tool occurs at al-Ghuwayr I. We have termed

these "Massive Tools." They are in the form of both blades and flakes, and are clearly, but crudely, retouched. They are large, exceeding 50 x 25 cm in at least two dimensions. Their function is as yet undetermined, but they may relate to architectural construction. They could have served either as large stone building block trimming tools, or perhaps they are the results of trimming the wadi cobbles used in building construction. Alternatively, these implements could have been used in ground stone manufacture.

Ground Stone

A rich ground stone assemblage is present at al-Ghuwayr I. Artifacts of numerous varieties, including mortars, grinding slabs, trough querns, a variety of stone vessels, more unusual forms, such as a large perforated weight, were recovered. These are presently under detailed analysis.

Other Finds

A variety of other materials were recovered. During the 1997/98 season, these included some beads, a mica or mother of pearl pendant perforated at both ends and in the center, and a beautifully manufactured bone pendant. Two additional crude pottery sherds (from Area I) also were recovered. Unlike previous seasons, however, no complete clay figurines were recovered. In 1996, for example, an animal (jackal or mountain goat?) figurine was retrieved, and in 1993, two anthropomorphic stone figurines and five clay zoomorphic figurine fragments were recovered. Other small finds from the earliest seasons include jewellery fragments, copper/malachite fragments and an incised baked clay "token."

Specialized Studies

Fauna Paul Croft (Lemba Archaeological Research Center, Cyprus) is presently conducting the analysis of the faunal remains. Thus far, a variety of economic forms have

been identified. These include caprines, cattle, pig, a small carnivore and one or more species of bird. Of particular interest is the presence of the partial remains of at least two cats in one of the niches of Room 1. These fall within the size range of modern domestic cat (*Felis catus*), but given their context they could represent either wild cat (*F. sylvestris = lybica*) or the smaller sand cat (*F. margarita*). Whether or not this is a fortuitous circumstance has yet to be determined.

Paleobotany. Reinder Neef (Deutsches Archäologisches Institut, Berlin) floated several liters of fill material and recovered a large amount of well-preserved materials. These included abundant and identifiable charcoal, barley, emmer wheat, pea and pistachio.

Phytoliths David Rhode (Desert Research Institute, Reno) collected samples for phytolith and pollen analysis, which will be conducted in the United States.

Geomorphology Rolfe Mandel (University of Kansas) conducted a preliminary geomorphological analysis of the site. He has identified three landforms upon which the site is located: an alluvial fan, a colluvial apron, and a high Pleistocene terrace. Most of the western third of the site is associated with the alluvial fan that formed at the mouth of a small, high-gradient wadi that joins Wādī al-Ghuwayr from the south. It was this wadi that initially exposed several meters of architecture at the site. A lobe of the fan extends out onto the high Pleistocene terrace. The PPNB horizon is sealed beneath ca. 1 m of stratified fan deposits on the western edge of the site. Most of the eastern two-thirds of the site is associated with a colluvial apron that formed at the foot of the wadi wall. The colluvial unit is ca. 50 -150 cm thick and thins away from the northern third of the wadi wall. PPNB features are sealed beneath and within the colluvium. The northern third of the site is associated with a high Pleistocene terrace

underlain by gravel-rich alluvium (the Upper al-Ghuwayr Beds). The surface of this terrace is the highest geomorphic surface other than the bedrock walls of the wadi. The PPNB horizon is sealed beneath a very thin veneer (less than 40 cm) of slope wash that covers the terrace surface.

Mandel's study will place Ghuwayr I within a wider geological context and will address site formation and post-occupational processes and well as assess the site's economic potential. He also will study the possibility that the inhabitants of al-Ghuwayr caused severe environmental stress, as has been suggested for larger Neolithic core settlements, such as 'Ayn Ghazāl (e.g., Rollefson 1997).

Chronology

Thus far, six radiocarbon determinations are available for the site. These are summarized in Table 2. They are stratigraphically consistent and indicate an early Middle PPNB placement.

Table 2. Radiocarbon determinations for al-Ghuwayr I, Jordan.

Date B.P.	Calibration	Laboratory	Provenience
8812 ± 61	7950-7870 B.C.	Hd 17219-17541	SW--Area 1, 10S40W
	7815-7705		"early phase"
8627 ± 46	7690-7660 B.C.	Hd 17220-17550	SW-Area 1, 05S35W
	7635-7540 B.C.		"late phase"
8528 ± 89	7575-7485 B.C.	Hd 17221-17359	NE-Area 4, 30N10E
8754 ± 52	7929-7592 B.C.	DRI 3256	SW-Area 2, 15S05W (Lv 3)
8755 ± 311	8484-7033 B.C.	DRI 3255	NE-Area 3, 00N40E (Lv 4)
9027 ± 116	8345-8297 B.C.	DRI 3253	SW-Area 2, 15S05W
	8273-7881 B.C.		(Lv 3)
	7810-7711 B.C.		
8806 ± 52	8007-7693 B.C.	DRI 3251	SW-Area 1, 00S35W
	7661-7636 B.C.		(Room 1-Lv 5)
8880 ± 117	8083-7592 B.C.	DRI 3252	SW-Area 1, 00S35W
			(Room 1-Lv 5)
8659 ± 178	8035-7411 B.C.	DRI 3254	SW-Area 1, 00S35W
	7399-7377 B.C.		(Room 3-Lv 6).
	7368-7309 B.C.		

Conclusions

Renewed investigations at al-Ghuwayr I have proven extremely successful. We now know that the site is far more complex than previously believed. Its relationship with a wider early Neolithic "interaction sphere" is yet to be determined, but it clearly functioned as an important settlement. In particular, it will be interesting to compare this small site with the numerous large Neolithic "mega" settlements with near "urban" characteristics that have recently been documented in both central (e.g., 'Ayn Ghazāl-Rollefson *et al.* 1992; Simmons *et al.* 1988, Wādī Shu'ayb-Simmons *et al.* 1989) and southern (e.g., Baṣṭa-Nissen 1990; Nissen *et al.* 1991, aṣ-Ṣifiyya-Mahasneh 1997, 'Ayn Jammān-Waheeb and Fino 1997, and perhaps 'Ayn Ḥammām-Rollefson and Kafafi 1985). The latter are all the more remarkable due to the marginality of the environment in the south and their occurrence on the fringes of the so-called "Levantine Corridor" (cf. Bar-Yosef and Cohen 1989).

At al-Ghuwayr I, the architectural sophistication indicates that it was more than a simple "outpost." There is a considerable amount of architectural variety at the site, even though it covers a relatively small area. In addition, the depth of deposits far exceeds what was anticipated. The artifact assemblage is varied and rich, and the preservation of both faunal and botanical remains is very good. These latter data sources will provide us with specific information of early Neolithic adaptive strategies within a marginal ecological setting. In short, the new investigations at al-Ghuwayr I have provided us with several questions that remain to be answered. These will be addressed in subsequent seasons.

Acknowledgements

We wish to thank the staff of the Department of Antiquities and its Director-General, Dr Ghazi Bisheh, for their as-

sistance in the project. We also would like to thank the hard-working staff and crew and the people of Wādī Faydān for their help throughout the project. Finally, we acknowledge the considerable assistance of the Royal Society for the Conservation of Nature, the British Institute for Archaeology and Ancient History, the American Center for Oriental Research, and Petra Moon Tourism Services in Wādī Mūsā.

Funding for the 1996 season was provided by the Brennan Foundation with additional support from the University of Nevada at Las Vegas. Support for the 1997/98 investigations was provided by the National

Science Foundation and the National Geographic Society, with additional support from the University of Nevada at Las Vegas and by the Department of Antiquities.

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References Cited

- Adams, R.
1991 The Wadi Faydan Project, Jordan. *Levant* 24:181-183.
- Algaze, G.
1989 The Uruk Expansion: Cross-Cultural Exchange in Early Mesopotamian Civilization. *Current Anthropology* 30:571-608.
- Bar-Yosef, O. and Belfer-Cohen, A.
1989 The Levantine "PPNB" Interaction Sphere. Pp. 59-72 in I. Hershkovitz (ed.) *People and Culture in Change*. BAR Int. Ser. 508. Oxford.
- Barnes, H., Flender, M., Ruben, I., Shafiq, R. and McQuitty, A.
1995 *Wadi Faydan Project, 1994-1995*. Report on file at the British Institute for Archaeology and Ancient History, Amman.
- Finlayson, B. and Mithen, S.
in press The Dana-Faydan (south Jordan) Epipaleolithic Project: Report on Reconnaissance Survey, 14-22 April, 1996. *Levant*.
- Gebel, H. and Kozlowski, S. (eds.)
1994 *Neolithic Chipped Stone Industries of the Fertile Crescent. Studies in Early Near Eastern Production, Subsistence, and Environment I*. Berlin: Ex orient.
- 1994 Ghwair I, a Neolithic Site in Wadi Feinan. *The Near East in Antiquity* 4: 75-85.
- Hauptmann, A.
1990 The Copper Ore Deposit of Feinan, Wadi Araba: Early Mining and Metallurgy. *The Near East in Antiquity* 1: 53-62.
- Levy, T. and Adams, R.
1997 *Excavations in the Wadi Fidan, Jordan (1997 Season)*. Paper presented at the annual meeting of the American Schools of Oriental Research, Napa, California, November 21.
- Mahasneh H.
1997 A PPNB settlement at As-Sifiyya in Wadi Al-Mujib. Pp. 227-234 in *SHAJ VI*. Amman: Department of Antiquities.

- Najjar, M.
 1992 Tell Wadi Feinan/Wadi Araba: a New Pottery Neolithic Site from Jordan. *The Near East in Antiquity* 3 : 19-28.
 1994 Ghwair I, a Neolithic Site in Wadi Feinan. *The Near East in Antiquity* 4: 75-85.
- Najjar, M., Abu Dayya, A., Suleiman, E., Weisberber, G. and Hauptmann, A.
 1990 Tel Wadi Feinan, the First Pottery Neolithic Tell in the South of Jordan. *ADAJ* 34: 27-56.
- Nissen, H.
 1990 Basta: Excavations of 1986-89. *The Near East in Antiquity* 1: 87-94.
- Nissen, H., Muheisen, M. and Gebel, H.
 1991 Report on the excavations at Basta 1988. *ADAJ* 35:13-40.
- Raikes, T.
 1980 Notes on Some Neolithic and Later Sites in Wadi Araba and the Dead Sea Valley. *Levant* 12:40-60.
- Rollefson, G.
 1997 The Neolithic Devolution: ecological Impact and Cultural Compensation at 'Ain Ghazal, Jordan. Pp. 219-229 in J. Seger (ed.) *Retrieving the Past*. Mississippi State: Cobb Institute of Archaeology.
- Rollefson, G. and Kafafi, Z.
 1985 Khirbet Hammam a PPNB Village in the Wadi el-Hasa, Southern Jordan. *BASOR* 258:63-69.
- Rollefson, G., Simmons, A. and Kafafi, Z.
 1992 Neolithic Cultures at 'Ain Ghazal, Jordan. *JFA* 19: 443-470.
- Simmons, A. and Najjar, M.
 1996 Current Investigations at Ghwair I, a Neolithic Settlement in Southern Jordan. *Neolithics* 2/96: 6-7.
- Simmons, A., Kafafi, Z., Rollefson, G. and Moyer, K.
 1989 Test Excavations at Wadi Shu'eib, A Major Neolithic Settlement in Central Jordan. *ADAJ* 33: 27-42.
- Simmons, A Kohler-Rollefson, I., Rollefson, G., Mandel, R. and Kafafi, Z.
 1988 'Ain Ghazal: A Major Neolithic Site in Central Jordan. *Science* 240 : 232-235.
- Waheeb, M. and Fino, N.
 1997 Evidence of Settlement Organization at 'Ain Jamman. Paper presented at the Symposium: *Central Settlements in Neolithic Jordan*. Wadi Musa, Jordan, July, 1997.
- Wilke, P. and Quintero, L.
 1994 Naviform Core and Blade Technology: Assemblage Character as Determined by Replicative Experiments. PP. 33-60 in H. Gebel and S. Kozlowski (eds) *Neolithic Chipped Stone Industries of the Fertile Crescent I*. Studies in Early Near Eastern Production, Subsistence, and Environment I. Berlin: Ex orient.



AL-BASIṬ NEOLITHIC SITE IN SOUTHERN JORDAN

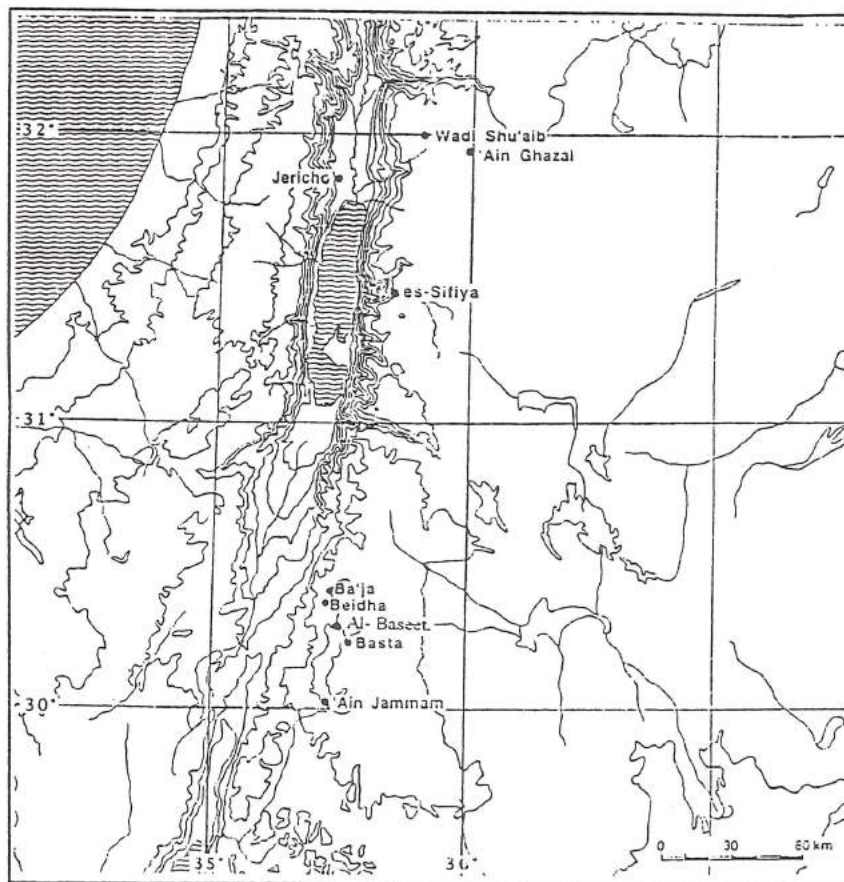
by
Nazeh Fino

Introduction

The Neolithic settlement of al-Basiṭ was discovered during the archaeological survey of the Wādī Mūsā water supply and wastewater project area in October-November 1996 ('Amr *et al.* 1996: 41-42 site Wādī Mūsā 8; 1998). The significance of this site was recognized then and an archaeological excavation was recommended to take place at the site before more of it is lost through construction activities ('Amr *et al.* 1996: 42). Such construction activities — for the building of a house — destroyed a further part of the site in July 1997. By chance, the symposium on Neolithic settlement patterns in Central Jordan was being held at Wādī Mūsā at the same time, and some of the par-

ticipants (H. G. K. Gebel, G. O. Rollefson and L. Quintero) dated this site to the Late Pre-Pottery Neolithic B period (LPPNB) on the basis of recovered surface artifacts (Fino 1997: 13). Because the site was endangered, the Department of Antiquities of Jordan decided to extend the Khirbat an-Nawāfla Project ('Amr and al-Momani 1998) to include excavations at the adjoining site of al-Basiṭ from 6-24 August and 10 October-25 November 1997. The excavation was directed by the author with Sa'ad Tweissi and Lina 'Arabiyat as square supervisors.

Al-Basiṭ is a medium-sized village, c. 5-10 ha. in size, located within the town of Wādī Mūsā near Petra (Fig. 1) at the following UTM grid coordinates: 738413E;



1. Al-Basiṭ and other large LPPNB settlements.

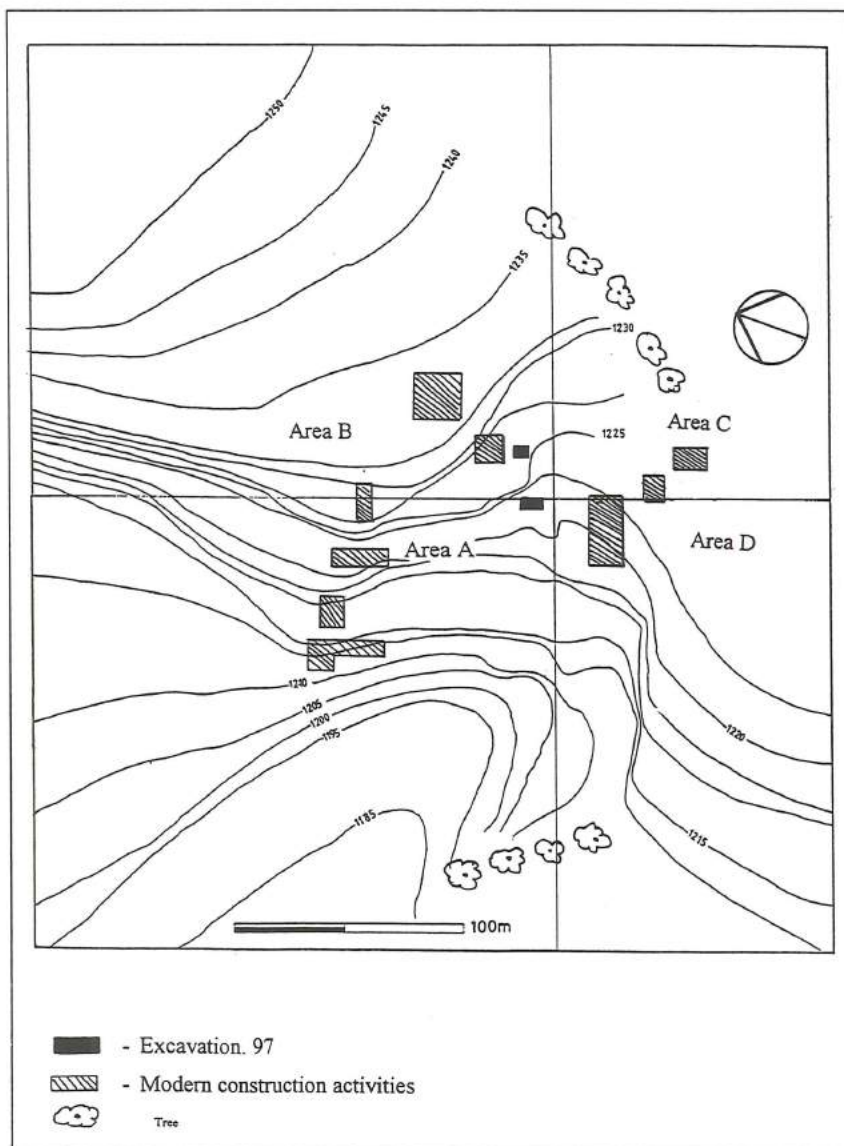
3358021N-738632E; 3357932N - 738766E; 3358166N-738793E; 3357954N. This settlement varies in elevation from 1195 to 1235m asl, and is located between two geographic units. Towards the east lie the steep slopes of the Eastern Arabian plateau with a series of springs located in the middle and upper parts of this area. The area to the west is characterized by sandstone areas of modest relief (Gebel 1988: 70, 71).

Stratigraphy and Architecture

After a contour map of the site was drawn, the site was divided into four areas: A, B, C and D (Fig. 2). Excavations were conducted in Areas A and B during the

1997 season. The excavation of square 02 in Area B revealed that the stratigraphic deposits in this portion of the site were 195 cm in depth, thus revealing a stratigraphic sequence which was divided into two phases from top to bottom (Phases I and II; Fig. 3). The upper Phase I is composed of agricultural layers, whereas Phase II is characterized by deposits from the LPPNB period. A description of the loci in Phases I and II is found in Table 1.

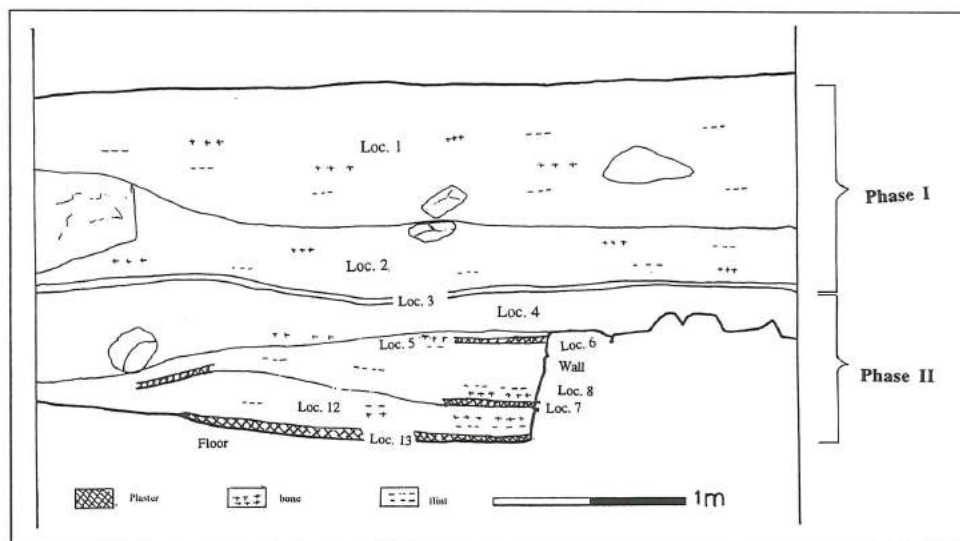
Phase I: Loci 1, 2 and 3 in square 01, Area A, and squares 01–02, Area B, are agricultural layers, with pottery dating to the MB(?), Iron II, Nabataean and Byzantine



2. Al-Basit 1997 excavation.

Table 1. Description of the loci in Phases I and II.

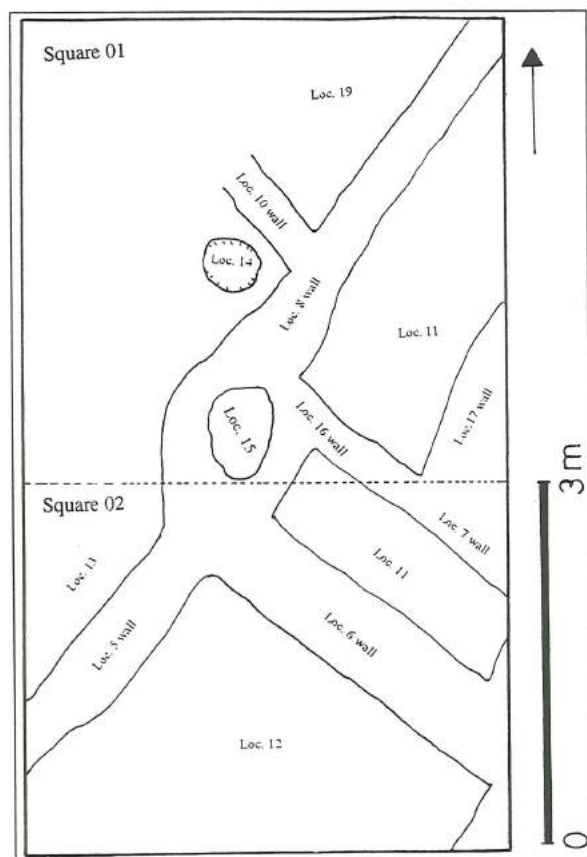
Phase Area Square			Locus	Description			
I	A	01	0	Top surface.			
			1	Yellow soil, fill mixed with pottery shards, flint, bone fragments, over all the square.			
			2	Dark brown soil, fill mixed with pottery shards, flint, bone fragments, over all the square.			
			3	Washed yellow soil, fill over all the square.			
I	B	01	0	Top surface.			
			1	Yellow soil, fill mixed with pottery shards, flint, bone fragments, over all the square.			
			2	Dark brown soil, fill mixed with pottery shards, flint, bone fragments, over all the square.			
			3	Washed yellow soil, fill over all the square.			
II	B	01	4	Dark greyish brown soil, loose, fill mixed with small limestone pebbles, flint, bone fragments, over all the square.			
			5	Brown soil, compact, may be roof, in the western part of the square.			
			6	Plastered floor, in the western part of the square.			
			7	Plastered floor, in the western part of the square.			
			8	Wall NE-SW, built with undressed limestones, in the middle of the square.			
			9	Dark greyish soil, fill mixed with flint, bone fragments, in the eastern part of the square.			
			10	Wall E-W built with small limestones.			
			11	Yellow greyish soil, compact. Surface, in the eastern part of the square.			
			12	Dark greyish soil, loose, fill mixed with flint, in the western part of the square.			
			13	Plastered floor, in the western part of the square.			
			14	Hearth, in the western part of the square.			
			15	Small stones built in circular shape, bin.			
			16	Wall E-W built with small limestones, in the southern part of the square.			
			17	Wall N-S built with small limestones, in the southeastern part of the square.			
			I	B	02	0	Top surface.
						1	Yellow soil, fill mixed with pottery shards, flint, bone fragments, over all the square.
						2	Dark brown soil, fill mixed with pottery shards, flint, bone fragments, over all the square.
3	Washed yellow soil, fill, over all the square.						
II	B	02	4	Dark greyish brown soil, fill mixed with flint, bone fragments, over all the square.			
			5	Wall NE-SW, built with undressed limestones, in the western part of the square.			
			6	Wall E-W, built with small limestones, in the eastern part of the square.			
			7	Wall E-W, built with small limestones, in the northeastern part of the square.			
			8,9,10	Dark greyish soil, loose, mixed with flint, stone vessels, bone fragments.			
			11,12	Yellow greyish soil, compact. Surface in the eastern part of the square.			
			13	Plaster floor.			



3. Al-Basit 1997: North section in Squares 01-02, Area B.

periods (mixed).

Phase II: LPPNB, separated from Phase I by Loc. 4 in squares 01-02, Area B (very dark greyish brown soil, 0.80 m thick with architectural remains, flint, animal bones and stone vessels) (Table 1 and Fig. 4).



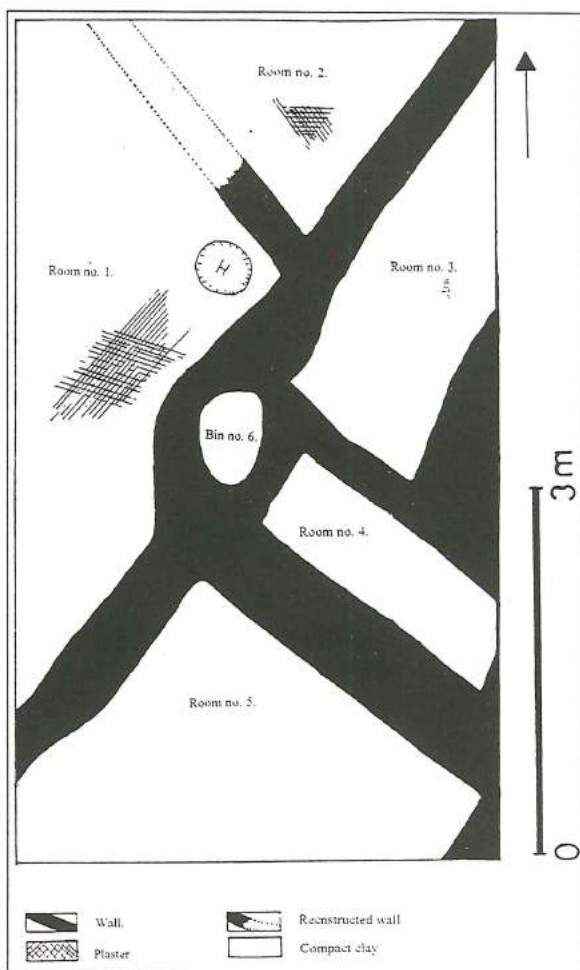
4. Al-Basit 1997: The main loci in Squares 01-02, Area B, Phase II.

The excavations in LPPNB deposits unearthed architectural remains which were not well-preserved due to destruction from later periods. That is to say that the architectural remains in this area are characterized by walls which were built of large undressed limestones that do not exceed 2 courses in height. These walls formed rectangular rooms, which abutted one another. The dimensions of the excavated rooms are not clear due to limited exposure (Figs. 4 and 5).

The interior walls and floors of Rooms 1 and 2 were covered with lime plaster (Fig. 5). In Room 2, the plaster floor was renewed at least three times. The plastered walls of both rooms were painted with red pigment. In the eastern corner of Room 1, there was a circular hearth set into the plastered floor. In contrast to Rooms 1 and 2, the floors of Rooms 3, 4 and 5 were covered with compact clay.

A tentative interpretation is that Rooms 1, 2 and 5 were used for domestic activities, whereas Rooms 3 and 4 were used for storage. This hypothesis is based on the layout of these rooms. A small storage bin, 0.60 m in diameter, was constructed in between the walls of Rooms 1, 3 and 4 (Bin no. 6 in Fig. 5).

The layout of the LPPNB building remains at al-Basit is similar to the archi-



5. Al-Basit 1997: LPPNB architecture in Squares 01-02, Area B.

ecture found at the sites of ‘Ayn Jammām (Fino 1996; 1997), ‘Ayn Abū Nkhaylah

(Kirkbride 1978: 1-10), Ba‘ja (Gebel 1988: 85) and Bas̄a (Gebel *et al.* 1988: 109).

Artifacts

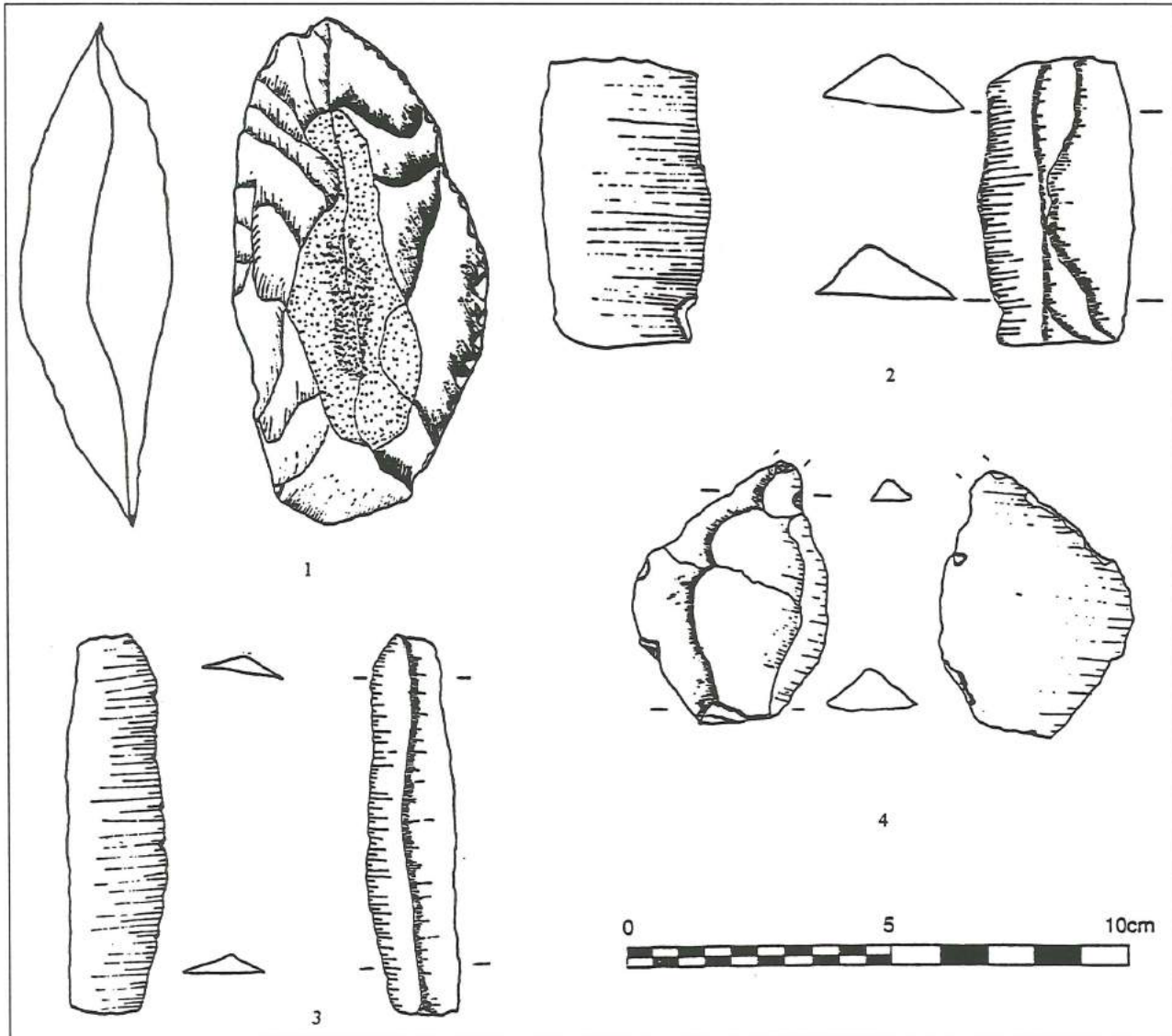
Excavation in Phases I and II unearthed more than 6064 pieces of chipped stone. Most of this material is made of flint, however there are also pieces of limestone and quartzite in the assemblage. The technical features of this assemblage are indicative of a LPPNB occupation. Table 2 illustrates the types and quantities of stone tools found in Phases I and II (Figs. 6 and 7).

The arrowheads, constituting 0.5% of the stone tools (Table 2), are divided into four types: Helwan, Jericho, Byblos and Amuq Arrowheads (Fig. 7). Helwan and Jericho Arrowheads usually appear in early PPNB deposits (Gopher 1994: 194, 260). At al-Basit, Amuq and Byblos projectile points constitute 80% of the arrowheads in the assemblage (Table 3). The composition of the arrowheads in this assemblage is also found at LPPNB sites such as ‘Ayn Jammām (Fino 1996; 1997), Bas̄a and Ba‘ja (Gebel 1988: 92-93).

The ground stone industry is very limited, and the ground stone tools sample collected during the 1997 season may not be a good representative of the site. Never

Table 2. Main type of flint tools.

	Phase I		Phase II					
Arrowhead	3	0.6	-	-	25	0.9	25	0.5
Sickle blade	2	0.4	6	0.2	-	-	6	0.1
Core	31	5.9	28	0.9	17	0.6	45	0.7
End scraper	1	0.2	6	0.2	4	0.1	10	0.2
Side scraper	15	2.8	26	0.8	9	0.3	35	0.6
Borer	7	1.3	149	4.5	54	1.9	203	3.3
Drill	1	0.2	2	0.1	-	-	2	0.03
Chopper	1	0.2	5	0.2	-	-	5	0.1
Chisel	-	-	7	0.2	8	0.3	15	0.3
Retouched blade	88	16.7	487	14.9	244	8.8	731	12.1
Retouched flake	99	18.8	387	11.8	225	8.1	612	10.1
Burin	-	-	59	1.8	22	0.8	81	1.3
Adzes/ Axe	-	-	3	0.1	-	-	3	0.04
Debitage	279	52.9	2109	64.3	2179	78.2	4288	70.6
Total	527	100%	3277	100%	2787	100%	6064	100%



6. Flint tools: 1. adze; 2-3. blades; 4. flake.

Table 3. Type of arrowheads.

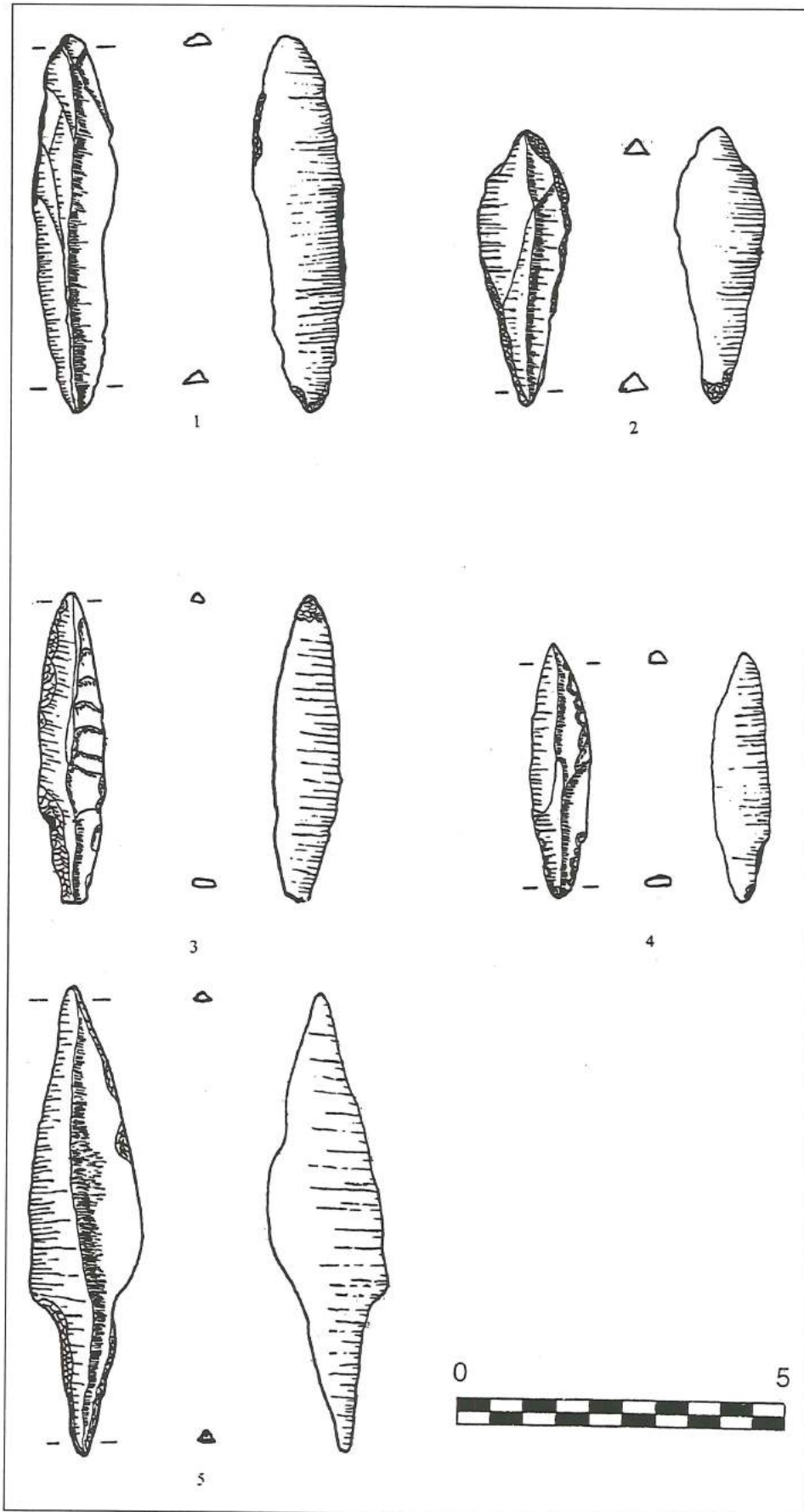
Al-Basit Arrowheads		
Type	No.	%
Helwan	3	12
Jericho	2	8
Byblos	9	36
Amuq	11	44
	25	100%

theless, the finding of a plano-convex grinding stone suggests that crops were processed at the site. Other artifacts in this assemblage include small and large stone bowls (Figs. 8-10).

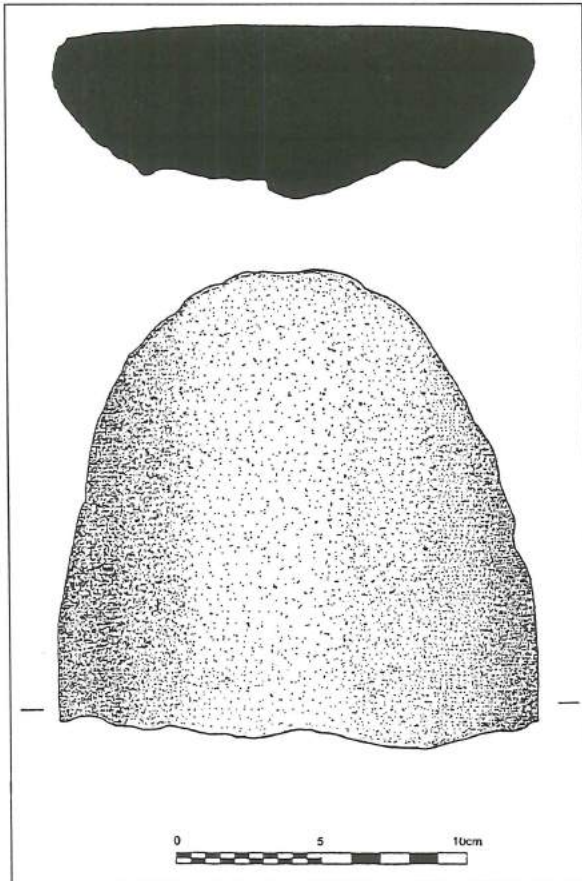
Conclusion

The 1997 excavation season at al-Basit demonstrates that the architecture and material culture of this site is comparable with other LPPNB sites such as 'Ayn Jammam, Basta and Ba'ja. It should be noted that the excavated area was limited and the site is in need of further exposure to be able to get better examples of the architecture and material culture, before the whole area is turned over to modern construction activities.

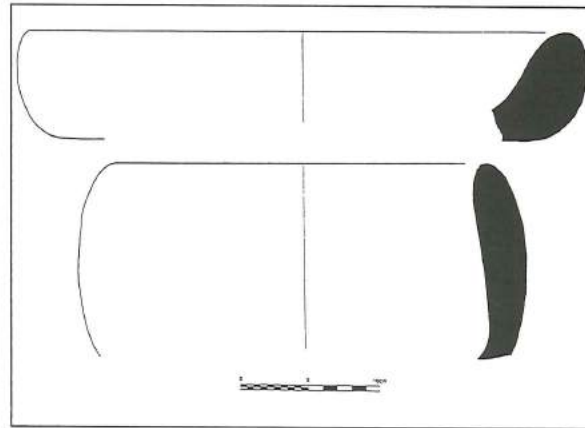
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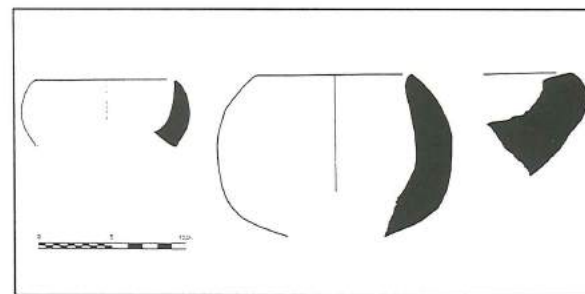
7. Arrowheads: 1-2. Amuq;
3-4. Byblos; 5. Jericho.



8. Grinding stone (of limestone).



9. Large stone bowls.



10. Small stone bowls.

References

- ‘Amr, K., Farajat, S., al-Momani, A. and Falahat, H.
 1996 *Archaeological Studies Final Report for Wadi Mousa Water Supply and Wastewater Project, Stage II - CDM - 002 Tender*. Unpublished report on file at the Department of Antiquities Registration Centre and the Water Authority of Jordan, Amman.
- ‘Amr, K., al-Momani, A., Farajat, S. and Falahat, H.
 1998 *Archaeological Survey of the Wādī Mūsā Water Supply and Wastewater Project Area*. AD AJ 42.
- ‘Amr, K. and al-Momani, A.
 1998 *Khirbat an-Nawāfla Excavation 1997*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
- Fino, N.
 1996 *Ain Jammam; An Archaeological Study*. Amman, University of Jordan: Unpublished M.A. thesis.
 1997 Al-Baseet, a New LPPNB Site Found in Wadi Musa, Southern Jordan. *Neo-Lithics* 3/97: 13-14.
- Gebel, H. G.
 1988 Late Epipalaeolithic - Aceramic Neolithic Sites in the Petra Area. Pp. 67-100 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.

Gebel, H. G., Muheisen, M. and Nissen, H. J.

1988 Preliminary Report on the First Season of Excavations at Basta. Pp. 101-134 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.

Gopher, A.

1994 *Arrowheads of the Neolithic Levant: A Seriation Analysis*. American Schools of Oriental Research, Dissertation Series, Vol. 10.

Kirkbride, D.

1978 The Neolithic in Wadi Rum: Ain Abu Nekheileh. Pp. 1-10 in R. Moorey and P. Parr (eds.), *Archaeology in the Levant*. England: Aris Phillips Ltd.



ARCHAEOLOGICAL RECONNAISSANCE IN THE AL-JAFR BASIN, 1997

by

Leslie A. Quintero and Philip J. Wilke

Introduction and Background

This paper briefly describes an archaeological reconnaissance conducted in the arid al-Jafr Basin of southeastern Jordan in the summer of 1997. The reconnaissance is an early phase of the al-Jafr Basin Archaeological Project, undertaken by the Lithic Technology Laboratory, University of California, Riverside, and designed to explore the prehistory of this empty quarter of Jordan. Initial observations showed that a very long prehistory exists in this region, one that is documented almost entirely by lithic technological traditions, the artifacts of which are the primary remaining surface deposits of cultural data.

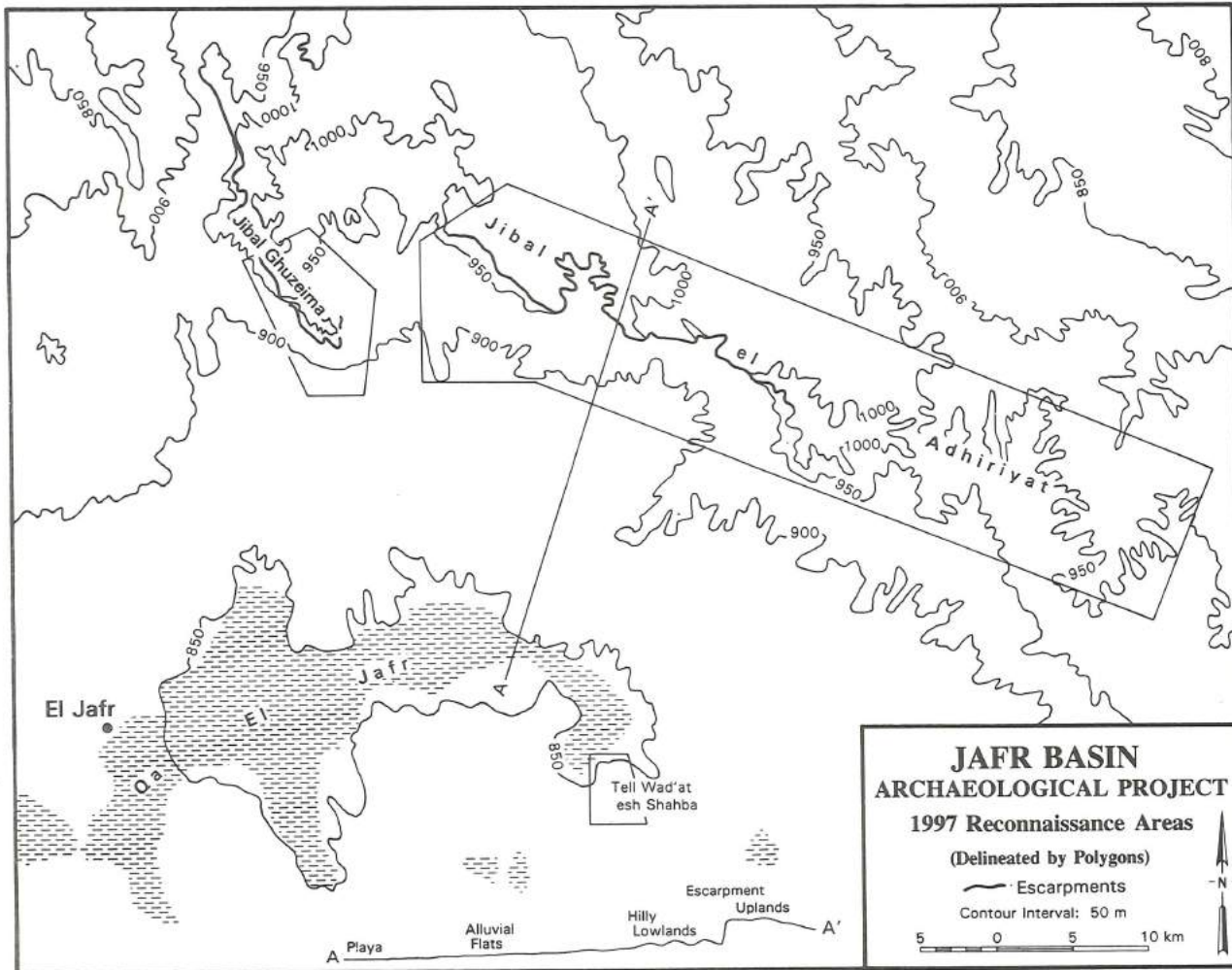
The goal of the al-Jafr Basin Project is to document long-term patterns of human use of the region and their relationships to ancient geomorphic zones, and to explore the significance of these patterns to the broad outlines of the prehistory of Jordan. The project focuses on the al-Jafr Basin because (1) this region provided ancient environments that were likely to have been extensively occupied for long periods of prehistory; (2) the current dryness (<50 mm annual precipitation) and remoteness of the region from most modern influences and economic developments are likely to have shielded archaeological sites from disturbance; and (3) this portion of Jordan remains essentially unexplored and undocumented archaeologically.

The al-Jafr Basin contains the most expansive enclosed drainage system in Jordan, encompassing 15,000 km² of the central plateau of the southeastern portion of the country (Bender 1975). In the center of the basin is Qā' al-Jafr, an enormous (240 km²),

dry mudflat, or playa system, the relict of a Pleistocene freshwater lake that is estimated to have been about 1,800 km² in area at its last high stand ca. 26,000 years ago (Huckriede and Wiesemann 1968; Bender 1975; fig. 1). During the Pleistocene, when favorable climatic periods gave rise to lake-stands, the region provided a rich lacustrine environment for human occupation.

Bordering the basin to the north and east are extensive uplifted sedimentary deposits, exposed portions of which range in age from Upper Cretaceous to Lower Tertiary. The uppermost exposure of the uplifted section consists of Paleocene and Eocene marls and limestones that comprise the Umm ar-Rijām formation (Fig. 2). The upper member of this formation contains extensive deposits of nodular flint. Elsewhere, notably flanking the ancient playa, are low-relief alluvial deposits of Pleistocene to recent age. Nine small and isolated basalt plugs occur along fissures in the uplands north of the playa (Kherfan 1987).

Only sparse archaeological exploration has been conducted in this vast area. It has consisted mainly of modestly recorded reconnaissances and observations, some made in the course of geological studies. Early archaeological field studies in the al-Jafr Basin and surrounding region (e.g., Rhotert 1938; Field 1960) documented the presence of numerous stone tools scattered on the surface of the desert pediments. Later research by Huckriede and Wiesemann (1968) noted a conspicuous Upper Paleolithic human presence in the basin and numerous Middle Paleolithic archaeological sites. Except for these studies, and a limited excursion by researchers from Japan (Fujii 1996),



1. Map of the northern portion of the al-Jafr Basin showing the relationship between the Qā'al-Jafr and the escarpments and associated uplands in the northern and eastern parts of the basin. Also shown are areas covered in the 1997 reconnaissance.



2. Western flank of Jibāl al-Khuzayma (Ghuzeima) showing relationship between uplands, escarpments, and hilly lowlands. Extensive flint deposits outcrop in the upper part of the exposed section comprising the Umm ar-Rijām formation, as seen in the foreground and on the isolated butte. The dirt track crossing the center of the photo ascends Jibāl al-Khuzayma via a low pass (Jibāl al-Khuzayma/Ghuzeima Pass) just to the right.

the archaeological record of the al-Jafr Basin remains almost completely unknown, lacking even a preliminary archaeological sequence. The present work in the al-Jafr Basin began with preliminary reconnaissance trips in 1993 and 1996, and continued with a more in-depth exploration in the summer of 1997 with the intent of expanding on these earlier works.

The 1997 Reconnaissance

The specific objectives of the 1997 reconnaissance were:

- (1) To locate archaeological deposits and examine them with respect to their geomorphic settings, including ancient lakeshore environments, nearby Quaternary landscapes, exposed Tertiary flint-bearing strata, and adjacent uplands, as well as seasonal watercourses that concentrate available rainfall.
- (2) To search for Paleolithic sites that might still be preserved and that attest to human occupation in the region when the Pleistocene lake and its related watercourses enriched the al-Jafr Basin.
- (3) To investigate the extent to which the southern desert region was used during Epipaleolithic times when the last waning, episodic lakestands existed, and during the Neolithic when the environment assumed conditions more like those of today.
- (4) To focus primarily on sites with lithic assemblages, since our expertise is in lithic technology, and on other sites likely to be related to these older manifestations.
- (5) Recognizing our limitations, to record the presence of later sites that might be present, but generally to leave their evaluation and study to others with the requisite interest and training.

We believe it important to note here that

the area has been used for considerable time by ancient and modern Bedouin groups, whose sacred places and burial cairns, or *rujum*, are to be respected and avoided. The locations and nature of these features are not important to the broader concerns of the al-Jafr Basin Project.

The area examined extended from the west flank of Jibāl al-Khuzayma on the northern rim of the basin southeastward approximately 50 km along Jibāl al-'Udhiriyyāt. A brief examination also was made at Tall Wad'at ash Shahbā (a landform; not an archaeological tall) on the east edge of the Qā' al-Jafr (Fig. 1). Geographically, attention was focused most strongly on two areas, the Jibāl al-Khuzayma region (map Jibal Ghuzeima, sheet 3251 II, 1:50,000), and the landscape along extensive southeast-trending escarpments of Jibāl al-'Udhiriyyāt that flank the northeast side of the basin, especially in the vicinity of Wādī al-Quwayr, the headwaters of Wādī Ukhaydir al-Matāha, Jibāl al-Ghuwayr, and the crown of Jibāl al-'Udhiriyyāt (as identified on maps Wādī Ukheidir ed Duweimi, sheet 3351 III, 1:50,000, and Qi'ān Wad'a, sheet 3350 IV, 1:50,000).

The procedure employed in the fieldwork was not designed to make an intensive systematic survey, but rather to examine on a regional scale the nature of sites and their relationships to geomorphic features with the goal of delineating specific areas for more intensive survey and analysis in the future. The reconnaissance involved a vehicle survey and a pedestrian search of specific zones to locate archaeological sites and identify their distribution patterns. Site locations were plotted on topographic maps and fixed with a small Garmin global positioning system (GPS); observations were recorded in notes and photographs; official site record forms were not used in this preliminary search, and sketch maps were not drawn of specific sites. Detailed recording of sites will follow in later phases of the research.

RESULTS OF THE RECONNAISSANCE

Geomorphic Zones

The reconnaissance resulted in the identification of several discrete geomorphic zones that are useful for characterizing the occurrence of archaeological sites (Fig. 1, section A-A'). These zones are here recognized as follows: *uplands*, or mesas (generally about 1000 m elevation asl), of uplifted sediments that comprise the head-waters or catchments of wadis, many of which drain into the al-Jafr Basin; *escarpments* of about 950 to 1000 m elevation and about 50 m high that mark the edge of the uplands and provide an abrupt transition to the nearby lowlands; *hilly lowlands* of moderate relief, generally 900 to 950 m elevation, that occur between the elevated uplands and the *alluvial flats*; alluvial flats, 850 to 900 m elevation, that extend from the hilly lowlands to the edge of the *playa* system, or mudflats (ca. 850 m elevation), that mark the former bed of Pleistocene Qā'al-Jafr.

Archaeological Sites

The accessibility of both water and flint for human use are seen as major determiners of the locations of ancient human activity, and hence of the locations of archaeological sites. Deposits of high-quality nodular flint are exposed on the hills, in the faces and at the bases of the escarpments, in the uplands, and in areas of broken terrain near the escarpments. Many preserved sites then relate to the quarrying and reduction of flint for tools in these zones. Such sites attest to a very lengthy human occupation of the region.

Forty-five archaeological sites were recorded. A preliminary evaluation suggests that most of these reflect more than one archaeological expression, or component; only a few appear to be single-component sites. The discussion that follows considers the data in terms of components reflecting general archaeological periods and the geo-

morphic settings in which they were found. The classification of sites in technological stages or periods should be considered tentative and subject to revision based on further studies (Table 1). A significant issue that needs to be resolved is the difficulty of assigning surface assemblages particular chronological and technological classifications in the absence of other dating criteria.

Lower Paleolithic Components

Lower Paleolithic components were not abundant, and were identified at 8 sites, located mainly along the escarpments. These Lower Paleolithic deposits are all assigned to the Acheulean tradition, and are identified primarily by the presence of handaxes and cleavers. Isolated artifacts occur on the flanks of the escarpments and at Tall Wad'at ash-Shahbā, an isolated hill at the east end of the playa that marks a high shoreline of the ancient lake (Huckriede and Wiesemann 1968). One cluster of lithic scatters containing handaxes occurs on ancient terraces in a truncated wadi drainage, or box canyon, of Jibāl al-'Adhiriyyāt that probably once contained a spring. Field observations suggest that this canyon was evacuated over a long period of time by a discharging aquifer, rather than by downcutting of the drainage from atop the escarpment, so that Acheulean occupation in this area most likely occurred adjacent to a spring-fed stream. Sites recorded here include al-Jafr-31 (with 10 handaxes), -32 (with 9 handaxes), and -33 (with 5 handaxes, 4 of which are cleavers).

Middle Paleolithic Components

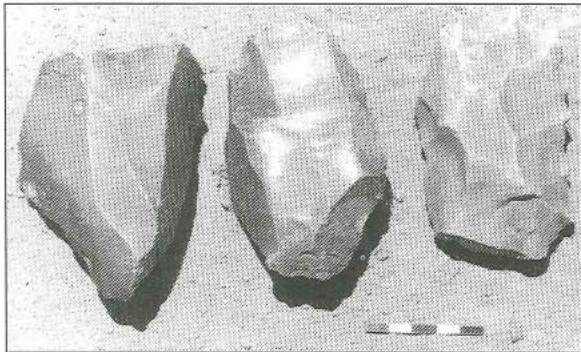
Middle Paleolithic components are abundant, appearing at 37 sites. These expressions are of two types. The first type (as at sites al-Jafr-9, -15, -38, and -43) includes assemblages of clearly recognized Levallois artifacts such as point cores, flake cores, points, etc. These artifacts were apparent as separate lithic scatters and isolates, and also

Table 1. Archaeological sites recorded in the 1997 reconnaissance and their preliminary classification.

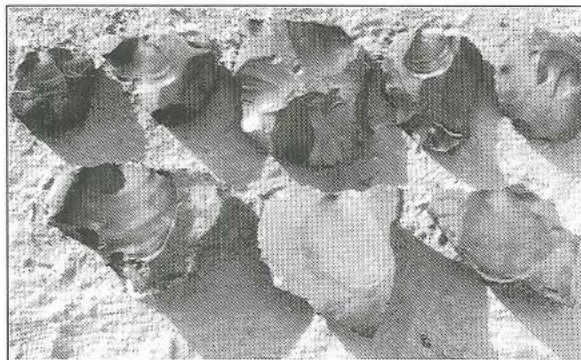
Site Zone	Quarry/ Workshop	Chronological Period						Comment
		LP	MP	UP	Epi	Neo	Other	
1 Escarpment	+	—	+	+	—	—	—	—
2 Hilly lowlands	+	—	—	+	+	—	—	—
3 "	+	—	+	+	—	—	—	—
4 "	+	—	+	+	—	—	—	—
5 "	+	—	+	+	—	—	—	—
6 "	+	—	+	+	—	—	—	—
7 Escarpment	—	—	+	+	—	—	—	—
8 Hilly lowlands	+	—	+	+	—	—	—	—
9 "	—	—	+	—	—	—	—	—
10 Uplands	+	—	+	—	—	—	—	—
11 Escarpment	+	+	+	—	—	—	—	—
12 Escarpment/Uplands	+	—	+	+	—	—	—	—
13 Uplands	—	—	—	—	—	—	+	historic?
14 Hilly lowlands	+	—	+	+	—	—	—	—
15 Uplands	—	—	+	+	—	—	—	—
16 Escarpment/Uplands	+	—	+	+	—	—	—	—
17 Uplands	—	—	+	+	—	+	—	petroglyphs, corral
18 "	+	—	+	+	—	—	—	—
19 "	—	—	+	+	—	—	+	petroglyphs
20 Hilly lowlands	+	—	+	+	—	—	—	—
21 "	+	+	+	+	—	—	—	—
22 "	—	—	+	+	—	—	—	—
23 Escarpment (base)	+	—	+	+	—	—	—	—
24 Hilly lowlands	—	—	+	+	—	—	—	—
25 "	—	—	+	+	—	—	—	—
26 Escarpment (base)	—	+	+	+	—	—	—	—
27 "	—	—	+	+	—	—	—	—
28 Escarpment	—	—	+	+	—	—	—	—
29 "	+	—	+	+	—	—	—	—
30 Escarpment (base)	—	—	—	+	—	—	—	—
31 "	—	+	—	—	—	—	—	—
32 "	—	+	—	—	—	—	—	—
33 "	—	+	+	—	—	—	—	—
34 Escarpment	—	—	+	—	—	—	—	rockshelter
35 "	+	—	+	—	—	—	—	—
36 Escarpment (base)	—	—	—	+	—	—	—	—
37 Hilly lowlands	+	—	+	—	—	—	—	—
38 "	—	+	+	+	—	—	—	—
39 "	—	—	+	+	—	—	—	—
40 Uplands	—	—	+	+	—	—	—	—
41 "	+	—	+	—	—	—	—	—
42 "	+	—	+	+	—	—	—	—
43 Hilly lowlands	—	+	+	+	—	—	—	—
44 "	—	—	—	—	+	—	—	—
45 "	+	—	—	—	+	—	—	—
Total components		8	37	32	3	1	2	

appeared at multi-component sites (Fig. 3). Levallois artifacts were widely distributed in the uplands and the hilly lowlands, and also at Tall Wad'at ash-Shahbā.

The other assemblage type (20 in number, as at sites al-Jafr-10, -12, -29, -35, and -41) is tentatively assigned to the Middle Paleolithic on technological grounds and consists largely of extensive quarry-and-reduction areas that are situated primarily along the escarpments. The chief characteristic of such sites is production of flakes "side-struck" from large nodules of flint (Fig. 4). Side-struck flakes usually are very broad, often are cortical, and tend to have hinge terminations. Such flakes left at the quarry sites generally are unmodified and very likely were rejected as tool blanks; however, some flakes are present that were retouched as scraping tools (Fig. 5). The nodules, which constitute a form of minimally prepared core, and the

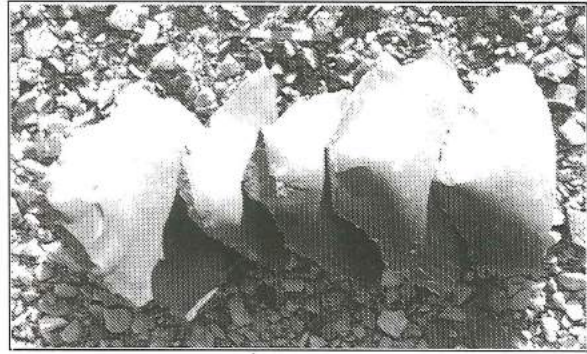


3. Middle Paleolithic cores and heavy scraper at al-Jafr-17. Here and elsewhere, centimeter scale.



4. Large Middle Paleolithic cores from which "side-struck" flakes were removed. Al-Jafr-12. Note scale at left.

1. We recognize the possible association of this technology to Chalcolithic/ Early Bronze "Fan-



5. Ventral view of large side-struck flakes; left and right specimens with faceted, convex platform preparation. Al-Jafr-10.

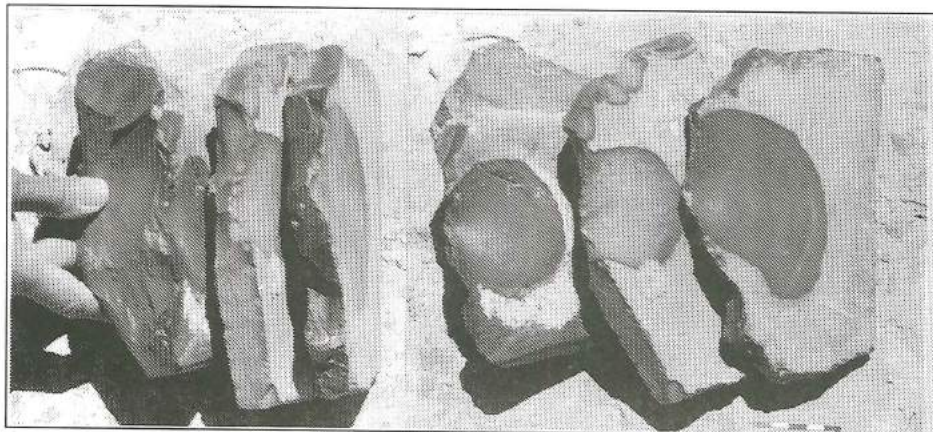
flakes struck from them, often both exhibit faceted convex platform preparation of the Levallois tradition (Fig. 6).¹ At large sites of this nature there are tens of thousands of such examples. Most sites are located at large outcroppings of flint nodules, generally where nodules of high-quality flint are exposed *en masse* on the surface of uplifted strata. These outcrops provided the basis for extensive quarrying and reduction of flint for tool blanks.

In addition to side-struck flake assemblages, many of these quarry sites also contain more traditional Levallois artifacts, and most of them also contain abundant blade-core production and reduction debitage. These blade-core assemblages are cautiously assigned an Upper Paleolithic age, as discussed below, but some may well be transitional Middle/Upper Paleolithic deposits.

Upper Paleolithic Components

Upper Paleolithic components are represented at 32 sites widely distributed in the uplands, along the escarpments, and in the hilly lowlands where flint suitable for blade-core production was available. In some cases (as at al-Jafr-1, -14, -27, -29, -30, -36, and -42) it appeared that the deposits were discrete components where one to many blade cores were prepared and reduced, and that the better blades were removed from the assemblages. In most cas-

scraper" production, but reject the possibility at present due to a lack of supportive data.

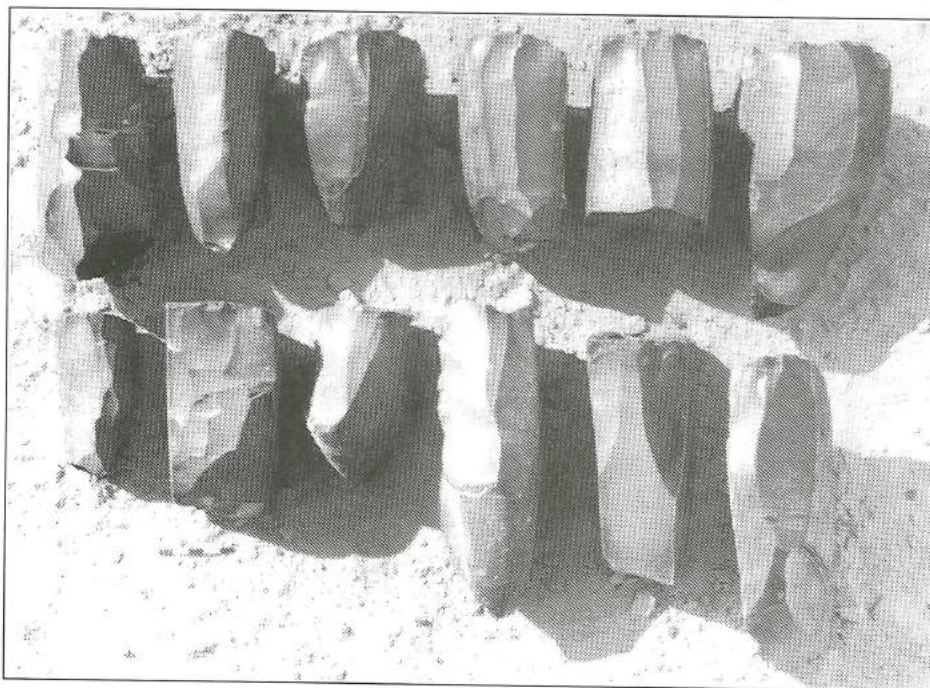


6. Platform and face views of side-struck flake cores showing faceted, convex platform preparation. Al-Jafr-1.

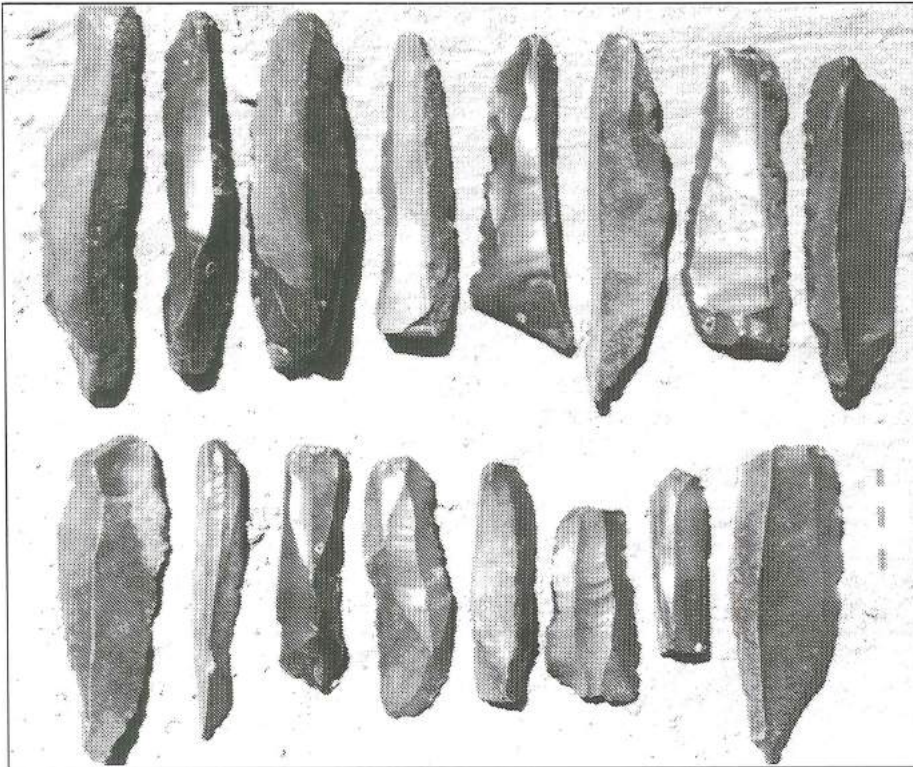
es (e.g., al-Jafr-5, -6, -8, -12, and -20), however, blade-industry assemblages were scattered over a large area otherwise dominated by the debris of Middle Paleolithic side-struck flake production. Assemblages assigned to the Upper Paleolithic include abundant blade-core production and reduction debris, including cores, platform spalls, initial cortical blades, crested blades, and regular blades, as well as flake cores, and tools such as end-scrapers made on blades. Spent blade cores left at such sites usually are single-directional, 10 cm or more long, and have single-facet platforms; some cores are bidirectionally opposed (Fig. 7). Blades usually represent early stages of core reduction, and are quite robust and

broad (Fig. 8). Most show no indication of platform isolation but were detached simply by striking the core platform a few millimeters behind one or two prominent ridges on the working face. Blade platforms are therefore very broad and thick.

It should be stressed that the attribution of these blade assemblages to the Upper Paleolithic remains problematic and requires further clarification. In view of the fact that they are undated surface manifestations, that they have not yet received intensive technological evaluation, that their association is so often with the prominent side-struck flake industry displaying Levallois technological features, and that certain ambiguity exists concerning blade production



7. Spent blade cores typical of Upper Paleolithic components. Al-Jafr-12.



8. Discarded, mostly early-stage, Upper Paleolithic blades. Al-Jafr-12. Table 1.

in transitional contexts, the possibility that some or all of the occurrences of this blade industry actually date to the Middle/Upper Paleolithic transition cannot be discounted.

Epipaleolithic Components

Components provisionally classified as Epipaleolithic were noted only at 3 sites (al-Jafr-2, -44, and -45) during the reconnaissance. One of these sites was located in the hilly lowlands near Jibāl al-Khuzayma/Ghuzeyma; while the latter two at the east edge of the al-qā' at Tall Wad'at ash-Shahbā are significant in that they occur along the last high mark of the Pleistocene lakeshore, as projected by Huckriede and Wiesemann (1968: map). It is noteworthy that two other Epipaleolithic sites located by Huckriede and Wiesemann during their geologic survey also occurred along this projected Pleistocene lakeshore. Assemblages observed in the present reconnaissance include small (bladelet) and large blade cores and many finely made, straight blades and bladelets. Large blades generally were detached from single-direction blade cores

made on thin, tabular pieces of flint. Bladelet cores are of both single-direction and opposed-platform configurations. A few burins on blades were noted also.

Neolithic Component

A single Late Pre-Pottery Neolithic B encampment (al-Jafr-17) was located in the uplands at the head of a tributary of Wādī al-Quwayr. The site is in an area of current Bedouin pasturage on the divide between the al-Jafr Basin and the drainage of Wādī Bāyir to the north. The main portion of the site contains a dense lithic assemblage that includes many naviform cores and single-direction blade cores, debitage from production and reduction of blade cores, burins, and other informal tools. There are indications that a buried structure may be present. About 100 m from the lithic scatter is a low rock corral about 10 by 20 m in size built into the slope of the tributary wadi. The corral is associated with a small assemblage of flakes of undetermined age, and its attribution to the Neolithic period is at present uncertain.

Nonetheless, the appearance of an LPPNB encampment in the southeastern desert of Jordan is most unexpected, and is suggestive of an early pastoral adaptation to the arid environment. About 200 m down the tributary of Wādī Quwayr is a group of petroglyphs, some of which may portray ibexes. Also at the same site is an Upper Paleolithic component marked by blade-core production and reduction debitage and many large blades, as well as a Levallois point core.

Other Finds

Additional undated sites and cultural features noted during the reconnaissance include many unrecorded burial cairns, or *rujum* (many with Safaitic [?] and Arabic inscriptions), usually on prominent topographic features such as the edges of escarpments, some of which may be of quite recent age, petroglyphs (at al-Jafr-17 and -19) of undetermined cultural association in the uplands, and some enigmatic rock structures.

Most notable of the sites with structures is al-Jafr-13, inconspicuously positioned in an upland drainage basin on Jibāl al-Khuzayma/Ghuzeima. It is a very large building complex distributed over perhaps 6-8 ha. Surface features include 12 low, rectangular, stone enclosures containing about 30 apparent dwellings, many of which are semi-subterranean with very low walls made of irregular blocks of limestone and large flint nodules. Also present are two large rectangular pavements of massive flint nodules, a stone corral, at least two structures for communal functions (?), one of which appears to be a "desert mosque." The mosque is a rectangular enclosure a single tier of rocks high that contains a niche in the middle of the south side with Arabic inscriptions on prominent stones. An apparent entrance to the structure is on the opposite wall. There is also a small rectangular building with well-preserved rock walls about one meter high. The site is devoid of artifacts, and there are

indications that in the past it was accessible only via a camel track. It is possible that this site represents a military encampment used in the recent past prior to the appearance of modern vehicles.

Concluding Remarks

Future work of the al-Jafr Basin Project will include additional observations on the sites located during the 1997 reconnaissance and a detailed recording of them; technological analysis of the lithic assemblages discussed above, and more detailed archaeological surveys of selected geomorphic zones. This next phase of the project is scheduled for the spring of 1999.

Specific investigations will focus on patterns of settlement adaptation within the geomorphic zones in the basin, including their relationships to the recurring appearance of the ancient lake and associated watercourses, and to exposures of tool stone. Lower Paleolithic settlement patterns in the al-Jafr Basin are essentially unknown, and more intensive search will be necessary to augment the number of known sites and their distributions. An important aspect of future work will be the search for sites with buried components, especially single-component sites and those with intact stratigraphy, possibly preserved in rockshelters or exposed in cutbanks, that will help to sort out the chronological problems associated with the Middle and Upper Paleolithic periods. Also of concern are the conspicuous exploitation of flint for side-struck flakes and for blades, and verification of the cultural periods to which these industries are currently attributed. Clarification is needed on the significance of the nearly complete co-occurrence of currently classified Middle Paleolithic and Upper Paleolithic components at quarry sites in the region. Detailed technological analyses of these assemblages will be of value in this regard. The apparent sparse Epipaleolithic occupation of the northern basin in general, and the limited as-

sociation of Epipaleolithic sites with ancient lakeshores and watercourses in the al-Jafr Basin remain problematic and require further inspection of these regions. Early pastoral adaptations in the northern uplands during the Neolithic period are suggested at al-Jafr-17, and it is hoped that additional related sites can be found with more intensive surveying. Finally, the cultural affiliations of rock art and the many inscriptions in the uplands bordering the al-Jafr Basin require documentation and analysis.

Our success in locating archaeological sites in the al-Jafr Basin was enabled by the extraordinary conditions of preservation. There has been little economic development, modern land-use has not heretofore been intensive, and the region is remote and relatively inaccessible. Because of the abundance of flint on the surface in many places, ancient archaeological surface assemblages appear not to have been gleaned as resources for tool production by later peoples. Combined, these factors have left an ar-

chaeological record that is largely unchanged and essentially frozen in time. These circumstances make the al-Jafr Basin a very unique and important region for studies of the earlier periods of prehistory.

Acknowledgements

We thank the Department of Antiquities of Jordan for permission to undertake fieldwork in the al-Jafr Basin. The British Institute at Amman for Archaeology and History, and the al-Jafr Police Post provided logistical support, and the Academic Senate of the University of California, Riverside, contributed partial funding for this project.

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Bibliography

- Bender, F.
 1974 *Geology of Jordan*. Berlin: Gebr. Borntraeger.
 1975 *Geology of the Arabian Peninsula, Jordan. USGS Professional Paper 560-I*. Washington: U.S. Geological Survey.
- Field, H.
 1960 North Arabian Desert Archaeological Survey, 1925-50. *Papers of the Peabody Museum of Archaeology and Ethnology* 45(2). Cambridge: Harvard University.
- Fujii, S.
 1996 A Preliminary Survey of the al-Jafr Basin, Southeast Jordan. *Neo-Lithics* 1/96:4-5.
- Huckriede, R. and Wiesemann, G.
 1968 Der Jungpleistozane Pluvial-See von El Jafr und Weitere Daten zum Quartar Jordaniens. *Geologica et Paleoentologica* 2:73-95.
- Kherfan, A.
 1987 The Geology of Jibal Ghuzayma: Map Sheet No. 3251 II. *Bulletin* 6. Amman, Geological Survey and Bureau of Mines, Geology Division, Geologic Mapping Project.
- Quintero, L. and Wilke, P.
 1998 Preliminary Archaeological Reconnaissance in the Jafr Basin, 1997: Report submitted to the Department of Antiquities, Amman.
- Rhotert, H.
 1939 *Transjordanien: Vorgeschichtliche Forschungen*. Stuttgart: Verlag Strecker und Schröder.

QĀ' ABŪ ṬULAYḤA WEST: AN INTERIM REPORT OF THE 1997 SEASON

by
Sumio Fujii

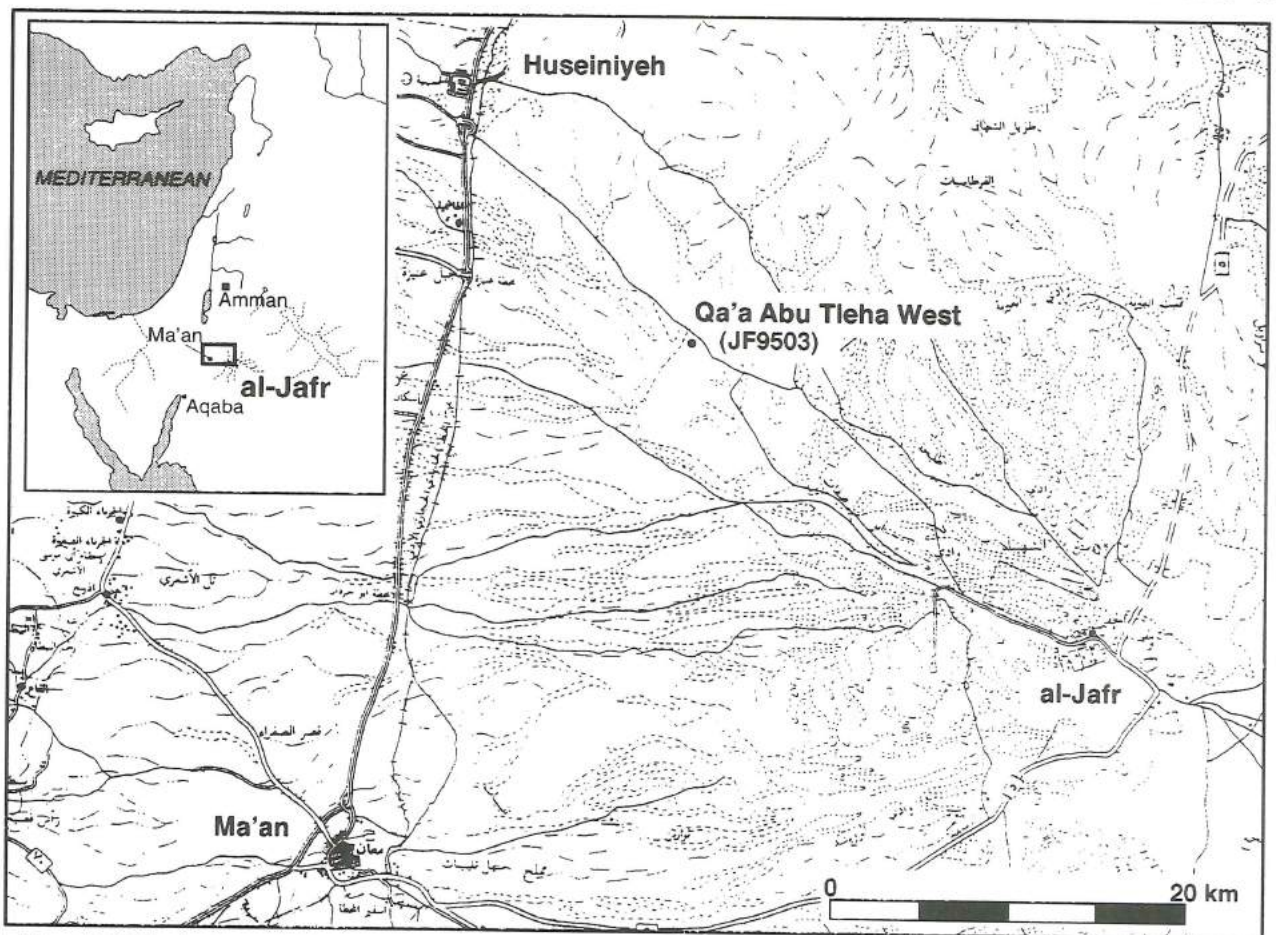
The first season of the al-Jafr Basin Pre-historic Survey and Excavation Project JBSEP was carried out from September 1 to October 10, 1997. This season's work was focused on the excavation of Qā' Abū ṬulayḤa West – a large manufacturing site of tabular scrapers that was found for the first time beyond the limits of the Negev/Sinai region. This report outlines the result of the excavation and briefly refers to the points at issue at the present stage.

Site Setting

Qā' Abū ṬulayḤa West (JBSEP Registra-

tion No. JF-9503) was found during our preliminary survey in 1995 and has been briefly introduced elsewhere (Fujii 1996). It is situated in the northwestern part of the al-Jafr basin (Fig. 1). The Desert Highway branches off just south of al-Ḥusayniyyah, a small town some 50 km north of Ma'ān, and leads directly to al-Jafr; the site is just between these two locations. Global Positioning System (GPS) identified the location: latitude 30°27'59" N, longitude 35°56'57" E, and approximately 980m in altitude.

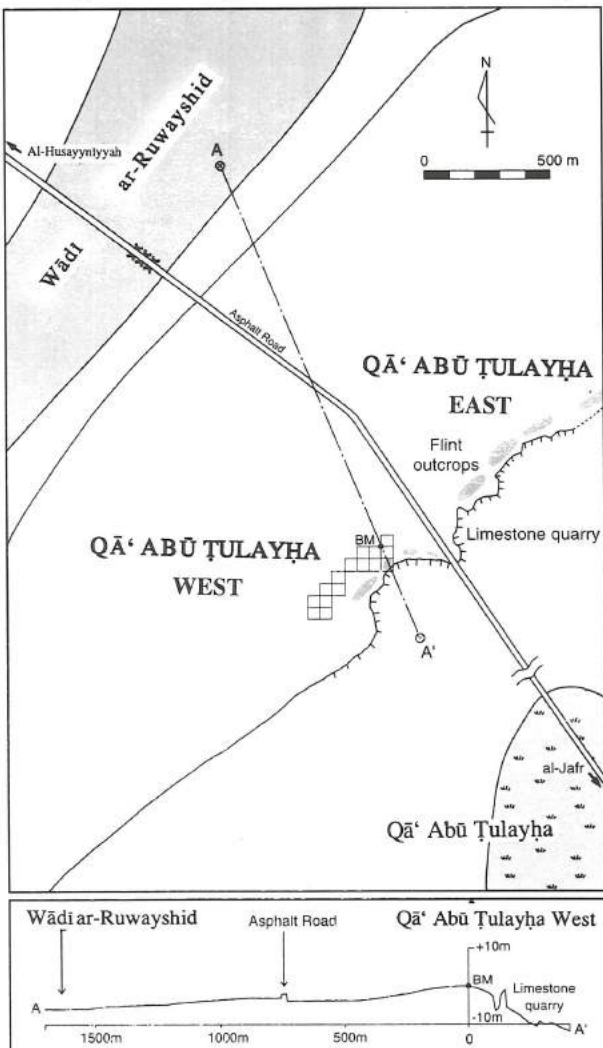
The climatic condition of this area is



1. The al-Jafr basin (especially the northwestern part).

very severe today. The annual rainfall in normal years is no more than 50 mm (Alex 1985: 360; Royal Jordanian Geographic Center 1986: 14). The shortage of rainfall, coupled with the high evaporation rate, results in a typical Irano-Turanian or Saharo-Arabian vegetational environment. Natural stands of trees are only rarely seen. Even shrubs and grasses are restricted to wadi beds and on the fringe of *qā'* (salt pan) during summer.

Topographically, the site is situated on a gentle hill between the two catchment areas: a small salt pan, *Qā' Abū Ṭulayḥa*, in the southeast and *Wādī ar-Ruwayshid* in the northwest (Fig. 2). More precisely, it is nearly on the top of the southeastern slope



2. *Qā' Abū Ṭulayḥa* West and East: schematic figure of the topography.

of the hill, thus facing *Qā' Abū Ṭulayḥa*. However, as is shown in the elevation map, the flat landscape makes it possible to view the opposite catchment area.

Geomorphologically, this area represents a typical *Hammada* - flint strewn desert (Bender 1968: 9; Cooke *et al.* 1993: 68). Flint pebbles/cobbles cover up the ground except for wadi beds, thus presenting a black distant view. They are characterized not only by heavy abrasion but also by thermal flaking and luster. The long weathering in the harsh environment and the direct exposure to the sun are probably responsible for this phenomenon.

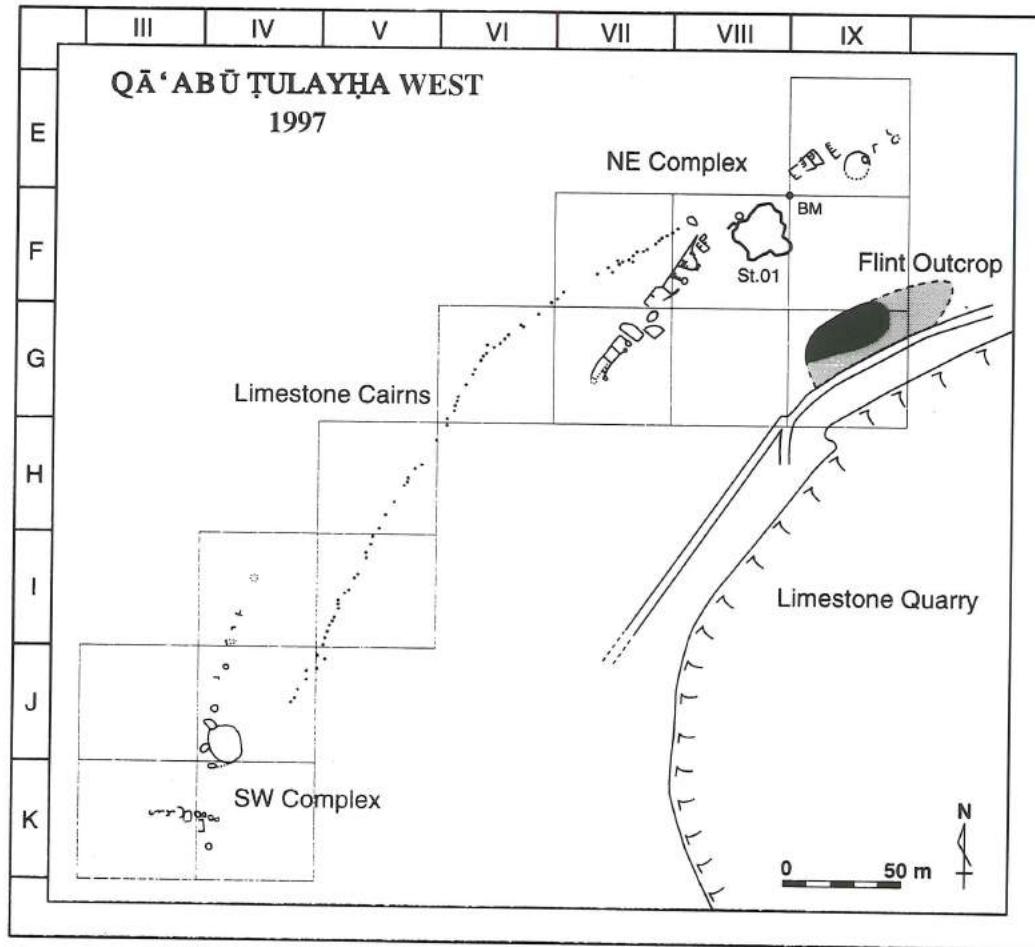
Worth noting is a line of flint outcrops that extends, though intermittently, along the southeastern slope of the hill. Evidently, it was the material source for the mass production of tabular scrapers of this site. It may also partly account for the *Hammada* landscape. Nevertheless, the *Hammada* around the site often includes small angular limestone gravel, which, when densely concentrated, leaves whitish, patchy blots on the black landscape.

Hydrologically, no perennial water source is found around the site. However, some local people told us that heavy rain in winter often causes *Wādī ar-Ruwayshid* to overflow leaving sporadic ponds. They also informed us that *Qā' Abū Ṭulayḥa* sometimes presents a marshy landscape in winter.

THE SITE

Qā' Abū Ṭulayḥa West

A large number of structural remains were recognized on the *Hammada* surface (Fig. 3). Needless to say, they do not necessarily belong to the same period. In fact, they differ much in many respects: size, plan, orientation, material, construction method, surface collection and so on. However, it is impossible at present to describe them separately in due order. The fol-



3. Qā' Abū Ṭulayḥa West: the structural complex and the flint outcrop.

lowing is thus a general observation lumping all together.

To date, the site has been divided into three units: the northeastern structural complex (hereafter NE complex), the southwestern complex (SW complex), and the flint outcrop area just between the NE complex and the limestone quarry that has been opened along the southeastern slope of the gentle hill.

The NE complex consisted of two large, round structures and at least three multi-roomed, rectangular ones. Besides, some small structures were scattered around them. In contrast, the SW complex comprised a large round structure and a number of small features, thus giving a different impression than the NE complex. The difference between the two was also discernible in the surface collection. Tabular scrapers and the debitage related to them were densely distributed in the NE complex, especially in

and around the large, round structures, but very rarely in the SW complex. These contrasts may be a reflection of some functional and/or chronological difference between both complexes.

Interestingly enough, more than seventy cairns were dotted in line every 5 m in average between both complexes. They looked as if they linked both complexes. Given this, opposite to the view mentioned above, they might imply chronological contemporaneity or at least some functional connection of both complexes. However, the function of these cairns themselves is still unknown. One possible interpretation is that they were a guiding wall for livestock. Another option is that they were twig- or poleholders for drive hunting (Fujii 1996). A reliable assessment must await further investigation.

Incidentally, the exposed section in the limestone quarry revealed that a thick lime-

stone formation contained at least two layers of tabular flint nodules in the upper part (Fig. 4). These flint layers, together with the limestone formation, seemed to ascend northwards, thus resulting in a series of horizontal outcrops mentioned above.

The flint outcrop area some 50 m south-east of the NE complex was included in the



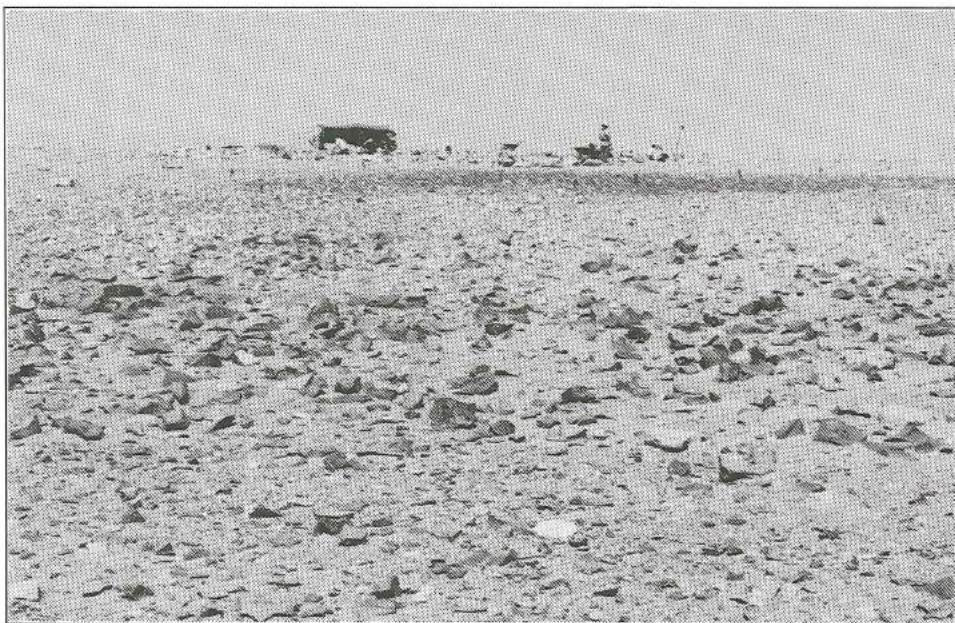
4. Qā' Abū Ṭulayḥa West: the exposed section of the limestone quarry.

southernmost outcrops of this series (Fig. 5). It yielded a great number of flint nodules often with heavy original cortex. They often showed not only platform preparations but also large and thin flaking scars on their surfaces, suggesting their use as cores of tabular scrapers. Besides, a large number of either thermally or artificially detached flakes were scattered around them. In contrast, finished products (tabular scrapers) were very rare in this outcrop area.

All these observations imply that this area was the first stage outdoor atelier for the core preparation and the blank detachment of tabular scrapers. Tool blanks detached here were probably brought to the second stage indoor atelier (e.g., Structure 01, mentioned below) and then retouched into finished products.

Qā' Abū Ṭulayḥa East

This site (JF-9704) was located in this season beyond the al-Ḥusayniyyah-Jafr local road (Fig. 2). Though a comparison with the western counterpart, Qā' Abū Ṭulayḥa West, might provide valuable suggestions, it is irrelevant to the main subject of this paper. Suffice it to say that Qā' Abū Ṭulayḥa East included few structures but contained a great number of tabular scrapers



5. Qā' Abū Ṭulayḥa West: flint outcrop area (front) and Structure 01 (rear).

and the debitage related to them (Fig. 6). Evidently, the mass production of tabular scrapers was made here also using the flint outcrops that extend over both sites.

Overall Picture

When both sites are put together, the total site area roughly measures 2 km long by 100 m wide. An enormous volume of cores, tool blanks, and finished products are densely distributed there. In addition, flint outcrops, though intermittently, extend more than 2 km along the southeastern slope. Obviously, Qā' Abū Ṭulayḥa West (and perhaps East also) is a large manufacture site of tabular scrapers. It is of great significance that the site is located in southeastern Jordan, because no knapping sites of tabular scrapers have been found beyond the limits of the Negev/Sinai regions. Qā' Abū Ṭulayḥa West indicates the need to revise the discussion on the trade system of tabular scrapers. Of further significance is the possibility that Qā' Abū Ṭulayḥa West is not a simple knapping site but a social complex with a variety of structural remains.

THE EXCAVATION OF STRUCTURE 01

Before starting the excavation, we covered the site diagonally with a 50 m x 50 m major grid system. Then we subdivided one square, Square F-VIII, with a 5 m x 5 m mi-



6. Qā' Abū Ṭulayḥa East: flint outcrop area (front) and limestone quarry (rear left).

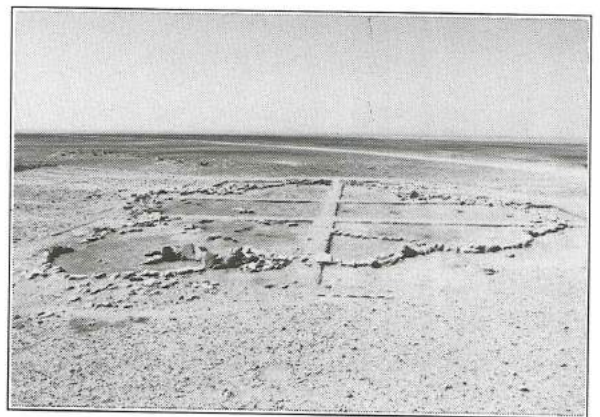
nor grid system. Structure 01, our main concern in this season, is situated in the north-eastern quarter of Square F-VIII (Figs. 3 and 7). This location corresponds roughly to the center of the NE complex.

Surface Collection

A systematic surface collection was made in advance of the excavation, focusing on Square F-VIII and its northern and eastern surroundings. A total of 144 minor squares was thus surface-surveyed.

The collection included at least three kinds of assemblages: 1) a heavily abraded and patinated, seemingly Paleolithic, blade-oriented assemblage, using rather fine-textured, smaller flint nodules; 2) a much less abraded and patinated, seemingly Paleobedouin-like, flake-oriented one using coarse-textured, smaller flint pebbles; 3) a slightly abraded and patinated, flake-oriented assemblage using fine-textured, often cortical, larger flint nodules.

Of the three, the former two were much less frequent. Further, the distribution of the artifacts of both assemblages correlated rarely with the location of Structure 01. Both observations indicated that these artifacts were basically irrelevant to the structure, thus making it possible to exclude them from the primary registration. In contrast, the last assemblage was highly relevant. It included hundreds of tabular scrapers and the debitage related to them. Further, there was a close correlation between



7. Structure 01: general view from east to west.

their distribution and the location of Structure 01. This enabled us to consider them to be not far from the original context. Accordingly, all findings belonging to the last assemblage were registered as artifacts from Layer 0 of each minor square and incorporated with the subject of the examination.

Stratigraphy

The stratigraphy of Structure 01 is summarized as follows (Fig. 8):

- Layer 0: surface collection layer mentioned above.
- Layer 1: surface layer in the strict sense. Buff to light brown, sandy or silty soil layer including a large number of small, abraded flint pebbles. Usually 1-2 cm thick, but more than 10 cm in drifts such as both sides of the stone walls.
- Layer 2a: buff and solid soil layer with a thickness of about 2-5 cm, but the solidity and thickness vary depending on the spot.
- Layer 2b: buff to light brown soil layer about 5-10 cm thick. Fairly compact, but sometimes loose depending on the spot.
- Layer 3: reddish brown, sandy soil layer about 10-30 cm thick.
- Layer 4: reddish brown and very compact soil layer often including angular limestone gravel. The thickness is still unknown due to the initial stage of a deep trench.

The archaeological implications of each layer, from the lower to the upper, were as follows. First, Layer 4 did not relate to Structure 01, although the upper surface of this layer represented the original ground level to Structure 02 mentioned below. Next, Layer 3 was the fill for Structure 02, but the upper surface of this layer corresponded roughly to the original ground

level of Structure 01. Layer 2b and Layer 2a were the fill for Structure 01. However, some hearths were dug from them, especially from the upper surface of Layer 2b. This suggests that these two layers included secondary floor levels. Lastly, Layer 1 was the thin surface layer; and Layer 0 was a fictitious layer, not carrying a true sediment and representing the surface collection.

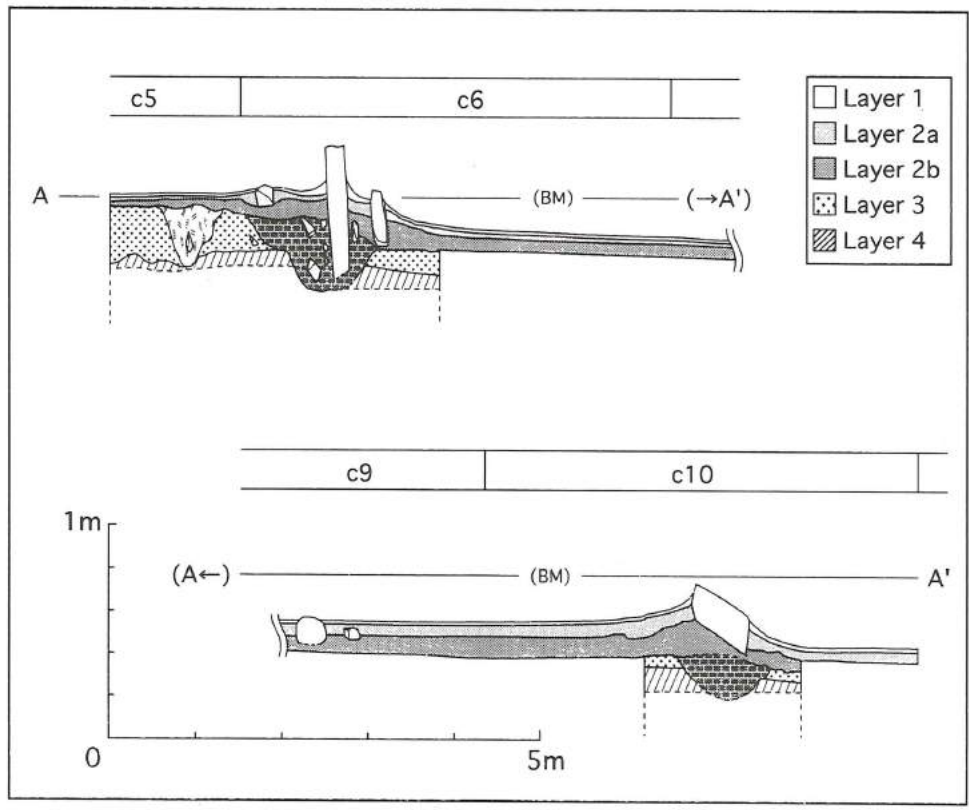
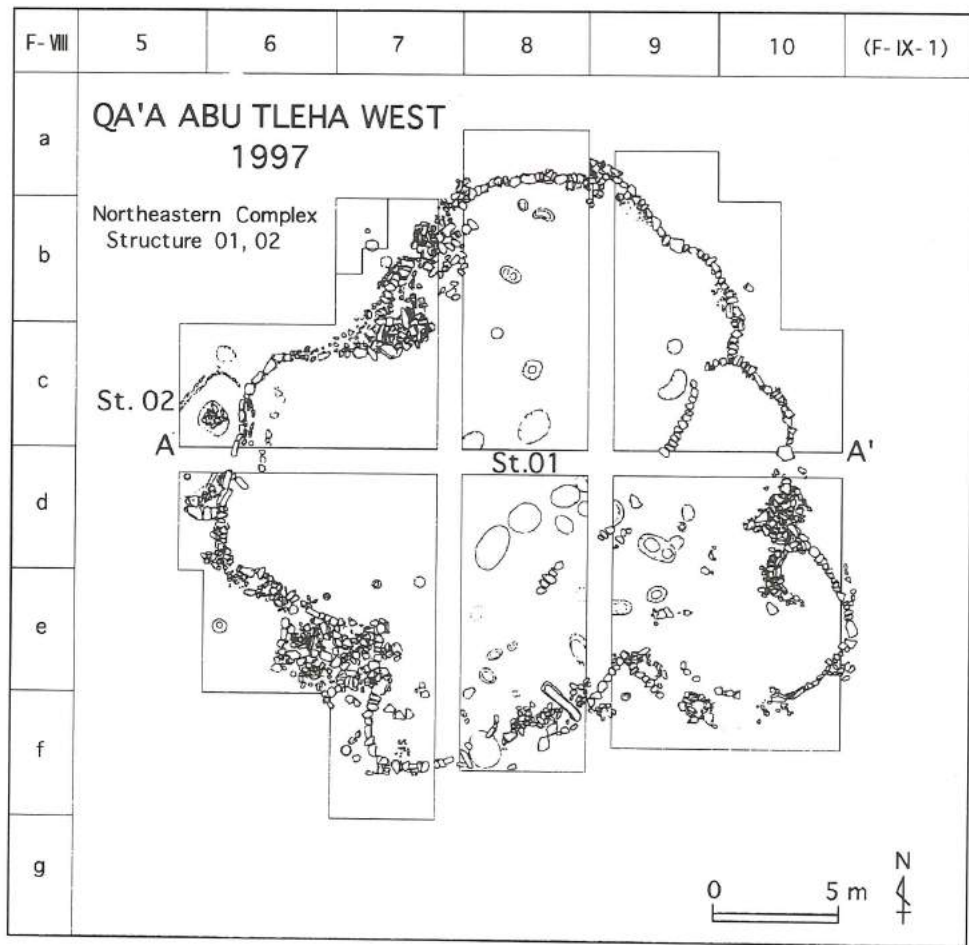
Construction Material

Round or angular limestone cobbles/boulders were used as the main material for construction. They were probably collected and/or quarried in the former exposure below the slope and brought uphill. Noteworthy was the use, though much less frequent, of flint masses; even discarded cores were reused for the wall construction. Interestingly, they were concentrated in the southeastern wall of the structure, suggesting that they were brought from the nearest flint outcrop some 50 m southeast of the structure.

Construction Method

The east-west section suggests that a foundation ditch about 1-1.5 m wide and 30-50 cm deep was dug in advance before piling up stones for walls. Next, limestone gravel and soil were filled up into the ditch in order to strengthen the foundation. Then a single row of larger limestone or flint cobbles/boulders was put horizontally, but sometimes in an upright position, as foundation stones. Lastly, smaller wall stones were piled up, but the original height of the wall was difficult to assess due to the collapse. Nevertheless, the volume of fallen stones scattered around the foundation gave the impression that it was about 1 m high. Given this, the wall might have been something like a windbreak under a tent-like simple structure (e.g., Cribb 1991: 102-6; Bienkowski and Chlebik 1991: Fig. 17).

Of special interest was the westernmost wall. Here the foundation ditch of Structure



8. Structure 01 and 02: general plan and east-west section.

01 came across the previous foundation stones of Structure 02. Instead of removing them, Structure 01 utilized them as a kind of inner recess wall to hold larger limestone boulders in an upright position (Fig. 9).

The floor had no special treatment. However, a rough cleaning of the original ground was possibly made, since some pits outside the structure contained a large amount of small, abraded flint pebbles and sandy soil. The shallow pit shown in the east-west section, for example, was filled up with such rubbish.

In summary, Structure 01 was a ground type structure with stone-built, low walls piled up in a foundation ditch.

General Plan and Small Features

The surface observation in 1995 had estimated Structure 01 to be roughly round in general plan (Fujii 1996). However, the excavation unveiled a rather different picture; it turned out to be a composite structure that consisted of five or six smaller units either semi-circular or roughly rectangular (see Fig. 8). These units were joined with each other around the courtyard, thus representing a flower-like general plan with a diameter of about 25 m. The size and the total plan of this structure reminded us of the large, composite structure found at Ademe (or al-'Uzayma) – a Chalcolithic site near Tulaylât al-Ghassûl (Stekelis 1935; Worschch 1991: 60-62).



9. Structure 01 (the westernmost unit) and Structure 02.

Incidentally, the westernmost unit seemed to be different from the others in general plan. Also noteworthy was the concentration of larger limestone boulders in this unit. These imply that this unit was of special significance. However, one should give careful consideration to the fact that this unit utilized the previous foundation wall of Structure 02 in order to uphold the upright foundation stones. This might have resulted in the straightening of the wall of this unit. The slight curving of the wall outside the previous structure may support this view.

As for small features inside the structure, a discontinuous inner wall was found in the southeastern quarter. The function of this inner wall is still unknown. However, the discontinuity and the rare occurrence of fallen stones suggest that this was not a wall in the strict sense but a simple partition or a foundation for posts. Besides, a small, bin-like feature was annexed to the southeastern unit of the structure. Though it yielded one hearth and some tabular scrapers, nothing can be said about the function.

Also difficult to interpret are the concentrations of limestone cobbles/boulders that were found at both ends of the westernmost structural unit. In view of the volume and the density, it is unlikely that both concentrations represent the natural state of fallen stones. This is also supported by another line of evidence: 1) a pit-like depression was recognized at the base; 2) flat limestone cobbles seemed to have been paved at the base. A possible interpretation is that both concentrations were a kind of depot or dustbin for the remaining material of the construction.

Lastly, no postholes were found throughout the structure despite careful excavation.

Hearths

A total of 33 hearths was found in and around Structure 01. Except for a few hearths found outside, most of them oc-

curred in the eastern half, especially in the southeastern quarter, of the structure.

The hearths were rather uniform in general plan: roughly round to oval. However, they varied to some extent in size. Smaller ones measured about 50 cm in diameter and about 5-10 cm in depth; larger ones, roughly 1-2 m in diameter but relatively shallow (about 10-15 cm deep). In general, they had no special bottom treatment, but a few were equipped with a pavement made of tabular limestone pebbles. No remarkable differences in the fill were discerned among them. It usually consisted of light grayish ash, a small amount of charcoal, some volume of isolated limestone gravel, and/or slightly burned, sandy soil. Noticeably, the fill rarely contained flint artifacts, suggesting that no heat treatment was applied to the production of tabular scrapers.

The point at issue is the stratigraphical placing of each hearth. Some were dug from the upper surface of Layer 3, the original floor level of the structure; others from the upper levels, mostly from the upper or middle surface of Layer 2b. It follows that the structure included at least two or three habitational phases. C14 samples from each hearth will hopefully provide some dating evidence.

Chipped Stone Artifacts

Structure 01 yielded some thousands of flint artifacts (Fig. 10). Since the examination is still underway, only some general points will be made below.

Material: The material for the chipped stone artifacts was rather uniform: buff to dark brown flint with fairly fine texture. Light buff to dark brown, thick original cortex was often recognized on their dorsal surfaces.

Inventory: To date, no remarkable differences have been confirmed among layers. Tabular scrapers and the debitage related to them had an absolute majority in the flint collection of each layer. Other tool classes

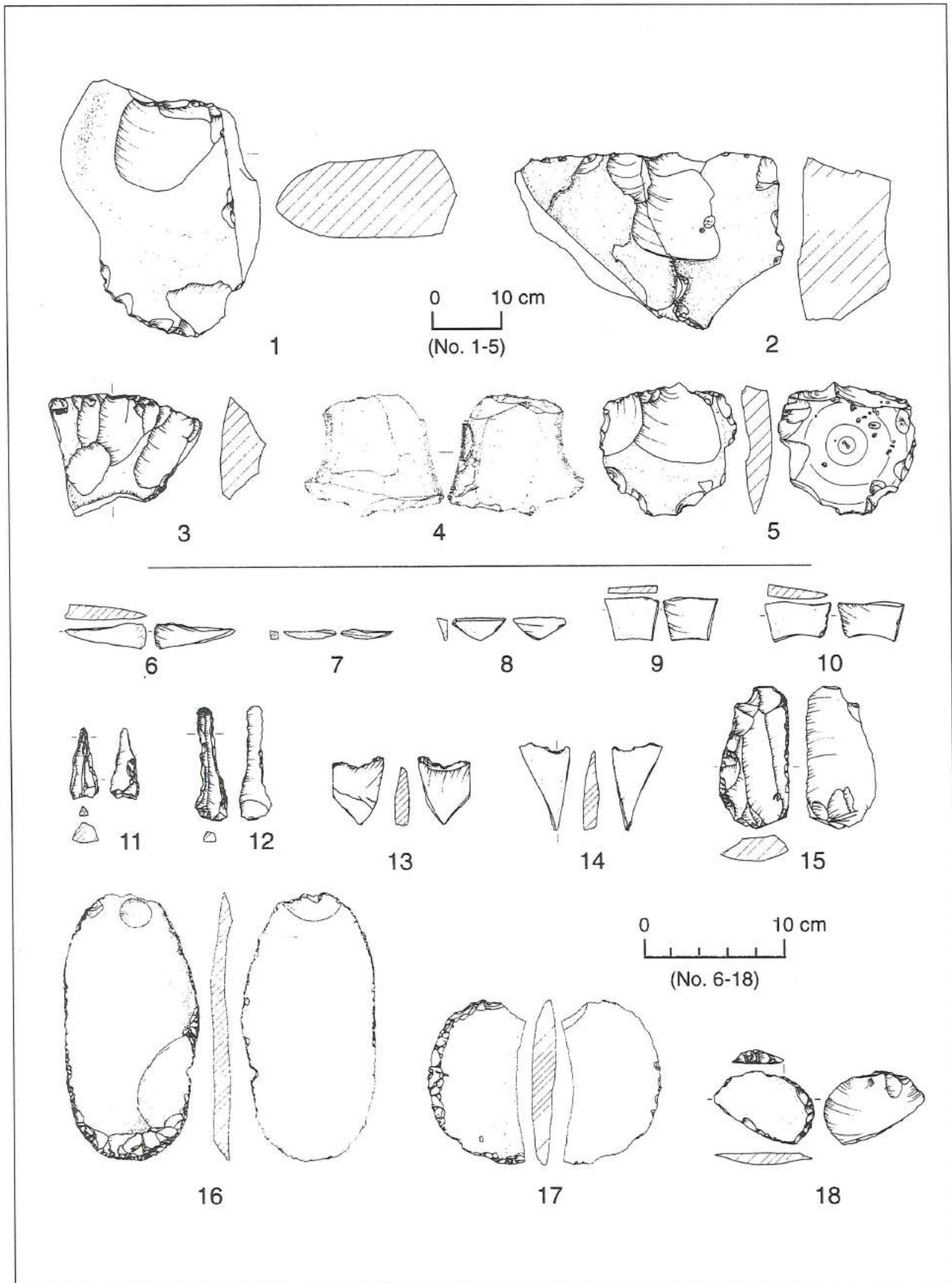
were extremely scarce. Also infrequent were cores, even including the ones that were reused for the wall construction. These frequencies contrasted well with those in the flint outcrop area mentioned above, probably suggesting that Structure 01 was the second stage atelier for re-touching tool blanks into tabular scrapers.

Cores: To date, four types of core material have been recognized: 1) tabular flint nodules, 2) cubic to amorphous ones, 3) robust flakes either thermally or artificially detached, 4) small- to medium-sized flint pebbles. Of the four, the former two were in majority and the third came next; the last one was infrequent. Typologically, cores included various types: single (Fig. 10: 2, 3), opposed (Fig. 10: 4), 90 degree opposed (Fig. 10: 1, 5), change of orientation, and other miscellaneous ones. Overall, the frequency descended in due order. As for the platform preparation, the plain or cortical type was predominant. Faceted and other types were less frequent. It seemed that these frequencies accorded roughly with those of the platforms left on tabular scrapers, although a firm conclusion must await further examination.

Incidentally, cores were often wasted. A single or at most a few discontinuous flaking scar(s) were left on their cortical surfaces (Fig. 10: 1, 2, 4). The rich occurrence of flint outcrops probably made it possible to waste raw material. The consistent preference of cortical blanks may also have been responsible for the waste.

Debitage: Unmodified flakes and blades were the most frequent in debitage classes with the former being predominant. They were mostly long and/or wide and often covered with original cortex, probably suggesting their use as tool blanks of tabular scrapers.

Of special interest was the characteristic debitage (Fig. 10: 6-10): provisionally called *tabular scraper trimming elements* (hereafter *TSTE*). Though no refitting has



10. Chipped stone artifacts from Structure 01.

been so far successful, it is evident that *TSTE* originated in the trimming process of tabular scrapers, for the following reasons: 1) it occurred in hundreds, thus corresponding roughly with the frequency of tabular scrapers; 2) the back edges of tabular scrapers were often snapped (Fig. 10: 17, 18), implying the origin of *TSTE*; 3) the retention of a thick layer of original cortex characterized both tabular scrapers and *TSTE*, thus linking both in relation to raw material; 4) *TSTE* included not only lunate/triangle (Fig. 10: 6-8) but also trapeze/polygonal (Fig. 10: 9-10) morphologies, reflecting a wide variety of trimming technique on tabular scrapers.

Larger and usually non-geometric *TSTE* were probably derived from the rough shaping of tool blanks; and smaller, often geometric ones, from the fine adjustment to enable a tight grip. Given this, the discontinuous back edges often observed on tabular scrapers do not necessarily indicate accidental breakage. They are perhaps rather the result of intentional trimmings, although the trimmings include unsuccessful blows, which might look like breakage.

Though many references have been made to the typology, the function, and the distribution of tabular scrapers, little is known about the technology (Rosen 1983, 1997: 71-75). This may be due to the paucity of information on debitage left in quarry sites. In this respect, *TSTE* could provide a clue to a better understanding of tabular scraper production strategy.

Tool classes: Hundreds of tabular scrapers occurred in Structure 01. This tool class was the overwhelming majority, making up almost 100 % of tool class samples. Both bulbar thinning (e.g., Fig. 10: 16) and grinding of cortical surface were often recognized, but the incision was totally absent.

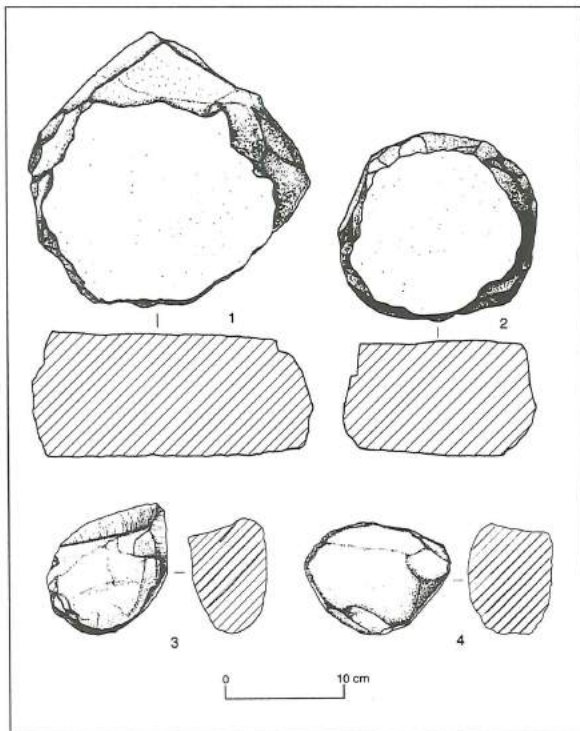
Typologically, the tabular scrapers were divided into three types: endscrapers (Fig. 10: 16), sidescrapers (Fig. 10: 17-18), and the composite of both. However, the divi-

sion was often arbitrary, because tool blanks trimmed into a wide but short morphology often caused confusion in type identification. For example, the working edge of a sidescraper was often made on the distal end, not on the side (lateral edge), of such tool blanks (e.g., Fig. 10: 17). The opposite was also true; that of an endscraper was often made on the lateral edges, not on the distal ends, of the tool blanks. This disagreement between the morphology of working edges and their positioning often perplexed us. (The typology here is based on the former.) Technologically, as mentioned above, the high frequency of trimming on the back edges was noted.

Other tool classes were quite rare. The collection included only a few retouched blades (Fig. 10: 15) and borers/perforators (Fig. 10: 11-12). Of interest was a few notches on *TSTE*, although they may simply represent accidental edge damage (Fig. 10: 13-14). Except for the last ones, these ordinary tools were commonly non-cortical and relatively small—a marked contrast with tabular scrapers. It seems that smaller cores (type 4 mentioned above) were a major supplier of tool blanks for these ordinary tool classes. Given this, the prehistoric flint knappers of this site may have used at least two different core reduction strategies: one for tabular scrapers and the other, though much less frequent, for ordinary tool classes.

Groundstone Artifacts

Groundstone artifacts were quite rare. No querns and pestles occurred; only two limestone anvils (Fig. 11: 1-2) and some basalt/limestone hammerstones (Fig. 11: 3-4) were separately recovered. Unfortunately, neither tabular scrapers nor *TSTE* were worked on these groundstones. However, it is most likely that they were used for the production of tabular scrapers, especially for the trimming and retouching processes. The slight striation and/or concavity at the ends of hammerstones may serve as evidence for



11. Groundstone artifacts from Structure 01.

this view. Nevertheless, the upper surfaces of the anvils were too smooth to be working surfaces that had been repeatedly in contact with hard and sharp edges of tabular scrapers. Possibly, they might have been used for grinding the cortical surfaces of tabular scrapers. The frequency of such products may support this hypothesis. Anyway, both hypotheses need to be tested by micro-wear analysis.

Incidentally, the material sources of these groundstone artifacts are rather easy to estimate. Limestone cobbles were evidently obtained from the former exposure below the hill. As for basalt cobbles, the nearest outcrop so far confirmed is situated some 10 km northwest of the site.

Pottery Sherds

Only a few pottery sherds occurred in Structure 01. They were chaff-tempered, coarse to fine wares with reddish surfaces and black cores. My first impression was that they were similar to samples of the Early Bronze age. However, they were too fragmented and isolated to be a reliable in-

dicator for a chronological assessment.

One should rather take notice of the archaeological implications of the scarcity itself. One possible interpretation is that the structure was exclusively used for tabular scraper production and that domestic activities were performed in other places within the site. This might be plausible from the viewpoint of intra-site spatial organization. Nevertheless, this hypothesis is hardly tenable considering the substantial absence of pottery sherds throughout the site. An alternative is that this structure was used during a short stay of flint knappers who were poorly equipped with hard wares. This view seems more plausible at the moment. Given this, Qā' Abū Ṭulayḥa West (and East also) might represent a cultural horizon not yet fully confirmed in the Levant – Pre-Pottery Chalcolithic or Pre-Pottery Early Bronze Age among pastoralists.

THE EXCAVATION OF STRUCTURE 02

Structure 02 had been buried under the *Hammada* surface (squares c5, c6, and d5), and was found during the excavation of the westernmost unit of Structure 01. Stratigraphically, Structure 02 is earlier than Structure 01. Thus it provides evidence of another aspect of Qā' Abū Ṭulayḥa West.

Stratigraphy and General Plan

The ground level of Structure 02 coincided roughly with the upper surface of Layer 4. On the other hand, that of Structure 01 corresponded with the upper surface of Layer 3, which represented the fill to Structure 02. Further, as mentioned earlier, the eastern foundation wall of Structure 02 was reused to hold the upright stones of the westernmost unit of Structure 01. Thus stratigraphically, Structure 02 is earlier than Structure 01, although further investigation is necessary to assess how big the chronological hiatus was between the two.

Typologically, Structure 02 was quite different from Structure 01. It was a small, single-roomed structure (ca. 5 m x 3 m) with roughly rectangular general plan (Fig. 12). Further, the area of this structure was less than one twentieth of that of Structure 01. It is however to be noted that the gap both in plan and in area is considerably narrowed when compared with each unit of Structure 01.

Construction Material and Method

With respect to the material itself, Structure 02 was similar to Structure 01; it mostly used limestone but sometimes flint material. However, there were a few critical differences between the two structures. First, Structure 02 included no cubic flint masses and exclusively used tabular flint nodules. Second, it used no flint cores. Third, it used both limestone and flint material trimmed in advance to a standard size (ca. 30 cm wide, 30 cm long, and 10 cm thick). In summary, the construction material of Structure 02 was uniform both in size and in morphology. This was another contrast to Structure 01 that randomly used limestone and flint cobbles/boulders, irregular both in size and in morphology.

As for the construction method, the first stage of Structure 02 was similar to that of Structure 01. A foundation ditch, though narrower and shallower in this case, was dug in advance following the expected general plan. However, the second stage was much



12. Structure 02: general view from west to east.

different from that of Structure 01. Two rows of foundation stones were put in an upright position along both sides of the foundation ditch – a long tradition in the inland Levant since the Neolithic. (Nevertheless, the foundation stones often changed into a single row especially when the material ran short. That may also be true for the northern part of Structure 02.) Then limestone gravel and soil were filled up between the two rows of upright stones in order to hold their standing positions. Since the height of the upright stones was slightly larger than the depth of the foundation ditch, their upper ends stood out on the ground level.

Noteworthy was the scarcity of loose stones around the foundation ditch. This suggests that the structure had no substantial stone wall on the foundation. Possibly, wooden posts for a tent-like simple structure might have been set between the two rows of the materials of which the upper ends slightly stood out on the ground.

Small Features

Small features were very rare in Structure 02; only one small hearth occurred on the southern part of the floor. This hearth was different in some respects from the hearths of Structure 01. First, it was very small in diameter (ca. 30 cm) but relatively large in depth (ca. 20 cm deep). Second, the fill consisted of black ash and a number of larger bits of charcoal. Third, it contained some amount of animal bones. All these contrasted well with the traits of the hearths of Structure 01. However, what these differences represent is still obscure. A possible interpretation is that this hearth was exclusively used for cooking. Given this, it is another contrast to Structure 01 where heating seemed to be the primary function of the hearths.

Incidentally, the figure of the general plan shows a pile of limestone cobbles in the northern part of the floor (see Fig. 8).

Actually, this represents a vestige of a pit dug from the upper level (perhaps Layer 3 or 2b). It may be included in a line of rubbish pits related to Structure 01.

Artifacts

The scarcity of artifacts characterized Structure 02, although the damage of the southern half may be partly responsible for that. No pottery sherds occurred. Further, the flint collection consisted of some flakes/blades only; neither tabular scrapers nor points/arrowheads were included. The total absence of distinctive artifacts makes it difficult to assess the chronology of this structure.

FAUNAL AND FLORAL EVIDENCE

Both faunal and floral evidence was very poor despite the application of 2 mm mesh dry sieving to the ash fill of hearths and some floor sediments.

Only a small amount of animal bones was recovered. The identification is now underway, but no significant results can be expected due to the small size of the samples and their poor state of conservation. The extreme scarcity of animal bones puzzled us, because we had supposed a pastoral and/or hunting subsistence strategy for the prehistoric inhabitants of this site.

It is unlikely that the intra-site spatial organization was responsible for the paucity, since animal bones were quite rare not only in Structure 01 but also throughout the site. The post-depositional history (i.e., extreme aridity, direct exposure to the sun due to the poor sedimentation, and marked difference of temperature both in a day and in a year) possibly caused the fragmentation of samples. Further, the strong wind in the al-Jafr basin might have dispersed them completely.

Also scarce was floral evidence; only a small amount of charcoals was retrieved from the fill of hearths. Their size, morphology, and texture reminded us of perennial shrubs growing in wadi beds around the

site. The prehistoric inhabitants possibly used the same fuel as that used by modern local Bedouins.

Interestingly enough, there was a marked difference in size of charred twigs between Structure 01 and 02. Samples from the former were much smaller than those from the latter. Climatic desiccation and/or over-exploitation may have been responsible for the difference.

Besides, no charred seeds were retrieved. Their absence may be a reflection that most of the hearths, especially those in Structure 01, were exclusively used for heating. One may also suppose that seed foods were floured in advance to carry over a long distance. This is plausible in light of the surrounding environment unsuitable for agriculture. However, more reliable assessment must await the water-flotation using the stock of the fill of the hearths.

Discussions

Since the excavation is still in progress, only a few general points will be made here focusing on the chronology and the site function. To conclude, the function of tabular scrapers will be briefly discussed.

Chronology

It is difficult at present to make a chronological assessment of Structure 02, because it yielded no distinctive indicators. The total absence of pottery sherds and tabular scrapers may suggest a pre-Chalcolithic character of the structure. Nevertheless, the lack of points/arrowheads casts doubt on this view. In sum, the comparison of artifacts has been so far fruitless. Also ineffective is the comparison of structural remains. Though a number of parallels have been found in the arid regions (e.g., Wādī al-Jilāt), they seem to range from the middle PPNB to the Late Neolithic (Garrard *et al.* 1994: 75-85) or even in a later period (e.g., Waechter *et al.* 1938: Plan I). Thus the comparison of structural remains cannot be a determinant.

What can be definitely said at present is: 1) no tabular scrapers were found in Structure 02, indicating a critical difference from the cultural horizon of Structure 01; 2) a thick sediment (ca. 10-30 cm deep) intervened between the original ground level of Structure 02 and that of Structure 01, possibly implying a considerable temporal gap between the two. In light of the above evidence, the dating it to the Neolithic (and perhaps to the late Neolithic) seems plausible. However, this is nothing but a hypothesis. A reliable assessment must await further excavation and the C14 dating now in progress.

In contrast, the rich occurrence of tabular scrapers makes it possible to place Structure 01 to the cultural horizon from the Chalcolithic to the Early Bronze Age. However, to be more specific is difficult at the moment, since 1) no reliable seriation has been established about tabular scrapers, 2) more sensitive indicators (e.g., pottery sherds) are virtually absent. At most, the absence of incised tabular scrapers may indicate a Chalcolithic date of this structure. However, as Rosen claims (Rosen 1997: 75), one should rather consider the presence/absence of incised tabular scrapers as a regional difference, and not as a reliable indicator for chronology. Also so far ineffective is the comparison of structural remains. Though the similarity between Structure 01 and that of Ademe is suggestive, a single example is far from determinative. The C14 dating now in progress will hopefully provide a clue to further specification.

Site Function

Qā' Abū Ṭulayḥa West (and perhaps East also) is evidently a large manufacturing site of tabular scrapers. This is supported by a line of evidence: 1) the rich occurrence of both finished products and the debitage related to them (cortical cores, large and cortical tool blanks, and TSTE); 2) the occurrence, though rare, of anvils and hammerstones; 3) the site location adjacent

to flint outcrops. In addition, the complete absence of artifacts related to domestic activities may also serve as evidence.

The mass production of tabular scrapers at Qā' Abū Ṭulayḥa West (and East) might account for some outliers that do not fit the logarithmic fall-off model of the frequency with the western Negev as starting point (Rosen 1983). The relatively high frequency at Jāwā (Betts 1991: 140-148), for example, could be related to the north-south transhumance (including the al-Jafr) of early pastoralists. The same can be said about some Early Bronze Age sites in the southern Jordan Valley - Tall Umm Ḥammād (Helms 1987: 49-81; Betts 1992: 122-31) and Tall Iktanū (McCartney 1996: 143-144), for example. The comparatively frequent occurrence of tabular scrapers at these sites might partly reflect the trade with early pastoralists who possibly made the transhumance between the Jordan valley and its eastern hinterland. However, one should refrain from further speculation. What can be said with certainty at present is that the discovery of Qā' Abū Ṭulayḥa West, as Rosen forecasted (Rosen 1983: 84), leads us to the revision of the fall-off model with a single starting point.

Besides, a number of questions are still to be addressed: for example, where did the flint knappers perform domestic activities during their stay at this factory? Were the rectangular structures beside Structure 01 used for these activities? Did they stay there all the year round or only during a specific season(s)? Did they specialize in flint knapping and trading, or did they periodically go there as sheep pastoralists? Were the flint outcrops exclusively used for a specific group or shared by a wide range of groups? What kind of trade network was constructed around this factory? All these should be inquired in future excavations.

Tabular Scrapers

It is no exaggeration to say that the un-

derstanding of Qā' Abū Ṭulayḥa West depends on the interpretation of the function of tabular scrapers. However, this issue is still in much controversy. Views so far advanced vary from cutting and butchering (McConaughy 1979: 304), reeds scraping (Unger-Hamilton 1991), wool shearing (Henry 1995: 372-73; Bennett *et al.* 1989), to a ritual function including sacrifice butchering (McConaughy 1979: 304, 1980: 53-58; Rosen 1997: 74-75). Also diversified are the bases of these interpretations. Some are based on microwear analysis (e.g., silica gloss) and others on field experiments and/or the general typology/technology of the samples (e.g., the marked preference of cortical surface). The material of these studies also varies from samples used in urban societies (e.g., Bāb adh-Dhrā', Tall al-Ḥasa, or Jāwā) to those used in the arid periphery (e.g., south Jordan, Negev, or Sinai).

However, as Rosen suggests (Rosen 1997: 74-75), it does not seem practical to presuppose a single function for tabular scrapers. One should take into consideration that their function could have fluctuated depending on users, situations, and/or periods. This may be true all the more because tabular scrapers were very widely distributed both in area and in period.

What is needed at present seems to be a dynamic review of the function(s). Therefore, the question concerning function needs to be revised as follows. What was the original function intended at the stage of production? How did it change (or not change) among neighboring users (i.e., pastoralists)? How did it fluctuate among distant users (i.e., inhabitants in urban societies)? What kind of special use was added on occasions due to daily contexts? All these questions must be separately addressed to clarify the overall picture of the functions of tabular scrapers.

However, a critical difficulty arises here because of the substantial lack of information on the starting point (the original function intended at the stage of pro-

duction). Though some quarry sites have been known in the western Negev and Sinai (Rosen 1983: 80), the sizes of the samples so far collected seem to be too small to allow a comprehensive discussion.

In this respect, Qā' Abū Ṭulayḥa West provides a good place to make a fresh start. Though much leaves to be said due to the early stage of investigation, the following two points seem to be helpful in re-considering the issue from the viewpoint of production sites. First, tabular scrapers were produced on a massive scale and discarded quite casually, indicating that they were put to practical use at least among manufacturers and neighboring users. Second, the persistent trimmings to enable a tight grip characterize them, also serving as evidence of their practical use. An experiment at the site proved that, because of the careful trimming, most of the samples fitted palm and fingers of a user (e.g., Fig. 10: 17).

Given this, one should perhaps focus attention for the moment on what kind of practical use tabular scrapers had. However, it is not clear how to proceed from there. A suggestion may be that butchering and/or wool shearing is the most plausible hypothesis, since the mass production at the site makes it difficult to imagine other minor functions. Nevertheless, as mentioned above, this does not necessarily rule out other possibilities. It is often the case that utility goods for some groups change into (or at least are added a character of) something ritual among distant users for whom it is difficult to obtain them.

Anyway, the interpretation of the function of tabular scrapers is the key to clarifying the archaeological implications of Qā' Abū Ṭulayḥa West. Microwear analysis and fatty acid analysis now in progress will hopefully enable us to throw new light on the issue.

Concluding Remarks

The first season of Qā' Abū Ṭulayḥa

West partly unveiled the potential of the so far poorly explored al-Jafr basin. This site (represented by Structure 01 in this case) seems to provide reliable evidence for tabular scraper production strategy. It also indicates the need to revise the discussion on the trade system - a key issue to trace the dynamics of the later prehistory of the Levant. Furthermore, the site (represented by Structure 02) may provide evidence of the earlier exploitation of the basin perhaps by pre-Chalcolithic populations.

It should also be noted that about ten prehistoric sites have been found during our short surveys in 1995 and 1997. Seemingly, they include a wide range of sites from the Middle Paleolithic to the Early Bronze Age. Among others, most noticeable is the site of JF-9702 that contained numerous tabular scrapers but little debitage. This may suggest the possibility that manufacturers and their neighboring users co-existed even within the al-Jafr basin. This also hints at the unexpected diversity of the basin.

Qā' Abū Ṭulayḥa West and the al-Jafr basin thus turned out to be worth investigating. The first season of our project only gave us a glimpse of the archaeological implications. The work of the next season will hopefully enable us to make further progress.

Bibliography

- Alex, M.
1985 *Klimadaten ausgewählter Stationen des Vorderen Orients*. Wiesbaden: Dr. Ludwig Reichert.
- Bender, F.
1968 *Geologie von Jordanien*. Berlin and Stuttgart: Gebr. Borntraeger.
- Bennett, W. J., Sollberger, J. B. and Gettys, A. F.
1989 Flint tools. Pp. 231-56 in Bennett, W. J. and J. A. Blakely (eds), *Tell el-Hesi: The Persian Period (Stratum IV)*. Winona Lake, Ind.: Eisenbrauns.
- Betts, A. V. G.
1991 The chipped stone assemblage. Pp. 140-8 in Betts, A. V. G. (ed.), *Excavations at Jawa 1972-1986*. Edinburgh: Edinburgh University Press.
1992 The chipped stone assemblage. Pp. 122-31 in Betts, A. V. G. (ed.), *Excavations at*

Acknowledgements

I would like to express appreciation to Dr Ghazi Bisheh, Director-General of the Department of Antiquities of Jordan, for his generous permission and kind cooperation. I am also indebted to Dr Fawzi Zayadine, of the Department, for his kind help during our preliminary survey in 1995, which marked the starting point of our project. My special thanks go to Mr Emsaytif Suleiman Emsaytif, representative of the Department, for his powerful and professional help both in the field and in the camp. My thanks also go to the members of the staff (Hisahiko Wada, Nazeh Fino, Chizu Kanenaga, Yoichi Hayasaka) for their helpful assistance. Prof. Steven A. Rosen (Ben-Gurion University) provided me with valuable suggestions. Ms. Caroline P. Davies (Arizona State University) kindly corrected my English of the first draft. However, I am completely responsible for this paper.

Lastly, I wish to thank Nissan Science Foundation for the generous financial assistance, and the Japan Embassy in Jordan for the kind cooperation.

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- Tell Um Hammad: The Early Assemblages (EBI-II)*. Edinburgh: Edinburgh University Press.
- Bienkowski, P. and Chlebik, B.
1991 Changing places: Architecture and spatial organization of the Bedul in Petra. *Levant* 23: 147-180.
- Cooke, R., Warren, A. and Goudie, A.
1993 *Desert Geomorphology*. Frome: Butler and Tanner Ltd.
- Cribb, R.
1991 *Nomads in Archaeology*. Cambridge: Cambridge University Press.
- Fujii, S.
1996 A preliminary survey in the al-Jafr basin, southeastern Jordan. *Neo-Lithics* 6/1.
1998 Out of the fertile crescent: The first season of Qā' Abū Ṭulayḥa West. Japanese Society of Near Eastern Archaeology (ed.), *The Excavation Reports of the Ancient Near East*, 1997. (in preparation)
- Garrard, A., Baird, D. Colledge, S. Martin, L. and Wright, K.
1994 Prehistoric environment and settlement in the Azraq basin: An interim report on the 1987 and 1988 excavation season. *Levant* 26: 73-109.
- Helms, S. W.
1987 Jawa, Tell Um Hammad and the EBI/late Chalcolithic landscape. *Levant* 19: 49-81.
- Henry, D. O.
1995 *Prehistoric Cultural Ecology and Evolution*. New York: Plenum Press.
- McCartney, C.
1996 A report on the chipped stone assemblage from Tell Iktanu, Jordan. *Levant* 28: 131-155.
- McConaughy, M.
1979 *Formal and Functional analysis of Chipped Stone Tools from Bab edh Dhra*. Ann Arbor: University Microfilm.
- Stekelis, M.
1935 *Les monuments mégalithiques de Palestine*. Archives de l'Institut de Paléontologie Humaine. Mémoire No. 15. Paris.
- Rosen, S. A.
1983 The tabular scraper trade: A model for material culture dispersion. *BASOR* 249: 79-86.
1997 *Lithics after the Stone Age*. Walnut Creek: Altamira Press.
- Royal Jordan Geographic Center
1986 *National Atlas of Jordan, part II: Hydrology and Agrohydrology*. Amman: Royal Jordan Geographic Center.
- Unger-Hamilton, R.
1991 Microwear analysis of scrapers and "sickle blades." Pp. 149-153 in Betts, A. V. G. (ed.), *Excavations at Jawa 1972-1986*. Edinburgh: University of Edinburgh Press.
- Waechter, J. d'A. and Seton-Williams, V. M.
1938 The excavations at Wadi Dhobai 1937-1938 and the Dhobaian Industry. *JPOS* 18: 172-86, 292-98.
- Worschech, U.
1991 *Das Land jenseits des Jordan*. Wuppertal und Zürich: R. Brockhaus Verlag.

EXCAVATIONS AT WZ 121, A CHALCOLITHIC SITE AT TUBNA, IN WADĪ ZIQLĀB

by

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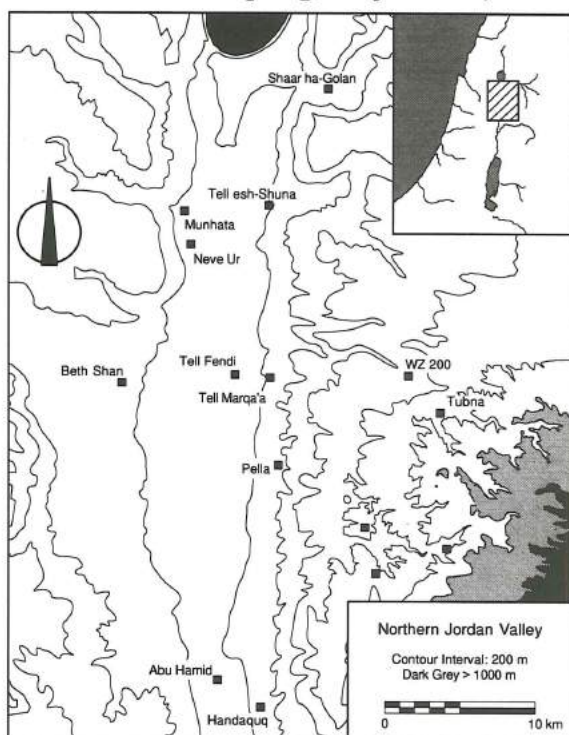
Introduction

During June and July of 1995, the Wādī Ziqḷāb Project carried out excavation of a Chalcolithic settlement on the western slopes of Tubna, in the al-Kūra district, northern Jordan. The site had been discovered during the course of a short season of test trenching in 1993.

The site lies at an elevation of about 550 m asl in a small olive grove on a terrace built over limestone and overlooking Wady Summayl (Wādī 'Ayn Zubiya), one of Wādī Ziqḷāb's main tributaries (Fig. 1). The nearest water source in antiquity, so far as we have been able to determine, would have been the stream some 100 m below the site. There is also a spring, 'Ayn Sirīn, about

1200 m to the northeast. Only about 1 km to the south of the site, oak-pistachio forest, mainly regenerated in recent times, gives some impression of what the environment of the region may have been like before widespread deforestation. The site itself has been disturbed by agricultural activities, including plowing, tree-planting, removal of stones for terrace construction, and probably the movement of fill during terrace construction. Most of the cultural remains we encountered occurred on a single terrace, with architecture concentrated near its southern end, but probe trenches also encountered fairly abundant Chalcolithic and some Byzantine artifacts upslope, along with a single stone-lined pit of Chalcolithic age, indicating that the site may originally have extended up to where the lowest modern houses now lie. Surface lithics on the lower terrace, meanwhile, extend from just south of the excavated areas more than 200 m to the northwest, although not all of these appear to be Chalcolithic. Many of the lithics to the far north appear to be of Middle Palaeolithic or Upper Palaeolithic age.

A test trench measuring 2 m x 1 m on this site during the summer of 1993 intersected a buried stone wall and was associated with undisturbed deposits, with abundant lithics and pottery sherds and fairly good preservation of bone, at a depth of approximately 50 cm. The general character of the material appeared to be either Late Neolithic or Chalcolithic. The purpose of broader excavations at this site was to determine its size, to estimate the number of structures, to uncover the plan of at least one structure, and to extract data on the character and distribution of pottery, lithics, fau-



1. Map of the northern Jordan Valley and surroundings, showing the location of Tubna and selected Late Neolithic and Chalcolithic sites (E. Banning).

nal and floral remains using the same methodologies we used at WZ 200, a Late Neolithic site we had excavated in 1990 and 1992 at the confluence of Wādī Summayl and Wādī Ziqlāb, about 3 km away. These include excavating by natural stratigraphic units, dry-screening excavated soils, gridding floors and surfaces into quadrats no greater than 50 cm on a side, and bagging the soil for floatation and micro-refuse analysis. In addition we hoped that the site might have Late Neolithic and Chalcolithic stratigraphic deposits, with evidence for the transition between them.

Remote Sensing

In May, before excavation commenced, a small team carried out survey of the main terrace on which site WZ 121 occurs. In addition to topographic surveying, this included a survey by differential proton magnetometer.¹

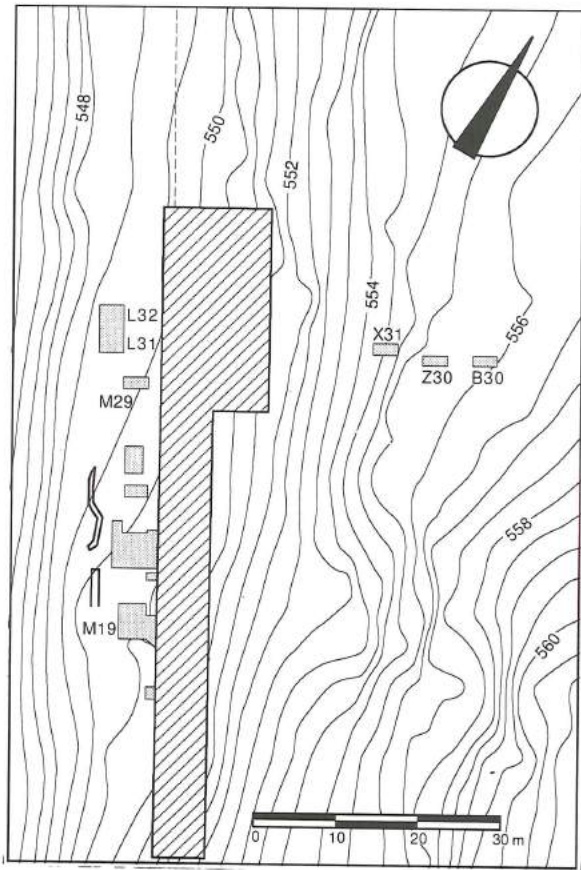
The magnetic survey involves measuring differences in magnetic intensity simultaneously at a base station and at a series of points across the surface of the site, so that diurnal variations — changes in the earth's magnetic field over time — are discounted. Variations in magnetic intensity across the site can, therefore, be attributed to variations in the magnetic properties of materials on and beneath the surface of the earth, principally in the amount of iron present. Since the targets of greatest interest in this surface were buried walls, which we would expect to have been constructed of limestone, at least in their lower courses, we were looking mainly for linear “negative” anomalies — long, narrow areas showing the dis-

tinctive signature of materials with low magnetic resistivity — because limestone has extremely little iron content compared with the soil that surrounds and overlies it on the site. This is not so simple as looking for areas of low magnetic intensity, however, because at mid-latitudes the anomalies show both a negative and a positive peak. For materials of low magnetic resistivity surrounded by soil with higher resistivity, the low values should occur south of the high values. At latitudes where the magnetic “dip” or inclination is about 45°, as at Tubna, we would expect the negative peak to be slightly larger than the positive peak and the buried wall to be offset north of the negative peak by approximately the distance from the instrument to the centre of the limestone wall. Here the instruments were 1.0 m above the modern surface, and most of the limestone walls that excavations later detected were not buried very deeply, so we would expect this shift to be only in the order of 1.2 to 1.4 m.

Maps of magnetic variation across the site appear in Figures 2 and 3. The “hot spots” with very high “spikes” of magnetic intensity combined with somewhat smaller “lows” to the north mark locations where there is probably iron metal, such as nails or steel cans, close to the surface. The areas of interest are principally the “troughs” of low magnetic intensity, which we might expect to be associated with buried limestone walls that run north-south, and “troughs” with somewhat smaller “ridges” just north of them that could mark buried eastwest walls. Unfortunately, few of the negative anomalies are extremely linear, and there is not

1. L. A. Pavlish, C. d'Andrea and S. Ierullo did the magnetic survey, while E. Banning, M. Blackham and P. Racher carried out the topographic survey. Note that the grid used for the remote sensing, because the topographic survey was not complete, deviates from grid north by about 1°. Measurement spacing along each north-south transect was 0.25 m, with 0.5 m between transects. The instrumentation consisted of two GSM-19T proton

magnetometers, with one-gamma precision, from the Physics Department at University of Toronto, one of which was used as a base station to correct for diurnal variations in the earth's magnetic field (differential magnetometry). The largest shifts in this field occurred in late morning and were as much as 20 gammas. Typical field intensity was in the order of 43000 gammas.



2. Topographic map of WZ 121, Tubna al-Gharbiyyah, showing location of magnetic survey (hatched). The 1995 magnetic survey at site WZ 121 (D. Lasby and E. Banning).

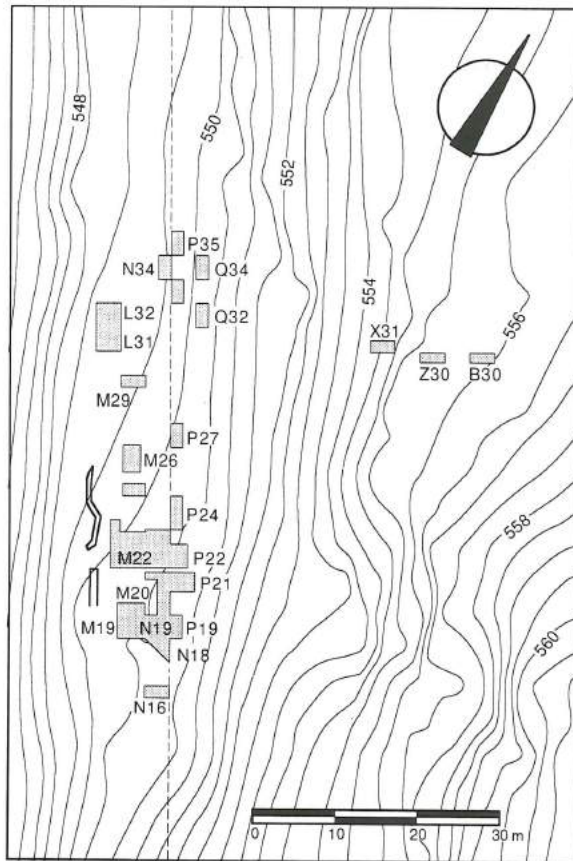
any really convincing evidence for buried structures. As later excavations showed, however, there was indeed quite a large limestone wall that seems to correspond with an anomaly that runs northsouth in the region of N19 to N22, and a positive anomaly, with a low just north of it, in P22, where excavations uncovered a stone-lined pit (see below). The most substantial negative anomalies, however, seem to mark places where bedrock is shallow; indeed bedrock outcrops just east and west of the site and comes close to the modern surface in many of our excavations. Deep pits in Area P21 may be responsible for the magnetic variation apparent there, but oddly it is a large negative anomaly similar to those that are due to bedrock near the surface, when pits into limestone would normally result in positive anomalies.

Excavation Areas

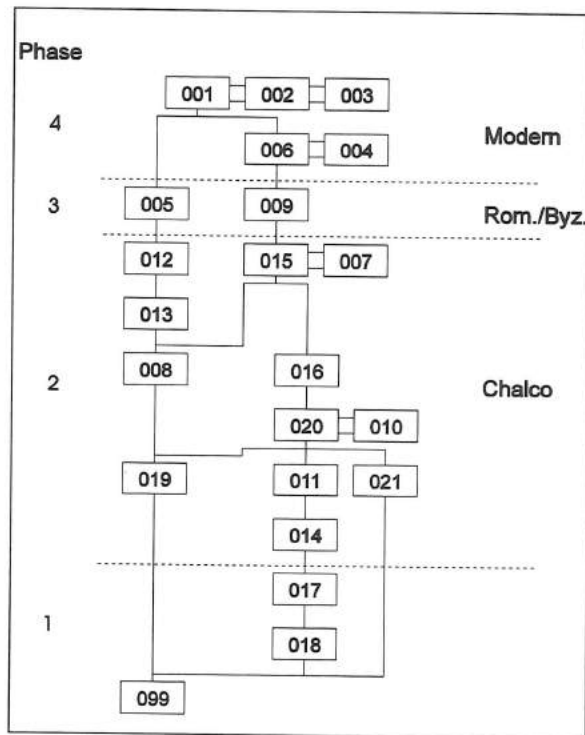
We imposed a 3 m x 3 m grid over the site, which we originally assumed was restricted to a single terrace on the hillside, using letters from west to east and integers from south to north, oriented to a grid north that was in fact roughly northwest (Fig. 4). The baseline, designated "P," extends from a benchmark A on a limestone outcrop at the southern extremity of the site to the corner of a modern house visible on the hillside to the northwest. The test trench excavated in 1993, simply designated Area A, fell within the grid square now designated as N19. We began by excavating half-squares, each 3 m x 1.5 m in extent, in Areas P19, P22, P24, P27, P33, P35, N34, Q32 and Q34 to prospect for subsurface cultural deposits and architecture. Later we closed some of these Areas, especially in the more northerly part of the site, and opened additional excavation Areas in N16, M19, N19, N20, M20, M21, P21, L22, M22, N22, L23, M23, N23, M25, M26, M29, L32, L33, and M37. Many of these were placed so as to expose a reasonably large contiguous area with architecture, although the need to avoid damage to olive trees made this difficult. We also prospected for cultural remains upslope, requiring us to extend our grid farther east than we originally anticipated, with probes of either 1 m x 3 m or 1.5 m x 3 m in Areas E26, B31, X31, Z31, and A34. The excavations revealed a near-contiguous area of some 90 m² in the southern part of the site, about 30 m² in the northern part, with smaller exposures between and to the east.

Stratigraphy and Architecture of the Site

The gross stratification of the site consists of irregular bedrock, overlain by Chalcolithic deposits from 0.2 to more than 1 m thick, in turn covered by Chalcolithic walls and other Chalcolithic deposits from which pits were dug and later filled. All of this is capped by shallow deposits of Byzantine and modern age that appear to be related to



4. Topographic map of WZ 121, Tubna al-Gharbiyyah. Location of excavation Areas at site WZ 121 in 1995 (E. Banning and D. Lasby).



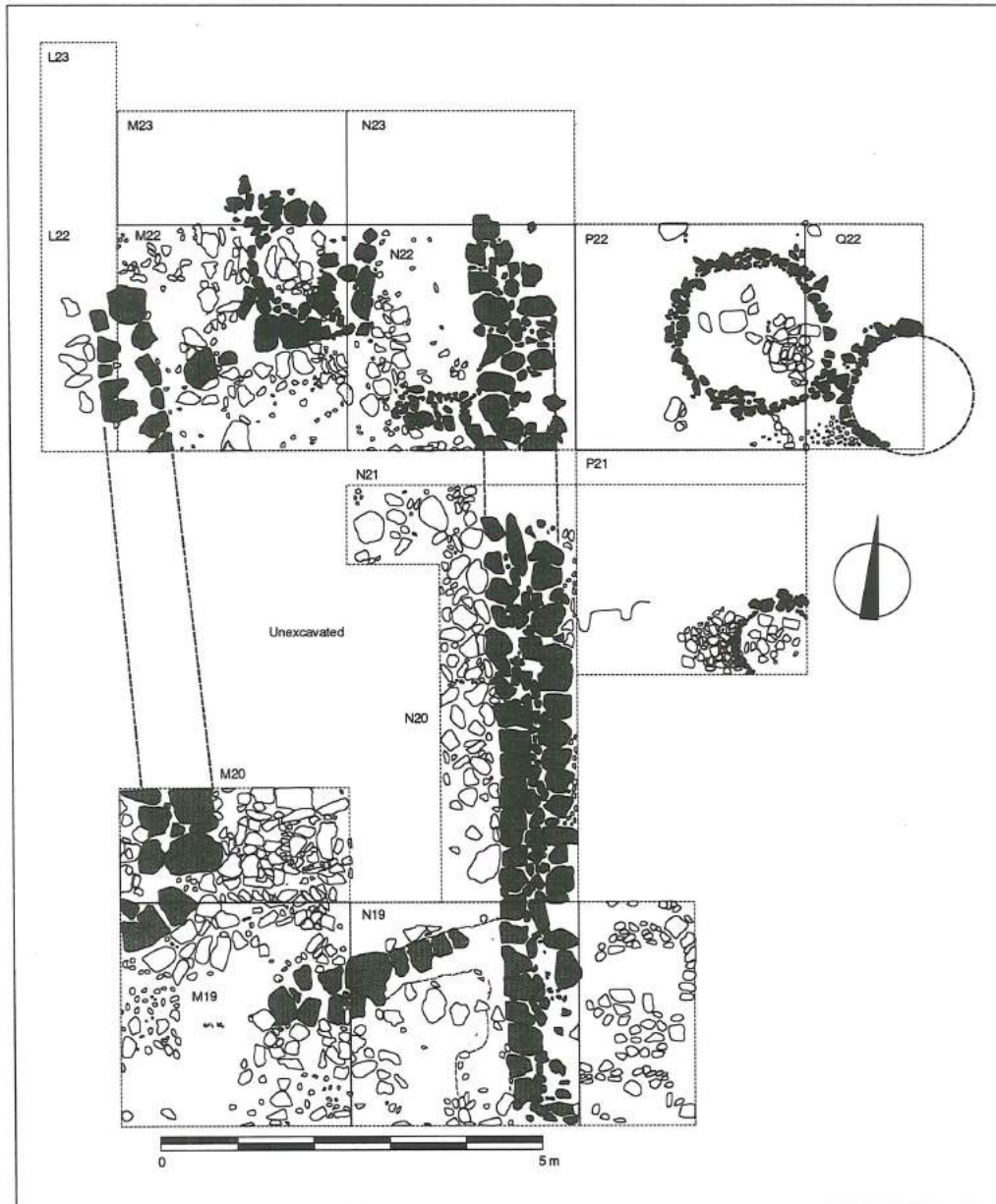
5. Harris matrix for deposits in the deep sounding in Area N19 at site WZ 126 (D. Lasby).

Table 1. Stratigraphic Phases at Tubna (WZ 121).

Phase	Description
4	Plowzone, modern site surface. Heavy disturbance.
3	Roman / Byzantine layer. Moderate disturbance.
2	Chalcolithic layer.
1	Early Chalcolithic layer, founded directly on bedrock.

ly parallel pottery from the nearby Late Neolithic site of Ṭabaqat al-Būma (WZ 200; Banning *et al.* 1992; 1994; 1996). It is possible that this hollow in the bedrock was roofed with some perishable material to provide a simple shelter. Similar bedrock pits, which seem to be dwelling pits of Chalcolithic Age, occur at other sites, such as Beth Shan (Fitzgerald 1934: 124). In other areas of the site, especially in the more northerly excavation Areas, we find abundant Chalcolithic material on bedrock, but without any features or architecture and it appears to represent either redeposited material or dispersed activity on the site, probably during Phase 2.

The principal architectural features of Phase 2, also of Chalcolithic Age, are what seem to be two very large buildings, one partially exposed in Areas L31 and L32 (Fig. 6) and the other extending into areas M19, N19, M20, N20, M21, N21, L22, M22, N22 and, possibly, N23. In the former, we have the building's northwestern corner and much of its western side. The corner was later cut by a Chalcolithic stone-lined pit (see below). In the latter, we have two parallel walls about 5 m apart and apparently marking the eastern and western sides of the building, but poor preservation near the surface at the north end and later pitting at the south end seem to have truncated the building's extremities and made it impossible to determine its full extent. Of crosswalls only wall M22.020 and wall A.002 (from the 1993 probe trench) are very convincing, and the former, at least, seems to be a later addition, perhaps associated with another pit like the one in L32. Neither crosswall is bonded with the large walls.



6. Architectural plan of structures in the southern part of the 1995 excavations at site WZ 121 in 1995 (E. Rachman and E. Banning). Grey shading on stones indicates walls.

In both buildings construction is very similar and generally quite massive, and there appears to have been at least one episode of rebuilding prior to Byzantine use of the walls as stone repositories in Phase 3. One to three courses of stones are preserved, and these are generally large, squarish boulders that give the walls something of a megalithic appearance. Most of the walls, at least in their last building phase, are double-leaf walls. We could detect no signs of foundation trenches but rather the walls appear to have been constructed on top of Chalcolithic surfaces, which in some

cases may have been laid down intentionally to make the ground a little more level prior to construction. In spite of this, the wall on the east side of the more southerly building is founded at a generally higher level than that on the west (M20.015, M22.009), and the surface between slopes down to the west. The eastern wall, in its earliest phase, appears to have extended only about 5 m from north to south, but the double-leaf wall built on top of it (N19.008=N20.008=N22.003) was at least 12 m long.

We found no hearths or other domestic

features within the buildings, and their exact function has yet to be determined, although it seems likely that they are portions of habitations with walled courtyards. Detailed analysis of the finds within the structures, including micro-refuse from some of the surfaces in M20, N22 and N23, may help us identify activities there.

Outside the southern structure, just east of its eastern wall, we found two well constructed, stone-lined pits and a number of other less formal pits. The stone-lined pits, P22.003 and Q22.005, had been cut from a surface at least as high as the bottom of the modern plough zone. In fact their associated use-surfaces may well have been higher than the modern surface and have been eroded or plowed away. Both pits are approximately circular in plan, with diameters a little under 2 m, and have nearly vertical sides lined with angular and sub-angular stones 10 to 15 cm across. The largest of the two (P22.003) was cut some 20 cm into the underlying limestone bedrock (locus 099). There may have been a third such pit in Area N18, just south of one of the large walls, where a circular floor has been chipped into the bedrock. Later pitting and rodent disturbance has obliterated traces of the upper part of this pit, if it in fact existed.

Pits P22.003 and Q22.005 were filled with fine, somewhat ashy soil containing relatively large Chalcolithic sherds and animal bones, but relatively few lithics (pit fills P22.004 and Q22.007), and the P22 pit was then covered with a flagstone pavement (locus P22.009) that was only partially preserved below the plough zone. In Q22.007 there is a substantial disturbance, particularly in the southeast corner from either animal burrowing or former tree roots, while P22.004 is disturbed by the roots of a recent grape vine. The function of these pits, and the pavement that covered at least one of them, has yet to be determined, but their contents seem to represent repeated deposits of domestic rubbish, probably from hearths

or ovens, over a relatively brief period of time. The sherds in the deposits are frequently flat-lying or gently sloping, giving the appearance of a large number of small, interleaved surfaces, as you might expect from the dumping of basket-loads of soil, and the fills' compaction varies substantially, but there is no evidence of less ashy soil intervening between the surfaces. It is noteworthy that similar pits with ash and pavements occurred, for example, at Tall al-Farah North (de Vaux 1957: 561) and Megiddo (Loud 1948: 59). They also appear similar to cist-graves at more southerly sites, such as Shiqmim (Levy 1987), but the ones at Tubna show no evidence of use as graves.

Phase 3 is represented on the main terrace by dark deposits containing fairly frequent Byzantine sherds in addition to Chalcolithic material, while Phase 4 represents modern pits, mainly associated with tree-planting, and plough zone.

On the upper terrace, although some trenches detected substantial deposits containing Chalcolithic artifacts, only Area B31 intersected any Chalcolithic architecture. This (B30.003) is another stone-lined pit, similar to those in P22 and Q22. Its fill (B30.004) is very rocky, however, unlike those on the lower terrace.

Ceramics

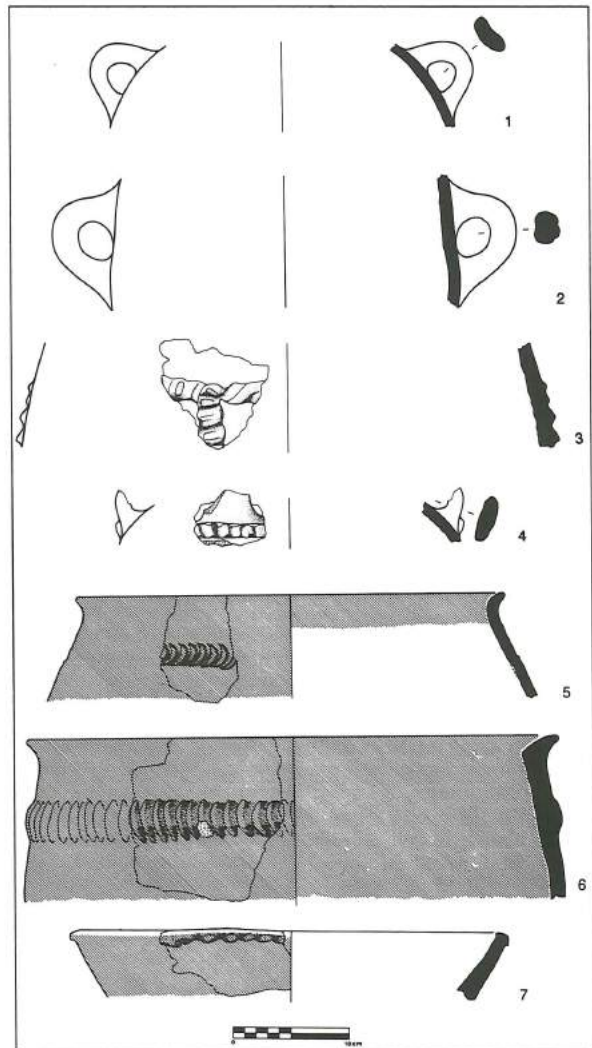
The pottery from WZ 121, except for occasional sherds of Byzantine date in upper loci, consists mainly of coarsely grit-tempered pottery with numerous parallels in such Chalcolithic sites as Pella (Smith and Hanbury-Tenison 1992), Abū Hābil (de Contenson 1960; Leonard 1992), Abū Hāmid (Dollfus and Kafafi 1986; 1993; Dollfus *et al.* 1988), Neve Ur (Perrot 1967), and Tall Fendi (Kareem 1989; Blackham *et al.* 1998). Preliminary observations in the field indicate that inclusions, often up to 3 mm in size, consist of chert, limestone or grog, and several distinct fabrics are recog-

nizable. Most common are thin to medium sherds of red, yellow or orange paste with angular chert inclusions and no slip. A less common fabric is usually yellow or light brown, of medium thickness, and with a brown or buff grog temper. Grey and black fabrics, again usually with angular chert inclusions, are also fairly common. A rarer fabric tends to be finer, with a thick white or buff slip and occasionally with red or brown paint. All are handmade, and determination of the exact methods of pot-building and final classification of fabrics is underway in Toronto.

The excavations yielded a wide repertoire of forms, with jars of various types apparently dominant. Many of these are somewhat inverted, without necks, making forms similar to "holemouth" jars except for the slight out-flaring at the lip (e.g., Figs. 7 and 8). There are also large numbers with short everted necks, often with scalloped decoration just below (Fig. 7: 5) and some with short to medium vertical necks that make an angle close to 90° with the shoulder. The distinction between "holemouth" jars with out-flaring lips and jars with short, everted necks is subtle, but the latter tend to show considerable thickening at the inflexion and are generally heavier. A few of the smaller jars have fairly vertical, only slightly inverted bodies with slightly out-turning rims (Fig. 8: 1), and appear to be from "beaker" forms. So far only two sherds, one a rim and shoulder and the other a handle and base, appear to come from churns and there are no clear examples of cornets.

Bowls include hemispherical, very slightly S-profile (Fig. 8: 19), and probably V-shaped forms. There is one example of a shallow bowl with a pedestal base (Fig. 8: 21).

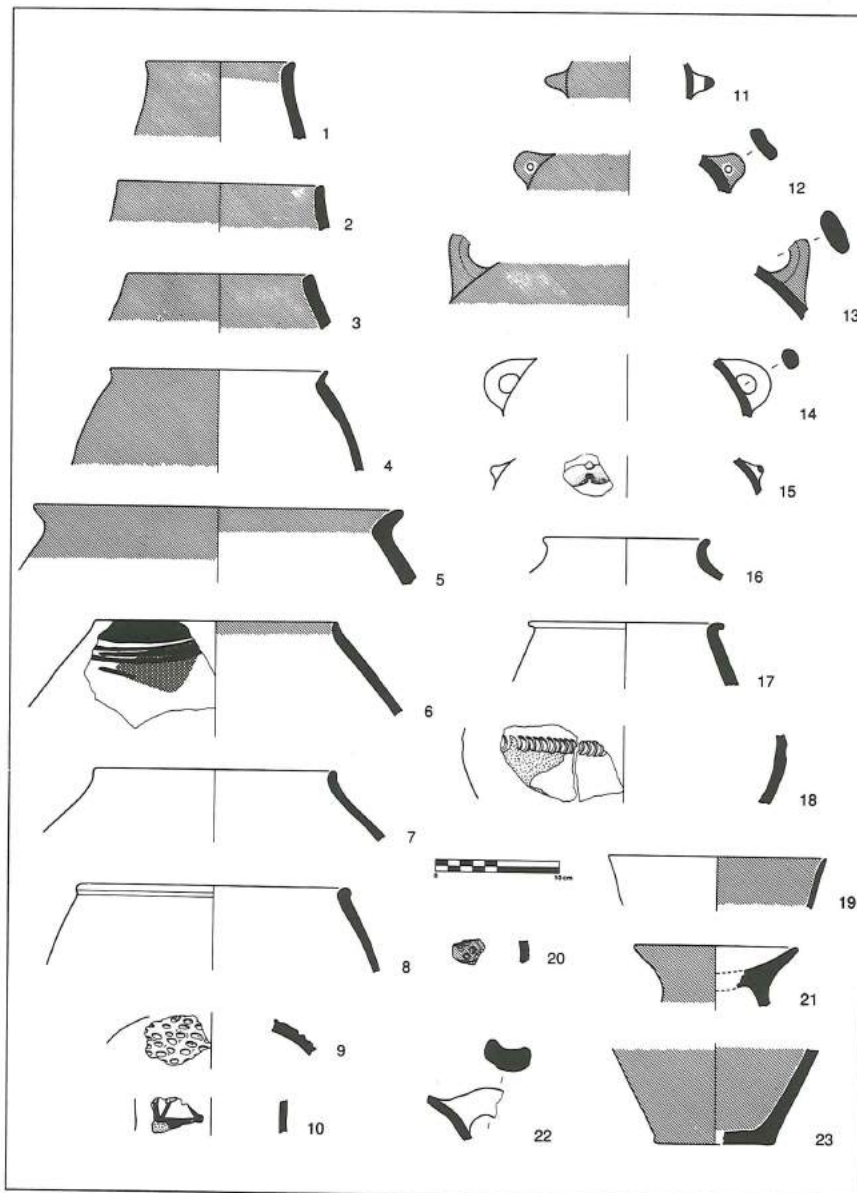
Bases are usually flat and V-shaped (Fig. 8: 23), with no evidence so far of mat impressions. Ring bases and concave bases are fairly common, but pedestal bases (Fig. 8: 21) are very rare.



7. Portions of large jars, some with applied or impressed decoration, and a large bowl (7) from site WZ 121 (J. Pfaff).

Handles are mainly strap handles with relatively flat (Fig. 7: 4), oval or somewhat U-shaped (Figs. 7: 1; 8: 22) sections (raised ridges on the two edges and a trough down the middle). There is often a large, flat void inside each handle attachment that results from folding of the clay during the handles' manufacture. Smaller handles are often round (Fig. 8: 14) or triangular (Fig. 8: 11) in section, and there are fairly frequent examples of small to medium pierced lug handles (Fig. 8: 15), again with either rounded or triangular sections. Ledge handles are virtually non-existent at the site.

Decoration consists primarily of applied and molded strips ("rope molding"), often



8. Smaller jars, handles and bowls from site WZ 121 (J. Pfaff).

arranged horizontally below the rims or necks of jars. One sherd (Fig. 7: 3) displayed both vertical and horizontal rope molding. Fairly common are jars with scalloped decoration apparently made by impressing and somewhat lifting the soft clay with a curved spatula, usually 2-3 cm in width ("spatula impressed," Figs 7: 5; 8: 18). Much more rare are punctate sherds, one of which has been impressed with a hollow reed (Fig. 8: 20). Red slip and red or brown paint occurs on a low but substantial proportion of sherds. Notably we seem to have painted decoration on the sherds with the thick white or pinkish buff slip, but so far

we have not been able to discern any geometric patterns in the painting that might relate it to the "cream wares" found at early Chalcolithic sites in the region, such as Kattaret as-Samra (Leonard 1989), Tal Tsaf (Gophna and Sadeh 1989), or Tall Abū Hābil (de Contenson 1960: 35; Leonard 1992: 71).

Lithics

The lithic assemblage is predominantly "expedient," with high proportions of utilized but unretouched flakes and their fragments, and "amorphous" cores, but there is also an important component of formed

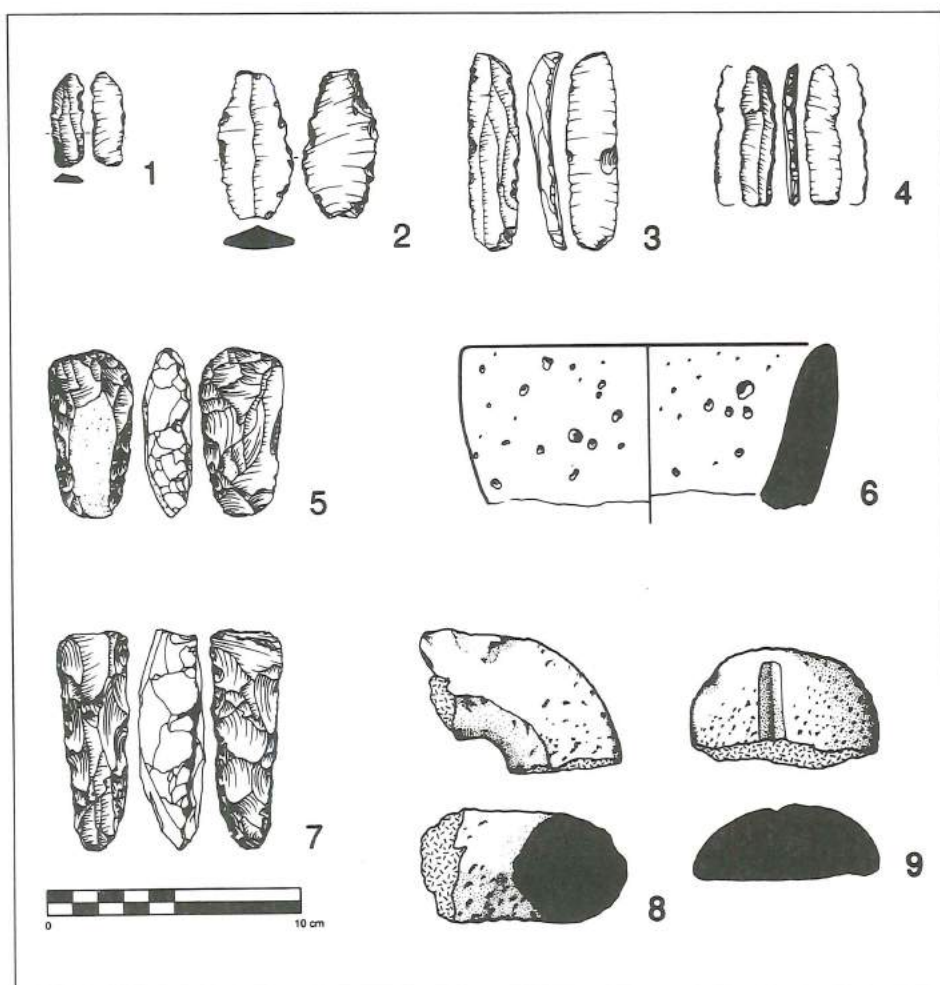
tools, including ground stone (cf. Fig. 9).

The chipped stone assemblage detailed here includes some 3430 artifacts recovered from Area N19 near the southern end of the excavations. This Area was chosen for preliminary analysis because all phases of occupation at the site are present. Because the proportion of the total assemblage so far analysed is small, it is currently impossible to determine to what degree this material is typical of the entire site.

The classification of this assemblage was by the same criteria used for the chipped stone assemblage from Tall Fendi (Blackham *et al.* 1998). As is typical for the Chalcolithic, it is dominated by debitage and *ad hoc* tools, with extensively retouched, formed tools making up only a very small proportion. Generally speaking, there does not seem to have been any significant

changes in lithic production strategy, or in the intensity of reduction over the period of occupation at the site. In all phases flakes (including proximal fragments) make up 20 to 30% of the debitage, and outnumber blades by a factor of five to 20.

The range of formed tools is broadly similar to that typically found at other Chalcolithic sites in the region, including Tall Fendi (Blackham *et al.* 1998). One notable difference between this assemblage and the one from Tall Fendi is that the density of formed tools seems to be somewhat lower here. Interestingly enough, the proportion of the formed tool assemblage made up of heavily retouched utilized elements, however, is much higher. The implications of this are presently unknown, but explaining these differences will be an important focus of future research. Although the number of



9. A selection of lithics from site WZ 119, immediately downhill from site WZ 121 and probably derived from it. Included are a sickle blade (4), two adzes (5 and 7), a basalt bowl (6), a fragment of a ring-shaped weight (8), and a "shaft straightener" (9) (J. Pfaff).

formed tools recovered from Area N19 is quite small, some general observations can be recorded regarding the assemblage as a whole.

Among the formed tools (Table 2), several tool types typical of the Chalcolithic are common, including adzes (Fig. 9: 5, 7), sickle blades (Fig. 9: 4), and fan scrapers. Projectile points seem to be absent.

Adzes are perhaps the most interesting type of tool recovered at the site, and are relatively frequent in both excavations and on the surface of the site. All stages of production, use, maintenance² and discard are well represented in this assemblage. Adzes were manufactured from a coarse white chert, outcrops of which are present in the Upper Cretaceous limestones at the southern end of the site. This raw material was used only for the manufacture of adzes, and was probably selected because of its high fracture toughness as compared with other more finely grained raw materials. It is also noteworthy that the 1981 Wādī Ziqlāb Survey recorded several scatters of flakes and cores of this material just across the wadi to the west (sites WZ 93, 94 and 95), which may represent Chalcolithic quarrying sites rather than Palaeolithic scatters. Exploring the possibility that these tools were the product of specialized or semi-specialized labour will be a major research priority.

The sickle blades and backed blades are typically narrow, with nibbled or minimally retouched cutting edges and abrupt or semi-abrupt backing retouch and truncated or

Table 2. Summary of lithic formed tools from Area N19 at site WZ 121 by stratigraphic phase.

Tool	Phase 1	Phase 2	Phase 3	Phase 4
Adze	-	-	-	1
Adze Resharpener Flake	-	-	-	1
Axe	1	-	-	-
Backed Blade	-	1	-	1
Discoid Scraper	1	-	-	-
Notch	-	2	2	1
Perforator Fragment	-	1	1	1
Retouched Element	2	9	-	5
Scraper	-	1	-	-
Sickle Blade	-	1	1	2
Tabular Fan Scraper Fragment	-	1	-	-
Total:	4	16	4	12

2. Note the adze-resharpener flake included as part of Table 2.

abruptly retouched ends.

The fan scrapers found at the site are of the oval or round types. Both end-struck and side-struck forms are present. These tools do not seem to have been made from true tabular flint; instead the curvature of the cortical surface seems to indicate that they were struck from large, flat-sided nodules.

Perforators are represented mainly in the form of broken bit fragments. Bits are triangular in profile, with unifacial abrupt retouch along both margins, and a triangular or trapezoidal cross-section.

Debitage composition (Table 3) is as expected for the Chalcolithic (see Blackham *et al.* 1998, for a brief description). "Debitage," as the term is used here, refers to all flakes, blades and fragments that have not been retouched to make formed tools, and excludes cores and core fragments (cf. Sullivan and Rosen 1985). Lithic production seems to have been based on the reduction of amorphous cores, with the aim of quickly producing large, minimally prepared flakes suitable for use as *ad hoc* tools. Given the small size of the assemblage from Phase 1, and the recent disturbances in Phases 3 and 4, it is impossible to state with any certainty whether or not there were any significant

Table 3. Summary ofdebitage from Area N19 at site WZ 121 by stratigraphic phase.

Element	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%
Flake	38	20.2	258	18.3	71	17.4	119	13.3
PF	20	10.6	128	9.1	48	11.8	82	9.2
MDF	76	40.4	664	47.1	183	45.0	513	57.3
SDF	17	9.0	119	8.5	46	11.3	72	8.0
SDPF	3	1.6	20	1.4	2	0.5	0	0.0
SDMDF	34	18.1	220	15.6	57	14.0	109	12.1
Total:	188		1409		407		895	

Element	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%
Blade	0	0.0	12	14.5	14	20.3	9	12.0
PB	3	50.0	19	22.9	12	17.4	17	22.7
MDB	2	33.3	41	49.4	38	55.1	39	52.0
SDB	0	0.0	2	2.4	1	1.5	3	4.0
SDPB	0	0.0	0	0.0	0	0.0	0	0.0
SDMDB	1	16.7	9	10.8	4	5.8	7	9.3
Total:	6		83		69		75	

Element	Phase 1	Phase 2	Phase 3	Phase 4
Chunk	17	130	27	64
Core	0	6	0	7
CTE	0	5	1	5
Tool	4	16	4	12
Total:	21	157	32	88

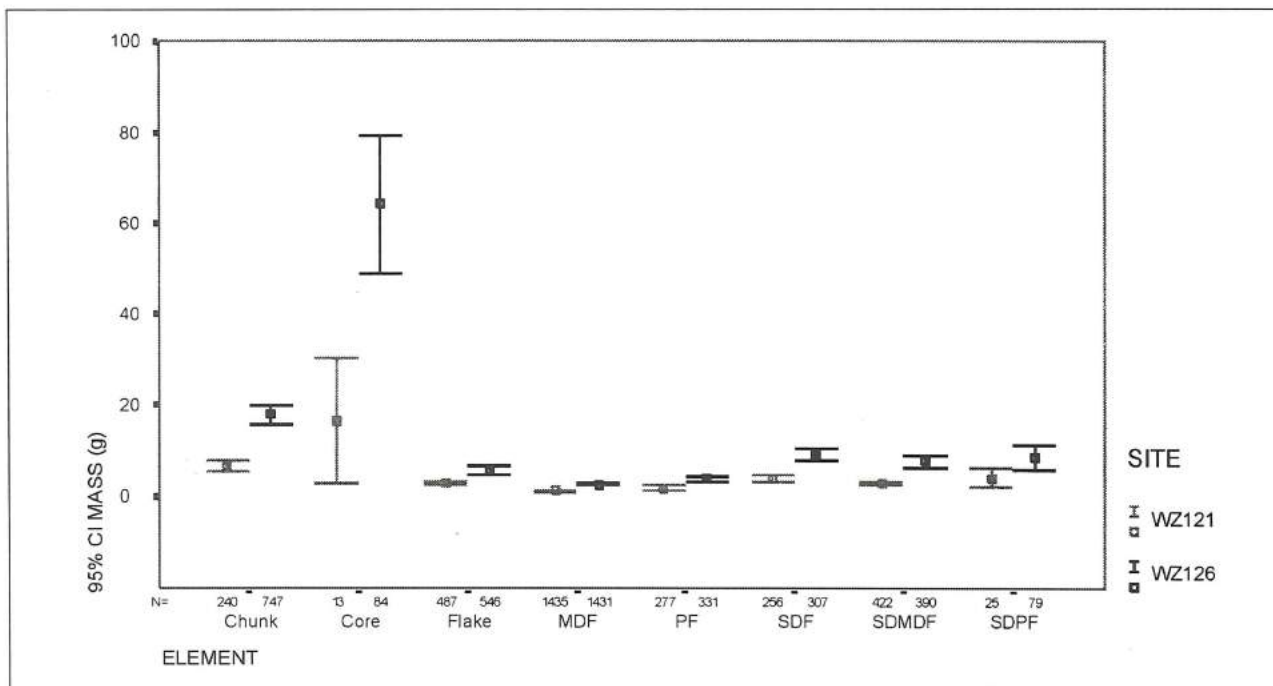
changes in lithic production strategy over time. Certainly the figures from Phases 1 and 2 would suggest that there were no major changes during the Chalcolithic, as these phases show remarkably consistent statistics. We can expect that most or all of the lithics in phases 3 and 4 are residual, representing Chalcolithic material redeposited in later times, but there may be some sorting there by size or shape.

What is interesting about this assemblage, as compared with the Chalcolithic debitage recovered from Tall Fendi (Blackham *et al.* 1998), is that the intensity of reduction seems to be far higher at Tubna. Greater reduction intensity can be seen in the debitage ratios (Table 4), which show that the number of flakes and secondary decortication flakes per core is far higher. The number of chunks per core is also much higher. All of this suggests that cores were being reduced to such an extent that they become unrecognizable as such, and are

Table 4. Debitage assemblage ratios from Area N19 at site WZ 121 by stratigraphic phase.

Elements	Phase 1	Phase 2	Phase 3	Phase 4
Flakes per Blade	19.3	12.5	4.6	7.7
Flakes per SDF	2.9	2.8	2.5	2.8
Flakes per Core	-	64.3	-	28.7
SDF per Core	-	23.2	-	10.3
Flakes per Chunk	3.4	3.0	4.4	3.1
SDF per Chunk	1.2	1.1	1.8	1.1
Chunks per Core	-	21.7	-	9.1

now classified as chunks. These ratios may be substantiated by the information in Figure 10, which shows that the average mass for each element type is significantly lower at Tubna (WZ 121) than at Tall Fendi (WZ 126). Unfortunately, it is impossible at present to determine with any certainty whether these differences are due only to variations in reduction intensity or are also influenced by differences in the average nodule size of the raw material. Smaller raw material would tend to result in smaller flake elements, and could also explain the scarcity of cores. Discriminating between these alternatives will be a priority for fu-



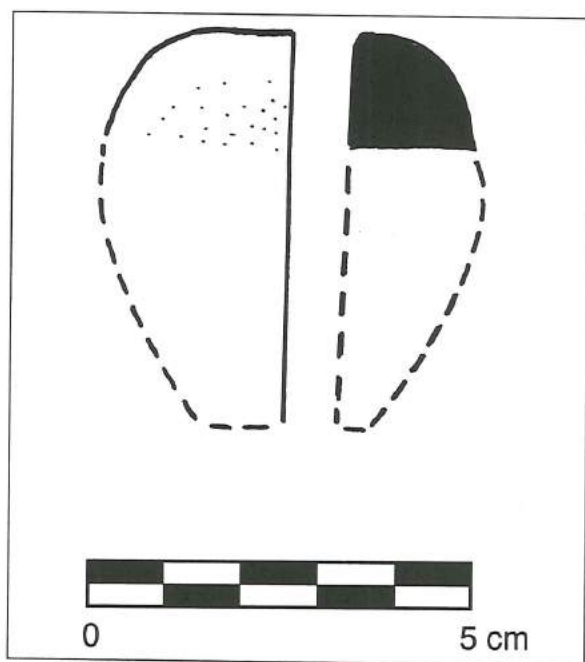
10. 95% confidence intervals or mean mass of element at Tubna (site WZ 121) and Tall Fendi (WZ 126). Flake and blade element counts are the sum of complete and proximal elements. PF = Proximal Flake Fragment, MDF = Medial/Distal Flake Fragment, SDF = Secondary Decortication Flake, SDPF = Secondary Decortication Proximal Flake Fragment, SDMDF = Secondary Decortication Medial/Distal Flake Fragment, PB = Proximal Blade Fragment, MDB = Medial/Distal Blade Fragment, SDB = Secondary Decortication Blade, SDBPB = Secondary Decortication Proximal Blade Fragment, SDMDB = Secondary Decortication Medial/Distal Blade Fragment.

ture research. More intense reduction might well have been caused by the difficulty of obtaining raw material at Tubna, where the principal source seems to have been cobbles from the wadi bottom, some 100 m below the site, down a steep and treacherous slope. In contrast, the costs of raw material acquisition would have been much lower at Tall Fendi, where such cobbles are available in the channel of Wādi Ziqlāb, immediately north of the site.

Ground-stone technology appears to have been intensive at the site, although we found a higher density of fragments of grinding stones and weights downslope at locality WZ 119, where it may have come to rest after being discarded at the edge of WZ 121, than in the excavations at WZ 121 itself. Among the finer work in ground stone were fragments of what appear to have been chalices and of two haematite mace heads (Fig. 11). There were also fragments of several basalt bowls or mortars, as well as pestle fragments.

Osteological and Botanical Remains

As has often happened during the course



11. One of two fragmentary haematite mace heads from site WZ 121 (E. Banning).

of the Wādi Ziqlāb Project, preservation of osteological remains has not been very good, while preservation of plant macroremains has been extremely poor. Nonetheless, we did collect 12 sediment samples for floatation and a large number of bones and bone fragments. We also have sediment samples that we intend to use for phytolith analysis.

Although a thorough understanding of the economic implications of the remains must await the completion of analysis, preliminary indications are that the fauna include substantial numbers of domesticated sheep/goat, cattle and pig.

Micro-refuse

One of the foci of our research is an attempt to identify activity areas through study of microscopic remains of lithic debris, bone and pottery chips, shell and other materials found on house floors and outdoor surfaces.

In three parts of the site, we gridded surfaces into quadrats of 25 cm x 25 cm and collected all the soil for this type of analysis, much as we did at the Late Neolithic site of Ṭabaqat al-Būma. Analysis of the these samples in Toronto is underway, under the direction of Paul Racher.

Residue Analysis

Another focus of our research is an attempt to identify the function of vessels through analysis of chemical residues absorbed into their fabric during use. We very carefully excavated and removed a sample of 81 sherds from good Chalcolithic contexts along with accompanying sediment volumes, enclosed them in aluminum foil and stored them in a freezer to await processing to remove organic compounds and analysis by Gas Chromatography-Mass Spectrometry (GC-MS). The reason for analysing a small sediment sample associated with each sherd is to check for contamination from the burial environment (cf.

Heron *et al.* 1991), while freezing is intended to prevent or slow down chemical alteration of residues in the sherds after excavation. Such chemical alteration could be accelerated by sudden increase in temperature or humidity.

It is our hope that prehistoric chemical residues (mainly fatty acids) will be preserved in at least many of the sherds, and that we will be able to associate them with vessels' former contents (cf. Rottlander and Schlichtherle 1978, 1983; Rottlander 1990; Skibo 1992; Haldane 1993). Among the substances with which we will compare any preserved residues are olive oil, wine, beer, and dairy products. If successful, this research will contribute to our understanding of the origins of dairying, which some authors would place in the Chalcolithic (e.g., Levy 1983), as well as of brewing, wine-making and olive pressing. Until recently, our only evidence for dairying in the Chalcolithic has been indirect: the presence of "churn" fragments among the pottery (Kaplan 1954: 97; Hanbury-Tenison 1986: 38-86). Liphshitz *et al.* (1991), meanwhile, have argued that "the earliest widespread use of olives in Israel was in the Early Bronze Age." If the residue analyses should show evidence for widespread use of vessels to store olives or their oil, however, we would have to reassess this statement. Alicia Beck will be undertaking the GC-MS work.

WZ 121 in a Regional Perspective

Site WZ 121, as one of very few partially excavated Chalcolithic sites in the hills of northern Jordan, allows us to begin to see how the Chalcolithic in this area fits into the southern Levant as a whole. Compared with Ghassulian and related sites in the southern Jordan Valley, and with Chalcolithic sites in the middle Jordan Valley (e.g., Tall Abū Hāmid (Dollfus *et al.* 1988, Pella (McNicoll *et al.* 1992), site WZ 121 seems to have a more dispersed settlement

pattern and a much smaller repertoire of material culture. This material culture also seems to be rather more "rustic" in that the pottery is almost exclusively coarse wares, even in forms that are found elsewhere in thinner, finer fabrics. The lithics are dominated by "expedient" or *ad hoc* technology and heavy tools, such as adzes, and show some evidence of more intensive reduction.

An interesting but puzzling aspect of Chalcolithic settlement in and around Wādī Zīqlāb is evidence that it is highly clustered. Although most of the one-kilometre quadrats of the 1981 Wādī Zīqlāb Survey turned up no evidence of Chalcolithic material, the neighbourhood of Tubna appears to have been extensively occupied during the Chalcolithic. In addition to the single Chalcolithic sherd that the 1981 survey found at Tall al-'Ajami Tubna (WZ 6), there is a small but reasonably dense scatter of artifacts, apparently quite similar to those from WZ 121, in the fields and yards around some modern houses on the southeastern outskirts of Tubna (WZ 127). These include sherds from large jars (Fig. 7: 5, 6) with distinctive "scallop" applied decoration. There is a broad, low-density lithic scatter on the slopes near the boy's school at the south end of Tubna that probably dates, in whole or in part, to the Chalcolithic (WZ 129). Local informants claim that a cave on this slope that is now closed off contains a spring or well that could have attracted Chalcolithic settlement, and that there had once been another well closer to the southern end of Ottoman Tubna. In addition, lithic scatters on the west side of Wādī Summayl (WZ 93, 94 and 95), about halfway between Tubna and Kufr al-Mā', may have something to do with the production of Chalcolithic adzes, to judge from the raw material, which is the soft, chalky chert that is typically white with red or orange staining. Originally these rather non-descript, large flakes and amorphous cores were judged to be "Palaeolithic or later" in age, but now a Chalcolithic date seems

more likely. It is noteworthy that these upland sites are not only all at elevations around 500-600 m, scattered over an area of only some 3 km², but are also located near the eastern edge of relatively flat table-land, at elevations of 300-500 m, with Brown Stony Soils that are typically the most fertile in these highlands (Fisher *et al.* 1966: 26-27) and are currently heavily exploited for production of wheat and pulses.

Recently the Wādī al-Yābis Survey discovered what may be a similar cluster of Chalcolithic activity at an elevation near 500 m, in the neighbourhood of Tall Maqlūb (Palumbo *et al.* 1990). There were found two Late Chalcolithic sites, one of which may be associated with a large dolmen field, that may "represent the first successful dry-farming and olive tree domestication on the highlands" (Mabry and Palumbo 1992: 68-69). Interestingly, these sites are also located fairly close to table-land with Brown Stony Soils that surrounds Kufr Abīl and occurs in patches near Ḥalāwa.

Apart from the cluster of Chalcolithic activity near Tubna, and the possible cluster in Wādī al-Yābis, the nearest Chalcolithic sites are much closer to, or in the Jordan Valley. These include Tall Fendi on the lower banks of Wādī Ziqlāb; Abū Hābil, Abū Ḥāmid, al-Ḥandaqūq and Pella somewhat to the south; and Beth Shan, Jiftlik, and Neve Ur just across the Jordan River. At elevations much higher than Tubna, in or near the upper reaches of Wādī Ziqlāb, we currently have no evidence for Chalcolithic occupation. The lack of Chalcolithic sites on the plateau may in part be due to lack of intensive survey, as comparable terrain in the Jarash region turns out to have had fairly numerous Chalcolithic sites (Hanbury-Tenison 1986: Figs. 8 and 9). Around Jarash, too, sites seem to be fairly well-clustered, and occur at elevations around 700 m, only a little higher than in Wādī Ziqlāb or Wādī al-Yābis, in what Hanbury-

Tenison (1986: 46) describes as "open steppe."

Another interesting aspect of Chalcolithic settlement pattern in the region is that sites are either low hills in the Jordan Valley, generally within about 2 km of the Jordan River, or are on the upper slopes of hills and ridges at elevations of 400-600 m. This appears consistent with Hanbury-Tenison's (1987) observation that in the Jarash region, "Chalcolithic sites are high up towards the top of south or west facing slopes, with access to water at some distance, and covering at least two hectares." In the case of site WZ 121, the closest and most convenient source of water would probably be the wadi floor some 100 m below the site, or a spring that locals tell us once occurred about 1 km to the south. 'Ayn Sirin is really quite a difficult walk to the northeast.

Although our sample sizes are small, current evidence suggests that Late Neolithic sites in the region tend to occur either in the Jordan Valley or near the bottoms of deep wadis, while village sites of the Early Bronze Age seem to occur in the Jordan Valley and up on the plateau (elevations greater than 800 m) and small Early Bronze Age sites down in the wadi bottoms. One might well ask why the distribution of Chalcolithic sites in the region, by contrast, seems to show a cluster of sites on the upper slopes of hills about half-way up the plateau, at elevations around 400 to 600 m. It is possible that this distribution has something to do with the development of an olive-oil industry, as the zone around modern Tubna has been a prime area for the production of olive oil for many centuries (Banning 1985: 140-44). Local farmers have told us that the high elevations at the east end of Wādī Ziqlāb's drainage basin are too windy to produce good crops of olives, while the depths of the Jordan Valley are too hot. The rocky 'Terra Rossas' and 'Brown Stony Soils' around Tubna, however, are apparently ideal for olive trees (Fisher *et al.*

1966: 49). The area in central Wādī al-Yābis where Palumbo *et al.* (1990) have also found Chalcolithic sites and the areas near Jarash where Hanbury-Tenison (1986) reports Late Chalcolithic sites are similarly favourable for olive production. Sites in the Jordan Valley, such as Tulaylāt al-Ghassūl (Mallon *et al.* 1934: 40) and Pella (Hanbury-Tenison 1986: 80), show significant amounts of cultivated olive pits among their plant remains. As Hanbury-Tenison (1986: 87) points out, their presence at such sites "does not mean that the trees were irrigated, or that the environment was different in antiquity ... and olives could easily have been picked in the Transjordanian hills and carried to Ghassul." As noted above, Lipschitz *et al.* (1991) would date the beginnings of such an industry somewhat later, and one of the things that remains to be understood is exactly how olives may have been processed in the Chalcolithic period. It is possible that the wide repertoire of basalt "grinding" fragments at upland sites such as WZ 121 have something to do with the crushing of olives and pressing of oil (cf. Epstein 1993). It is also noteworthy that there are two "cup-mark mortars" at site WZ 121, similar to ones that Epstein suggests were used for extracting oil.

Conclusion

Site WZ 121 provides new evidence for variety among Chalcolithic sites in northern Transjordan, but does not provide enough of a stratified sequence to shed light on the transition from the Late Neolithic or to the Early Bronze Age. It does provide particularly good evidence for the nature of Chalcolithic settlement and economy in the hills bordering the Jordan Valley, where Chalcolithic farmers may have produced

olives or olive oil to be consumed by more populous sites in the Jordan Valley and beyond. Upland sites like WZ 121 may also have been important loci for the production of pastoral products, such as ghee (clarified butter). These are hypotheses we hope to test through chemical analysis of absorbed residues in pottery.

Acknowledgements

Excavations at Tubna were funded by a grant of the Social Sciences and Humanities Research Council of Canada. We would like to thank Dr Ghazi Bisheh, Director-General, and Ibrahim Zu'bi, the representative of the Department of Antiquities of Jordan for their efforts on our behalf, and the people in Tubna who facilitated our work. Yarmouk University provided housing for the advance field team in 1995, and we would particularly like to thank Prof. Zeidan Kafafi for his hospitality. John Tomenchuk and Julian Siggers kindly offered advice on the lithics, and Dan Rahimi on the pottery. Prof. Zeidan Kafafi and Dr Geneviève Dollfus allowed us to see pottery from Abū Ḥāmid, and the latter also made helpful comments on the comparison of the Abū Ḥāmid and Tubna assemblages during a visit to our laboratory in Toronto. Larry Pavlish provided a report on the magnetometer survey, and Julia Pfaff illustrated pottery and lithics.

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Bibliography

- Banning, E. B.
 1985 *Pastoral and Agricultural Land Use in the Wadi Ziqlab, Jordan: an Archaeological and Ecological Survey*. Unpublished Ph.D dissertation, University of Toronto.
- Banning, E. B., Dods, R. R., Field, J., Kuijt, I., McCorrison, J., Siggers, J., Taani, H., and Triggs, J.
 1992 Tabaqat al-Būma: 1990 Excavations at a Kebaran and Late Neolithic site in Wādi Ziqlāb. *ADAJ* 36:43-69.
- Banning, E. B., Rahimi, D. and Siggers, J.
 1994 The Late Neolithic of the Southern Levant: Hiatus, Settlement Shift or Observer Bias? The Perspective from Wadi Ziqlāb. *Paléorient* 20(2):151-64.
- Banning, E. B., Rahimi, D., Siggers, J. and Taani, H.
 1996 The 1992 Season of Excavations in Wādi Ziqlāb, Jordan. *ADAJ* 40:29-49.
- Blackham, M., Fisher, K., and Lasby, D.
 1998 Tell Fendi, a Late Chalcolithic Settlement in the Lower Wādi Ziqlāb, Jordan. *ADAJ* 42.
- Contenson de , H.
 1960 Three Soundings in the Jordan Valley. *ADAJ* 4/5:12-98.
- Dollfus, G. and Kafafi, Z.
 1986 Abu Hamid, Jordanie. Premiers Résultats. *Paléorient* 12(1):91-100.
 1993 Recent Researches at Abu Hamid. *ADAJ* 37:241-255.
- Dollfus, G, Kafafi, Z., Rewerski, J., Vailland, N., Coqueugniot, E., Desse, J. and Neef, R.
 1988 Abu Hamid, an Early Fourth Millennium Site in the Jordan Valley. Pp. 567-601 in A.N. Garrard (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR Int. Ser. 396 (ii). Oxford.
- Epstein, C.
 1993 Oil Production in the Golan Heights During the Chalcolithic Period. *Tel Aviv* 20: 133-46.
- Fisher, W., Atkinson, D., Beaumont, P., Coles, A. and Gilchrist-Shirlaw, D.
 1966 *Soil Survey of Wadi Ziqlab, Jordan*. Durham.
- Fitzgerald, G. M.
 1934 Excavations at Beth Shan in 1933. *PEFQ* Statement:123-34.
- Gophna, R. and Sadeh, S.
 1989 Excavations at Tel Tsaf: An Early Chalcolithic Site in the Jordan Valley. *Tel Aviv* 15/16(1):3-36.
- Haldane, C.
 1993 Direct Evidence for Organic Cargoes in the Late Bronze Age. *WA* 24:348-60.
- Hanbury-Tenison, J. W.
 1986 *The Late Chalcolithic to Early Bronze I Transition in Palestine and Transjordan*. BAR Int. Ser. 311. Oxford.
 1987 Jerash Region Survey 1984. *ADAJ* 31:129-59.
- Heron, C., Evershed, R. P. and Goad, L. J.
 1991 Effects of Migration of Soil Lipids on Organic Residues Associated with Buried Potsherds. *Journal of Archaeological Science* 18(6):641-59.
- Kaplan, J.
 1954 Two Chalcolithic Vessels from Palestine. *PEQ* 36:97-100.

- Kareem, J.
 1989 Tell Fendi: Jisr Sheikh Hussein Project, 1986. *ADAJ* 33:97-109.
- Leonard, A., Jr.
 1989 A Chalcolithic "Fine Ware" from Kataret es-Samra in the Jordan Valley. *BASOR* 276:3-14.
 1992 Tell Abu Habil. Pp. 64-76 , 162-67 in A. Leonard, Jr. (ed), *The Jordan Valley Survey, 1953: Some Unpublished Soundings Conducted by James Mellaart*. AASOR Winona Lake, IN.
- Levy, T. E.
 1983 The Emergence of Specialized Pastoralism in the Southern Levant. *WA* 15(1):15-36.
 1987 *Shiqmim I: Studies Concerning Chalcolithic Societies in the Northern Negev Desert, Israel (1982-1984)*. BAR Int. Ser. 356. Oxford.
- Liphschitz, N., Gophna, R., Hartman, M. and Biger, G.
 1991 The Beginning of Olive (*Olea europaea*) Cultivation in the Old World: A Re-assessment. *Journal of Archaeological Science* 18(4):441-53.
- Loud, G.
 1948 *Megiddo II, Seasons of 1935-9*. Oriental Institute Publications. Chicago: University of Chicago Press.
- Mabry, J. and Palumbo, G.
 1992 Environmental, Economic and Political Constraints on Ancient Settlement Patterns in the Wadi al-Yabis Region. Pp. 67-72 in *SHAJ* IV. Amman: Department of Antiquities.
- Mallon, A., Koeppel, R. and Neuville, R.
 1934 *Teleilat Ghassul I, 1929-32*. Rome: Pontifical Biblical Institute.
- McNicoll, A. W., Edwards, P. C., Hanbury-Tenison, J., Hennessy, J. B., Potts, T. F., Smith, R. H., Walmsley, A. and Watson, P.
 1992 *Pella in Jordan 2. The Second Interim Report of the Joint University of Sydney and College of Wooster Excavations at Pella 1982-1935*. Med. Arch. Suppl. 2. University of Sydney. Canberra.
- Palumbo, G., Mabry, J. and Kuijt, I.
 1990 The Wadi al-Yabis Survey. Report on the 1989 Field Season. *ADAJ* 34: 95-118.
- Perrot, J.
 1967 Neve Ur, un nouvel aspect du Ghassoulien. *IEJ* 17:202-32.
- Rottlander, R. C. A.
 1990 Lipid Analysis in the Identification of Vessel Contents. Pp 37-40 in W. R. Biers and P. E. McGovern (eds) *Organic Contents of Ancient Vessels* MASCA Research Papers in Science and Archaeology 7. University of Pennsylvania, Philadelphia.
- Rottlander, R. C. A. and Schlichtherle, H.
 1978 Food Identification of Samples from Archaeological Sites. *Archaeo-Physika* 10:260-67.
 1983 Analysis of Contents of Prehistoric Vessels. *Naturwissenschaften* 70:33-38.
- Skibo, J. M.
 1992 *Pottery Function, A Use-Alteration Perspective*. Interdisciplinary Contributions to Archaeology. New York: Plenum Press.
- Smith, R. H. and Hanbury-Tenison, J.
 1992 The Pottery Neolithic and Chalcolithic periods. Pp. 17-27 in A. W. McNicoll *et al.*

Pella in Jordan 2. The Second Interim Report of the Joint University of Sydney and College of Wooster Excavations at Pella 1982-1985. *Medit. arch. Suppl.* 2. Canberra.

Sullivan, A. P. and Rosen, K. C.

1985 Debitage Analysis and Archaeological Interpretation. *AA* 50(4):755-79.

de Vaux, P.

1957 Les fouilles de Tell el-Farah près Naplouse. *RB* 64:552-80.



TALL FENDI, A LATE CHALCOLITHIC SETTLEMENT IN THE LOWER WĀDĪ ZIQLĀB, JORDAN

by

Mark Blackham, Kevin Fisher and David Lasby

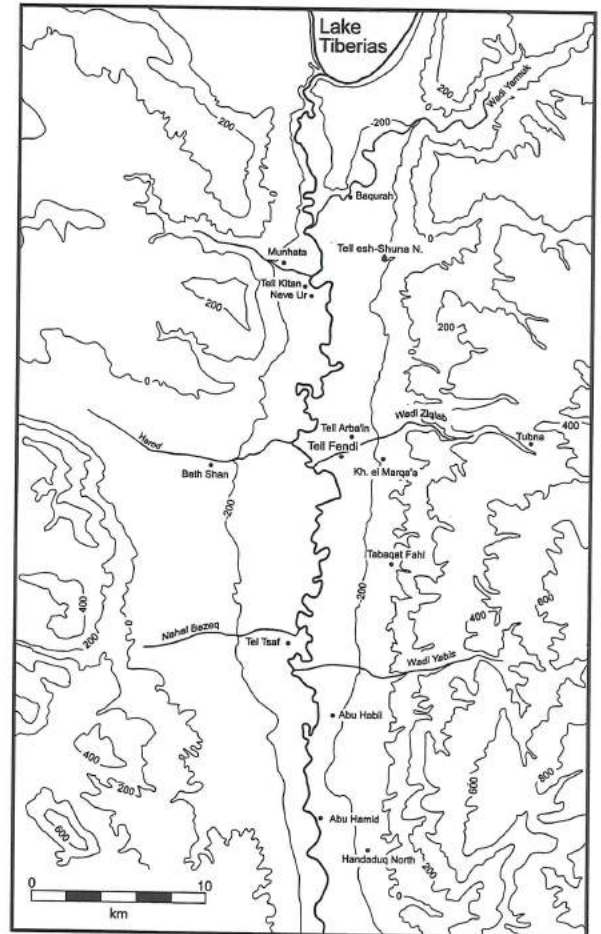
Introduction

Six weeks of excavations were carried out at Tall Fendi from September through November of 1996 as part of a research project investigating Chalcolithic chronology and settlement in the northern Jordan Valley. This project is affiliated with, and draws material support from, the Wādī Ziqlāb Project at the University of Toronto (Banning and Fawcett 1983; Banning 1985; Banning *et al.* 1987, 1989, 1992, 1996). Tall Fendi has been reported in a number of surveys (de Contenson 1964; Glueck 1951; Ibrahim *et al.* 1976; Kafafi 1982; Kareem 1989; Lenzen *et al.* 1987; Mellaart 1962; Yassine *et al.* 1988). While no previous excavations had been carried out at this site, Kareem (1989) did conduct an intensive surface pickup of artifacts in 1986, as part of the Jisr ash-shaykh Hussein Project (Lenzen 1987).

The site is located in the Baysān depression of the northern Jordan Valley, at an elevation of -248 m asl. The site is approximately 2 km west of Khirbat Marqā'a and 7 km east of Beth Shan, at Palestine Grid co-ordinates 205.030/212.650 (Fig. 1). The tall is a low mound rising 4 m above the surrounding alluvial plain, measuring approximately 130 m east-west by 140 m north-south, covering roughly 2 ha (Fig. 2).

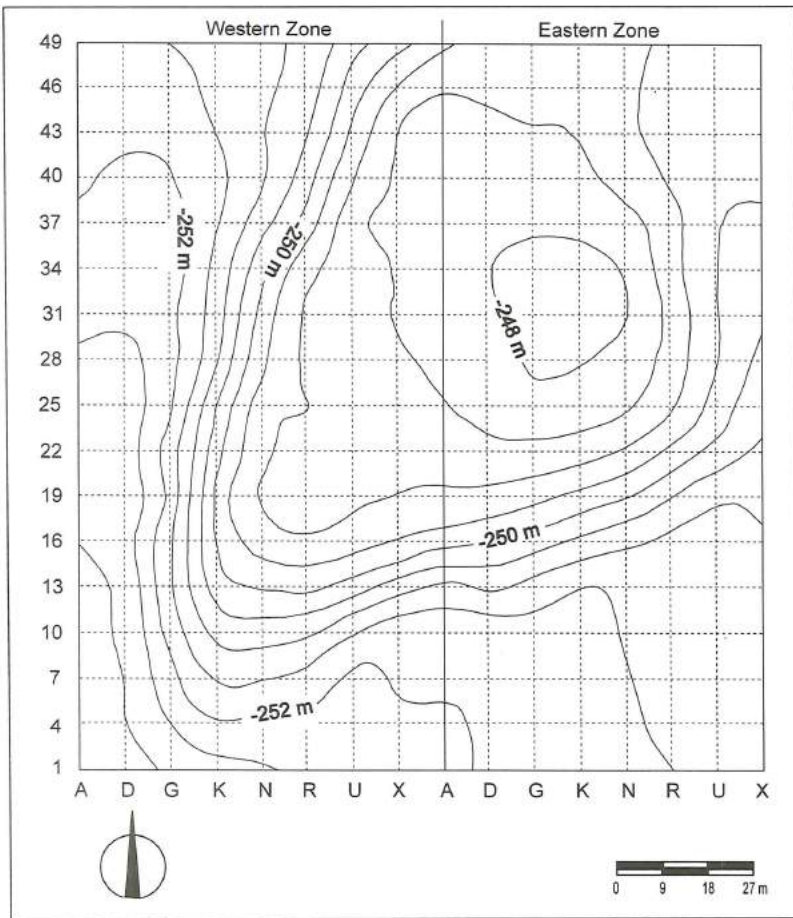
Geological Setting

The mound was not formed entirely by the deposition of cultural sediments. Deep probes reaching to a depth of 2.4 m indicate that cultural deposits range in thickness from 0.4 m on the southern slope, to 1.0 m on the top of the site, and rest on a mound of naturally deposited clay. The cultural de-



1. The Baysān Region.

posits are a grey-brown clay loam, while the underlying natural sediments consist primarily of a fine white-grey calcareous clay or marl, remarkably free of inclusions. These marls form part of the al-Lisān Beds, sediments deposited by Lake al-Lisān, and the remnant Lake Baysān, during the Upper Pleistocene and early Holocene (Bender 1974; Koucky and Smith 1986). The formation of the mound might well be the result of an accumulation of these lacustrine sediments over an underlying oolitic limestone formation, as appears to be the case at near-



2. Topographic Map of Tall Fendi (D. Lasby).

by Tall al- 'Arba'in, where outcrops of limestone are clearly visible.

Environmental Setting

The modern course of the Wādī Ziqḷāb lies immediately north of the site, continuing southwest for 1.7 km, where it drains into the Jordan River. Wādī Ziqḷāb is fed by several springs and, today, its drainage is controlled by a modern dam but, during the Chalcolithic (4500-3500 BC), it was probably a perennial water source for Tall Fendi. These water resources would have been augmented by those originating from Wādī Abū Ziyād, which is also spring-fed and lies only 1.4 km south of the site. The water sources, in conjunction with the fertile valley soils that surround the site, would have made Tall Fendi a potentially productive location for a farming community during the Chalcolithic.

According to Koucky and Smith (1986:

Fig. 6), Tall Fendi was situated adjacent to an extensive marshland, the last vestige of the receding Lake Baysān, during the Chalcolithic period. If this were the case, the mound would have been an attractively dry location for settlement at that time. It seems that the environment of Tall Fendi may well parallel that of Tulaylāt al-Ghassūl, as interpreted by Webley (in Hennessy 1969), but more will be known when soil analyses are complete.

The Site

Kareem (1989) reports that a mud-brick building was built in the southwest corner of the site in 1955, and was destroyed in 1970. Since that time, the site has not been occupied. The former location of this building is now marked by modern debris, including large fragments of concrete foundations. The tall, like the surrounding fields, is currently ploughed twice yearly, once be-

fore the planting of barley in December and again after the harvest in May. Because the cultural deposits at the site are not deep, this farming activity has damaged the site to some extent. Such disturbance is quite evident on the southern slope of the site, where many large cobbles have been dislodged by plowing, and are strewn over the field. During our excavations, workmen were removing these cobbles in order to facilitate the next season's plowing. In an attempt to avoid the most disturbed areas on the southern and western margins of the site, we decided to excavate near the summit, on the eastern portion of the tall.

The material culture represented at this site is primarily Late Chalcolithic. There are no Bronze Age or Iron Age deposits, but Persian, Byzantine, and Ayyubid/Mamluk ceramics were found in small quantities. Excavations uncovered the foundations of a Chalcolithic house, several associated architectural features, and a large quantity of stone and bone tools, and abundant Chalcolithic pottery. The artifacts and features suggest that the site was once a small farming community, whose inhabitants were exploiting the rich valley-bottom soils. On the basis of ceramic parallels, we suggest that Tall Fendi was contemporary with the larger Chalcolithic settlement at Pella, also known as *Ṭabaqat Faḥl* (Hennessy *et al.* 1983; McNicoll *et al.* 1982, 1986; Smith and McNicoll 1986). The community at Tall Fendi may have been associated socially and economically with this larger neighbour, whose size is estimated to have been 30 ha at this time (Smith and Hanbury-Tenison 1986:24).

The Excavations

The baseline of the site was set to the west of the site's centre and aligned along current magnetic north.¹ The baseline divides the site into eastern and western

zones, both of which are independently labelled. A 3 x 3 m grid was superimposed over the site, creating excavation areas labelled alphabetically from west to east and numerically from south to north (see Fig. 2). In the 1996 season, excavations were carried out only in the eastern zone. Within each area, loci are defined on lithological criteria, and are used to designate coherent provenience units. Loci are identified using three digits (i.e., 001). Loci are further subdivided into 'bags', which are used to give greater spatial or vertical control within the individual locus. As an example, a specific provenience area may be designated as Area F29, locus 006, Bag 12, expressed in short form as F29.006.12.

Once the plow-zone sediments were removed, excavations proceeded using either a trowel or a small handpick. The sediments of all loci were dry-screened, partially or in full, through a 3mm mesh in order to gather data on pottery, lithics, faunal, and botanical remains. In general, fill layers were screened 50% and other contexts 100%. Soil samples were taken at selected locations for pedological and microbotanical analyses.

Stratigraphy

During our general survey of the site, we observed that a cut had been made into the west side of the mound. This 2 m wide gouge extended from the top of the mound, to about 0.5 m below the level of the surrounding fields, at a depth of more than 4 m. This exposure showed less than 1 m of cultural deposits on top of the mound and, below this, lay 4 m of clay marl deposits. To confirm this exposure, several test trenches were dug on the east and south sides of the mound. These trenches confirmed that cultural deposits were confined to a thin layer on top of the site, and suggest that settlement at the site was primarily limited to the Late Chalcolithic, although some human activity

1. The annual change in magnetic declination is estimated at 2 minutes easterly as of 1960 (1:50,000

map series).

did occur during later periods.

The stratigraphy of the site is shallow but complex. Many areas have been subjected to post-depositional disturbances, including pit digging, plowing, and the constant burrowing activity of the Palestinian mole-rat (*Spalax ehrenbergi*).

The small scale of excavation in the 1996 season did not permit the time or resources to take all horizontal exposures down to natural deposits. Only in Areas F29, G29, and E31 were unit excavations taken down to culturally sterile clay. Based on the sequence in these squares, there appear to have been three main construction events, possibly interpreted as phases of occupation. A section drawing of the north wall of Test Trench 2 (Fig. 3), which forms a part of Area F29, shows that the first human activity at the site (locus 012) occurred directly over the lacustrine marls (locus 099). Subsequent occupation surfaces occurred at the interface of locus 006 and locus 005, as well as at locus 004, the latter surface corresponding to the occupation of

the house. The intervening layer, locus 006, was composed of fill and debris, including several mud-bricks. Locus 009 was a hard-packed clayloam, and may have been formed by a continuous and rapid accumulation of sediment on a well-used surface. A number of flat-lying sherds were found within this locus, although no changes in either soil colour or texture could be discerned.

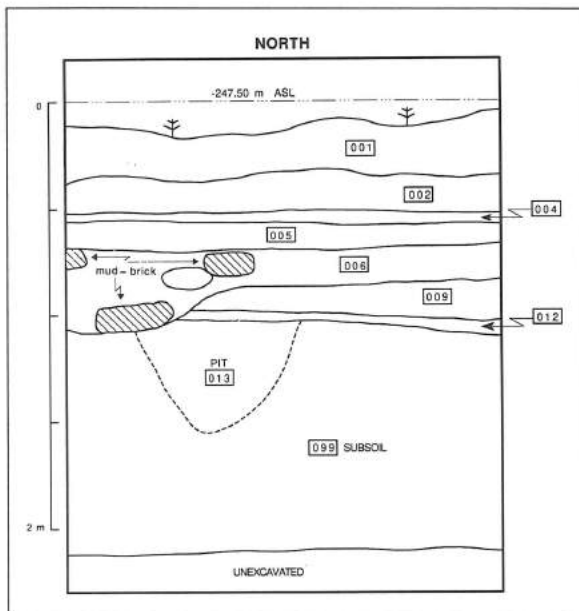
Separate features were observed in locus 005, but are not shown on the top plan (Fig. 4) because they were deposited at an earlier time. These features include a small oval platform made from rounded cobbles that projects into the north wall of F29 and extends into Area F30, just below the southeast corner of the building. At the same level in Area F29, an isolated line of stones was found in the northwest corner.

The pit feature, locus 013, shown with a dotted outline (see Fig. 3), is not visible in section because it was located 30 cm to the north of the section.

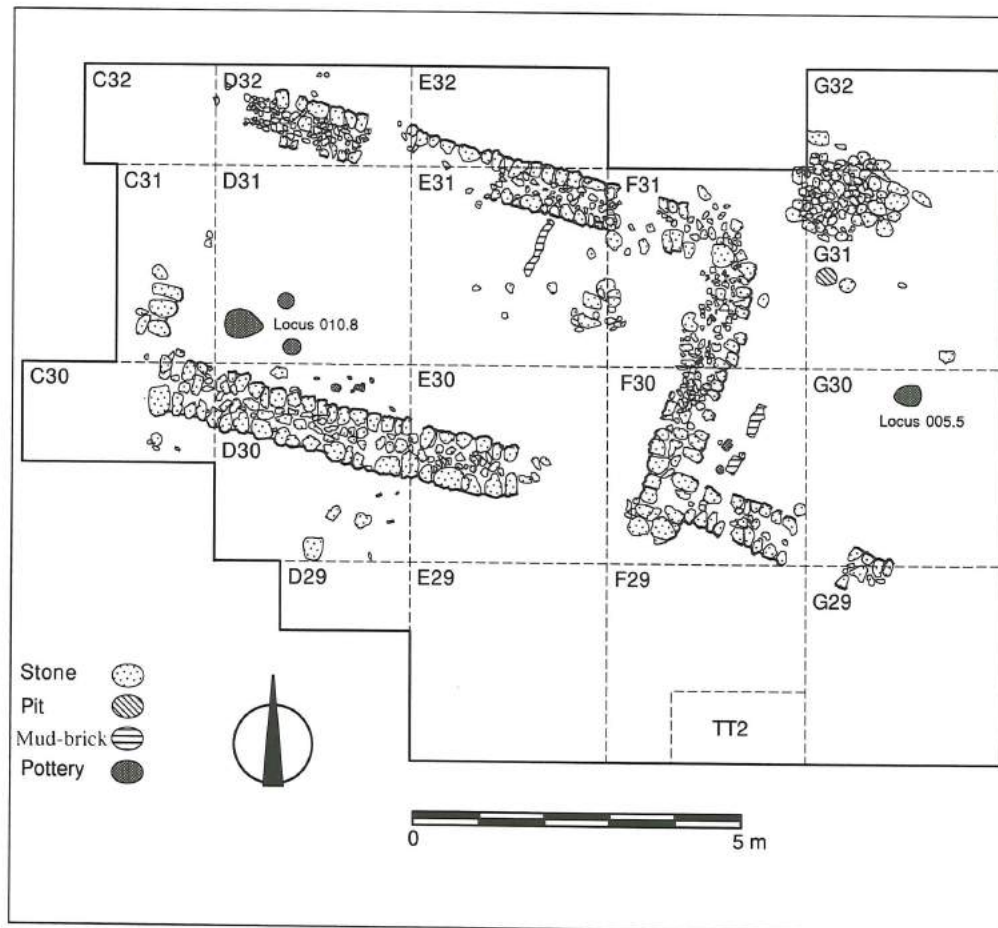
Architecture and Features

Several mud-bricks averaging 37 x 25 x 12 cm were found at a depth ranging from 0.6 to 1.0 m in the northwest corner of Test Trench 2 (Area F29). It was anticipated that these mud-bricks would lead to other architectural remains, and excavations were begun in Areas F29, E29 and F30. During the course of excavations, the cluster of mud-bricks proved to be isolated, and does not seem to have been associated with any other architectural remains.

No architecture was found in Area E29, but in F30, the remains of a stone wall foundation were uncovered just below the plow zone. Excavation in surrounding areas exposed the well preserved remains of a Chalcolithic 'broad-room' house (Fig. 4). By the end of the excavation season, complete and relatively intact foundations of the building were exposed. This structure was comparatively small, measuring approximately 9 x 5 m in external dimensions, with the long axis



3. Site WZ 126, Area F29 - Test Trench 2. Site Stratigraphy at Unit F29. Pit 013 does not form part of this section but is situated 30 cm to the north of this section cut. It is shown here to illustrate the depth of deposits.



4. Plan of the Chalcolithic broad-room house and associated architectural features (plan by E. Banning).

oriented generally east-west.

A broad-room house, as defined by Dothan (1959:14) and Porath (1985:14) usually has at least two rooms, the smaller of which is as wide as the house and 2 to 4 m in length. No stone foundations were found that would delineate a smaller room but we did locate the remains of a 1 m mud-brick wall or divider situated about 3 m from the outer wall, which suggests that a similar spatial logic guided construction. Porath suggests that the larger rooms were courtyards but this is unlikely in the Tall Fendi case.

Most of the plans of broad-room houses published for this period show the doorway situated in the long wall and entering the larger room. But site disturbances, especially at the northwest corner of the house where a wide pit was dug in Byzantine times, make it impossible to determine the exact location of the house doorway. One

possible location is in the north wall in Area D32 and another is in the southeast corner in Area E30. Despite the structural patterns seen at other sites, the wall opening at E30 seems the most likely location for the doorway as the break is distinct, and in an area which appears to have been relatively free of disturbance.

The wall foundations were single-course, double-leaf stone walls with rubble fill, averaging 85 cm in width. The surface on which these stones were laid varies less than 15 cm in elevation, suggesting that the area was filled and levelled before construction began. Presumably these foundation stones served as footings for a more substantial mud-brick wall, as at Tulaylāt al-Ghassūl (Koepfel 1940; Mallon *et al.* 1934; North 1961) and Abū Ḥāmid (Dollfus and Kafafi 1986, 1987, 1988; Dollfus *et al.* 1988); likely destroyed by plowing.

The stone foundations of an external

wall projected eastward from the southeast corner of the building. This wall continued for only a few meters before ending in a jumble of wall collapse (Area G29). As originally constructed, this wall was probably much longer, but was destroyed by later digging or modern plowing activity. It is possible that this wall bounded an outer courtyard space on the eastern side of the house.

The building at Tall Fendi is similar in construction to Chalcolithic buildings found at Rasm Harbush (Epstein 1978:27), Abū Hāmid (Dollfus and Kafafi 1988: fig. 18), Tall Kitan (Eisenberg 1993:878), Meser (Dothan 1959: fig. 2), and Tulaylāt al-Ghassūl (Hennessy 1969: fig. 4). Unfortunately, the structures at Pella XIV (McNicoll *et al.* 1982: fig. 4) are not complete enough to enable comparisons. The structures at Abū Hāmid are the most similar in terms of construction techniques and size, whereas those at Tulaylāt al-Ghassūl and Rasm Harbush are similar in width but longer (about 12 m). In general, the structure at Tall Fendi is smaller than its counterparts.

Near the northeast corner of the building was a circular pavement of medium-sized, rounded cobbles. Nearly all cobbles were flat on the upper side, forming a relatively level working surface. Stone pavements of this sort are a common feature at Tulaylāt al-Ghassūl (Bourke *et al.* 1995: fig. 8; Mallon *et al.* 1934:44-46; North 1961: fig. 8), and were also found at Meser (Dothan 1959: fig. 2) and Pella (Hanbury-Tenison 1986:228). The function of these pavements remains uncertain. Mallon suggested that they were work places for processing grains or for cleaning but, at Abū Maṭar child burials were found under similar structures (Perrot 1955). Subsequent excavation underneath the pavement revealed no other features. Soil samples were taken from between and below the stones for phosphate, micro-refuse and micro-morphological

analysis in the hopes of being able to determine the use of the platform. Adjacent to this pavement was a blackened area containing a thin layer of ashy clay-loam deposits, perhaps the remains of a hearth, but no associated construction or charred remains were found to confirm this.

Inside the building, in Areas E31 and F31, was an enigmatic cluster of stones founded on a semi-circle of large cobbles interspersed with traces of mud-brick detritus. We suspect the underlying stones are the disturbed remains of a stone-lined pit, but are uncertain about the cluster of large stones above that appear to be unrelated. Many small pieces of what appears to be a mud plaster were found, but no plaster-lined features or floors.

Just below the oldest surface in Area F29 (F29.012, fig. 3), dug into sterile subsoil, was a 0.5 m deep pit (F29.013) containing what appears to have been the remains of a jar burial. The vessel was a medium-sized, open-mouthed storage jar with a slightly everted rim, 26 cm in diameter. The jar was associated with a number of human deciduous teeth, a mandible, and other unidentified bone fragments. The deposit was disturbed but the context suggests that it was originally a jar burial, a common means of internment for infants at Tulaylat al-Ghassūl (Mallon *et al.* 1934). This jar is presently being reconstructed and is not shown below in Figures 5 or 6.

In the southwestern corner and near the south wall of the structure, were the *in situ* remains of several crushed pottery vessels. Among these were the remains of a number of large storage jars (Fig. 4: D31.010.8). The upright remains of another large storage jar were found in the eastern 'courtyard' (G30.005.5).

There is little evidence to suggest that Tall Fendi was occupied as a permanent settlement in either the Persian or Ayyubid/Mamluk periods. It is possible, however, that the site was put to some use during the

Late Roman or Byzantine periods. In the northwest corner of the building, where there was considerable post-depositional disturbance, relatively high percentages of Byzantine sherds were found. In addition, five post-holes (15-20 cm in diam) were dug into the Chalcolithic deposits at a later time, although there is no evidence to suggest that the post-holes were contemporary with the disturbance of the house foundations.

Ceramics

Several periods were represented in the upper plow-zone. These included, as noted above, Persian, Roman/Byzantine, and some Ayyubid/Mamluk sherds. The only diagnostic example of Persian period ceramics recovered was a rim sherd of a Phoenician "sausage jar" (Fig. 5: 1) (Bikai 1978; Paice 1987:97). While Persian period ceramics are common along the Levantine coast, they are an unusual find east of the Jordan River. In fact, no recognizable Persian period pottery was found in the entire Wādī Ziqlāb Survey (Banning and Fawcett 1983). The jar recovered at Tall Fendi would date between 525 to 400 BC (Paice, pers. comm).

Roman/Byzantine pottery was found in greater quantities. Almost all of the sherds found consisted of thin red (2.5YR 5/6) ware with a ribbed body. The example shown in Figure. 5:2, is the complete rim and neck of a large bell-shaped storage jar. It is likely that many of the recovered sherds were part of these large jars, as no other rim types were found.

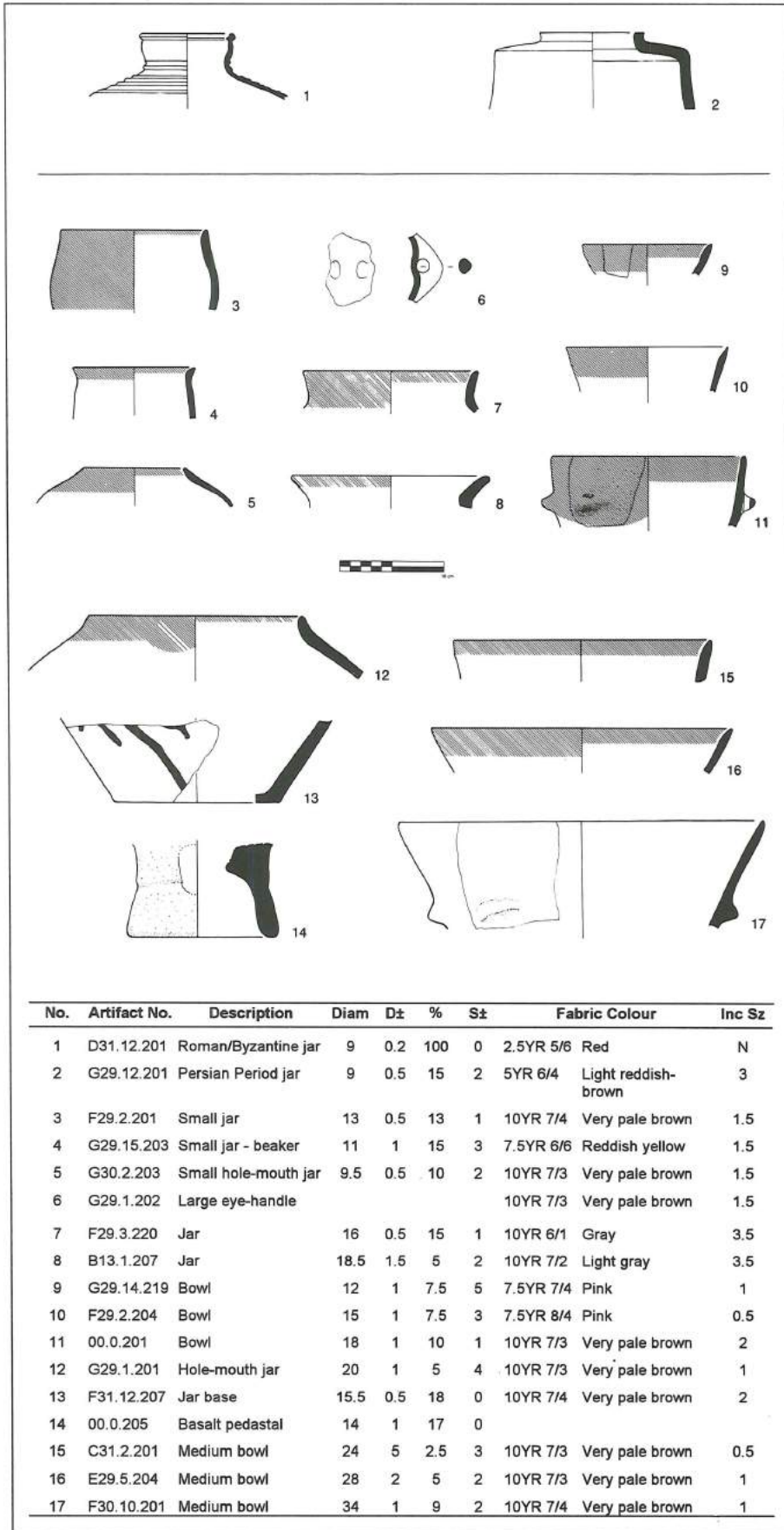
Recognizable Ayyubid/Mamluk material was confined to two small sherds with green and blue glazing.

The composition of the Chalcolithic pottery fabrics is generally consistent, not surprisingly considering the abundant amounts of fine grey clay available on the site itself. Exploitation of the site as a clay source continues even today. During our excavations, local residents were observed removing clay deposits from the west cut (mentioned

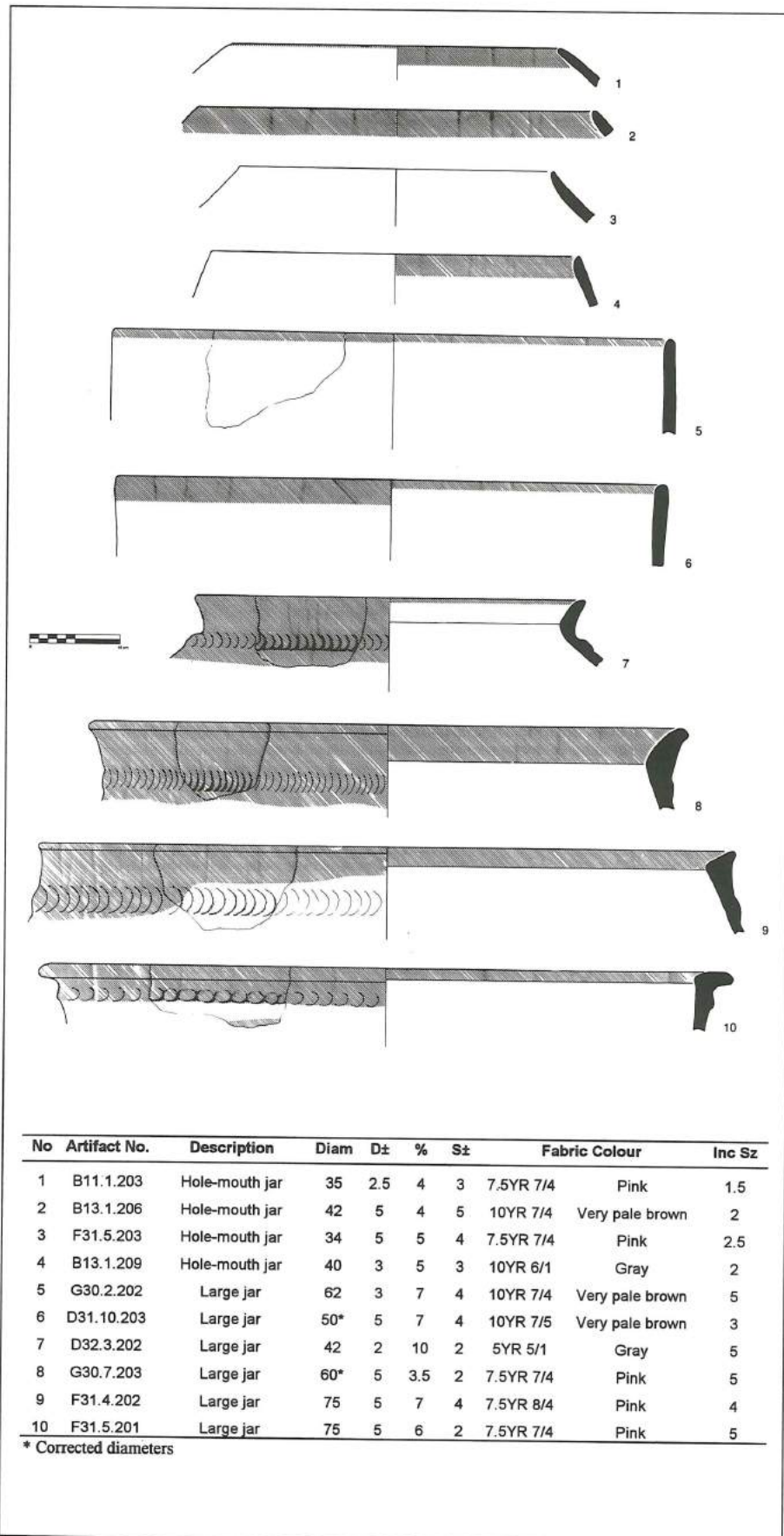
above) for manufacturing domestic pottery and *tābūn* 'ovens'. When fired thoroughly, this clay produces a pottery fabric very pale brown or pink in colour (Munsell terminology), often described as buff. The clay in most vessels appears well-levigated, and variations in fabric composition are largely due to the type of temper used. For the most part, inclusions consist of either crushed limestone or chert (size fraction), but a few sherds contain shell. This shell temper would have been readily available, as indicated by the ubiquity of land and water snail shells found throughout the site. A number of the larger vessels contained inclusions of small (4-5 mm), rounded pebbles, suggesting that gravels from nearby stream channels were sieved for use as temper.

Vessel forms vary considerably, and the examples shown in Figures 5 and 6 do not represent the entire assemblage. No complete vessels were found, but on the basis of sherds and handles recovered, the following types of Chalcolithic vessels were present: small, open-mouth jars with vertically-pierced lug handles; V-shaped bowls (ranging from 12 to 17 cm in diameter); small hole-mouth jars, some with slightly everted rims; large hole-mouth jars with plain rims; small jars with outflaring rims (beakers); large storage vessels with heavy, short, everted rims; large vessels with plain rims and upright walls; and large, plain rim basins with thick bases.

Pottery decoration consists mainly of red slip (2.5YR 4/6), and the application of horizontal clay strips, or mouldings. Most vessels have some form of red slip decoration. Slip decoration is applied in three ways: covering the entire outside of the vessel, as outer and inner rim bands of varying thickness, and as painted swaths or roughly parallel lines on the outside of the vessel. Applied strips of clay are moulded with either a scalloped design or with finger impressions. Scalloped designs could be made by pressing a finger or thumb into the clay and



5. Selected pottery from Tall Fendi, all levels. Headings: Diam, diameter in cm; D±, diameter range; %, percent of rim diameter preserved; S±, stance range in degrees; Inc Sz, maximum inclusion size in mm. Fabric colour descriptions are Munsell.



6. Larger vessels found at Tall Fendi, all levels. Headings: see Fig. 5.

rolling it to the right to create a series of quarter-moon shapes or by using a small spatula. Scalloped designs average 30 mm in width, whereas finger-impressed mouldings average 15 mm. Few sherds show incisions, but where these do exist, they are 1-2 cm in length and arranged in a horizontal series.

All vessels are handmade, although some may have been finished on a tournette. Many of the smaller vessels are thin-walled, smoothly finished and show fine striations, but wall thicknesses are variable and striations are discontinuous and horizontal, rather than continuous and spiralled, as on wheel-turned pots. These manufacturing characteristics suggest that vessels were first coil or slab built and then finished on a turntable, or tournette, using interrupted rotation (Rye 1981:64). Vessel bases are either smooth or have a circular impression, sometimes concave, that forms a thin ring about the circumference. Commenge-Pellerin (1990:12) suggests that these types of ring bases were formed by circular supports centred on tournettes. There are no mat-impressed bases in the assemblage. Most of the small vessels have red slip applied outside and a band painted on the inside rim.

Considering the small area excavated, the assemblage appears to contain a relatively high percentage of large storage jars (Fig. 6), of which there are three basic types: hole-mouth jars with plain rims, jars with upright walls and plain rims, and jars with short, heavy everted rims. All rim sherds of the large jars have red slip applied to the upper lip of the rim and to the outside. In some cases, the slip covers the applied bands.

Strap handles, lug handles, and pierced lug handles are present in the assemblage. Strap handles are approximately 80 mm long by 35 mm wide with flat or oval cross sections. Pierced lug handles vary in size, ranging from 40 to 120 mm in length. There

is only one example of an unpierced lug handle (Fig. 5: 17).

Absent from the ceramic assemblage, as of the 1996 season, are cornets, spouted vessels, churns, pedestalled vessels (although a ground stone pedestal was found), and painted pattern decorations.

The Chalcolithic pottery recovered at Tall Fendi closely parallels that found at Pella in Areas XIV and XXV (Hennessy *et al.* 1983; McNicoll *et al.* 1982, 1986), Tall Abū Hābil North (Contenson 1960:31-49; Leonard 1992:64-76), and at the recently excavated site of Tubna, in the hills of the Wādī Ziqlāb (Banning *et al.* 1997). There are fewer typological parallels with the assemblages at Neve Ur (Perrot *et al.* 1967), Tall Tsaf (Gopher 1988; Gophna and Kislev 1979; Gophna and Sadeh 1989) and Abū Hāmid, which appear to be more similar to the Ghassulian assemblage.

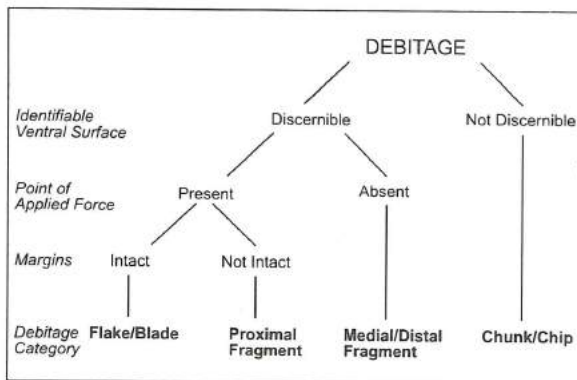
The Chipped Stone Assemblage

The chipped stone assemblage recovered totals over 4600 artifacts. At this time, only the material recovered from the contiguous excavation area has been analyzed. Given the short occupation span at the site, it is unlikely that the unanalysed material from the deep probes is substantially different from that recovered in the contiguous excavation area.

Two classification schemes were applied to the assemblage. One approach, for the formed tools, is typological and, for the debitage and *ad hoc* tools, a technological approach was used. The formed tool classification is based on those developed by Rosen (1983, 1997), Lee (1973), and Gopher (1989). The classification scheme used for the debitage is based on one originally developed by Sullivan and Rosen (1985), for differentiating between bifacial and core reduction strategies. As it was applied here, the classification scheme is intended to permit a gross assessment of the stage and intensity of core reduction. As detailed in

Figure 7, the classification is a hierarchical one, based on the presence or absence of specific technological attributes. Flakes and blades are defined as elements that are complete, having both a striking platform and complete medial/distal margins. Proximal elements are defined as those that have striking platforms, but incomplete medial/distal margins. Medial/Distal elements are those without a striking platform, but with an identifiable ventral surface. Chunks are elements of two cm, or larger, in maximum dimension, with neither a striking platform, nor a ventral surface. Chips are elements with the same criteria, but less than 2 cm in maximum dimension.

As is typical of Chalcolithic sites, the density of extensively retouched, formed tools is very low; at no point do they comprise more than two percent of the chipped stone assemblage. The overwhelming bulk of the assemblage is comprised of debitage



7. Debitage Classification Scheme (after Sullivan and Rosen 1985).

or *ad hoc* tools. Attempts to discriminate between utilized and unutilized lithic elements on the basis of macroscopically visible criteria alone have proven to be generally unreliable (Young and Bamforth 1990). As a consequence, only those elements continuously retouched and distinct along their entire margins were identified as utilized. Further work using microscopic criteria will be carried out in order to produce a more reliable assessment of what proportion of the debitage was utilized as *ad hoc* tools.

For the purposes of chronological analysis, the occupation of the site was divided into four stratigraphic phases (Table 1). Generally, assemblage composition appears to be fairly consistent throughout, suggesting that there were no major changes in chipped stone production strategy during the period of occupation, although there seem to have been changes in the intensity of reduction (Tables 2 and 3).

Formed Tools

The range of formed tool types is generally consistent with other Chalcolithic sites known from the region. Adzes, tabular fan scrapers, sickle blades, backed blades and perforators make up the bulk of the assemblage (Table 2). The adzes are generally plano-convex in shape, with a high hog-backed cross-section. Most of the adzes are core tools, but one specimen was made on a large flake. Bits are formed by

Table 1. Stratigraphic Phasing.

Phase	Description
Indeterm.	Strata where phasing is indefinite.
Plow - zone	Plow - zone, modern site surface. Heavily disturbed.
1	Pit, square F29, dug into clay subsoil, associated with probable jar burial.
2	Strata below the level of the house walls.
3	Strata contemporary with the house walls.
4	Hardened layer above the level of the house walls, and below the plow - zone. Moderately disturbed.

Table 2. Formed Tool Assemblage Composition.

Tool	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone
Adze	-	-	1	1	-
Adze Fragment	-	-	1	1	-
Adze Preform	-	-	1	-	-
Axe Fragment	-	-	1	-	-
Backed Blade	1	2	6	-	-
Chopper	-	1	-	-	-
Notch	-	1	3	-	1
Perforated Disc Fragment	-	-	2	-	-
Perforator	-	1	-	1	-
Perforator Fragment	-	-	-	1	-
Retouched Element	1	1	6	5	1
Scraper	-	-	1	1	-
Sickle Blade	-	-	8	1	2
Tabular Fan Scraper Fragment	-	1	1	1	-
Weight	-	-	1	-	-
Total:	2	7	32	12	4

longitudinal removals on the dorsal surface of the tool, and removals from the lateral margins on the ventral side of the tool. Tabular fan scrapers are represented by three small fragments, which makes identification of the sub-types difficult. The fragments are thin, with fairly steeply retouched edges. Two of the fragments have the rounded edge profiles of oval or round scraper forms, while the other seems to be from a rectangular form, as demonstrated by the near 90 degree angle in the edge profile. The sickle blades and backed blades are fairly narrow, with minimally retouched and somewhat irregular cutting edges. Backing is abrupt to semi-abrupt, and ends are truncated or retouched. Sickle blades are differentiated from backed blades by the presence of sickle gloss. Perforators are steeply unifacially retouched, with elongated triangular bit profiles. All specimens bear signs of significant edge rounding. The perforated disc fragments both seem to come from examples of the round sub-type.

Both specimens appear to have broken approximately in half. No trace of a notch is present on either specimen. The perforations are slightly offset from center, biconical in form and smoothed by grinding, with a diameter of approximately 1.5 cm. The edge profile is round, and retouch is flat and bifacial, although there is far more retouch on the dorsal surface of the tool than the ventral.

Debitage (see Table 3)

As at other Chalcolithic sites (Rollefson 1992), the debitage assemblage reflects a strong emphasis on the rapid production of generalized flakes. The reduction strategy employed is probably best described as "amorphous", as the term has come to be used by North American researchers dealing with New World assemblages. Platforms are large, and the amount of platform preparation is minimal; flakes generally have only one or two large platform scars. Flake cores are single- or multiple-

Table 3. Debitage Assemblage Composition.

Element	Phase 1	%	Phase 2	%	Phase 3	%
Flake	10	23.8	103	19.6	286	18.1
PF	7	16.7	47	9.0	188	11.9
MDF	19	45.2	236	45.0	729	46.1
SDF	3	7.1	55	10.5	172	10.9
SDPF	0	0.0	18	3.4	35	2.2
SDMDF	3	7.1	66	12.6	173	10.9
Total:	42		525		1583	

Element	Phase 4	%	Plowzone	%	Indeterm.	%
Flake	77	15.2	48	16.2	24	17.7
PF	57	11.2	23	7.7	11	8.1
MDF	249	49.1	123	41.4	75	55.2
SDF	42	8.3	29	9.8	9	6.6
SDPF	11	2.2	9	3.0	4	2.9
SDMDF	71	14.0	65	21.9	13	9.6
Total:	507		297		136	

Element	Phase 1	%	Phase 2	%	Phase 3	%
Blade	0	0.0	8	28.6	25	26.9
PB	1	16.7	5	17.9	22	23.7
MDB	4	66.7	11	39.3	33	35.5
SDB	0	0.0	1	3.6	3	3.2
SDPB	0	0.0	1	3.6	3	3.2
SDMDB	1	16.7	2	7.1	7	7.5
Total:	6		28		93	

Element	Phase 4	%	Plowzone	%	Indeterm.	%
Blade	2	25.0	1	12.5	0	0.0
PB	1	12.5	2	25.0	0	0.0
MDB	0	0.0	3	37.5	2	50.0
SDB	1	12.5	0	0.0	1	25.0
SDPB	2	25.0	0	0.0	0	0.0
SDMDB	2	25.0	2	25.0	1	25.0
Total:	8		8		4	

Element	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone	Indeterm.
Chunk	18	158	342	124	65	39
Core	0	21	45	8	7	3
CTE	0	5	2	3	0	1
Tool	2	7	31	12	4	0
Total:	20	191	420	147	76	43

platform, with striking platform location not being spatially structured to produce a particular geometric form. Instead, platforms are distributed almost randomly, with the sole criterion for selection apparently being the viability of flake removal at a given location. Given the absence of cores used specifically for blade production, it would seem that blades were struck from mixed blade-flake cores. Cores are not generally reduced to the point of complete exhaustion.

Preliminary analyses suggest an increasing intensity in lithic reduction over time. Excluding the small sample from Phase 1, the heavily disturbed plow zone, and the unassignable remains, there was a progressive increase in the ratio of flakes to secondary decortication flakes (SDF), the ratios of flakes and SDF to cores, as well as the ratio of chunks to cores (Table 4). This increase in the number of elements per core, and the reduction of cores to the point that they are classified as chunks suggests that reduction intensified as time progressed. The motivation for this increase in reduction intensity is not clear at present, and will be a focus of future investigations.

Other Material

All bone was highly fragmented and bone preservation appears to have been poor, despite the calcareous nature of the

soil. The poor preservation may be due to a high degree of rodent activity within the deposits. Few bone tools were found, although some bone fragments show signs of polishing. A preliminary analysis suggests that the faunal assemblage contains sheep, goat, pigs, a significant number of land and water snails, as well as some human teeth and bone fragments.

Several fragments of groundstone vessels, made from either basalt or phosphorite, were recovered, including several rim pieces and one base fragment of a pedestal bowl (see Fig. 5:14).

Although mace-heads and figurines occur at other regional Chalcolithic sites, such as Abū Ḥāmid and Abā Hābil, they have yet to be recovered at Tall Fendi.

Acknowledgements

The excavations at Tall Fendi were made possible with private funds and with the assistance of many people along the way. In particular, we would like to extend our thanks to Prof. E.B. Banning at the University of Toronto, who not only let us use his field equipment in Jordan but also supplied us with stationery, computers, cameras, and much needed advice. We also thank Dr Ghazi Bisheh, the Director-General, Sultan Shrayda, then Inspector, and Isma' il Milhim, our representative, of the Department of Antiquities, for their support during our

Table 4. Debitage Assemblage Ratios.

Elements	Phase 1	Phase 2	Phase 3	Phase 4	Plowzone	Indeterm.
Flakes per Blade	17.0	11.5	10.1	44.7	23.7	-
Flakes per SDF	5.7	2.1	2.3	2.5	1.9	2.7
Flakes per Core	-	7.1	10.5	16.8	10.1	11.7
SDF per Core	-	3.5	4.6	6.6	5.4	4.3
Flakes per Chunk	0.9	1.0	1.4	1.1	1.1	0.9
SDF per Chunk	0.2	0.5	0.6	0.4	0.6	0.3
Chunks per Core	-	7.5	7.6	16.0	9.3	13.0

excavations. Ibrahim Zu'bi and Abd al-Karim Ta'ani, also from the Department, gave us a helping hand on several occasions. We thank Abd al-Karim Salah al-'Awad, the landowner, who was accommodating and hospitable and we express our gratitude to Ahmad Shrayda, who made our stay in Dayr Abū Sa'id so pleasant.

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Bibliography

- Banning, E.B.
1985 *Pastoral and Agricultural Land Use in the Wadi Ziqlab, Jordan: an Archaeological and Ecological Survey*. Unpublished Ph.D. dissertation, University of Toronto.
- Banning, E. B., Dodds, R. R. and Field, J. J.
1992 Ṭabaqat al-Buma: 1990 Excavations at a Kebaran and Late Neolithic Site in Wadi Ziqlab. *ADAJ* 36:43-69.
- Banning, E. B. and Fawcett, C.
1983 Man-Land Relationships in the Ancient Wadi Ziqlab: Report on the 1981 Survey. *ADAJ* 27:291-309.
- Banning, E. B., Rahimi, D. Siggers, J. and Ta'ani, H.
1996 The 1992 Season of Excavations in Wādī Ziqlāb, Jordan. *ADAJ* 40: 29-50.
- Bender, F.
1974 *Geology of Jordan*. M.K. Khdeir, transl. Gebr. der Borntraeger, Berlin.
- Bikai, P.M.
1978 *The Pottery of Tyre*. Warminster.
- Bourke, S. J., Seaton, P. L. Sparks, R. T. Lovell, J. L. and Mairs, L. D.
1995 A First Season of Renewed Excavation by the University of Sydney at Tulaylāt al-Ghassūl. *ADAJ* 39:31-63.
- Commenge-Pellerin, C.
1990 *La poterie de Safadi (Beershéva) au IV^e millénaire avant l'ère chrétienne*. Les Cahiers du Centre de Recherche Français de Jerusalem, No. 5. Association *Paléorient*, Paris.
- Contenson, H. de
1960 Three Soundings in the Jordan Valley. *ADAJ* 4/5:12-98.
1964 The 1953 Survey of the Yarmouk and Jordan Valleys. *ADAJ* 8/9:30-46.
- Dollfus, G. and Kafafi, Z.
1986 Abu Hamid, Jordanie Premiers Résultats. *Paléorient* 12(1):91-100.
1987 *Abu Hamid*. Yarmouk University and CNRS, Amman.
1988 *Abu Hamid: Village du 4^e Millénaire de la Vallée du Jourdain* Amman: Centre Culturel Français and the Department of Antiquities of Jordan.
1993 Recent Researches at Abu Hamid. *ADAJ* 37:241-262.
- Dollfus, G., Kafafi, Z. Rewerski, J. Vaillant, N. Coquenirot, E. Dese, J. and Neef, R.
1988 Abu Hamid, an Early Fourth Millennium Site in the Jordan Valley. Pp. 567-601 in A.N. Garrard and H.G. Gebel (eds), *The Prehistory of Jordan: The State of Research in 1986*. BAR Int. Ser. 396 (ii). Oxford.

- Dothan, M.
1959 Excavations at Meser 1957, Preliminary Report of the Second Season. *IEJ* 9:13-29.
- Eisenberg, E.
1993 Kitan, Tall. Pp. 878-881 in E. Stern (ed.) *The New Encyclopaedia of Archaeological Excavations in the Holy Land*, Vol. 3. The Israel Exploration Society and Carta. New York.
- Epstein, C.
1978 A New Aspect of Chalcolithic Culture. *BASOR* 229:27-45.
- Glueck, N.
1951 *Explorations in Eastern Palestine*. *AASOR* :25-27.
- Gopher, A.
1988 The Flint Industry from Tel Tsaf. *Tel Aviv* 15/16:37-46.
1989 *The Flint Assemblages of Munhatta*. Les Cahiers du Centre de Recherche Français de Jerusalem 4. Paris: Association *Paléorient*.
- Gophna, R. and Kislev, M.
1979 Tel Saf. *RB* 86:112-114.
- Gophna, R. and Sadeh, S.
1989 Excavations at Tall Tsaf: An Early Chalcolithic Site in the Jordan Valley. *Tel Aviv* 15/16:3-36.
- Hanbury-Tenison, J. W.
1986 *The Late Chalcolithic to Early Bronze I Transition in Palestine and Transjordan*. BAR Int. Ser. 311. Oxford.
- Hennessy, J. B.
1969 Preliminary Report on a First Season of Excavations at Teleilat Ghassul. *Levant* 1:1-24.
- Hennessy, J.B., McNicoll, A.W., Hanbury-Tenison, J.W., Watson, P.M., Randle, L. and Walmsley A.G.
1983 Preliminary Report on the Fourth Season of Excavations at Pella, 1982. *ADAJ* 27:325-360.
- Ibrahim, M., Sauer, J. A. and Yassine K.
1976 The East Jordan Valley Survey, 1975. *BASOR* 222:41-66.
- Kafafi, Z.
1982 *The Neolithic of Jordan (East Bank)*. PhD, Freie Universität Berlin.
- Kareem, J.
1989 Tall Fendi: Jisr Sheikh Hussein Project, 1986. *ADAJ* 33:97-109.
- Koepfel, R.
1940 *Teleilat Ghassul II*. Rome: Institut Biblique Pontifical.
- Koucky, F. L. and Smith, R. H.
1986 Lake Beisan and the Prehistoric Settlement of the Northern Jordan Valley. *Paléorient* 12(2):27-36.
- Lee, J.R.
1973 *Chalcolithic Ghassul: New Aspects and Master Typology*. Unpublished Ph.D. thesis, Hebrew University. Jerusalem.
- Lenzen, C.J., Kareem, J. and Thorpe, S.
1987 The Jisr Sheikh Hussein Project, 1986. *ADAJ* 31:313-319.
- Leonard, A. Jr.
1992 The Jordan Valley Survey, 1953: Some Unpublished Soundings Conducted by

- James Mellaart. *AASOR* 50. Indiana: Eisenbrauns, Winona Lake.
- Mallon, A., Koepfel, R. and Neuville, R.
 1934 *Teleilat Ghassul I*. Rome: Institut Biblique Pontifical.
- McNicoll, A., Smith, R.H. and Hennessy, B.
 1982 *Pella in Jordan 1*. Canberra: Australian National Gallery.
- McNicoll A., Smith, R.H. Hennessy, B.J. and Potts, T.
 1992 *Pella in Jordan 2*. Canberra: Meditarch Suppl.
- Mellaart, J.
 1962 Preliminary Report of the Archaeological Survey in the Yarmuk and Jordan Valley for the Point Four Irrigation Scheme. *ADAJ* 6,7:126-157.
- North, R.
 1961 *Ghassul 1960 Excavation Report*, *Analecta Biblica: Investigationes Scientifcae in Res Biblicas*, No. 14. Rome: Pontificio Istituto Biblico.
- Paice, P.
 1987 A Preliminary Analysis of Some Elements of the Saite and Persian Period Pottery at Tall el-Muskhuta. *Bulletin of the Egyptological Seminar* 8:95-107.
- Perrot, J.
 1955 The Excavations at Tall Abu Matar, near Beersheba. *IEJ* 5:17-40, 73-84, 167-189.
- Perrot, J., Zori, N. and Reich, Y.
 1967 Neve Ur, un nouvel aspect du Ghassoulien. *IEJ* (4):201-232.
- Porath, Y.
 1985 A Chalcolithic Building at Fasa-el. *Atiqot* 17:1-19.
- Rollefson, G.O.
 1992 Chipped Stone Tools from Pella. Pp. 231-241 in A. McNicoll *et al.*, *Pella in Jordan 2*. Canberra: Meditarch Suppl.
- Rosen, S.A.
 1983 *Lithics in the Bronze and Iron Ages in the Levant*, unpublished Ph.D. dissertation, University of Chicago.
 1997 *Lithics After the Stone Age: A Handbook of Stone Tools from the Levant*. Walnut Creek: Alta Mira Press.
- Rye, O. S.
 1981 *Pottery Technology: Principles and Reconstruction. Manuals on Archaeology* 4. Taraxacum, Washington.
- Smith, R. H. and Hanbury-Tenison, J.
 1986 The Pottery Neolithic and Chalcolithic Periods. Pp. 17-27 in A. McNicoll *et al.* *Pella in Jordan 2*.
- Smith, R.H. and McNicoll, A.
 1986 The 1982 and 1983 Seasons at Pella of the Decapolis. *BASOR* Suppl. 24:89-116.
- Sullivan, A.P. and Rozen, K.C.
 1985 Debitage Analysis and Archaeological Interpretation *AA* 50: 755-779.
- Yassine, K., Ibrahim, M. and Sauer, J.
 1988 The East Jordan Valley Survey, 1975: Part 1. Pp. 159-187 in K. Yassine (ed.), *The Archaeology of Jordan*. Amman: University of Jordan.
- Young, D. and Bamforth, D.B.
 1990 On the Macroscopic Identification of Used Flakes. *AA* 55:403-409.



**PRELIMINARY REPORT ON THE UNIVERSITY OF SYDNEY'S SIXTEENTH
AND SEVENTEENTH SEASONS OF EXCAVATIONS AT PELLA
(ṬABAQAT FAḤL) IN 1994/95¹**

by

S.J. Bourke, R.T. Sparks, K.N. Sowada, P.B. McLaren and L.D. Mairs

Introduction

The sixteenth season of excavations at Pella took place over two sessions, a winter session between 5 January and 11 February, and a spring session between 15 March and 21 April 1994. The seventeenth season took place between 12 March and 21 April 1995. In both seasons, the team numbered 34, with up to 55 local workmen being employed.²

Over the course of the eighteen weeks of excavations there were twelve areas of ac-

tivity on the main tall of Khirbat Faḥl and on Tall al-Ḥuṣn, but due to size restrictions only the Prehistoric and Bronze Age discoveries from the main tall will be addressed in this report. All pre-classical activity on Tall al-Ḥuṣn, and all post-Bronze Age activity on the main tall will be addressed in subsequent reports. This being said, there are seven main areas of activity addressed in this report:

1. In the South Central field (Area XXXII, trench D) enlarged excavations aimed to

1. The 1994/5 field seasons were directed by Stephen Bourke (ARC Postdoctoral Research Fellow in Archaeology, University of Sydney). Major funding bodies were the Pella Volunteer Scheme in association with the Near Eastern Archaeology Foundation (University of Sydney), the Australian Department of Foreign Affairs and Trade (Cultural Resources Section), the Australian Research Council, the Australian Institute of Archaeology (Melbourne), and the University of Sydney. We would like to thank H E Mr Mohammed Adwan, then Minister for Tourism and Antiquities; Dr Safwan Tell, Director-General of the Department of Antiquities in 1994, and Dr Ghazi Bisheh, current Director-General, Wajeih Karasneh, now of the Irbid Office, Department of Antiquities Representative in 1994 (winter), and 1995 (spring), and Ismael Melhem, then of the Irbid office, Representative in 1994 (spring), for their considerable interest and support. Equally appreciated was the enthusiasm, interest and assistance provided by H E Mr J. Shepherd, then Australia's Ambassador to Jordan, and his staff. We thank William Lancaster, Director of the British Institute at Amman in 1994, and current Director, Alison McQuitty, and Dr Pamela Watson, then Assistant Director of the Institute, for much logistical support and equipment hire. Finally, we thank the people of Ṭabaqat Faḥl village for continued hospitality.

2. Core staff members for the 1994 sessions were Stephen Bourke (director), Wajeih Karasneh (DAJ representative, Area IX), Ismael Melhem (DAJ Representative, Area IX), Erin Crumlin (XXVIII A and B), Karin Sowada (IVE), Samantha Eames (IIIQ), Jaimie Lovell (XXXIID),

Ruth Ward (XXIIIB), Karen Hendrix (XXVIII A), Bruce McLaren (IIIF, IVE and XXXIIC), Kathryn Swan (XXXIIE and XXIIIB), Tim Adams (XXXIVF), Amanda Parrish (XXVIII B), Ben Churcher (XXXIVF), Andrea Rowe (XXXIVA and XXXIVE), Rachael Sparks (registrar), Bronwyn Douglas (photographer), Vicki Griffith and George Findlater (surveyors), Jo Atkinson (conservator), Cameron Petrie, Lisa Mullen, Rachel Jackson, Catriona Bonfiglioli and Françoise Cuff (draftspersons), Lachlan Mairs (archaeozoologist), Chantelle Hoppé (archaeobotanist), Maree Browne (volunteer co-ordinator), Abu Issa (foreman), Abu Sami (chief cook), 58 Australian volunteers and a local workforce of up to 55.

Core staff members for the 1995 season were Stephen Bourke (director), Wajeih Karasneh (DAJ representative, Area IX), Fiona Richards (XXXIID), Erin Crumlin (XXXIV E and G), Bruce McLaren (XXVIII C), Kathryn Swan (XXXII G), Ruth Ward (XXXII F), Tim Adams (XXXIVB), Karen Hendrix (XXVIII A), Ben Churcher (XXXIV F), Rachael Sparks (registrar), Rosemary Allan (photographer), Franz Reidel (surveyor), Jo Atkinson (conservator), Paul Donnelly, Cameron Petrie and Rachel Jackson (draftspersons), Lachlan Mairs (archaeozoologist), Chantelle Hoppé (archaeobotanist), Fouad Hourani (soil micromorphologist), Maree Browne (volunteer co-ordinator), Chris Browne (palaepathologist), Abu Issa (foreman), Abu Sami (chief cook), Aladdin Madi (cook's assistant), 30 Australian volunteers and a local workforce of up to 50.

expose greater areas of EBA and Chalcolithic occupation, whilst continuing the search for Neolithic remains.

2. Excavations in the south-west field Deep Probe (Area XXVIII, Trench A) continued to explore MBA, EBA and earlier deposits.
3. Further investigation of major MBA wall construction techniques and phasing in the south-east field East Fortification Complex (Area III, trench F).
4. Work began on the exploration of the MBA western fortification complex in the south-west field (Area XXVIII, trench C).
5. A deep sounding in the South Central Field (Area XXXII, Trench F) was commenced to explore large concentrations of mudbrick debris thought to relate to the EBA city wall found thirty metres to the east (in XXXIID) in 1992.
6. Work began on a Deep Sounding in the east field (Area IV, trench E), exploring MBA, EBA and earlier deposits.
7. Excavations continued in the south-east field in the area of the Late Bronze Age Governors' Residence (Area III, Trench Q).

More detailed reports on each of these field activities appears below, following a rough chronological order according to the dominant archaeological periods in each area. Further comment on a selection of small finds appear after field descriptions by area of excavation, followed by summary reports on the faunal remains excavated in 1994/5.³

1. Trench XXXIID: South Field Neolithic through MBA (Figs. 1-8)

After the promising results from the 1992 sondage (Bourke *et al.* 1994: 83-93), over the course of the eighteen weeks of excava-

tion during 1994/95, exploration expanded to the north, east and west of the original sounding until a 17 x 14 m area had been uncovered. Neolithic, Chalcolithic, EBA and MBA deposits of differing nature and varying extent were uncovered.

Shallow Ceramic Neolithic deposits, confined to an area roughly 5 x 5 m in extent, were located several metres west of the original sounding. They consist of shallow occupation deposits, several small areas of thick white plaster floor, a number of shallow pits, and short stretches of two stone walls (Fig. 1). Elements of the associated pottery (see below) find parallels within Jericho PNA and PNB assemblages.

Chalcolithic deposits and structures were found to be extensive across the area north of the later EBA city wall, but not to its west or south. Two further Late Chalcolithic ceramic-lined silos were uncovered in 1994 (Fig. 2) similar to those discovered in 1992 (Bourke *et al.* 1994: 85-86), along with at least three closely associated sub-phases of fragmentary Late Chalcolithic architecture, silos and pebble paving. A 4 x 4 m expansion to the north-east in 1995 uncovered a section of a very large structure which almost filled the newly opened area (Fig. 3). Although the overall plan remains



1. Trench XXXIID. Neolithic Plaster Floor Scraps and Postholes.

3. S. Bourke contributed field descriptions, ceramic summaries and edited the report. R. Sparks contributed all notes on small finds, excepting the amulet which was analysed by K. Sowada. P.

McLaren contributed notes on MBA fortifications and related pottery (IIIF and XXVIIIIC), and L. Mairs contributed the archaeozoological report.

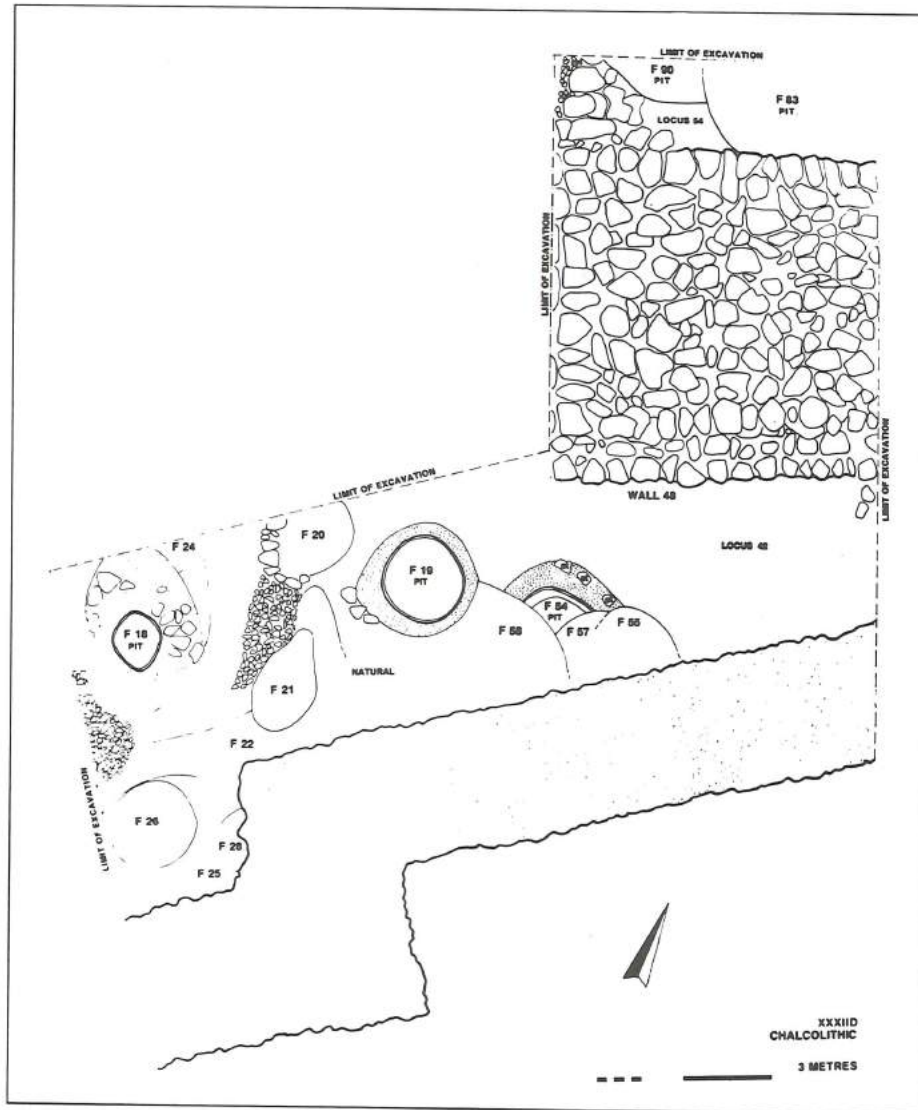
unclear due to the restricted size of the 1995 expansion, the structure is over two metres wide, running east/west. Construction is unusual, as the two-course small fieldstone foundation, sealed by a single layer of bun-



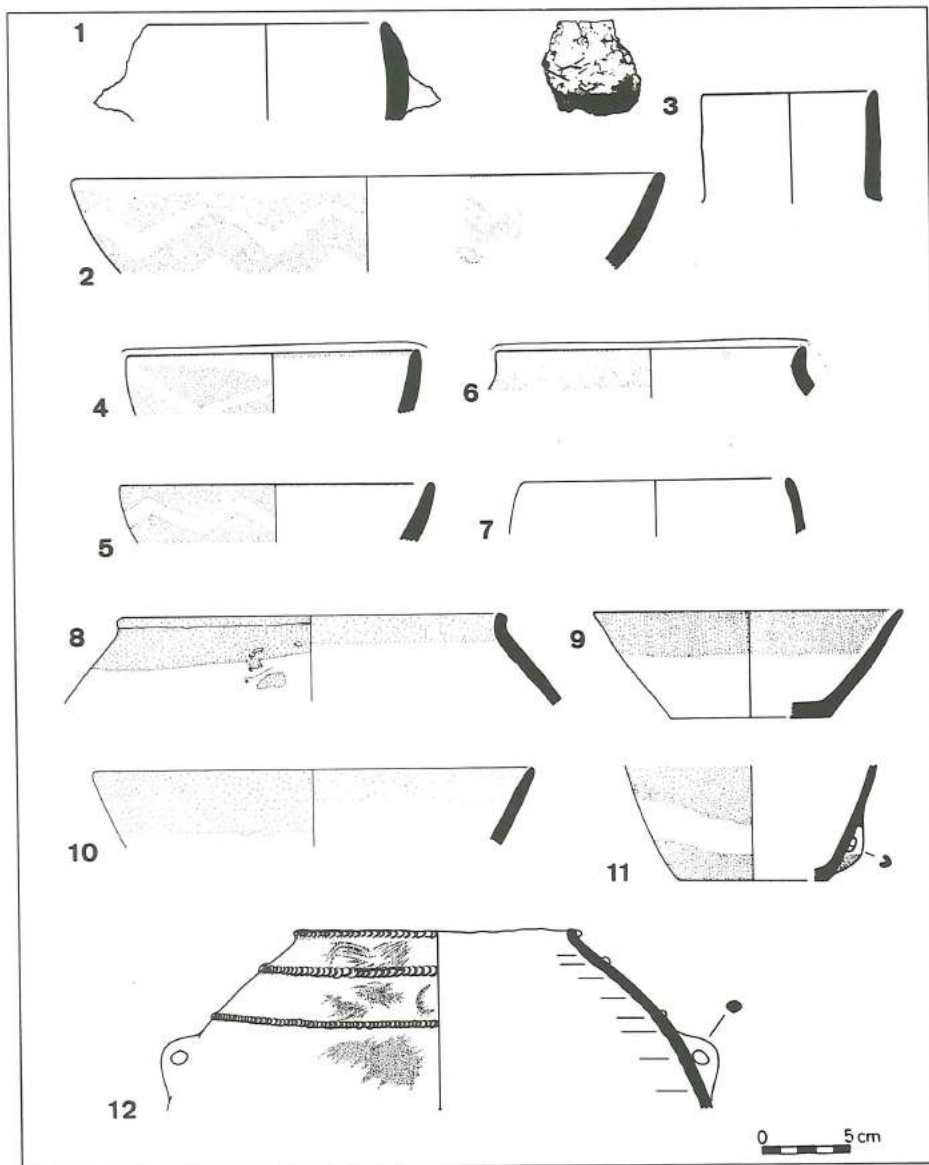
2. Trench XXXIID. Chalcolithic Ceramic Storage Silo.

shaped dark brown mud-bricks, does not seem substantial enough to represent the footings of what otherwise appears to be a massive boundary wall. If the structure is not a wall, then some form of raised platform would seem a reasonable alternative. Associated pottery (Fig. 4: 8-12 and below Fig. 7: 5-6) is Late Chalcolithic in date and similar to material recovered in 1992, although some elements present in the earliest sub-phase may suggest a more lengthy Chalcolithic occupation than first indicated.

Early Bronze age discoveries are dominated by the recovery of a fourteen metre stretch of the monumental stone and mud-brick wall (Fig. 5) first detected in 1992 (Bourke *et al.* 1994: 83-85). It seems likely



3. Trench XXXIID. Plan of major Chalcolithic Structures.



4: 1-12. Neolithic and Chalcolithic Pottery from Trench XXXIID
 1. CN 15609, XXXIID 44.10 (Pottery Neolithic): Lug Handled Bowl. 2. CN 15685, XXXIID 46.2 (Pottery Neolithic): Open Bowl. 3. CN 15697, XXXIID 46.6 (Pottery Neolithic). Tall Narrow Necked Jar. 4. CN 15694, XXXIID 46.6 (Pottery Neolithic). Small Bowl. 5. CN 15696, XXXIID 46.6 (Pottery Neolithic): Short Necked Jar. 6. CN 15684, XXXIID 46.2 (Pottery Neolithic): Small Bowl. 7. CN 15692, XXXIID 46.5 (Pottery Neolithic): Small Jar. 8. CN 15226, XXXIID 18.37 (Late Chalcolithic): Short Necked Jar. 9. CN 15227, XXXIID 18.37 (Late Chalcolithic): Open Bowl. 10. CN 15627, XXXIID 42.34 (Middle/Late Chalcolithic): 'V-Shaped' Bowl. 11. CN 15628, XXXIID 42.34 (Middle/Late Chalcolithic): Lug-Handled Flat Base. 12. CN 15994, XXXIID 18.33 (Late Chalcolithic). Very Large Storage Jar (from Silo).

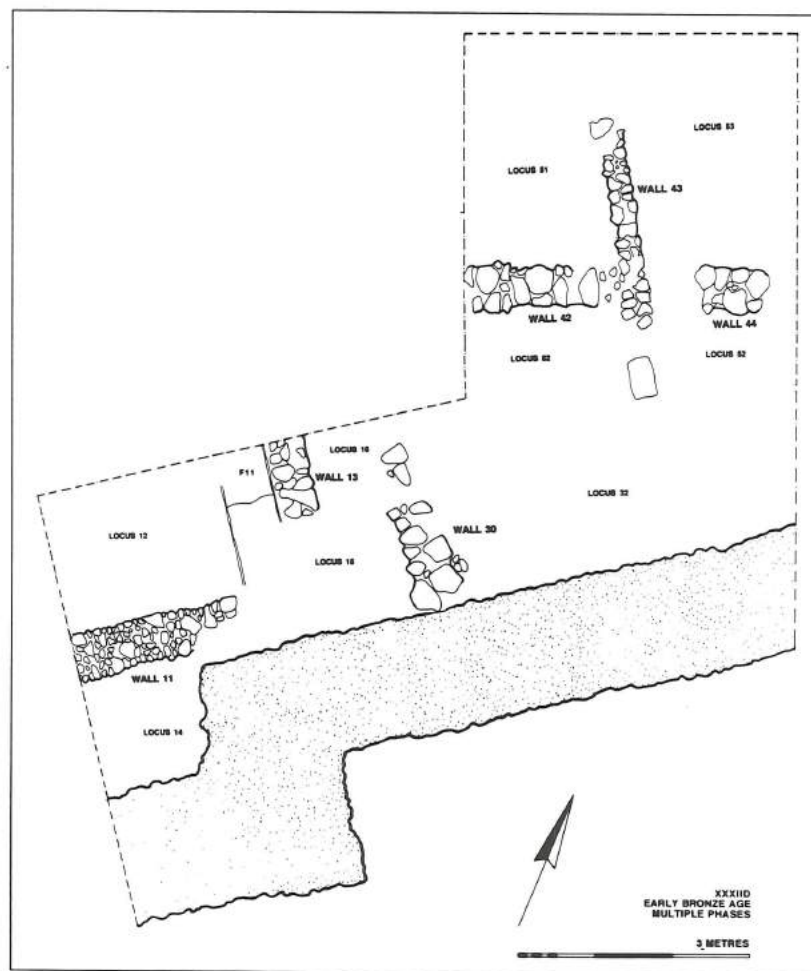


5. Trench XXXIID. EBA City Wall. Southern Trace.

that the wall represents part of the southern trace of the Early Bronze Age tall fortification, although the full course must remain

doubtful as massive MBA (west) and Iron Age (east) cuts have truncated it, as construction technique, structural history and associated artefacts are all very similar to the eastern trace of the EBA city wall discovered in 1992 (Bourke *et al.* 1994: 98-99).

Two very scrappy phases of EBA domestic architecture were traced north of the city wall (Fig. 6), matching the two phases of similar architecture discovered in 1992 (Bourke *et al.* 1994: 83). One phase is earlier than the city wall, and one at least partly contemporary with it. At any rate, all Early Bronze Age structures and associated de-



6. Trench XXXIID. Plan of Multiphase EBA Domestic Architecture.

posits date within the EBIB/II periods on the ceramic evidence (Fig. 7b: 7-21).

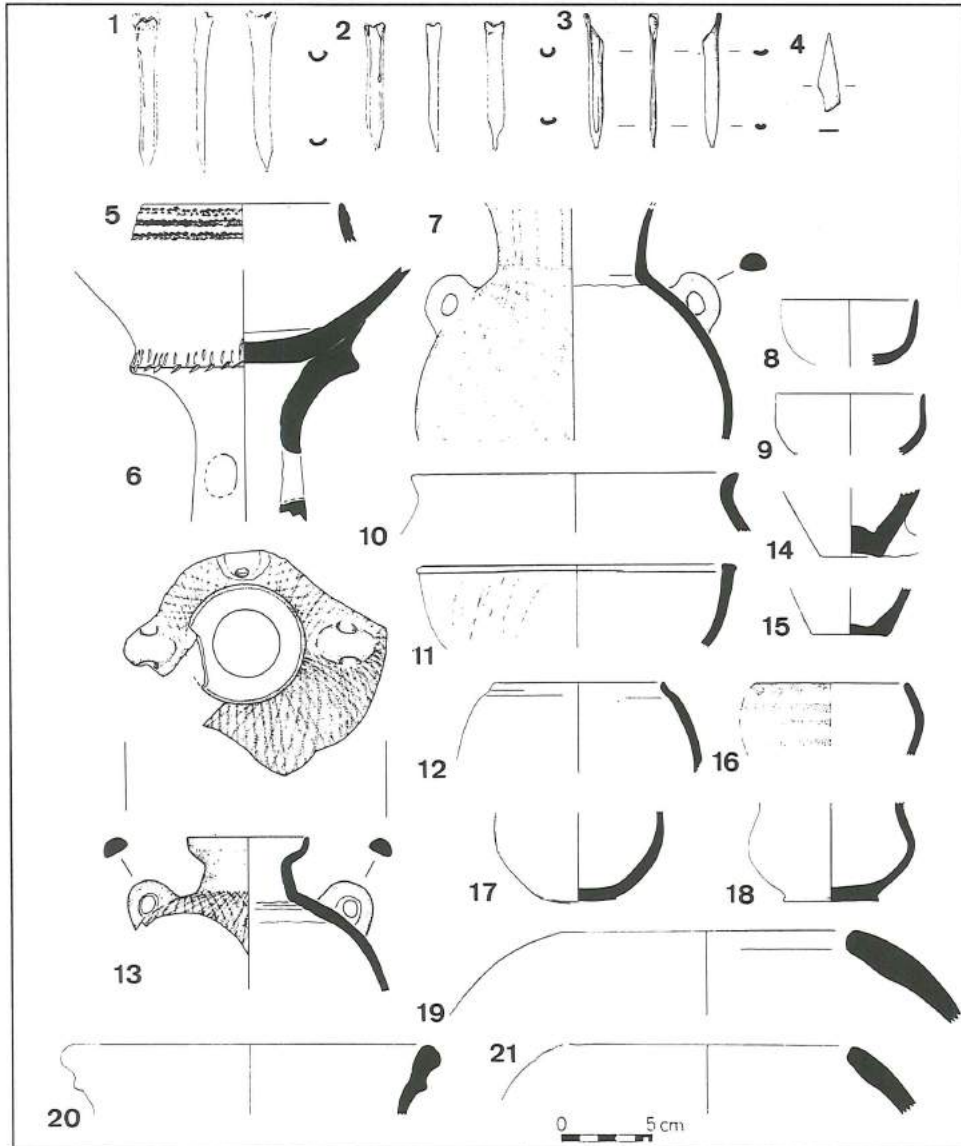
Chalcolithic levels produced a number of worked ovi-caprid metatarsals, such as those illustrated in Figure 7a:1-3. These are common tool types during the Chalcolithic, examples being known from sites such as Tall Abū Ḥāmid (Dollfus and Kafafi 1993: Fig. 3:12), Tulaylāt al-Ghassūl (Hennessy 1969: Fig. 11:1-2 and 8; Bourke *et al.* 1995: Fig. 7:14) and Horvat Beter (Dothan 1959: Fig. 18: 45-6). The tapering points suggests function as a borer, perhaps in piercing skins/hide. Bone tools of this kind have the advantage of being easily resharpened when the point becomes blunt, giving them a potentially long life, and leading to considerable variation in length. Another bone tool found in EB levels (RN 170107, Fig. 7a:4) may also be a borer, although the flat section suggests a slightly different method of

use to preceding examples.

Above the EBA phases, isolated wall fragments (one quite substantial), two intramural burials (MBIIA/B and MB/LB respectively), and what may be the debris from a massive mudbrick terrace wall in the far west of the area, make up the disconnected fragments of the Middle Bronze Age levels. Ceramic material associated with the various structures, burials and deposits date from the MBIIA/B through to the MB/LB period (Fig. 8).

2. Trench XXVIII: West Field Neolithic through MBA (Figs. 9-14)

The deep probe through Second Millennium deposits in the south-west of the tall was commenced in 1984, and continued in 1986 and 1992 (Bourke *et al.* 1994: 99-104). Over the course of 1994/95 the probe



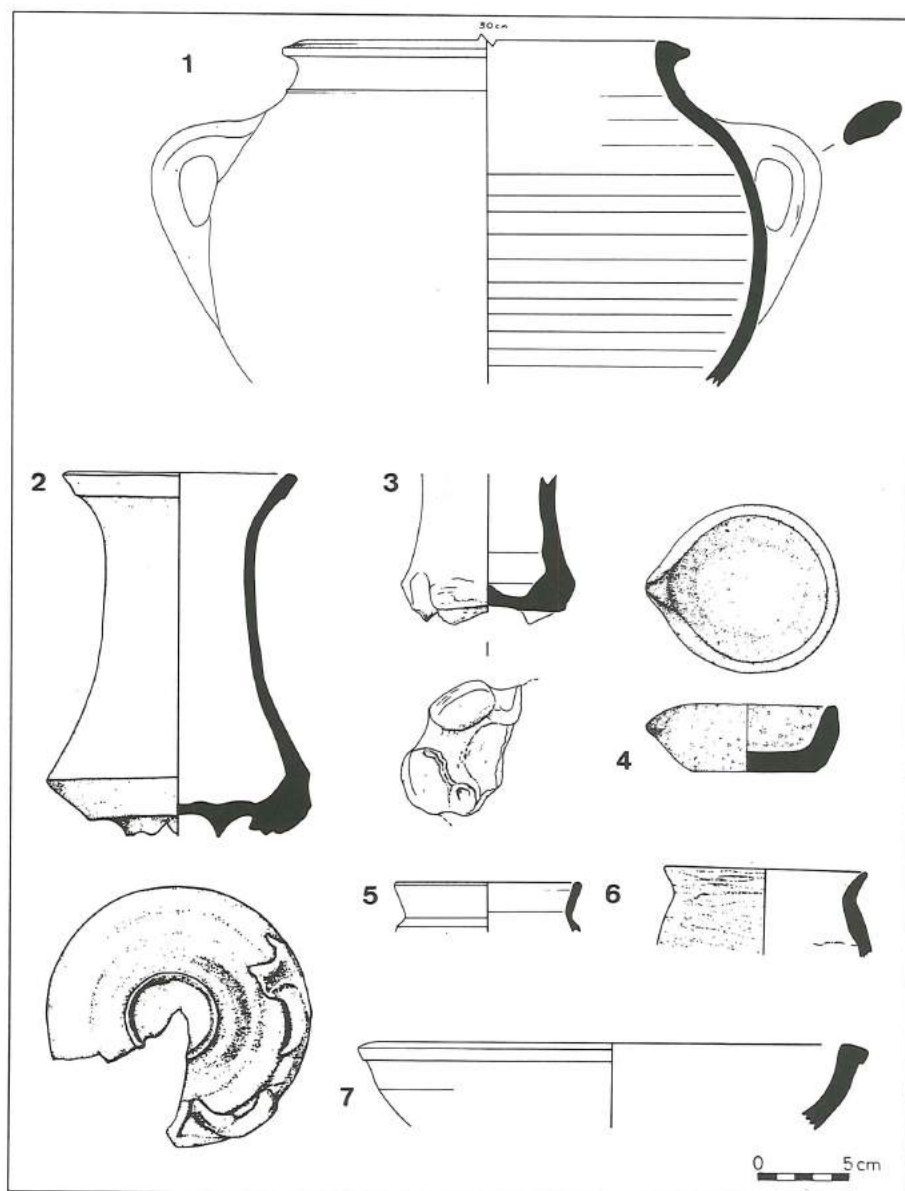
7. Trench XXXIID. Chalcolithic and EBA Small Finds and Pottery.

a) 1-4. Bone Points:

1. RN 170010, XXXIID 18.37 (Late Chalcolithic): Worked bone point. Mended from two fragments with a small chip from one edge. The surface is polished on both sides. 2. RN 170011, XXXIID 18.38 (Late Chalcolithic): Worked bone point. Mended from two fragments, and complete except for a small chip from the surface. Whittled to a point at one end, with the surface polished on both sides. 3. RN 170171, XXXIID 18.36 (Late Chalcolithic): Worked bone point. Mended from two fragments but incomplete, with the tip and upper part of shaft missing. Highly polished on both sides. 4. RN 170107, XXXIID 25.3 (Latest EBA): Worked bone point with flat upper and lower surfaces, broken at upper end and tapering to a point at the other. Highly polished on all surfaces.

b) 5-21. Chalcolithic and Early Bronze Age Pottery:

5. CN 15528, XXXIID 42.15 (Late Chalcolithic): Incised Red Slip Jar. 6. CN 15955, XXXIID 44.2 (Late Neolithic/Early Chalcolithic): Slash-Incised Fenestrated Chalice. 7. CN 15980, XXXIID 42.10 (Early EB): Red Slipped Pattern Burnished TNN Jar. 8. CN 15504, XXXIID 42.10 (Early EB): Small Bowl. 9. CN 15505, XXXIID 42.10 (Early EB): Small Bowl. 10. CN 15412, XXXIID 39.5 (Late Chalcolithic): Short-Necked Jar. 11. CN 15421, XXXIID 39.4 (Late Chalcolithic/Earliest EB). Deep Bowl. 12. CN 15420, XXXIID 39.4 (Late Chalcolithic/Earliest EB): Fine Holemouth Jar. 13. CN 15981, XXXIID 34.4 (Early EB): Red Slip Pattern Burnished Spouted TNN Jar. 14. CN 15398, XXXIID 26.6 (Latest EB). Flat Ring Loop Handled Jar Base. 15. CN 15395, XXXIID 26.4 (Latest EB): Flat Ring Jar Base. 16. CN 15376, XXXIID 25.4 (Latest EB): Fine Red Painted Chalky White Slipped Bowl. 17. CN 15375, XXXIID 25.4 (Latest EB). Fine Red Painted Chalky White Slipped Disk Base. 18. CN 15374, XXXIID 25.4 (Latest EB): Fine Red Painted Chalky White Slipped Convex Disk Base. 19. CN 15386, XXXIID 25.6 (Latest EB). Simple Swollen Square Holemouth Jar. 20. CN 15388, XXXIID 25.7 (Latest EB): Simple Swollen Rounded Holemouth Jar. 21. CN 15386, XXXIID 25.6 (Latest EB): Rounded Ridge Neck TNN Jar.



8. Trench XXXIID. Middle Bronze Age Pottery.

1-7. Middle Bronze Age Pottery from Trench XXXIID:

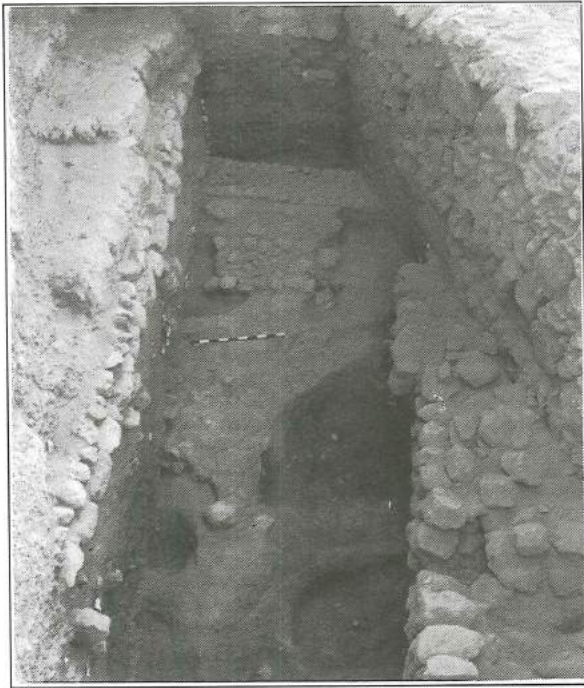
1. CN 15929, XXXIID 50.36 (Latest MBA): Painted White Slip Short Necked Jar.
2. CN 15874, XXXIID 50.38 (Late MBA): Fine Loop-Based Cylindrical Jar.
3. CN 15871, XXXIID 50.43 (Late MBA): Fine Loop-Based Cylindrical Jar.
4. CN 17005, XXXIID 51.9 (Early MBA): Flat Based Heavy Fabric Lamp.
5. CN 15880, XXXIID 50.43 (Late MBA): Fine Carinated Bowl.
6. CN 15971, XXXIID 51.11 (Earliest MBA): Carinated Small Bowl.
7. CN 15979, XXXIID 51.11 (Earliest MBA): Deep Bowl.

was taken down through six metres of occupational debris into sterile layers. The trench was originally laid out as a 10 x 5 m exposure in 1984, but the enforced preservation of a series of massive stone walls within the trench gradually reduced the area available to a 7 x 2 m diagonal strip across its middle. By the end of the 1995 field season, sterile deposits had been reached across this strip. Pits cut into the natural red pebbly conglomerate contained Ceramic Neolithic, Chalcolithic and EBA material. Short stretches of EBA walls were uncovered in the far eastern end of the 'strip', and multiple phases of MBA architecture (some

very large) were encountered across the trench.

Neolithic and Chalcolithic remains were confined to material from a number of pits cut into the sterile conglomerate (Fig. 9). Chalcolithic pits (Phase H) were large and deep and likely to have been used for grain storage, whilst the small Neolithic pits (Phase J) were probably used for cooking and domestic refuse.

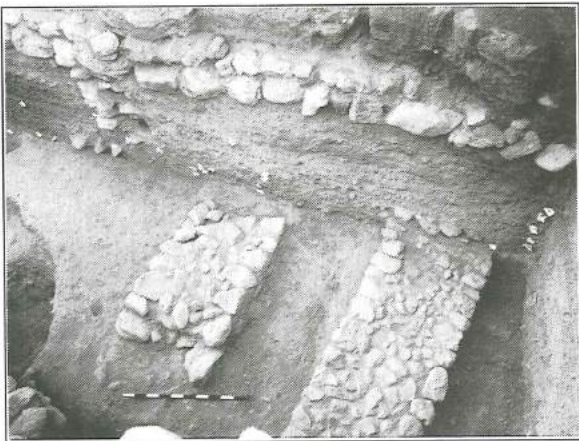
EBA deposits were extensive, but most layers were not associated with architecture. The only EBA architecture consisted of a short stretch of a double-walled structure (Phase G), located in the far eastern end of



9. Trench XXVIII A. Neolithic through EBA Pits cut into Natural.

the trench (Fig. 10). The double walls were neatly constructed of small fieldstones topped with gritty orange mud-bricks, with the interior between filled with gravel and small stones. Associated pottery dated to the EBIB/EB II periods (Fig. 11: 4-11).

Middle Bronze Age remains, both structural and depositional, were very extensive, with occupation likely to span the entire MBA in an essentially unbroken sequence. Six main phases of MBA architecture (Phases A-F) were isolated. The latest MBA phases (A-B) have been described in pre-



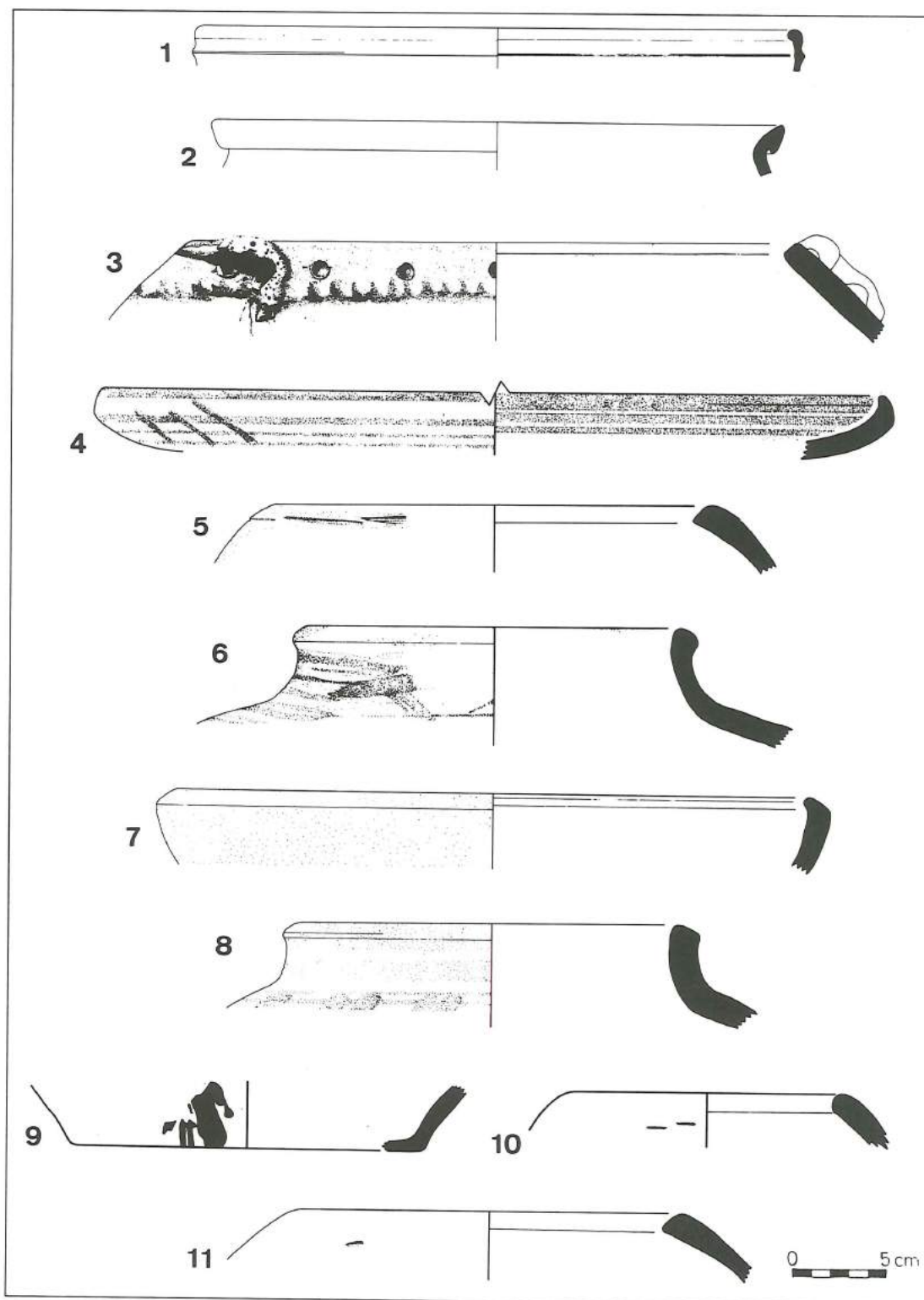
10. Trench XXVIII A. Early Bronze Age Double-Wall.

vious reports (Bourke *et al.* 1994: 101-104), although further analysis of Phase A-B ceramics would modify the picture slightly. Original readings for the date of the Phase A complex of floors (Bourke *et al.* 1994: Phase II, 101) dated them to the MB/LB period. However, they may span a wider period (MBIIC-LBIB) than first thought, if cooking pots such as those illustrated in Fig. 11: 1-2 are typical of the levels in which they were found.

Beneath the floors of the Phase A complex, a series of intramural burials of varying degrees of elaboration had been uncovered between 1984 and 1992 (Bourke *et al.* 1994: Phase III, 102-103). During 1994, four additional burials were excavated, two beneath floor packing, and another two beneath Phase A walls (see below) indicating that this area had been in use as a burial ground for some time before the construction of Phase A.

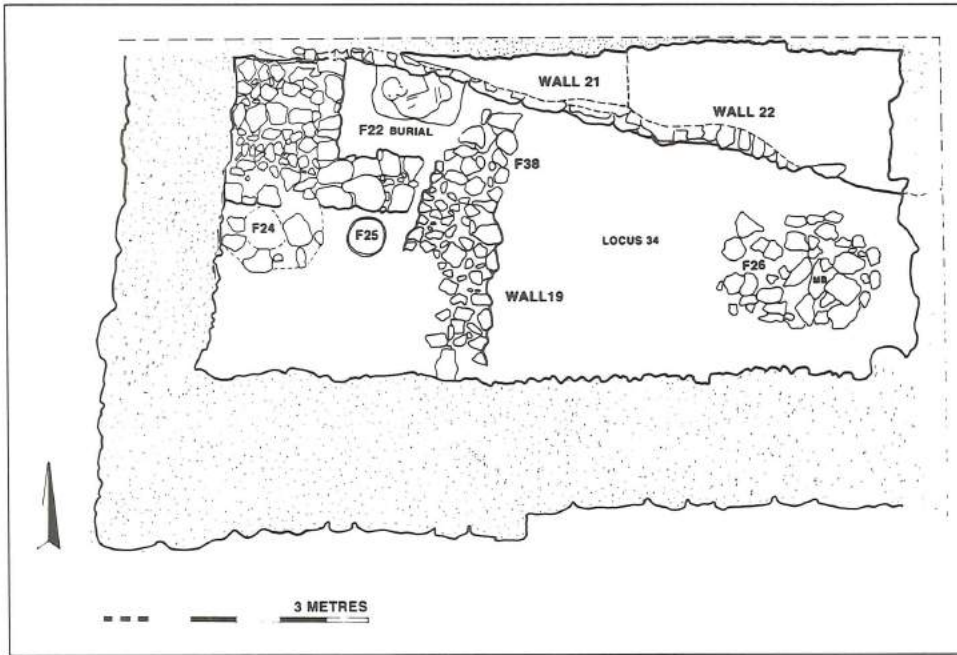
Four major phases (C-F) of MBA architecture were found below Phases A and B. The first of these (Phase C), a large mud-brick and stone wall, rebuilt several times (Walls 21/22), runs roughly east/west along the northern edge of the trench (Fig. 12). It seems likely to be the exterior wall of a major structure, with associated deposits to its south representing a thoroughfare many times resurfaced throughout the later MBIIB and earlier MBIIC periods.

Below this 'roadway' phase, a complex of three rooms and an east/west street (Phase D) running along the (then) southern margins of the wall were uncovered (Fig. 13). This complex and associated deposits are consistent with domestic occupation, and date from the first half of the MBIIB period. Beneath this phase, a massive stone and mud-brick wall with offset buttress was uncovered (Phase E), running east/west along the southern edge of the trench (see above, Fig. 9, right foreground). This massive border wall may be associated with the formal MBA defensive line, or (more likely) the



11. Trench XXVIII. Bronze Age Pottery.

1. CN 15260, XXVIII 29.6 (LBI/II): Cooking Pot. 2. CN 15262, XXVIII 29.6 (LBI/II): Cooking Pot. 3. CN 15568, XXVIII 33.28 (Late MBA): Plastic Snake-Decorated Holemouth Jar. 4. CN 15943, XXVIII 43.7 (Late EB): Grain Wash Platter Bowl. 5. CN 15948, XXVIII 43.7 (Late EB): Slash-Incised Holemouth Jar. 6. CN 15942, XXVIII 43.7 (Late EB): Grain Wash TNN Jar. 7. CN 15944, XXVIII 43.7 (Late EB): Upright Deep Bowl. 8. CN 15964, XXVIII 44.4 (Early EB): Grain Wash TNN Jar. 9. CN 15969, XXVIII 44.4 (Early EB): Flat Base of Jar. 10. CN 15968, XXVIII 44.4 (Early EB): Rounded Holemouth Jar. 11. CN 15962, XXVIII 45.6 (Earliest EB): Pinch Rounded Holemouth Jar.



12. Trench XXVIII. Multiphase Late Middle Bronze Age Architecture.



13. Trench XXVIII. Multiphase Early Middle Bronze Age Architecture.

exterior wall of a civic structure, dating to the second half of the MBIIA period. Beneath this wall, the earliest MBIIA remains (Phase F) consist of a series of scrappy wall fragments, pits, drains and floor surfaces.

Small Finds from burials in Trench XXVIII (Fig. 14).

Among grave goods from the burial pits in Trench XXVIII were ceramic models of a wheel (Fig. 14:9-10).

Wheels of this kind are well known from excavations in Palestine and Syria, dating from the third Millennium BC onwards,

where they appear as components of model carts and chariots. As the wheels from XXVIII are of different materials and design, they seem likely to represent at least two vehicles. A similar wheel (CN 13409, IIC 45.3), made of red-slipped clay and dating to the MBII B period was found at Pella in 1988. Contemporary parallels may be found at Gezer (Dever 1986: Pl. 49:8 and 54:7) and Tall al-Far'ah (Mallet 1988: Fig. 23: 7).

The scarab (Fig. 14:8) belongs to Tufnell's class of Antelope/Ibex base design, Class 9B, also identified as a goat. Plain modelling of the back and sides is a feature of many scarabs of this type cited by Tufnell, and the present example is no exception. Three scarabs bearing the goat design have been found previously at Pella, in the large MB/LB Tomb 62 (Richards 1992: 22ff., CN 12-14). Of these pieces, Richards no. 13 is the closest parallel for the base, sides and back, bearing a goat with a spotted hide and 'sign above the back. The goat design is also known from a range of sites in Palestine and Egypt, but the hatched body and semi-circle in behind the animal is found on scarabs from Jericho (Tufnell 1984: nos. 2478, 2483 and 2484; Cam-

bitoglou 1986: NM 53.278), Tall Far'ah South (Tufnell 1984: no. 2486; Petrie 1930: Pl.XXII: 232) and Tall al-Ajjul (Tufnell 1984: nos. 2493 and 2494). The antelope design is a well-known SIP scarab type, its floruit found in Jericho Groups III/V, dating to the MBIIB/C periods (Tufnell 1984: 195-196). A seventeenth century BC date for this example seems likely.

3. Trench IIIF: East Field Middle Bronze Age Fortifications (Figs. 15-17 and 20)

One problem connected with the eastern complex of MBA fortifications remained outstanding at the end of the 1992 field season, which was the exact relationship of the massive north/south eastern perimeter wall (IIIC Wall 41) and the equally massive east/west wall (IIIF Wall 7) that joined it in the north-eastern corner of trench IIIC. Trench IIIF (east of IIIC) had been opened in 1984 to address this issue, but did not reach constructional surfaces by the end of that season (McNicollet *al.* 1992: 42-43). The trench was reopened in 1994 to complete investigations.

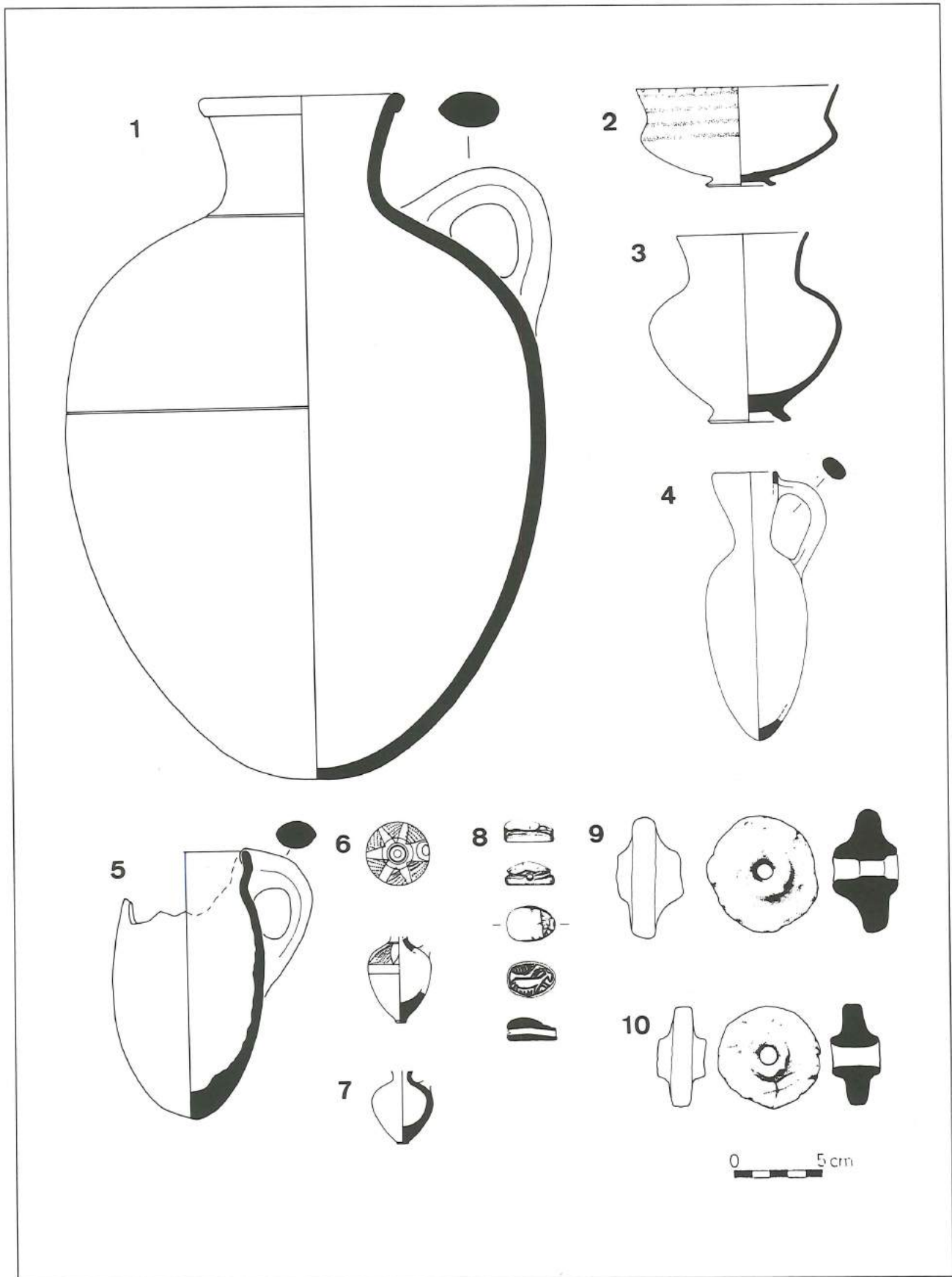
A sondage 2.5 x 2.0 m in extent was placed within the southwest quarter of IIIF (Fig. 15), positioned to cut the outer margins of both walls (IIIC W41 and IIIF W7) in the area of their intersection, so that a trench carried down through the mud-brick courses would recover the constructional relationship through time (Fig. 16). The sondage was carried through six metres of mud-brick superstructure before reaching the 1.5 m high stone sockle of IIIC Wall 41 and associated foundation trench deposits. The 75 cm deep foundation trench had been cut through a series of small pits and associated deposits (dating to the EB I) into the sterile gravels which lie at the base of the occupation sequence. The IIIF Wall 7 foundations began some two metres higher than those of IIIC Wall 41, due to the sharp rise in the bedrock topography (an east/west ridge) at this point. Although the foundations dif-

fered in height, the mud-bricks of the two walls were bonded together, with the grey bricks of the upper phase of Wall 41 'keyed in' to the orange bricks of Wall 7. Although it is possible that Wall 7 should only be associated with the upper 'grey brick' phase of Wall 41, all contextual material from constructional fills associated with Wall 41 suggest that all three mud-brick 'bands' of Wall 41 were constructed sequentially in the same program, and that Wall 7 was 'keyed in' when the Wall 41 superstructure reached the height of the IIIF ridge wall foundations.

Pottery associated with IIIC Wall 41 constructional levels (Fig. 17: 11-15; see below Fig. 20: 1-7) dates to the MBIIA/B period, or the eighteenth century BC. Parallels can be drawn with Apeh (MBIIA), Gezer, Shechem, Megiddo and Hazor (MBIIA/B), although some forms are long-lived, particularly at Jericho (MBIIB). Pottery associated with IIIF Wall 7 construction levels (Fig. 17: 1-10) is of similar date.

4. Trench XXVIIIIC: West Field Middle Bronze Age Fortifications (Figs. 18-20)

A heavy concentration of *in situ* mud-brick and much mud-brick debris had been identified on the middle south-western slope of the main tall during surface survey in 1989, and as the area seemed the best candidate for the long sought after western return for the city fortifications, a 3 x 15 m exploratory trench (XXVIIIIC) was opened over and north of the mud-brick concentration at the beginning of the 1995 field season. Initial excavation revealed three main Romano-Byzantine phases upslope and immediately above the mud-brick mass. The uppermost phase consisted of a massive Late Byzantine (sixth century AD) terrace wall, enveloping an earlier phase of Byzantine domestic structures (fifth/sixth century AD), which were in turn constructed directly on top of a small stretch of Late Roman/Early Byzantine (fifth century AD) limestone-paved colonnaded street.

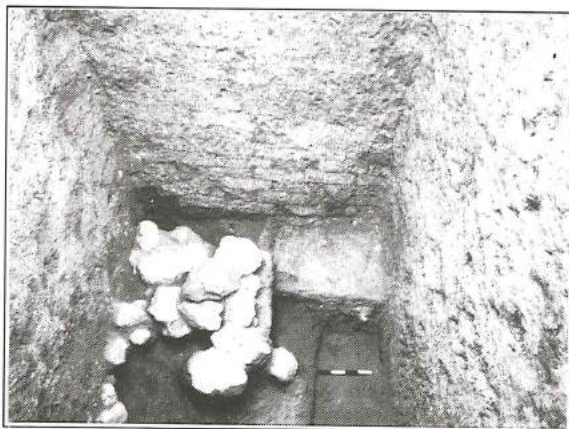


14. Trench XXVIII. Middle Bronze Age Burial Pottery and Small Finds.

- 1-7. Pottery from trench XXVIII A 1. CN 15993, XXVIII A 31.2 (MB/LB): One-Handled Amphoroid Jar. 2. CN 15500, XXVIII A 31.2 (MB/LB): Painted WS Carinated Bowl. 3. CN 15520, XXVIII A 31.2 (MB/LB). Fine Buff Jar. 4. CN 15517, XXVIII A 31.2 (MB/LB): White Slip Dipper Juglet. 5. CN 15983, XXVIII A 31.24 (Late MBA): Dipper Jug. 6. CN 15518, XXVIII A 32.11 (Late MBA): Tall el Yahudiyeh Piriform Juglet. 7. CN 15521, XXVIII A 32.12 (Late MBA): Fine Buff Piriform Juglet.
- 8-10. Small Finds from Trench XXVIII A :
- RN 170128, Steatite Scarab. XXVIII A 32.12. (Late MBA). L. 16 x W. 12 x Th. 7 mm. Carved off-white to beige oval steatite scarab amulet. It is complete and pierced longitudinally for suspension. The unglazed surface is lightly polished. The plain back bears a line delineating the head from the thorax, with two small nicks at the edge serving to define the thorax from the wing case. A diagonal nick divides the thorax. The trapezoidal head with double side lines and horn is joined to an inverted plain trapezoidal clypeus. On one side, the scarab is separated from the base by a single horizontal incision, and on the other, by two incised horizontal lines. An incised oval border frames a design along the length of the scarab base, depicting a horned quadruped in motion facing right. The body is cross-hatched with light incision, and the neck is incised with light diagonal lines. Four vertical lines are visible under the body as a 'space filler'. Over the back of the animal is a semi-circular space-filling ornament, the interior of which is lightly incised with seven diagonal lines.
- 9-10. RN 170174: XXVIII A 33.33. (Late MBA). Ceramic model wheel. L.79 x W.74 x Th. 39 mm. Medium levigated clay with many white lime, some grey chert, dark brown stone inclusions. Core 7.5 YR 7/4 'dull orange' and Slip 10 YR 8/3 'light yellow orange'. Mohs 3-3.5. Hand-made disc, roughly formed edges, one face rising to centre; smoothly bored hole through centre, rough at exits either end. 9. RN 170185, XXVIII A 33.28. (Late MBA). Model wheel, L. 70 x W. 68 x Th. 30 mm. Made of chalky white stone, possibly limestone. Mohs 2.0. Worn surface, slightly accreted with cut or tool marks across face. Disc with flat sides and flat upper/lower faces with central flanges around central hole.



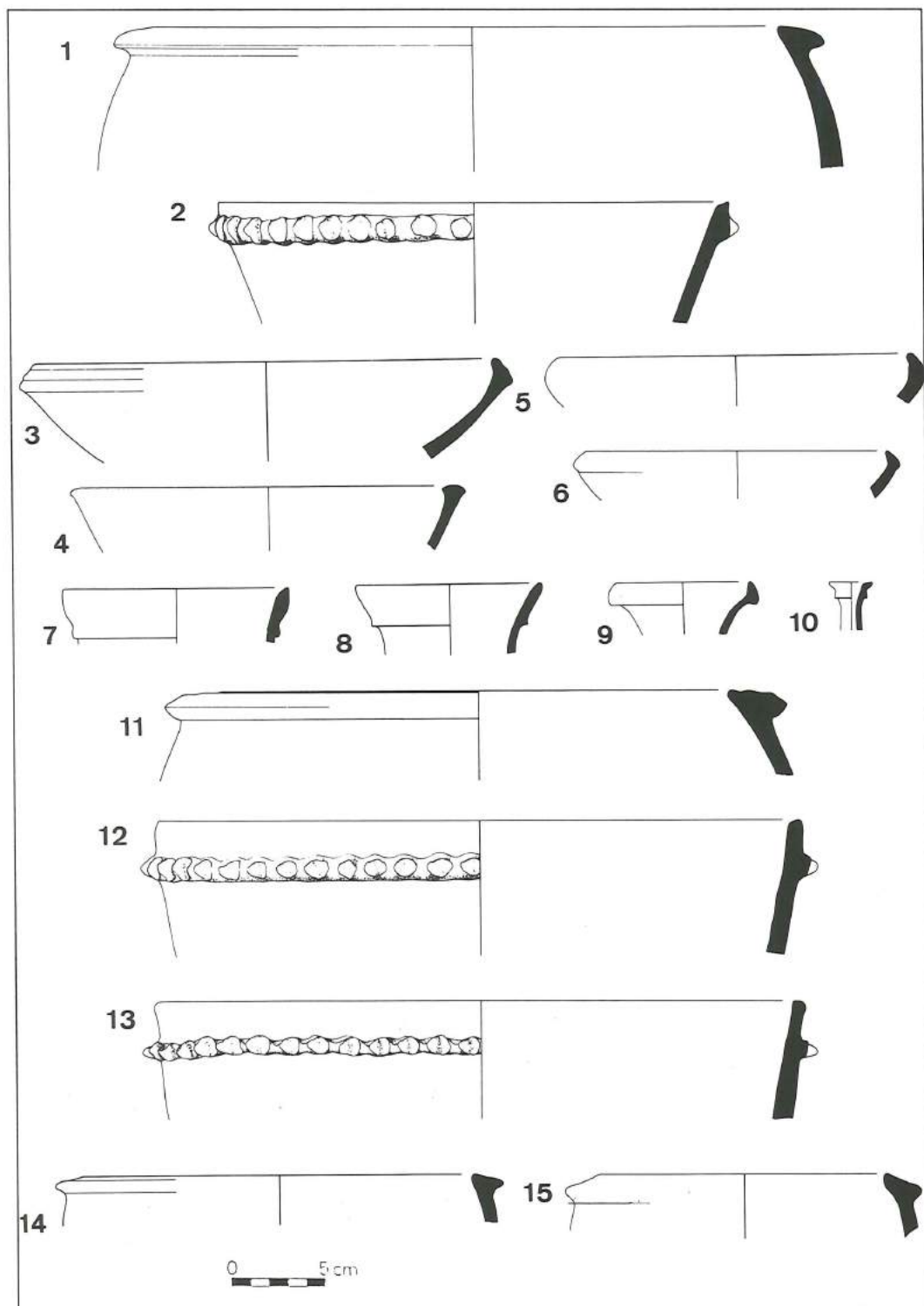
15. Trench IIIF. Beginning of Sondage between MBA fortification walls.



16. Trench IIIF. Base of IIIF Wall 7 (Black bricks at Base).

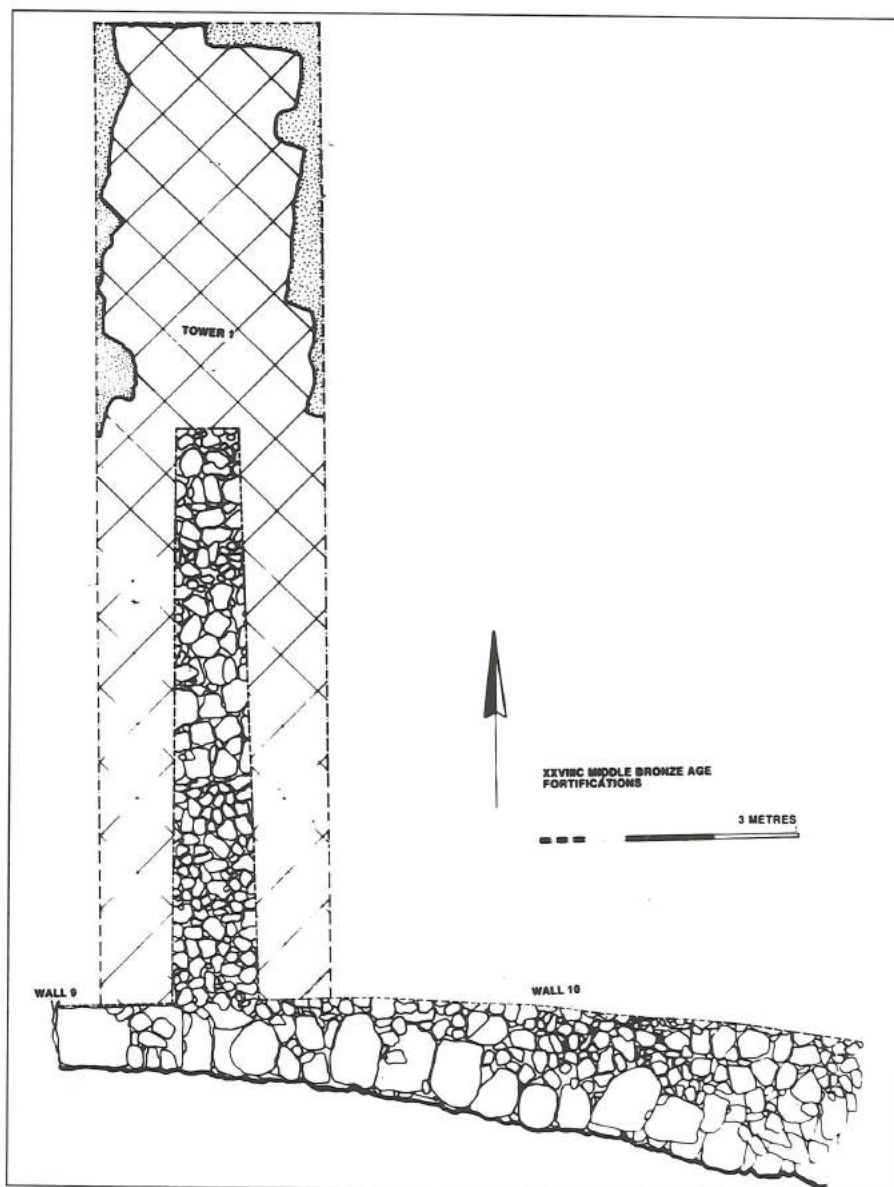
Following the removal of the Roman/ Byzantine pavers, a very large mud-brick structure was revealed immediately below. When the Late Roman/Byzantine street was constructed the top of this mudbrick structure had been sheered off, and the pavers laid directly upon the mud-bricks. As finally uncovered, the brick structure proved to be a solid mud-brick tower (Tower 1), consisting of approximately forty courses of mud-brick built upon a five course stone foundation, this last cut into bedrock (Fig. 18). The tower is nearly eight metres wide and over twelve metres thick. The entire south face of the tower was exposed as it lay close below the surface due to the tall slope (Fig. 19), whilst the northern face, preserved a bare twenty centimetres in from the north baulk, was traced along slightly less than three metres of its face, as it lay under some seven metres of later overburden.

In two separate probes on either side of the main trench, the western and eastern edges of the tower and associated city wall sections were uncovered (Fig. 18). The outer face of the western wall (Wall 9) was covered in mud plaster two/three centi-



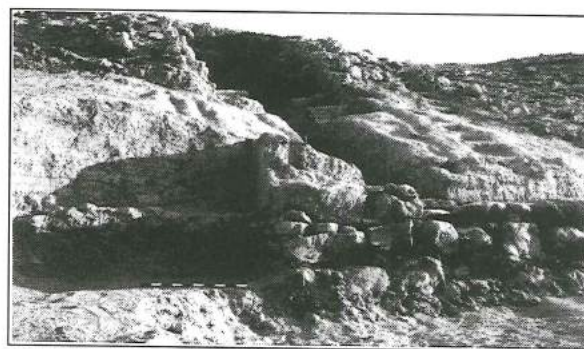
17:1-15. MBA Pottery from Trench III F Sondage.

1. CN 17084, III F 5.7 (Early MBA): Krater.
2. CN 17077, III F 5.5 (Early MBA): Cooking Bowl.
3. CN 17079, III F 5.5 (Early MBA): Rill-Rim Bowl.
4. CN 17106, III F 5.9 (Early MBA): Deep Bowl.
5. CN 17086, III F 5.7 (Early MBA): Simple Bowl.
6. CN 17085, III F 5.7 (Early MBA): Deep Bowl.
7. CN 17081, III F 5.6 (Early MBA): TNN Jar.
8. CN 17107, III F 5.9 (Early MBA): TNN Jar.
9. CN 17097, III F 5.7 (Early MBA): TNN Jar.
10. CN 17080, III F 5.5 (Early MBA): Ridge-Necked Juglet.
11. CN 15467, III F 7.8 (Earliest MBA): Krater.
12. CN 15466, III F 7.8 (Earliest MBA): Cooking Pot.
13. CN 15482, III F 7.13 (Earliest MBA): Cooking Pot.
14. CN 15468, III F 7.8 (Earliest MBA): Small Krater.
15. CN 15474, III F 7.5 (Earliest MBA): Small Krater.



18. Trench XXVIIIIC. Plan of Tower-1 and Walls 9 and 10.

metres thick, with an overall wall thickness averaging 2.6 m. It is attached to the western face of the tower at an oblique angle, set back 1.5 m from the southern edge (Fig. 19). A metre thick stone revetment links the southern edge of the tower with Wall 9, some four metres west of the tower, forming in effect a stepped triangular buttress, which is sealed with the same mud plaster facing as is Wall 9 and the western face of Tower 1. The eastern wall (Wall 10) joins flush with the southern edge of the tower, and averages 2.4 m in thickness. Tower 1 projects back over eight metres into the city proper. It is probable that a second (interior)



19. Trench XXVIIIIC. Intersection of Wall 9 and Tower 1.

line of walling ran parallel to that of Walls 9 and 10, in effect forming a casemate off either side of the tower. Further excavation will be required to confirm this arrangement.

The latest ceramics from tower foundation deposits are MBIIA/B in date. Parallels with MBIIA phases at Aphek are close and convincing. An MBIIA stepped rim juglet (Fig. 20: 20) found with a child burial placed within the stone foundations of Tower 1, is close to similar examples from the 'Palace' phase at Aphek (Beck 1985). Pottery from fill layers associated with both lateral walls (Fig. 20: 8-19) dates to the MBIIA/B period, and suggests that after the construction of the tower and walls, the casemates were filled with near contemporary debris. Overall, pottery parallels drawn from Aphek, Shechem, Megiddo and Jericho support an MBIIA/B date for the construction of the western fortification complex, matching the date independently determined for the eastern complex (Bourke *et al.* 1994: 96).

5. Trench XXXIIF: South Field MBA and LBA Funerary Libation Deposits (Figs. 21 and 23-24)

A new 5 x 5 m trench (XXXIIF) was opened some fifteen metres to the west of trench XXXIID in 1995 to determine if further traces of the EBA city wall could be detected west of the Wooster Area XXV Deep Probe (McNicoll *et al.* 1992: 30-31). Immediately below topsoil, numerous two metre deep Iron II pits badly cut about the insubstantial Iron I and LB/EI remains, but once below these pits, two distinct building phases (MBIIC/LBIA and LBIB/IIA) of an elaborate multi-roomed structure were uncovered (Fig. 21). The carefully constructed large and medium stone footings, the neatly laid pinkish buff mud-brick superstructure, extensive use of thick painted plaster on the walls and associated benches, and the elaborately fashioned and carefully sealed mud-brick and white mud plaster bins that abut the western face of the central north/south wall, taken together indicate a likely civic status for the building.

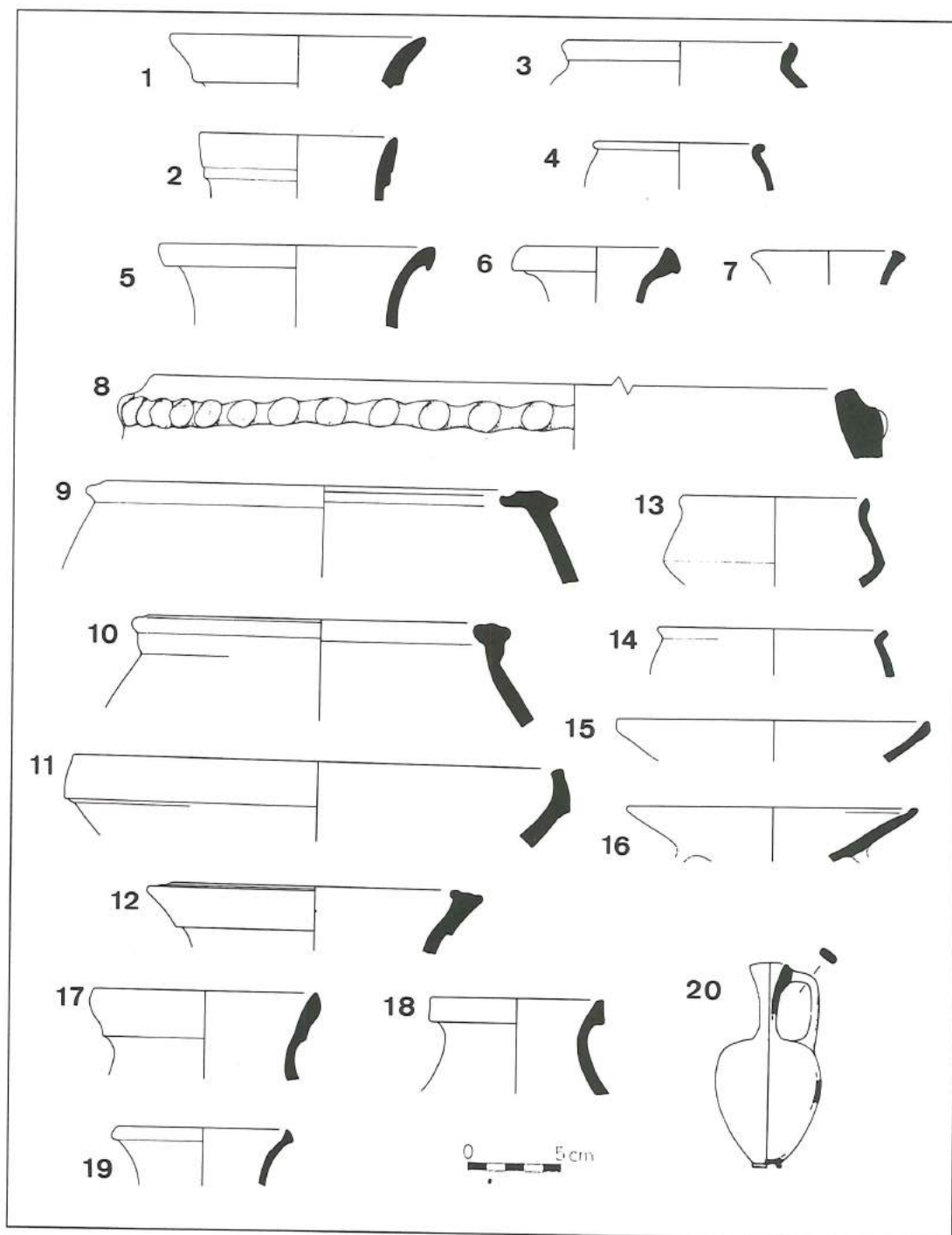
In a series of plaster-lined bins associated with both phases of the structure, a number

of complete ceramic vessels were found (Figs. 22 and 23). A collection of ceramic bowls, platters, small jars, juglets and plates, and an Egyptian faience lid came from two bins associated with the later building phase (Fig. 23), whilst a series of ceramic funnels (large and small), pinch-spouted flasks (large and small), and a unique gypsum bowl were recovered from bins associated with the earlier phase of the building (Fig. 24).

Given the direct association of similar rough-finished funnels with MB/LB burials at Pella (Smith 1973: 211-212 and Pl. 20: A-C) and Megiddo (Guy 1938: 72 and Pl. 37: 13), and the central place of funerary libations in Levantine ancestor worship (Pitard 1994), coupled with the suggestion that public facilities existed to both sanctify new and purify decommissioned utensils used in ancestral worship (Pitard 1996), it may be suggested that the plaster sealed bins contain examples of such decommissioned funerary libation vessels. This in turn may suggest that the building is just such a public temple/repository as that alluded to in the Emar tablets (Fleming 1992).

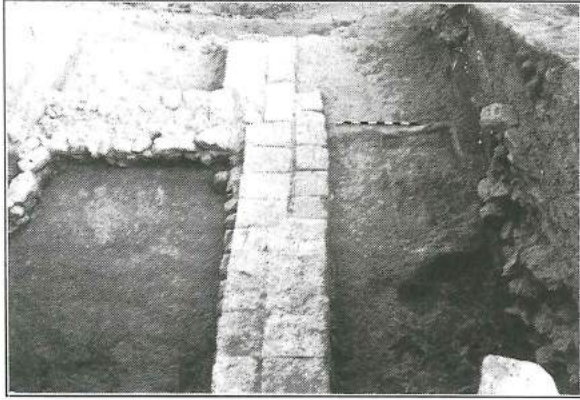
A similar lid in the Walters Art Gallery Baltimore, is thought to be from Tunch el-Gebel in Egypt. This is conical, and was matched with a tall ribbed body (Egypt's Golden Age 1982: 151, no. 157). Another close parallel is a ribbed cup in Lucerne, which makes use of similar 'dot' decoration in a simple zigzag pattern. This form of ribbed vessel is thought to be imitating basketry, where the ribs represent multiple reed coils which have been stitched together. They date from the Second Intermediate Period to the early Eighteenth Dynasty. It has been suggested that the type may have originated in Nubia, where it is most common (Egypt's Golden Age 1982: 142, no. 138).

This vessel is a product of a Palestinian gypsum workshop. Bowls formed a very minor part of the repertoire during the MB/LB period. The closest parallel is provided



20: 1-7. MBA Pottery from Trench IIIF and Trench XXVIIIIC.

1. CN 15471, IIIF 7.8 (Earliest MBA): TNN Jar. 2. CN 17074, IIIF 7.8 (Earliest MBA): TNN Jar. 3. CN 15460, IIIF 7.10 (Earliest MBA): Fine Carinated Bowl. 4. CN 15473, IIIF 7.6 (Earliest MBA). Fine Bowl. 5. CN 15483, IIIF 7.13 (Earliest MBA): TNN Jar. 6. CN 15457, IIIF 7.12 (Earliest MBA): 7. CN 15461, IIIF 7.10 (Earliest MBA): TNN Jar. MBA Pottery from XXVIIIIC 8. CN 17025, XXVIIIIC 9.3 (Early MBA): Cooking Pot. 9. CN 17068, XXVIIIIC 9.1 (MBA): Krater. 10. CN 17027, XXVIIIIC 9.3 (Early MBA): Storage Jar. 11. CN 17028, XXVIIIIC 9.3 (Early MBA): Deep Bowl. 12. CN 17054, XXVIIIIC 9.4 (Early MBA): TNN Storage Jar. 13. CN 17051, XXVIIIIC 9.4 (Early MBA): Fine Carinated Bowl. 14. CN 17052, XXVIIIIC 9.4 (Early MBA). Fine Bowl. 15. CN 17031, XXVIIIIC 9.3 (Early MBA): Fine Platter Bowl. 16. CN 17040, XXVIIIIC 9.3 (Early MBA): Loop Base Fine Platter Bowl. 17. CN 17039, XXVIIIIC 9.3 (Early MBA): TNN Jar. 18. CN 17026, XXVIIIIC 9.3 (Early MBA): TNN Jar. 19. CN 17053, XXVIIIIC 9.4 (Early MBA): TNN Jar. 20. CN 17001, XXVIIIIC 8.7 (Earliest MBA Burial). Fine Buff Burnished Juglet.



21. Trench XXXIIF. Plastered Bins (far right) and MBA mud-brick walls.

by an MB/LB carinated rim fragment from Gezer Field VI (Dever 1986: Pl. 52: 12). Ring bases were used on other contemporary gypsum bowl forms, such as the plate or ram's-head handled bowls from Pella (RN 70961, unpublished) and Jericho (Kenyon 1960: Figs. 171: 15 and 187: 17). In the absence of close parallels in stone, it seems likely that the inspiration for this shape came from a variant of the traditional MB/LB ceramic carinated bowl, where the upper walls lean in slightly and which sometimes feature similar lug handles. Comparable material is known from Pella (McNicoll *et al.* 1992: Pl. 44: 3), Tall Dan (Biran *et al.* 1996: Fig. 4: 99.17), Gibeon (Pritchard 1963: Figs. 9: 4 and 27: 4) and Tall Far'ah South (Price-Williams 1977: Figs. 26: 4, 35: 5 and 51: 3). The gypsum version shows a tendency to place the carination further down the body than that seen on the ceramic prototypes. It probably represents a spontaneous development within the local gypsum industry.

6. Trench IVE: East Field Deep Probe (Figs. 24 and 27)

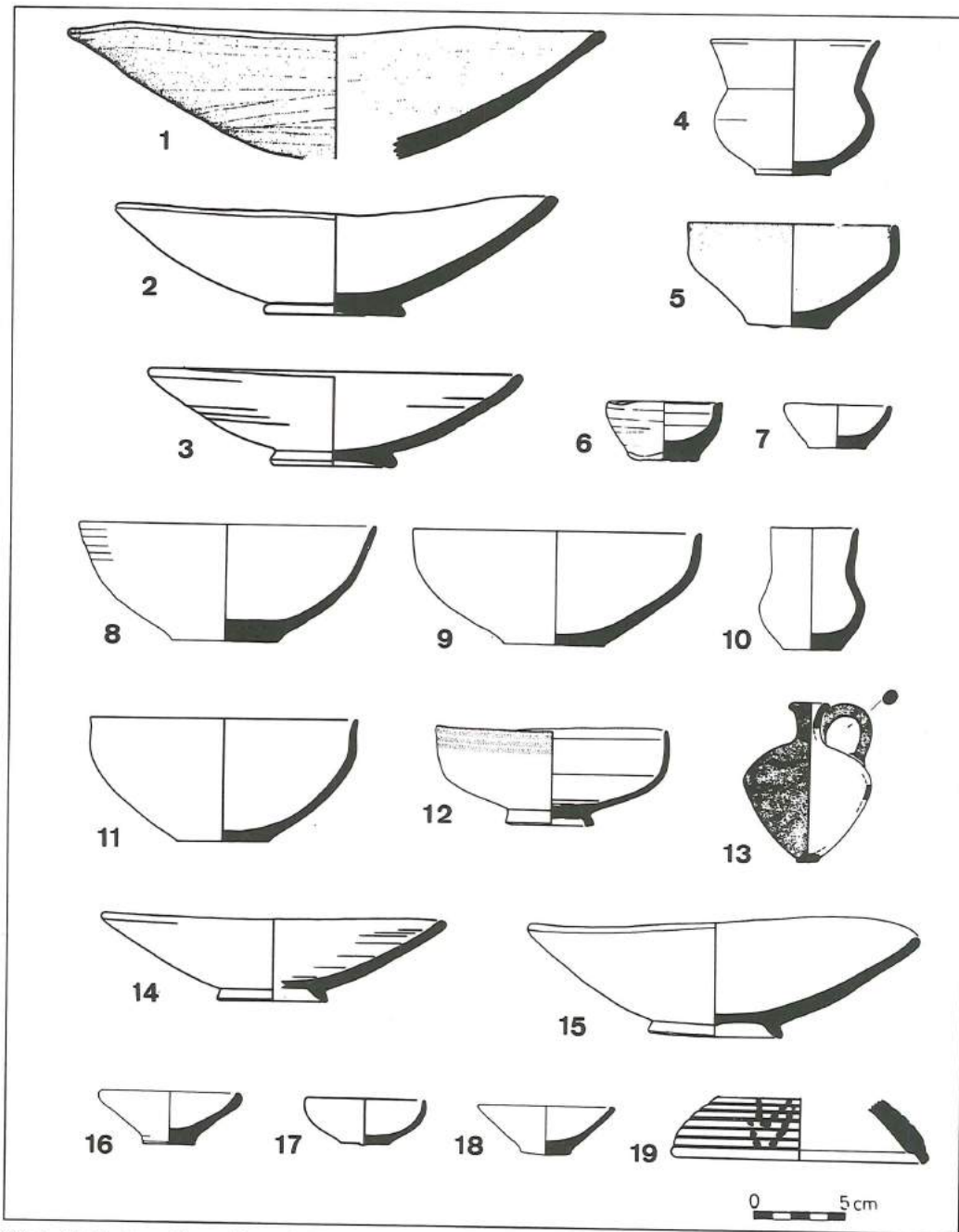
Trenches IIIP and IVE had reached LBIIA/B levels by the end of the 1990 field season, when last excavated (Walmsley *et al.* 1993: 184-188). In the intervening years, several very wet winters (particularly that of 1992) had rendered the six metre high baulks very dangerous, and in places they

had collapsed into the trench, putting much of the adjacent consolidated Late Byzantine/ Umayyad housing at risk. As a conservation measure, it was decided to backfill trenches IVE and IIIP, but before this occurred a sondage 3 x 3 m in extent was placed in the centre of trench IVE to sound the area to sterile.

Over the course of the 1994 field season, the sounding penetrated through seven metres of deposit before reaching sterile gravel. In so doing, three phases of LB (LBI-IIA), four phases of MB (MBIIA-IIC), and two phases of EB (EBIB-II) architecture and associated ceramics (see below Fig. 25a: 1-7) were discovered above a series of stone and plaster-lined pits ranging in date from the EBI through Ceramic Neolithic (Fig. 24). All pits were cut into a thick dark brown redeposited Aceramic Neolithic layer (probably PPNB in date), which in turn lay above sterile red gravels. The sequence recovered from the IVE sounding is similar in most respects to that recovered from trench IIIC, but has in addition a number of Pottery Neolithic through Late Chalcolithic pits as well as the redeposited PPNB material.

7. Trench IIIQ: South-East Field Buildings and LBIB-IIA Governors' Residence (Fig. 25b - 27)

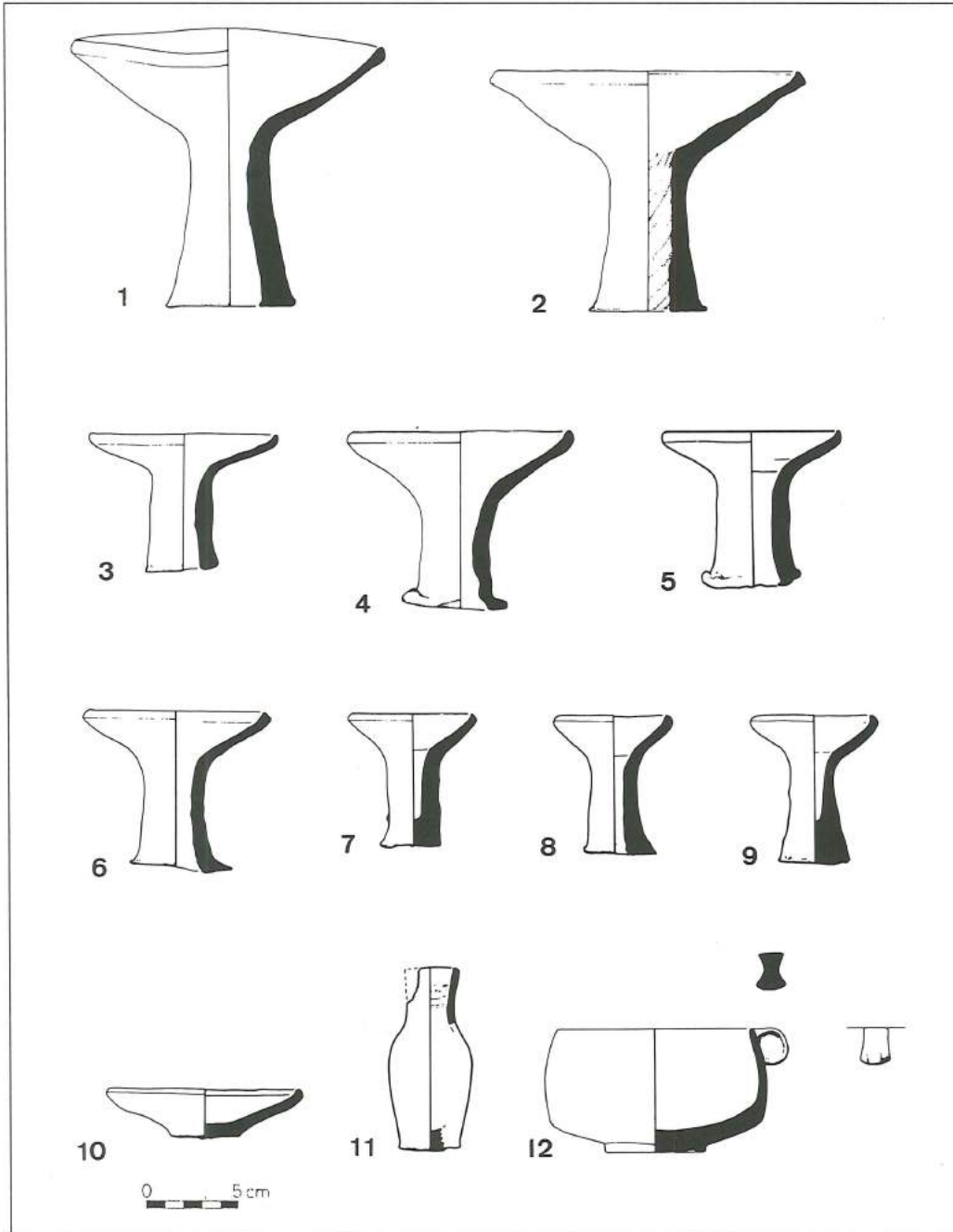
Whilst completing the exposure of the Governors' Residence (trenches IIIN/IIIS) in 1992, we uncovered a major street running down its western side (Bourke *et al.* 1994: 104-109). As it seemed likely that further civic structures lay to the west of the street, trench IIIQ, last dug in 1990 (Walmsley *et al.* 1993: 188), was reopened in 1994 and taken down to the phase of the Governors' Residence (East Cut Phase V, LBI/IIA). As a four metre high baulk separated trenches IIIQ and IIIN, it was first removed. Thereafter excavations continued through two phases of LBIIA/B (East Cut Phase IVA-B) architecture and a complex of plaster-lined bins, benches and pits, perhaps as-



22:1-18. Pottery from Trench XXXIIF. LBA Phase of Funerary Libation Deposit.

1. CN 15977, XXXIIF 2.36 (LBA): Platter Bowl. 2. CN 15976, XXXIIF 2.36 (LBA): Platter Bowl. 3. CN 15975, XXXIIF 2.36 (LBA): Platter Bowl. 4. CN 15926, XXXIIF 2.38 (LBA): Fine Carinated Bowl. 5. CN 15927, XXXIIF 2.27 (LBA): Upright Bowl. 6. CN 15850, XXXIIF 2.27 (LBA): Small Rough Based Bowl. 7. CN 15904, XXXIIF 2.27 (LBA): Small Bowl. 8. CN 15906, XXXIIF 2.32 (LBA): Bowl. 9. CN 17007, XXXIIF 2.36 (LBA): Bowl. 10. CN 15978, XXXIIF 2.36 (LBA): Bowl. 11. CN 15892, XXXIIF 2.33 (LBA): Carinated Bowl. 12. CN 15891, XXXIIF 2.33 (LBA): Small Jar. 13. CN 15905, XXXIIF 4.3 (LBA): Black Burnished Piriform Juglet. 14. CN 17009, XXXIIF 4.1 (LBA): Platter Bowl. 15. CN 15895, XXXIIF 4.1 (LBA): Platter Bowl. 16. CN 15894, XXXIIF 4.1 (LBA): Small Bowl. 17. CN 17008, XXXIIF 4.1 (LBA): Small Rough Based Bowl. 18. CN 15893, XXXIIF 4.1 (LBA): Small Rough Based Bowl.

19. Faience Lid from LBA Phase of Funerary Libation Deposit . RN 180034, XXXIIF 2.23. LBI/IIA: Faience lid fragment L. 46 x W. 33 x Th. 13 mm. . Pinched edge, sides gently convex, seven horizontal ridges preserved on exterior. The interior edge is flanged to fit onto the vessel rim. White glazed exterior and white at core, Munsel 10 YR 8/2 'white'. Decorated exterior with brown spots in possible multiple 'v' design, 10 YR 4/2 'dark greyish brown'. Mohs 2.5.



23:1-11. Pottery and one Small Find from the MB/LB Phase of the Funerary Libation Deposit in Trench XXXIIF.

1. CN 17010, XXXIIF 11.2 (MB/LB): Large Funnel. 2. CN 17024, XXXIIF 11.4 (MB/LB): Large Funnel. 3. CN 17011, XXXIIF 11.4 (MB/LB): Rough Based Medium Funnel. 4. CN 17017, XXXIIF 11.4 (MB/LB): Rough Based Medium Funnel. 5. CN 17022, XXXIIF 11.4 (MB/LB): Rough Based Medium Funnel. 6. CN 17020, XXXIIF 11.4 (MB/LB): Rough Based Medium Funnel. 7. CN 17016, XXXIIF 11.4 (MB/LB): Small Rough Based Chalice. 8. CN 17014, XXXIIF 11.4 (MB/LB): Small Rough Based Funnel. 9. CN 17015, XXXIIF 11.4 (MB/LB): Small Rough Based Chalice. 10. CN 17019, XXXIIF 11.4 (MB/LB): Small Rough Based Plate. 11. CN 17018, XXXIIF 11.4 (MB/LB): Small Rough Based Bottle.

12. Gypsum Bowl from the MB/LB: Phase of the Funerary Libation Deposit. RN 180050, XXXIIF 11.4, F.26 (Plaster-lined pit). MB/LB. Gypsum Bowl. Mohs 2.0. Simple rim with vertical, concave sided lug handle attached either on or just below rim; sides are convex to a sharp carination low on the body, then curved in to well-formed ring base. Circular in plan view, with a compass point in the centre of the base underside, probably from blocking out the shape. The vessel has been mended from several fragments and is incomplete, with parts of the rim and upper body missing.



24. Trench IVE. Base of Deep Sounding and Chalcolithic Pits.

sociated with olive oil processing and storage (Fig. 26), before reaching the Governors' Residence architectural phase, dating to the LBIB/IIA periods.

This Residence phase consisted of an initial (LBIB) major construction phase (Phase VB), featuring substantial walls of roughly dressed fieldstone foundations topped with neatly laid yellow-brown mudbricks, well constructed stone doorways, white plaster floors and stone paved courtyards (Fig. 27). This was followed by an extensive (LBIB/IIA) rebuilding (Phase VA2), consisting of a series of relatively poorly constructed walls laid over the primary surfaces abutting the early phase walls, subdividing the original courtyarded areas into smaller (apparently domestic) structures. These were associated with numerous pits, some stone lined. In the last (LBIIA/B) phase (Phase VA1), there was further evidence for semi-permanent round structures defined by post and stakehole patterns, erected within the reduced courtyard areas in the southern reaches of the trench, matching the occupational history of the Governors' Residence across the roadway from the IIIQ complex (Bourke *et al.* 1994: 105-107).

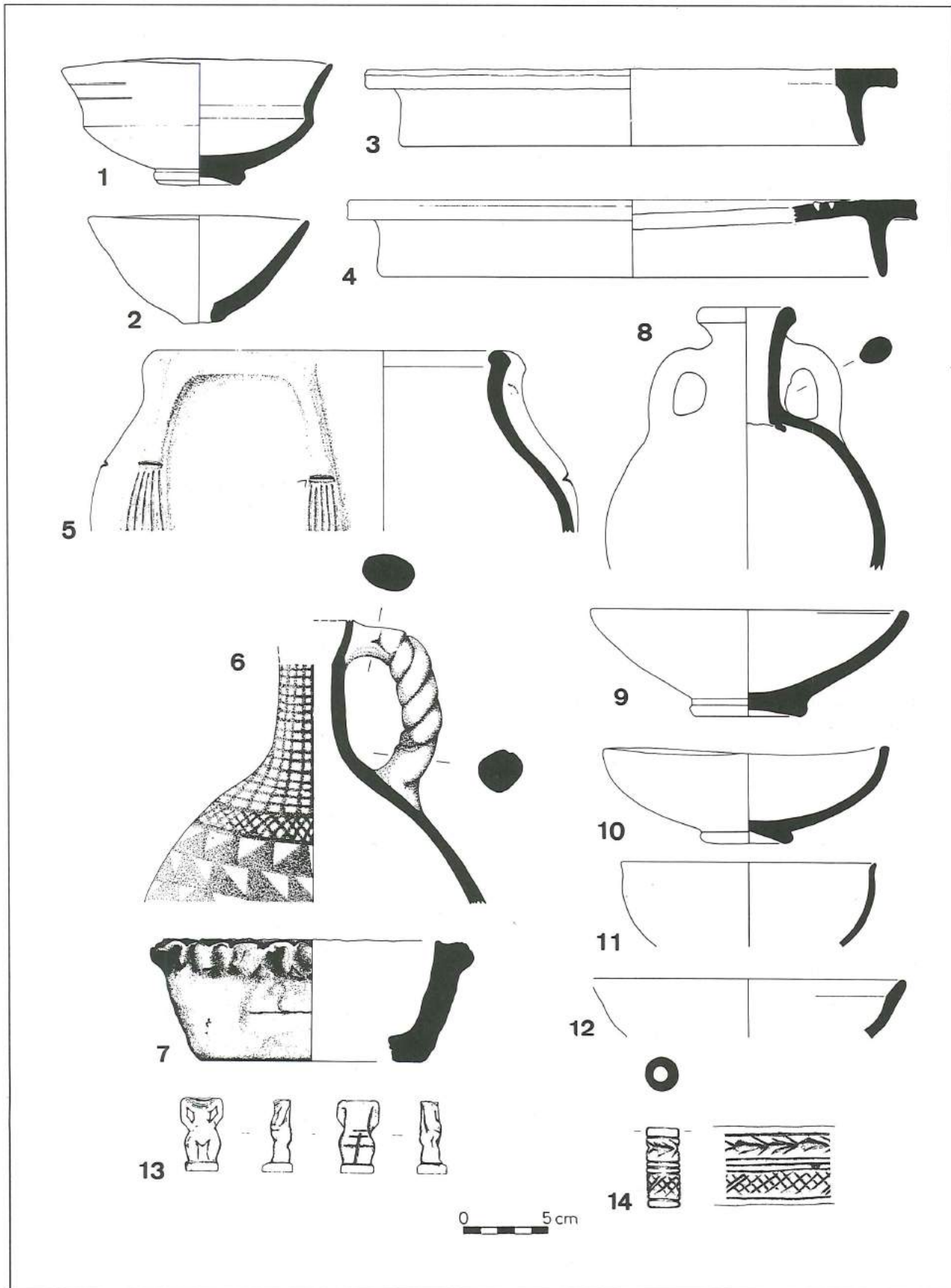
Pottery from the Residence phase (Fig. 25b: 8-12) is securely LBI-IIA in date, with the few small fragments of Mycenaean and Cypriot imports (if contemporary) suggesting the refined relative chronology pro-

posed above.

No. 13 is an example of the Ptah-Sokar amulet type well-known from the region (McGovern 1985: 18). Late Bronze and Iron Age Ptah-Sokar amulets come from a range of Palestinian sites, including Megiddo, Beth Shan, Lachish and Tall Far'ah South, and Egyptian sites such as Buhen and Matmar. Good parallels can be identified from Megiddo. Two large examples with clearly modelled *wesh* collars closely match the Pella amulet. These were found in Stratum VB, dating to the Tenth Century BC (Loud 1948: Pl. 206: 48 and 206: 50). Two slightly later examples from Stratum VA feature more curvaceous modelling of the body, but are still worth noting here (Loud 1948: Pl. 206: 54-55). From Lachish, Iron Age II examples feature a plinth and a suspension hole at the back (Tufnell 1953: Pl. 35: 44).

McGovern has suggested that the black disk on the head of Ptah-Sokar amulets occurs from the LBII into the Iron II. This trait was visible on the blue faience head (Pella RN 150007), possibly an unusual form of Ptah-Sokar amulet, found in an Iron Age I context at Pella in 1992 (Bourke *et al.* 1994: Fig.18: 5). Although the head is missing from RN 170009, the clear modelling and dense faience suggests a relatively fresh mould and firing at a higher temperature than that of RN 150007. The amulet was found on the main tall during the removal of the IIIQ/N baulk, in a Phase Oa-Ob context (McNicoll *et al.* 1992: 90-93), dating to some stage within the Iron I/IIA transition. Given the context and parallels, a tenth century BC date is not unreasonable.

Seal no. 14 (Fig. 25) belongs to the Mittanian common style; a similar example was discovered at Pella in 1988 (RN 110507, Walmsley *et al.* 1993: Fig. 15: 4), featuring net, double row of fish and reflected scroll design. Fish and net combinations of this kind were a popular design during the Late Bronze Age, with parallels found at Beth Shan VIII (James and McGov-



25a and b. Trench IVE and Trench IIIQ. Bronze Age Pottery and Small Finds. a: 1-7, b: 8-14.

- a) 1-7. Pottery From Trench IVE Deep Sounding; b:8-12. LBA Pottery from Trench IIIQ; 13-14. LBA Faience Amulet and Faience Cylinder Seal from Trench IIIQ .
- a) 1. CN 15263, IVE 111.6 (LBA): Carinated Bowl. 2. CN 15265, IVE 111.10 (LBA): Funnel. 3. CN 15244, IVE 111.16 (Late MBA): Cooking Plate. 4. CN 15249, IVE 111.16 (Late MBA): Cooking Plate. 5. CN 15293, IVE 115.8 (MBA): Plastic and Incised Zoomorphic Decorated Cooking Pot. 6. CN 15336, IVE 122.1 (Earliest MBA): Red Painted Chalky White Slip Twisted Handle Jug. 7. CN 15334, IVE 124.1 (Early EBA): Heavy Walled Cooking Bowl.
- b) 8. CN 15325, IIIQ 120.20 (LBIIA): Painted White Slip Pilgrim Flask. 9. CN 15274, IIIQ 120.5 (LBIIA): Open Bowl. 10. CN 15289, IIIQ 121.3 (LBIIA): Simple Bowl. 11. CN 15311, IIIQ 126.1 (LBIB): Fine Bowl. 12. CN 15313, IIIQ 126.1 (LBIB): Everted Rim Bowl.
13. RN 170009. IIIQ 118.3: Phase Oa-Oe, Iron I/IIA: Faience Amulet. Mohs 3.0. L. 27 x W. 15 x Th. 9 mm. Mould-made amulet, missing the head, of a squat naked figure with short legs, protruding belly, arms akimbo and hands on the stomach, standing on a plinth. Angular and well-defined body; the legs, although apart, are not separated. The flat back is schematic, with a diagonally incised line separating the legs, two short horizontal incised lines across the small of the back and a horizontal modelled curve below the buttocks. Across the shoulders, a linked wesh collar is visible. The amulet is glazed shiny pale blue (now worn) on a dense and hard grey-white faience base.
14. RN 170067. IIIQ 121.14. LBIB/IIA: Cylinder seal. Whitish faience, surface glaze missing except for faint bluish traces. Mohs 2.5. L. 28 x D.12 mm. Complete. Pierced through length. Decorated with cross-hatched net design in upper register, framed by parallel lines above and below. There is an additional parallel line below, with a row of three fishes swimming left below, similarly framed.



26. Trench IIIQ. Late Bronze Age Plastered Features (Phase IV).



27. Trench IIIQ. Late Bronze Age Walls, Bins and Courtyards (Phase V).

ern 1993: Pl. 62b), Megiddo VIIA (Loud 1948: Pl. 161:14), Atchana level VB (Collon 1987: no. 931), Rās Shamra (Schaeffer-Forrer 1983: RS 23. 11 and RS 24. 227) and Ayia Irini (Pecorella 1977: no. 67; Figs. 190 and 210: 67). Mitanninan 'Common Style' seals seem to appear in greater numbers in northern Palestine, especially at sites like Beth Shan, suggesting the development of local workshops in the region (Guardata 1986: 16). Both fish and fish with net motifs may have originated in this area (Guardata 1986: 17; Collon 1975: 133), although they are also found at Nuzi (Porada 1947: Pl. 5: 78-84).

8. Archaeozoological Report (1994-95)

Over 7,000 identifiable fragments of bone have been analysed, dating from the Neolithic through to the Iron Age. Discussion will focus on general trends in animal use on the main tall and the more specialised use of Tall al-Ḥuṣn during the EBA, where hunting of deer (*Cervid* sp.) and gazelle (*Gazella* sp.) played a major role in the 'domestic' economy. On the main tall at Pella there is a gradual decline in the use of cattle (*Bos*) and a concomitant rise in the use of sheep and goats (*Ovicaprines*) from the Neolithic through to the Late Bronze Age (LBA) when ovicaprine use escalates.

In the Iron Age, the pre-LBA status quo is resumed. These findings have important implications for current hypotheses on the development and collapse of urban society during the EBA, for the redevelopment of urbanism in the MBA and its subsequent collapse in the LBA; and for the restructuring of Iron Age society.

Methodology has been discussed previously (Bourke *et al.* 1994: 121-123). However, to summarise briefly, data is analysed using the Number of Individual Specimens (NISP), the Minimum Number of Individuals (MNI) calculated by the maximum distinction method, and Sheep/Goat Equivalents (SGE), a relative meat value based on Twentieth Century liveweight-at-slaughter patterns. The NISP and MNI values are given for comparison with other sites. However, discussion relates to meat equivalent values as these give a more realistic interpretation of dietary preferences and animal use. For analytical purposes, since the number of positively identified Cervid remains are very low in comparison with cattle, all juvenile Bos/Cervid remains are classified as juvenile cattle, as this is more likely the case.

Neolithic faunal remains have been scanty. It would be inappropriate to present these figures as representative of an early domestic economy since NISP values are less than ninety. In contrast, 644 identifiable fragments have come from Chalcolithic levels in trench XXXIID. The absolute non-existence of Gazella remains, together with the relatively light use of Ovicaprines, pigs and cervids is of great interest for this period (see Tables 1-4). Cattle comprise nearly 85% of the dietary meat in the Chalcolithic, higher than in any subsequent period, whilst ovicaprines make up less than 9%. This indicates that during the Chalcolithic the population at Pella was highly settled and depended almost entirely on domestic livestock. This is in keeping with Croft's findings at Tall ash-Shūna North,

where domesticates predominate but with a slightly different emphasis, due to that site's location on the floor of the Jordan valley (Baird *et al.* 1994: 130-131). It is interesting that gazelle were hunted at Tall ash-Shūna North, and deer at Pella. This and the larger dependence on pigs at Shuna emphasise the different environmental niches of the two, with the valley floor being somewhat wetter and less timbered than the environs of Pella.

At Pella there is no evidence for the dramatic variation in animal husbandry techniques found at ash-Shūna North over the Chalcolithic/Early Bronze Age periods (Baird *et al.* 1994: 130-131). However, relatively low NISP values alone have been used by Croft in his study, and it remains to be seen if his interpretation holds after further excavation and analysis. Theories behind the rise of complex urban society during the EBA are based on an assumed increase in complexity of socio-economic and political institutions (Richard 1987: 22). However, the faunal evidence from Pella indicates that the domestic economy was running to a tried and tested formula from early in the settled history. In this regard, it could be construed that urbanism at least had its roots (and perhaps even its main trunk) in the Chalcolithic period. Richard further suggests that a three-tiered ranked site city-centred state polity was in evidence by the EB II, with varying levels of administrative organisation based on function as producer or redistribution centre (Richard 1987: 28). It remains unclear how city states inter-related with their 'hinterland' sites. The Egyptian Old Kingdom model, as discussed by Redding in the analysis of the Kom el-Hisn fauna (Redding 1992: 99-107), does not seem appropriate for the EBA Levant, even though strong Egyptian influence in the region is obvious. Pella varies very little between the Chalcolithic and the EBA (see Tables 1-4). EBA Pella was intermediate in size, although strongly walled, and produced exactly the same livestock as during the Chalcolithic. Richard's three-

tiered, centrally organised, urbanised EBA society does not account sufficiently well for the observable variety of economic structures in the region.

Middle Bronze Age Pella witnesses only a subtle change in animal husbandry practices, with a slight decline in the use of cattle, and a relatively sharp increase in the use of deer. Once again, there is no indication of major changes in animal husbandry practices between the EBA and the MBA, such as those Horwitz reported for the Refaim Valley (Horwitz 1989: 44-54). As with Croft's interpretation, Horwitz based her conclusions on NISP values alone, and very low ones at that (the total NISP for both periods is only 537). The MBA deposits at Pella are extensive, with the faunal count being correspondingly huge. There was little variation in husbandry practices between the early and middle stages of the MBA. Although there was some variation in the late MBA, this may have been due to the relatively low bone count for this phase. There is no evidence for central control and distribution of foodstuffs at Pella during the MBA, despite spatial analyses from sites in the region that may suggest otherwise (Dever 1987: 159).

There is little evidence of changing animal husbandry practices in the first half of the LBA, but this alters as the period unfolds. Ovicaprine use nearly doubles, whilst pig and cattle use drops dramatically, this perhaps in keeping with adaptation to a drying environment, and may tie in with climate-based theories on the collapse of regional economies at the end of the Bronze Age (Liverani 1987: 66-73). The agricultural basis of Canaanite culture would have been seriously eroded by any severe climate change. Indeed, many authors have suggested that the entire eastern Mediterranean may have been affected, undermining trading networks, socio-economic structures and even political systems, with the possibility of famine being widespread

(Redford 1992: 223; Lloyd 1989: 56; Ahlström 1993: 292; Mazar 1990: 288; Gorny 1989: 91).

With the coming of the Iron Age, we see a return to the status quo of earlier periods, perhaps indicating a return to a climate more conducive to cattle rearing, although pig production remains relatively low. During this period there is also a change in butchery practices, with chop marks and sagittally cut vertebrae increasing in frequency. This may reflect the changing types of tools available during the period. Iron holds its edge and can be sharpened more easily than either bronze or stone. Not all butchery was carried out using iron cutting implements, since most carcasses were still being disjointed, as in previous periods. However, there appears to be less concern about accuracy in this regard, as evidenced by the presence of more butchery marks in general, and an increasing number of carcasses being split sagittally (i.e. in half down the spine). There are less than 300 identifiable specimens from this period, which hampers analysis. However, the implications are that the environment had improved and new technology and butchery practices were being implemented.

Table 1. NISP values for all periods on the main tall.

	Chalco	EBA	MBA	LBA	IA	Total
Ovicaprine	255	365	2682	407	163	3872
Bos	226	219	746	55	88	1334
Bos/Cervid	11	16	73	4	19	123
Cervid	12	5	137	8	10	172
Sus	140	41	203	5	9	398
Gazella	0	1	10	0	1	12
Total NISP	644	647	3851	479	290	5911

Table 2. MNI values for all periods on the main tall.

	Chalco	EBA	MBA	LBA	IA
Ovicaprine	75	112	377	94	46
Bos	56	64	196	24	22
Bos/Cervid	9	12	38	3	11
Cervid	4	3	39	4	6
Sus	23	20	99	4	6
Gazella	0	1	3	0	1
Total MNI	167	212	752	129	92

Table 3. SGE values for all periods on the main tall.

	Chalco	EBA	MBA	LBA	IA	Total
Ovicaprine	75	112	377	94	46	704
Bos	672	768	2352	288	264	4344
Bos/Cervid	54	72	228	18	66	438
Cervid	24	18	234	24	24	324
Sus	34.5	35	148.5	6	9	233
Gazella	0	1	3	0	1	5
Total SGE	859.5	1006	3342.5	430	410	6048

Table 4. Percentage SGE values for all periods on the main tall.

	Chalco	EBA	MBA	LBA	IA	Mean
Ovicaprine	8.7	11.1	11.3	21.9	11.2	11.6
Bos	84.5	83.5	77.2	71.1	80.5	79
Cervid	2.8	1.8	7	5.6	5.9	5.4
Sus	4	3.5	4.4	1.4	2.2	3.9
Gazella	0	0.1	0.1	0	0.2	0.1

Tall al-Ḥuṣn during the Early Bronze Age: An example of intra-site variation

During the EBA, an easily defended site on Tall al-Ḥuṣn had been occupied and heavily fortified. The foundations for major fortifications have been uncovered on the eastern side of al-Ḥuṣn, and it is from this area that the vast majority of faunal material has emerged. In all, 1102 fragments have been identified, producing a very different picture from that on the main tall (Table 5).

Table 5. Animal use on Tall al-Ḥuṣn during the Early Bronze Age.

	NISP	MNI	SGE	%SGE
Ovicaprine	896	91	91	19.2
Bos	72	22	264	56.1
Bos/Cervid	15	4	24	5.1
Cervid	30	11	66	14
Sus	38	13	19.5	4.1
Gazella	51	7	7	1.5
Total	1102	148	471.5	

Hunting of deer and gazelle becomes relatively more common, ovicaprine use increases dramatically, and cattle use drops. The hills surrounding Pella must have been well forested, providing an adequate habitat for deer. As hunting has always been as-

sociated in historical times with the officer class in the army, it is perhaps not surprising that the occupants of a fortress on Tall al-Ḥuṣn obtained more than fifteen percent of their dietary meat in this manner. The variation between the main tall and al-Ḥuṣn is marked. The variation is not as marked as the NISP values alone would indicate (see Tables 1 and 5), since the vast majority of identified specimens were either cranial or distal limb elements. This would indicate that the EBA courtyard area (trench XXXIVF) was used as a primary butchery area, since the remains were found in floor deposits and not in pits. This is a prime example of the spatio-functional differentiation that would be expected in a complex segmented society.

The Equids of Pella

Not many equid remains have been recovered from Pella. Equids did not form a major part of the diet in the Near East until Hellenistic times, being used mainly as pack animals for the caravans transporting goods across the Near East, so it is not surprising that their remains are infrequently found, and those that normally appear come from donkeys (*Equus asinus*) or mules. The horse (*Equus caballus*) was mentioned in the Drehem archive from the Ur III period (2113-2029 BC) in Mesopotamia (Postgate 1994: 161), and apparently introduced into Egypt around 1700 BC, just prior to the Hyksos era (Cansdale 1970: 76), but direct evidence for the horse in the southern Levant in the MBA is still lacking.

The earliest evidence for horse at Pella comes from two Late Bronze Age IIA pit deposits, the first from trench XXXIIF on the main tall, and the second from trench XXXIVB on Tall al-Ḥuṣn. This would seem to be the earliest direct evidence for the horse in Jordan. They were used for pulling war chariots by all eastern Mediterranean peoples, but intensively by the Egyptians, Mitanni and the Hittites during the LBA.

Conclusion

For a death assemblage that covers five Millennia, the number of identified specimens is small. Still, the death assemblage at Pella gives some idea of the animals consumed at the site, and given some intra-site variation between the main tall and al-Ḥuṣn, a pattern has emerged that indicates a degree of stability in animal use during most of the settlement history. Whilst fewer cattle were killed than sheep or goats, as much larger animals cattle provided the bulk of the meat consumed on the site - strongly indicating both a preference for this meat and an ability to support cattle in larger numbers than today. In the el-Amarna texts, oxen figure heavily in preparations for the arrival of Egyptian troops in various cities in the Levant, and 500 oxen were given by one ruler to the king of Egypt as a gift (EA 301). Cattle were obviously highly prized in the Levant as well as in Egypt. Sheep and goats made up the majority of the remainder of the meat source at Pella. Once again, their secondary product use can only be surmised at this stage. Numerically, they predominated in all periods at the site.

As mentioned earlier, the second half of the Late Bronze Age witnessed a change in animal husbandry practices that could easily fit with the collapse of regional systems in the Levant at this time. Economic stress created perhaps by environmental deterioration is apparent. The reversal of husbandry trends in the Iron Age suggests a return to the stability of previous eras.

9. Summary and General Conclusions

The recovery of a fifteen metre deep sequence in Area IV (trench IVE) was important, although the very thin Chalcolithic and Neolithic layers were disappointing. The presence of Neolithic (again sparse) in the much expanded trench XXXIID was encouraging, as was the isolation of two complete phases of Chalcolithic architecture in the eastern area of the expansion, promising more in

the future when excavations will again be expanded to the east. The recovery of a complete sequence in the western tall (trenches XXVIII B and XXVIII A) was also important, although the very thin Chalcolithic and Neolithic layers was again disappointing.

The massive depth and elaboration of the EBA terracing operations on Tall al-Ḥuṣn (XXXIV F) again underlines the importance of the EBA architecture on the southern hill, and the south-eastern gatehouse (XXXIV E) and western industrial/storage facility (XXXIV B) only serve to emphasise the elaboration of the al-Ḥuṣn EBA complex.

The newly instituted exploration of the MBA west fortification complex (trench XXVIII C) promises much, as does the discovery of MBA cultic deposits along the central southern slopes (trench XXXII F); both areas will be further explored in future seasons. With the east fortification deep probe (III F) and the exploration of the area west of the Governors' Residence (III Q) complete, excavations in the East Cut (Areas III/IV) are finally at an end after fifteen years, having uncovered over 4000 years of virtually continuous occupational history. With six probes into natural at various places along the south side of the tall, it becomes increasingly clear that the Neolithic and Chalcolithic settlements on the main tall were neither continuous nor extensive. Equally, it seems that the earliest (EBIA) and latest (EBIII-IV) EBA phases are absent. However, continued recovery of extensive monumental architecture of second Millennium BC date underlines the strength and continuity of occupation during this period.

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Bibliography

- Ahlström, G.
 1993 *History of Ancient Palestine from the Paleolithic Period to Alexander's Conquest*. Sheffield.
- Albright, W.F.
 1938 *The Excavation of Tel Beit Mirsim II : The Bronze Age*. New Haven.
- Albright, W.F.
 1943 *The Excavation of Tell Beit Mirsim III: The Iron Age*. New Haven.
- Amiran, R.
 1970 *The Egyptian Alabaster Vessels from Ai*. *IEJ* 20: 170-179.
- Amiran, R.
 1978 *Early Arad. The Chalcolithic settlement and Early Bronze City*. Jerusalem.
- Amiran, R., Alon, D. and Cohen, C.
 1976 *A Public Buildings Area in the Ancient Canaanite City of Arad*. *IMN* 11: 35-40.
- Baffi Guardata, F.
 1986 *Iconographic Contributions of Palestinian Glyptic to the Mitannian "Common Style"*. Pp 15-19 in M. Kelly-Buccellati (ed.), *Insight Through Images. Studies in Honor of Edith Porada*. Malibu.
- Baird, D. and Phillip, G.
 1994 *Preliminary Report on the Third (1993) Season of Excavations at Tall esh-Shuna North*. *Levant* 26: 111-133.
- Bar-Adon, P.
 1980 *The Cave of the Treasure*. Jerusalem.
- Barkay, G.
 1996 *A Late Bronze Age Temple in Jerusalem?* *IEJ* 46: 23-43.
- Beck, P.
 1985 *The Middle Bronze Age IIA Pottery from Aphek. 1972-84: First Summary*. *Tel Aviv* 12: 181-203.
- Beit-Arieh, I.
 1983 *Central-Southern Sinai in the Early Bronze Age II and its Relationship with Palestine*. *Levant* 15: 39-48.
- Ben-Arieh, S and Edelstein, G.
 1977 *Akko - Tombs near the Persian Gardens*. Jerusalem.
- Bourke, S.J.
 1997 *Pre-Classical Pella in Jordan: A Conspectus of Ten Years' Work (1985-1995)*. *PEQ* 129: 94-115.
- Bourke, S.J., Seaton, P.L., Sparks, R.T., Lovell, J.L. and Mairs, L.D.
 1995 *Preliminary Report on a First Season of Renewed Excavations at Teleilat Ghassul by the University of Sydney, 1994*. *ADAJ* 39: 31-64.
- R.T, Sowada, K.N.
 1994 *Preliminary report on the University of Sydney's Fourteenth season of excavations at Pella (Tabaqat Fahl) in 1992*. *ADAJ* 38: 81-126.
- Buchanan, B.
 1966 *Catalogue of the Ancient Near Eastern Seals in the Ashmolean Museum*. Oxford.
- Callaway J.
 1980 *The Early Bronze Age Citadel and Lower City at Ai (et-Tell)*. Cambridge, MA.

- Chambon, A.
 1984 *Tell el-Far'ah I - L'Age du Fer*. Paris.
- Clamer, C.
 1988 Alabaster Vessels, 108-111. in J.D. Seger and H.D. Lance (eds), *Gezer V*. Jerusalem.
- Cansdale, G.
 1970 *Animals of the Bible Lands*. London.
- Collon, D
 1975 *The Seal Impressions from Tell Atchana/Alalakh*. Wiesbaden.
 1987 *First Impressions: Cylinder Seals in the Ancient Near East*. London.
- Crowfoot, J.W., Crowfoot, G.M. and Kenyon, K.M.
 1957 *Samaria-Sebaste III: The Objects*. Oxford.
- Dever, W.G.
 1987 The Middle Bronze Age. The Zenith of the Urban Canaanite Era. *BA* 57: 148-177.
- Dever W.G., Lance, H.D. and Wright G.E.
 1970 *Gezer I* Jerusalem.
 1974 *Gezer II*. Jerusalem.
- Dever, W. G. (ed.).
 1986 *Gezer IV*. Jerusalem.
- Dollfus, G. and Kafafi, Z.
 1993 Recent Researches at Abu Hamid. *ADAJ* 37: 241-262.
- Dothan, M.
 1959 Excavations at Horvat Beter (Beersheba). *Atiqot* 2: 1-42.
- Dunand, M.
 1939 *Fouilles de Byblos I*. Paris .
 1958 *Fouilles de Byblos II*. Paris.
- Edwards, P. C., et al.
 1990 Preliminary Report on the University of Sydney's Tenth Season of Excavation at Pella in Jordan. *ADAJ* 34: 54-75.
- Esse, D.L.
 1991 *Subsistence, Trade and Social Change in Early Bronze Age Palestine*. Chicago.
- Finklestein, I., Bunimovitz, S. and Lederman Z.
 1993 *Shiloh*. Jerusalem.
- Fischer, P.M.
 1996 Tall Abū al-Kharaz. The Swedish Jordan Expedition 1994. Fifth Season Preliminary Excavation Report. *ADAJ* 40: 101-110.
- Flanagan J.W. McCreery D.W. and Yassine K.N.
 1994 Preliminary report on the 1993 season at Tell Nimrin. *ADAJ* 38: 205-206.
- Fleming, D.E.
 1992 The Rituals from Emar: Evolution of an Indigenous Tradition in Second Millennium Syria. Pp. 51-61 in M.W. Chavalas and J.L. Hayes (eds), *New Horizons in the Study of Ancient Syria*. Malibu.
- Franken, H.J. and Ibrahim, M.M.
 1878 Two seasons of excavations at Tel Deir Alla, 1976-1978'. *ADAJ* 22: 57-80.
- Funk, R.W. and Richardson, H.N.
 1958 Sounding at Pella: *BA* 21: 82-96.
- Gal, Z.
 1994 *Lower Galilee during the Iron Age*. Winona Lake.

- Gorny, R.
1989 Environment, Archaeology and History in Hittite Anatolia. *BA* 52: 78-96.
- Grant, E.
1929 *Beth Shemesh*. Philadelphia.
- Guy, P.L.O.
1938 *Megiddo Tombs*. Chicago.
- Hankey, V.
1995 A Late Bronze Age Temple at Amman Airport: Small Finds and Pottery Discovered in 1955. Pp. 169-186 in S.J. Bourke and J-P. Descoedres (eds), *Trade, Contact, and the Movement of Peoples in the Eastern Mediterranean: Studies in Honour of J. Basil Hennessy*. Sydney.
- Horwitz, L.K.
1989 Diachronic Changes in Rural Husbandry Practices in Bronze Age Settlements from the Refaim Valley, Israel. *PEQ* 121: 44-54.
- Hennessy, J.B.
1969 Preliminary Report on a First Season of Excavation at Teleilat Ghassul. *Levant* 1: 1-24.
- James, F. W. and McGovern, P. E.
1993 *The Late Bronze Egyptian Garrison at Beth Shan: A Study of Levels VII and VIII*. Philadelphia.
- Keel, O., Shuval, M. and Uehlinger, D.
1990 *Studien zu den Stempelsiegeln aus Palastina/Israel III*. Freiburg.
- Kempinski, A.
1989 *Megiddo. A City-State and Royal Centre in North Israel*. Wiesbaden.
- Kenyon, K.M.
Excavations at Jericho I. London.
- Levy, T.E. and Shalev, S.
1989 Prehistoric Metalworking in the Southern Levant: Archaeometallurgical and Social Perspectives. *WA* 20: 352-372.
- Liverani, M.
1987 Collapse of the Near Eastern regional system at the end of the Bronze Age: the case of Syria. Pp. 66-73 in M. Rowlands et al. (eds), *Centre and Periphery in the Ancient World*. Cambridge.
- Lloyd, S.
1989 *Ancient Turkey. A Traveller's History of Anatolia*. Berkeley .
- Loud, G.
1948 *Megiddo II*. Chicago.
- McGovern, P.
1985 *Late Bronze Age Palestinian Pendants*. Philadelphia.
- McLeod, W.
1970 *Composite Bows. Tut'ankhamun's Tomb Series III*. Oxford.
- McNicoll, A.W., et al.
1992 *Pella in Jordan 2*. Sydney.
- Starkey, J. and Lankester Harding, G.
1932 *Beth Pelet II*. London.
- Mallet, J.
1987 *Tell el-Far'ah II. Le Bronze moyen*. Paris.

- Margueron, J.
 1977 Ras Shamra 1975 et 1976. Rapport préliminaire sur les campagnes d'automne. *Syria* 54: 151-188.
- Mazar, A.
 1990 *Archaeology of the Land of the Bible*. New York.
- Metzger, M. and Barthel, U.R.
 1993 *Kamid el-Loz 10*. Bonn.
- Miron, R.
 1990 *Kamid el-Loz 8*. Bonn.
- Mitchell, T.C.
 1985 Another Palestinian Inscribed Arrowhead. Pp. 136-153 in J.N. Tubb (ed.) *Palestine in the Bronze and Iron Ages. Papers in Honour of Olga Tufnell*. London .
- Montet, P.
 1928 *Byblos et l'Égypte*. Paris.
- Mount-Williams, L.
 1980 *Terqa Preliminary Reports 8. Object Typology of the Third season* . Malibu.
- Oren, E.
 1973 *The Northern Cemetery at Beth Shan*. Leiden.
- Nicholson, P.
 1993 *Egyptian Faience and Glass*. London.
- Parker, B.
 1949 Cylinder Seals from Palestine. *Iraq* 11: 1-43.
- Petrie, W.M.F.
 1906 *Hyksos and Israelite Cities*. London.
- Philip, G.
 1988 Hoards of the Early and Middle Bronze Ages in the Levant. *WA* 20 :190-208.
- Philip, G.
 1989 *Metal Weapons of the Early and Middle Bronze Age in Syria-Palestine*. Oxford.
- Philip, G.
 1991 Tin, Arsenic, Lead: Alloying Practices in Syria-Palestine around 2000 BC. *Levant* 23: 93-104.
- Postgate, J.N.
 1994 *Early Mesopotamia*. New York.
- Potts, T.F., *et al.*
 1988 Preliminary report on the Eighth and Ninth seasons of excavations by the University of Sydney at Pella (Tabaqat Fahl), 1986 and 1987. *ADAJ* 32: 115-149.
- Potts, T.F., Colledge, S.M and Edwards P.C.
 1985 Preliminary report on a Sixth season of excavations by the University of Sydney at Pella in Jordan (1983/84). *ADAJ* 29: 181-210.
- Pitard, W. T.
 1994 The Libation Installations of the Tombs of Ugarit. *BA* 57: 20-37.
- Pitard, W.T.
 1996 Care of the Dead at Emar. Pp. 123-140 in M.W. Chavalas (ed.), *Emar: The History, Religion and Culture of a Syrian Town in the Late Bronze Age*. Bethesda.
- Price-Williams, D.
 1977 *The Tombs of the MBA II Period from the '500' Cemetery at Tell Fara South*. London .

- Pritchard, J.B.
 1943 *Palestinian Figurines in Relation to Certain Goddesses Known through Literature.* Philadelphia.
- Pritchard, J.B.
 1963 *The Bronze Age Cemetery at Gibeon.* Philadelphia .
- Redding, R.W.
 1992 Egyptian Old Kingdom Patterns of Animal Use and the Value of Faunal Data in Modeling Socioeconomic Systems. *Paléorient* 18: 99-108.
- Redford, D.
 1992 *Egypt, Canaan and Israel in Ancient Times.* New Jersey.
- Renfrew, A.C.
 1972 *The Emergence of Civilisation: The Cyclades and the Aegean in the Third Millennium BC.* London.
- Richard, S.
 1987 The Early Bronze Age: The Rise and Collapse of Urbanism. *BA* 57: 22-44.
- Sandars, N.
 1978 *Sea Peoples - Warriors of the Ancient Mediterranean 1250-1150 BC.* London.
- Schaeffer-Forrer, C.F.A.
 1983 *Corpus I des Cylindres-Sceaux de Ras-Shamra-Ugarit et d'Enkomi-Alasia.* Paris.
- Sellin, E. and Watzinger, C.
 1913 *Jericho.* Leipzig.
- Shalev, S. and Northover, J.P.
 1993 The Metallurgy of the Nahal Mishmar Hoard Reconsidered. *Archeometry* 35: 25-47.
- Smith, R. H.
 1973 *Pella of the Decapolis. The 1967 Season of the College of Wooster Expedition.* Wooster.
- Stager, L.E.
 The First Fruits of Civilisation. Pp.172-188 in J.N. Tubb (ed.), *Palestine in the Bronze and Iron Ages. Papers in Honour of Olga Tufnell.* London.
- Teissier, B.
 1984 *Ancient Near Eastern Cylinder Seals from the Marcopoli Collection.* London .
- Toueir, K.
 1978 *The Syrian Archaeological Expedition to Tell al 'Abd Zrejehey: Clay Figurines of the Third Millennium BC.* Malibu.
- Tubb, J.N., Dorrell, P.G. and Cossing, F.J.
 1997 Interim Report on the Ninth Season (1996) of Excavations at Tell es-Saidiyeh, Jordan'. *PEQ* 129: 54-77.
- Tufnell, O.
 1953 *Lachish III. The Iron Age.* Oxford.
 1958 *Lachish IV. The Bronze Age.* Oxford.
 1984 *Studies on Scarab Seals II.* London.
 1978 Graves at Tell el-Yehudiyeh - Reviewed after a Lifetime. Pp. 76-101 in R. Moorey and P. Parr (eds), *Archaeology in the Levant. Essays for Kathleen Kenyon.* Oxford.
- Walmsley, A.G. et al.
 1993 Preliminary Report on the University of Sydney's Eleventh and Twelfth Season of Excavation at Pella in Jordan. *ADAJ* 37: 165-240.

Watson, P.M. and Tidmarsh, J.C.

1996 Pella/Tall al-Ḥuṣn Excavations 1993: The University of Sydney's 15th Season.
ADAJ 40: 293-314.

Watzinger, C.

1929 *Tell el-Mutesellim* 2. Leipzig.

Yadin, Y., Aharoni, Y., Amiran, R., Dunayevsky, I. and Perrot, J.

1958 *Hazor I*. Jerusalem.

1960 *Hazor II*. Jerusalem.

1961 *Hazor III-IV*. The Plates. Jerusalem.

Yadin, Y., Aharoni, Y., Amiran, R., Dunayevsky, I., Perrot, J. and Ben-Tor, A.

1989 *Hazor III-IV*. The Text. Jerusalem.



**TALL ABŪ AL-KHARAZ
THE SWEDISH JORDAN EXPEDITION 1997
EIGHTH SEASON PRELIMINARY EXCAVATION REPORT**

by

Peter M. Fischer

Preface

Excavations, directed by the author, were carried out at Tall Abū al-Kharaz, north of Wādī al-Yābis and about 4 km east of the River Jordan, from 11 April - 14 May 1997. The team members were Hikmat Ta'ani, the representative of the Department of Antiquities, Irbid office, who also acted as trench master of Trenches XXXIVB and XXXIXD, and foreman in the field. Other trench masters were Anna Ekström, University of Lund (Trenches XXXIVA, XXXVII and XXXVIII A), Salameh Faiad, Irbid Department of Antiquities ("The White Building" and Trench XXXIXB), and Stina Orsenmark, Monika Stolfer (Trenches XXXIVD and XXXIXA) and Anica Tanevska (Trenches XXXIVC, XXXVIII B and XXXIXC), all from Göteborg University. The expedition's architect was Muwafaq al-Bataineh, the draughtsperson Lamia Khoury and the photographer Hussein Debajeh, all from Yarmouk University. The team was further supported by twenty-five skilled workers from Pella and al-Mashār'a.

RESULTS OF THE EIGHTH SEASON

The objectives were (for the location of areas and trenches, see Fig. 1):

1. Further excavation of Area 2 in the western part of the upper plateau, where excavations had been performed from 1989 until 1993, in order to expose more of the defence systems of the Early and Late Bronze Age.
2. Further excavation of Area 7 in the northern part of the tall, partly excavated in 1993 and 1994, in order to investigate do-

mestic architecture.

3. Complete excavation of the "White Building", which had been discovered on the top of the tall the year before.

Information concerning excavation and sampling techniques, and electronic support, may be found in the preliminary reports previously published in *ADAJ* (Fischer 1991 and 1993-97). In the description below, the results from colluvial soil are presented area by area, and period by period.

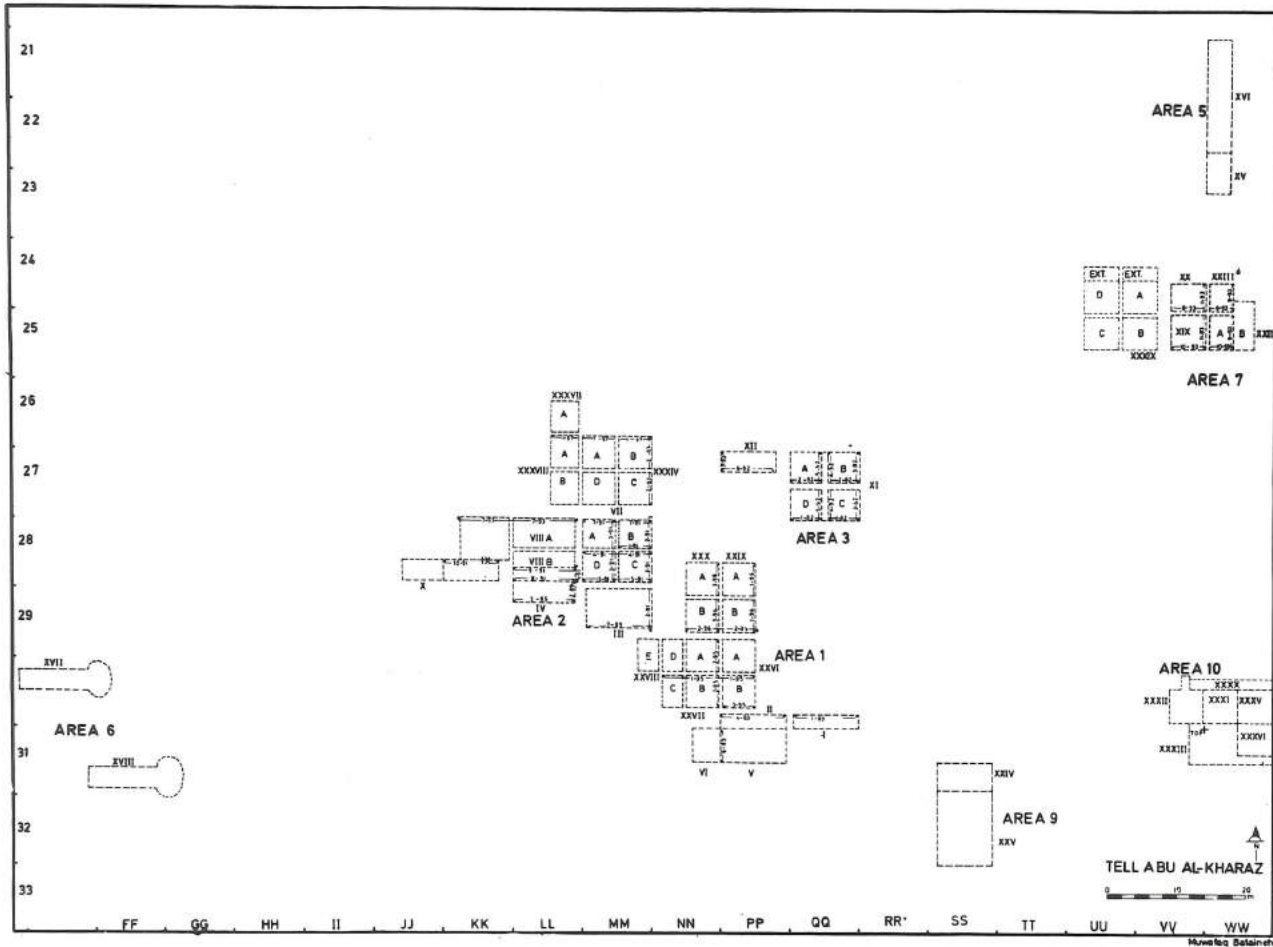
Area 2: Trenches XXXIVA-D, XXXVII and XXXVIII A and B

The trenches, which cover 160 m², are within the Grids LL/MM 26/27 (see the grid system in Fischer 1991). The co-ordinates of the centre of Trench XXXIV, that is, the middle of the crossing baulks separating sub-trenches A-D, correspond to E 206.104 and N 200.660 ± 1 m according to the Palestine Grid co-ordinate system.

This part of the tall slopes downwards from east to west approximately 2 m in 10 m, and from south to north approximately 1 m in 10 m, except for the extreme north-west part of the excavation area, which falls steeply to the north-west.

Colluvial soil

The colluvial soil is 10-30 cm deep. Stones belonging to walls which originate from the Iron Age and post-Iron Age periods are visible on the surface. The pottery is a mixture of all the periods found at Tall Abū al-Kharaz: post-Iron Age (mainly Abbasid, but also Roman and Byzantine), Iron Age, Late Bronze Age and Early Bronze Age periods are represented.



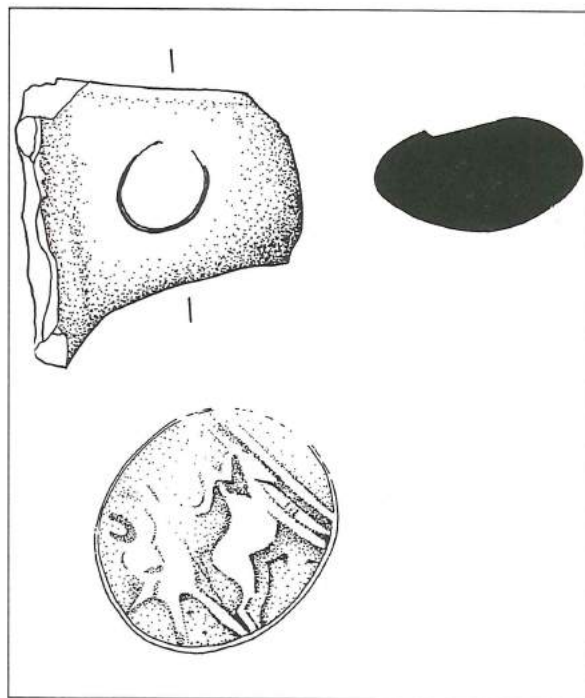
1. Tall Abū al-Kharaz 1989-97. Sketch of areas and trenches.

Iron Age and Post-Iron Age

Stratum 1A/1

The most recent architectural phase is only visible in the highest, south-eastern part of the area. It is represented by a wall, approximately 0.7-0.8 m wide (W 424) which runs north-north-east to south-south-west. Its direction corresponds to similar walls from the uppermost stratum which were found during earlier seasons (see e.g. Fisher 1997).

Most of the pottery from this stratum consists of late Iron Age types but there are other sherds mainly of Late Roman/Byzantine origin. A seal impression on the upper part of an Iron Age storage jar handle should be mentioned: it shows an animal flanked by one or two figures (Fig. 2). The preliminary date of this phase points to the late part of the Iron Age and a reuse of the



2. Iron Age storage jar handle with seal impression.

area during post-Iron Age periods.

Iron Age (see pottery forms in Fig. 4¹)

Stratum 1A

The dominating structure of this phase is a well-constructed cistern over 4 m deep (Fig. 3): it is oval, approximately 4 x 3 m, stone-built, sealed with clay between the stones, and carefully plastered. It could contain 30 cubic metres of water in its present state. The original water capacity may be estimated at about 50 cubic metres. The cistern was approached from the north-west by a path paved with stone and mud-brick, which ended in a 1 m wide step of hard clay leading up to the cistern. The cistern is surrounded by a stone pavement, which obviously represents part of a glacis.

A tentative date for this phase is the later part of the Iron Age, mainly based on specific pottery types, for example a complete Black Burnished Juglet inside the cistern (Fig. 4:7).

Strata 1B-1C/1

These previous two occupational phases reveal domestic architecture, which had been partly destroyed by the glacis constructed later.

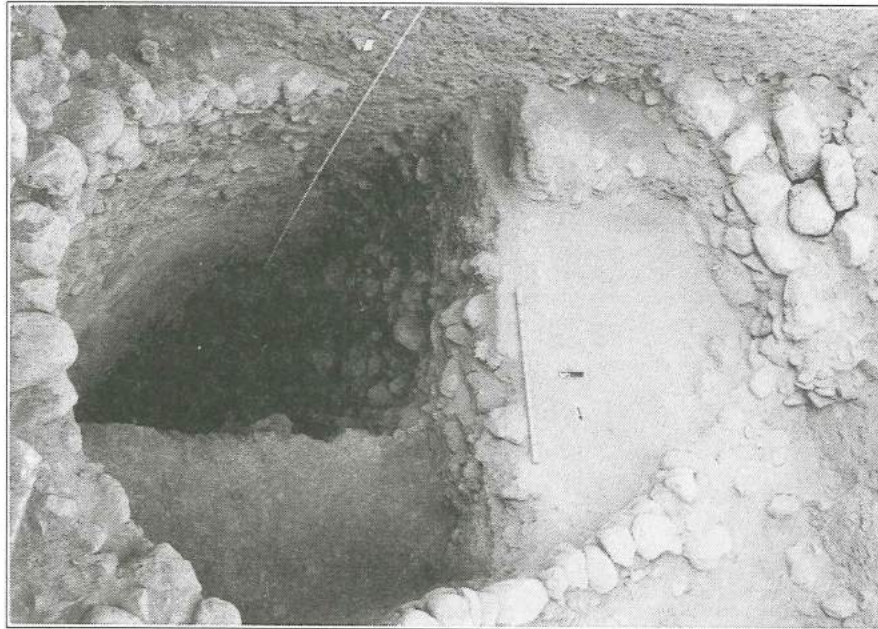
Strata 1C/2-1C/4

The domestic architecture of these three phases of occupation was originally built in the Late Bronze Age, reused during the Iron Age and later on used as a quarry for the glacis. Stone-paved rooms and passages were excavated.

Late Middle Bronze/Early Late Bronze Age (see pottery forms in Fig. 5)

Strata 2A-2C

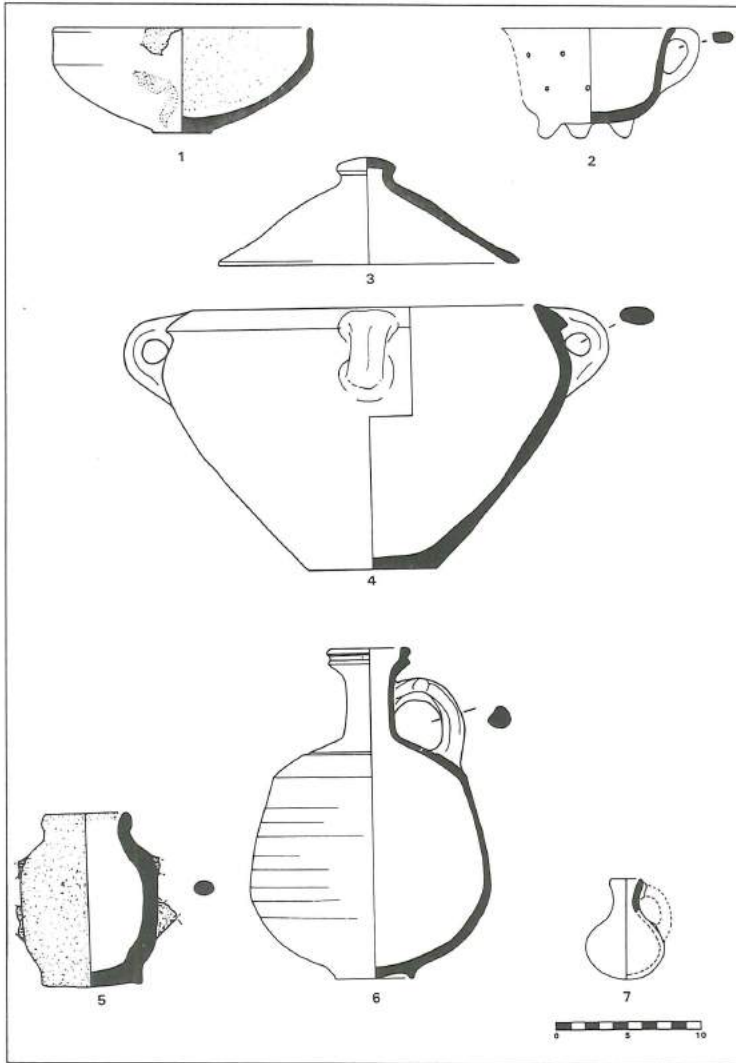
Three phases of occupation are represented. An impressive construction, 10 m x 10 m, with walls more than 1 m thick, on the inside of the 4.2 m wide city wall resembles a tower with stone-paved internal rooms (Fig. 6). This monumental construc-



3. Area 2. Iron Age cistern. Estimated original size: 50 cubic metres.

1. The following abbreviations have been used for the pottery descriptions: 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.



4. Iron Age II pottery.
 1. XXXIVB1L501-1, bowl, WM, S, light brown, fine with a few large inclusions, SS, red paint on rim and inside, red patches below rim on outside .
 2. XXXIVB1CL479-1, strainer, WM, H, reddish-brown clay, coarse, mainly grey inclusions, SS.
 3. XXXIVB1L464-1, lid, WM, H, dark grey, coarse, white inclusions, SS.
 4. XXXIXA1L125N1080, krater (four handles), WM, H, greyish-brown, light grey core, medium-coarse, mainly white inclusions, light brown slip.
 5. XXXIXA1L130N1083, juglet, WM, H, brown clay, fine, SS, red paint.
 6. XXXIXD1L129N1078, jug, WM, H, grey clay, brown core, medium-fine, mainly white inclusions, SS.
 7. XXXIVC1CL495N1056, juglet, HM, MH, brown clay, fine, thick black slip, burnished.

tion, including the city wall, is built on the remains from the Early Bronze Age, and was certainly also reused during the Iron Age. A foundation deposit was found just below the first course of the city wall and includes three approximately 16 cm long and 3 cm wide flint knives with trapezoid sections. It is interesting to notice that the three long knives have not been in use, which may suggest that they had been produced specifically as a foundation deposit. The smaller knife, of a similar shape but with traces of frequent use, was found close to the other knives. However, this could be a coincidence.

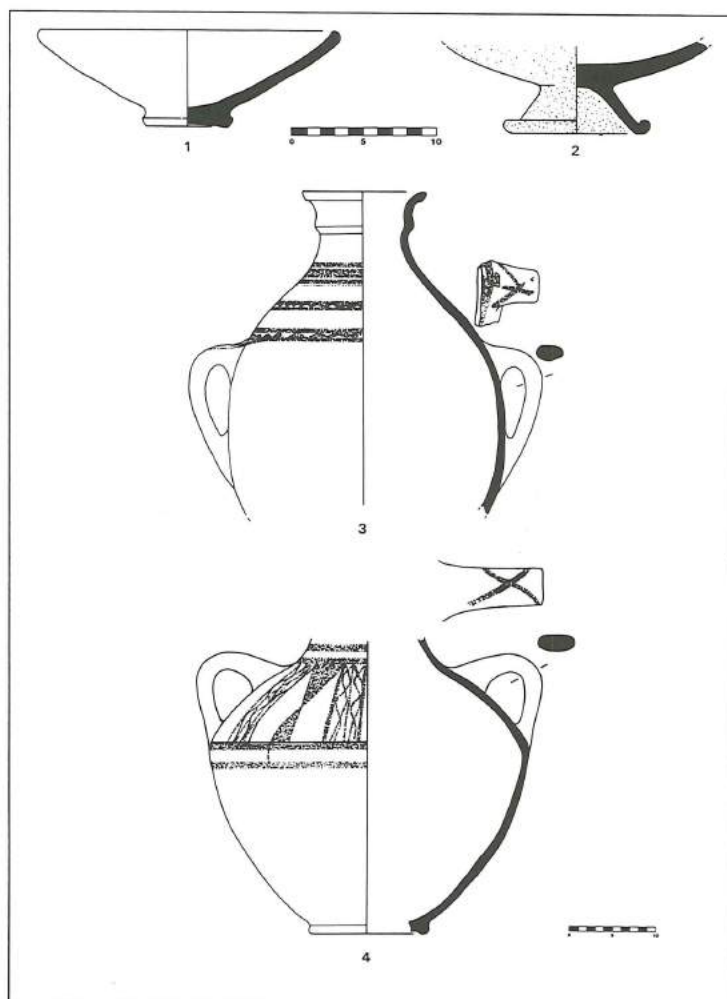
The pottery from this period includes Chocolate-on-White ware among other types.

Early Bronze Age (see pottery forms in Fig. 7)

Strata 3A-3C

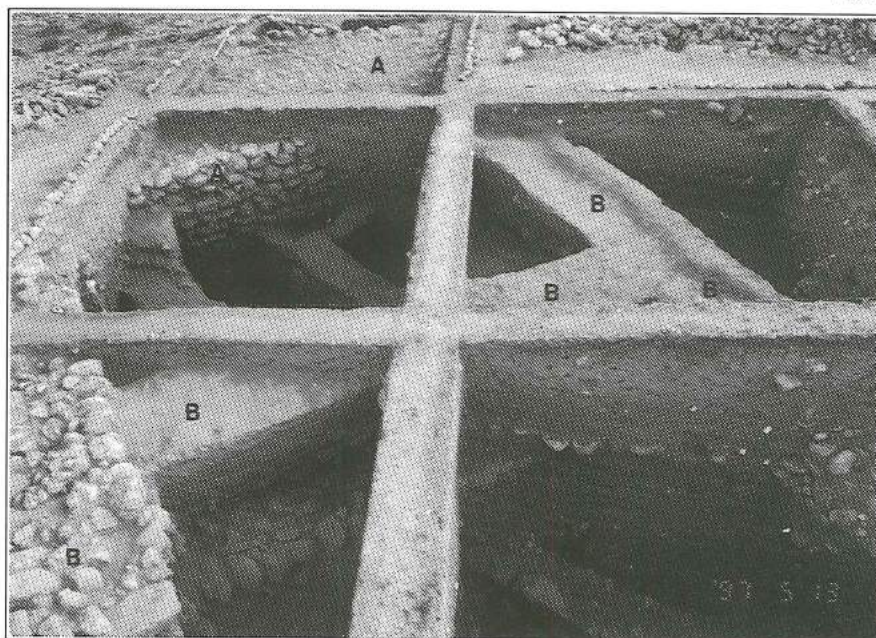
Three phases, which belong to the site's earliest occupation with architecture, were found (Fischer, in the press): Phase III (corresponds to Stratum 3A according to the relative sequence of the 1997 strata), Phase II (Stratum 3B) and Phase I (Stratum 3C). Phase III, which belongs to the transitional Early Bronze II/III period, is sparsely represented in this area, because of intensive building activities during later periods. The remains from Early Bronze Age II (Phase II) include bowls, platters and jugs of Metallic Burnished ware (see the previous reports in *ADAJ 35-41*).

Complementary information from Phase



5. Late Middle Bronze /Early Late Bronze Age pottery.

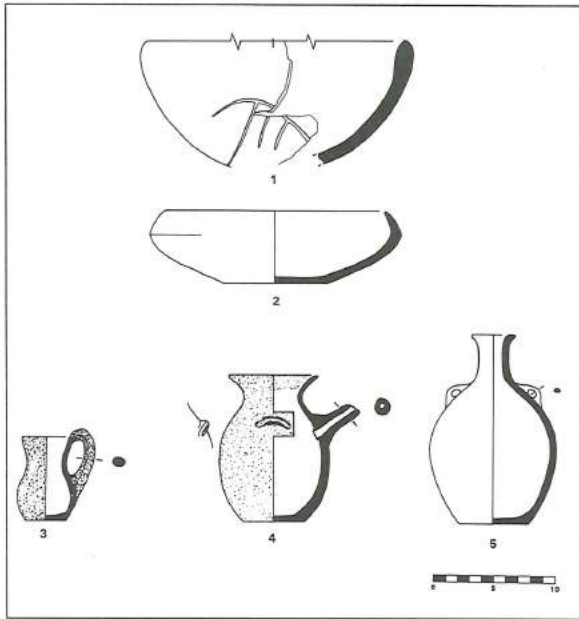
1. XXXIVD2L486-1, bowl, WM, MH, light brown, coarse, mainly grey inclusions, SS.
2. XXXIVA2L519-1, chalice, WM, H, yellowish-grey clay, light greyish-black core, yellowish-brown slip.
3. XXXIVC2L504N1053, jug, Chocolate-on-White, WM, H, greyish-yellow clay, light grey core, medium coarse, multi-coloured inclusions, burnished white slip, matt brown decoration.
4. XXXVIIIIB2L555-3, jug, WM, H, light red clay, light brown core, coarse, mainly white inclusions, burnished brownish-white slip, matt brown decoration.



6. Area 2. Late Middle Bronze/ Early Late Bronze Age city wall (A; approx. width 4.2 m with attached architecture of a possible tower (B; approx. widths of walls 1.2 m).

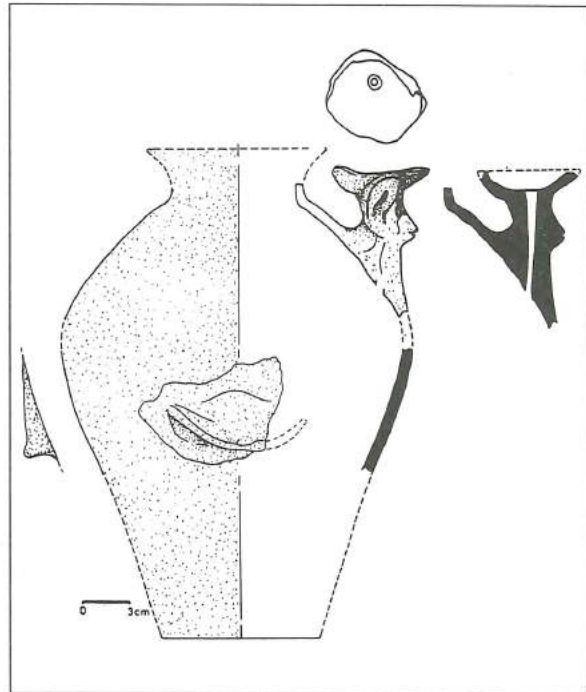
I, the second part of the Early Bronze Age I and the beginning of Early Bronze Age II, was obtained. A thick destruction layer

created fortunate find circumstances, sealing the entire remains of an Early Bronze Age IB house. This was the first evidence



7. Early Bronze Age pottery.

1. XXXVIII B3L568, bowl (?), HM, S, reddish-brown clay, coarse, multicoloured inclusions, "Grain Wash Ware", incised decoration.
2. XXXIV B3L572N1072, platter-bowl, mould-made, H, light red clay, medium-coarse, mainly white inclusions, greenish-grey slip on inside and pinkish-brown on outside, hand-burnished outside.
3. XXXIV B3L565N1977, juglet, HM, M, brown clay, grey core, medium-coarse, mainly white inclusions, red slip, burnished.
4. XXXIV B3L573N1071, spouted juglet, WM, MH, light brown clay, fine, red slip.



8. Early Bronze Age storage jar with a 'spout' in the shape of an animal (bat?) and a ledge handle, HM, H, light brown clay, medium-fine, SS; traces of soot on "rim" of pillar handle.



9. Early Bronze Age basket filled with grain.

of a catastrophe, local or regional, during the first phase of occupation at the site. Parts of a rectangular house with an almost undisturbed interior were exposed. It contained a variety of complete household objects, among them platters, jugs and juglets, including one with a wide mouth, a tiny spout and ledge handles, and storage jars, some of which still contained grain. One unusual find is a jar with a pillar-like 'spout': the pillar is modelled to depict a head, which shows human and animal traits resembling a bat with large ears (Fig. 8). In one room were the quite well-preserved remains of a basket plaited of organic fibres (Fig. 9); it had a rope-like handle and contained grain and a wooden spoon. A cylindrical jar, the second vessel of its kind at

the site, represents an Egyptian import from the Naqada IIIb/c culture.

Fourteen recently obtained high-precision calibrated radiocarbon datings, were synchronized with the ceramic sequence of both locally produced vessels, that is, within the northern Jordan Valley, and imported wares (Tables 1 and 2). Most Early Bronze Age vessel types were petrographically analyzed (for a thorough discussion of Early

Table 1. Tall Abū al-Kharaz, Early Bronze Age. Calibrated dates BC, phase by phase: age ranges and probability factors in brackets.

Phase I	
OxA-4334	
1σ: 3296(0.08)3275 3270(0.13)3238 3105(0.44)3014 3000(0.35)2923	
2σ: 3335(0.36)3153 3140(0.64)2916	
OxA-4335	
1σ: 3095(1.00)2919	
2σ: 3332(0.17)3221 3192(0.04)3155 3136(0.78)2890	
OxA-4336	
1σ: 3353(0.29)3293 3280(0.05)3266 3239(0.66)3103	
2σ: 3499(0.04)3455 3379(0.93)3028 2976(0.03)2930	
OxA-5094	
1σ: 3096(0.25)3057 3046(0.19)3016 3004(0.55)2924	
2σ: 3307(0.14)3235 3179(0.02)3162 3134(0.84)2916	
OxA-5095	
1σ: 3304(0.31)3237 3178(0.06)3163 3132(0.04)3122 3108(0.39)3030 2981(0.20)2932	
2σ: 3336(0.31)3220 3191(0.69)2923	
OxA-5096	
1σ: 3033(0.71)2953 2944(0.29)2910	
2σ: 3264(0.01)3245 3101(0.96)2880 2799(0.02)2781	

Bronze Age pottery shapes, petrography, radiocarbon dates and synchronism, see Fischer, in the press). Imports came from Egypt, the Judean Mountains and the Upper Galilee. The wares include Egyptian cylindrical jars, Early and Mature Metallic Burnished wares together with comb-decorated storage jars from the Upper Galilee, locally produced Light-Faced Painted juglets, Grain Wash and Band Slip decorated jars, pattern burnished vessels, and inverted conical cups. The latter type may be an import. This synchronization gave the duration of the three earliest occupational phases at the site, Phases I-III, and their position within the Palestinian and Egyptian chronological framework (Table 3).

Area 7. Trenches XXXIXA-D; Grids UU24/25

In 1993 an Iron Age II house with four

rooms surrounding a courtyard was found in this almost flat area (Fischer 1995:100-102). It lies approximately 50 m north of the summit of the tall. The area was extended to the east in 1994. A new trench, approximately 100 m² large, was opened to the west of the previous excavations. The centre of the new trench, that is the middle of the crossing baulks separating sub-trenches A-D, corresponds to E 206 183.5 and N 200 683.5 ± 1 m.

Iron Age and Post-Iron Age

Stratum IA/I

One long wall, which runs east-west along the northern edge of the upper plateau, and another quite disturbed wall 10 m to the south belong to the scanty remains of the uppermost stratum.

The majority of the pottery from this most recent phase of occupation consists of late

Table 2. Tall Abū al-Kharaz, Early Bronze Age. Calibrated dates BC, phase by phase: age ranges and probability factors in brackets.

Phase II			
OxA-4331			
1σ:	3300(0.28)3235	3178(0.04)3165	3108(0.42)3022 2988(0.26)2926
2σ:	3335(0.39)3153	3140(0.61)2920	
OxA-4332			
1σ:	3500(0.23)3453	3436(0.02)3430	3379(0.38)3306 3231(0.19)3184 3161(0.18)3115
2σ:	3613(0.01)3600	3514(.99)3096	
OxA-4333			
1σ:	3036(1.00)2907		
2σ:	3299(0.05)3236	3176(0.01)3166	3107(0.94)2876
OxA-5091			
1σ:	3097(0.23)3056	3047(0.77)2921	
2σ:	3323(0.15)3232	3182(0.03)3159	3138(0.82)2910
OxA-5092			
1σ:	3015(0.06)3004	2923(0.60)2875	2802(0.26)2778 2716(0.08)2705
2σ:	3034(0.64)2863	2812(0.25)2742	2726(0.09)2697 2679(0.02)2664
OxA-5093			
1σ:	3312(0.36)3233	3181(0.08)3161	3137(0.46)3033 2963(0.10)2936
2σ:	3339(0.35)3211	3200(0.49)3020	3000(0.16)2925
Phase III			
OxA-4329			
1σ:	3331(0.47)3224	3190(0.14)3156	3133(0.24)3074 3070(0.14)3037
2σ:	3346(0.89)3020	2991(0.11)2925	
OxA-4330			
1σ:	3297(0.25)3237	3173(0.01)3170	3106(0.44)3020 2992(0.30)2925
2σ:	3335(0.28)3211	3201(0.09)3153	3139(0.64)2920

Table 3. The proposed Early Bronze Age chronology of Tall Abū al-Kharaz .

Occupation	Chronology		
	Absolute	Palestine	Egypt
Phase I	3200-3100 BC	EB IB, later part	Later part of Dynasty "0"
Phase II	3100-2850 BC	EB II	Dynasty 1- 1st half of Dynasty 2
Phase III	2850-2775 BC	EB II/III trans.	Dynasty 2

Iron Age shapes but there are also Abbasid sherds, among them a Cream Ware jug with a "turban" handle (Fischer 1995:116-117). The preliminary date of this phase points to the late part of the Iron Age and a reuse of

the area during post-Iron Age periods.

Iron Age
Stratum IA

The well-preserved remains of a four-

roomed house were exposed. The house is almost square and measures 8 x 8 m (cf. the 9 x 9 m large house to the east); it is built close to the northern edge of the plateau. There are two rooms in the west, one in the north-east, and another one, which is stone paved, in the south-east. The latter has no wall separating it from the central courtyard: there may have been wooden pillars towards the courtyard. Two ovens were found in the courtyard. Numerous household and daily life objects were found inside the house: clay vessels comprise bowls, jugs and juglets, kraters, cooking pots and storage jars; other objects are loom weights of unfired clay, iron arrow heads, and tools of stone and bone. A sewer of clay was found attached to the southern wall of the house. Two objects were found to the south close to the house, a knife and a rhyton. The knife has a bone (or ivory) handle and an iron blade, which is attached to the handle with bronze rivets. The almost complete ceramic rhyton is unique at the site and shows an animal (donkey?) with two attached vessels (Fig. 10). The animal has a detailed modelled bridle. The hollow trunk is connected with the two vessels and the hole in the animal's muzzle. One may suggest that this kind of vessel was used in cultic activities.

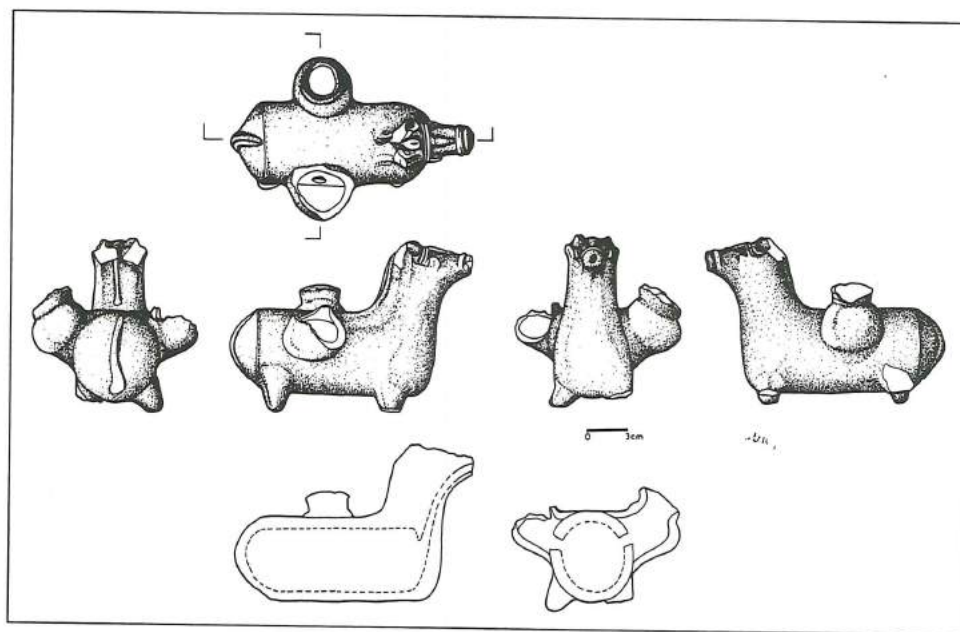
Further excavations to the south (to the summit) and west may perhaps reveal a religious building.

Area 10: The White Building (Trenches XXXI-III, and XXXV-XXXVI; Grids WW30/31 (Fig. 11)

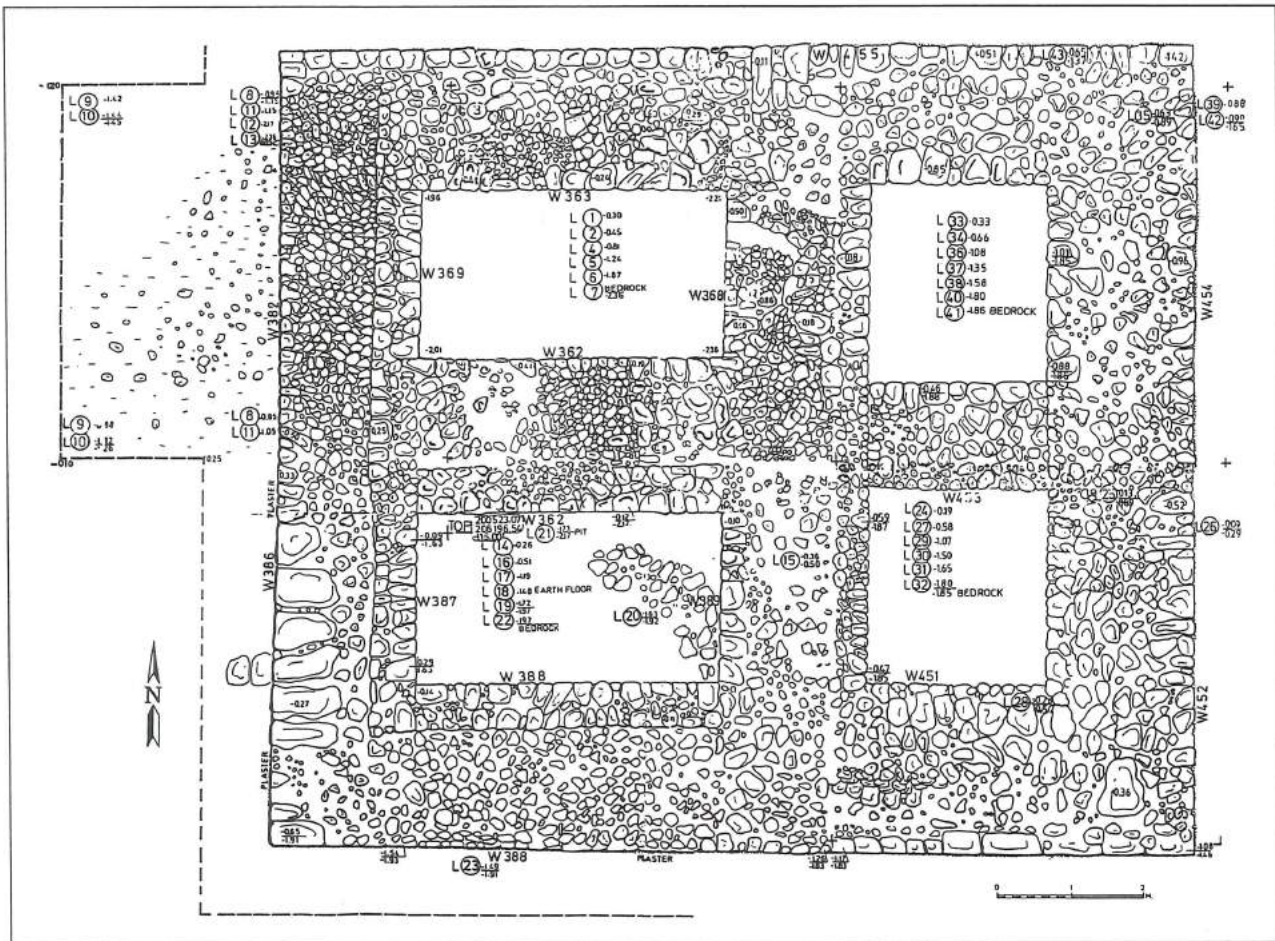
The excavations of this building on the flat summit of the Tall started in 1996 (Trenches XXXI-III) and were extended 5 m to the east during the 1997 season. Two more rooms and the eastern façade were exposed. The building is rectangular, 10.60 mx11.70 m. The axes of the building are oriented strictly north-south and east-west. The building is partly constructed of ashlar blocks of stone. It is covered on the outside with fairly well-preserved white plaster of lime and sand.

The two new eastern rooms are identical in size and measure 2.30 x 2.65 m. The building may represent a fortress. It may also be part of a larger complex, because further architectural remains could be traced to the east and south.

An Iron Age date was suggested for the building in the previous report. This dating was mainly based on the pottery and the Aramaic ostrakon, which was found in 1996. The pottery from inside the new



10. Iron Age rhyton, WM/HM, MH, brown clay, brownish-grey core, medium-coarse, mainly black inclusions, light brown slip, red paint.



11. "The White Building" of Tall Abū al-Kharaz.

rooms does not contradict a date within the later part of the Iron Age.

Acknowledgements

I would like to express my great gratitude to TRH Prince Raad Zeid and Princess Majda Raad Zeid for their interest in and support of *SwedJordEx*. I am also grateful for the generous assistance of the Department of Antiquities and its Director-General, Dr Ghazi Bisheh, which included the loan of one of the Department's vehicles vital for the excavations to be carried out successfully. I am, in addition, indebted to Prof. Dr Zeidan Kafafi and the administration of the Yarmouk University for permission to employ members of the archaeological institute staff, and to Prof. Em. Basil Hennessy and Dr Stephen Bourke for

permission to rent the Pella Dig House. I also would like to thank Drs Patricia and Pierre Bikai at ACOR for their hospitality. Finally I wish to thank all members of the team for their sincere interest and hard work, which greatly contributed to the successful execution of the excavations.

Financial support was given by The Royal Academy of Letters, History and Antiquities, Stockholm, Sweden, and the private company Polylys Com.

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Bibliography (selected)

Fischer, P.M.

- 1991 Tell Abu al-Kharaz. The Swedish Jordan Expedition 1989. First Season Preliminary Report from Trial Soundings. *ADAJ* 35:67-104.
- 1993 Tell Abu al-Kharaz. The Swedish Jordan Expedition 1991. Second Season Preliminary Excavation Report. *ADAJ* 37: 279-306.
- 1994 Tell Abū al-Kharaz. The Swedish Jordan Expedition 1992. Third Season Preliminary Excavation Report. *ADAJ* 38: 127-145.
- 1995 Tall Abū al-Kharaz. The Swedish Jordan Expedition 1993. Fourth Season Preliminary Excavation Report. *ADAJ* 39: 93-119.
- 1996 Tall Abū al-Kharaz. The Swedish Jordan Expedition 1994. Fifth Season Preliminary Excavation Report. *ADAJ* 40: 101-110.
- 1997 Tall Abū al-Kharaz. The Swedish Jordan Expedition 1995 and 1996. Sixth and Seventh Seasons Preliminary Excavation Report. *ADAJ* 41.
- in press *The Early Bronze Age at Tell Abu al-Kharaz, Jordan Valley: A Study of Pottery Typology and Provenance, Radiocarbon Dates, and Synchronism*. Sheffield Academic Press.

Wentworth, C.K.

- 1922 A Scale of Grade and Class Terms for Clastic Sediments, *Journal of Geology* 30: 377-392.
- 1933 Fundamental Limits to the Sizes of Clastic Grains, *Science* 77: 633-634.



FROM EDMITE TO LATE ISLAMIC: JABAL AŞ-ŞUFFĀḤA NORTH OF PETRA

by

Manfred Lindner, Ernst A. Knauf, Ulrich Hübner and Johannes Hübl

Introduction

The archaeological potential of the Jabal aş-Şuffāḥa region only c. 15 km north of Petra had previously been overlooked due to its limited accessibility (Fig. 1). The surveys carried out by teams of the Naturhistorische Gesellschaft Nürnberg (NHG), directed by M. Lindner in 1994, 1995, 1996 and 1997 used a combination of landrover, pick-up truck, donkey, hiking and climbing at all times assisted by the friendly al-‘Amārīn families.¹

The Routes to Jabal aş-Şuffāḥa

The routes to Jabal aş-Şuffāḥa are ancient and coming from Petra, Nabataean-Roman relics abound around al-Bayḍā, Siq Umm al-Ḥirān, the Jabu plain and the al-Ba‘ja range (Lindner 1986: 112-130). Opposite Siq Umm al-‘Alda, on a natural hill and dominating the surrounding plain, a Nabataean farmstead has a rock-cut wine press with an unusually sophisticated must-shaft (Fig. 2). On the way from the al-‘Amārīn Housing Project at ‘Atnūb, no less than seven such installations were noted. In antiquity the sun-heated sandstone rock was used to transmute the must of freshly trodden grapes into an alcohol-rich wine.² The region north of Petra was apparently producing the wine for the whole of Greater Petra. Umm al-‘Alda, as the area is called locally, is crowded with tumbled ruins of houses and walls, graves, surface pottery

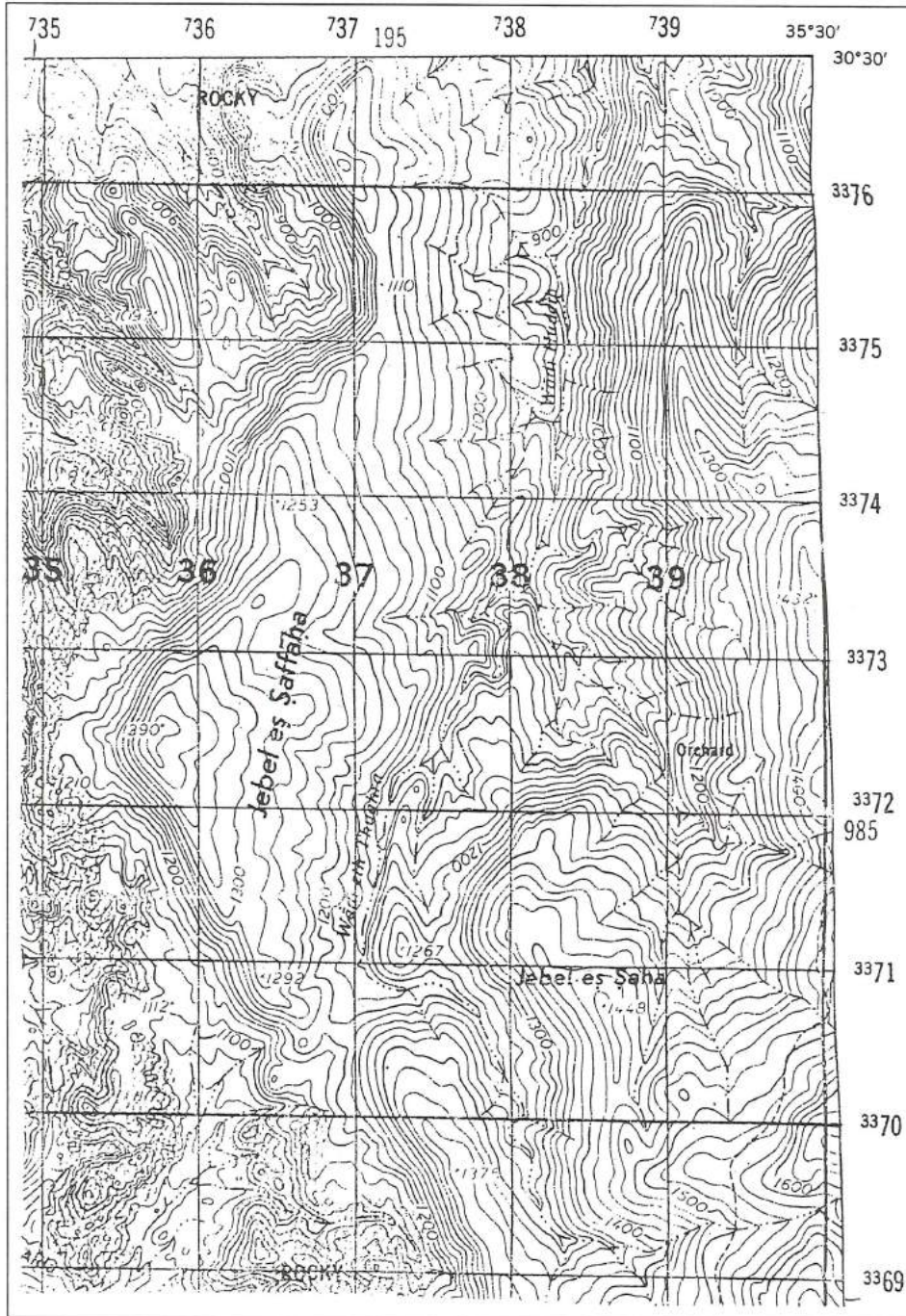
and a typical Nabataean troglodyte house where a rock-cut staircase runs up to a “roof” (Fig. 3). Looking down, another wine press appears, which cannot be seen from the valley behind (Fig. 4). Nabataean, Late Roman, Byzantine and Late Islamic sherd scatters mark the main phases of occupation.

Below and in plain sight of the ridge of Jabal aş-Şuffāḥa, a camp was installed in 1994. The area proved to have been settled. Big juniper trees (*Juniperus phoenicea*) indicate a large catchment area where there may be cisterns. Houses were built against rows of rock faces. Two abutments belonged either to a cistern or a house. Small channels along rocks diverted and conducted water. The access to Wādī Nemala is dominated by a 6 x 6 m structure of finely dressed ashlar and a few steps. The presence of Nabataean fine ware may indicate that the installation was of a cultic nature. The sandstone area is quite different from the Cretaceous ridge of Jabal aş-Şuffāḥa rising from the plateau where it geologically belongs.

Another survey of Jabal aş-Şuffāḥa followed a bedouin track from Umm al-‘Alda which may have been an ancient route from Wādī Mūsā to ash-Shawbak. The *wusum* engraved in a white sandstone boulder heralded at some time the border between the ash-Shawbaki tribes and the people of the Greater Petra area (Fig. 5).

1. During one survey the NHG group was accompanied by the representatives of the Department of Antiquities, Suleiman Farajat and Hani Fallahat, who also supported the surveys in other respects.
2. Wolfgang Graf zu Castell-Castell has to be thanked for the suggestions that making wine in

the heated stone presses did not take long. The wine would have been rather rich in alcohol but not too flowery. The must shaft had to be partly covered and animal skins were not useful for being filled with fresh wine. The lack of vessel fragments by the wine presses poses a problem yet to be solved.

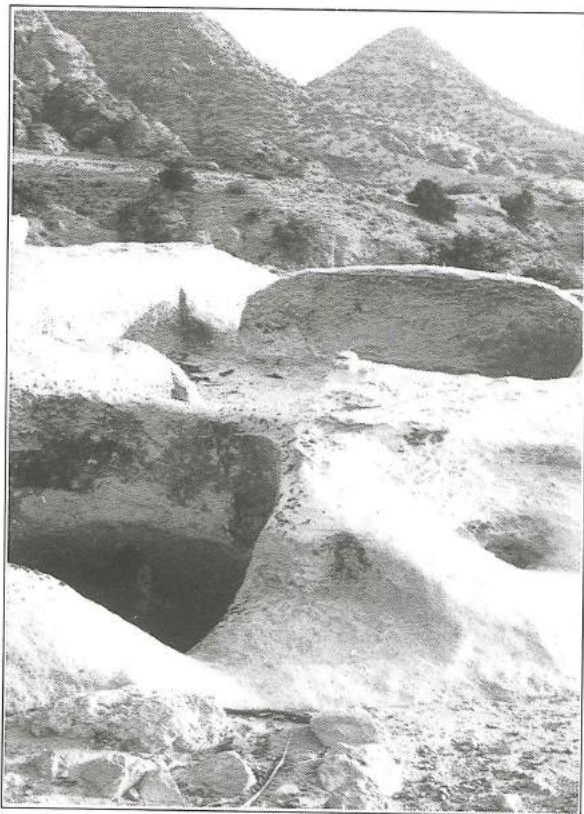


1. Jabal as-Şuffāha. Map of Palestine 1:50 000

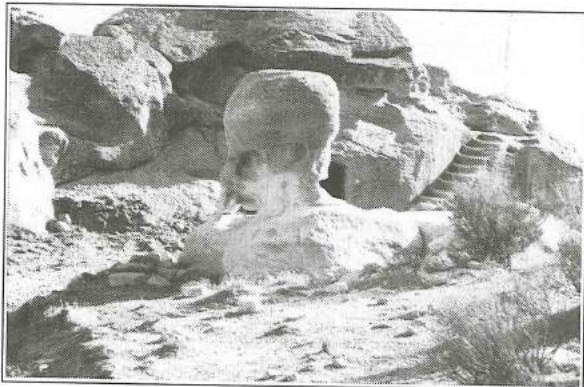
Driving up to the mountain as close as possible, the shortest, if not most convenient access is beside a steep terraced wadi to the east of the ridge.

This ridge consists of different kinds of hard Cretaceous limestone. In its upper part, the mountainside drops steeply toward the west and gently toward the east. The sloping plateau is covered with heaps of piled stones, terrace walls and field boundaries.

Most standing stones are not of a cultic or sepulchral significance but the remains of stone and brushwood fences. They are found all over the level areas of Jabal as-Şuffāha outside the settlements. Few house ruins of an average of 5 x 5 m and stone pens of large boulders (one of 10 x 5 m, another of 9 x 9 m) seem to be the remains of installations for animals as well as agriculture and horticulture. A thin scatter of



2. Wine press at Umm al-'Alda.



3. Nabataean hamlet with staircase to roof.

Iron II sherds beside Nabataean, Roman and Byzantine sherds may be collected from the surface.

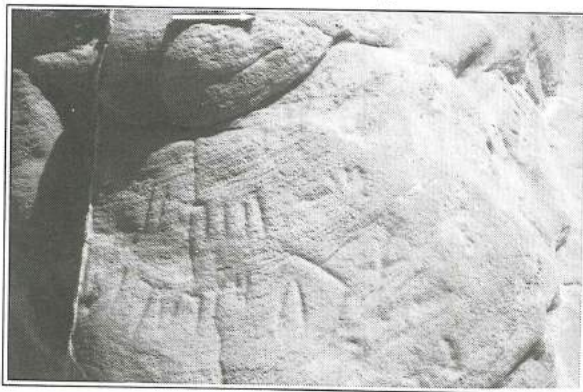
An Islamic Sanctuary

The highest point of the mountain (1390 m) is marked by an open sanctuary of ash-Shaykh Ahwar with a courtyard of 7.5 x 11

3. How the settlements of Jabal aş-Şuffāḥa should be called, depends of course, on what they actually were. The sizes are reminiscent of villages or "estates". And we do not know whether they were agricultural centres. Nor do we know anything about



4. Wine press behind cave dwelling.



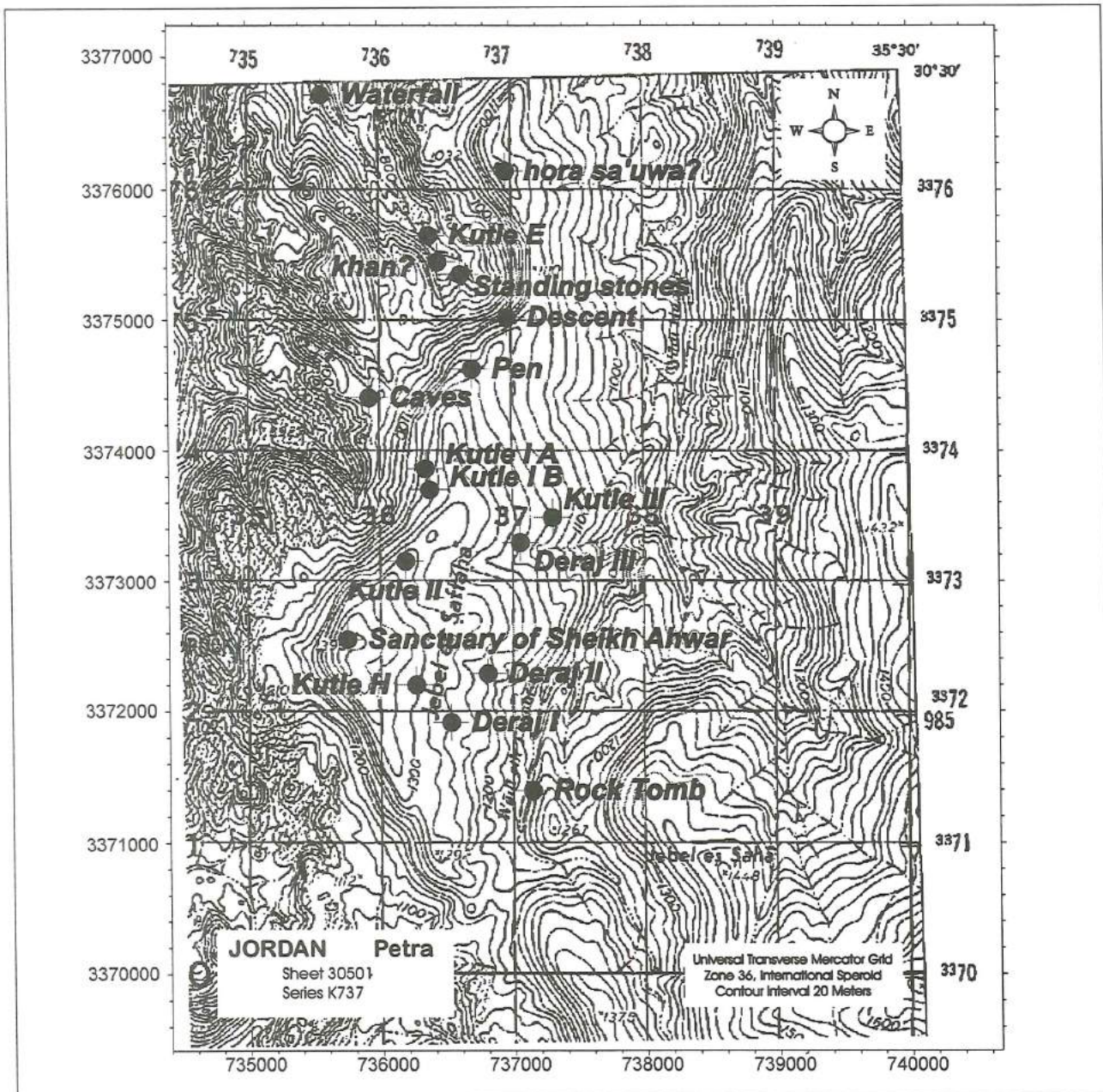
5. *Wussum* by the footpath to Jabal aş-Şuffāḥa.

m and a *miḥrāb* directed toward Mecca. At some time in the recent past the modest structure was repaired. According to Musil (1908: 58) the grave of 'Abdallah, ancestor of the 'Amrani ('Amārīn) was venerated in a similar manner, and visitors left small gifts there. The holiness of this prominent place may go further back in time: Iron II, Roman-Nabataean and Late Islamic sherds were collected at the spot.

The Settlements of Jabal aş-Şuffāḥa (Figs. 6 and 7)

Further down to the north, east and south, are ruins of settlements of the size of small villages, farmsteads or "estates" built, at different times, on rocky outcrops with stone and surrounded by many massive terraces and cultivable fields.³

the inhabitants. Were they families of one tribe or did land owners, leaseholders or tenants live there with their families and slaves and does one have to imagine different set-ups for different periods?



6. Map (1:50 000) with locations of settlements and other sites (J. Hübl).

Kutle II - An Edomite Settlement⁴

To the north-east of ash-Shaykh Ahwar's *weli*, directly at the eastern side of the aš-Şuffāḥa ridge, a ruined settlement of considerably large ashlars at 1290 m was first noticed in 1994. Due to its size and the mass of cut stones in the ruin field, it was difficult

to detect the ground plan. Kutle II, as it was called by the NHG team, was photographed from the air (Fig. 8), visited a second time, and properly surveyed by GPS in 1995 (Fig. 9). The houses, walls and terraces were destroyed by earthquakes and natural deterioration, once the roofs were caved in.

4. The settlements' names originated from two sites, i.e. Deraj I, where steps or terraces recommended the name for local bedouins, and from Kutle I, with the previously known name of 'Ayn Kutle. Sites later discovered offered no opportunity for

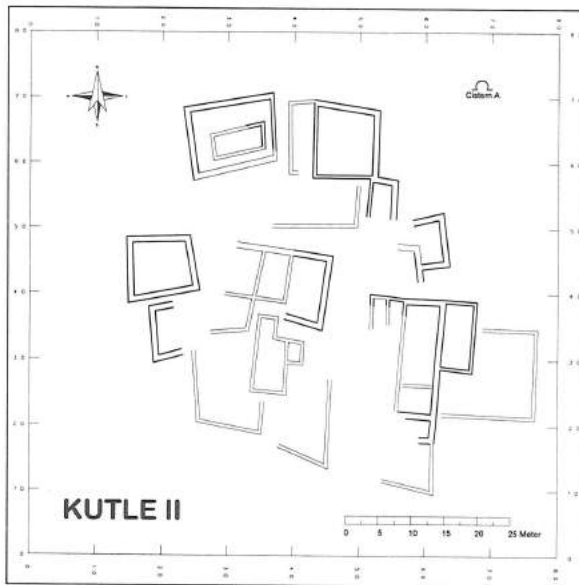
new names, except numbers and letters. Unfortunately, the names could not be changed or adapted to the phases or periods later, because they were already reported to the Department of Antiquities and in the Annual of NHG.

Locality	Easting [m]	Northing [m]	Elevation asl [m]
Kutle II	736191	3373154	1290
Kutle III	737307	3373486	1150
Kutle I A	736345	3373863	1190
Kutle I B	736375	3373700	1200
Descent	736970	3375020	1090
Standing stones	736617	3375350	880
khan ?	736445	3375448	860
Kutle E	736379	3375650	860
Waterfall	735573	3376717	710
Caves	735925	3374410	1030
pen	736700	3374625	1160
hora sa'uwa	736965	3376140	1170
Deraj III	737062	3373295	1180
Kutle H	736266	3372202	1300
Deraj I	736527	3371915	1260
Deraj II	736807	3372286	1230
Rock Tumb	737143	3371395	1170
Sanctuary of Sheikh Ahwar	735750	3372550	1390

7. List of coordinates of Jabal aş-Şuffāha sites 1995/97 (J. Hübl).



8. Iron II (Edomite) Kutle II from the air.

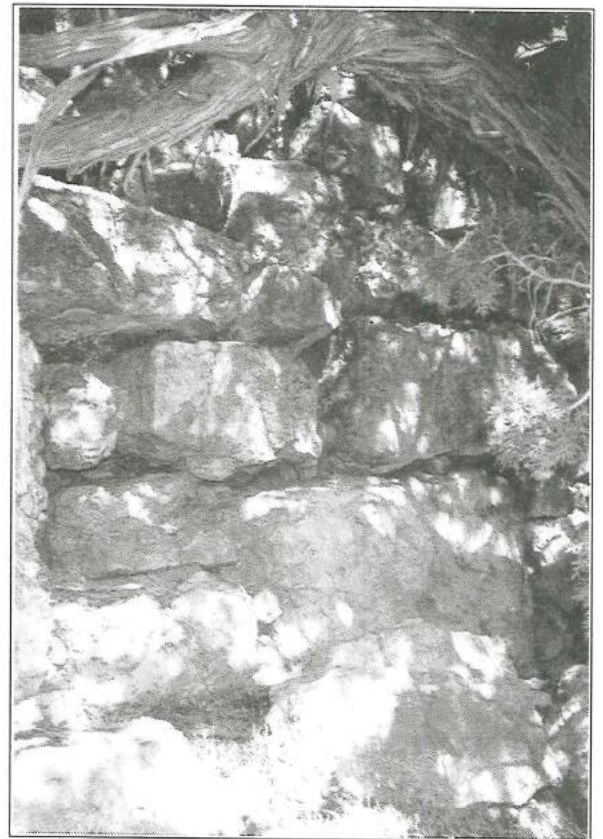


9. Plan of Kutle II.

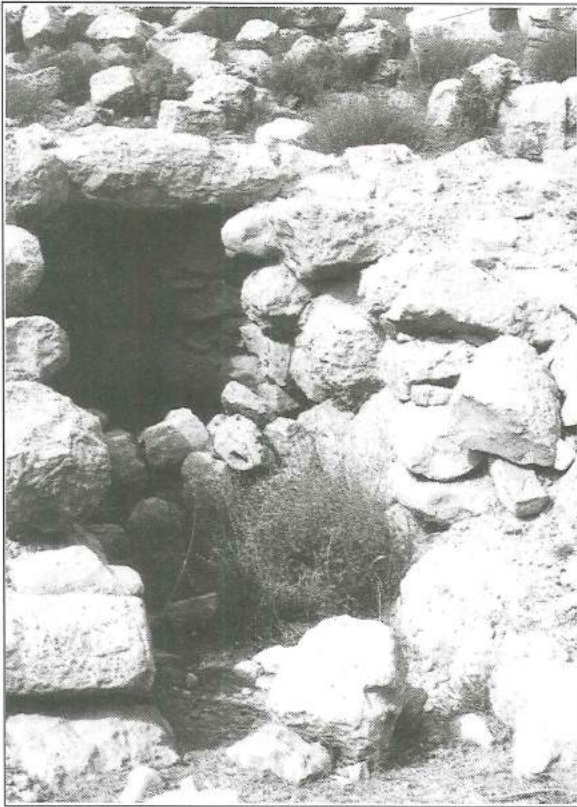
Stone-robbing from villages located further down the slope has to be considered. Still, walls up to 2.50 m are still standing, and

many walls seem to be in their original state (Fig. 10). On the whole, Kutle II was a compound of 6 or 8 square houses on terraces, extending over c. 50 x 50 m with partly double massive walls built in the header-stretcher technique using roughly worked limestone ashlars. Three terrace walls border its lower (eastern) side.

There was no spring at Kutle II. Although 'Ayn Kutle is, at least nowadays, visible from here, the inhabitants for some reason or other relied on cave cisterns. Cistern A at the north-east corner is entered by a small "dromos". The interior is 5 m long and 3 m high. Cistern B, located in the southern part of the settlement at about the same elevation, is 6.5 m long and 1.6 m high. Both cisterns are fortified with inserted stones and were at some time entirely plastered. Two other cisterns were built in the same way (Fig. 11). All of them were filled from the surface run-off and possibly from cracks in the limestone. Two frag-



10. Original wall of Kutle II.

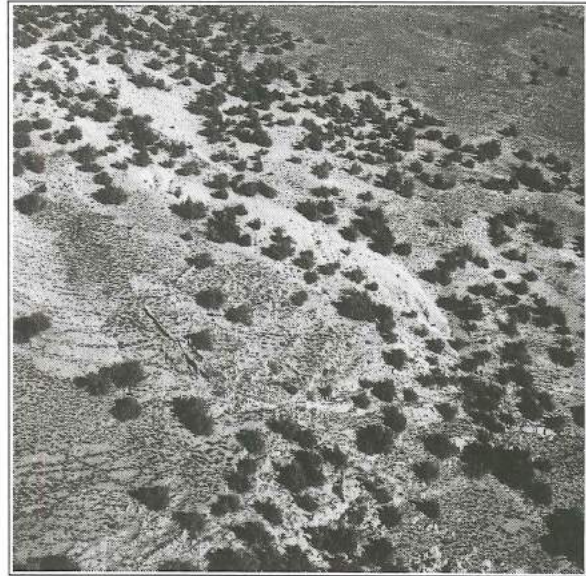


11. Cave cisterns of Kutle II.

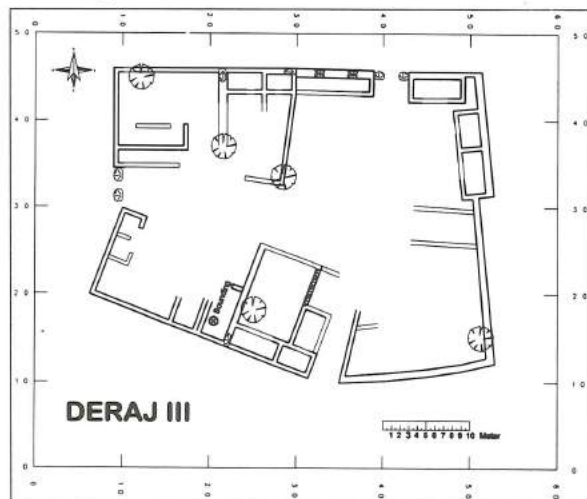
ments of millstones but no architectural pieces were noted. The most striking discovery was the high percentage of Iron IIC pottery fragments. The past of Kutle II is represented by the distribution of surface wares: 53 Iron II, 1 Nabataean, first century AD, 22 Nabataean - Roman -Byzantine and 30 Late Islamic sherds, the latter mostly at one of the cisterns. The Iron II pottery consisted of household and storage ware with a few finer fragments.

Deraj III: An Iron II Fortress

The settlement called Deraj III by the NHG team was discovered in 1994, seen from the air and subsequently visited in 1995 and 1997 (Figs. 12 and 13). It is located at 1180 m and surrounded by more trees than other sites of Jabal aş-Şuffāha. The stone which could be taken from and out of the ground not far away is more brownish than gray. The *khirba* of c. 45 x 40 m is built on and surrounded by a lot of sturdy terraces. Massive enclosure walls in the



12. Deraj III from the air.

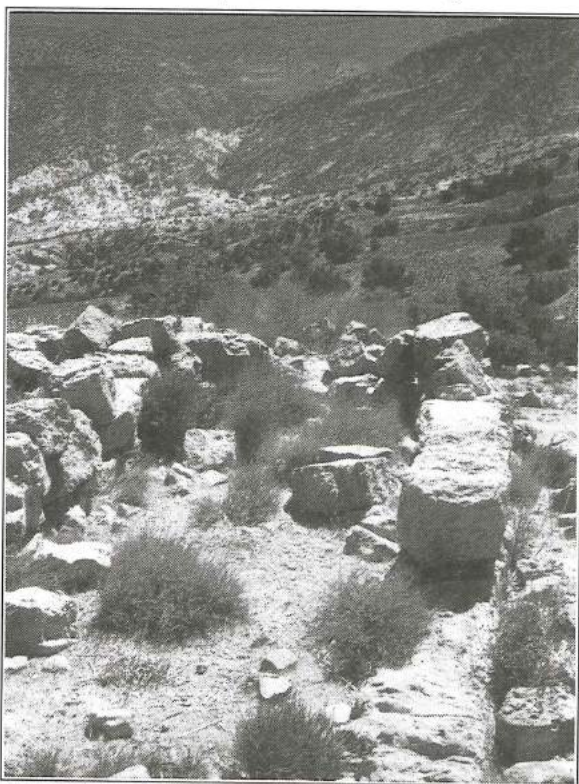


13. Plan of Deraj III.

north-west (32 m) and in the south-west (30 m) were examined (Fig. 14). Due to the size of the ashlar of up to 0.90 x 0.60 x 0.60 m and 1.50 x 1.50 x 0.50 m the were not doubled. Part of the north-west wall is restacked to form a rounded pen. The south-western wall with three casemates of c. 5 x 2 m, two of them divided by a monolith of 2.40 (!) x 1.10. x 0.70 m is part of a wall which originally enclosed the whole place (Fig. 15). The size of the masonry and a tower-like projection of the eastern wall indicate a fortress. The slope above, where quarrying large ashlar would have been easy, is terraced with similarly built massive walls. Some of them form semi-circles



14. Massive wall of large ashlars of Deraj III.



15. Casemates of Deraj III.

and might indicate the catching of floods or even of non-perennial springs. To the west, traces of flowing water were observed. Whereas around and in the ruin field most of the soil had disappeared, there was more than 0.30 m good, loose soil to be found in the interior. Beside the mentioned walls, the *khirba* is astonishingly empty.

The surface pottery of Deraj III is peculiarly scarce. There are Iron II and Nabataean-Roman sherds besides a small scatter

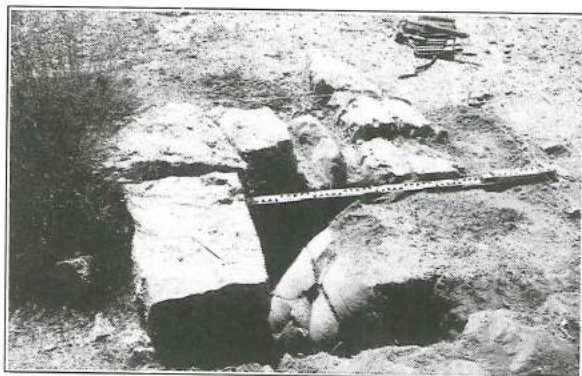
of Late Islamic ware. An Iron II storage jar with two handles stuck out near an interior casemate wall (Fig.16). Fragments of a large bowl with a ring base found outside the walls belong to the Iron II period. Unfortunately no part of the rim is preserved.

A steep trail runs down to a narrow wadi with massive terracing and damming and a cave cistern, ostensibly to guarantee the water supply.

The details of Deraj III point to a Late Iron II fortress. The massive wall structure and the lack of a habitation area except the casemates could thus be explained. The scarcity of ceramics might be due to its brief use.

Kutle H - A Nabataean-Roman Settlement

From the Islamic sanctuary or *weli* described above, a wadi originates which was in its descent systematically and efficiently terraced at intervals of 5-15 m by walls still extant up to more than 2 m. Walls to both sides of the terraces acting as conduits led rainwater to four natural but artificially modified caves to the right and left of the wadi (Fig. 17). The lower terraces are broken but the cave cisterns are preserved. One of them is 2.5 x 3.5 m and 2 m high, another, equipped with a lintel and covered with 4 layers of large ashlars, has a somewhat higher ceiling. Two other cave cisterns behind their entrances of laid stones measure c. 3 x 3 m.⁵



16. Iron II storage jar in the ruin field of Deraj III.

5. Kutle H was discovered by Ulrich Hübner who surveyed the rim of the western escarpment and

was able to overlook the mountainside almost as well as from a helicopter.



17. Cave cistern of Kutle H.

To the south of the terraced wadi at 1300 m, a settlement extends over c. 50 x 80 m (Fig. 18). Of the houses which were built on ledges in the hard limestone, only a few walls are still standing. The surface pottery is not less scarce than in other settlements of Jabal aş-Şuffāḥa but more widely spread and predominantly Nabataean-Roman. Kutle H may have been planned and then built in the late first century AD. It is situated in plain view of Deraj I which after its Edomite phase, was reoccupied in the Late Roman period.

Deraj I - An Iron II-Late Roman-Byzantine Village

In 1994, from the footpath to Siq Umm al-Ḥirān and from an exploratory trip to Juheir at the ash-Shawbak road, a *khirba* was spotted on the slope of the aş-Şuffāḥa massif at 1260 m. The access from the Wādī

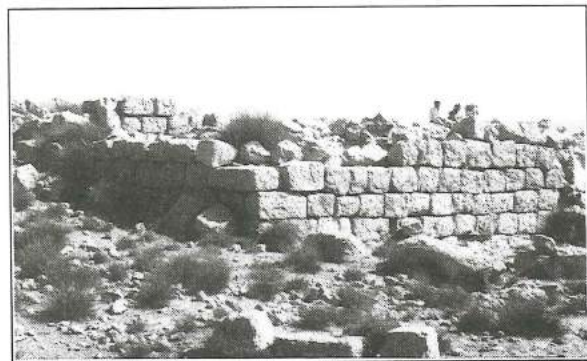


18. Settlement of Kutle H with Jabal aş-Şaha and Jabal ash-Sharā in background.

Mūsā - ash-Shawbak road was difficult and a footpath from Umm al-‘Alda proved to be more convenient. Deraj I, as the ruined settlement of c. 30 x 40 m was called, derives its name either from the steps leading up to a main building or simply from the numerous terraces around. The building is a 12 x 12 m dry-stone structure of regularly laid and carefully trimmed ash-lars of a sharp-cornered flinty limestone (Fig. 19). Walls are standing up to 2.30 m. Three steps and a threshold belong to an entrance in the east which together with the walls of this part of the building is destroyed. Its interior is divided into three rooms by walls which might be secondary. Similar to Kutle II and Kutle H, there are cave cisterns. Cistern A with an opening of 2.5 m is 5 m long and in a dome-shaped ceiling 2 m high. In the humid interior, fireplaces and the skeleton of a goat were found. Cistern B, further west, is 4 m long and about 3 m high. Both caves were partly completed with fieldstones. Entrances and interiors were originally plastered.

The 12 x 12 m structure, situated on a shoulder of the gentle slope, was (and is) dominating the whole settlement and its surroundings. Except for the steps and the threshold no architectural pieces were noted. Two wadis to the north sport old specimens of *Juniperus phoenicea* and *Pistacia atlantica*. The vegetation is due to massive terrace walls.

The surface pottery of Deraj I does not entirely correspond with its architecture. A

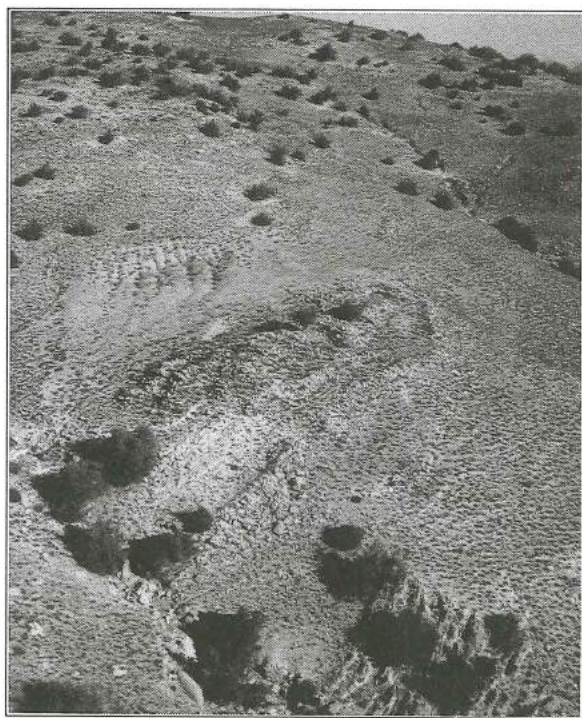


19. Main structure of Deraj I.

first occupation is proven by Iron II pottery, similar to the assemblages of Kutle II, Tawilan and Khirbat al-Mu'allaq. The fragments represent about 30 % of the total. About 50 % of the sherds were of the Late-Roman-Byzantine periods. The ceramics are mostly cooking pots and a few cups. The Nabataeans under Obodas II, Aretas IV and Rabb'el II are less well represented, in fact only with c. 10 %, as is the Late Islamic period. Typical sherds collected close by one of the cisterns show a use by pastoralists rather than an occupation of the site. The main building cannot be traced back to the Edomites. It might have been a *villa rustica* of the Late Roman-Byzantine period.

A Late Roman "Estate": Deraj II

Located at 1230 m, some 100 m to the north-east of Deraj I, Deraj II was examined in 1994 and photographed from the air in 1995 (Fig. 20). The ruin field situated in a north-east, south-west direction is somewhat smaller than Deraj I. The stone material is light brown and on the whole smaller cut than in Deraj I. A particular main build-



20. Deraj II from the air. Terraced wadi in foreground.

ing is lacking. Compared with Deraj I, the site is less well preserved and more walls are restacked. Like Deraj I, it is close to a wadi, in fact, with pincer-like walls and some barrages built right into it. Mudflats running toward the wadi indicate a good water supply. The settlement, rather an "estate" or a large farm regarding its size, was inhabitable during the whole year. Given lots of massive terrace walls and correspondingly much ground for agriculture and gardening, Deraj II probably produced more food than it consumed. An Iron II occupation of Deraj II could not be ascertained. The surface pottery (less than at Deraj I) consists of ca 80 % Late Roman household ware and a few Late Islamic sherds. The main occupational phase can thus be dated to the third-fourth centuries AD.

Kutle III: An Iron II - Byzantine "Estate"

Kutle III located at 1150 m north-east from Kutle II and rather close by Deraj III was first seen during a low-altitude flight, and subsequently visited in 1995. Its size is c. 70 x 30 m, with a *pistacia* on top of the *khirba*. The rocky surroundings are as well dotted with a lot of trees as those of Deraj III. This richness is partly due to the large terraces on the slope above the settlement. There is more stone material than on Deraj I and II, but the place shows more destruction than the other *khirba*. A heap of building stones to the east reveals the former existence of a larger building. At the southern end, original wall stones are restacked to form a pen. Three walls the length of the ruin field are tumbled down the slope. There, only pastures and ancient fields without large terraces are to be seen. In a wadi to the south, a reservoir of 8 x 8 m and two more catchments for spring and rain water are remnants of old and perhaps more recent endeavours to store water.

The surface pottery is mostly crushed.

The *khirba* has been trodden over by pastoralists to whom the restacked pen has to be ascribed. The pottery consisted of 40 % Iron II, 40 % Byzantine fragments, very little Nabataean ware of the first centuries AD and some Late Islamic sherds. There were two main occupational phases, an Iron II phase and a Byzantine one.

A Late Islamic Village Kutle I A/B (1190/1200 m)

First visited from a campsite above the village of Kutle IA (the name Kutle has been given by the local al-‘Amārin families and derives from ‘Ayn Kutle) is built of limestone ashlar of medium size, covering c. 80 x 35 m (Fig. 21). From its northern house walls on a rocky outcrop it dominates an overflow spring⁶ south of it and the recognizable remnants of a *khān*. To the west, Kutle IA was protected by the escarpment of the aṣ-Ṣuffāḥa ridge and to the east by a steep embankment of an especially hard limestone, where fossilized (and crystallized) starfish were observed. A dangerously narrow trail winds itself between the escarpment and the village to the west. Anybody approaching the spring was in stone-throw or arrow-shot distance from the house walls. The overflow of the spring runs (and ran) down the perpendicular escarpment



21. Kutle I (A) from the air.

where a rich plant life was examined by I. Künne in 1995. House walls in the village are still standing up to 2 m (Fig. 22). When seen from the air or from the embankment to the east, house squares and lanes show an orderly layout. The interiors have masonry pillars for the support of beams. One of the houses measured 5.0 x 3.5 m on the inside. The gap between the double walls was filled with rubble. Generally, Kutle IA is a village in the Ayyubid-Mamluk-style.

The surface pottery includes different styles within the Late Islamic period. Excepting one Ayyubid fine ware sherd, most sherds belong to the hand-made village ware without decoration, whilst there is a small percentage of painted ware with linear and criss-cross decoration. Flour was made with millstones with the upper parts preserved.

The top of the embankment in the east, in fact a plain, was probably used as summer dwellings and groves (Arabic: *al-ḥaūṭa*). A threshing floor between the embankment and the village indicate cultivation of grain fields that could be located directly east of the village and on the plain above.

In 1997, a second village was discovered at the same escarpment to the north. With a size of c. 30 x 30 m, it is a little smaller than the one described previously. Ac-



22. Walls of Kutle I (A).

6. The spring or well was neglected when the first survey reached Kutle IA, but cleaned and newly surrounded with stones the second time. The water stays always on the same level, no matter how

much of it has been taken out. Originally, the spring may have been located further to the north-east, from where a small gully descends to the present hole.

ording to the surface pottery which includes a small percentage of linear painted decoration, it is contemporary with Kutle IA, at least to a certain extent. However, more walls are standing higher up, and a small wadi may have run through the village. The interior of one of the houses is 5 x 3 m with an anteroom of a further 3 x 3 m. A surprising equipment is a mortar in a large immovable boulder. The utensil of 0.45 m depth was probably for communal use. For everyday use in a family, millstones were used.⁷ There are broad similarities between the village and Kutle I. Therefore as a habitat compound by itself it was called Kutle I B and consequently the other village not Kutle I but Kutle IA.

Kutle E: A Late Islamic Settlement

Kutle E was reached from Kutle IA on a steep but structured path, sometimes with rock-hewn steps, in 1997, after the site had been made out with binoculars from the aṣ-Ṣuffāḥa ridge in the previous year.⁸ Its beginning is marked by a large and massive dam. As the further examination of the site showed, without the dam no habitation would have been possible in the gorge-like valley. Now that the dam is broken, flash floods submerge the ruins. A little above, an "avenue" between standing stones at 880 m extends over c. 100 m. without a marked entrance or an end.⁹ The first built structure of the settlement is less damaged than the rest of the ruin field. Situated at 860 m it is 20 m long, and partly built of well-cut and dressed ashlar. It may have been a *khān*. There are two parts of the ruin field at 850 m: One to the right (30 x 25 m) is built over a small rise, another (25 x 25 m) on a plain

between, at least nowadays, two wadi courses. Two houses or rooms of 4 x 4 m revealed seemingly poorly worked building stones, and doubled walls. In one spot, where some digging had been done non-weathered building stones of a better quality were observed. In fact the appearance of the ruin field may be totally deceptive.

The very scarce surface pottery was identified as Late Islamic. Below the settlement proper, the wadi disappears in a narrow canyon with high straight walls. The footpath to the left of it leads through a passable valley down to a swamp and a spring ending in a waterfall at 710 m which descends toward Wādī 'Arabah.

The people who came here during the Middle Ages, apparently overestimated the possibilities of the marginal and vulnerable site. It is true, they closed a few gullies in the rock walls of the valley with built barges. However, it has to be noted that the dam had to be planned and built before settling was possible. A few flash floods and the destruction of the dam (perhaps by an earthquake?) were enough to force the people to seek refuge in another place.

The Ridge Survey of 1996/97

The ridge of Jabal aṣ-Ṣuffāḥa from Kutle IA to its end in the north was surveyed in 1996/97. Right by the rim of the mountainside a round structure of 7m in diameter with double walls of massive boulders up to 1.20 m in width was a pen or an enclosed garden. The survey proved that even this marginal area was used agriculturally and for the herding of goats. Fieldstones were collected in smaller and bigger heaps. To the right of the old footpath there are ter-

7. These mills are found in almost every Late Islamic village around Petra. Even in present-day Wādī Mūsā they serve for special preparation now and then.

8. Elisabeth Schreyer looking for further settling on and around Jabal aṣ-Ṣuffāḥa saw and verified the site. Due to her insisting it was visited next year and called Kutle E after her name.

9. Its function cannot be explained. Standing, intentionally erected unworked stones on Jabal aṣ-Ṣuffāḥa never turned out to be of a cultic or sepulchral significance, but were rather parts of a house, a pen or a field wall. Besides, Kutle E was visited only once, and one day was not sufficient to do more than a preliminary prospecting.

aces of hewn stones. Of several additional pens or gardens, the largest measures 15 x 12 m with a few ruined huts nearby. A disturbed tomb is marked by an originally standing stone not of the area (Fig. 23). Directly by the rim, the ruin of a house of 5 x 3 m was, at some unknown time, turned into a grave facing east-west, and later pilfered. In its vicinity were found two fine yellowish Iron II body sherds (of the same vessel) the only indication so far of Edomite presence on the ridge. In the same area, a structure of very massive boulders of 4 x 4 m with a depression and a pillar lying in the interior may have been a tomb. The one Late-Roman sherd found there does not allow a dating.

The ridge is, at its western side, blown out by strong and steady winds. Right by the abyss, cold air can be felt in small holes in the rock, early signs of further deterioration of the mountain.¹⁰ Near the end of the ridge, a great heap of piled fieldstones shields an interior of only 2 x 2.5 m with a single rectangular stone lying in it (offering place or tomb?).

A shepherd called the place at 1170 m *hora sa'uwa*, allegedly the name of ash-

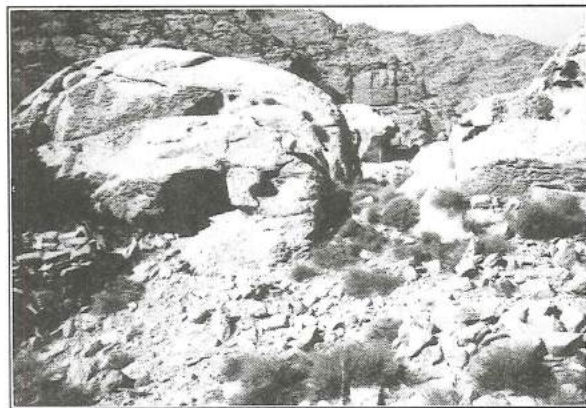


23. Disturbed tomb with worked (originally standing ?) stone.

Shaykh Ahwar's sister. On the whole, the ridge shows the same system of large terraces, heaped fieldstones, small houses and large pens as all over Jabal aş-Şuffāḥa outside the settlements.

The Western Slope of Jabal aş-Şuffāḥa

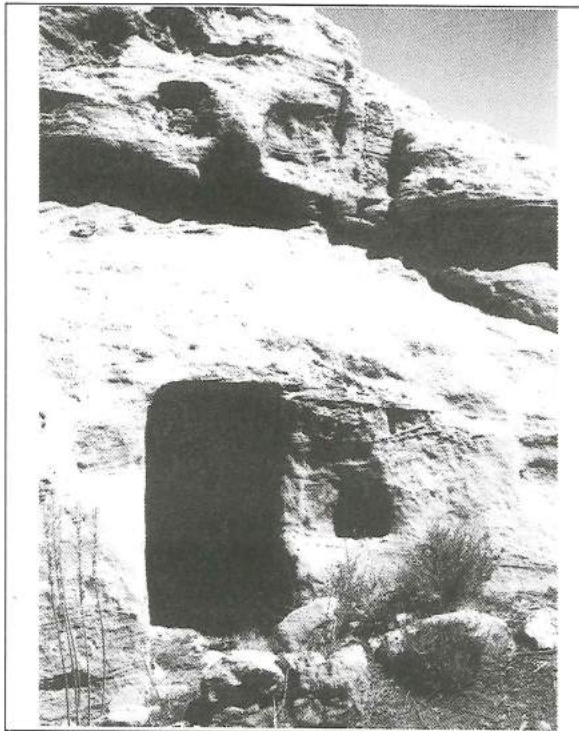
The western slope of Jabal aş-Şuffāḥa was diagonally crossed from Kutle IA to the foot of the mountain in the south and also diagonally from Kutle E to Kutle IA. Below Kutle IA at 1030-1080 m a farmstead was spotted behind large rocks. 12 Roman-Byzantine and 4 Late Islamic sherds were found. The place at 1080 m in a particular greyish (*ad-Diṣi*?) sandstone also harboured a nest of porcupines. Further down and to the south-west a Nabataean settlement included a few house ruins as well as several cave chambers and cisterns (Fig. 24). Water was conducted through channels. One of the entrances sports an inserted lintel, another has a basin in the Nabataean style cut into the rock wall (Fig. 25). The terraces on this side of the mountain are especially massive. They had not only to preserve the soil for agriculture and gardening but also to protect the habitats. Surrounded by caves and house



24. Ruin field in front of rock shelters on eastern Jabal aş-Şuffāḥa.

10. While inspecting the edge of Jabal aş-Şuffāḥa in the north, two different layers of the Cretaceous limestone were observed. In contrast to the out-blown and crumbling-up stone material at a place called "*hora sa'uwa*"(?) by the bedouins, in the north and south the limestone breaks away

in thick slabs. Further down thick layers of clay and marl were (artificially ?) opened up. A finely grained sandstone observed at the western escarpment might have been *ad-Diṣi* sandstone revealed under the Cretaceous limestone.

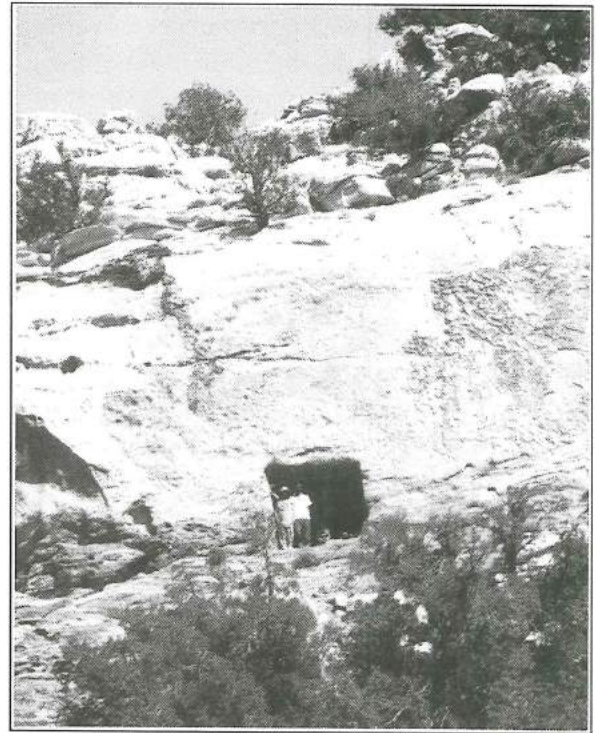


25. Nabataean-style rock work on eastern Jabal aş-Şuffāḥa.

ruins, a wide open place was at one time agriculturally used.

A Rock-Cut Tomb Opposite Jabal aş-Şuffāḥa

Separated from Jabal aş-Şuffāḥa by the steep and stony Wādī ath-Thughra, a sandstone range to the east belongs geologically to the "rocks" surrounding the isolated massif. A rock-cut tomb was cut into a vertical wall of the range at 1170 m and had been robbed (Fig. 26). The opening of 3 x 4 m, located 30 m above the wadi bed, is devoid of any decoration. No closing can be conjectured. In the interior of also 3 x 4 m, two graves of 0.45 width are cut into the ground, one parallel to the sides, the other in a right angle to them. The walls lack fine trimming. A lot of debris, sand, dust, birds' droppings, (with one fine Nabataean body sherd) cover the floor. There was, however, a significant scatter of Nabataean to Byzantine sherds to be noticed all the way from Kutle II to the tomb and further on to a house ruin in a steppe area with large *Juniperus phoenicea*



26. Rock tomb in Wādī ath-Thughra.

trees, *Artemisia Sieberi* bushes and even annual yellow grass. Here, everything bears witness to relatively plenty of winter rain and a continuous agricultural and pastoral use of the area since antiquity. From here across a divide at 1200 m with a view of Baboul Ba'ja, the road to Ba'ja and further to Petra-Wādī Mūsā may be reached. As to the dating of the rock-tomb one should be careful. There is only one other rock tomb outside Petra known to the authors, that is the tomb of al-Mukhayfir to the west of Şabra with all indications of probably Late Roman origin. But a comparison is futile; the tomb of al-Mukhayfir despite its simple design, was elaborately cut out of the mountain top, decorated with relief pilasters at the corners and elevated by a second (masonry) storey (Lindner 1986: 180-183).

Three Main Occupational Phases of Jabal aş-Şuffāḥa

Summarizing the results of the 1994-1997 surveys of Jabal aş-Şuffāḥa by NHG

teams, the region was occupied at elevations of c. 850 - 1290 m during three main phases.

The Iron II (Edomite) Phase

In this phase, on the eastern slope right by the rim of Jabal aş-Şuffāḥa, the settlement of Kutle II was built and inhabited around the seventh century BC according to the surface pottery. Judging by its architecture, Deraj III was built as a fortress around the same time. Again according to the surface pottery and to the lack of habitats in the interior it was not occupied for very long. The water supply was, due to its favourable location, much more sophisticated than that of Kutle II. The other settlements on Jabal aş-Şuffāḥa, Deraj I and Kutle III were occupied around the same time. It seems possible that Deraj III was built as a fortress to protect the Iron II inhabitants against aggressions from the east. We do not know when exactly the Edomite settlements were left. It was probably at the time when the Edomite state perished.

The Nabataean-Roman-Byzantine Phase

The second occupational phase is represented by the settlements of Kutle H, Deraj I, Deraj II, Kutle III and the western slope of Jabal aş-Şuffāḥa. In analogy to the Iron II habitation one would have expected a general Nabataean settling activity all over the mountain. Such an activity would have been sponsored by the "court" and/or rich families around the first century AD. The reading of the surface pottery provides, however, quite different results. Each of the settlements, farms, villages or "estates" has its own story to tell. Kutle H with its ingenious water supply was inhabited since the first - second century AD, after the Iron II phase, whereas Deraj II was built in the Late Roman period, that is third - fourth century AD. Deraj I was reoccupied in the Late Roman-Byzantine period, during the time when Deraj I had been already inhabited for a longer time. Kutle III, belongs

exclusively to the Byzantine period. It was reoccupied after a temporal gap of almost 1000 years.

The people who worked on the slopes of Jabal aş-Şuffāḥa were perhaps descendants of the Edomites and Nabataeans of the region. The pottery of the latest village still preserves first century AD traditions of the Nabataean culture. The contrast between the pottery and the modest architecture of the inhabitants is reminiscent of Petra, where people lived in simple houses but indulged in seemingly luxurious pottery. There is no doubt, people living (and making a living) on Jabal aş-Şuffāḥa in the Nabataean to Byzantine periods were agriculturists and according to their terrace-farming methods pastoralists only in second place. The large pens protected the livestock from predators and may have enclosed gardens. Not much can be said about the social status of the people who lived here. In an agricultural system of collective terracing it seems unlikely that small families tilled their own ground. They were probably in bondage to rich owners who resided either in a *villa rustica* on the mountain or more luxuriously at Petra or elsewhere.

The Late Islamic Phase

The Late Islamic phase (12th - 16th centuries AD) is in the Jabal aş-Şuffāḥa region represented by the villages of Kutle IA,B and Kutle E. Additionally, there was an overall reuse (but less reoccupation) of the region, the latter proven by Late Islamic pottery finds without, though, a single geometrically painted Mamluk sherd. Kutle I AB, preliminarily datable by surface pottery only, is roughly comparable to several strongholds or enclaves or defensible villages in the Greater Petra area, for example Anajil, ar-Ruwayshid (medieval at-Ṭayyiba), Seyl Batha, an-Naqqa II and the Wādī al-Mudhlim site at Petra, all of them are being prepared by M. Lindner for publication in the near future. Reuse was also observed

atop Jabal al-Qṣeir, where the defensibility of an Iron II mountain stronghold was exploited in Late Islamic times (Lindner *et al.* 1996) and on Jabal al-Khubtha were lately an Iron II occupation was discovered (Lindner *et al.* 1997).

We do not know exactly how long the Late Islamic reuse of Jabal aṣ-Ṣuffāḥa lasted, but the impression prevails (supported by the lack of geometrically painted Mamluk pottery) that settled habitation petered out long before the Ottoman conquest, and that nomadic bedouins took over to this day. In October 1995 and 1997 one or two al-‘Amārīn families with a lot of goats and a few camels were encountered on Jabal aṣ-Ṣuffāḥa.

The Settling Fluctuation on Jabal aṣ-Ṣuffāḥa

The fluctuation of settling activities on Jabal aṣ-Ṣuffāḥa cannot be overlooked. Settlement and resettlement prove that by agriculture and husbandry the mountainside was habitable. There were, of course, raids, despoiling of natural resources (firewood!) and natural catastrophies like droughts, epidemics and locusts. Of one catastrophe there is definite proof, that is earthquakes. Less visible but as undeniable are political changes and subsequent lack of contacts to markets and urban centres.¹¹

Acknowledgements

The authors are greatly indebted to the Director-General, Dr Ghazi Bisheh of the Department of Antiquities of Jordan for permitting and, through the local representatives Mr Suleiman Farajat and Mr Hani

Fallahat, supporting the surveys of Jabal aṣ-Ṣuffāḥa. Thanks are due to J.P. Zeitler for helping to analyze the ceramics, to Ingrid Künne who combined botanical studies with archaeological exploration and to Elisabeth Schreyer who beside the surveys was responsible for such different tasks as organization, catering and camping. Our friend Dakhilallah Qublan of Petra was mentor and guide at the same time. Without his assistance, most discoveries would not have been made. The authors are also thankful for the friendly help of the local al-‘Amārīn families who proved themselves as loyal and reliable, quite contrary to Musil who labelled (or libelled?) them as “berüchtigte Räuber” ninety years ago (1908: 59).

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11. M.Lindner “The Settling Fluctuation on Jabal aṣ-Ṣuffāḥa” Paper submitted to the 7th Conference

on the History and Archaeology of Jordan at Copenhagen, June 1998.

Bibliography

Lindner, M.

1986a Archäologische Erkundungen in der Petra-Region 1982-1984. Pp. 87 - 188 in M. Lindner. (ed.), *Petra-Neue Ausgrabungen und Entdeckungen*. München.

1986b *Petra - Neue Ausgrabungen und Entdeckungen*. München.

Lindner, M. and Knauf, E. A.

1997 Between the Plateau and the Rocks. Edomite Economic and Social Structure. Pp. 261-264 in *SHAJ V* Amman: Department of Antiquities.

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

1996 Jabal al-Qseir: A Fortified Iron II (Edomite) Mountain Stronghold in Southern Jordan, its Pottery and its Historical Context. *ADAJ* 40: 137-166.

1997 An Iron Age (Edomite) Occupation of Jabal al-Khubtha (Petra) and Other Discoveries on the "Mountain of Treachery and Deceit" *ADAJ* 41:177-188.

Musil, A.

1908 *Arabia Petraea III. Ethnologischer Reisebericht*. Wien.

THE NABATAEO-ROMAN SITE OF WĀDĪ RAMM (*IRAM*): A NEW APPRAISAL

by

Laurent Tholbecq

Introduction

A major Nabataean settlement was discovered in Wādī Ramm by G. Horsfield and excavated by himself together with R. Savignac in the early 1930s, followed by D. Kirkbride in May 1959.¹ The Department of Antiquities in Ma'ān began a large-scale clearing operation in 1962 concentrating on various complexes situated on the hills surrounding the temple of the settlement. More than 2800 m² of architectural remains were exposed. Unfortunately, this undertaking did not result in any publication. The large areas of remains which had been laid bare and ignored for decades suffered rapid deterioration and the earthquake of 1995 caused great damage to the temple itself.²

The French Institute of Archaeology for the Near East (IFAPO/Amman) came to an agreement with the Department of Antiquities of Jordan to clean the site and to record its main visible features. At the same time, B. Reeves and D. Dudley (University of Victoria-Canada) excavated, in the same framework, an area which turned out to be a major bath complex associated with a "villa".³ IFAPO's first season was carried

out in the summer of 1996, which was followed in 1997 by the opening of some probes below the level reached in the 1962 excavations in order to obtain new chronological sequences of the various buildings.⁴ Five limited soundings have been put down around the temple and what was called the western complex. The complexes, some chronological points and elements for comparison will be discussed briefly in the following text.

The Temple

One of the first aims of the 1996 season was to record in detail the remains of the temple exposed in 1962 in order to provide a complete update of the last plan published by Kirkbride (Fig.1).⁵ This was followed by the 1997 soundings which provided new material for a better understanding of the different phases of the building.

The Primitive Sanctuary of Lat

A new Thamudic inscription reused in the foundation of the central chapel (*naos*) of the Nabataean temple refers to the construction of a sanctuary (BYT) of Lat, done by a member of a tribe well-attested on other

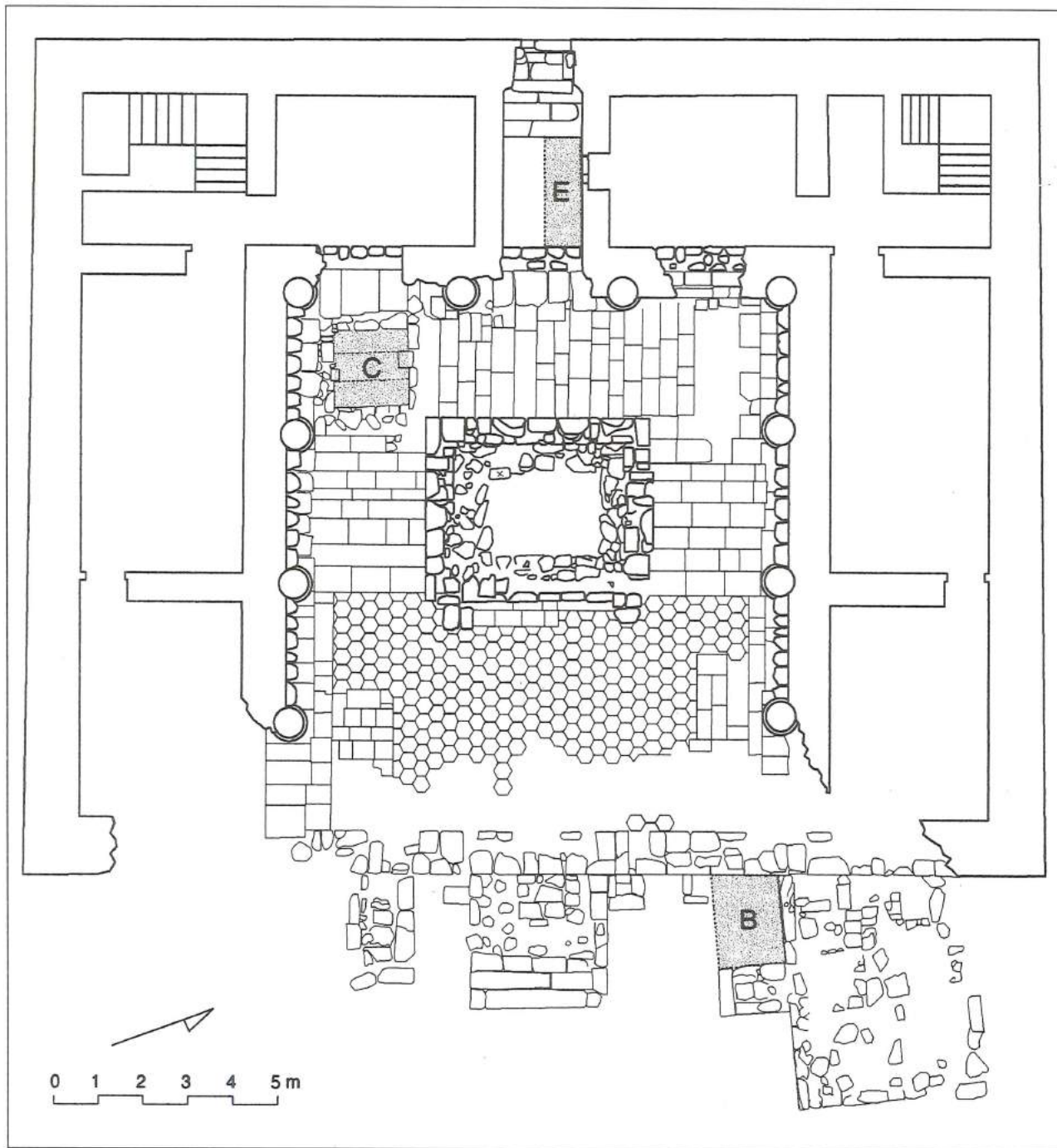
1. The first reports are, Savignac 1932: 581-597; 1933: 403-422; 1934: 573-591, Horsfield and Savignac 1935: 245-278, Kirkbride 1960: 65-92. The Nabataean inscription of 'Ayn ash-Shellalah were reinterpreted by Strugnell, 1959. The site was then presented in detail by Starcky 1966: 978-980. The literary sources are discussed in Graf 1983: 655-656. For the Greek and Latin inscriptions of the site, see Sartre 1993: 173-182.

2. The restoration of the temple and of the western complex has been undertaken in 1996 under the supervision of Sawsan Fakhiry (Department of Antiquities of Aqaba).

3. Dudley and Reeves 1997:81-106.

4. The members of the 1996 team were E.Natchiz, B.Ravez (topographers) and M.Malkawi (archaeologist) and the author (director). L. Mhamdiyeh served as Department of Antiquities representative and architectural draughtsman. In 1997, the Department's cooperation was under F. Zayadine. During those two seasons, the Department of Antiquities paid the workmen who helped in the cleaning and excavation process. Yvonne Gerber (Basel University) did the preliminary reading of the pottery. The Final Report of the two campaigns is in preparation and will be published in *Syria* (forthcoming).

5. Kirkbride 1960: pl.III.



1. Top plan of the Nabataean Temple of Wādi Ramm (*Iram*), (1996).

inscriptions of the area.⁶ The fact that the block with the dedicatory inscription was reused for the foundation of the first temple phase, indicates that this sanctuary preceded that building. D. Kirkbride, in a probe on half of the central chapel, found several

artefacts interpreted as domestic.⁷ She also suggested that the substructure of its pavement (in which the inscription was later found), according to its height, could have been part of an earlier wall. If this is so, that small section of wall could be part of this

6. For the inscription, see Farès-Drappeau and Zayadine in this volume.

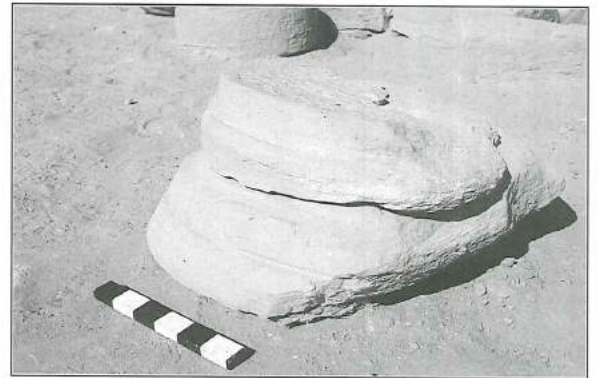
7. Kirkbride 1960: 85.

primitive sanctuary.⁸

The Temple under Nabataean and Roman periods

Around the late first century BC to early first century AD, a rectangular podium (12.1 x 13.9 x 1 m) had been erected, probably above the afore mentioned first sanctuary. It was reached by a narrow centred stairway (3 m wide) with seven steps (Fig.2). This podium supported a central chapel of 3.2 m x 2.7 m and was surrounded by 14 columns on its four sides. This peripteral temple had 4 columns on its front and back and 5 columns on both sides. The column drums, standing on Attic bases, were carefully dressed, with a reserved undressed circle of 1cm high on both their extremities (top and bottom). If the height of the drums vary, the transitions from one drum to the other were intentionally underlined. This treatment must be considered as an intentional decoration. If this assumption is correct, the columns were originally free-standing and were bound by walls in a later phase. They were supporting Nabataean

capitals of which two echinuses and one upper half with horns were found (Figs. 3 and 4).⁹



3. Echinus of a Nabataean capital, front column (1996).



4. Upper half of a Nabataean capital, front column (1998).



2. The podium and its front stairs, from the east (1996).

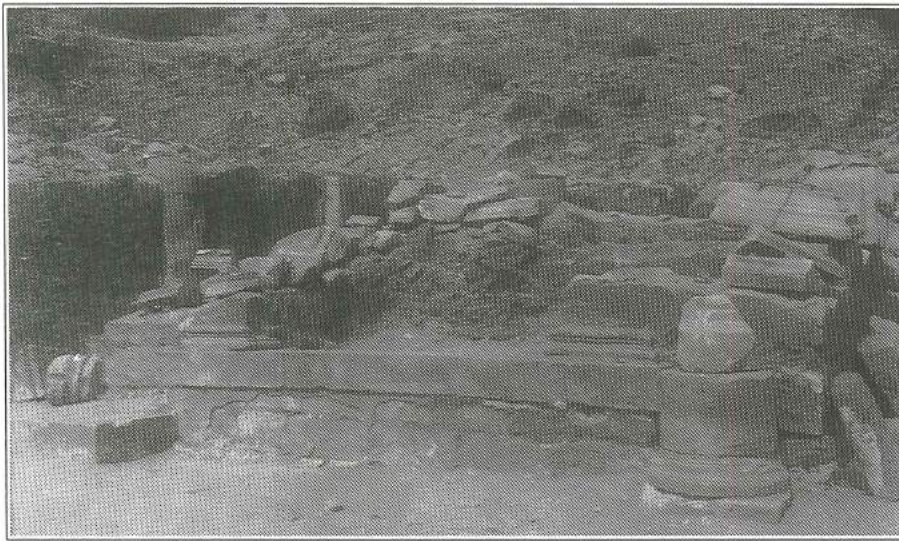
8. Kirkbride 1960: pl.III, Section E-F. It is important to note that the walls of the *naos* have unusual large foundations. But those are also part of the substructure sustaining the pavement inside the *naos*. Unfortunately, between D.Kirkbride's description and our visit, the archaeological levels connected with the central chapel were destroyed. During our cleaning, sterile sand was reached directly under the foundations of the central chapel.

A probe under the hexagonal pavement of the main podium could hopefully solve this question.
9. The upper half of a capital was found by the Department of Antiquities during the removal of one of the fallen columns of the façade still *in situ* in the summer 1997. The capitals belong to Judith McKenzie's Type 1 Nabataean capitals, McKenzie 1990: 190.

The *naos* was opened on its eastern side, facing the entrance of the monument. Its pavement was set 0.6 m above the pavement of the podium itself. Unlike other Nabataean temples where the main podium is reached by two small stairs of narrow steps,¹⁰ this chapel was not preceded by steps but its access was limited by a grill. Its eastern face was underlined by two pilasters on both sides of the opening as documented on old photographs (Fig 5). Unfortunately, only one course of the *naos*'s façade re-

mains today (Fig.6). The *naos* was crowned by a cornice of which elements were found during the first excavations.¹¹ There was shown the representation of the divinity Allat.¹²

In a later subphase, a thin dwarf wall was built between the columns. We might suggest that this wall did not reach the capitals. It was apparently too thin (less than 0.25 m) to support any entablature but could have supported a light cornice subtly different from the one of the *naos*.¹³ The columns



5. *Naos*, from the east, (1934, by courtesy of Ecole Biblique et Archéologique Française de Jerusalem - East Jerusalem).



6. *Naos*, from the east (1996).

10. The temple of Khirbat adh-Dharih, the Qasr al-Bint, the temple of the "Winged Lions" and the sanctuary of ad-Dayr have this feature in common.
 11. Horsfield and Savignac 1935: pl.XIII.
 12. The attribution to Allat by G. Horsfield and R.Savignac was based on the inscriptions of 'Ayn ash- Shallalah and a graffito found in the temple itself. This is, if necessary, now con-

firmed by the newly found Thamudic inscription dedicated to Lāt. The lower part of a sandstone statue was also found in the 30s and interpreted as a Tyche. Its date is not known but it could refer to later phases of the building. For a possible recent comparison, see Figueras 1992; for Allat, Starcky 1981.

13. Horsfield and Savignac 1935: pl.XIII.

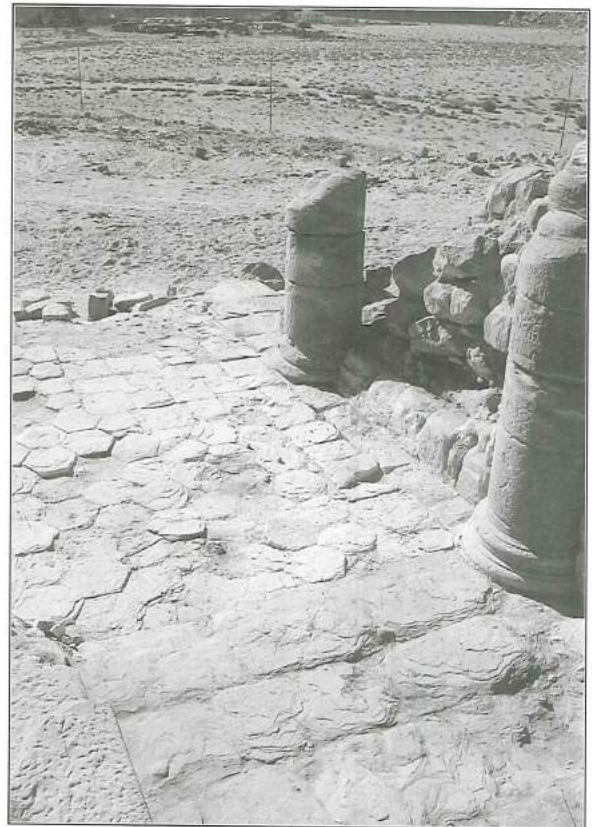
were then plastered and the inner face of the walls decorated with painted stucco. Several blocks found in the ruins were covered with lozenges imitating rectangular courses with lozenged incised decoration on their flat side. According to their thickness, they are in all probability to be associated with the afore said dwarf-wall. Thus, at this time, the external temple precinct was apparently decorated with an incised stucco while the inner faces of the walls were decorated with ornamented paintings.

In front of the *naos*, the flooring of the podium was composed of hexagonal sandstone pavers while the rest was paved with ordinary flagstones (Fig.7). On both northern and southern limits, the hexagonal pavement is interrupted by flagstones. They are associated with cultic furniture found *in situ* in the 1930's. Moreover, the pavement shows several traces of restoration.¹⁴ On the south-western side of the podium, there was a 1.80 m deep square cistern covered by flagstones and supported by a single arch. Parts of its hydraulic mortar is still visible.¹⁵

In a later intermediate phase, the temple was enclosed by a major wall except on its frontal façade. This is Kirkbride's wall "C" which appeared also to have been built against the rear wall of the podium. Kirkbride assumes that this wall was built to give stability to the podium. It could also have been for a reorganisation of the roofing. The construction of that wall can be

dated roughly to the first century AD¹⁶ which gives us an indication for the preceding phase of construction, that is, around the turn of the first century BC and AD. It is therefore tempting to relate the original construction phase to the reign of Aretas IV (9/8 BC - 40 AD).¹⁷

The latest building phase of the temple was determined by another probe¹⁸ opened against the back wall of the temple; its



7. Hexagonal pavement after cleaning of the podium, from the west (1996).

14. During sweeping a part of the damaged hexagonal pavement, we were lucky enough to find a coin of the first half of Rabbel II's reign. Nevertheless, this cannot be used as sound chronological evidence.
15. Probe C consisted of cleaning the cistern, unfortunately emptied during the 1962 excavations.
16. Probe E (2.4m / 1.4m) was made in the western hall of the temple, between the rear wall of the podium and the stairs leading to the western complex.
17. Many scholars were tempted to base the chronology of the temple on a graffito found on painted stucco fragments and first published in 1935 (Horsfield and Savignac 1935: 264-268).

- The dedication to "the Great Goddess of Iram" dates to the year 41. Aretas IV is the only Nabataean king who reigned more than 41 years. However, based on the fact that nothing refers to the titulature of a Nabataean king, R. Savignac concluded that the inscription refers to the era of Bostra. J. Starcky who read the inscription again also concluded that the graffito dates to 147 AD (Starcky 1966: col 979-980). He added that his reading was certain. Therefore this dedication does not give any conclusive evidence of an original building phase to be dated to Aretas IV.
18. Probe A (4.5m x 1.5m) was opened between the western door of the temple and the Western Complex.

foundation trench contained material of the end of the first century AD and early second century AD. This should date the latest extension of the building unless the back wall and the lateral walls are not contemporary. At this time, several rooms were added to the former temple along three of its sides, except on its façade. The temple was trapezoidal in outline (22.8 m wide on the front, 23.1 m wide on the back and 19.2 m on its sides). A communication between the temple and the western complex was established through a hall and several steps leading to a door in the back wall of the monument. Two stairways were built on its backcorners reaching an upper floor or the roof of which nothing remains. No pavement was found as far as the external rooms or in the western hall.

There is no evidence left of the later occupation or destruction levels of the building. Nevertheless, the 1962 excavation revealed another major structure which adds to our knowledge of Nabataean religious cults: a rectangular platform of 5.3m x 3.5m is abutting the north-eastern part of the temple's façade (Fig. 8). This structure was



8. Rectangular platform in front of the temple, from the south-west (1996).

reached by three central narrow steps. A probe¹⁹ put down to its foundations indicates that the platform was added after the second building phase and belongs to the later phases. This is probably to be associated with well-known numismatic representations of an altar from Bostra, Adra'a, Mādabā and Charach Moba, dated to the late second and third centuries AD. Those coins show small platforms supporting "betyles" reached by a few narrow central steps (possibly a ladder). On several examples, courses are clearly drawn on the anterior face of the platform. Sometimes, priests seem to stand on it to perform rituals.²⁰ As far as we know, the abutting platform of Wādī Ramm's temple seems to be the only surviving construction of this type.

Despite the lack of archaeological evidence, and apart from the Nabataean grafito mentioned above, a Latin dedication of an altar indicates, however, that the temple was still in use in the first half of the third century.²¹ As yet the abandonment for its date remains unknown.

Thus far, the stratigraphical evidence gives us the following tentatively dated sequence of events:

- I. A sanctuary (BYT) is built and dedicated to Lat.
- IIa. A main temple (peripteral tetrastylus) is erected before or around the late first century BC to early first century AD.
- IIb. A dwarf wall is erected between the columns.
- IIc. A major wall is built around the podium in the early first century AD.
- IIIa. The temple is reorganized in the late first century AD, early second century

statues on the podium?).

21. Sartre 1993:179-180; the lower part of the altar with its inscription moved earlier to Amman and the upper one found during the 1996 clearance of the podium have been joined together and are now shown in Amman's Archaeological National Museum.

19. Probe B (2.2m x 1.5m) was opened in front of the temple, between the temple and the steps of the cult platform.

20. Spijkerman 1973: Adraa, pl. 10, nos. 1,2,3,4,12; pl.11, nos.17,18; Bostra, pl.15, nos 38,42 (showing its courses),43,44 (in perspective); pl. 17, 67,72; Charach Moba, pl.22, nos.5; Meshorer 1985, Bosra, p.88, no. 239 (with two priests or

AD (Rabbel II?).

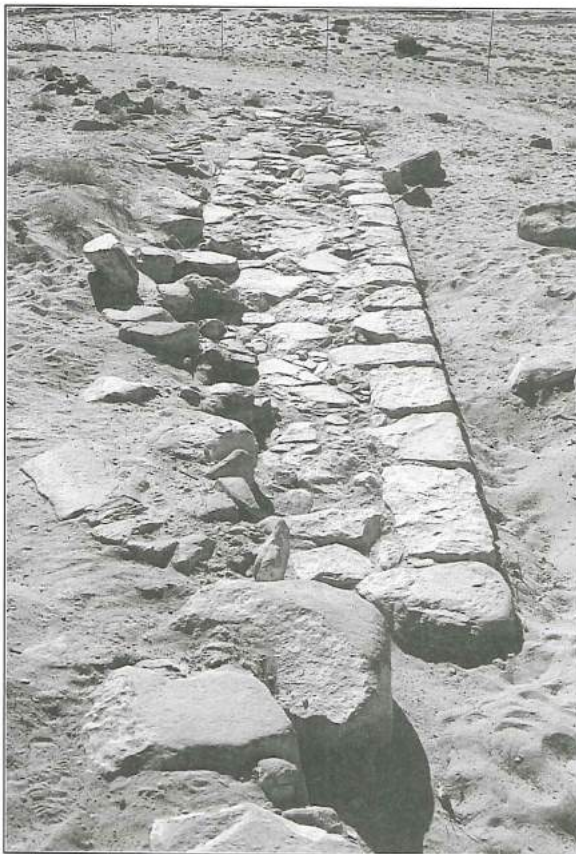
IIIb. The cultural platform is added.

So far, the limits of a supposed temenos have not been found. An orthogonal structure 1.8m wide and 17 m long in front of the temple could be the northern limit of a monumental access to the sanctuary (Fig. 9). It is not established yet if this is the base of a stylobate or part of a wall.

The field work did not focus on the temple only. Other buildings sketched in the 1930 or exposed in 1962 were recorded, especially behind the temple (western complex) and in the depression south of the temple hill (southern "village").

The Western Complex

In 1962 an important complex of 20



9. The orthogonal structure, east of the temple, looking west.

22. Rooms CO1 and CO2 form a first unit. Rooms CO4, CO5 and CO 6 constitute a second unit.

23. For Probe A, see above, Probe D (2.20m x

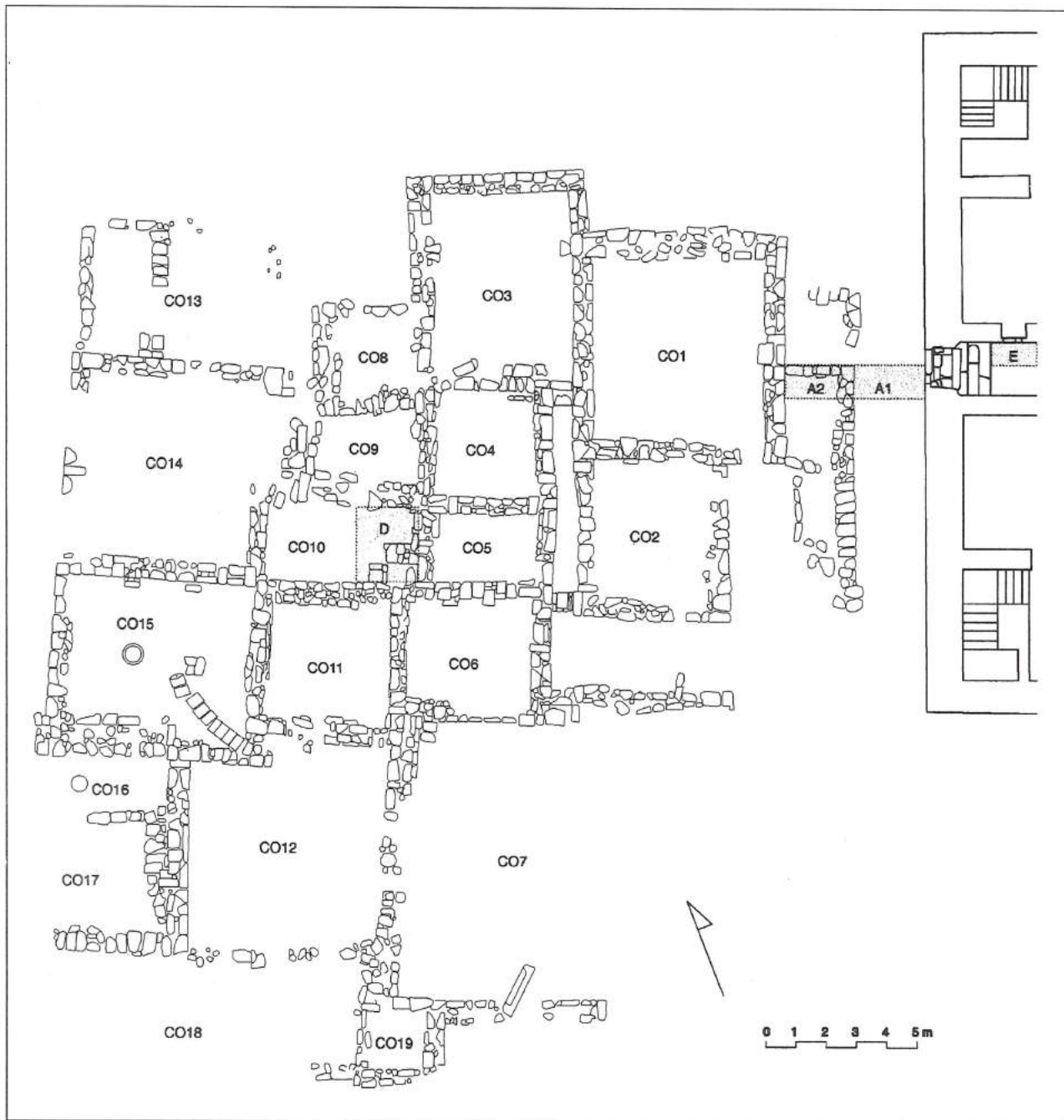
rooms was cleared behind the temple (Fig.10). At least three main rectangular units of two or three major rooms can be traced through later additions.²² They follow the general orientation of the temple. Our soundings have provided some preliminary chronological sequence. The two probes²³ have indicated that

- the visible western complex is contemporary with the latest building phase of the temple, that is, the late first to early second century AD. The newly excavated levels, untouched in 1962, are dated to the third century. The latest surface sherds found in the complex during the 1996 cleaning operation are dated to the mid-fifth century. The occupational levels revealed domestic activities.
- Both trenches evidenced earlier structures below the surface remains of the complex which are tentatively dated to the late first century BC and early first century AD. That means the earlier complex coexisted already with the first phase of the Nabataean temple. Without further investigation, the function of this complex and its relation to the temple itself remains unclear.

The Southern "Village"

This 3500 m² area sketched in the thirties was recorded (Fig.11). It is limited on its southern edge by a wall of nearly 100 m. Two other similar long walls limit the northern side of the main wall on which the temple has been built. Their dates and function remain unknown - they are perhaps to be associated with the canalization system feeding the site from several springs on the east slope of the Jabal Ramm. The southern settlement does not refer to a grid but rather seems to have grown in an unplanned manner. The remains just emerge above the topsoil. Two thresholds indicate the level of

2.00m) was the extension of the probe opened in 1996 in the Western Complex (room CO10).



10. 1997 probes of the western complex.

the remaining structures. The complex has also several large enclosures. The surface collection of sherds appears to be of Nabataeo-Roman dates.

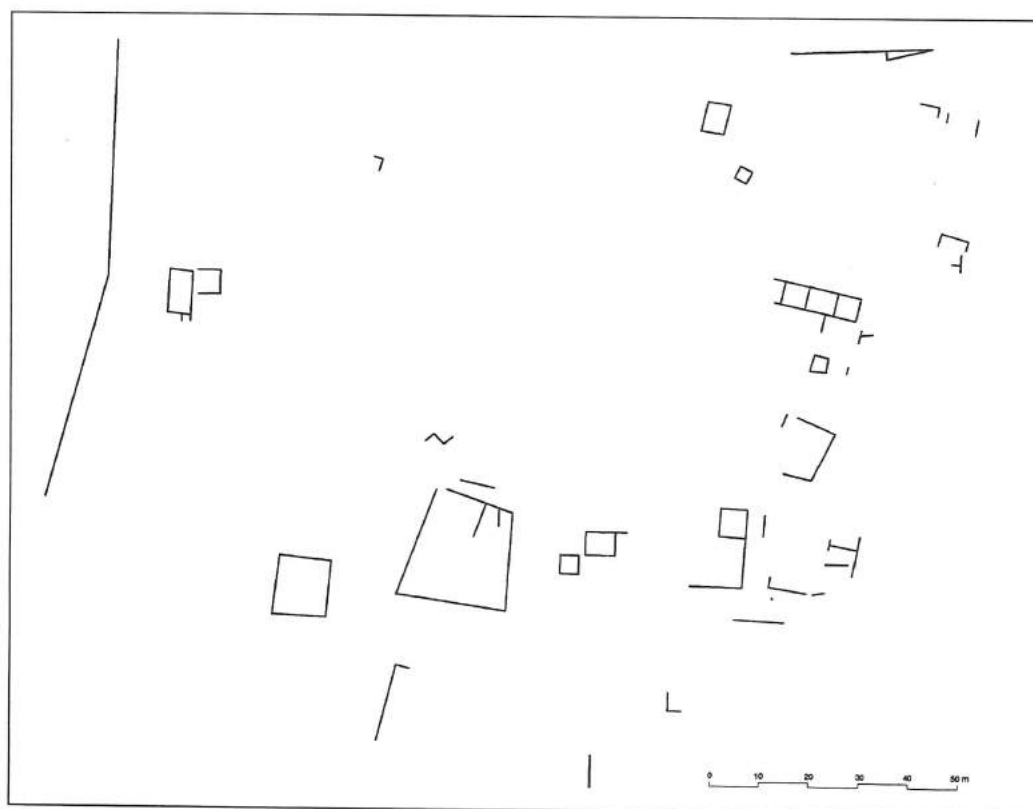
Towards Rural Egyptian Models from Ptolemaic and Roman Periods

It seems possible to assert that several

Nabataean temples refer to Egyptian models. Those influences are noticeable in plans, elevations, structural elements (niches, cryptae under the podium, etc.) and decorative features (sculpture, stucco, etc.).²⁴ Here is not the place to expose all the reasons for this assumption but several examples can be introduced to place the proposed compari-

24. Tholbecq 1997: 1086-1088; this comparative study of the Nabataean temple is the subject of the

author's PhD dissertation (Université Catholique de Louvain - Louvain-La-Neuve / Belgium).



11. 1997 plan of the Southern "Village".

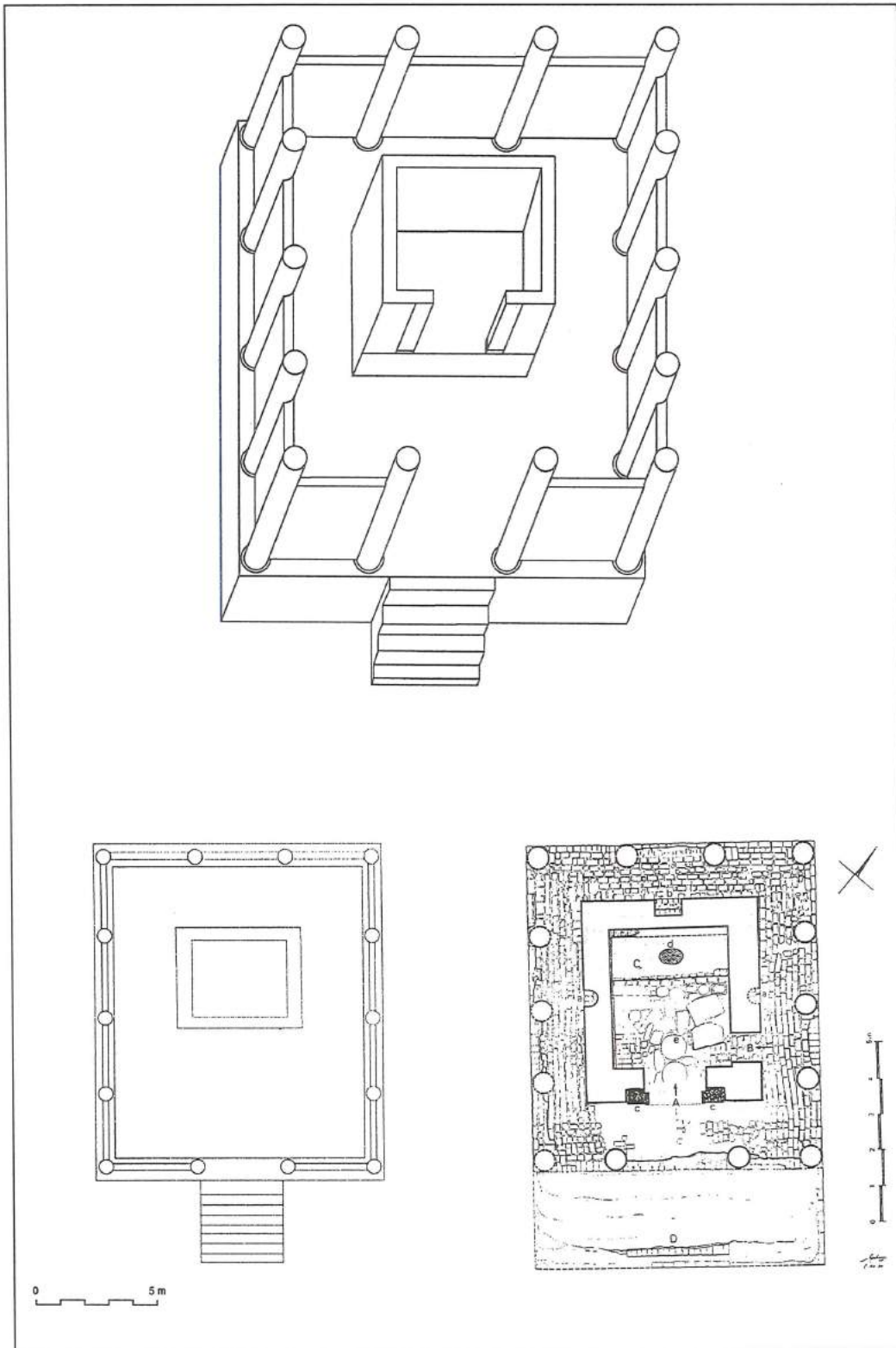
sons for Wādī Ramm's temple in this general context. Several Nabataean temples show a rectangular plan, opening through a rectangular front room (cf. Dhibān, first temple of Oboda, Khirbat. adh-Dhariḥ, Temple of the Winged Lions of Petra). This plan finds its origin in Egypt in temples of the Ptolemaic and Roman period. For instance, the second stage of the temple of Khirbat adh-Dhariḥ clearly refers to rural Egyptian sanctuaries of which the Temple of al-Qal'a (Coptos) is a good example.²⁵ This affiliation explains several characteristic features of adh-Dhariḥ's temple organization. The elevation of the main façade of the building finds also an excellent parallel in the funeral Temples of Tuna el-Gebel (Hermopolis Magna).²⁶ Speaking of structural elements, the presence of niches at the back wall of several Nabataean temples (in Petra: in the Temple of the Winged Lions or the decoration of the back wall of the Qaṣr al-Bint

which underlines a rectangular niche) could also find its origin in Egypt.

While it does not enter in a Classical Nabataean typology like the examples of Khirbat adh-Dhariḥ or the temple of the Winged Lions, the Temple of Wādī Ramm seems to find parallels in Egypt, too. The first phase of the temple finds a good parallel, though later, in the Serapeion of Luxor dedicated in Hadrian's reign²⁷ (Fig. 12). This temple consists of a rectangular podium (12 m long x 8 m wide). It supports 14 columns (4 on the short and 5 on the long sides) and its front is reached by steps. The general proportions of both monuments are identical, although the building of the Wādī Ramm example is noticeably bigger. The only substantial difference is the extension of the *naos*, which is smaller in the Wādī Ramm temple. This configuration allowed extra space in front of the *naos*, creating a pronaos-like space, characteristic of various

25. Pantalacci and Traunecker 1990: 7; general organisation in plan, hall around the main podium, lateral rooms

26. Perdrizet 1941: pl. XXIV - Pensabene 1993: 266.
27. Golvin *et al.* 1981.



12. Tentative schematisation of the Temple under Aretas IV (?). The Serapeion of Luk-sor, from Golvin *et al.*, 1981: 119, fig.2.

Nabataean temples. Moreover, if the interpretation is correct, the erection of a dwarf wall in a sub-phase could refer to Egyptian examples too.

Nevertheless, the latter idea is supported

by the fact that the later extension of the Nabataean temple of Wādī Ramm (phase IIIa) has also a parallel in Egypt. The temple of Dayr Chelouit, in Western Thebaid, its decoration dating from the time of Au-

gate (now destroyed) inside the temenos, between the temple and the main entrance of the temenos could help us to understand the function of the orthogonal structure mentioned above.

The plan of Egyptian temples correspond to precise rituals clarified through texts or representations covering the walls. If the affiliation between Egyptian models and Nabataean temples is established, it is then essential to understand why the Nabataeans referred to those particular models and how those types were adapted to answer to Nabataean rituals of which, without any literary reference, we know very little.

Conclusion

Wādi Ramm (*Iram*) is the first site mentioned by Cl. Ptolemaeus in his list of cities in *Arabia Felix* (*Aramava-Geogr.*, 6.7.27)). At first sight, Wādi Ramm seems situated outside the main caravan routes even if it was probably linked to Qurraya (*Ostama*) and Tabuk (*Thapava*) or other Nabataean sites of the Madian if not to major harbours like Aila and Leuke Kome. In addition, several Minean inscriptions testify to ties with Southern Arabia. The springs were exceptional enough to attract the nomadic tribes and to incite them to build a sanctuary to Lat. Two built cisterns - today badly damaged by the removal of their construction material - were fed by canalizations coming down from 'Ayn ash-Shallalah and other close springs. A second canalization system came from 'Ayn Abū Rumayleh down through the temple hillside to the eastern complex and its baths. We do not know if those springs were abundant enough to feed an important agricultural settlement in spite of dams and structures having been found during surveys around Wādi Ramm itself.²⁹

The role of the Wādi Ramm settlement as part of a regional sanctuary is clear. The

primitive building dedicated to Lat was the meeting place for several nomadic tribes. It was followed by the building of a major temple going back to Classical models. Nabataean dedications to Allat by various workmen (macon, sculptor, architect?) in 'Ayn ash-Shallalah must refer to a major undertaking, presumably the building (phase IIa) or the transformation of the temple itself (phase IIIa). This evolution could evidence the growing importance of the Nabataeans at the turn of the era. Similarly, the Roman power marking its presence among the nomads, is attested by the Latin dedication of a governor mentioned above. This policy was also evidenced through the bilingual dedication of the temple of Ruwaffa in the second century³⁰ or the work carried out on the Western temple of Oboda (Negeb) in the late Roman period.³¹

The function of the western complex during the Nabataean occupation is not yet understood. It is also too early to determine the precise functions of the eastern complex in the settlement at this time but the presence of a "villa" (connected with courtyards) associated with baths close to a sanctuary has also been discovered at Khirbat adh-Dhariḥ. The question of the organisation of such sanctuaries (staff associated with the temple, authority in charge of the religious meetings and commercial fairs, economical autonomy or dependence) remains open.

The next campaign will provide hopefully more evidence for the chronology and the economical background of this settlement connected to a main regional sanctuary. Several questions need to be answered: is the temple associated with a temenos and its related features (altar or banqueting halls); which are the functions of the successive western complexes and the southern "Village" and is there evidence of agricultural

29. Graf 1983: 654-657.

30. Sartre 1982: 25.

31. Negev 1997: 53-54.

or pastoral activities or of distant commercial contacts? Last but not least, the date of abandonment of the site still needs to be determined. Those are the main questions on which our attention will focus in the next season.

After two short but very fruitful campaigns, we have now updated plans of the structures exposed in 1962. First stratigraphical indications and the parallel study by IFAPO of Semitic inscriptions of the area (see F.-Drappeau and Zayadine 1997) and in this volume allow us to rethink the settlement of Wādī Ramm in a broader his-

torical context. On this base, one can now pose new questions about the origin and the life of this site on the roads between Hegra and Petra. In addition, after cleaning, the Wādī Ramm settlement is going to be a historical and archaeological site of major interest for tourists and scholars alike.

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Bibliography

- Dudley, D. and Reeves, B.
 1997 The Wadi Ramm Recovery Project: Preliminary Report of the 1996 Season. *In Echos du Monde Classique/Classical Views*, XLI, 16:81-106.
- Figueras, P.
 1992 The Roman Worship of Athena-Allat in the Decapolis and the Negev. *ARAM* 4/1 and 2: 173-183.
- Golvin, J.-Cl., 'Abd el-Hamid, S., Wagner, G. and Durnand, Fr.
 1981 Le petit Sarapieion romain de Louqsor. *BIFAO* 81: 115-128.
- Graf, D.F.
 1983 The Nabataeans and the Hisma: in the steps of Glueck and beyond, Pp.647-664 in C.L.Meyers and M.O'Connor (eds), *The World of the Lord Shall Go Forth: Essays in Celebration of the Sixtieth Birthday of David Noel Freedman*. Philadelphia.
- Horsfield, G., and Savignac, R.
 1935 Le Temple de Ramm. *RB* 44: 245-278.
- Kirkbride, A.S. and Harding L.
 1947 Hasma. *PEQ* 75: 7-26
- Kirkbride, D.
 1960 Le Temple nabatéen de Ramm, son évolution architecturale. *RB*, 67: 65-92.
 1960 Région du Wadi Ramm (Chronique Archéologique). *RB* 67: 280-281.
- McKenzie, J.
 1990 The Architecture of Petra. *BAMA* 1. Oxford.
- Meshorer, Y.
 1985 *City-Coins of Eretz-Israel and the Decapolis in the Roman Period*. Jerusalem.
- Negev, A.
 1993 *New Encyclopedia of Archaeological Excavations in the Holy Land*, IV. Jerusalem: Pp.1255-1257, s.v. Er-Ram.
 1997 The Architecture of Oboda Final Report. *Qedem* 36. Jerusalem.
- Pantalacci, L., Traunecker, Cl.
 1990 *Le temple de'El-Qal'a, I, Relevé des scènes et des textes*, Institut Français d'Archéologie Orientale. Cairo.

- Pensabene, P.
1993 *Elementi Architettonici di Alessandria e di altri siti egiziani, Repertorio d'Arte dell'egitto greco-romano, C, III.* Rome.
- Perdrizet, P.
1941 Temples et Maisons funéraires d'époque gréco-romaine. Pp.51-105 in S.Gabra *et al.* (eds), *Université Fouad Ier, Rapport sur les fouilles d'Hermoupolis Ouest.* Cairo.
- Sartre, M.
1982 *Trois études sur l'Arabie Romaine et Byzantine. Latomus* 178. Brussels.
1993 Inscriptions de la Jordanie, Tome IV, Pétra et la Nabatène méridionale, du wadi Hasa au golfe de 'Aqaba. *I.G.L.S. XXI:* p.165-182. Paris.
- Savignac, R.
1932 Le Sanctuaire d'Allat à Iram. *RB* 41: 581-597.
1933 Le Sanctuaire d'Allat à Iram. *RB* 42: 403 - 422.
1934 Le Sanctuaire d'Allat à Iram (suite). *RB* 43: 573-591.
- Spijckerman, A.
1978 The Coins of the Decapolis and Provincia Arabia, *Studii Biblici Franciscani Collectio Maior* 25. Jerusalem.
- Starcky, J.
1966 Pétra et le Nabatène. Pp. 978-980 in H. Cazelles and A.Feuillet (eds), *Supplément au Dictionnaire de la Bible, VII.* Paris.
1981 Allath, Athèna et la Déesse syrienne. Pp. 119-130 in L.Kahil and Ch. Augé (eds), *Mythologie gréco-romaine. Mythologies périphériques, Études d'iconographie.* Colloques internationaux du CNRS, n°593. Paris.
- Strugnell, J.
1959 The Nabataean Goddess Al-Kutba' and her Sanctuaries. *BASOR* 156: 29-38.
- Tholbecq, L.
1997 Les Sanctuaires des Nabatéens: État de la question à la lumière de recherches archéologiques récentes. *Topoi* 7/2: 1069-1095.
- Zayadine, F. and Farès - Drappeau, S.
1997 Epigraphic Survey in Wādī Rum (Jordan) 1996. *ADAJ* 41:37-43 (Arabic Section).
1998 Two North-Arabian Inscriptions from the Temple of Lat of Wādī Iram. *ADAJ*:42.
- Zivie Ch. M., Azim, M., Deleuze, P. and Golvin, J.-Cl.
1992 *Le temple de Deir Chelouit, IV. Etude Architecturale.* Institut Français d'Archéologie Orientale. Cairo.

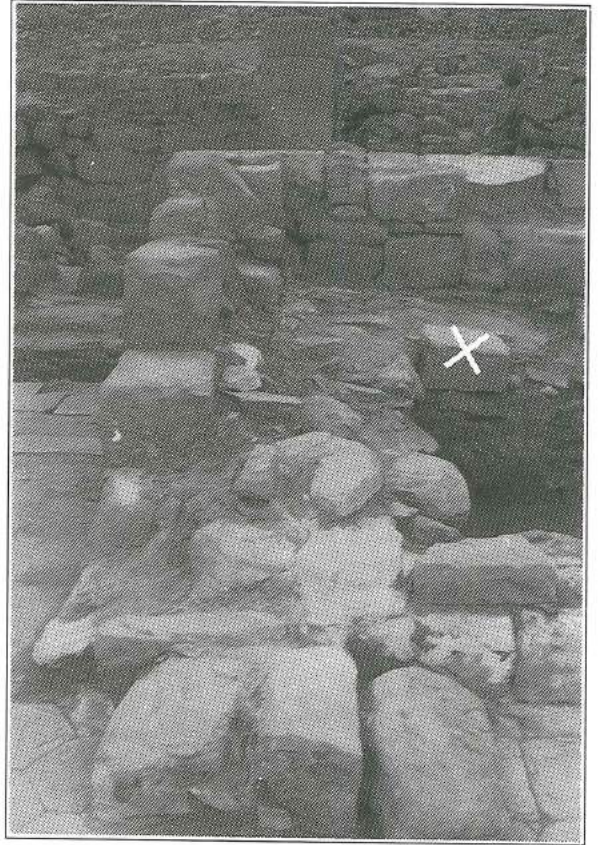
TWO NORTH-ARABIAN INSCRIPTIONS FROM THE TEMPLE OF LĀT AT WĀDĪ IRAM

by

Fawzi Zayadine and Saba Farès-Drappeau

In the years 1996 and 1997, the Department of Antiquities consolidated the temple of Lāt in Wādī Iram which had been shaken by the recent earth tremors (Figs. 1 and 2). The work was supervised by Sawsan Fakhiry, Inspector of the 'Aqaba District with the assistance of Muhammed Malkawi. The workers found there, during the clearance of the central cella, an inscribed block and deposited it at the entrance of the monument. On June 9th, 1997, Saba Farès-Drappeau and Fawzi Zayadine visited the temple as part of the epigraphic survey of the area, and noticed the inscription. They returned the next day in the company of Hussein Abu Al-Hassan (King Sa'ud University in Riyadh) and Mahmud al-Russan (Yarmouk University) who participated in the preliminary decipherment of the inscription.

The block of yellowish sandstone measures 53 x 23 x 26 cm and was apparently built into the floor of the cella (Fig. 2) where its negative was clearly visible. The face bearing the inscription was turned inward, a



2. The inscribed block *in situ*. (x=Block with inscription) (Photo: L. Tholbecq).



1. General view of the Temple of Lāt Temple.

fact that prevented Diana Kirkbride from noticing it during her excavation in 1959.

1. Text of three lines of Thamudic E nicely incised in spiral.

H. of letters: *alef*: 5.5cm; *sin*: 2cm. (Figs. 3 and 4).

Transliteration

LĠT BN 'SLH BN TKM WBNY BT LTD 'L 'D

“By Ġa(w)ṭ the son of A(w)slh, son of Tkm and he built the sanctuary (bayt) of Lāt of 'L 'AD (tribe).”

Interpretation

ĠT, Ġa(w)ṭ is a frequent north Arabian name (Harding 1971: s.v.; Negev 1991: *GAWTW*, No. 862.

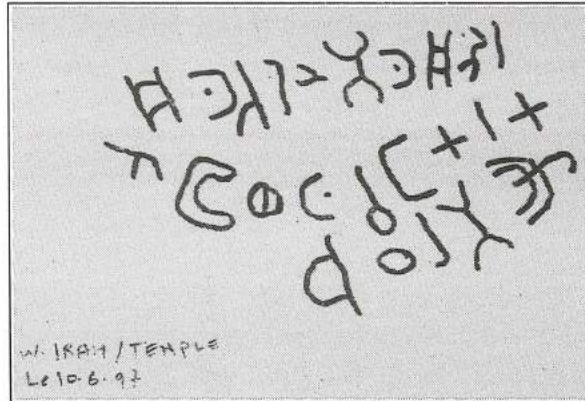
'SLH, A(w)slh is also common in Thamudic and Safaitic and Nabataean: Negev, *op. cit.* No. 50; Harding 1971: s.v.

TKM is a new name in the north Arabian onomasticon. In the Arabic Lexicon, *TKM* means: the middle of a way. See Harding 1971: s.v. *TKMTN*.

BNY, to build, see Jean and Hoftijzer 1965: s.v.

BT, *bayt* means the sanctuary in North Arabian dialects (Jean and Hoftijzer 1965: s.v.). The Ka'ba of Mekka was designated as *al-bayt al-'atīq* by the Arab chroniclers (Fahd 1965: 213).

D is the proposition of *nisba* = 'be-



4. Facsimile of Inscription I.

longing to' in Thamudic and Safaitic. 'L 'D is the north Arabian tribe mentioned several times in the Koran. The most significant reference is sūrat 89, al-Fajr: 5-8:

“Have you not heard how your Lord dealt with 'Ad, (and with) Iram of the high peaks, whose like was never created in the whole land? And (of) Thamud who hewed the rock in the valley?”

Some translators of the Koran misunderstand the word *'imād* and render it into “many columned city of Iram”. But in Arabic it means: the “high support” and *'Imād al-samā'* refers to the “high mountains”. 'Mūd in Al-Bakry (1983: 971-972) is cited in several instances as a mountain in the al-Ḥijāz. In Wādī Iram, Jabal 'Amud is well-known.

2. A reused sandstone block in a wall of the settlement south of the Temple of Lāt is



3. Thamudic E Inscription I of the Temple of Lāt.

inscribed with one line in Thamudic E. It measures: 63 x 35 x 15 cm (Figs. 5 and 6). H. of *mem* : 6cm; *waw* and *bâ* : 3cm.

Transliteration

L'MR BN GWT

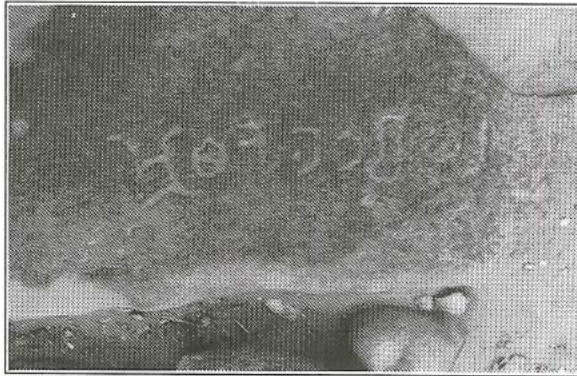
By 'Amr son of Gawṭ.

Interpretation

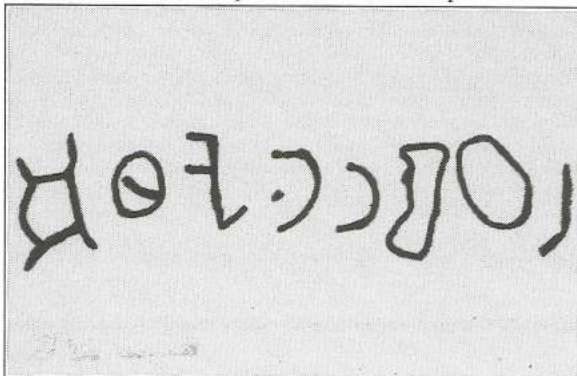
It is probable that 'Amr is the son of the former, although the tribe is not mentioned. It is remarkable that in this graffito, the *waw* of Gawṭ, was marked as in Nabataean.

Conclusion

The name of the valley was known from a Nabataean inscription published by Savignac (1932: 591-592): "May be remembered Hayan, son of 'Abdallahi, son of Ibn 'Atmu, in front of Allat, the goddess of Iram, for ever". It is possible in this case that the site which was located on a major artery between the al-Ḥijāz and Syria was considered by the Koran as one of the wonders of the world. It is today one of the



5. Thamudic E Inscription II of the Temple of Lāt.



6. Facsimile of Inscription II.

greatest touristic attractions, known as "the Valley of the Moon". Other tribes such as Mezn, Ḥl'l, and M'n'l assembled around the Temple of Lāt, together with the Nabataeans. But the original founder of this sanctuary is Gawṭ son of Awsalah, from the tribe of 'Ad. The recent soundings of L. Tholbecq did not provide evidence of this temple (see his article in this volume). But in her report, Diana Kirkbride (1960: 85) assumes the existence of an earlier sanctuary: "Bien que le sondage n'ait pas fourni de preuve d'un sanctuaire antérieur, il reste possible qu'il y en ait eu un, à peu près sur le plan de l'actuel". This earlier sanctuary (*bayt*) need not be monumental and was most probably a cubic building to house the baetyl of Lāt. It is posited that the Nabataeans remodelled the earlier temple by the addition of a columned portico, possibly in the time of Aretas IV. Savignac (1935: 267-268) published a Nabataean graffito on the plaster of the temple dated 40+(see also discussion: Tholbecq, in this volume). He assumed, without providing convincing evidence, that this date should be calculated according to the era of the *Provincia Arabia* (106 AD). However, a Nabataean inscription of Jabal al-Kharaza in Wādī Iram, near a dam, is dated to the "41st year of Aretas who loves his people" (Milik 1958: 249-250). It is more plausible in this case that the graffito of the temple is to be dated to the year 41 of Aretas IV (= 32 AD), not ignoring the fact that the Nabataean presence in Wādī Iram goes back to at least the sixth-fifth century BC. How they imposed their leadership on to the other tribes remains an open question which will be discussed in another paper.

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Bibliography

- Al-Bakry
1983 *Mu'jam ma ista'jam III*. Mustafa al-Saqqa (ed.) Beirut.
- Fahd, T.
1968 *Le panthéon de l'Arabie centrale à la veille de l'Hégire*. Paris.
- Harding, G. L.
1971 *An Index and Concordance of pre-Islamic Arabian Names and Inscriptions*. Toronto.
- Jean, Ch. F. and Hoftijzer, J.
1965 *Dictionnaire des inscriptions sémitiques de l'Ouest*. Leiden: Brill.
- Kirkbride, D.
1960 Le temple nabatéen de Ramm. *RB* 67: 65-92.
- Milik, J. T.
1965 Nouvelles inscriptions nabatéennes. *Syria* 35: 227-251.
- Negev, A.
1991 *Personal Names in the Nabataean Realm*. *Qedem* 32. Jerusalem.
- Savignac, J.
1932 Le sanctuaire d'Allat à Iram. *RB* 41: 581-597.
1935 Le temple de Ramm. *RB* 44: 245-278.
- Tholbecq, L.
1998 The Nabataeo-Roman site of Wādī Ramm, A new Appraisal. *ADAJ* 42.

SWISS-LIECHTENSTEIN EXCAVATIONS AT AZ-ZANṬŪR IN PETRA 1997

by

Bernhard Kolb

With contributions by Daniel Keller and Yvonne Gerber

Introduction

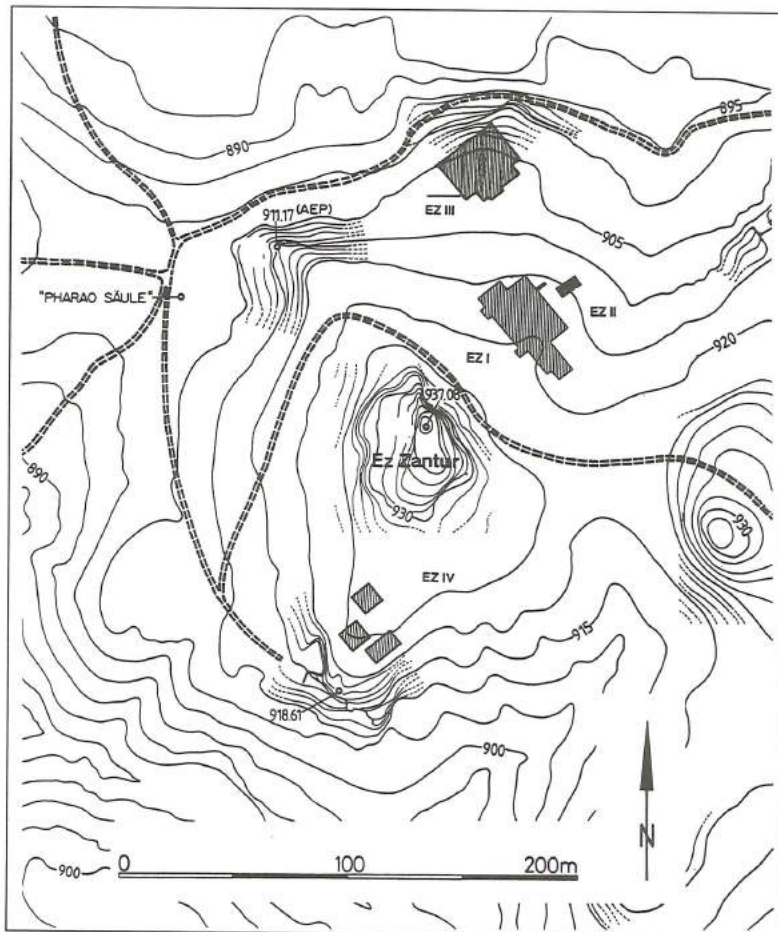
The eighth season of excavations in Petra of Basel University in cooperation with the Swiss-Liechtenstein Foundation for Archaeological Research Abroad (SLFA), lasted from the August 17 till October 14, 1997. The following archaeologists worked under the direction of B. Kolb: André Barmasse, Maxime Boillat, Annegret Reber, Yvonne Gerber, Rolf Frank, Daniel Keller, Christoph Schneider und Matthias Grawehr. Jacqueline Studer (Musée d'Histoire Naturelle Genève) analysed the bone material, while Christiane Jacquat (ETH Zürich) and Danièle Martinoli, University Neuchâtel,

studied the archaeo-botanical material.

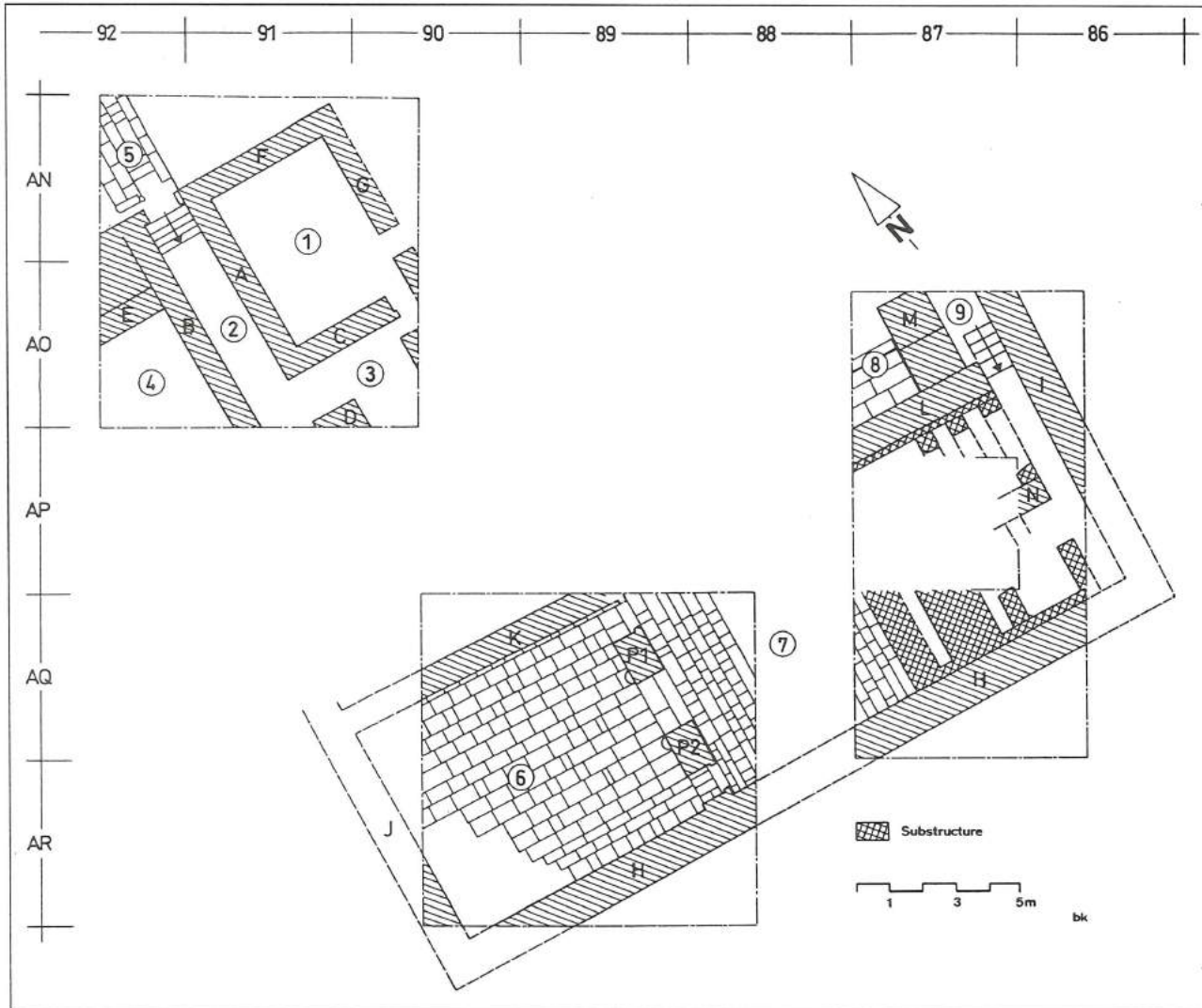
The restorer Christine Pugin again dealt with the small finds which were drawn by Irma Haussener and photographed by Othmar Jäggi. The coins were studied by Markus Peter. Necessary conservation and restoration of structures and wall-paintings was done by a team from Intermonument Restaurauro under the supervision of U. Bellwald.

We resumed the exposure of the Nabataean "villa" on site EZ IV with its spectacular inner decoration (Figs. 1 and 2). An area of 200 m² was investigated inspite of up to 3.5 m thick destruction layers.

With the exposure of several rooms



1. Az-Zanṭūr: Topographic map with fields of excavation (drawing: B. Kolb).



2. EZ IV. Schematic plan of the structures (drawing: B. Kolb).

along the north-western edge of the terrace and an eastwards extension of the excavation area we brought the excavation in the Nabataean structures on site EZ III to a provisional end. Consolidation and restoration of the walls and floors will be the main aim of the 1998 season.

EZ IV: The Nabataean “Villa”

During the 1997 season the southernmost part of the mansion, that is walls H, I and J, was exposed. The building has an east-west extension of approximately 24 m (Figs. 1 and 2). Wall I, which is most probably the building’s eastern enclosure wall, runs the entire length of the terrace on its steep eastern flank. On the gently sloping wes-

tern flank, however, several stretches of walls visible on the surface, as well as the two doorways in wall B (Kolb 1996: 233, Figs. 3-4) indicate that the ground plan reaches further west than the area so far excavated.

Room 6

The 100 m² surface of squares PQ 89-90/AQ-AR exposed most of room 6 (Figs. 2-3). The room with walls H, J and K and pillars P1 and P2 covers an area of about 6.8 m x 8 m. Wall H is built directly on bedrock. Its thickness is 1.2 m and the widest on terrace EZ IV. The double-faced dry stone wall is constructed with well cut ash-lars of sandstone, some of them with bos-

ses. The eastern part of the wall is built on a foundation of one, sometimes two courses of hugh hammer-dressed brecie blocks.

The two pillars P1 and P2 limit a broad central passage of 1.8 m width which is flanked on its inner side with stuccoed and painted half-columns (Fig. 3). The half columns have stone socles covered with a thin layer of plaster. The socle of the half column on pillar P1 is connected with the upper plastered part with two simple half roundels. The preserved parts of the columns have smooth shafts. A few ashlar found in the debris have protruding half column drums and imply that the parts of the half columns made of stucco were stabilised with these supports, jutting from the walls at regular intervals.

The central passage is flanked by two lateral doors, which were also accentuated with architectural stucco: in the area of the south door lay a fragment of a quarter column 1.5 m in length, decorated with painted convex flutes and gilt arrises (Fig. 4). It seems fairly certain that the quarter column decorated the corner between the door and wall H. A similar find near the door on the northern side of the passage – which was not completely cleared in 1997– has not yet been made.

The floor of room 6 is laid out with a



3. EZ IV. Room 6 from NE (photo: D. Keller).



4. EZ IV. Room 6: quarter column made of plaster, *in situ* (photo: D. Keller).

well-preserved limestone pavement which is missing only in the western corner, where the bedding for the flagstones, made of beaten earth and closely set stones is still *in situ*. The thresholds of the central passage and the side doors are missing. A few fragments of the painted wall decoration rescued from the loose earth from the threshold areas, had decorated the room till its destruction in the earthquake of 363 AD (see below). The thresholds must, therefore, have already been missing in the last phase of use.¹

The countless smaller and larger fragments of a black and white mosaic found in the debris of room 6 almost certainly belonged to the original building context (Fig. 5). The geometrical design of the mosaic consisted of



5. EZ IV. Room 6: black and white mosaic fragment (photo: D. Keller).

1. Few remains of the mortar bedding of the lost threshold were found in the area of the doorstep of the northern door. It is impossible at the mo-

ment, to explain a wooden slat discovered in the fill of the southern threshold-area some 20 cm below the level of the adjacent flooring.

squares and triangles and is directly comparable with the painted decoration of the upper zone in room 1 (Kolb 1997: 238f., Fig. 9). The mosaic probably covered the upper floor of room 6. A glass sherd, stuck in the mortar-bedding of a mosaic fragment can be dated to the first century AD and seems to support the provisional dating of the villa.²

Wood has been an extremely rare find since the beginning of our excavations in 1988. The substantial remains from the debris in room 6 are therefore particularly significant. They consist of six carbonised wooden beams ranging between 1.2 m and 1.4 m in length and with diameters of c. 0.12 m (Fig. 6). The cracked flagstone visible below the beams in Figure 6, is a witness to the violence with which the wood hit the floor. An identification of the beams as parts of the floor construction of the upper storey is likely but in no way secure: the ends of the beams which reach down to the floor, appear to have been sawed off and not broken. This – given their position in the

middle of the room – seems to imply that they were not part of the supporting structure of the first floor.

The Last Phase of Occupation

Household objects such as a basalt hand mill, two bone spoons, an alabaster pyxis and a number of unidentifiable iron objects, as well as large quantities of ceramics and glass vessels of the fourth century AD lay buried on the pavement, along walls H and K, beneath innumerable fragments of stucco from the wall- and ceiling decoration (see below for the contributions of D. Keller and Y. Gerber). The datable objects confirm last year's findings from room 2, where the coins indicated that the end of the final phase of occupation came with the earthquake of 363 AD (Kolb 1997: 234).

The thick layer of mural and moulded stucco fragments on top of the household utensils of the fourth century proves beyond any doubt that the Nabataean decor remained on the walls up till the aforementioned natural catastrophe.³



6. EZ IV. Room 6: carbonized beams, *in situ* (photo: D. Keller).

2. D. Keller pointed out, that a comparable glass sherd from Callirhoë was dated by Dussart to the period of the first century BC-AD.; cf. O. Dussart, *Les verres*, in Clamer 1997: Pl. 22.14; For a date of the structures on EZ IV see Kolb 1997: 234.
3. In Palmyra M. Gawlikowski demonstrated stratigraphically that a dwelling of the second century

AD was still decorated with its original stuccoed and painted wall decoration in the Abassid period, i.e. about 600 years later! Cf. M. Gawlikowski, *Fouilles récentes à Palmyre*, in: *Académie des inscriptions et belles-lettres. Comptes rendus des séances de l'année 1991*: 399-410.

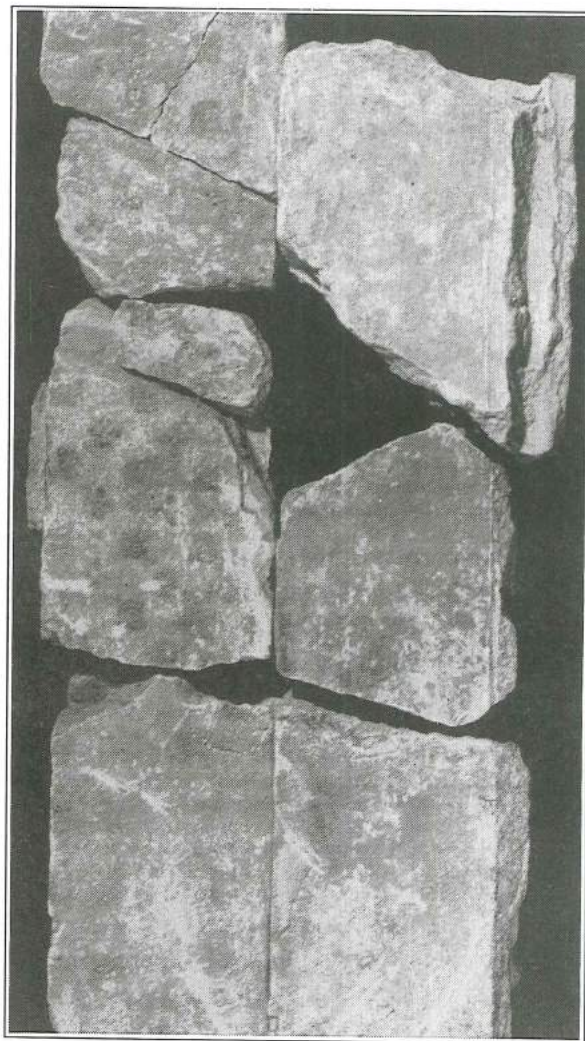
Interior Decoration of Room 6

The c. 40 cm thick layer of fallen stucco which was removed just north of wall H revealed an unbelievable quantity of fragmentary cornices, representing no less than a dozen different types (Fig. 7). The walls of room 6 appear to have been extremely richly decorated with horizontal divisions. It is also possible to make first statements about the decoration of the wall between the cornices. A first clue is given by three large fragments painted with white flowers, fruit and leaves on a dark green background. Another pattern is also represented by several fragments (Fig. 8). Two horizontally stepped (broken forward and back) decorative strips, each about 15 cm wide are painted plain orange with a geometric pattern in black, white and red. The slight projection of the geometrically painted strip on the one hand and a base fragment on the other - again broken forward and back - make it clear that we are dealing with the remains of a vertically arranged pilaster-decoration. Both schemes appear to belong to the building's second decorative phase:⁴ the mouldings of the first phase, which divided the walls into panels and which were subsequently plastered over in the second phase, are plainly visible on the broken edges and on the back of the fragments.

The provisional dating of the second phase of decoration towards late first cen-



7. EZ IV. View of fragmented stucco cornices from room 6 (photo: O. Jäggi).



8. EZ IV. Room 6: fragments of the painted stucco-decoration (photo: O. Jäggi).

ture/early second century AD as suggested in 1996 has been pushed forward a little on our site EZ III. In room 121 (see below, Fig. 12) we came upon fragments of murals and cornices closely related to those on site EZ IV. A coin which had been struck under King Rabbel II, was embedded in a piece of rough plaster (rendering coat). The coin defines a *terminus post quem* of 103-106 AD for the decoration of room 121.

Rooms 7-9

In squares 87-88/AO we reached the floor level of the partially excavated room 7 (see Fig. 2). The flagstone pavement is laid at a right angle to that in room 6 and con-

4. The sequence of phases is sketched in Kolb 1997: 239f.

sists of considerably smaller and much less well-preserved sandstone pavers on a slightly lower level (923.80 m compared to 923.85 m in room 6). To the east, in squares 86-87/AP-AQ, the pavement of the ground floor is lost. Only two sides of the room are clear - the pillars P1 and P2 in the west and wall H in the south. Since there are no indications of a separating wall between walls L and H, room 7 probably extended to wall I in the east (see Fig. 2). The function of room 7, when one takes into consideration the adjacent, richly decorated room 6, was probably that of a courtyard.

The eastern faces of pillars P1 and P2, facing room 7, were as richly decorated as those on the west side. On the east foot of pillar P1 were found a modillion-cornice of 70 cm length as well as fragments of the connected painting. A vegetative decor in black is painted on an ochre coloured ground. Red cherry-like fruits are depicted among a dense black foliage.

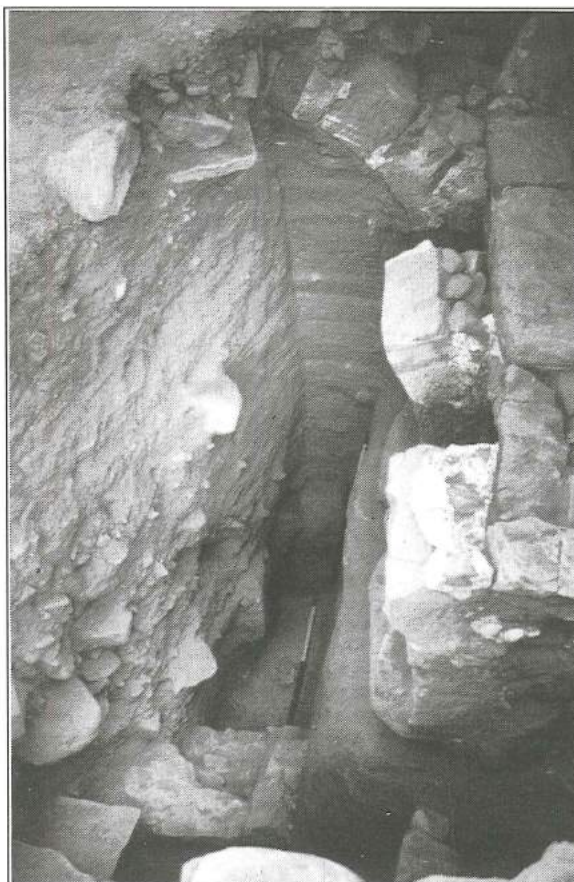
While the bedrock in the area of room 6 and the western section of room 7 can be assumed to be just below the floor level, it falls sharply further eastwards, necessitating the construction of the extraordinarily well-preserved sub-structures in squares 86-87/AP-AQ. The easterly edge of what is preserved of the pavement in room 7 marks the transition to the area of the lost floor which was supported by the said sub-structure. Rows of arches ranged between walls H and N and between N and L, some of which are completely intact while others are preserved as pillars (Fig. 9). The pillars of the arches along wall L stand somewhat higher in a ledge hewn out of the rock. The sub-structures extend about 3.5 m down to the bedrock surface of the lower floor. This cellar or these cellars were originally reached by a short staircase in corridor 9 which was walled up during the last phase of use in the fourth century.

The pavement in the partially exposed room 8 is laid more or less on the same le-

vel as the floors of rooms 1-3 and 6-7 (918.72 m). The floor in room 8 rests on a sub-structure just like that of the aforementioned room 7. The coins found in rooms 8 and 9 confirm that the end of the last phase of use of the southern corner of this large building was again due to the earthquake of AD 363.

Room 1 and its Murals

In PQ 90-92/AN the second half of room 1, which measures c. 4 m x 5 m, was excavated during the campaign of 1997. In addition to the door in wall C room 1 opened with a passage to the east (see Fig. 2). The debris in room 1 again contained a large number of flagstones from the collapsed upper floor. The last 30 cm above the floor level consisted almost exclusively of fragmented stucco cornices and wall-paintings. The careful removal of this last layer re-



9. EZ IV. View of the substructures in 87/AO-AP from the east. (photo: D. Keller).

quired more than a week and gave the impression that there could hardly be any large sections of wall decoration still clinging to walls A and F behind the protective bulk left in front of them. This foreboding was fortunately only confirmed in the northern part of wall A, where the roots of plants had, in the course of time, reached deep down and forced away resp. destroyed the wall covering. On the northern wall F a few, small, painted patches are still *in situ*.

The consistent theme of the decorations allows a reconstruction of the basic design of this wall despite its bad state of preservation. In contrast to wall C opposite, which is decorated along its entire length with a single illusory painted architectural façade, two smaller façades of 2 m length had been depicted on wall F, separated by a central painted pilaster. Both façades were framed above by the blue-grey epistyle – like those on walls A and C – supported by painted pilasters in the corners of the room (Kolb 1997: 235, Figs. 7-8).

In contrast to walls A, C and F, which are preserved to a height of at least 3 m, wall G has collapsed eastwards down to the last course of stones. In many places the preserved sections of the wall decoration were higher than the remaining wall itself and stood as fragile, painted stucco-lamina. In the last days of the dig numerous large fragments of wall-painting could be recovered from the area east of wall G, which will allow a reconstruction of the decoration up to the height of the pilaster-supported blue-grey epistyle. An architectural façade is once again depicted differing only in details from the better preserved one on wall C.

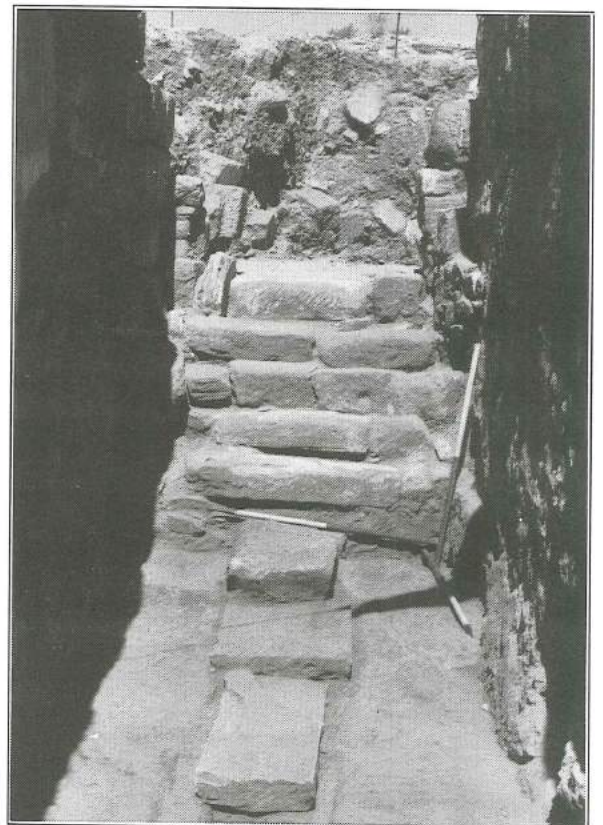
Rooms 2 and 5

The remaining part of corridor 2 (c. 923.95 m) was cleared in square 92/AN (Fig. 2). A five-step stairway at the north

end of the corridor, leading up to room 5 (925.20 m), was built over the covering slabs of the rock-hewn channel in room 2. The hastily built stairway, like the cover slabs of the channel, belong to the final phase of construction and use (Fig. 10).

EZ III

In squares 117/G-H the northern edge of room 111 was cleared (Figs. 11 and 12). Only a few stones of wall BG, which is very badly preserved, are still in place. The same is true of the two short walls CQ and BH, which join on to wall BG. The walls stand on the levelled rock terrace which ends in an arch shape in the north of squares 117/H-I. The west side of room 111 opened, with 2 columns, onto room 118 and was accessible in the south, that is in the east from rooms 112, 120 and 114.⁵ Its close connection with the structures of the southern



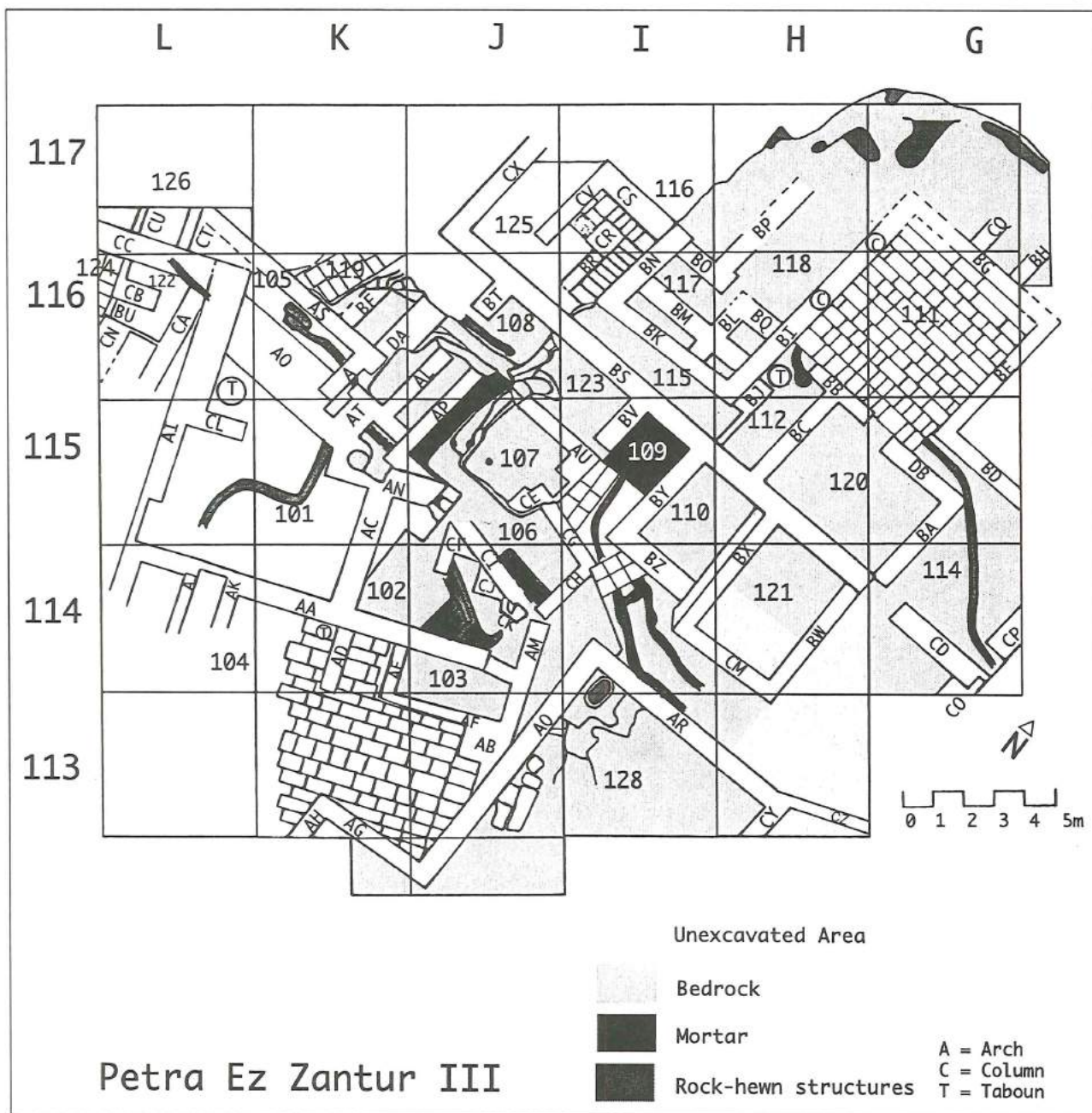
10. EZ IV. Corridor 2 and steps leading up to room 5 (photo: D. Keller).

5. The previous reconstructions of room 111 as a peristyle are thus untenable.

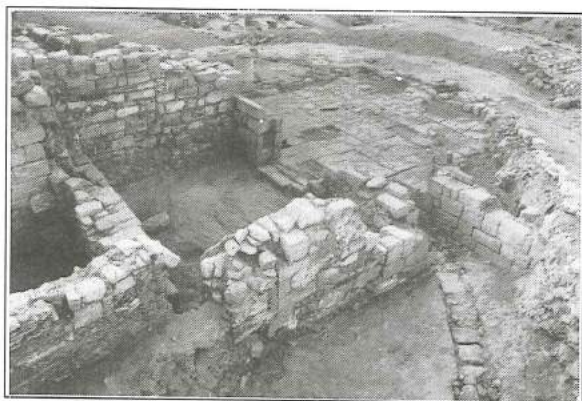
rooms characterizes room 111 as courtyard. A further indication is its weatherproof flooring of flagstones; the neighbouring rooms 112, 120 and 140 have floors of beaten earth. A short, corridor-like extension connects courtyard 111 with room 114 (c. 3.7m x 5m) in 114-115/G (Figs. 11 and 12). The unusually broad door, with a span of 1.2 m, opens to the east and may have been the main entrance of the house. If this assumption is correct, room 114 was a foyer con-

necting the eastern rooms around courtyard 111 and through the passage in wall CD, to the neighbouring area to the south. A wastewater channel hewn out of the bedrock runs from a funnel-shaped gully in room 112, along wall BB, across room 114 and can be followed to the threshold in wall CP.

In room 120, to the south of courtyard 111, we reached bedrock (Figs. 11-12). The room, measuring 3.5 m x 4.5 m stretches along the courtyard and was probably a rep-

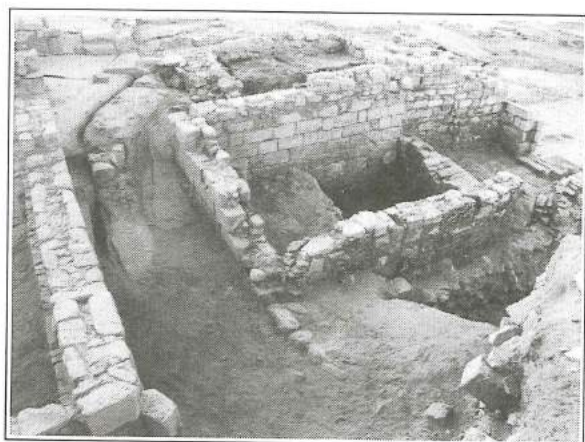


11. EZ III. Schematic plan of the structures (drawing: M. Boillat).



12. EZ III. Rooms 111, 120-121 and 114 from SE (photo: R. Frank).

representative room in the original building context. Room 121, south of wall BS, has a badly built east wall BW which is only loosely jointed to walls BS and BA (Figs. 11-13). Room 121 originally opened through a later blocked door in wall BS. About 2 m below surface we came upon strata containing large quantities of ash, debris of the collapsed walls and their decoration, that is, fragments of red plaster and polychrome cornices. These strata reached almost down to the floor level, where a deposit of several broken Nabataean coarse ware vessels and a coin from the reign of Commodus (180-191 AD) were found. However, the most remarkable find from room 121 was the previously mentioned bronze coin of Rabbel II dating from the last years of the independent Nabataean kingdom (103-106 AD). It was stuck in a piece of under-plaster and provides a good



13. EZ III. Wall AR, the rock-hewn channels and rooms 120-121, from the east (photo: R. Frank).

terminus post quem for the decoration of room 121, for the wall BS and for the walls of room 120.

In PQ 114/I we excavated down to the bedrock from the western edge of the pavement in room 109 (Figs. 11 and 13). It was again evident that during the early use of the site – probably still in the first century BC – water played a central role: two more or less parallel channels connected with an overflow are carved out of the rock and run from room 109 to the east. The sloping bank built of slabs and hydraulic mortar along wall BX in room 110 seems to indicate that this room, too, was originally used in connection with water.

In the western squares 116-117/I a staircase with two flights was exposed at the edge of the terrace. Its upper flight runs from corridor 115 down to a flagstone paved landing between wall CS and staircase pillar CR (Figs. 11 and 14). The obvious danger of walls CS and CV collapsing dissuaded us from clearing the visible door opening in wall CV.

The staircase proves that the terracing of the structures was not confined to the two main levels on EZ III already mentioned, but that it continued in the steep parts of the north-western slope.

The fact that the stratified finds are not chronologically homogeneous makes it difficult to date the rooms. A preliminary analysis of the finds indicates that the rooms were abandoned in the Severan period, that is significantly earlier than the building EZ IV which was inhabited until 363 or the dwelling on EZ I destroyed in the early years of the fifth century AD.

B. Kolb

EZ IV: Glassfinds from Room 6

The destruction by an earthquake was clearly demonstrated by the contexts in room 6: Below the collapsed wooden beams and fragments of the wall decoration there were diverse, broken vessels of both glass



14. EZ III. General view of the rooms along the north-western edge of the terrace. Staircase 116 in the foreground (photo: R. Frank).

and pottery, lying directly on the paved floor. The fact that this destruction layer on EZ IV can be connected with the earthquake of 363 AD was already proved by the coins found during the 1996 campaign in corridor 2 (Kolb 1997: 234).

It is noticeable that all the ceramic and glass vessels lay on the floor along walls H and K and that not a single one was found in the central area of the room. Wooden shelving, standing against these walls would be a possible explanation for this phenomenon – but if they existed they have left no trace.

Analysis of the Glass Finds

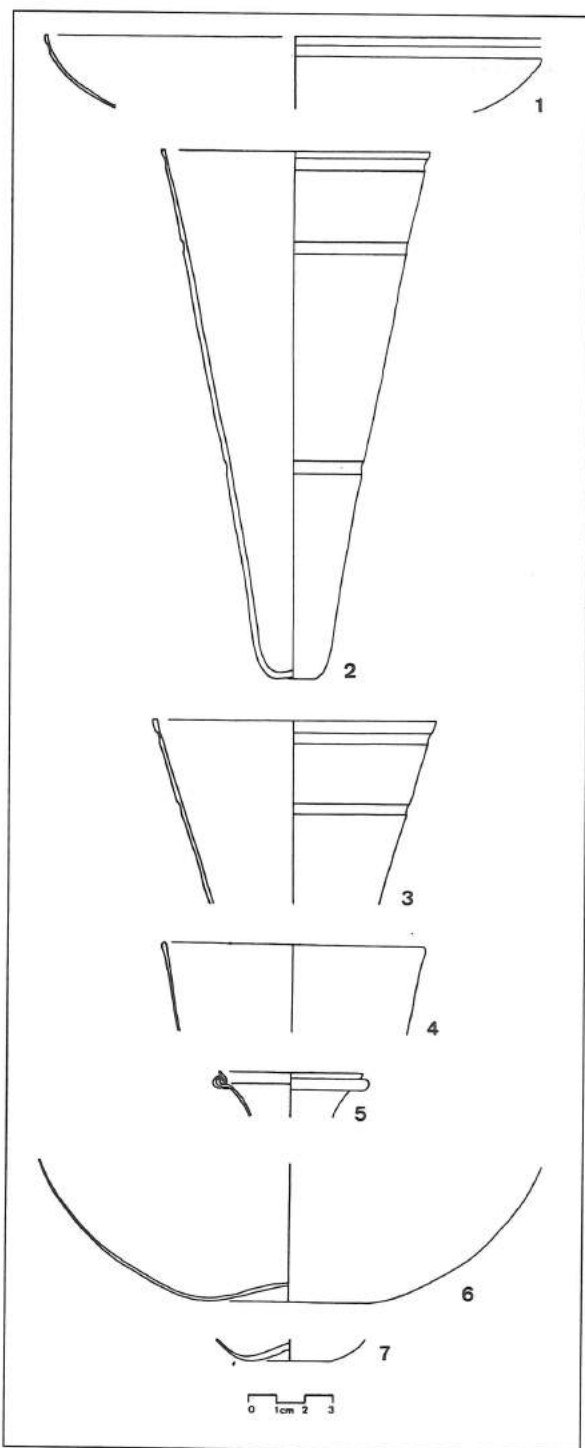
Apart from a large quantity of undeterminable and undecorated body sherds there were seven more or less determinable glass vessels. These are: the rim fragment of a shallow bowl with cracked-off rim and a broad incised groove on the outside just below the rim (Fig. 15: 1); an almost completely preserved conical beaker with cracked-off rim, three broad incised grooves

on the outside and a small shallow slightly concave bottom (Fig. 15: 2); a rim sherd of a second beaker with the same form but with two broad incised grooves (Fig. 15: 3); a rim fragment of a conical goblet with a rounded straight rim (Fig. 15: 4); the rim fragment of a bottle or an *unguentarium* with a rounded, sloping rim, funnel-shaped spout and a folded flange immediately below the rim (Fig. 15: 5); the concave bottom of a large vessel with a spherical body (Fig. 15: 6) and finally, a second concave bottom sherd (Fig. 15: 7).

There are two distinguishable qualities of glass: on the one hand vessels of good quality clear glass with fairly thick walls (Nos. 1-3) and on the other hand vessels of thin, corroded bluish green to greenish blue glass (Nos. 4-7). It is very likely that the thin-walled, greenish-blue glass of lower quality belong to a cheap local production while the vessels of better quality thick-walled bleached glass could be regarded as imports.⁶ Whether the difference in quality

6. This supposition is made partly because greenish blue glass is much commoner than colourless glass, at least in the Late Roman strata on az-Zantur. On the phenomenon of simple cheap glass vessels being locally produced in Roman towns while lighter quality glass was imported

from specialised workshops, see Rütli 1991: 144-168. On the existence of specialised glass workshops of the fourth century AD in Palestine see Davidson Weinberg 1987: 62-70; Kuhnen 1990: 285; Kuhnen 1994: 47.



15. Nos. 1-7: EZ IV. Glass from room 6 (drawings: D. Keller).

7. On vessel No. 1 see Davidson Weinberg and Goldstein 1988: 94-96 Nr. 459-464 Figs. 4, 48, 459-464; on the pair of conical beakers No. 2-3 see Davidson Weinberg and Goldstein 1988: 93 No. 439-449 Figs. 4, 47, 439-449. On the dating of the glass factory in the decades between 350 and 380 AD: Kuhnen 1994: 47 n. 28.
8. This is true not only in the Syro-Palestinian area

of the glass is really a reflection of its provenance can only be suggested at the moment. There are numerous comparisons for the thick-walled, colourless vessels with cracked-off rim (Nos. 1-3) from the glass factory in Jalame in the Carmel region (Israel) which was active in the third quarter of the fourth century AD.⁷ It is tempting to consider these vessels as imports from the Palestinian area, for example from Galilee.

A completely preserved rim (No. 1) is comparable to a bowl from Samaria, which not only has horizontal incised grooves but also an incised decoration of stars and Greek letters. It is supposed to come from a fourth century AD context (Crowfoot 1957: 416-417 No. 1; Fig. 97:1). Rims of undecorated bowls of this shape are known from our site EZ I in Petra from layers of the fourth and fifth centuries AD. These shallow bowls can thus be regarded as a typical example of glass drinking vessels of the fourth century in Palestine and Transjordan.⁸ Conical glass beakers with wide incised grooves occasionally appear in later find contexts in Transjordan, for example in the first half of the fifth century AD in Callirrhoë ('Ayn az-Zārā) and from the late fourth till early sixth century in the legionary fortress of al-Lajjūn.⁹ Undecorated beakers of the same form appear on site EZ I chiefly in the layers of building phase Late Roman I, that is before 363 AD; the same is true of similar beakers with blue blobs. A fragmentary conical beaker with engraved decoration from the American Excavations of the Temple of the Winged Lions in Petra is also from the destruction level of the 363 AD earthquake (Hammond and Johnson 1994: 333, 336, Fig. 5). The

or in the Eastern Mediterranean but also in Europe: Isings 1957: 143-144 Form 116.

9. Callirrhoë: O. Dussart, *Les verres*, in Clamer 1997: 100 Pl. 26, 1. On the dating of the Late Roman settlement of Callirrhoë see the coins dated to the years 383 - 457 AD; cf. Clamer 1997: 92-93 No. 22-57; al-Lajjūn: Jones 1987: 624, 626, 634, 642 No. 20, 45 Figs. 127, 20, 131, 45.

conical beaker can therefore – at least in Petra – be considered a leading form in the middle of the fourth century AD with a few late follow-ups – whether these beakers were used as drinking cups or lamps in the Late Roman period is still a matter of discussion. There are convincing arguments for both uses – both from the find contexts and from the pictorial sources – so that both suggestions can be taken into consideration.¹⁰ The find contexts in room 6, however, suggest that these beakers were used as drinking vessels rather than as lamps, since there are absolutely no holders which could have supported the beakers as lamps. These would have been necessary, had they been used as lamps while for a drinking cup they are not necessary, since a drinking cup can be held in the hand and placed upside down on its rim when empty.¹¹ Rim fragment No. 4 with its rounded rim and conical wall likewise has parallels from Jamale (Davidson Weinberg and Goldstein 1988: 40-41. 62 No. 8; 187 Figs. 4: 2, 8: 4, 24, 187). However, comparable rims are already present in Dura Europos (Syria) of the third century AD (Clairmont 1963: 103 No. 473 Pl. 11, 473). Such vessels also appear in the Late Roman fort of Mazed Tamar (Israel); however, they cannot be more precisely dated there since the fort was occupied from the late third to the early seventh century AD. Most of the glass finds from Me'azad Tamar belong to the fourth and fifth century AD.¹² The rim fragments of this form from Khirbat Shema' (Israel)

probably also belong in the fourth and early fifth centuries.¹³ The form is also known in Transjordan, but in later find contexts – for example Callirrhoë ('Ayn az-Zārā) in the first half of the fifth century and from al-Lajjūn in the first half of the sixth century AD (Callirrhoë: O. Dussart in Clamer 1997: 100, Pl. 26: 3-4; al-Lajjūn: Jones 1987: 625. 640 No. 39-40 Figs. 130: 39-40). Rims of such beakers appear on terrace EZ I in layers belonging to the fourth and fifth centuries AD. Whether this rim can be reconstructed as a conical beaker with a shallow pushed-in base, as other, well-preserved vessels imply¹⁴ can only be suggested. A reconstruction of such beakers with a concave bottom would also be possible. Most importantly, this form is one of the commonest glass types of the fourth century AD although it already appears in the third century and continues into the fifth and sixth centuries. The funnel-shaped spout closed with a folded flange immediately below the rim of the spout can be compared with Syrian gutturnia with pear-shaped bodies (Hayes 1975: 60-61 No. 157 Fig. 7: 157), usually dated to the third century AD for example the rims from Dura Europos dated pre-256 AD (Clairmont 1963: 104-106 Nos. 487-488. 500-501 Pl. 12: 487-8, 500-501). Such ointment containers appear in the necropole on the Mount of Olives in Jerusalem until the middle of the fourth century AD.¹⁵ This form can thus also be considered as a representative of the Late Roman glass corpus of the mid-fourth century in the Near

10. Now concisely summarised by Fleming 1997: 32; Zevulun and Olenik 1978: 21. 41-42; Davidson Weinberg and Goldstein 1988: 89-91.

11. On the phenomenon that artificial stands for drinking vessels without an appropriate base are a rare commodity, see e.g. the painted Nabataean fineware: S.G. Schmid, *Die Feinkeramik der Nabatäer: Typologie, Chronologie und kulturhistorische Hintergründe*, in B. Kolb and S.G. Schmid, *Petra-az Zanṭūr II, Terra Archaeologica III* (forthcoming).

12. Erdmann 1977: 106-107 No. 565. 570 Pls. 6, 565. 570. On the postulated dating of most of the glass

vessels and the duration of occupation of the fort see Erdmann 1977: 98. 111; Kuhnen 1989: 64.

13. Meyers and Kraabel and Strange 1976: Pls. 8, 4, 16-21; on the debated stratigraphy and chronology as well as the uncertain break in occupation in the early fifth century AD in Khirbat Shema' see Kuhnen 1989: 24-25. 33.

14. See e.g. such glass from Samaria: Crowfoot 1957: 416 No. 10 Fig. 96, 10; a similar vessel in Toronto cf. Hayes 1975: 104 No. 379 Fig. 11, 379.

15. Bagatti and Milik 1958: 143-144. 152 No. 12. 24. 26 Figs. 33, 12. 24. 26. On the dating of the grave 230 see Kuhnen 1989: Beilage 3 No. 53.

East. Glass vessels with concave bottoms (Nos. 6 and 7) are extremely common in the Near East in the Late Roman period. While they usually belong to bottles, when found in the glass factory of Jalame (Davidson Weinberg and Goldstein 1988: 76-77 Nos. 309-317), the finds from the Late Roman dwellings on az-Zantūr (EZ I) in Petra show that, at least in the fourth and fifth centuries they were more likely to be found on bowls (Keller 1996: 295-297. 303 No. 1 Fig. 879, Pl. 6:1). While the relatively high preserved body of No. 6 suggests a closed form it is not possible to draw a conclusion about either fragment.

In general what we have is a small but – for the 363 AD earthquake level – typical group of glass vessels.¹⁶ That four of these vessels can be described as drinking vessels is not surprising, but illustrates the position which glass had in the Late Roman tableware where it had, to a large extent, replaced fine ware – or at least complemented it.¹⁷ In Late Roman Petra this seems to have been especially true of drinking vessels, the bowls and cups. However, the glass here did not appear as the replacement for stamped TS-vessels as it did in Palestine, but in concurrence with local Nabataean fine ware. Plates and platters could also be ARS vessels.¹⁸ What is surprising is that there are more cups (Nos. 2-4) than bowls (No. 1) in this ensemble. This proportion is completely reversed – in favour of bowls – in the layers of building phase Late Roman II on EZ I which is dated only a couple of decades later.¹⁹ The situation in the late fourth and early fifth centuries where glass bowls had completely replaced the local fine ware bowls is already apparent in the mid-fourth

century AD where bowls in both materials appear together in the same find complex (see below, bowl Fig. 17).

Catalogue: Glass Finds from Room 6 (Fig. 15)

1. Rim of a shallow bowl with cracked-off rim and a broad incised groove on the outside below the rim.
PQ 89-90/AQ-AR, Abs. 3, FK 3065, in front of wall K.
Colourless; Diam.: c. 18 cm, height: 2.6 cm, wall thickness: 0.08 cm (broken edge), 0.09 cm (rim).
2. Whole profile of a conical beaker with cracked-off rim, three broad incised grooves on the outside and a flat, slightly concave, small bottom.
PQ 89/AR, Abs 3, FK 3051, in front of wall H (EF 3066).
Colourless; Diam.: 9.6 cm, height: 19.1 cm, wall thickness: 0.20-0.25 cm (wall), 0.15 cm (rim).
3. Rim of a conical beaker with cracked-off rim and two broad incised grooves. PQ 89-90/AQ-AR, Abs. 3, FK 3065, in front of wall K.
Colourless; Diam.: 10.2 cm, height: 6.6 cm, wall thickness: 0.14 cm (broken edge), 0.16 cm (rim).
4. Rim of a conical goblet with rounded lip. PQ 88-89/AQ-AR, Abs. 3, FK 3051, in front of wall H.
Greenish blue; Diam.: 9.4 cm, height: 3.2 cm, wall thickness: 0.05 cm.
5. Rim of a closed form with rounded lip and a folded flange immediately below. PQ 89-90/AQ-AR, Abs. 3, FK 3065, in front of wall K.
Bluish green; Diam.: 5.2 cm, height: 1.6

16. Another find complex with glass vessel-fragments similar in composition (FK 1301, 113/H Abs. 4) was found during the 1997 season on site EZ III together with 3 coins: EF 1311 (third-fourth centuries AD), EF 1313 (358-361 AD) und EF 1316 (Nabataean).

17. See Kuhnen 1989: 66-67, where the central significance of glass of Palestine, at least in the mid-

dle of the fourth century AD is demonstrated.

18. See e.g. the ARS vessels from the Late Roman dwellings on EZ I in Schneider 1996: 139-140 Figs. 592-598.

19. See Keller 1996: 295-297. 303-305 Nos. 1-11, Figs. 879-889. The other glass finds from the layers of Phase Late Roman II confirm this picture.

cm, wall thickness: 0.10 cm.

6. Bottom and body sherd of a vessel with a concave bottom and hemispherical body (Fig. 15. Nr. 6). PQ 88-89/AR, Abs. 3, FK 3051, in front of wall H.

Greenish blue; Diam.: 5.8 cm, height: 5.0 cm, wall thickness: 0.05 cm (broken edge), 0.13 cm (centre of bottom).

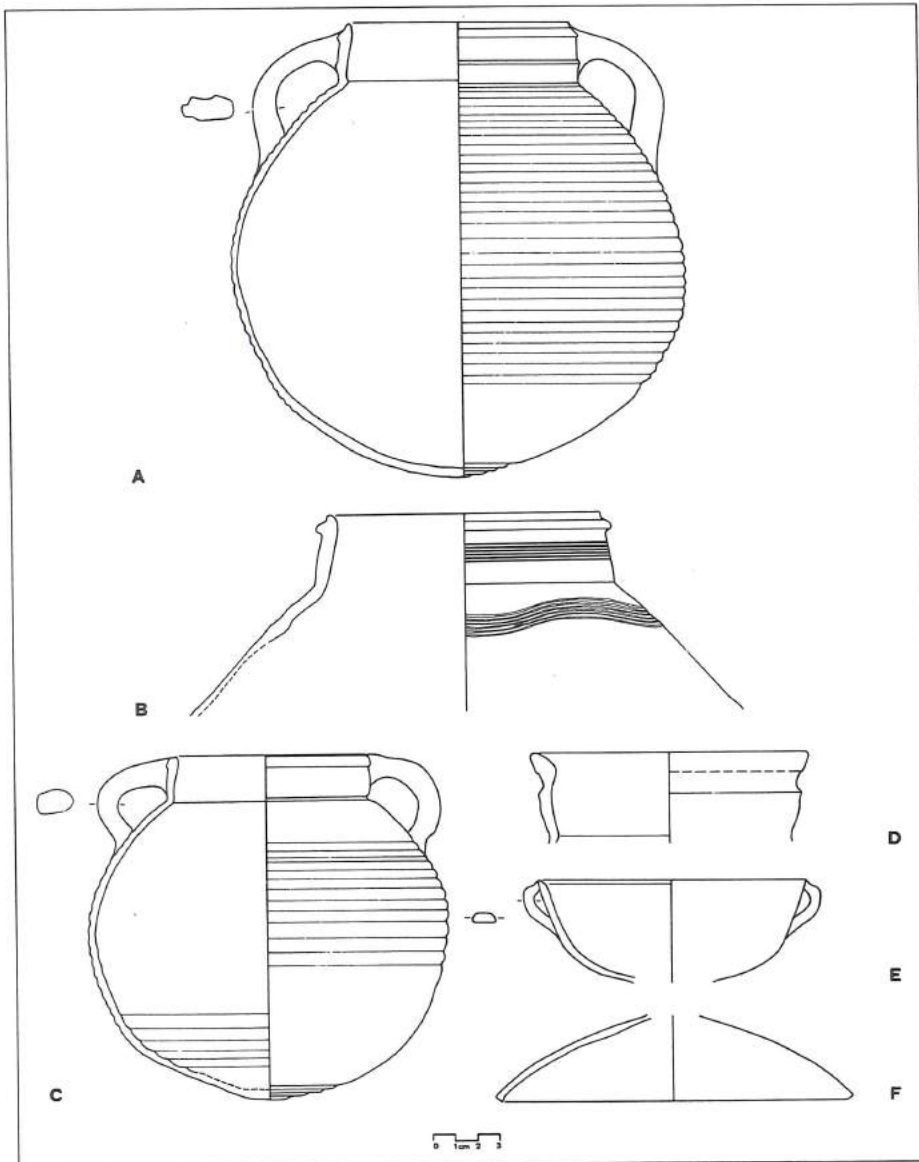
7. Bottom of a vessel with concave bottom. PQ 88-89/AR, Abs. 3, FK 3051, in front of wall H.

Greenish blue; Diam.: 3 cm, height: 0.75 cm, wall thickness: 0.05 cm (broken edge), 0.23 cm (centre of bottom).

D. Keller

Coarse Ware Pottery from Room 6

Among the finds of Room 6 there were two complete cooking pots (Fig. 16: A and C), a complete jug (Fig. 17:H), a complete pilgrim flask (Figs. 17: G and 18), a complete basin (Fig. 17: I), two rims of two different jars (Figs. 16: B and D), the rim of a jug (Fig. 17: K), the rim of a juglet (Fig. 17: L), a casserole which was reconstructed from eight rim sherds, four body sherds and three bottom sherds (Fig. 16: E), several sherds counted as 6 individual lids (like Fig. 16: F), four were of 16 cm in diameter, two of 12 cm in diameter. There was also the upper part of an incense burner, made of clay, and two complete "Nabataean" bowls,



16. A-F: EZ IV. Coarse ware pottery of the fourth century AD from room 6 (drawings: I. Haussener).

16.A EF K 3046.3062 Cooking pot. Reddish yellow (Munsell 5YR 7/6), surface: red (Munsell 2.5YR 5/6), bottom blackened. Diam. rim: 10 cm.

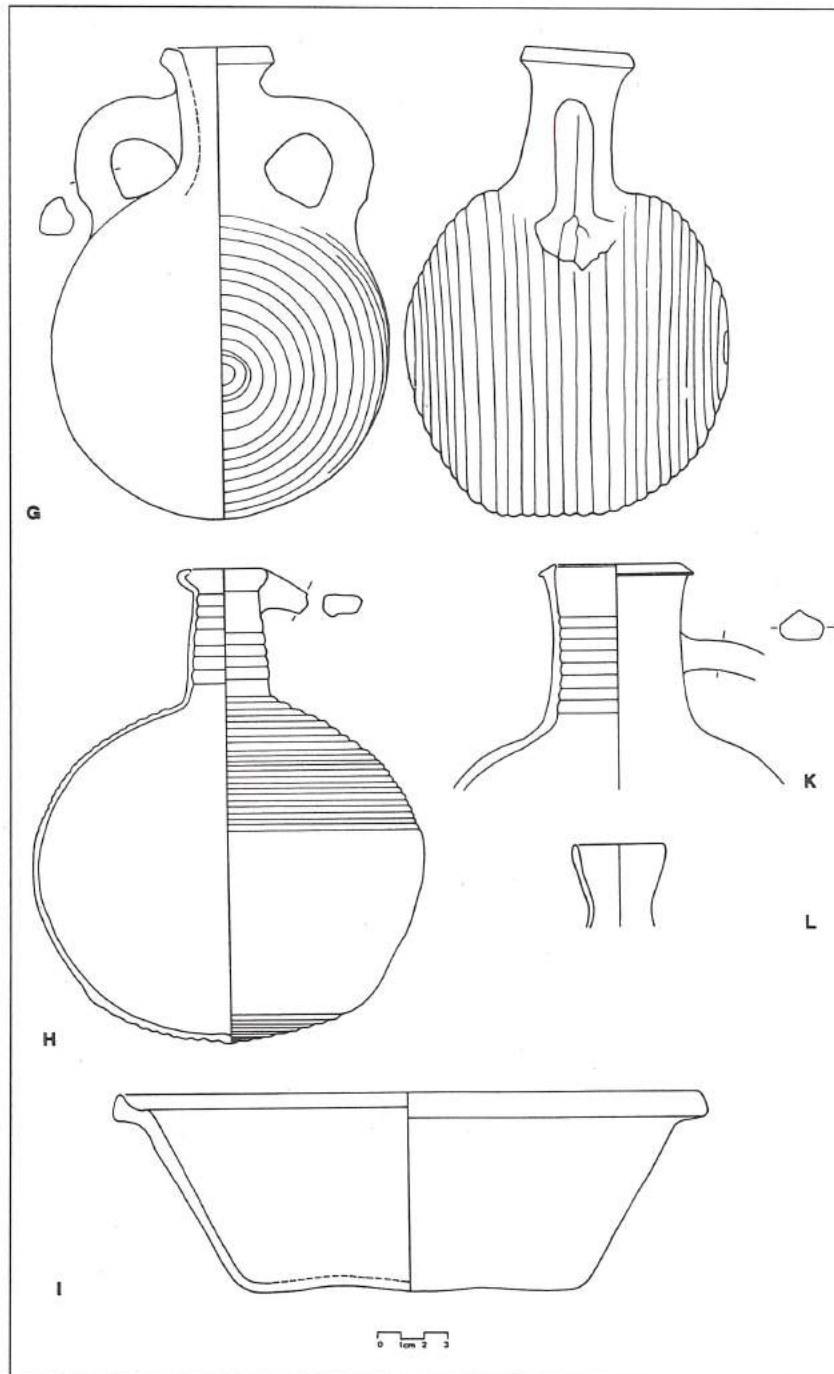
16.B K 3046.1514 Jar. Light red (Munsell 10R 6/8), surface: white (10YR 8/2). Diam. rim: 12 cm.

16.C EF K 3046.3057 Cooking pot. Light red (Munsell 2.5YR 6/6), surface: very pale brown (Munsell 10YR 8/3). Diam. rim: 9 cm.

16.D K 3046.1513 Jar. Light red (Munsell 10R 6/8), surface: very pale brown (Munsell 10YR 8/3). Diam. rim: 12 cm.

16.E K 3046.1511 Casserole. Reddish gray (Munsell 10R 6/1), surface: light gray (Munsell 5YR 7/1). Diam. rim: 12 cm.

16.F K 3046.1512 Lid. Reddish yellow (Munsell 5YR 6.5/6), surface: light gray (Munsell 10YR 7/2). Diam. rim: 16 cm.



17. G-L: EZ IV. Coarse ware pottery of the fourth century AD from room 6 (drawings: I. Haussener).

17.G EF K 3046.3058 Pilgrim flask. Pink (Munsell 5YR 7.5/4), surface: white (Munsell 2.5Y 8/2). Diam. rim: 4.5 cm.

17.H EF K 3046.3059 Jug. Red (Munsell 10R 5/8), surface: red (Munsell 10R 4/8). Diam. rim: 3 cm.

17.I EF K 3065.3081 Basin. Light red (Munsell 2.5YR 6/8), surface: reddish brown (Munsell 5YR 5/3) and white (Munsell 10YR 8/2). Diam. rim: 24 cm.

17.K K 3046.1600 Jug. Light red (Munsell 2.5YR 6/8), surface: white (Munsell 2.5Y 8/2). Diam. rim: 5.4 cm.

17.L K 3046.1510 Juglet. Light red (Munsell 10R 6/8). Diam. rim: 4 cm.

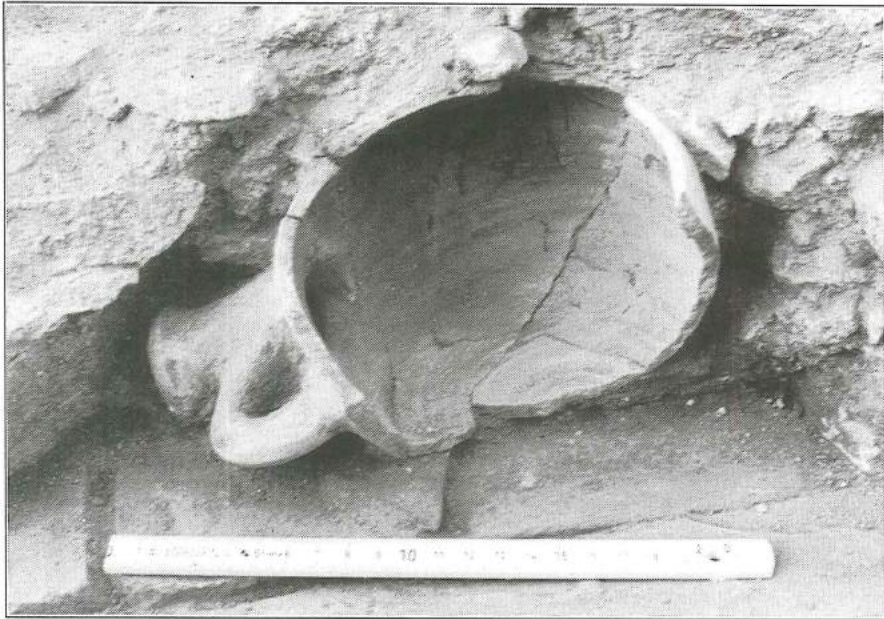
one with birds and palmettes as decoration. The style of the palmettes clearly indicates that the painted bowl was also manufactured in a late period (contemporary with the common ware discussed here) according to the context in which the bowl was found.²⁰

The vessel forms are a representative

cross-section of the current coarse ware repertoire from the fourth century AD. The six lids – only one of which belongs to a retraceable vessel, the casserole (Fig. 16:E), suggest that in all likelihood this ceramic assemblage was composed of more vessels than those found. Nevertheless, the basic

20. The plain Nabataean bowl, EF 3056. The painted Nabataean bowl, EF 3055, shall not be discussed further in this report; it will be subject of

another report which will investigate the development of the Nabataean painted pottery after the middle of the second century AD.



18. EZ IV. Room 6. Pilgrim flask *in situ* (photo: D. Keller).

outfit of a Late Roman house is present.

Comparisons with the Late Roman Pottery from Site EZ I

Some of the vessels are well-known from the Late Roman houses on the terrace on the other side of the hill, *az-Zanṭūr I*, such as the big jar decorated with fine incised lines (Fig. 16:B; cf. Fellmann Brogli 1996: 242, Figs. 728-729, type A.2a), the casserole with two vertical handles (Fig. 16:E; cf. Fellmann Brogli 1996: 257 Figs. 773-774, type C.6a), the basin (Fig. 17:I; cf. Fellmann Brogli 1996: 260 Fig. 788, type C.1a), the pilgrim flask (Fig. 17:G, 18)²¹ and the lids (Fig. 16:F; cf. Fellmann Brogli 1996: 269 Fig. 841, type D.1a). The two cooking pots, one with a broad ridge running directly below the rim (Fig. 16:C) and the other big pot with a sloping outer rim and a small ridge below it (Fig. 16:A) have no direct parallels in the Late Roman houses from site EZ I, but are in the tradition of the Late Roman cooking pots classified as A.2a/A.2b and A.1a in the corresponding publication (Fellmann Brogli 1996: 244 Figs. 733-734, and 245 Figs. 736.738).²² Also unparallel

in the *az-Zanṭūr* Late Roman houses are the rim forms of the jar with a thickened end (Fig. 16:D), the narrowing rim of the juglet (Fig. 17:L) and the sloping outer rim of the jug with a single vertical handle extending from the neck to the shoulder (Fig. 17:K). The jug with the rim curved inward is striking (Fig. 17:H). Not only is the rim form unparallelled and unusual for *az-Zanṭūr* pottery; the clay, with its lighter red fabric and slightly darker red surface, suggests the possibility that this jug was not manufactured locally (the clay has not yet been analysed). The clay of all the other vessels from Room 6 is typical of Late Roman ware from Petra, that is the fabric is mainly light red, sometimes reddish yellow, with the exception of the pilgrim flask with a kind of pink fabric.

Chronology

The pottery from the Late Roman houses on site EZ I (*az-Zanṭūr*) dates from the fourth century AD. There were two occupation phases, one which ended with the earthquake of 363 AD (Late Roman I), the second supposedly lasting from the last

21. Its rim form and handle shape resemble more type B.18b of Fellmann Brogli 1996: 267 Fig. 828, than her type B.18a: 267 Fig. 827.

22. In the meantime the typology has been more differentiated and some of the types already published are divided in further sub-types.

quarter of the fourth until the early fifth century AD (Late Roman II; Fellmann Brogli 1996: 222; 236, also with a reference to B. Kolb in the same publication). All of the EZ I vessels which are referred to as comparisons to the ceramic shapes from Room 6 occur in both occupation phases.²³ On the other hand none of the forms which are peculiar to, and only to, occupation phase Late Roman II and probably arise at the end of the fourth century AD were found in Room 6. This, and also the corroborating observation that Room 6 was probably destroyed by some violent event (possibly the earthquake from 363 AD, which is known to have caused severe damage on terrace EZ I), is a strong argument in favour of dating the pottery assemblage to the middle of the fourth century AD, that is before 363.

Although no clear differentiation of the ceramic repertoire emerges between phase Late Roman I and Late Roman II (see also Fellmann Brogli 1996: 237), some further observations support a dating of the Room 6 assemblage before AD 363. The clay fabric of the vessels, which are from an early fourth century context, is mostly of a bright red (light red, sometimes reddish yellow), carefully levigated, and well, that is, hard-fired whereas pottery from late fourth century onwards very often show clay colour which is greyish or darker red, and the fabric is more 'porous' – that is, coarser tempering, maybe more sand, is added.²⁴ All of the vessels from Room 6 have a bright red coloured clay and are well fired.

General Comparisons

For parallels to the cooking pots, the casserole, the lids and the basin it is best to refer to the studies of R. Fellmann Brogli

(Fellmann Brogli 1996: 238-239). The cooking pot with a sloping outer rim (Fig. 16.A) has some resemblance to the rim published by P. Parr (Parr 1970: 371 Fig. 8: 134), dated to the fourth century / first half of the fifth century AD. The fine incised lines of the storage jar (Fig. 16:B) and the rim form of the pilgrim flask (Fig. 17.G) are well-known features of Late Roman/Early Byzantine Petra (Hammond 1977-1978: 232 Pl. 46:1). The jug with the sloping outer rim and the vertical handle extending from the neck (Fig. 17:K) resembles another example from Petra (Zayadine 1974: 235 Pl. 59:3 (8) and 236 Pl. 60:8), dated by F. Zayadine to the beginning of the fourth century AD, and a jug from the al-Lajjūn fortress, Area K, trenches 1-2, also dated to the first half of the fourth century AD (Parker 1987: 577 Figs. 103, 109). Our example seems not to have carinated shoulders as in al-Lajjūn. The unusual rim form of the red coloured jug (Fig. 17:H) is comparable to examples only from much farther north, for example from Mount Nebo (Bagatti 1985: Pl. 19, Fig. 18:8). The original distribution area of this vessel with this rim form is not yet clear.

All these comparisons support our dating pertaining to the pre-363 AD strata. This small pottery assemblage from the fourth century AD is an important contribution to our knowledge of the pottery in South Jordan which is still insufficiently known.

Y. Gerber

Acknowledgements

Hani Falahat, the representative of the Department of Antiquities, was very helpful for the duration of the excavation. Thanks

23. Types (A.1a), A.2a, (A.2b), B.18b, C.1a, C.6a, D.1a. Compare the types with the list in Fellmann Brogli 1996: 237 Fig. 727.

The difference in sherd counts between occupation phases Late Roman I and Late Roman II is due to the different numbers of sherds found

overall: 589 versus 111 sherds respectively. Thus, even if the sum of the different types is less in phase Late Roman I, the types were already in use during the first occupation phase.

24. The pottery analyses are not yet finished.

are also due to Dr Ghazi Bisheh, Director-General of the Department of Antiquities as well as to Suleiman Farajat, Inspector of the Department at Petra, for their support. Our special thanks go to the SLFA (Zürich), Max Geldner Foundation (Basel) and Novartis (Basel) whose generous financial support made the 1997 campaign possible.

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Bibliography

- Bagatti, P.B. and Milik, J.T.
1958 *Gli scavi del "Dominus flevit" (Monte Oliveto - Gerusalemme) I. La necropoli del periodo romano.* Jerusalem.
- Bagatti, B.
1985 Nuova ceramica del Monte Nebo (Siyagha). *LA* 35: 249-278.
- Clairmont, Ch.W.
1963 *The Glass Vessels. The Excavations at Dura-Europos, Final Report IV/5.* New Haven.
- Clamer, Ch.
1997 *Fouilles archéologiques de 'Aïn ez-Zâra/Callirrhoé. Villégiature hérodienne.* BAH 147. Beirut.
- Crowfoot, G.M.
1957 Glass. Pp. 403-422 in J.W. Crowfoot, G.M. Crowfoot and K.M. Kenyon, *Samaria-Sebaste III. The Objects from Samaria.* London.
- Davidson Weinberg, G.
1987 Specialized Production in a Late Roman Glass Factory. *Erlsr* 19: 62-70.
- Davidson Weinberg, G. and Goldstein, S.M.
1988 The Glass Vessels. Pp. 38-102 in G. Davidson Weinberg (ed.), *Excavations at Jalame. Site of a Glass Factory in Late Roman Palestine.* Columbia.
- Erdmann, E.
1977 Die Glasfunde von Meẓad Tamar (Kasr Gehainije) in Israel. *Saalburg-Jahrbuch. Bericht des Saalburg Museums* 34: 98-146.
- Fellmann Brogli, R.
1996 Die Keramik aus den spätrömischen Bauten. Pp. 219-281 in *Petra—ez Zantur I.*
- Fleming, S.J.
1997 Late Roman Glass at the University of Pennsylvania Museum: A Photo Essay. *Expedition* 39 Nr. 2: 25-41.
- Hammond, Ph.C.
1977-1978 Excavation at Petra. 1975-1977. *ADAJ* 22: 81-101; 229-248.
- Hammond, Ph.C. and Johnson, D.J.
1994 American Expedition to Petra. The 1990-1993 Seasons. *ADAJ* 38: 333-344.
- Hayes, J.W.
1975 *Roman and Pre-Roman Glass in the Royal Ontario Museum. A Catalogue.* Toronto.
- Jones, J.
1987 The Glass. Pp. 621-654 in S. Th. Parker (ed.), *The Roman Frontier in Central Jord*

- an. Interim Report on the Limes Arabicus Project, 1980-1985 Part II, BAR Int. S. 340 (II). Oxford.*
- Isings, C.
1957 *Roman Glass from Dated Finds. Groningen.*
- Keller, D.
1996 Die spätrömischen Gläser mit Fadendekor. Pp. 295-309 in *Petra–ez Zantur I.*
- Kolb, B.
1997 Swiss-Liechtenstein Excavations at az-Zantur in Petra 1996: The Seventh Season. *ADAJ 41: 231-242.*
- Kuhnen, H.-P.
1989 *Studien zur Chronologie und Siedlungsarchäologie des Karmel (Israel) zwischen Hellenismus und Spätantike. Beih. TAVO B, 72. Wiesbaden.*
1990 *Palästina in griechisch-römischer Zeit. Handbuch der Archäologie. Vorderasien II. 2. Munich.*
1994 Kirche, Landwirtschaft und Flüchtlingssilber. Zur wirtschaftlichen Entwicklung Palästinas in der Spätantike. *ZDPV 110: 36-50.*
- Meyers, E.M. and Kraabel, A.T. and Strange, J.F.
1976 *Ancient Synagogue Excavations at Khirbet Shema', Upper Galilee, Israel 1970-1972. Durham N.C..*
- Parker, S.Th.
1987 The Pottery. Pp. 525-619 in S. Th. Parker (ed.), *The Roman Frontier in Central Jordan. Interim Report on the Limes Arabicus Project, 1980-1985 Part II, BAR International Series 340 (II). Oxford.*
- Parr, P.J.
1970 A Sequence of Pottery from Petra. Pp. 348-381 in J.A. Sanders (ed.), *Near Eastern Archaeology in the Twentieth Century. Essays in Honor of Nelson Glueck. New York.*
- Petra–Ez Zantur I
1996 R.A. Stucky *et al.*, *Petra–Ez Zantur I. Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen 1988-1992. Mainz.*
- Rütti, B.
1991 *Die römischen Gläser aus Augst und Kaiseraugst. Forschungen in Augst XIII. Augst.*
- Schneider, Ch.
1996 Die Importkeramik. Pp. 129-142 in *Petra–ez Zantur I.*
- Zayadine, F.
1974 Excavations at Petra (1973-1974). *ADAJ 19: 135-150; 233-245.*
- Zevulun, U. - Olenik, Y.
1978 *Function and Design in the Talmudic Period. Tel Aviv.*



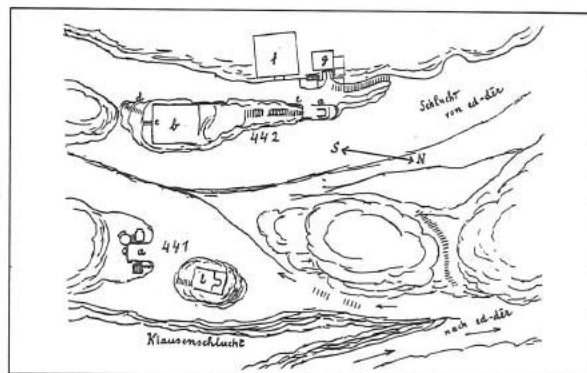
OBSERVATIONS AND INVESTIGATIONS IN THE UPPER VALLEY OF THE HERMITAGE NEAR AD-DAYR, PETRA

by

Herbert Donner and Ellen Sieg

Climbing up the usual ascent from the basin of Petra to ad-Dayr, visitors pass a narrow rock terrace from which the steep, impassable gorge of Sadd Khurayrib 'Iyāl 'Awda¹ descends in a southeasterly direction to the Wādī as-Siyyagh. This rock terrace is just before the high plateau. On the right side of the ascent, steps at a prominent rock lead up to a Christian hermitage (Dalman No. 424; Brünnow and Domaszewski 1904: No. 460). This led G. Dalman to call the whole area, including the Sadd Khurayrib, "Klausenschlucht" (Valley of the Hermitage; Dalman 1908: 23. 250f.). On the left side, going back at an acute angle and passing a rock, there is an unnamed² flat hollow from which a small, short gorge leads off almost exactly to the south and is closed off by a huge boulder. This hollow is marked on the Tourist Map (1992: B 2) as Hermitage south-east below the plateau of ad-Dayr and approximately 250 m away from it. From the north-west the Wādī ad-Dayr comes down, offering the opportunity to quickly and easily climb up to ad-Dayr. To the south-east the hollow and its southerly gorge are drained in winter by the Sadd Khurayrib 'Iyāl 'Awda. Most visitors do not notice this place, passing and overlooking it on their way to ad-Dayr (Fig. 1).³

There has been little scholarly interest in this hollow and its small gorge until now.



1. First and Second Sanctuary of the Valley of the Hermitage, Nos. 441 and 442 (Dalman 1908: Abb. 196).

Many books and papers do not even mention it (e.g. Brünnow and Domaszewski 1904; Browning 1982). Others confine themselves to short references or incomplete descriptions, such as Robinson (1930:148-150), Lindner (1985:35f.), Scheck (1985: 423) and Wenning (1987: 263). It is true that the descriptions given by Musil (1907: 137-139) and by the Horsfields (1938: 24-26) are short and incomplete, but they nonetheless contain observations and points of view worth considering. The only careful, detailed and basically reliable description with sketchmaps was written by Dalman (1908: 255-262 and 1912: 30f.).

This article has been written in honour of G. Dalman and his work in Petra about 90 years ago. Some observations and con-

1. "Barrier of the little carob trees of the Bedouin clan 'Iyāl 'Awda"; cf. Dalman 1908: 215.
2. Musil 1907: 137 speaks of the "kesselförmige Ebene (that is basin-shaped valley) umm Zeytune". Dalman's objection to this description is produced by an error, as if Musil had meant the gorge coming down from the plateau of ad-Dayr. The expression "kesselförmig", however, is not really applicable to the hollow, and we could not

verify the name Umm Zaytūna on the spot, just as little as Dalman could. In this respect Musil himself was wrong, for the name is fixed at the Jabal Umm Zaytūna about half a kilometre south-east of the upper hermitage.

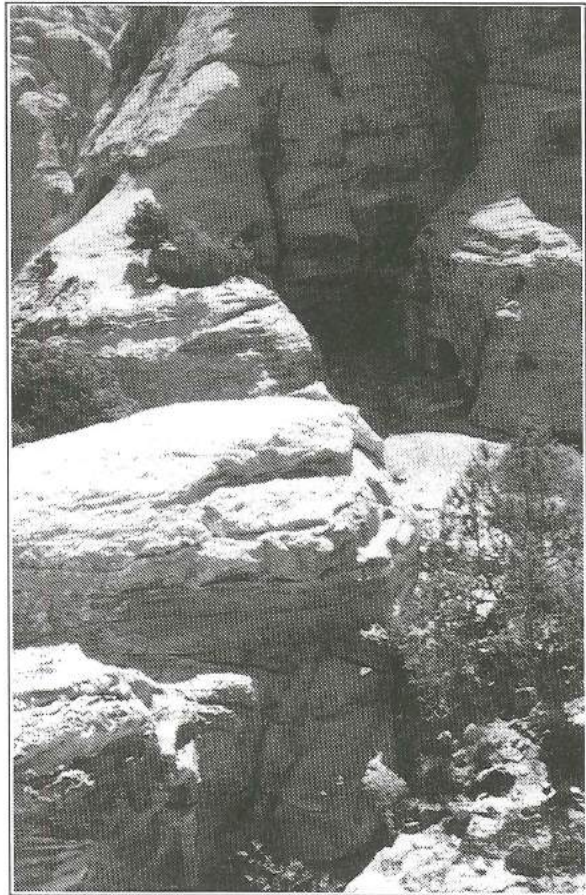
3. In fact it is difficult to see from the ascent to ad-Dayr. We only saw it from the roof of the façade of ad-Dayr, that is from above.

siderations are added to Dalman's work and sketches (see Figs. 1,2,5,7,8). Furthermore, some new sketches were drawn by E. Sieg and are added here.

The ancient monuments form three groups: 1. Dalman No. 441 on the south-east side of the hollow; 2. Dalman No. 442 on its west side and 3. Dalman No. 442¹ on the west side of the small southern gorge. Two other features are added: a first short report on newly discovered water installations on the east side of the small gorge and a brief discussion on a small sculpture fragment.

Dalman No. 441 (Al-Ḥammām)

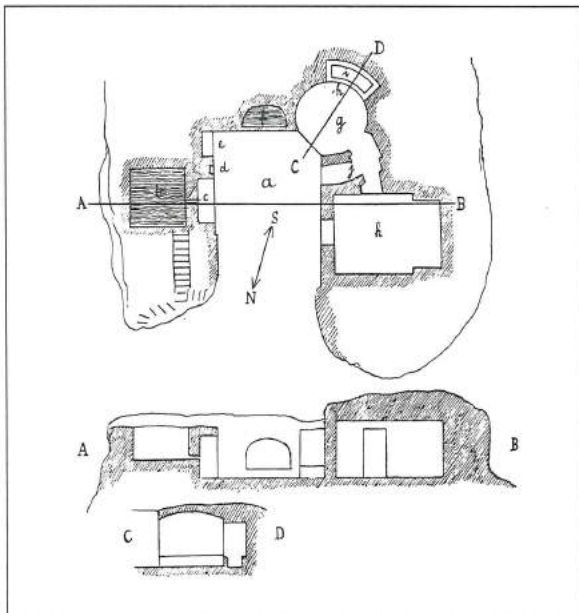
Referring to Dalman's survey his description of this rock monument (1908: 256-259; see Figs. 2-4) translates as "unique and enigmatic" (Dalman 1908: 258 "ist einzigartig und hat etwas Rätselhaftes"). In the centre is an open area carved out of the rock.⁴ It is open at the front, extending from north-north-west to south-south-east, surrounded by some installations that are rather difficult to interpret. The quarried rock



3. View of Dalman No. 441 from the north-west (in the foreground the *stibadium* rock).



4. View of Dalman No. 441 from the north-west (in the middle, on the left of the *stibadium* rock, the upper part of the "Klausenschlucht" (Sadd Khurayrib 'Iyāl 'Awda).

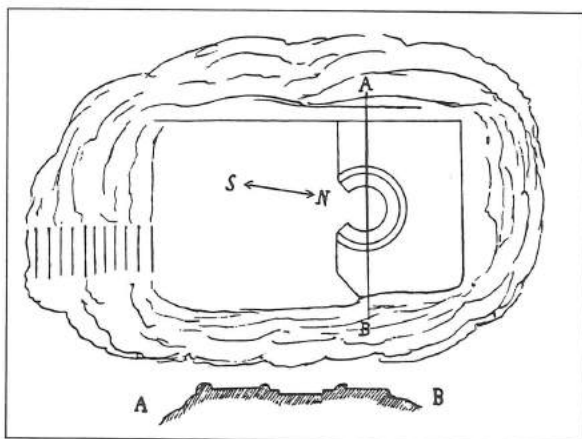


2. First Sanctuary of the Valley of the Hermitage, No. 441 a-k. Ground plan and cross-sections (Dalman 1908: Abb. 197).

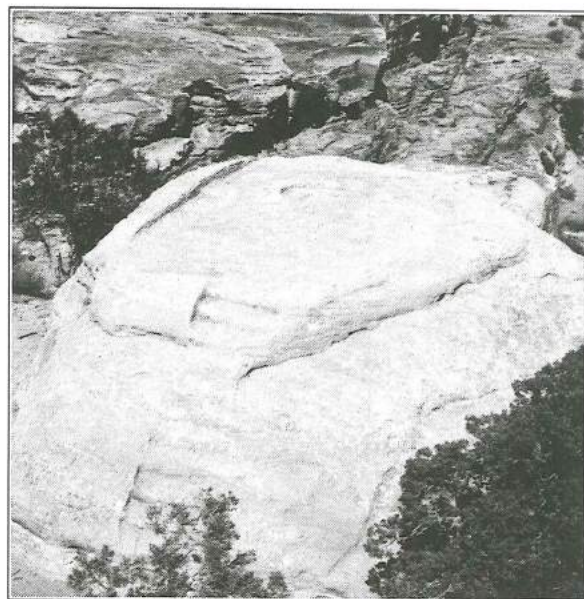
wall on the left side shows three niches of different height (*c-e*), one of them (*c*) getting water from an upper cistern (*b*) by a rock-cut channel. This cistern is the reason why the whole installation is called al-

4. Dalman 1908: 256 "hofartiger Raum" (that is a room like a yard), but it seems to be real yard.

Ḥammām. The set-up can hardly be explained in any other way than by assuming a kind of faucet regulating the water supply from above. At the back is a niche-basin (f), apparently without any connection with the cistern. At the right far corner of the open yard area, the relatively wide entrance to a *rotunda* (g) is visible. This *rotunda*, 2.40 m in diameter, has at its back a niche (h) with a curved trough (i) of 1.49 x 0.56 m and 0.50 m deep. All rooms and installations are hewn out of the rock, as is the room on the right side of the yard (k). This room has a niche in its back wall and a passage (j) to the *rotunda* as well as to the yard. North-north-east of the yard an isolated knoll of rock rises above the ground, accessible by steps from the south, having an artificially levelled place at the top. In its northern area is one of those round installations called *stibadium* (cooking range) by Dalman (Figs. 5 and 6).⁵ It is known that such *stibadia* frequently occur in Petra, but it is very difficult to understand and explain their function. A *stibadion*, also called *sigma* or *accubitum*, is a semicircular Roman dining installation ei-



5. *Stibadium* No. 441 I. Ground plan and cross-section (Dalman 1908: Abb. 200).



6. View of the *stibadium* rock (Dalman No. 441 I) from the south-east.

ther in *triclinia* instead of the usual three *lecti* (stone benches) or outdoors.⁶ If this is the case in Petra too, then the *stibadia* served for meals cooked on the flat area mentioned before. Not many people, however, could take part in such meals because of the small size of the *stibadia*: in this case not more than three to five participants at best.

No. 441 is very difficult to interpret; all interpretations are uncertain. Dalman took it to be a tomb, though not without some reservation.⁷ In this case the *stibadium* served for meals for the obsequies, for feasts for the dead. Or was the isolated rock regarded as a sacred rock with "sacrificial slaughters" in front of the *stibadium*? (Dalman 1908: 259). Musil, giving a somewhat confusing description, considered the installation as the dwelling of a Christian hermit, the *stibadium* being a sacrificial altar.⁸ According to Robinson (1930: 148) Nos. 441 and 442 belonged together and were

5. See Dalman 1908: 91 an incomplete collection.
 6. Cf. Poland, *RE* 2 III 2 (1929) Sp. 2481 s.v. *Stibadion*; Rodenwaldt, *RE* II A 2 (1923) Sp. 2323f. s.v. *Sigma*; Gross, *Der Kleine Pauly* 5 (1979) Sp. 182 s.v. *Sigma*.
 7. Dalman 1908: 257 "ein Trog ..., der doch wohl trotz seiner gebogenen Form ein Grab bedeutet" (i.e. a trough ... probably being a grave in spite of

its curved shape).

8. "50 paces south of this offering-place, a staircase cut out of the rock leads to a hermitage. Some paces south-east of the staircase is a tripartite hermitage with three crosses and a Nabataean inscription" (Musil 1907: 137f.; transl. from German). Nothing of that can be seen on the spot. Obviously Musil's notes got mixed up.

just a "sanctuary", No. 441 being a special "mortuary chapel". Finally, the Horsfields (1938: 25 n. 3) simply thought of it as "a house". These are the interpretations up-to-date and, at most, one can make some comments on the various solutions.

As far as we can ascertain, rock-cut monuments in Petra serve three main functions: as tombs, as dwellings (the special case of Christian hermitage included) and as sanctuaries:

- a) A tomb can almost certainly be excluded. The *rotunda* (g) in connection with the curved trough (i) contradicts this use as this would be a completely new combination in sepulchral architecture. The curved 'trough' is too short for a burial plot.⁹ Furthermore, there is neither an example nor is it imaginable that people in Petra buried their dead in a curved position, lying on the side. A *triclinium* does not exist here. It is difficult to consider the *stibadium* on top of the isolated rock as a kind of substitute for it because only few persons could meet there.
- b) A dwelling is highly improbable. It would have been insufficient for a family, for the only habitable room is the chamber (k) with a floor area of 8.8 m², the niche in the back wall not included. Contrary to Musil's view, there are no traces of a hermitage. Which function could the *rotunda* (g) have had with the round trough in a dwelling? Finally, the rock with the *stibadium* would have to be separated from the dwelling, although its staircase and the *stibadium* opening to the south show that both are clearly related to each other.
- c) As far as sanctuaries are concerned, Dalman described their functions perhaps not completely but in the main correctly: "I thought the term 'sanctuary' would be applicable only in cases where

several sacred objects seemed to form a group. Such objects are holy stones, niches with idol blocks, sacred cells, circular holes, water basins for ablutions, places for offerings and sacred meals" (1908: 67f. transl. from German). Almost all of these feature exist in No. 441. We have niches (c-e), even though without idols (*baityloi*) which might have been transportable; we have a water basin (f) for ablutions, a cistern (b) with enough water for cultic purification, a *rotunda* (g) which could have served as a sacred cell to keep some cultic object, and the rock *stiba* as a place for offerings and sacred meals. Only holy stones and circular holes are lacking. Was No. 441 a sanctuary? If so, one would have to add - a very small sanctuary. Speculations begin here because not much is known about Nabataean religion and cults. Presumably it was some kind of 'private' cult practised by a very small group of people. The strange positioning of the *rotunda* (g) could support this assumption, giving the impression that the *rotunda* was the first and oldest part of the monument and all other niches, rooms, and basins were related to it. But another supposition is possible as well: a place for keeping and venerating a sacred object that belonged to one of the sanctuaries on the plateau of ad-Dayr and, if need be, could be carried up in procession. Possibly a guardian, a custodian, or what is called in the Old Testament a "Levite" could have lived in chamber (k). Other interpretations remain possible. Was the sacred object kept in the rounded trough (i)? We do not know, just as we do not know the date of No. 441.

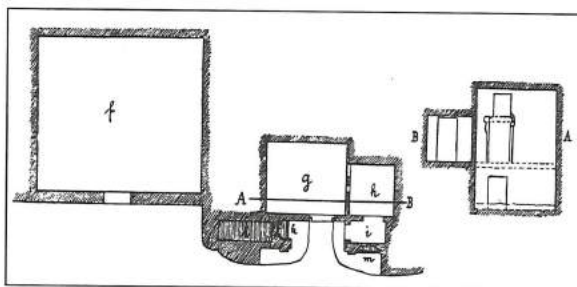
Dalman No. 442

Once more we refer to Dalman's survey

9 The simple rectangular pits where the dead were buried used to be about 2 m long.

and description (1908: 259-262), in addition to that of the Horsfields (1938: 24-26). No. 442 is a unit consisting of four rooms (see Fig. 7).

1. A spacious square rock chamber (*f*) of 7 x 7 m, accessible through a tall door. Above the door was a window, separated from the door through an inserted lintel. This room may have been a *triclinium*, but no traces of benches are visible.
2. A smaller room (*g*) of 3.50 x 3.53 m with a basement; the floor between the two storeys is lost. The ceiling of this room "is divided into panels in a chequer-board design ... differentiated by the horizontal and vertical parallel incised lines in alternate panels, imitating one of wood" (Horsfields 1938: 25).¹⁰ On the right side of the door which is similar to that of the main chamber (*g*), is a cross with a small base and two cross-beams, a so-called patriarchal cross,¹¹ and a small niche to the left of it.
3. An adjoining room (*h*) without a basement, connected with (*g*) by a door, and a window above it. On the left side of this door another simple cross is visible.
4. An anteroom (*i*), connected by doors with (*h*) and with the forecourt. On the left side of the door to (*h*) is a third cross. On the left side of the forecourt in front of room (*g*) is an open water basin (*l*) and a niche-basin (*k*), another one (*m*) on the



7. Group of chambers, No. 442 f-i. Ground plan and cross-section, with entrance wall (Dalman 1908: Abb. 204).

10. Not in the room *f*, as Wenning 1987: 263 states.
 11. Sachs - Badstübner - Neumann 218f. The Horsfields call it a "Nestorian cross".

right side of the forecourt. The complex is separated by a narrow passageway from a high isolated knoll of rock stretching from north-west to south-east, accessible by stairs and having at the top an artificial rectangular level (*b*) of 6.00 x 7.60 m, but no *stibadium*. At the bottom of the staircase, opposite to the space between rooms (*f*) and (*g*), is a niche with an idol block in relief (*e*) (Fig. 8) and a small vaulted niche above it.¹² Lengthening the staircase to the north-west, another open basin is visible (*a*).

We may add to this description some new observations. Neither Dalman nor the Horsfields seem to have noticed that a simple cross is incised on the *baitylos* (*e*): here a Christian hermit exorcized the power of the pagan idol by the holy cross, expressing that he, indeed, had an idea of the meaning of such Petra *baityloi*. Annulments like this are attested elsewhere in Petra, for example at the so-called "Tropfheiligtum" of Qattār ad-Dayr.¹³

The adjoining room (*h*) shows in its back wall and on the right side of the door to the anteroom (*i*) two holes in the rock which are similar to handles, often occurring in Petra. Their function is unclear and perhaps not always the same: were they for votive gifts, wreaths or coats to be hung here? Or were animals tethered at the lower ones? Furthermore, in the back part of the right wall of room (*h*) is a small niche, probably for a lamp. Finally, a water channel at the north-east corner of the levelled place (*b*) on the rock has to be mentioned.

Here too, it is difficult to interpret No. 442. Thus much, however, is certain: Christian hermits lived here, at the earliest in the fourth century, that is evident from the crosses. We cannot exclude Christians who had any relations to the plateau of ad-Dayr, although we do not know precisely to what

12. Dalman 1908: 261, Fig. 203.

13. Dalman 1908: 253, Fig. 193.

extent the ancient Nabataean monuments were used by Christians. There is no archaeological evidence unless the name ad-Dayr, "the monastery", might be an indication, but this name could also have been given on other grounds. The question which arises is, what was No. 442 in earlier Nabataean times? Two possible functions should be taken into consideration:

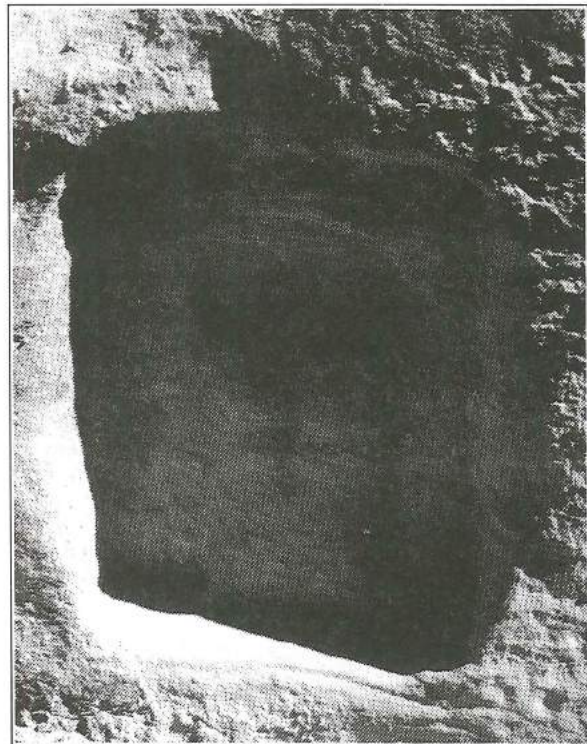
a) Dalman discussed the complex under the title "Second sanctuary of the Valley of the Hermitage". But he meant a sanctuary for the veneration of a deity just as little as in the case of No. 441. He meant a rock tomb, assuming "that the burial was in the basement of room (*h*) while all other rooms served as rooms for sacrificial celebrations" (Dalman 1908: 262; transl. from German). If this is the case, the isolated knoll of rock had at its top "the offering place of the sanctuary" (Dalman 1908: 259). This interpretation, however, may be questioned. Room (*h*), according to Dalman's own description and sketch (see Fig. 7), had no basement; (*h*) seems to have been mistaken for (*g*). Traces of burials in the basement of room (*g*) have not been recognized until now. Dalman's opinion does not offer explanations as to the function of the adjoining rooms (*h*) and (*i*) connected with each other, and with room (*g*) by doors. A *triclinium* does not seem to have existed - or was hall (*f*) a *triclinium* indeed though no benches are visible? Its extension would fit well. The relation of the "offering place" on top of the rock to the burial place remains unclear.

b) The Horsfields (1938: 24-26) interpreted No. 442 as "a well-preserved house of several rooms ... of the free-standing type", that is a dwelling. Their examples for such houses (1938: 24) are not always quite convincing, and the problem of rock dwellings in Petra is not yet solved. The imitation of a wooden coffered ceiling would fit well with the

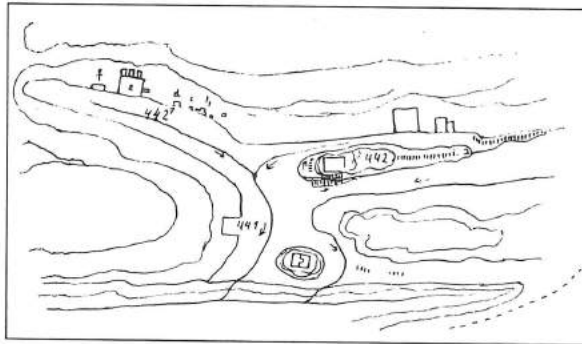
Horsfields' interpretation. But what about the three or four water basins near a dwelling? Such installations seem to have been used for cultic ablutions. The Horsfields took the place on top of the isolated rock (*b*) for "an outdoor *triclinium*" - but how does a *triclinium* fit here if the complex was a dwelling? Or is No. 442 a sanctuary after all, as Robinson (1930: 148) thought?

Dalman No. 442¹

Musil's description (1907: 139), led Dalman to investigate at least six installations in the back part of the small southern gorge (Fig. 9), cut out of the western cliff face. Unfortunately, his report is very short (Dalman 1912: 30f.). He supplemented and corrected his own original sketch-map (see Fig. 1). As to the gorge, he confined himself to the following: "At first there is a niche with an idol block in relief (*a*) (Fig. 9), then a larger empty niche (*b*), a small niche (*c*) in the middle of which a smaller niche is visible for an idol to be put in, a niche-basin



8. Idol niche with block idol in relief and incised cross (Dalman No. 442 e).



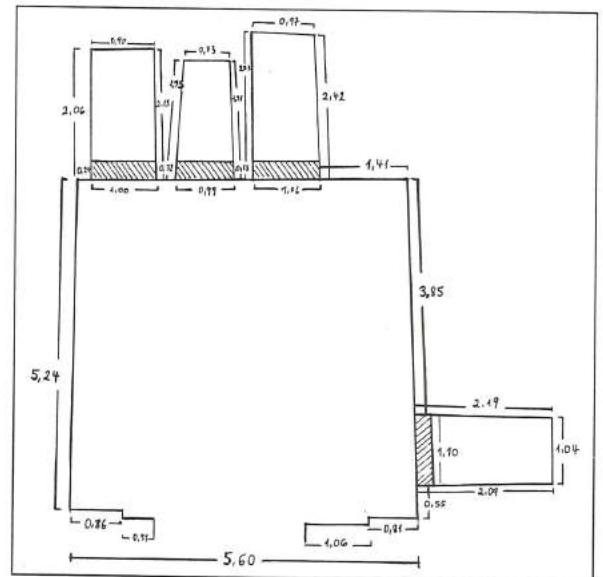
9. The sanctuaries of the Valley of the Hermitage (Dalman 1912: Abb. 18).

(d), a burial chamber (e) with the imitation of square stone blocks framing both sides of the entrance which seems to be unusual in Petra (therefore Musil called it a Roman tomb), finally an open grotto (f)” (transl. from German). The installations are “read” from the right to the left, and the whole got the inconvenient number 442¹ because Dalman’s sequence of numbers was already set. Dalman did not give any details about the proportions. Other publications do not seem to exist.

In the following, we shall give some information and several sketches as the result of our own survey. We retained the number 442¹, but we prefer to “read” the installations the other way round, that is from left to right, in order to put the largest and most important installations at the beginning.

a) A grotto (Dalman f). The façade is so weathered that it is impossible to see whether it had a real entrance or was simply open at the front. Inside it is weathered as well, but traces of plaster and three niches, most likely for lamps, are visible. The ‘floor’ is covered to a large extent with debris and stone boulders but according to its extension, the ground level corresponds approximately to the next burial chamber (b). This is so badly preserved that we have not even tried to survey it. Such a grotto could have been anything, originally even a *triclinium* judging by the neighbouring burial chamber.

b) A large burial chamber (Dalman e), carefully carved out of the rock, of different measurements (Fig. 10): left side wall 5.24 m, back wall 5.35m, right side wall 5.50 m, front 5.60 m - taking an average length of 5.42 m as a basis=29.38 m². The average height of the chamber is 3.50 m. In the back wall are three deep grave niches and space enough for a fourth (Fig. 11). In the right side wall there is only one burial niche with space for three additional ones. This adds up to four grave niches of sixteen possible ones (the left wall has no niches). It appears that the burial chamber was abandoned at an early stage. All the niches have at least, two graves one on top of the other, perhaps three if we assume a



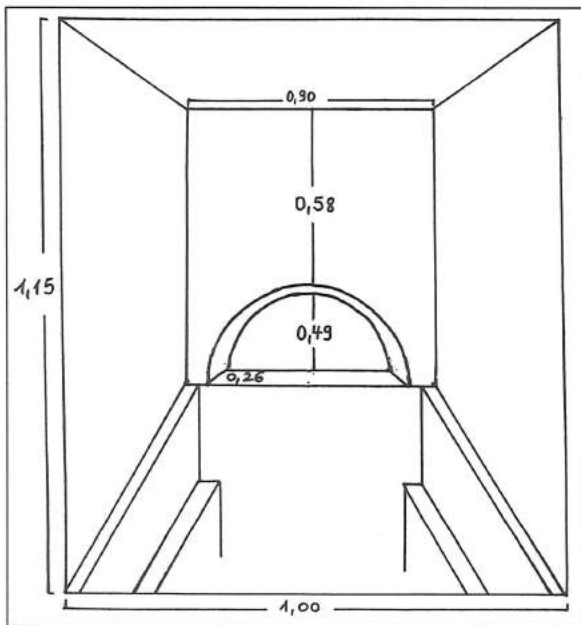
10. Ground plan of burial chamber, No. 442¹ b.



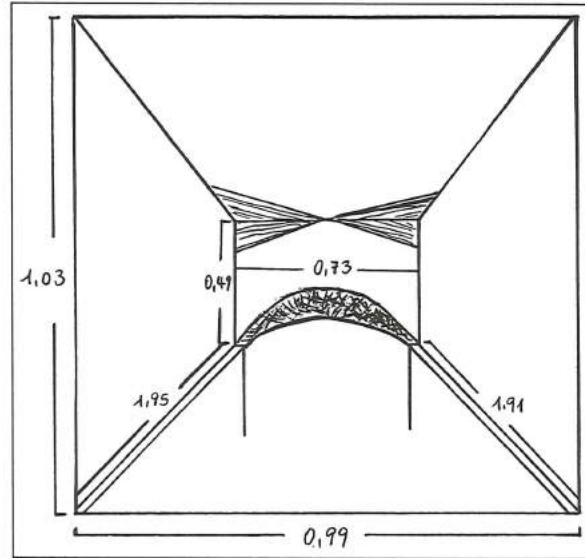
11. Dalman No. 442¹ (b): Burial chamber with the grave niches (1)-(3).

burial at the level of the niche entrance. The graves are separated from each other by heavy stone slabs, some preserved completely, some in pieces. The slabs were put on ledges of different width: mostly about 8 cm, in (3) 19 cm, in (4) up to 21 cm. The height of each tomb is 0.84 (3) to 1.30 m (1, middle grave). All is preserved relatively well. Further details of the grave niches and graves:

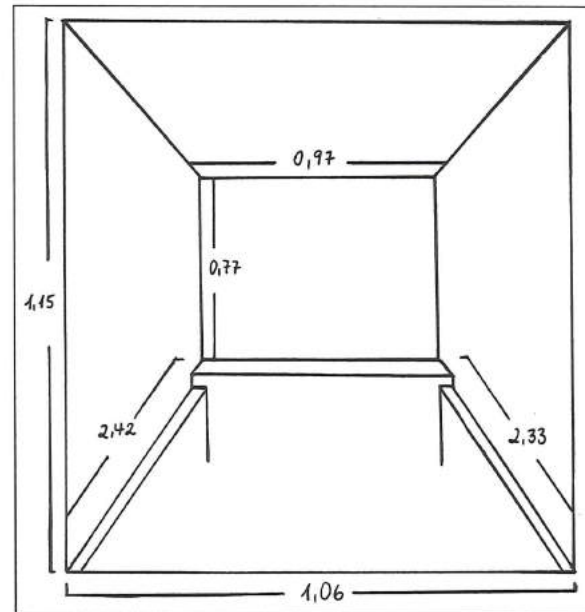
- (1) In the back wall a vaulted niche is visible (Fig. 12), perhaps indicating that there were only two graves below. The lowest grave is filled with sand and debris. Some pieces of stone slabs are at the front of the grave niche.
- (2) The back wall is vaulted and arched, at the top shaped like a v (to increase the place to lie?). The ceiling of this grave niche falls gently away to the back (Fig. 13). The middle grave is filled with a sort of mortar layer.
- (3) In this niche (Fig. 14) we have some stone slabs secondarily piled up upon the lowest one.
- (4) Approximately one-third of the lowest grave is filled with debris, the middle grave with a mortar-like mixture as in (2) (Fig. 15). We do not know anything



12. No. 442¹ (b): Grave niche (1)



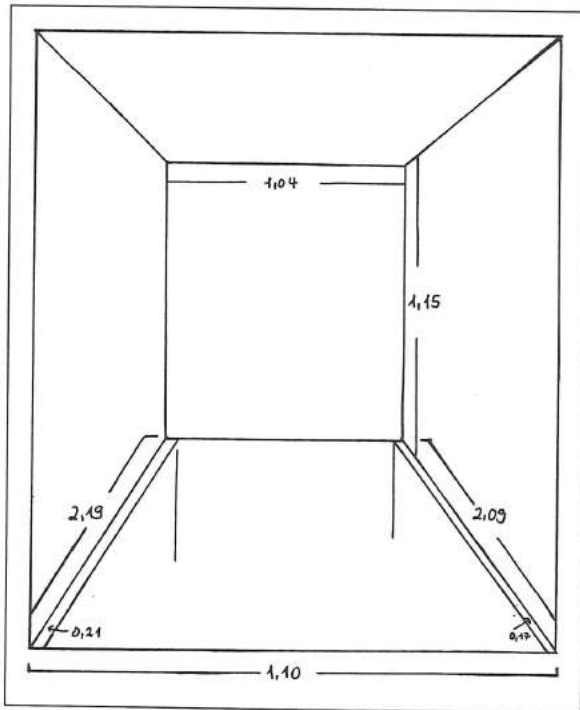
13. No. 442¹ (b): Grave niche (2).



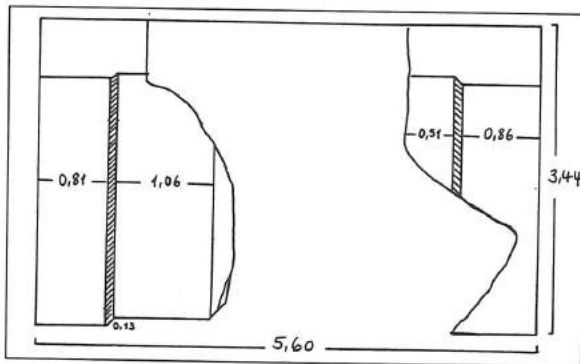
14. No. 442¹ (b): Grave niche (3).

about the function of these layers of mortar which are possibly original.

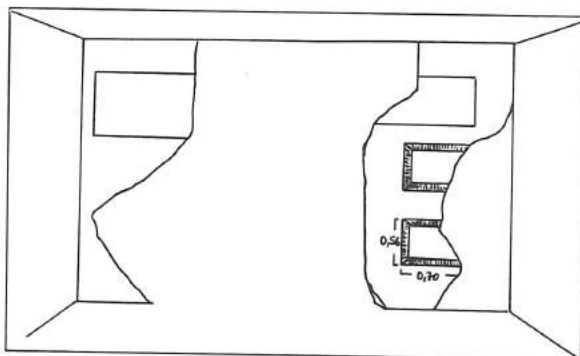
In the burial chamber (*b*) are many little holes at varying distance on all four walls directly underneath the ceiling. Did they serve for suspension of wall hangings, blankets or something similar? The front had a door which cannot be reconstructed exactly because of the weathering, the brittleness of the rock, and other damage. Inside (Fig. 16) traces of plaster are visible. Outside (Fig. 17) square stone blocks are imitated, perhaps on both sides of the entrance, but only



15. No. 442¹ (b): Grave niche (4).



16. No. 442¹ (b): Interior of the front.



17. No. 442¹ (b): Exterior of the front.

the right side is preserved, the left is weathered and broken. Other examples for such a kind of imitation are: at the front of the

14. Cf. Wenning 1987: 244.

15. Brünnow and Domszewski 1904: 414, No. 849;

main temple Qaṣr Bint Fir'awn above the pilasters in stucco¹⁴, and inside the so-called "Painted House" in the Siq al-Bārid near Bayḍā¹⁵, in the latter case painted with red lines on grey stucco. All in all, the burial chamber was well equipped and decorated rather luxuriously.

Finally, there are two badly preserved Nabataean inscriptions above the grave niches (1) and (4), which are of special interest. Musil (1907: 139) mentioned them, and Dalman (1912: 92 No. 72) published one of them - the one above niche (4) - in his collection of Petra inscriptions.

1. A one-line inscription above the grave niche (4), incised on a chiselled surface (Fig. 18), hardly legible (Fig. 19). Dalman (No. 72) only presents the last two letters: ? K'. According to the traces, however, about 8 to 10 letters are to be presumed. The penultimate one could also be a B, and then backwards perhaps an S and the ligature 'L - more or less like this:

..... 'L S K/B'¹⁶

This inscription can scarcely be reconstructed. Regarding only the last two let-



18. Dalman No. 442¹ (b): Inscription No. 1 above the grave niche (4).



19. No. 442¹ (b): Drawing of the inscription No. 1 above the grave niche (4).

cf. Wenning 1987: 90.

16. 'not as a final letter.

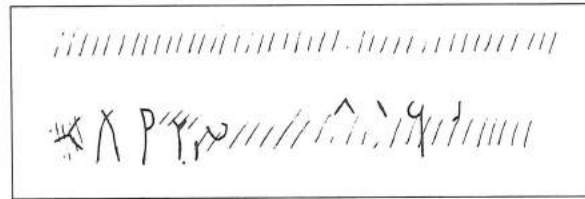
ters as certain and taking them as one word, one could think of the local adverb K' "here"¹⁷, perhaps in the sense of "[NN lies] here". This formula, however, does not seem to be attested in Nabataean epigraphy and the adverb K' does not occur in Nabataean script more than once.¹⁸ One could take into consideration personal names with -K' or -B', titles or parts of a date. Personal names: BRK' (Al-Kraysheh 50; cf. Cantineau 1987: 75 and Negev No. 201f.), (?) MK' (Cantineau 1987: 113f., Al-Kraysheh 1986: 106, Negev 1991: No. 632), 'B' (Cantineau 1987: 55, Al-Kraysheh 1986: 24, Negev 1991: No. 2), GLB' (= Galba?) (Cantineau 1987: 78), WHB' (Al-Kraysheh 1986: 67; cf. Negev 1991: No. 335), RB' (Cantineau 1987: 145, Negev 1991: No. 1048), KLB' (Cantineau 1987: 107, Al-Kraysheh 1986: 100, Negev 1991: No. 560).¹⁹ Titles: MLK' "the king", HPRK' (*hyparchos*) "the governor", KLYRK' (*chiliarchos*) "the general". But none of these words agree with the visible traces of letters.

2. A probably two-lined inscription above the grave niche (1), incised on a chiselled surface (Fig. 20), line 1 illegible, the traces of letters in line 2 gone over with red colour, perhaps just recently (Fig. 21):

l.1: length of the line and number of



20. Dalman No. 442¹ (b): Inscription No. 2 above the grave niche (1).



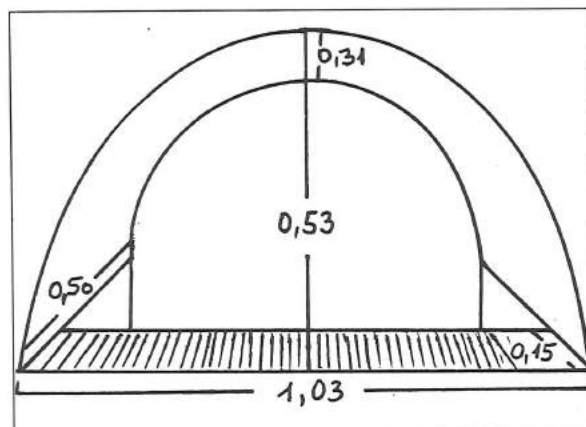
21. No. 442¹ (b): Drawing of the inscription No. 2 above the grave niche (1).

letters unknown

l.2: K/B N/W/D . Q ..

No letter can be recognized exactly. This inscription remains totally unclear.

- c) A small niche-basin (Dalman *d*) of 1.03 x 0.53 m (Fig. 22) without any water channel leading to it.
- d) A small rectangular idol niche (Dalman *c*) of 0.35 breadth and 0.58 height (Fig. 23). In its back side is an even smaller vaulted niche of 0.36 m height for a transportable idol (*baitylos*). Idol niches near graves are so common and widespread that there is no need to give examples.
- e) A large idol niche (Dalman *b*) in the style of a temple, carved out of the rock (Figs. 24 and 25), the cella of which is 1.21 m wide, 2.37 m high and 0.32 m deep. The total height cannot be determined because of the weathering in the upper part. A probably transportable *baitylos* stood in the cella like in the case of *d*. The image is completed by two small niches on



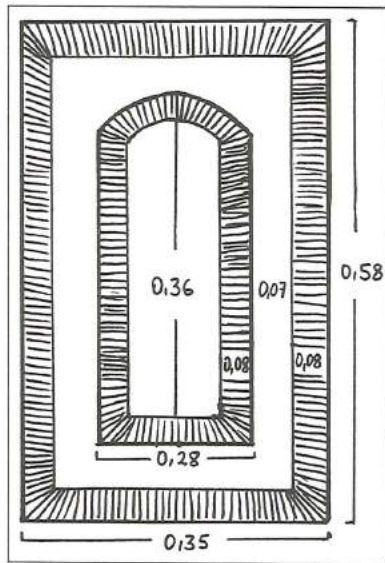
22. No. 442¹ (c): Niche basin.

17. Cantineau 1987: I 99; II 105.

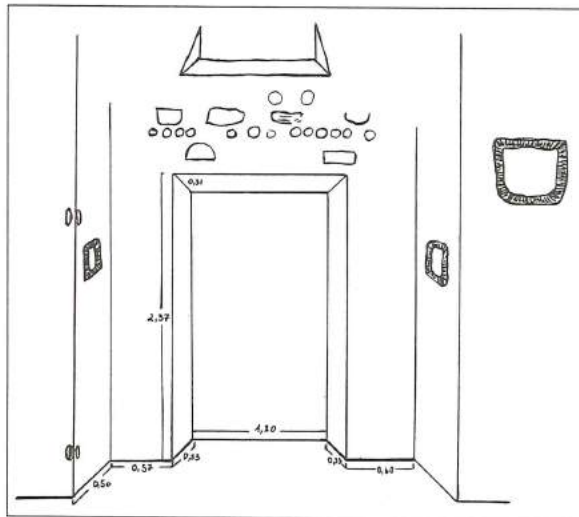
18. Cf. Janssen and Savignac, *RB* 1904: 403f.

19. The following personal names are also attested in

Palmyrenian: BR[K/P]', 'B', WHB', KLB', RB'; cf. J.K. Stark, *Personal Names in Palmyrene Inscriptions* (1971).



23. No. 442¹ (d):
Idol niche.



24. No. 442¹ (e): Idol niche.

both sides, two holes on the left in order to tie something, and numerous holes and niches above the cella. All this makes highly probable that a kind of worship was held in front of this idol niche. There are traces of chisel-work around it. On the right side of the installation a small niche is visible, perhaps for a lamp.

f) An idol niche (Dalman *a* ?) which is badly eroded, mainly on its left side (Fig. 26). It has a cella of 0.70 m height.

It appears that No. 442¹ is a rock monument with six single installations: a burial chamber, perhaps a *triclinium*, a niche-basin, and three idol niches. Similar monuments are widely seen in Petra and else-

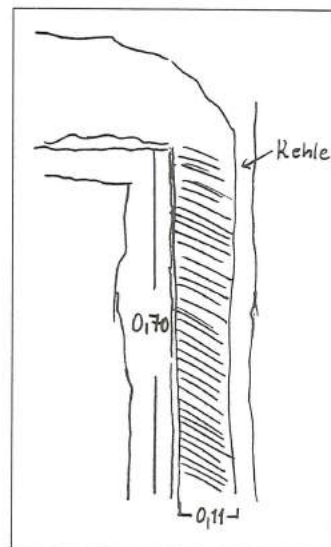


25. Dalman No. 442¹ (e): Idol niche.

where (Fig. 26).

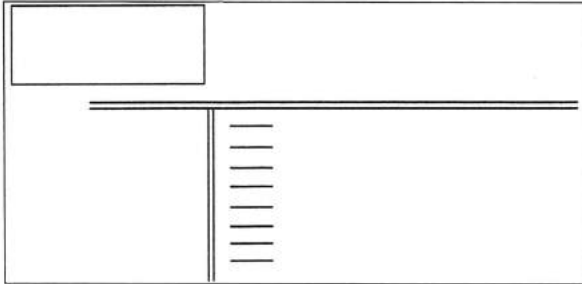
No. 442²

In view of further investigations, a brief account of some hydraulic installations, apparently not noticed before, is given here. They were discovered in the middle part of the small southern gorge, cut out of the east-



26. No. 442¹ Idol
niche.

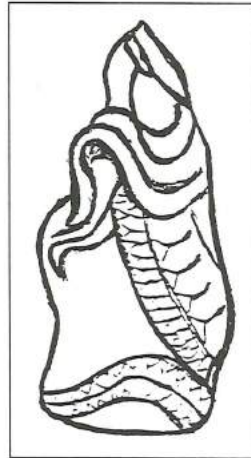
ern cliff face, opposite to the unit of No. 442¹. At an altitude of about 3 m from the ground is a medium-sized rectangular water basin and below it a horizontal flat channel. Another channel branches off down to the ground, approximately at the south-west corner of the basin. On the right side of the latter channel stairs lead up to the basin. A sketch looks like this:



The purpose of these hydraulic installations is not quite clear. It does not seem to continue to the left, that is in a northerly direction. Therefore it can be assumed that the installations had nothing to do with No. 441, particularly as this small “sanctuary” had its own cistern for water. More probably the installations No. 442² belonged to Nr. 442¹, for this rock tomb had only a single, astonishing small, niche-basin (c). When the water collected was not sufficient, people built No. 442² in order to get more water.

A sculpture Fragment of Limestone

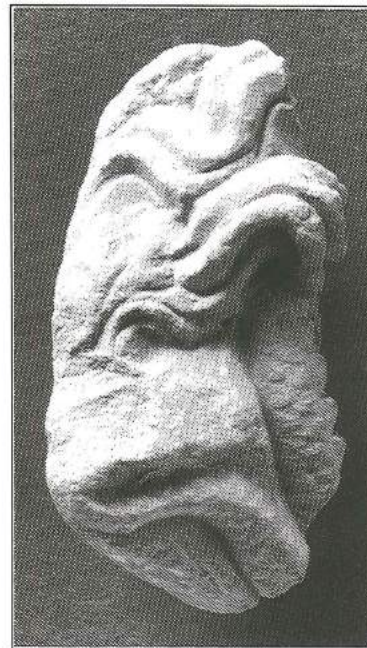
On the right side at the head of the “Klausenschlucht” (Sadd Khurayrib ‘Iyāl ‘Awda), halfway between the actual ascent to ad-Dayr and No. 441, Rev. M. Schade found a small sculpture fragment of pale limestone lying on the surface. It is difficult to measure because of its unevenness: maximum height is about 5.5 cm, maximum width about 2.9 cm. At first glance it cannot be recognized (Figs. 27 and 28), but closer scrutiny shows two locks of hair falling from the right to the left. Underneath the hair is a kind of bulge slightly curved from the left to the right, looking similar to the body of a snake. Further down, the end of a



27. Drawing of the Medusa fragment from the upper Valley of the Hermitage.



28a. Fragment of a Medusa from the upper Valley of the Hermitage.



28b. Fragment of a Medusa from the upper Valley of the Hermitage.

snake's body is clearly visible, shaped in the form of waves and tapering towards the end. Unruly streaming hair and two knotted serpents under the chin, disappearing under the hair or framing the face, belong to the characteristics of Hellenistic - Roman Medusas. Glueck (1965: 353-356) collected and discussed the material. The Nabataeans also knew the motif of Medusa (Gorgo). There are four examples from Petra: two on the front and on the back of a pillar capital (Glueck pl. 40), and two at both ends of the frieze of the so-called "Lion Triclinium" (Glueck pl. 38b). Two others are from Khirbat at-Tannūr: one without serpents (Glueck pl. 38a), another one with serpents from the *pectorale* of a sculpture fragment of Mars or Iupiter Dolichenus (Glueck pl. 39). All are similar to the so-called bronze goddess of Ostia (Glueck pl. 16a). Glueck described the Medusas on the pillar capital as follows: "A pair of wings is visible on top of each head, with two knotted serpents under each chin. The lines of the serpents' bodies that enclose the lower part of the face in each instance and then disappear underneath the outflaring separate locks of hair, framing most of each head, re-emerge together with

the outward-facing heads of the serpents above the temples of each Medusa. The damaged faces of these Medusas conform to the fixed Nabataean style of representation" (Glueck 1965: 354f.).

There cannot be any doubt: this is a piece of the left side of a Medusa, and judging by its appearance not from an architectural element, but more likely from the statue of a deity. Did the fragment belong to No. 441 or 442? It could have come to the spot where it was found from anywhere. It is easy to imagine that it was swept down by winterly spates from the plateau of ad-Dayr.

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Postscript: When we payed a short visit to the upper Hermitage in October 1997, we recognized some changes, some illicit excavations especially, in Nos. 441 g, 442 (h) and 442¹ (b).

Bibliography

- Browning, I.
 1982 *Petra*. New and Rev. Ed. London.
- Brünnow, R.E. and Domaszewski, A. v.
 1904 *Die Provincia Arabia auf Grund zweier in den Jahren 1897 und 1898 unternommener Reisen und der Berichte früherer Reisender* I: Pl. 13, p. 328 (M [= Musil] 1-3). Strassburg.
- Cantineau, J.
 1987 *Le Nabatéens* I/II. Paris. Reprint Osnabrück.
- Dalman, G.
 1908 *Petra und seine Felsheiligtümer. Palästinische Forschungen zur Archäologie und Topographie* I. Leipzig.
 1912 *Neue Petra-Forschungen und der Heilige Felsen von Jerusalem. Palästinische Forschungen zur Archäologie und Topographie* II. Leipzig.
- Glueck, N.
 1965 *Deities and Dolphins. The story of the Nabataeans*. New York.
- Horsfield, G. and A.
 1938 Sela-Petra. The Rock of Edom and Nabatene. *QDAP* 7: 1-42, pl. 53:3; 54:1; 55:2.
- Kennedy, Sir Alexander B. W.
 1925 *Petra. Its History and Monuments* (cf. Fig. 27).
- Al-Khraysseh, F.
 1986 *Die Personennamen in den nabatäischen Inschriften des Corpus Inscriptionum Semiticarum*. Diss. Marburg.
- Lindner, M.
 1985 *Petra. Der Führer durch die antike Stadt*. Fürth.
- Musil, A.
 1907 *Arabia Petraea. II Edom. Topographischer Reisebericht*. 1. Teil. Wien: Kaiserl. Akademie d. Wissenschaften (cf. Fig. 100-102, p. 131f.).
- Negev, A.
 1991 *Personal Names in the Nabatean Realm. Qedem* 32.
- Robinson, G.L.
 1930 *The Sarcophagus of an Ancient Civilization. Petra, Edom and the Edomites* (cf. Fig. p. 363).
- Sachs, H., Badstübner, E. and Neumann, H.
 n.d. *Erklärendes Wörterbuch zur christlichen Kunst*. Hanau.
- Scheck, F.R.
 1985 *Jordanien. Völker und Kulturen zwischen Jordan und Rotem Meer*. Köln: DuMont Kunstreiseführer.
- Tourist Map
 1992 *The Tourist Map of Petra*. Scale 1/5000. Amman: Royal Jordanian Geographical Centre.
- Wenning, R.
 1987 *Die Nabatäer - Denkmäler und Geschichte. Eine Bestandsaufnahme des archäologischen Befundes. Novum Testamentum et Orbis Antiquus* 3.

BROWN UNIVERSITY 1997 EXCAVATIONS AT THE PETRA GREAT TEMPLE¹

by

Martha Sharp Joukowsky

Introduction

With the continuing support of the Department of Antiquities of the Hashemite Kingdom of Jordan and Dr Ghazi Bisheh, Director-General, excavations were carried out at the Petra Great Temple from June 14 to August 11, 1997. The 1997 plan and trench layout of the excavations can be seen in Figures 1a and b.

The staff of 1997 was comprised of Martha S. Joukowsky, Director; Artemis A. W. Joukowsky, Administrator and Photographer; Joseph J. Basile, Associate Director; Elizabeth E. Payne, Assistant Director; Paul C. Zimmerman, Chief Architect-Surveyor; Michael F. Slaughter, Assistant Director, Photographic Recorder and Photo Development; Deirdre G. Barrett, Finds Recording; Monica L. Sylvester, Computer Data Base; Simon M. Sullivan, Draftsperson; and Sara G. Karz, Glass Analyst and Archaeologist. Senior Archaeologists included Leigh-Ann Bedal, Laurel D. Bestock, Brian A. Brown, Katrina M. Haile, Elizabeth A. Najjar, Margaret G. Parker, and the field excavators were Hilary Mattison, Constantinos Sistovaris, Thomas Smolenski, and Benjamin H. Kleine, who also served as our 1997 Web Page Designer. John Forasté, Brown University Photographer and his wife, Diane, spent one week recording our work. Volunteers included Betsy F. Alderman, David Barrett, Francesca and Thomas Bennett, Fr. David Clark, Patricia and John Payne, and Joyce and Frank Coffey.

Besides Terry E. Tullis, geologist, 1997 Great Temple Consultants included archi-

tectural historians Judith S. McKenzie and Jacqueline Dentzer-Feydy; Thomas R. Paradise, geologist; Zbigniew T. Fiema, archaeologist; May Shaer, consolidation and preservation; Christian Augé, numismatics; Stephan G. Schmid, Nabataean fine wares analysis; and Yvonne Gerber, plain wares analysis; Dakhilallah Qublan, foreman, who also has been responsible for the carrying out of the consolidation and conservation of the Great Temple.

Ghalib Abbadi was again assigned to us by the Department of Antiquities for help in moving architectural components and soil removal. His service to us was indispensable. Once again, the Jordanian Department of Antiquities appointed Mohammad Abd Al-Marahale as our Department of Antiquities Representative.

Figure 2 identifies the columns, antae, and stairways by "names" (see *ADAJ* 41, 1997: 196) and in the following text when describing an area, the "name" of the column, anta wall and stairway also will be used.

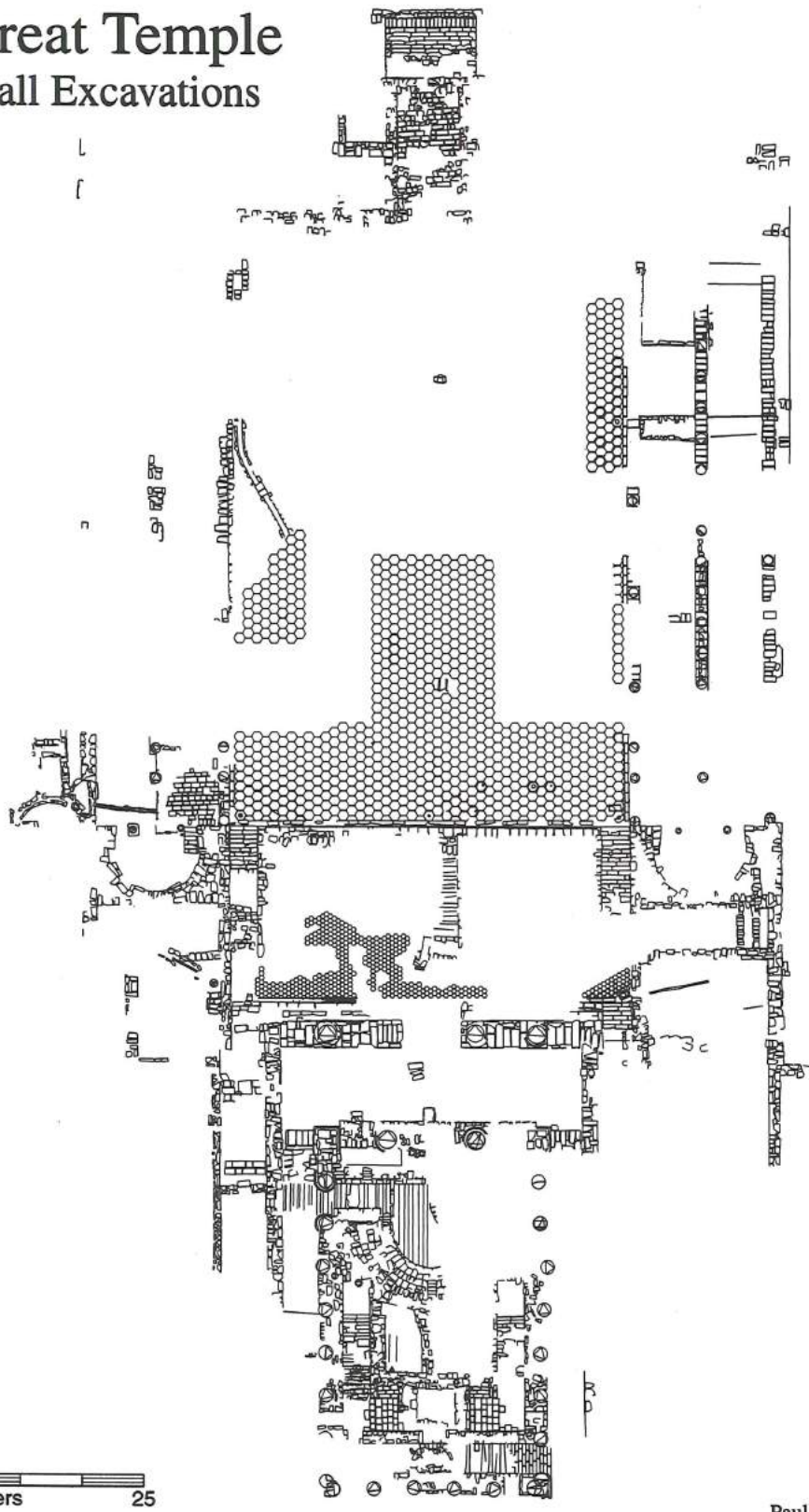
Goals

1997 marked the fifth year of two-month excavations by Brown University at the Great Temple. Not only did this season of excavation research, consolidation, and publication planning promise to be productive, but also it was intended to serve as a time of reflection of our work during the past four years. Our research design was in place, and our focus was on the multi-disciplinary nature of the documentation of the excavations. Additionally, it was to be a field sea-

1. Please refer to our past annual reports in *ADAJ*.

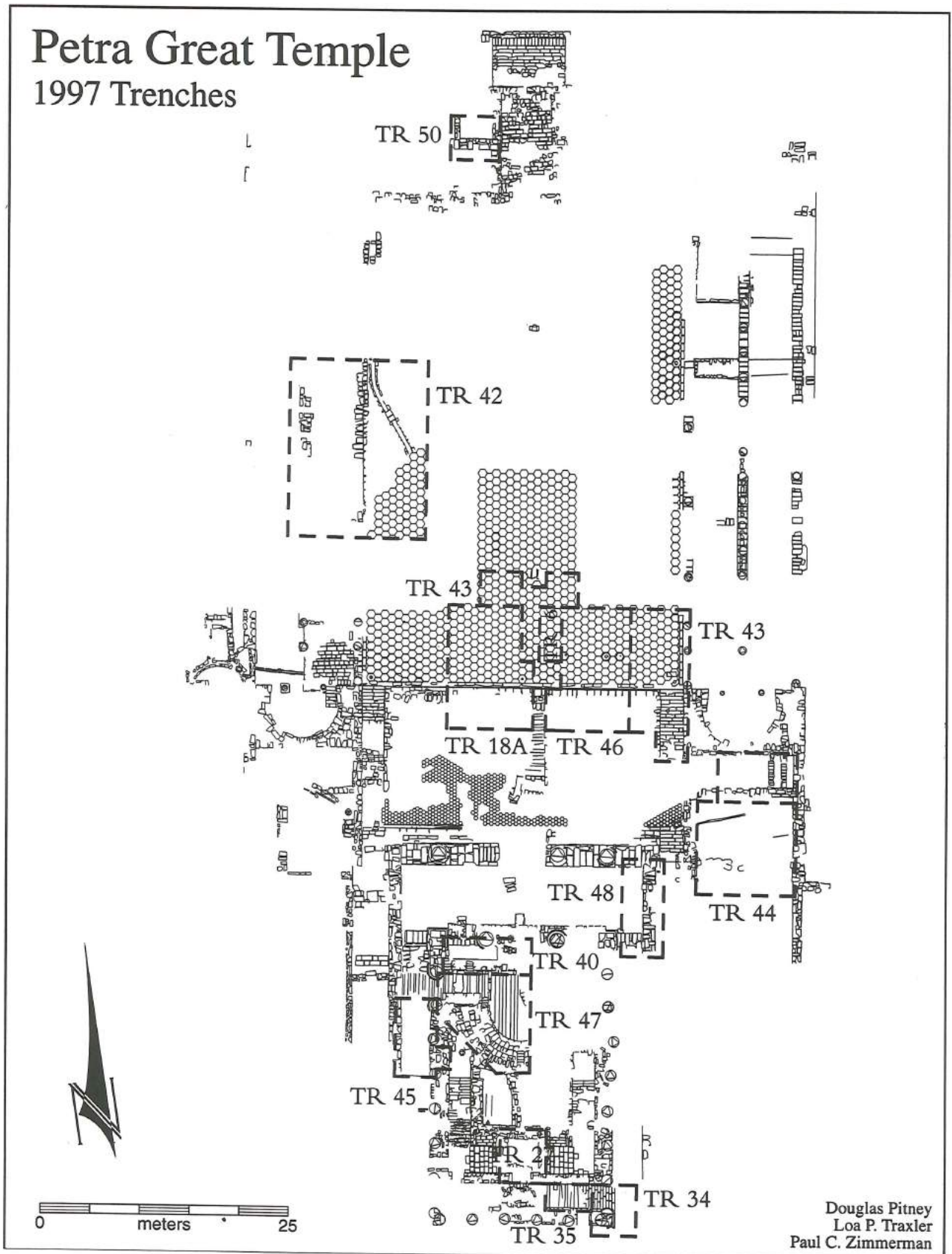
Petra Great Temple

1997 Overall Excavations

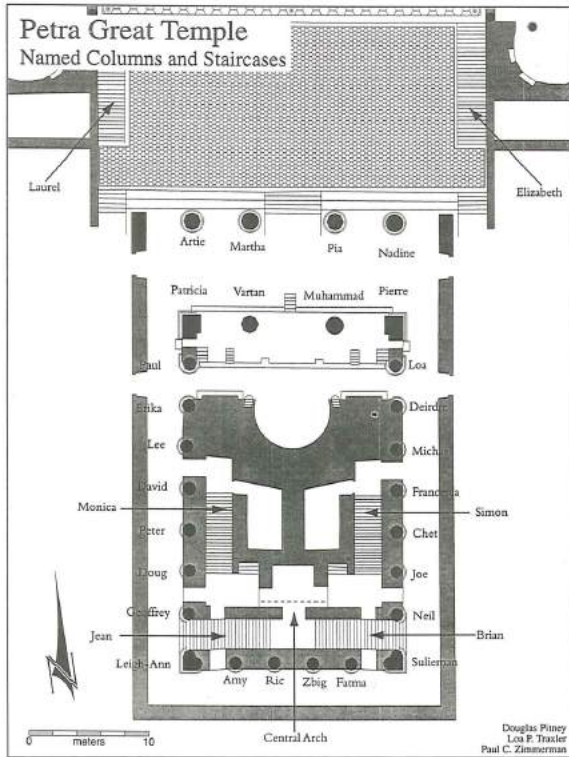


Douglas Pitney
Loa P. Traxler
Paul C. Zimmerman

1a. Great Temple: 1997 Plan of overall Excavations.



1b. Great Temple: 1997 Trenches .



2. 1997 Named Temple Elements.

son designed to carry out priorities established in 1996 excavations were planned to continue in several areas.

- In the Lower Temenos, the completion of the area east of the West Stairway and the East-West retaining wall — (1996, Trench 18) — would undergo excavation until the area west of the Central Stairway was cleared.
- Excavation also would be undertaken in the West Lower Temenos to better understand its shared connection with the Hexagonal Pavement and the East Colonnade, and to confirm their architectural plans. The East Stairway (Elizabeth Stairway) from the Lower Temenos to the Upper Temenos would be located and excavated.
- Once excavation had been completed in the above two areas, the East Exedra, which had been partially excavated in 1996, was to undergo continued investigation.
- In the Upper Temenos, excavation would continue in the Arched Passage from the Upper Temenos to the presumed 'Lower

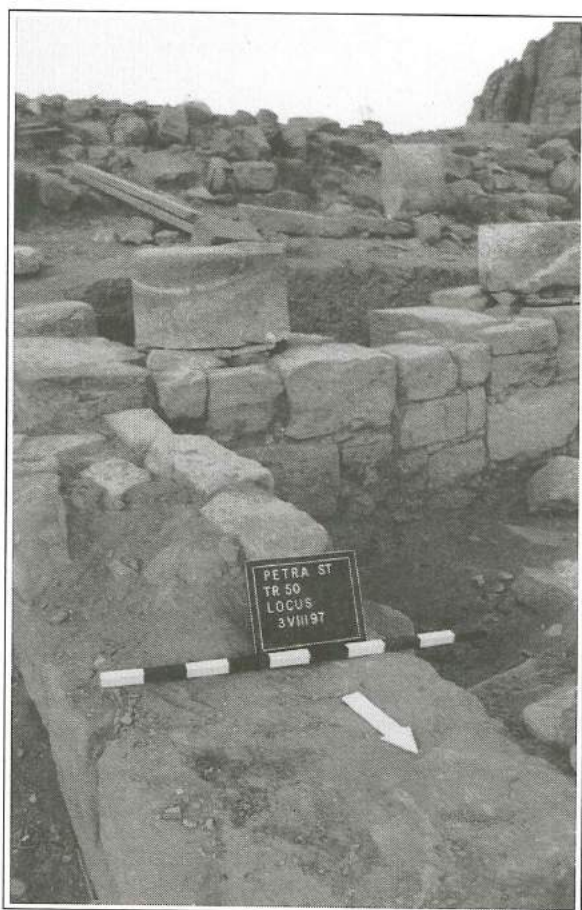
Market' (1996, Trench 38).

- In the Great Temple, a new trench would be located behind the West Anta Wall (Patricia Anta) in the Temple cella to define the architecture of this area. Of particular interest was our 1996 discovery of the upper courses of a major east-west semi-circular wall. We speculated that this wall might clearly define the area and held the promise of being a major architectural component of the Great Temple. This curvilinear wall would be cleared on the west in a new trench to expose its upper courses, and to understand how it interrelated with the West 'Adyton' Stairway (Monica Stairway) and the West 'Adyton' room.
 - Research also would continue in the rear of the Temple (1996, Trenches 34, 35, and 26) to better understand the interrelationship between the 'Adyton' Arch and the Temple rear.
 - Continued excavation would also take place on the east side of the Temple rear near the Sulieman Column in the East Corridor (Trench 34) to locate its founding level.
- To aid visitors, signs with the site plan and explanation of the major features of the site in Arabic and English, were placed on site. The major objective of 1997 was to further clarify the ground plan of the Great Temple and to publish the results of our five years of research.

RESULTS

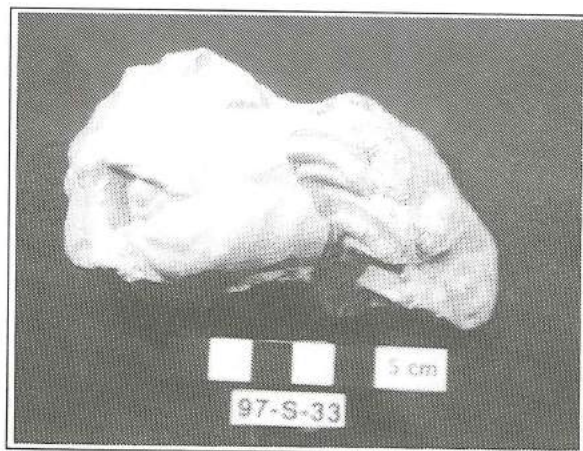
Propylaeum

In order to better understand the Propylaeum, work was initiated in Trench 50 to the west of the stairs of the Propylaeum. Defined here was a columned terrace structure with limestone stylobate blocks, many of which bore mason's marks. This structure (Fig. 3) extended 5 m east-west x 3.28 m north-south. Once a series of wall structures were cleared, the column drums found



3. 1997 Propylaeum (Photo: A. A. W. Joukowsky).

lying nearby were re-erected. The small exquisite limestone sculpture of a lion's head (Fig. 4) was recovered in this excavation. More excavation must take place in this area if we are to define the Propylaeum and its relationship to the Stairs.



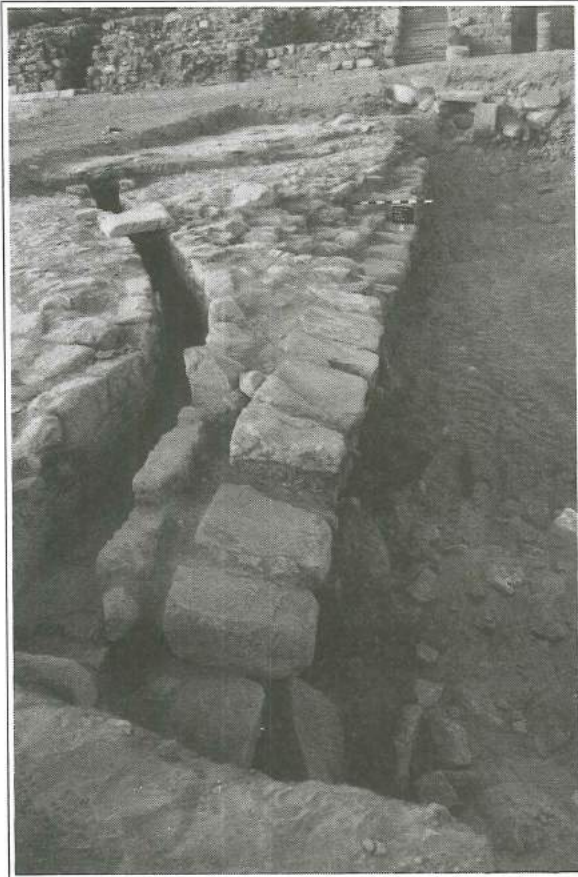
4. Lion's Head found in the Propylaeum (Photo: A. A. W. Joukowsky).

Lower Temenos

Lying to the west of the Temple Precinct near the Temenos Gate was the backfill from the so-called "baths" excavations left there from the 1950s and 1980s. This fill, conspicuous in our 1994-1996 aerial photographs, was covering an area of possible excavation that might delineate the architecture of the Lower Temenos and locate what interconnections, if any, existed between the Temple and the baths. After days of work, this backfill was finally removed. Excavations in this area will take place in the future. We designed a drainage abutment with the soil reinforced with stone so that the winter rains would be drawn away from collecting in the excavated 6 m depth of the bath structure excavations.

Excavation was undertaken in the west Lower Temenos to better understand its shared connection with the central sector of the Hexagonal Pavement and the East Colonnade, and to confirm their architectural plans. In Trench 42, a large portion of the Hexagonal Pavement was cleared. To the trench west, under the Hexagonal Pavement a portion of the Nabataean rebuilt/reconstructed Canalization System was excavated. Extending south-east to north-west, this shallow canal presumably connected to the system discovered in the center of the Lower Temenos. This part of the system was found in 1994, when the disturbed pavers had lost their support and had tumbled into the early Nabataean subterranean Canalization System drainage. Recovered from a segment of this shallow canalization (Fig. 5), at a point where the water system took an abrupt turn to the west, was an extraordinary cache of first century CE Nabataean wares which in antiquity had clogged the canal. Also found here was a bronze finial with a floral motif shown in Figures 6 and 7.

Excavations continued in several areas along the East-West Retaining Wall of the Lower Temenos. The area east of the West



5. Canalization in the Lower Temenos (Photo: A. A. W. Joukowsky).



7. Bronze finial from the Canalization System (Photo: A. A. W. Joukowsky).

46, to recover the full expanse of the massive East-West Retaining Wall which, when fully exposed, measured some 27 m in east-west length. From Trench 18A, a fragmented pilaster of a torso with drapery was recovered (Fig. 8). In one of the openings under the Hexagonal Pavement a fragmented painted Nabataean plate was found (Fig. 9).

From the east corner of the East Exedra, to the west corner of the West Exedra, the



6. Bronze Finial from the Canalization System (Photo: A. A. W. Joukowsky).

Stairway and the East-West Retaining wall (1996, Trench 18) underwent excavation until the areas east and west of the Central Stairway were cleared. This major project was undertaken in Trenches 18A, 43, and



8. Limestone pilaster block of a fragmented figure 18A042 (86 cm in length, 24 cm in height, 50 cm in width) found in the Lower Temenos (Photo: A. A. W. Joukowsky).

width of structural elements in this southern terminus of the Lower Temenos was now found to measure approximately 55.7 m in total length. Time, however, precluded the continued excavation of the East Exedra.

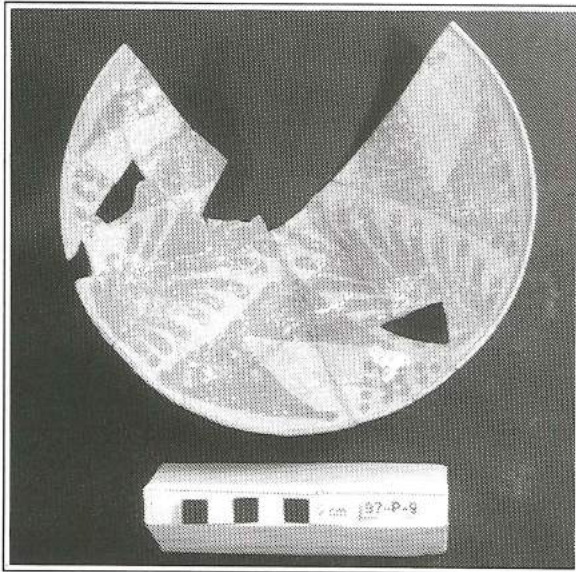
Time permitted the East Stairway (Elizabeth Stairway) from the Lower Temenos to the Temple Forecourt to be located and excavated in Trench 49. Two-thirds, or a

north-south length 7.20 x 2.61 m east-west width, was excavated of the East Stairway. Many of the stair treads of this stairway were found cracked, broken, and slumped at downward angles into a branch of the Nabataean Subterranean Canalization System, which lay below the stairs.

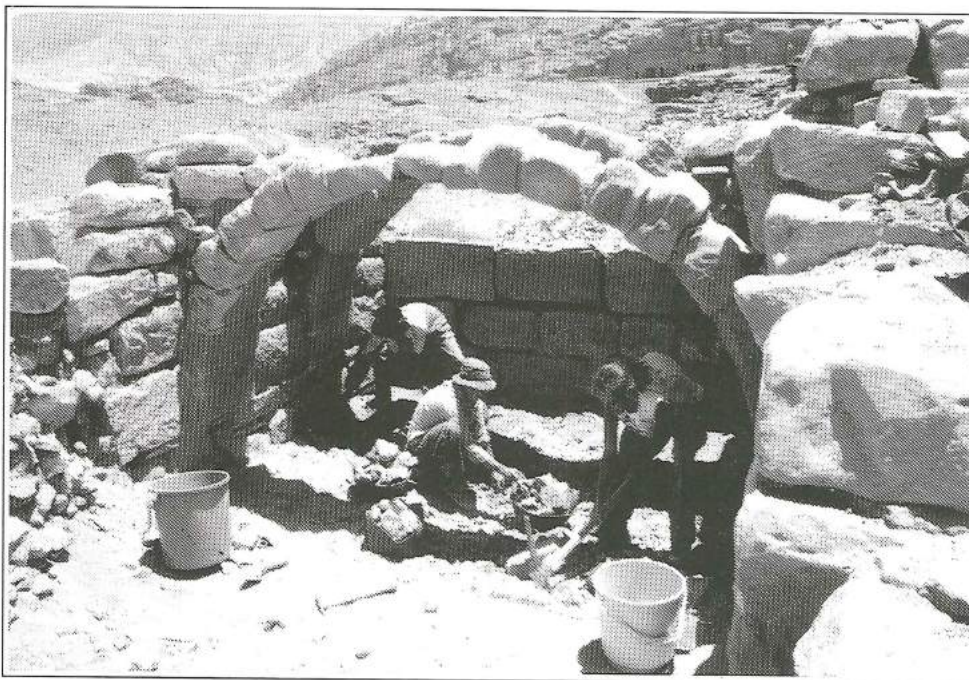
For better public understanding of the precinct we continued to re-erect columns in the East Triple Colonnade (Special Project 48).

Upper Temenos

In the Upper Temenos, excavation continued in the Arched Passage from the Upper Temenos to the presumed 'Lower Market' (1996 Trench 38, 1997 Trench 41). Found in Trench 41 (Trench 38, 1996) and bonding with the rear wall of the East Exedra were an elegant series of seven arches, however, all but the two recognized in 1996, and consolidated in that year, had collapsed in antiquity and could not be re-constructed. Shown in Figure 10 during excavation, this area was excavated to a 5 m depth, a portion of this probable cistern contained numerous Nabataean wares as well as stacks of imported marble pavers. It is



9. Nabataean plate of the second Nabataean style from the Lower Temenos below the Hexagonal Pavement in Trench 46, Locus 17 (Photo: A. A. W. Joukowsky).



10. Arched structure (cistern?) (Photo: A. A. W. Joukowsky)

estimated that the original measurements of this structure were 10 m east-west length x 3.23 m north-south width. More work has to be undertaken in this area before the full extent of this structure is fully understood. (The excavation of this area is planned for 1998.)

Undertaken as Special Project 50 in the Temple Forecourt, the massive, precariously fallen one-ton sandstone drums which had tumbled from the Temple Porch were stabilized in 1997 to prevent their further collapse onto the Lower Temenos. This involved the re-positioning of the drums and providing them with additional support to arrest slippage that might be caused by earthquake action or winter rains. Figure 11 shows the arrangement of the drums after their repositioning.

Great Temple

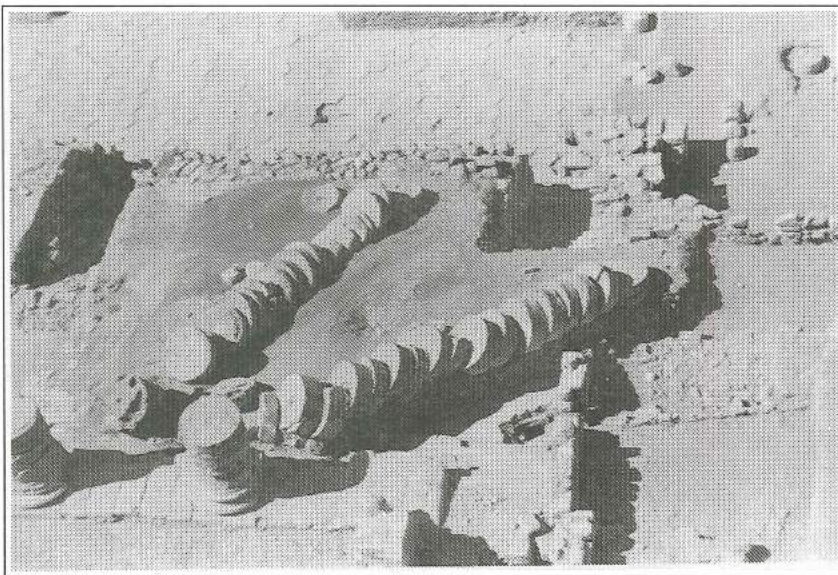
The earth choking the east exterior wall by the excavation of the East Interior Anta (Pierre Anta) was removed in Trench 48, so that the full sweep, measuring approximately 6.40 m width x 24.5 m length, of the Temple Pronaos could be viewed. Here it was found that the East Corridor Wall extending between the Temple Stylobate and the Anta wall, and the beginning of the East

Colonnade was in a better state of preservation than its twin counterpart (Patricia Anta) excavated in 1994 on the west.

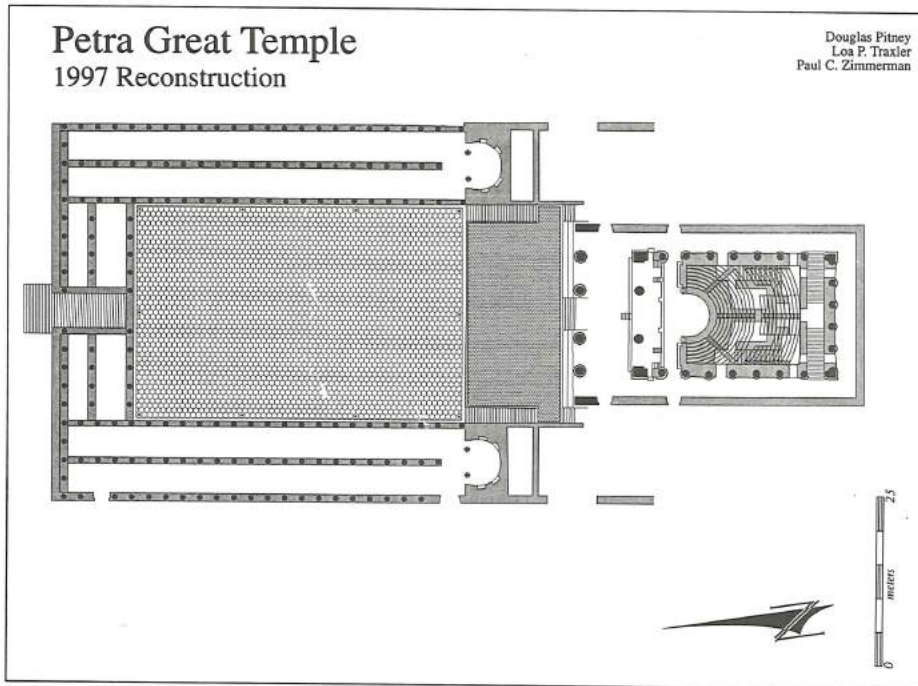
The *Theatron*-shaped Structure and Related Features

In the Great Temple, several new investigations were undertaken. One of the major excavations was of the east-west semi-circular wall (the upper courses of this wall had been discovered at 1996). We posited that this excavation would define the cella — it held the promise of being a major architectural component of the Great Temple. In exposing the upper courses of this wall, we also wanted to understand how it interrelated with the West 'Adyton' Stairway (Monica Stairway), the West 'Adyton' room, the Central Arch, and of course, with the Great Temple architecture as a whole.

What was found was a theater structure; a summary of our findings are presented below under subdivisions: Cavea, Orchestra, Pulpitum or Platform, Walkway between the Orchestra and the Cavea, the West Corridor and the Temple rear. This is followed by a discussion of the structure's tentative flow pattern. Figure 12 shows the reconstruction of the precinct with the theater.



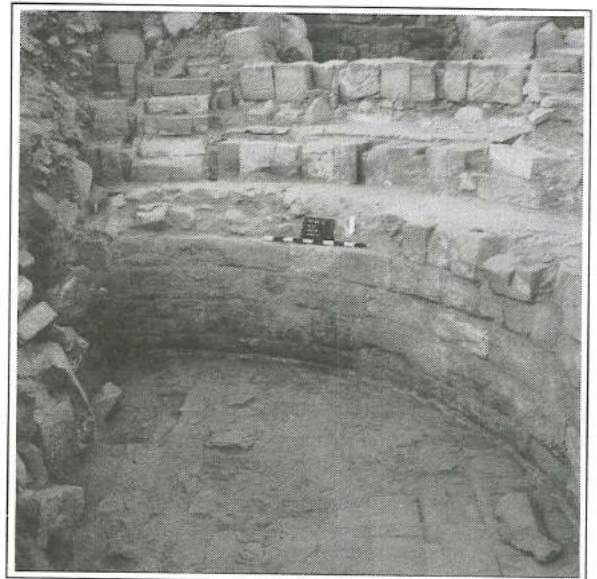
11. Upper Temenos showing the Porch Column Collapse, after stabilization (Photo: A. A. W. Joukowsky).



12. Petra Great Temple precinct, 1997 Reconstruction of the Precinct.

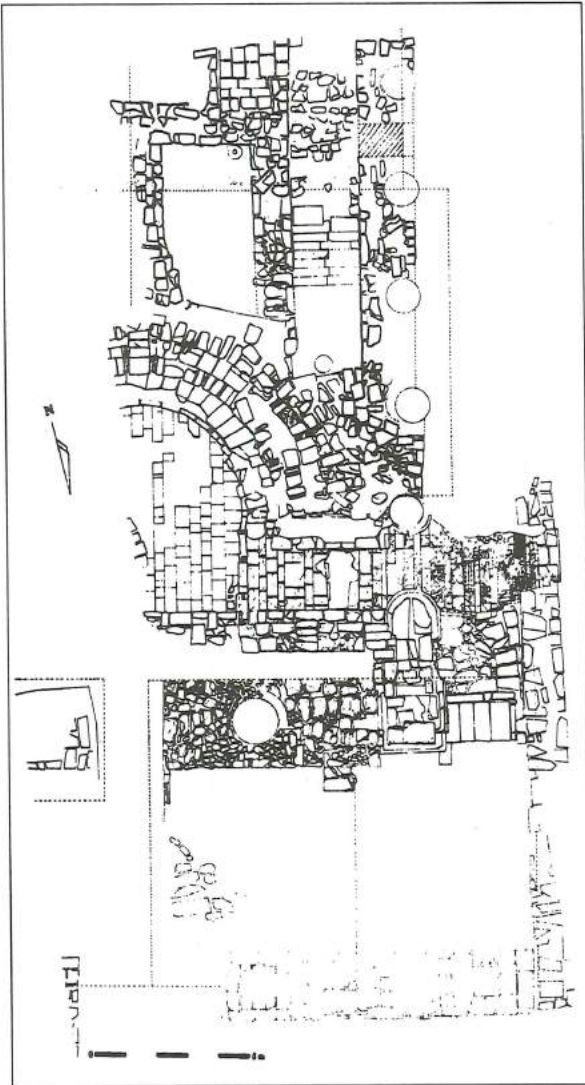
Cavea

Trench 40, measuring 9.8 x 6 m, was located to the west of the Lee Column and extended to the center of the cella; before excavation; we thought this would define the front wall of the curvilinear cella. In an irregularly shaped Trench 47, excavation was undertaken to define the rear wall of the cella. One half of an apsidal structure with tiers of seating was discovered, which we tentatively identified to be a Nabataean structure in the form of a theater. The photograph in Figure 13 shows its extant seating, and Figure 14 its plan. Facing north, were five extant courses of carefully hewn limestone seats with two six-step stairways (*scalaria*) in the *cavea*. This *cavea* was above a 1.5 m high plastered apsidal wall. Below the lowest tier was a paved *diazoma* (horizontal passageway or aisle) on the lower *cavea* wall measuring 1.5 m in width and set with alternating white and dark red sandstone pavers. The extant lower five-course *cavea* wall was constructed with carefully dressed blocks, 0.20 - 0.30 m in height, with curved faces. Unquestionably, the auditorium was central to the structure and it dominated the monument's interior.



13. Theater *cavea*. Detail of Theater Seats (Photo: A. A. W. Joukowsky).

The *cavea* seats averaged 0.35 - 0.40 m in height and 0.55 - 0.70 m in depth. The second to fifth tiers were of white sandstone ashlar which were divided into four wedge-shaped sections (*cunei*). Based on the excavated evidence, we can predict that the *cavea* was divided by three staircases — with one in the center and two on either side. Although the collapse of the West Colonnade scarred the structure, further ev-



14. Plan of the *Theatron* Area, scale: 5m. (Drawn by M. S. Joukowsky).

idence for the seating was be found to continue up to the east and west platforms to where the rear of the *cavea* must have stood in antiquity. The complex is built up to the casemate Inter-Columnar Walls, over the vaulted substructures of the East and West stairways (the Simon and Monica Stairways), the 3m x 5.5 m Vaulted West Chamber, the as yet unexcavated East Chamber, which is presumed to exist, plus the center area of the Central Arch.

Of note was that some of the blocks in

the seating area were channeled ashlar — their tops and facing surfaces had been chiseled out to produce narrow, 0.02 to 0.05 m deep, rectilinear, channel-like slots, which may have served as the socles for wooden arm rests or dividers. We hypothesized they may have delineated single and double seats.² In the massive collapse that fell into the West ‘Adyton’ Staircase (Monica Stairway), the West ‘Adyton’ Room, and the Central Arch area, many channeled ashlar were found in the debris — we reason these slotted blocks were used throughout the *cavea*. To reiterate, the *cavea* extended over the Monica and Simon Stairs, the Vaulted Rooms and the Central Arch to the rear of the Temple, at least to the north edge of the Brian and Jean Staircases.

Unfortunately, the upper portions of the structure were either in poor condition or were completely missing. In spite of this, we project that there may have been as many as 20 original courses of seats, with a *diazoma* bisecting the *cavea* between the tenth and the eleventh row of seats.³ A conservative estimate of the seating capacity would be a minimum of 550 and a maximum of 630 persons. This is based on the probability that the excavated preserved portion held at least 52 people, and, if originally, there were a total of 20 tiers of seats extending to the south stairways, this would account for substantial additional seating. These calculations must remain tentative, however, until we can confirm the extent of the *cavea* to the south.

On the north is a small and narrow, 0.7 m stepped sandstone stairway that leads up to the *cavea*. Although there are post holes for a railing, it does not appear as if this stairway provided a major access to the auditorium; it is so poorly constructed that it may well have been a later addition for access

2. That these served as water channels or as roof supports have also been suggested, but these ideas have been rejected.

3. This estimate has been arrived at by our architect-surveyor, Paul Zimmerman.

into the *cavea*.

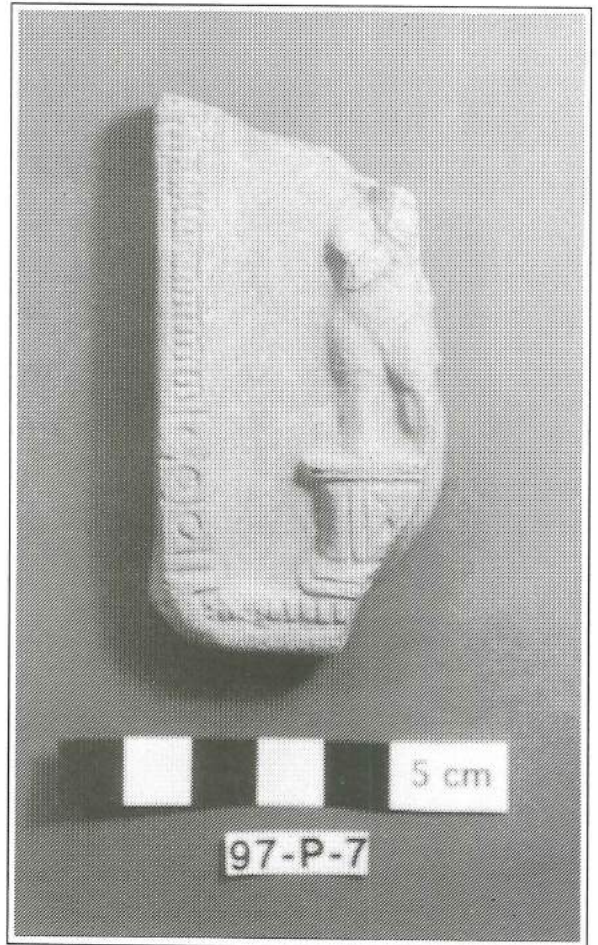
Orchestra

The projected preserved diameter of the orchestra is approximately 6.5 m. The floor of the orchestra is paved with rectilinear sandstones longitudinally placed, north-south, and perpendicular to the center of the *cavea*. These were set in place after the *cavea* was constructed. A line of red pavers led us to speculate that originally this floor may have had a variegated patterned design. Unfortunately, the damage to it is appreciable — perhaps in our future excavations of the remaining part of the structure, the floor design may become better delineated. In the excavation of the orchestra, several capitals were found (see Fig. 15).

The orchestra area is too restricted and small for any large function, but may have been used for speeches, dramatic presentations, simple religious rituals and ceremonies. In the east balk of Trench 47, the orchestra, is a collapsed stone feature of four ashlar that has yet to be excavated. This may have served as a platform, or as the base for a statue or even as an altar. Future excavation will clarify the function of this feature. Also in this trench was found a fragmented plaque with Harpocrates represented (Fig. 16).



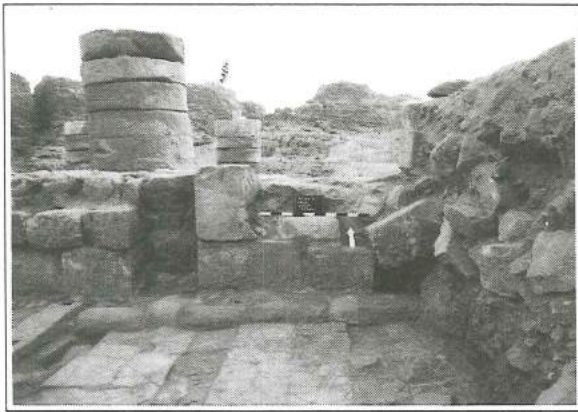
15. Capital Element in the *Theatron* TR47:Loc23 VII 97 (Photo: A. A. W. Joukowsky).



16. Plaque of Harpocrates found in Trench 47 of the *Theatron* area. (Photo: A. A. W. Joukowsky).

Pulpitum or Platform

The east-west excavations in Trench 40, between the Paul Column (to the rear of the east Pronaos) and to the Mohammed Column, were very productive, for there is an architectural component that we tentatively identified as a pulpitum or the front of a raised platform, which at this time has been incompletely excavated. Constructed of sandstone ashlar four courses in height, the excavated portion of this feature is 1.3 m in height x 5.66 m in length by approximately 1 m in width. It is curbed by sandstone ashlar, 0.4 m in width which lie 0.3 m above the orchestra floor (Fig. 17). In the south wall facing the *cavea*, interrupting the wall of diagonally-dressed sandstone blocks, are two small staircases, and in the center there is a niche 0.5 m in width x 0.4 m in depth.



17. Pulpitum of the *Theatron* (Photo: A. A. W. Joukowsky).

It is assumed that this feature if a *scaenae frons* (stage building) cut off the visibility to the Temple Pronaos and the entrance of anyone seated in the *cavea*, but if it was a raised platform, visibility to the Temple Forecourt would still have been possible.

Walkway-entry

A paved walkway of some 3 m width lies between this stage-like structure or platform – either the pulpitum or the *scaenae frons* – and the orchestra. At the east end of the excavated portion of this walkway and positioned perpendicular to the pulpitum or platform is a threshold, 3 m in length and 0.30 m in width, with deeply-cut, squared hollow cavities in its upper surface. Because quantities of metal were found in this area, it is probable that these cavities supported a gate or door with metal fittings.

West Corridor

As already seen in past years, the interior of the Great Temple was found to have been highly decorated. The 1.9 m casemate walls of the West Corridor (Trenches 45 and 47), constructed up to and behind the West Anta pier (Patricia Anta, Trench 48), were frescoed with red, yellow, green, and blue stucco. More columns were found covered with vestiges of red painted and white stucco decoration.

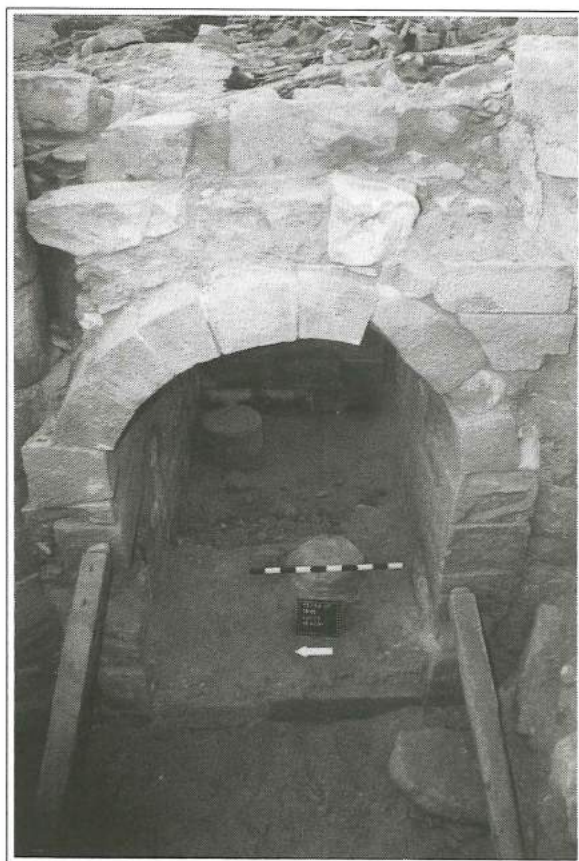
Excavations also took place in the West

Corridor to define the architecture of this area. These investigations took place behind the West Anta Wall (Patricia) and from the engaged Paul Column to the Erika Column extending to the Temple center west. Recovered were many well-preserved, worked decorative stucco fragments: some with egg and tongue and egg and dart motifs, and vegetal elements, and some painted cornice fragments. One limestone acanthus capital fragment still had traces of gold leaf adhering to its surface.

In the southeast of Trench 45 (between the Lee and David Columns), we also excavated the arched doorway in the casemate Inter-Columnar Wall at the bottom of the ‘Adyton’ West Stairway (Monica Stairway), between the West Stairway and the West Corridor. Presumably this arched doorway provided access to the steps that led up to the platforms in the rear of the *cavea*. Erosion damage to the arched doorway had been appreciable from annual winter rains that had been trapped at the bottom of the exposed stairs. Therefore, the main purpose of this work was to open this area for the passage of water from winter rains. During excavation, the structural integrity of the arch, its Inter-Columnar wall and the Lee Column showed a serious need for stabilization (Fig.18). The ashlar had not fallen, but had been jostled out of their original positions and were listing to the west. This stabilization was completed during the fall of 1997 before the advent of the winter rains.

Temple Rear

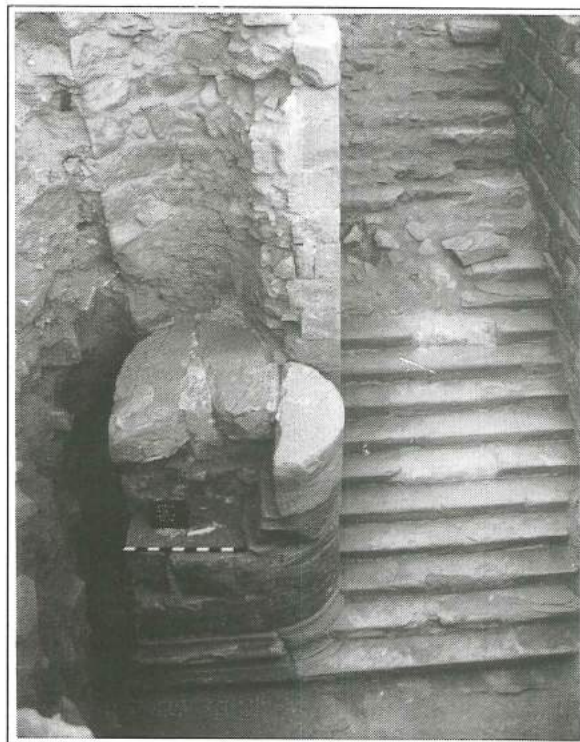
Continued research was devoted to the rear of the Temple (1996, Trenches 34, 35 and 26), to better understand the inter-relationship between the ‘Adyton’ Central Arch and the Temple rear. Excavation resumed under the now-consolidated Central Arch in Trench 26, but, when the arch ashlar were found to be further compromised by earthquake, the project was abandoned until additional consolidation measures



18. West Corridor Arched Doorway into the West Stairs (Monica Stairway, Photo: A. A. W. Joukowski).

To our great surprise, in the center south of the Temple leading up to the platform that was supported by the Central Arch, was the recovery of an east-west flight of stairs (Brian Stairway), approximately 7 m in length x 2.2 m in width, extending from the upper 'Adyton' to the East Interior Corridor. At the foot of these steps at 885.93 m elevation, we discovered that these stairs were built around, and were therefore constructed after, the Attic heart-shaped column base of the Sulieman column in Trench 34 (Fig. 19). A large window and an arched doorway were found in the south wall of the stairwell. At their top, they accessed the small paved platform and the north-south West Staircase (Simon Stairway) excavated in Trench 15 in 1995. (The elevation of the East Corridor floor lies at a 7 m depth below present day ground level.)

In the Temple rear, continued excavation



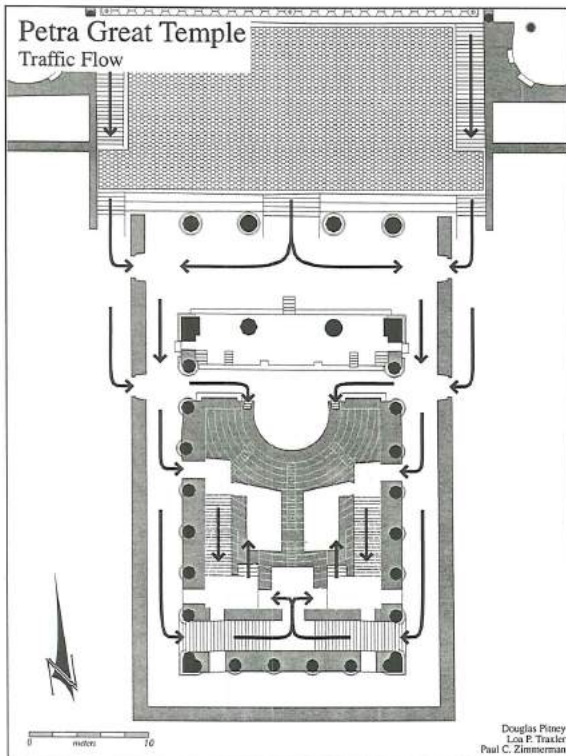
19. Temple southeast, east-west rear stairs (Brian Stairway, Photo: A. A. W. Joukowski).

also took place on the east side of the Temple in the East Corridor (Trench 34) to locate its founding level. (This operation continued the Trench 34 excavations initiated in 1996.) Eight courses of the massive heart-shaped southeastern column (Sulieman Column) were removed, section x section, for re-erection. Here, too, large amounts of multi-colored — green, red, blue and yellow — decorative stucco were recovered.

Design — Flow Pattern

Now, given a new plan for this building, how did it work? We found the flow pattern at the time it was used as a *theatron* to be extraordinarily well-planned and efficient. A tentative traffic flow pattern is shown in Figure 20.

On the ground level, access was from the Lower Temenos, up the East or West Stairways, (Laurel and Elizabeth Stairways) to the East or West Walkways, and from the Walkways into the East or West Corridors. Alternatively, access might also have been through the Temple Entrance, if it too was



20. Petra Great Temple, proposed traffic pattern.

not blocked,⁴ to the front of the now blocked Temple Pronaos. (As the pulpitum wall had been constructed between the two center columns, the participant was obliged either to turn to the right, and then left into the West Corridor — or to turn to the left to gain entry into the not as yet excavated East Corridor).

Once in the Corridors, the major route which would be taken by most participants who wished to access the *cavea*, would have been from the now-excavated West Corridor. The major access would have been through the arched doorway between the Lee and David Columns. (We anticipate a similar entrance to the East Stairway (Simon Stairway) from the East Corridor between the Michael and Francesca Columns.) Returning to the structure west, once the West Stairway (Monica Stairway) had been mounted, access to the *cavea* was via the paved platforms at the top

of these stairs, which with a 90° turn accessed the twin small flights of steps which may have led to an arched passage which exited at the middle *diazoma*. Once in the *cavea* the participant would have had the option either to descend to the lower rows of seats or mount the *scalaria* that led to the upper seating and up to the *diazoma*, if one existed, at the upper reaches of the *cavea*.

Entry or egress from the rear of the Temple theatron could also have been from the East or West Corridors. These participants would have elected to walk up the Trench 35 recently-excavated southeast stairway (the Brian Stairway), or the as yet unexcavated southwest stairway (Jean Stairway) which led from the East and West Corridors to the twin platforms which accessed the rear of the *cavea*. Also from the Corridors either entry or exit could have been gained to the exterior East and West Walkways.

As for the narrow series of steps found leading up the side of the *cavea* to the lower west *cavea* walkway, it would appear that this was a minor access, perhaps for special purposes, and that these served as “emergency” steps to the front of the *cavea* walkway (and from there to one of the three major *scalaria*).

For the performers, from the west, we do know that between the Paul and Erika Columns there must have been a secondary entrance along the paved walkway which led to the orchestra on the west. (We assume the same plan existed on the east between the Loa and Deirdre Columns.) This access would also have served the performers, speakers, in short, any person who was to perform on the orchestra floor. An additional entry onto the top of platform is the narrow 0.8 m passageway from the West Corridor cut into the wall between the Patricia Anta and the Paul Column. (It will be

4. Erika L. Schluntz believes that it may have been blocked by a screen wall that extended between

the porch columns, and that the former pronaos area should now be considered “backstage.”

of interest to excavate the corresponding East Anta (Pierre Anta) and the Loa Column wall to find if an opening existed here as well.)

Discussion

The Great Temple stands alone above a large colonnaded Lower Temenos among thousands of architectural fragments, including elephant-headed capitals. The Temple itself is embellished with floral Nabataean capitals, and it cannot be forgotten that this well-preserved building is also decorated with masks, recovered from the West Walkway in 1995. The whole precinct is built with an emphasis on axuality and frontality.

Interpreting this large public edifice is at the heart of the archaeological process — there has been a great deal of debate regarding the identity of this building. If our structure is, in fact, a Great Temple, the theater is certainly its dominant architectural element.⁵ On one hand, this structure is built like a temple, and on the other, it has a theater-like structure in place of the cella. It cannot have served as a sacred space, a religious building that was decommissioned and desacralized. In other words, it could not have been built as a temple and then have become transformed into a civic structure — one has to assume that a shift in function would go against Nabataean religious tradition. Therefore, it must have served either as a religious or as a secular structure. And if it is a religious structure, why could it not have served as an instrument of religio-political propaganda? The kings of Nabataea certainly utilized religion to further their political ambitions.

For some time the author has been puzzled about this monumental structure. Although the conventions of classical architecture proscribe this building to be the

Great Temple, it is clear that Nabataean creativity, their lack of preconceived ideas, and their unusual architectural borrowings from the classical world could have led them to utilize the Great Temple either for ritual or administrative purposes. The purpose of this structure has yet to be determined — it remains a riddle. We know that this theater-like structure must have served as the central focus for the Great Temple after it was rebuilt. Since the interpretation of this building is somewhat enigmatic, future excavation will hopefully clarify its function.

In future seasons we will test several hypotheses to explain and understand this building.

- 1) It was a temple or a theater-temple;
- 2) It served as the civic center for Petra in the Nabataean and Nabataean-Roman periods as,
 - a) a bouleuterion where the boule (city council) met or as a *comitium* or *curia*, a Roman political meeting place;
 - b) an odeum or small concert hall;
 - c) a law court, council chamber, meeting hall.

Now it is possible that this is a civic structure — perhaps it is where the Nabataean “popular assembly” held their meetings. It is worth quoting Strabo (16.4) who states:

Petra is always ruled by some king from the royal family; and the king has as Administrator one of his companions, who is called “brother.” It is exceedingly well-governed; at any rate, Athenodorus, a philosopher and companion of mine, who had been in the city of the Petraeans, used to describe their government with admiration, for he said that he found both many Romans and many other foreigners sojourning there, and that he saw that the foreigners often engaged in lawsuits, both

5. Few roof tiles were excavated in the center of the structure, for that reason we believe the side colonnades may have been roofed; because few roof

tiles were found in the Temple center, I believe the area over the auditorium was unroofed.

with one another and with the natives, but that none of the natives prosecuted one another, and that they in every way kept peace with one another...

The king is so democratic that, in addition to serving himself, he sometimes even serves the rest himself in his turn. He often renders an account of his kingship in the popular assembly;⁶ and sometimes his mode of life is examined.

We must be mindful of the Latin Imperial inscription studied by Stephen V. Tracy and dated between ?112 and 114 CE, found in the rear West Vaulted Room on the floor.⁷ Further investigations of the parallel room to the east (the east chamber has yet to be excavated) may determine the actual purpose of these interior chambers in the rear of the Temple. There is but a single entry into this West Chamber. This room, 3.5 m in width-by 5.5 m in depth, with walls 4 m in height did serve for storage in the late Nabataean-Roman period (for stacks of roof tiles were found here — lying in an earth deposit above the Latin inscription), but originally it may have served as a secure space for keeping records, a room for the storage of arms, a holding pen for prisoners, or, although dark, a changing room for ac-

tors. Or its purpose may have been solely for the support of the *cavea* extending above it.

But perhaps the Great Temple was rebuilt as a bouleuterion? We should not forget the multiple references to the boule at Petra in the Babatha Archives discovered by Yigael Yadin from the *Cave of the Letters*.⁸

The Great Temple precinct's location adjacent to the Temenos Gate and the most sacred Qaṣr al-Bint is not accidental. A Great Temple or a bouleuterion-odeum should be accessible to the citizens of Petra and provide a gathering place where the decisions of the day could be announced and discussed by the populace. So, was the Great Temple a center of worship where performances of a ritual nature were performed or was it the location of the highest court? Or did this structure serve other or perhaps even multiple civic functions? We seek scholarly discussion of this issue.

Even if we restrict the interpretation of the function of the building, we are still left in the dark with a number of compelling questions. If it is a temple, what deity is worshipped here? And if it served as a civic center, what was its intended use — bouleuterion, odeum, (bouleuterion and odeum, it is conceivable that it could have been

6. In the strict sense of the word, this building would have been for the meeting of the deme (the popular assembly), not the boule (city council).

7. Can we state that this find adds the appropriate force to the argument that this should be identified as a civic structure? In a private communication, G. W. Bowersock stated: "The monumental Latin inscription is perfectly compatible with a temple, particularly one in which the emperor might have been *a sunnaos theos*. There is nothing about this find to suggest identification of the building as civic. Of course, it does not weigh against this possibility either."

8. From the Nahal Hever cave, these priceless finds are known as documents from "the Cave of the Letters." Published in 1989 by the Israel Exploration Society, The Hebrew University of Jerusalem and the Shrine of the Book, as *The Documents from the Bar Kokhba Period in the Cave of the*

Letters, Naphtali Lewis (ed.), the letters and transactions tell us that Babatha was a wealthy Jewess from the village of Maoza in the provincial administrative center of Zoara, located on the shores of the Dead Sea.

For reasons still not fully understood, sometime around the beginning of the Bar Kokhba Revolt, Babatha and her family left the region of Mazoa for En-Gedi where they hid in the cave at Nahal Hever until their untimely demise around 132 CE. When Babatha fled to the cave near her second husband's home in Judaea, she took with her this extraordinary collection of legal documents that were obviously vital to her and her family. Nearly 2000 years later, these priceless documents, which were once merely family archives, have become our single most important source of information on the legal affairs of the inhabitants of the province of Roman Arabia and Petra.

used for both purposes).⁹ How does this precinct relate to the urban fabric of the city itself? It must be considered in relation to the city plan of central Petra. While the function of this structure remains obscure, it surely presents a significant architectural component of Petra.

Although we have shed new light on urban Petra, the implications of these finds have certainly opened new questions about the site and the city. The reappraisal of the Great Temple architecture, chronologically and stratigraphically, will greatly enhance our understanding of the socio-political and religious culture of Petra.

Catalog

The 1997 catalog contains an additional 33 coins, 68 lamps, and 46 other items including Nabataean wares, a partial Greek inscription, a Rhodian-style stamped amphora handle dated from ca. 146 to 108 BCE, two bronze finials, and the sculpture of a lion's head found in Trench 50 of the Propylaeum. Portions of elephant-headed capitals continued to be recovered in the Lower Temenos; however, although they fit the diameters of the Lower Temenos column drums, the mystery yet remains as to what part of the Lower Temenos these capitals adorn. Architectural decorative elements continue to be prolific, but of particular interest is a pilaster found in the Lower Temenos fill above the Hexagonal Pavement. This is a limestone block with the relief of a life-sized headless torso, whose identity has yet to be discovered.

Sara G. Karz has been studying the glass fragments which had not been given close attention up to now, and has prepared her research for the soon-to-be-published *Five Year Report*. Our data base now stores some 115,742 items — in 1997 the Grosso Modo

data base had 31,181 objects recorded with approximately 21,300 or 68% representing pottery sherds. Our architectural fragment data base, totaling 5078 fragments, numbered an additional 832 pieces recorded in 1997, again, many of which were capital elements. Thus our corpus of objects was updated, not only with the new finds, but also with a fuller documentation of those we have identified as having been unearthed in important loci.

Consolidation and Preservation

1997 consolidation projects continued the work of previous years. An additional 75 m of fencing was installed to protect the areas excavated as well as the large architectural fragments that were recovered. Before excavation can resume we were devoted to the time-consuming quarrying and cutting of new blocks for step areas that have been robbed, and to the pointing and consolidation of the architectural elements of the precinct.

In the **Lower Temenos** are three projects. The East Exedra, excavated in 1996, suffered structurally during the 1996 winter rains. Because it was in danger of collapse, this structure underwent extensive consolidation. Now that it has been reinforced with mortar and painting, it is planned to excavate it in 1998.

The curbing in front of the East-West Retaining Wall has been consolidated, for its blocks over time have shifted from their original positions.

The 1997 excavations found the Eastern Stairs (Elizabeth Stairway) from the Lower to the Upper Temenos in varying states of collapse into the subterranean canalization system which extended below them. It is planned to create extra support for these steps before they are consolidated and re-

9. F. Zayadine, (pers. comm.) further suggested that the structure may have served as the seat of the Principia. Z. T. Fiema dismisses this suggestion by commenting that the archaeological evidence

suggests that the Headquarters of the Arabian Legion was in Bostra and that the Principia would have had to be there as well.

installed.

In the **Upper Temenos** and the **Great Temple**, columns that had collapsed from earthquake tremors continued to be re-erected. In addition, there was the consolidation of deteriorated blocks found in all areas of the site.

Both the East and West 'Adyton' Staircases (Simon and Monica Stairways) suffered erosion from the heavy rains of 1996. An enormous effort has been made for their consolidation and restoration. The re-erection of seven courses of the five-to-six part engaged drums of the heart-shaped Sulieman Column in the rear east of the Great Temple now has been completed. Before this process could be undertaken, the Nabataean support wall behind the Sulieman Column had to be dismantled and reconstructed, for it had all but collapsed to the west and was intruding on the area occupied by the column.

The Central Arch, once again, required support before excavation can continue. Partially conserved in 1995 and 1996, this area was partially excavated again in 1997, because we wanted to see it in its entirety. To our disappointment further consolidation has to be undertaken before further excavation can take place. This will be completed before the onset of the 1998 season.

The West Corridor and the Inter-Columnar Wall arch required complete dismantlement for anastylosis to take place. The west flank of this wall, its arch, and the Lee Column was excavated in 1997. It was discovered that these architectural elements had undergone significant earthquake damage — both the wall and the arch had slumped out of position at awkward angles to the west. The Lee Column had to be completely dismantled and re-erected during the 1997 field operations. This time-consuming re-erection during the 1997 field season placed an enormous strain on the progress of the 1997 field schedule. But, because of logistics, it had to be completed

before work in the theater-like structure could be initiated.

The theater-like structure requires consolidation. But we thought it better to postpone this effort until some point in the future when this structure will be fully excavated.

We continue to be committed to the consolidation of this great edifice, which in part has been made possible by the World Monuments Fund. Although our major subventions are through Brown University, we have received significant support not only from the Department of Antiquities, but also from the newly-formed Petra Regional Council.

Major scale consolidation which has been carried out under the direction of Dakhilallah Qublan. Knowing that the site was susceptible to deterioration from the winter rains, the main areas of focus were the repair of the 'Adyton' East Stairway (Simon Stairway), the Trench 45 arch and wall at the bottom of these stairs, and the Inter-Columnar wall between the Lee and David Columns that required complete removal and re-erection. In the Temple rear, the Sulieman Column was also re-erected with the elements that had been removed during the 1997 excavation season. Once this project had been completed, a dam was constructed at the east rear of the Great temple to divert rainfall.

Donna D'Agostino created an upgrade of the Architectural Fragment data base, and the author entered the data. At ACOR, the bronze finials were restored by Fatma Marii. The 1997 coins, which had been given a preliminary reading during the field campaign by Christian Augé, were cleaned in Amman, also by Fatma Marii. They await a final reading. After Yvonne Gerber had studied the pottery, the Trench 42 fragments were sent to Providence where the author drafted and described them. Simon M. Sullivan undertook the drawing of catalogued items and several of the architectural fea-

tures, but in the main, the trench drawings were drafted in Amman by Ala H. Bedawi. The site catalog was organized for publication by Deirdre G. Barrett.

The plans for a full digital reconstruction and virtual reality tour of the Great Temple is being prepared by Eileen L. Vote, Brown University graduate student in the Department of the History of Art and Architecture. The complete model of the whole edifice generated in Auto CAD is being exported to a 3D modeling program. Because a large part of the Great Temple is no longer standing, producing such a simulation will enable our archaeology colleagues, architectural historians and anthropologists to work on a visual reconstruction of the site as a whole and to experience how the Temple may have looked during the various stages of its use. A digital simulation also will provide us with the ability to show in a realistic way what the architecture of the central part of Petra looked like in antiquity. The completed project will allow the viewer to experience the whole building in its setting by creating a full virtual environment. It is projected that this study will be completed in 1999.

The compilation and final editing of the five year report entitled, *Petra: Great Temple Volume I: Brown University Excavations 1993-1997*, has been the focus of our home schedule during this winter. Editing has been completed by David A. Detrich, and the author corrected and annotated the text as Kirsten K. Hammann put it into PageMaker and Simon M. Sullivan oversaw the layout. Interdependently, Simon M. Sullivan consulted experts for the CD-ROM, for there was far too much data to be presented in book form. What we attempted to do was to plan ahead for problems, that

is, the illustrations, that had to be selected and given size considerations as the publication was put together.

Now that the summaries of our five years of excavation have been discussed, we turn to our phasing of the site and place its progressive stages of architectural development into a chronological scheme.

V. Site Deposition Analysis

If possible, we wanted to find the primary building phases of the site, as it became abundantly clear that the Great Temple precinct had a complex deposition history. Moreover, there were multi-depositional contexts whereby soils and features had been spatially altered. There were multiple occupations as well as long term occupations that had also altered the site over an extended period of time. Additionally, there had been geophysical changes and erosion that had to be dealt with and analyzed. We realized the complexities of the situation, and implemented our recovery methods to provide us with data on the phasing of structures. Our understanding and constant restudy of the stratigraphy of the temple site itself has been hampered by the lack of sealed archaeological contexts (see below).

Based on site deposition, our annual excavations have determined the general sequence or phases of the Great Temple construction, collapse and abandonment. Seven phases have been tentatively identified. These may be modified by subsequent excavations, but at present are used as the backbone of the archaeological evidence. The ideas espoused below are tentative and hypothetical.

Phase I is labeled, Nabataean I.¹⁰ This represents a major construction of the Tem-

10. I suggest that there may have been an earlier small temple that was distyle in antis (two massive columns on the façade set between wall ends or pilasters — the Vartan and Mohammad Columns). This is an almost square structure,

measuring approximately 18 m east-west-by 22 m north-south. If there was a roof, there is no evidence for it. This structure then underwent a transformation, and with remodeling had its side and rear walls dismantled when the building

represents a major construction of the Temple Precinct. The major goal of the project was to construct a building of importance in Central Petra and to orient it toward the main thoroughfare of the city. The dramatic backdrop of the al-Katute provided a perfect siting for the building. Built into the rocky site, an enormous amount of fill was brought in to create the setting for an imposing structure set on a high terrace platform. As the upper terrace sloped away, a flat terrace had to be leveled out in the planning for the Great Temple. An early Canalization System was also constructed, perhaps even before the Temple was laid out. This had to be functional, for it was feared that the terrace fill might otherwise erode. A Central Stairway was built to lead up to this structure. It probably originated from what then was the central artery of the city (the later paved Colonnaded Street), through the then non-existent Lower Temenos up to the Upper Temenos.¹¹ (These are the Center Stairs that were later blocked-off in Phase II.) The Lower Temenos may not have been developed in this phase, or it may have seen the building of the arched system excavated in the east. At some point in Phase I, we assume that this Lower Temenos Arch System was put in place.

The massive Great Temple was then constructed. The building façade became what we see today as tetrastyle in antis — four columns in the front of the building with wall ends or pilasters at the extremities of

the antae walls of the Temple Cella. A roof probably existed between the Porch Columns and the Pronaos Columns, but its architectural design is unclear — the Porch Columns could have been surmounted by either a “regular” pediment or a broken pediment — but as for this structural detail, we have no archaeological evidence. What we do see today are the Great Temple Stylobate (the upper step or platform on which the columns rested) and the Pronaos (the Porch in front of the Temple Cella), and we assume they were built, roughly, at the same time.

As far as the building’s interior was concerned, Phase I also included the erection of the eight interior bichrome plastered sandstone columns on the building’s flanks and six columns at the rear. At least in late Phase I, these columns were decorated with flat red plaster on the bottom with white ridged plaster above, for there is still evidence for this decor. These columns were decorated with deeply-carved limestone capitals with fine sculptural decoration. The side corridors were also constructed, and were decorated with multi-colored plaster. To protect both the wall and column plaster, roofing probably extended around the structure from the side columns to the tops of the corridor walls.

What the central part of the structure looked like in the Phase I architectural plan is not clear. If this structure is a temple, it must have held a cella and an adyton, but no

= scheme was enlarged to construct a grander edifice by later Nabataean architects — our now, Phase I structure. This modified Phase I structure, saw the extension of the building to the north by approximately 9 m, with the construction of the Pronaos, plus two new antae with four new columns between them.

A paucity of masonry indicates this phase, and I have little stratigraphic evidence to support it, but it appears to me that the construction of the Pronaos and the Stylobate as seen today is considerably different than the Patricia and Pierre Anta Walls and the Pronaos columns which served the original structure. Future excavations

will clarify if this earliest building existed, but I suspect it did. This then was a small structure, probably a temple which crowned the hill, and could be viewed from all parts of central Petra. With the construction of the Phase II Lower Temenos and Propylaeum, the Temple was not visible from the Colonnaded Street.

11. This good suggestion offered by Z. T. Fiema in an informal communication, may be confirmed by the GPR results which seem to indicate a subterranean stepped structure in the Lower Temenos. This structure may also be part of the Canalization System, at this point the evidence is not clear.

basis of the few roof tiles found, the center of the structure may have been open to the sky, or hypaethral.

From the style of the floral decoration, especially the limestone capitals, the Petra Great Temple iconographic evidence appears to be similar to that of the al-Khazna.¹² Tentatively the evidence suggests this structure was constructed sometime in the last quarter of the first century BCE¹³ by the Nabataeans who combined their native traditions with the classical spirit. By this reckoning, therefore, this structure was built during the reigns of either King Malichus I (62-30 BCE), or Obodas II (30-9 BCE), or perhaps both.

Phase II is what we refer to as Nabataean II. There is a new, complete monumental rebuilding program — an architectural metamorphosis was launched in this phase. The architects wanted to make a strong statement and might have drawn their inspiration for the precinct perhaps from Alexandria which at that time epitomized the architecture of a great city. It is obvious that the rulers of Petra took pride in the embellishment of their Precinct while providing for its functional demands with a sense of spatial logic. The Precinct had to emanate a sense of power befitting Nabataean wealth. This construction period is placed in the later Nabataean period based on the Trench 18 Locus 10 pottery identified as belonging to the last quarter of the first century BCE.¹⁴

So, what did these Phase II architects have in mind? To begin with, there had to be a building of an elegant columned Propylaeum for access to the Precinct and a series of new steps had to be laid to be built up to the level of the Lower Temenos.

At the same time the architects ably conceptualized the Lower Temenos as a symmetrical, formal presence which purposefully emphasized the Great Temple. The Central Staircase may have remained in use for part of this time, but there was a challenging and exasperating problem confronting the planning of the area. It was the Canalization System. It must have been either inadequate or non-functional, or both. The answer, as with so many architectural questions, was clear; the Canalization System had to be reconfigured, and the most expedient way to do this was to completely rebuild its interior for drainage and enlarge its exterior, reusing a portion of the Central Stairs for water flow. With this rebuilding, the Phase I Central Stairs had to be blocked-off. This set in motion a completely new series of changes which made the design of the Lower Temenos radically different from what it had been before. Although a new standard was about to be set, this created a difficult situation, for the architects had to decide how to lead people from the Lower Temenos to the Upper Temenos. This may have provided the impetus for a scheme which would involve precise planning for the complete remodeling of the Lower Temenos. The architects approached all as-

12. As mentioned earlier, the most detailed study of Petra monuments has been undertaken by Judith S. McKenzie in her tome, *The Architecture of Petra*, Oxford 1990, also see the discussion regarding the site of Medain Saleh in Saudi Arabia. Judith McKenzie and Angela Phippen in "The Chronology of the Principal Monuments at Petra, Levant 19, 1990:152 summarize their views of Nabataean sculpture by stating, "Simplification of the classical elements of architectural decoration is related to chronological development. This change was seen in the moldings, Doric

frieze, capitals, florals and sculpture."

13. This idea was put forward in a public lecture on August 24, 1993 in Amman, and in the discussion period, the archaeologist, Nabil Khairy, stated that an early first century date was accurate. And McKenzie's typology assigns the structures including the Qaṣr al-Bint, al-Khazna, the Temple of the Winged Lions and the Baths to this time period.

14. This is a pocket of pottery that was left *in situ* near the east wall of the West Lateral Stairs.

pects of the Lower Temenos design simultaneously from laying out the stairways and the Exedrae to enhancing the area with triple colonnades. In short, they converted the area, creating a vast architectural foreground for the Great Temple.

For the bold new plan to work, the Phase II Lower Temenos had to serve as a functional space on its own. The wall with arch springers had to be filled-in with earth; this was key for this area had to be level and have proper drainage. Because the Central Stairs were dysfunctional, there had to be lateral staircases, and these had to have accompanying luxurious exedrae and other appurtenances to complete the finished look of the ensemble.

In closing off the Central Stairs, a massive East-West Retaining Wall had to be built on the same line as the twin lateral stairways and the Exedrae which delimited the Lower Temenos on its south. This east-west wall would also serve to support the Upper Temenos fill. New lateral stairways on the east and west (Elizabeth and Laurel Stairs) also had to be built connecting the Lower Temenos to lead people to the Upper Temenos and the Temple Forecourt. Other monumental structural changes in the Lower Temenos included the construction of the roofed Triple Colonnades with elegantly carved elephant-headed capitals which flanked the area on its east and west sides. This Lower Temenos court-plaza was then embellished with a sweeping, white limestone Hexagonal Pavement, which tied all the elements together and gave them and the area as a whole the feeling of association.¹⁵ These architectural components were all interconnected features that boldly defined the area's spacious importance.

The Phase II Temple continued to crown the composition of space, and the edifice we know today as the Great Temple emerged. The exterior was enlarged with exterior walkways on its flanks which connected with the twin east and west lateral stairs leading from the Lower Temenos. These walkways may have been roofed, but this is not at this point clear from the archaeological record. This is also when the limestone pavement of small hexagonal pavers put in place to embellish and finish off the Great Temple Forecourt, and if it had not been there in Phase I, a nine-step stairway was installed to lead into the Temple from the Temple Forecourt.

In the Great Temple interior, there was the careful construction of the Inter-Columnar Walls (walls with arched doorways and windows between the columns). The building of these inter-columnar walls disturbed and all but destroyed the plaster decoration of the columns. How high these casemate walls were is still a matter of conjecture, but we do know they fell short of covering the capitals. As some of the Phase I capitals had been damaged, restoration had to be undertaken, and we have evidence for their repair.

Also at this time, there was the major re-configuration of the Temple interior. The Phase I core of the Great Temple, the Cella, was reconstructed as an approximate 600 seat *theatron*-like structure, open to the sky and descending to the orchestra or pulpitum. The building of the pulpitum between the two Antae (Pierre and Patricia) and the Pro-naos columns (Vartan and Mohammed) post dates the building of the *cavea* and orchestra. Its bottom courses, still *in situ* are definitely superimposed on the theater floor-

15. The date of this pavement is also open to question. It can be paralleled to other such pavements at the site, which, at this point, have been imprecisely dated. In a personal communication, Professor Stucky stated (pers. comm.) that the pavement he recovered from the Petra site of az-Zanṭūr and the

pavement from the site of al-Katūta, excavated by N. Khairy in the 1980s, were Nabataean Classical. At that time, I believed this pavement to be later in our phasing of the Great Temple site. Now, it is agreed to assign its construction to the later of two Nabataean construction phases.

ing which extends under it. The heart of the Great Temple was now the theater, and the architects blended the proportions of the theater to blend in with the Phase I architecture. Its transformation must have reflected the changed circumstances of Petra royalty.

Additionally, multiple sets of new stairs were installed in the Temple rear — East and West (east-west) Stairs (the Brian Stairway and the probable Jean Stairway). These accessed the lateral Inner Corridors, and the East and West (north-south) Stairs (the Monica and Simon Stairways) with adjacent East and West Vaulted rooms. These four stairways accessed the Inner Corridor which led to the Temple exits, the Walkways.

This renovation we have placed sometime near the end of the reign of Aretas IV, ca. 40/44 CE, or to the rule of Malichus II (40/44-70 CE), and possibly to the reign of Rabbel II (70-106 CE). It is therefore suggested that these modifications took place sometime in the first or early second century CE. But questions persist: What was the transition between the earlier Nabataean structure and what we know as the Great Temple? Why was the transition from one type of installation to another so swift, in less than 100 or so years?

The next phase, **Phase III**, we call Nabataean-Roman. Serving as a buffer state against the desert tribes, Nabataea retained its independence but paid taxes to Rome. Completely subsumed by the Romans under the Emperor Trajan in 106 CE, Petra and Nabataea then became part of the Roman province known as *Arabia Petraea*. Under Roman rule, Roman Classical monuments abounded, many with Nabataean overtones — thus it is appropriate to identify this time, post 106 CE, as the Nabataean-Roman phase.

When Petra entered into the “Roman” world in the second century CE, we assume that the Great Temple was recycled by

Nabataean-Roman architects, and this is our Phase III or Nabataean-Roman period. The precinct continued to serve the Romans as one of the principal monuments of the city. And if there were post 106 CE changes made to the Temple and its Precinct. These changes are not altogether clear from the stratigraphy.

We posit, however, that at some point during the Nabataean-Roman period — in the last half of the second century CE — the Lower Steps of the Propylaeum were modified to conform with the paving of the Colonnaded Street and were added to for ease of entry into the Precinct.

As we know, Petra continued to flourish during the Roman period, with a Monumental Arch spanning the as-Siq, and tomb structures either carved out of the living rock or built free-standing. There is no reason why the Great Temple should not have continued to serve as a principal monument of the city, and the fragmented Latin imperial inscription, if we assume it is in some way associated with this building, attests to its importance and one of its last uses.

The evidence suggests that the Great Temple continued to serve the people of Petra until some point in the late third or early fourth centuries CE. This is our **Phase IV**, in which the evidence suggests that there was a minor collapse and abandonment of the structure. In the archaeological record, this period was represented on the Temple West by the accumulation of fill, 1 m in depth. The areas in use were worn with neglect, but the precinct as a whole was remarkably well preserved.

By 313 CE, Christianity had become the state-recognized religion of the Roman Empire. In 330 CE, the Emperor Constantine established the Eastern Roman Empire with its capital at Constantinople. Although the 363 CE earthquake destroyed half of the city, it appears that Petra retained its urban vitality into late antiquity, when it was the seat of a Byzantine bishopric.

Our **Phase V** begins with a major destruction, probably related to the fourth century CE earthquake. At least part of the structure collapsed onto the fill accumulated in Phase IV. Up to this point, we have no evidence to suggest the Great Temple continued to function. What is clear, however, is that the temple structure was devastated by the earthquake presumed to have taken place in the fourth century, which is said by some to have brought the city of Petra to the brink of ruin and total abandonment, but we have reason to believe that this was not the case.

In **Phase VI** dated to the Byzantine period there was reuse of the Temple Precinct, but this reuse was probably domestic in nature. At this point in our investigations, the Byzantine reuse does not provide us with a clear picture of how the various architectural components of the precinct were used and were interrelated, if they were at all. Therefore, this phase is problematic, with a series of differing activities that take place in different sectors of the Temple Precinct and having varied time spans; these are difficult to correlate. In the Great Temple, the floor pavers and the upper stair treads were robbed. Numerous surface drains were constructed over the extant remains, and some doorways were narrowed, indicating that only parts of the structure were in use at this time. In the Lower Temenos, a platform and stairs were constructed the West Exedra, and later this area was used either to house a kiln or to serve as a dump for burned debris.¹⁶ In the east Lower Temenos, lime slaking was a major activity which probably consumed many of the limestone elements of the Great Temple's decorative program — architrave blocks and capitals—perfect fodder for such

activity. Slowly fill accumulated and the Precinct was worn by time and neglect.

Phase VII represents the modern reuse of the site. Although, thankfully, the major portion of the Great Temple lies under its massive collapse, farming activities had taken place in the Lower Temenos, which had been subdivided by the Bedouin farmers into two plots of ground using fallen column drums to separate the areas. Here too it is a miracle that any of the Hexagonal Pavement remains, for in the north the farmer's fill lies centimeters below the modern ground level surface, whereas to the south near the East-West Retaining wall, the soil build-up is greater; one to two meters in depth.

At the turn of the century, European scholars began to explore the area, but notice of a Great Temple received scant reference in the record. In the 1930s Petra began to capture scholarly and tourist interest, and accommodation was provided at first with tents and then Nazzal's Camp was constructed behind the Qasr al-Bint as a hotel for tourists and visitors with the hotel dump positioned in the Great Temple Forecourt between the east Porch Column fall of the Nadine and Pia Columns.¹⁷ Recently, this complex is now known as the Burckhardt Archaeological Center which serves as the headquarters for our archaeological campaigns.

As excavations continue, it must be borne in mind that this phasing is tentative and may be revised in light of future excavation. Our understanding of the site has been difficult, not because of the lack of dateable materials, but because the mixture within archaeological contexts of artifact stylistics ranges from the first century BCE to the early fifth century CE in date — the

16. The area may have served as the dump of a praefurnium for the adjacent baths. But of this we cannot be sure.

17. This dump can be viewed in pre-1997 aerial photographs. Positioned between the Nadine and

Pia porch column fall in the Upper Temenos, it is a rounded structure bordered by stones, and is almost 1.5 m in diameter. The fact that it is a dump is hearsay — it has not been excavated.

Great Temple Precinct was in use for approximately 500 years. There are few sealed deposits, and much more has yet to be explored before we can understand the archaeological deposition of these remains.

The existence of the Great Temple is now an established fact. Our discoveries over the past five years will enable scholars and the public at large to study and visit this great edifice. Before the excavation is closed, I hope to reveal not only more of the architectural layout of the building and its sacred precinct, but to understand better its function, its phasing, and how it was woven into the fabric of its Nabataean, Nabataean-Roman, and Byzantine urban environment.

The wealth and importance of Petra as the Nabataean capital had to be made clear to both her subjects and those powers with whom she interacted. In the heart of the city, the Great Temple must have been impressive. The visitor entering the complex from the Propylaeum and crossing the great open expanse of the Lower Temenos became involved in a great architectural experience. The drama of the Nabataean planning is evident — there are exciting vistas of the Exedrae, the double great staircases, the seemingly limitless rows of columns and the remarkable façade of the Great Temple itself. The fabulous architectural decoration of the elephant-headed capitals set against the monumental architecture of the Lower

Temenos and the height and breadth of the impact of the Temple structure with its deeply sculpted, elaborate floral capitals demonstrated power and wealth. The overall construction of the precinct must have been directed by royal patronage, and it clearly is a response to the needs of the Nabataean court and its administration.

Conclusion

Some of the questions that still abound about this structure we hope will be answered as our work progresses. We now know why this temple seems to be so different in architectural plan from the traditionally established canon of the classical temple. What is the relationship of the theater-like emplacement to the Temple? Could this be a theater-temple? Or could it be a civic bouleterion?¹⁸ Could it have served dual or several functions, be they either religious or secular, or does it have yet other functions? What is the relationship of this structure to the fabric of the city? What are the earliest structures constructed on this site, and what and when did modifications take place to the temple complex?

Acknowledgements

To be celebrated is our Brown crew and superb Bedouin work force. Needless to say, without the support of Brown University, the American Center of Oriental Re-

18. A most useful source is John Arthur Hanson's 1959 publication entitled, *Roman Theater-Temples*, Princeton. Hanson looks at the plans of these structures. But those at Dura Europos associated with the temples of Atargatis, Artemis Nannaia, and Artemis Azzanathkona are not in the same design as our structure. The closest Dura parallel in architectural design is "H" associated with the Sanctuary of Artemis Nannaia, but the theater lies outside the sanctuary proper. The lack of models for our structure leaves us without definite answers. The temple at Seleucia-on-the-Tigris is also hypaethral, but again it is not inside the temple structure. The Nabataean temple of Baal Shamin at Si' has three steps facing the central court — the theater is the

courtyard for the temple. This is true also of the theaters at Sur and Sahr. Hanson explores the concept of the theater-temple, and on p. 98 he states: "In addition to what may properly be called sanctuary theaters, we find numerous cases in which temples are located near theaters and easily accessible to them, cases which seem to represent more than meaningless accident." And on p. 77, "What is common to all [theater-temples] is a location on the central axis of the theater overlooking the orchestra with the front facing the stage building, with provision for a statue of the divinity. Most have a colonnaded façade and many are approachable by special steps or entrances through the back wall of the *cavea*."

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search in Amman, and the devotion of Drs Pierre and Patricia Bikai, the loyalty of the American Embassy, the help of HRH Prince Ra'ad bin Zeid — and, most important of all, the friendship and affection of all of our participants — these excavations would not

have been realized.

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NABATAEAN FACES FROM PETRA

by

Philip C. Hammond and Teresa Mellott - Khan

During the seasons from 1975 to 1977 of the American Expedition to Petra, the excavations at the "Temple of the Winged Lions" produced a series of unique architectural affixes. A few of them were rendered unrecognizable as a result of the earthquake tumble (AD 363), but some twenty-four were relatively well-preserved. They consisted of naturalistic mold-cast human faces, with the exception of AEP 1975, R.I. No.12, which may have been only a "Tragic Mask". The sizes and find locations of these affixes suggest that they were displayed on the lower frieze of the altar platform of the Temple.

The apparent visibility of the affixes, their naturalism, the fact of molding (i.e. with prior individual sculpting), and (one-time?) casting, indicates their individual importance within the Temple *cella*. All seem to have certain physical characteristics in common: rounded cheeks, bulbous eyes, and pouting lips, which suggests local Nabataean manufacture (Glueck 1965: 225-26; Hammond 1973: 87). At the same time, the individuality of the faces indicates that actual persons were being portrayed. The placing of individual portraits within the Temple *cella* likewise indicates the importance of the personages portrayed. When these factors are examined, four possibilities for such representations seem obvious: deities, local royalty, allied royalty, or distinguished local citizens.

In the first instance, with the sole exception of AEP 1976, R.I. No. 35 (possibly Helios?), none of the recovered examples display any of the usual attributes, nor other recognizable symbols usually exhibited in the Nabataean (and other Near Eastern) re-

ligious iconography. Hence, the affixes do not depict Nabataean deities, nor those from any other associated cultural group. Patrich's arguments (190: 50, 104 ff., 152, 153ff., 189) against anthropomorphic depiction of Nabataean deities may, perhaps, support this conclusion.

In the case of the possible Nabataean royal portraiture being represented, the only source for comparative examples is to be found on the extant Nabataean coins, where a relatively limited repertoire of the royal portraits is available. The official coinage of the Nabataeans began with Aretas III (87 - 62 BC), although non-portraiture types of previous rulers appear earlier. Meshorer (1975: 11) notes that it was only at a very advanced stage in the minting of Nabataean coins that "...the Nabataean kings ventured to strike coins with a definitely Nabataean character and without any attempt to imitate foreign issues". It is, therefore, with the mints of Aretas III that a search for any identification of portraits with those of the recovered affixes can begin.

Meshorer comments in detail concerning the characteristics of individual royal portraits on Nabataean coins. He notes that the coins of Aretas III bear the profile of the King, "...with the copious locks of the Arab race and a formidably curved nose, quite as hawk-like as those of his Seleucid predecessors, Grypus and Antiochus XII" (13).

The coins of Obodas II (62-60 BC) are seen to "...reflect the transition from the coins of the Seleucids (particularly as regards the form of the hairdress) to the later Nabataean types with their distinctively 'oriental' faces" (80). Likewise, the coins of Malichus I (52-30 BC) distinguish him

quite distinctly from other Nabataean kings, in that "...his face is depicted as that of a young man and his hair hangs down in long, distinct ringlets, a style not found among none [sic] of the other Nabataean kings. Another notable feature is that the ringlets fall down in more or less straight lines, unlike the hair of his successors, which fall in oblique, wavy lines" (24).

During the reign of Obodas II (30 - 9 BC), the majority of Nabataean coins bear the jugate portraits of both the king and the queen, therefore providing the possibility of the identification of the female affixes recovered from the Temple.

The king appears with his hair "...tied on top with a fillet which is wider than that on the coins of his predecessors and which terminates in a knot, whose ends hang down at the back...", while the queen's head is obscured and "...it is difficult to distinguish her hairdress, the shape of her ornaments, or the details of the object binding her hair, which may be a diadem or a wreath" (33).

With the reign of Aretas IV (9 BC - AD 40) the Nabataean kingdom reached its highest political, economic and artistic peak. With the length of his reign, also came a proliferation of mintages at various points in time, which likewise vary in the portrayal of the king and his queens. Meshorer sees the portraiture of the earliest mints of Aretas as archaic, in that "...the hair is diademed, falls straight down onto the nape of the neck and covers the ears: a robe [*himation?*] is wrapped around the shoulders" (43).

With the advent of the queen's (Huldu) jugate bust on the coins the portraiture improves. Huldu is "...invariably portrayed with a veil which leaves the front of her head and the laurel wreath on it exposed to view, but covers her hair and the nape of her neck and hangs down onto the robe around her shoulders... At times the queen also wears jewelry, a necklace of beads as well as earrings; the latter are spiral-shaped ... or shaped like a pendulum.." (43).

Around AD 18, Huldu was replaced by queen Shaqilat and Meshorer again sees a lesser level of both artistic style and execution (957-58). Conservatism, which also apparently appears in the redecoration of the temple interior, seems evident in the two main mintages of Malichus II (AD 40 - 70). Both of those mintages, in silver, or bronze, follow the pattern of his predecessor.

Rab'el II (AD 70 - 106) shared the early part of his reign with his mother, Shaqilat, but the conservatism of his father, Malichus, was not shared in terms of his coin portraiture after her death. Meshorer points out that the king appears with "... thick ringlets falling luxuriantly onto his shoulder and the nape of his neck: his chin is heavy and protrudes ..." (77). On the other hand, the portrait of Gamilat, Rab'el's queen, did not fare so well, as Meshorer again points out, and she appears less well portrayed than did Shaqilat. However, it must be noted that the features which Meshorer decries (i.e. thick lips, protruding chin, and even the "thick" veil) may well represent a naturalistic trend in royal portraiture, not a degeneration of either artistry, nor technical skill. From ca. AD 102 onward (Meshorer — between AD 103-106), Rab'el's final mintages display the portrait of his new queen, Hagiru. When comparison is made between the royal portraits on the coins (especially those of Aretas IV and later) and the architectural affixes recovered from the Temple, certain specific similarities are evident: for example the "oriental" faces, curly hair, beardlessness, large eyes, and heavy lips. However, there is an obvious absence of other details, such as the laurel wreath, diadems, the veil, distinctive jewelry, or parallel hair treatments. Only one of the facial affixes appears as filleted (R.I. No. 167) and only two appear to have any sort of other headdress treatment: R.I. No. 3 has a double head band and R.I. No. 190 has an indistinct addition on the right side of the face. Still further, no close

parallel appears to exist between any of the faces, *s.s.*, depicted on the affixes and any member, male or female, of the repertoire of the regnal portraits available on the coins.

Hence we must conclude that the persons being depicted on the architectural affixes are not meant to represent the kings, nor the queens, of Nabatene. However, they do, as noted above, have the physical characteristics and hair styles which are more distinctly Nabataean than the more Hellenistic features of Roman portrait styles, either in statuary or painting.

There remains only the fourth possibility, initially proposed, for identification of the affixes: namely that these affixes depict distinguished local citizens.

Given that possibility, therefore, the question arises as to who would be so prominent, or so honored, to merit public display of their faces in the temple to the supreme goddess of the Nabataeans.

Again, a series of possibilities arise in answer to this question, along with a broad range of comparative parallels in both the Graeco - Roman world and the Near East, to note only the most proximate regions.

It is obviously unnecessary to cite the multitude of examples of personalized statuary, busts, and masks, which stemmed from public honors accorded the Imperial families, senators, victors in games, friends, and various other private citizens during both Republican and Imperial Roman times (Suetonius, 1930: I. vii, lxxv, lxxvi; II. xxxi, lii, xcvi; III. xxiii, xxvi, lvii; IV. vii, xiv, xxii; V. ix, xi; VI. xii, xxv, xxxi, xlv, lvii; VII. i (Galba), (Otho) xxiii, vii; VIII. v (Vespasian), xxiii (Titus), iv, (Domitian), vi, xiii, xv, xxiii; II. iv ("imaginibus"); VI. xxxvii; VIII. i (Vespasian); VII. iii (Vitellius), ix; VIII. ii (Titus); II. xcvi; III. lxx, lxx (poets); 1935: IV. xxxiv; (On Gammarians) XVIII).

In addition, private persons accorded themselves, or family members, the same

"privilege" for personal display. There is the report, for example, that one Libo Drusus had a "...house crowded with ancestral busts" (Tacitus II. 27, 32; Orentzel 1979: 145).

Private citizens displayed statues of reigning emperors in their homes and on their estates, exchanging heads, often in gold or ivory, as a new emperor came upon the scene (Tacitus I.73-74).

The Senate and the public vied with each other in awarding statues, especially to the Imperial family, but also to worthy citizens, as well (Tacitus II. 41,64,183; II. 18, 56, 64, 72; IV. 64, 67).

Art historians of the Classical periods (e.g. Bieber, 1977; Thompson, 1988, *et al.*), supply us with detailed analyses of hair styles, beards, and ornamentation appropriate for comparison with the Roman corpus. When comparisons are sought just prior to the Augustan age and extending to the terminal date of the temple, no actual identifications can be made. Neither the beardless faces from Julian, Flavian and early post-Flavian Periods, nor the bearded examples from the later periods (Hadrian and following) fit those of the Temple examples of male faces. The beardless faces during the earlier period (Augustan and Claudian) depicted the men's hairstyles in an "...elegant and always repeated arrangement of the hair over the forehead" (Bieber 1977: 188-89). Augustus, himself, is depicted with the cheekbones standing out of a "meager face", hollow-cheeked, yet still with an expression "dignified and serene" (192). In the Flavian period (Bieber's "monumental realism" style - 203) royal male portraiture shows many tight curls, with a "bowl-shaped" cutting style (for example Fig. 836, Pl. 143 - Domitian). Trajan shows rows of vertical curls, with a "bowl-shaped" cutting style (Fig. 842, Pl. 144). With Hadrian, who instituted the practice, as with later portrait sculpture, there is reversion to the beards and full hairstyles typical of Greek

philosophers and gods (208, 218, 255). Likewise, female hair styles from the same periods are not those to be seen on the Temple examples. As Bieber again points out (150, 197; and for example of commoners' styles, Thompson 1988: 99-115), the earliest hairstyles of the Hellenistic period appear as the "melon coiffure" of the early Ptolemaic princesses. By the Julian period, the most common was center-parted, "laid in fine wavy lines to the sides". Livia, however, illustrates the varieties in vogue during her long imperial history. Her early style was "similar to the melon coiffure", with the continuation of the previous chignon. Flavian women adopted two styles, the most prominent being the "...honey comb headdress, with small curls attached to a wire frame." The second style (cf. the early statue of Agrippina the Younger / Poppaea Sabina ?), came into favor, with a coiffure built with a diadem decorated with ringlets and ribbons. Bieber suggests the latter may have been actually the transitional forerunner of the former. The above "honeycomb" headdress along with other complicated styles, such as high toupees, wire frames, intricate braid patterns, and a kind of tongue pattern at the front part of the hair, continued into the third century (for example Matidia, Sabina, Plotina, the Younger and Older Faustina, Alcestis, and Plotina -165, 150, 151, 166, 218).

Not until the rule of Septimius Severus did the hairstyles become simpler, with the hair merely being drawn over the ears and with deep waves being parted in the middle (e.g. Julia Domna, Julia Mamaea, Otacilia, Julia Paula, Salonina, 151, 152, 254, 251).

Other characteristic facial treatments, for both male and female Roman statuary: for example, forehead treatment, eye modeling, and so on (150, 192, 205, 218, 255) are also absent on the temple specimens. All of these comparative characteristics prove negative for possible identifications when the non-royal portrait sculptures are compared.

The Egyptians had long been addicted to the same habit of honorific portraiture. With the advent of Ptolemaic political control of the land, the practice continued with an Hellenistic emphasis. Athenaeus (XIII. 576) cites Callixenus in regard to the "many images" of Cleino, cup-bearer and mistress of Ptolemy Philadelphus, and notes that Ptolemy honored Philadelphus with two gold portrait statues, along with three for Bernice (V. 203) at one public festival. He also notes statues to Arsinoe (XI. 497) and, quoting Masurius, on the basis of a record left by Callixenus of Rhodes, describes a procession staged by Ptolemy, in which were carried statues of Alexander and Ptolemy, along with those of "kings and gods". Even this display was more subdued than the "parade" of the neighboring Seleucid monarch, Antiochus Polybius, in which were carried "statues of all beings who are said or held to be gods, demigods, or even heroes among mankind" (X.195; V. 196 ff.)!

Since the Nabataeans copied the coin types of their Hellenistic neighbors, in the earliest mintages, comparison of the coin portraiture of the Ptolemies provides another possible identification source. However, when coins from the period of Ptolemy I onward, including representations of the queens, are considered, no parallels with the Petra faces can be found (Poole, 1982: Pl. 1 - 30; Bieber 1955: 90 and Figs. 403, 340, 93). Still further, Ptolemaic statuary up to the time of Augustus provides no identifications. In terms of the females, for example, the "melon" hairstyle, not found at Petra, regularly appears (Bieber 1997: 86, 92, 94, 149), and even the center-parted hairstyle of Arsinoe III (Bieber 1977: 92, and Fig. 356) seems different from the center-parted style at Petra. Although Ptolemaic queens appear with protruding lips and rounded cheeks, female nose types appear generally thinner and more "Greek" than the Petra examples. The presence of di-

adems / fillets, worn by both males and females (Bieber 1977: 92 - 94 and Figs. 344, 356; 94 and Fig. 364; and cf. on Cleopatra, 94 and Fig. 360), is likewise a feature lacking on the Nabataean representations.

The neighboring Palmyrenes found it necessary to add projecting brackets to the columns along their main street for the purpose of displaying honorific busts accorded by the "Council / Assembly / Senate and People" to merchants and other citizens of note, as well as to Roman emperors, who had contributed to the prosperity of the city (Robinson 1946: 65, 102, 104; Starcky and Munajjed 1948: 29; Starcky and Gawlikowski 1985: 41, 42, 43, 44, 45, 55, 58, 74, 75, 78, 70, 124-127).

In the temples of Palmyra, we also find that individual donors had spaces allocated to them by the priests for bas-reliefs of their choice (Rostovtzeff 1938: 76; Robinson 1946: 185). The Palmyrenes provide us with a lavish number of funerary busts, paintings and reliefs depicting honored members of their families (Colledge 1967:155, 66; Robinson 1946: 93, 122, 123; Starcky and Munajjed 1948: 19, 22, 27; Starcky and Gawlikowski 1985:128-132). In addition, the Tariff even notes a tax on bronze statues, so common was the practice.

Dura Europus likewise furnishes examples of pictorial recognition of individuals. The commander of the XXth cohort (Palmyrenian), the tribune Julius Terentius, along with his officers and men, appear on a fresco in the temple of Yarhibol, 'Aglibol, and Arsu, in the dress of sacrificers (Starcky and Gawlikowski, 1985: 53 - 54). Other similar donors so represented include one Konon, son of Nikostratos, in the Temple of Bel. In the Temple of Zeus Theos, the same piecemeal decoration by donors appears to have been prevalent, as at Palmyra (Perkins 1973: 38, 40 - 41, 50, 72). At the Synagogue, the paintings, though apparently not involving pictorial depiction of actual donors, were at least

commissioned by individuals (Perkins 1973: 56; Rostovtzeff 1978:116; Wischnitzer 1948: v).

Parthians, too, were infected with portrait decoration as an architectural feature. Perkins (1973: 106) notes the use of busts adorning the walls and voussoirs of Parthian buildings at Hatra, with the suggestion that such decoration was confined to the Temple architecture. The nature of these is, however, uncertain as to attribution.

Only the religious iconoclasm of the Jews, Nabatene's nearest neighbors, precluded the practice of individual donor portraiture developing there, but the synagogue decorations at Dura Europus and elsewhere, including Palestine, suggest a latent desire to emulate the pictorial practices of their neighbors (Rostovtzeff 1978: 102; Perkins 1973: 55-56'; Patrich 1990:153 ff.).

In short, the practice of public display of private persons' portraiture, of every variety, was widespread and needs no profound verification. But, the question of which persons merited such display among the Nabataeans remains to be determined. Since the affixes do not bear any of the usual indications as to whether the person represented was living or dead, no definitive answer can be offered in that respect. However, the open eyes of our few semi-complete examples suggests the former state, in spite of the same open-eyed treatment seen on Palmyrene funerary busts and plaques, to cite the nearest parallel body of sculpted portraiture.

The fact that these affixes were first sculpted (life size and then reduced?), molds made, and finally, the miniature casts produced, may also suggest that the individuals depicted were still alive.

If these portraits had been placed on architectural features of a more secular nature (e.g. full-size on pedestals along the "Paved-Street", through Petra's city center), it might be assumed that they represented

public dedication in honor of citizens who had made some public contribution, monetary, military, or political. Yet, no indication of such a practice can be documented at Petra, nor elsewhere in Nabatene. Still further, the actual loci of the recovered affixes points to a specific relation with the Temple itself. This opens the issue of purpose, once again. Such portraits may be a parallel practice seen elsewhere for honoring citizens in a public fashion, with the temple selected as the appropriate "public" location for such display; or, they may have been a ritual means to call the attention of the goddess to the individual involved (a sort of insurance); or may have been dedicated as votives in response to some specific benefit achieved by the dedicant and attributed to the assistance of the goddess; or, finally, they may have simply been the (time-honored) response on the part of the religious institution to exceptional donations for the construction of the temple, itself. Any of these possibilities remain viable. However, the paucity of the affixes, in the mass of the recovered remains, their relative seclusion in the Temple, rather than in some more "public" location, and the obvious cost involved to produce them, may well suggest private production, rather than civic dedication. The cost factor (both in posing for the original sculpted version and the expense involved in production) suggests that the persons so represented were at least of the wealthier leisure class of Nabataean society. This supposition is further heightened by the well-nourished appearance of the persons represented on the recovered temple affixes. Neither of these aspects rules out possible prophylactic, or thanksgiving, motives for the production and placing of the affixes in the temple, but the relatively small number of them re-

covered suggests that, even for wealthy members of the Nabataean community, the practice was not widespread. Assuredly, if the purpose had been purely cultic, many more citizens who could afford both the time and the expense involved would have been similarly represented. Thus the answer to their presence may be the possibility that they represent Temple response to donations from the individuals so "blessed" by the privilege of being displayed within the Temple. In any event, certain contributions to our further understanding of Nabataean culture arise from the recovery of these affixes:

- 1) The first evidence that such a practice even existed among the Nabataeans has now been recovered in a defined archaeological context. The mold recovered by Murray and Ellis (1940: 30 - 31 and Pls.) was identified with the period of Obodas and no attribution of use suggested.
- 2) Once again, the eclectic nature of Nabataean culture is illustrated by their appropriation of a concept, which is adapted, not simply adopted, to their own cultural purposes.
- 3) Perhaps for the first time, aside from numismatic and possibly glyptic art, we have the opportunity to see, even if in fragmentary form, the actual faces of some of the Nabataean residents of Petra.¹

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1. The authors wish to thank Lin J. Hammond for editing the original text.

Bibliography

- Athenaeus
 n.d. *The Deipnosophists*. The Loeb Classical Library.
- Bieber, M.
 1977 *Ancient Copies*. New York.
- Colledge, M.A.R.
 1967 *The Parthians*. London .
- Glueck, N.
 1965 *Deities and Dolphins* . New York.
- Hammond, P. C.
 1973 *The Nabataeans – Their History, Culture and Archaeology*. Lund .
- Meshorer, Y., Murray, M.A. and Ellis, J.C.
 1940 *A Street in Petra*. London.
 1975 *Nabataean Coins*. Jerusalem.
- Orentzel, W. C. and A. E.
 1979 *Roman Portraits* .University of Missouri Press.
- Patrich, J.
 1990 *The Formation of Nabatean Art*. Jerusalem.
- Perkins, A.
 1973 *The Art of Dura-Europos*. London .
- Robinson, D. M.
 1946 *Baalbek/Palmyra*. New York: J.J. Augustin Publishers.
- Rostovtzeff, M.
 1938 *Dura-Europos And Its Art*. London
- Starcky, J. and Munajjed, S.
 1948 *Palmyra: The Bride of the Desert*. Damascus.
- Starcky, J. and Gawlikowski, M.
 1985 *Palmyre*. Paris.
- Suetonius
 1930 *The Lives of the Caesars*. The Loeb Classical Library.
 1935 *The Lives of Illustrious Men*. The Loeb Classical Library.
- Tacitus
 n.d. *Annals*. The Loeb Classical Library.
- Thompson, C. L.
 1988 *Hairstyles, Head-Coverings and St. Paul, Portraits from Corinth*. *BA* (June): 99 - 115.
- Wischnitzer, R.
 1948 *The Messianic Theme in the Paintings of the Dura -Europos Synagogue*. Chicago.

Catalogue

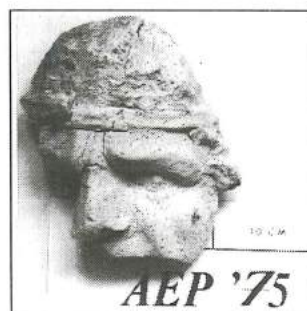
The illustrated "faces" are described below by year of excavation, by the usual Register notations: Object Number, Date (found), Find Location (Area Site and Stratigraphic Unit), Form, Material, Description, Condition, and Dimensions). All examples remain with the Department of Antiquities.

AEP 1975

No. 3 II.3(101)

AFFIX

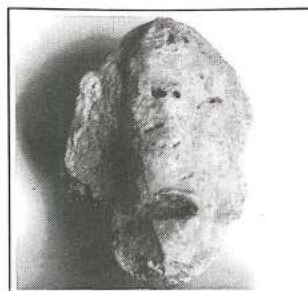
Plaster. Molded; right side, lower face missing; double head band; heavy eyebrows; iris raised; high cheek-bone; angular nose; finger marks on interior. Poor, fragmentary. L.-9.5 cm x W.- 7.0 cm.



No. 12 II.3(101)

AFFIX

Plaster. Molded human face. Mouth gaping; other features unrecognizable (shown as a "Tragic Mask" ?); plug hole at rear. Poor. H.- 11.0 cm x W.- 8.0 cm.



No. 85 II.3(103)

AFFIX

Plaster. Molded human face affix; right side and half of left side only; iris shown by dot; lips pursed; straight nose; female. Good, fragmentary. L.- 5.6 cm x W.- 5.0 cm.



AEP 1976

No. 32 II.2(101)

AFFIX

Plaster, white. Human face, molded; inclined to left; broken and missing above eye level and below chin; female. Poor, fragmentary.



No. 35 II.5(201)

AFFIX

Plaster, white. Human face; naturalistic style; male; short cropped curly hair framing face to above ear level; round face; pouting lips; flattened nose; heavy brow; possible neck torque; head slightly inclined to left; radiating rays of plaster added; Helios (?); possible gilding over red paint base; plugged to masonry, dressing



of stone visible on back. Excellent. H.- 4.3 cm
x W.-3.1 cm.

No. 79 II.2(102/103)

AFFIX

Plaster, white. Molded male head; bulbous protruding eyes, originally painted, looking left; head originally wreathed (?); hair curled; trace of plug hole on back; broken and missing from upper lip down; substrate in rough plaster, finished in finer white plaster. Fragmentary. Face W.- 12.0 cm.



No. 166 II.2(254)

AFFIX

Plaster. Human head; face inclined to right; applied strips for hair detail; crude modeling; damaged in fall; broken and missing from mid-neck. Fragmentary.



No. 167 II.2(254)

AFFIX

Plaster. Female head; slightly turned to right; hair piled on head and filleted; slightly bulbous eyes; full face; back of head built up with plaster strips for reinforcement; damaged in fall. Worn and damaged. H.-11.7 cm x W.-8.2 cm.



No. 168 II.2(105)

AFFIX

Plaster. Female head; hair parted in middle; hair braided (?) around forehead, with rest piled on top of head; bulbous eyes; full face; plaster added in back of face at cheek line for support and attachment to surface; ancient break across face below eyes, too worn for repair. Broken and worn. H.- 7.4 cm x W.-4.6 cm.



AEP 1977

No. 112 III.8W(101)

AFFIX

Plaster. Molded male head; hair slightly curly, reaching below ear; heavy brows; bulging eyes; bulbous nose affixed (?); heavy lips; finger marks on back; left side broken and missing; trace of red paint. Fair, fragmentary. H.-

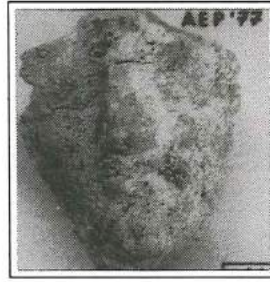


4.9 cm. x Original W.-4.4 cm.

No. 113 III.8W(101)

AFFIX

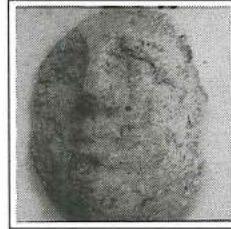
Plaster. Molded human female (?) head slightly bulbous eyes; classical nose; heavy lips; cleft chin; fragment of plug and trace of copper oxide on back. Poor, fragmentary.



No. 114 III.8W(101)

AFFIX

Plaster. Molded human male (?) head; as RI No 113, but with trace of plug on back; finger marks on back. Poor, fragmentary.



No. 153 III.8S(6)

AFFIX

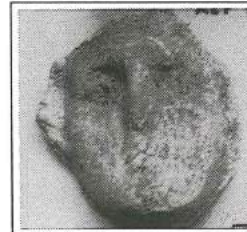
Plaster. Molded human male head; well formed; brows wrinkled; slightly flattened nose; bulbous eyes; heavy lips; deep cleft between lip and chin. Poor, fragmentary.



No. 154 III.8S(6)

AFFIX

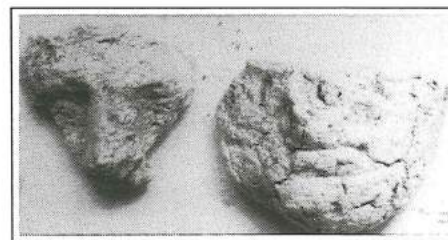
Plaster. Molded human male (?) head; left side of face damaged; traces of curly hair around head; slightly bulbous eyes; small mouth; finger marks on back; trace of blue paint on face. Poor, fragmentary. Original W.-4.40 cm.



No. 155 III.8S(6)

AFFIX(ES)

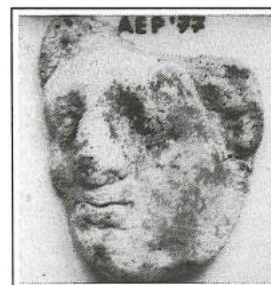
Plaster. As is RI No 23 A/B. Lower half of human head; gross features; finger marks on back; upper half missing. Poor, fragmentary.



No. 184 III.8(103)

AFFIX

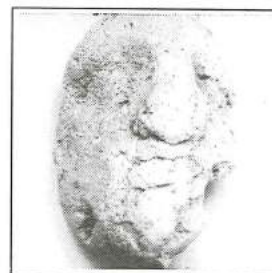
Plaster. Molded; human male head; wavy hair; slightly bulbous eyes; flattened nose; pouty lips; trace of blue paint on eyes; trace of red paint on hair. Fair, fragmentary. W.-3.5 cm.



No. 185 III.8(103)

AFFIX

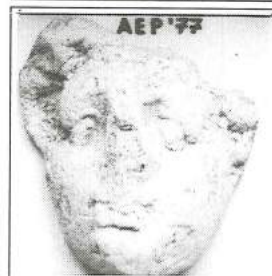
Plaster. As RI No 153, but flatter. Poor, fragmentary.



No. 186 III.8(103)

AFFIX

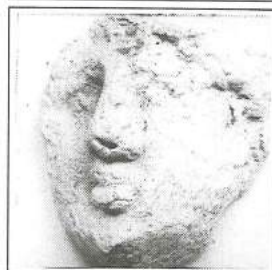
Plaster. Molded; human male (?) head; slightly inclined to right; curly hair; worried facial expression; nose broken and missing; pouty lips. Poor, fragmentary. W.-3.5 cm.



No. 187 III.8S(8)

AFFIX

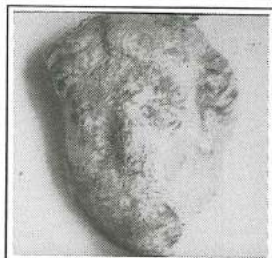
Plaster. Molded; human male (?) head; hair in waves; head slightly inclined to right; bulbous nose; very pouty lips; badly worn. cf. AEP '77, RI No 114. Poor, fragmentary, worn. W.-3.9 cm.



No. 188 III.8S(8)

AFFIX

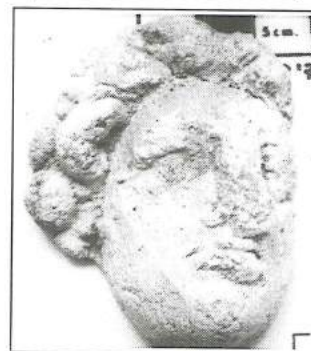
Plaster. Molded; female head; wavy hair with center part; classical hair style; almond-shaped eyes; nose worn; small mouth with edges turned slightly down; round face. Good, worn. H.-6.8 cm x W.-4.7 cm.



No. 189 III.8(103)

AFFIX

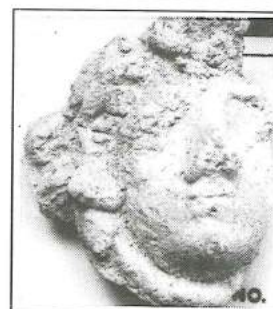
Plaster. Molded; human male head; hair in heavy curls; prominent nose; lips in extreme pout; lip corners turned down; bulging eyes; prominent chin; head inclined to left. Good, worn, part of nose missing. H.-5.75 cm x W.-4.45 cm.



No. 190 III.8S(8)

AFFIX

Plaster. Molded; human male head; flowing curly hair; fruit (?) and leaf on right side of face; neck torque (?); raised eyebrows; prominent nose; small mouth; firm chin; left side broken and missing. Fair, broken, fragmentary.



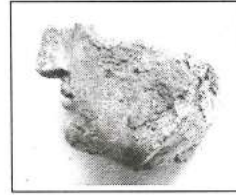
ADAJ XLII (1998)

H.-6.45 cm.

No. 191 III.8(103)

AFFIX

Plaster. Molded; fragment of human head; thick cast with remains of plaster plug with imprint of wooden affixing plug; lower 2/3 of face; extremely well molded; classical nose; nostrils indicated; mouth slightly open; firm chin. Poor, fragmentary.



THE WATER CATCHMENT SYSTEM OF NAKHL, JORDAN

by

Gerald L. Mattingly, James H. Pace, Richard A. Stephenson and Eley P. Wagnon

Introduction

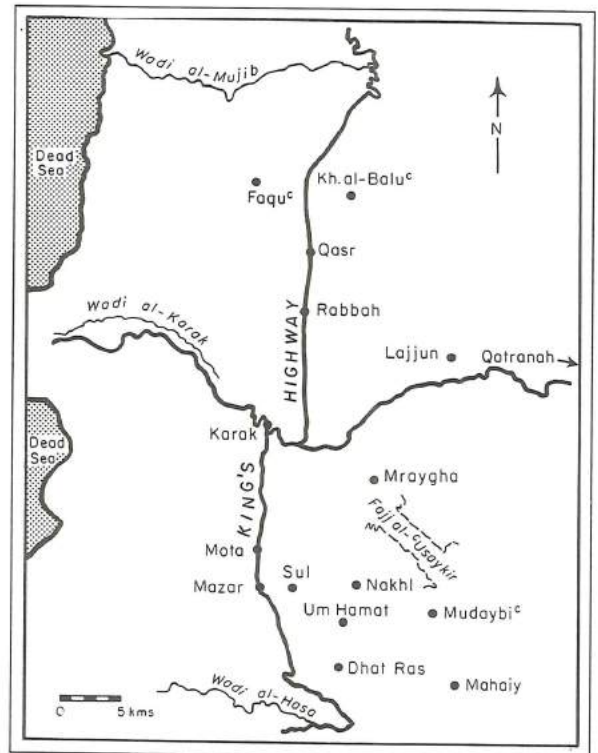
The pilot season of the al-Karak Resources Project (KRP), conducted between July 5 and August 7, 1995, was an intensive surface survey of seventeen carefully selected sites on the al-Karak Plateau. The plateau is 875 sq. km stretching between the Wādī al-Mūjib on the north, the Wādī al-Ḥasa on the south, the Dead Sea escarpment on the west, and the fringe of the desert on the east that is roughly marked by the modern Desert Highway. KRP is an outgrowth of the Miller-Pinkerton survey that was made between 1978 and 1983. That investigation examined 443 sites that ranged in date from Paleolithic to Ottoman times. The objective of the Miller-Pinkerton survey was to locate, name, place on a map, and extensively sherd ancient sites on the plateau. This information has proved to be invaluable in light of the fact that several sites observed on that survey no longer exist and others continue to disappear because of the rapid population growth that Jordan is experiencing.

The purpose of KRP is to build upon the work of the Miller-Pinkerton survey by employing a multidisciplinary approach to examine ways in which the ancient inhabitants of the plateau utilized the available natural resources of the area. It is our effort to study the interrelationship between archaeological remains such as architecture, artifacts, and off-site features and their environmental contexts, for example, climatic factors, water resources, surficial geology, and geomorphology. By examining both artifacts and ecofacts KRP hopes to contribute not only to the reconstruction of the history of the plateau, but to establish how, and on

what its ancient inhabitants survived, with the understanding that this knowledge will contribute to the future welfare of the people who live there. This underlying purpose, therefore, led KRP in its pilot season in 1995 to give special attention to surface features associated with water management at the seventeen sites surveyed. One particular site displaying remarkable evidence of the ability of its ancient inhabitants to harvest rainfall is Nakhl.

The Environmental Situation at Nakhl

Nakhl is an unoccupied ruin located about 8 km east of the modern town of al-Mazār, which itself lies about 13 km south of al-Karak on the ancient King's Highway (Fig.1). The extensive ruins cover an area of



1. Map showing location of Nakhl in the al-Karak region.

about 500 m (N-S)x300 m (E-W). The site, which is at an elevation of approximately 1100 m asl, is more than 1,500 m above the al-Ghawr. The edge of the uplands, at al-Ghawr, is approximately 20 km to the west. The site is situated at the head of three wadis, all of which drain into the Wādī al-Mūjib, the northern boundary of the al-Karak Plateau. The Wādī Sharmā is located on the southeast side, the Wādī Ghayth on the east, and the Wādī Nakhl on the northwest side. The Wādī Ghayth is structurally controlled by a graben, located about 3 km in an easterly direction, and extends southeasterly from the Wādī al-Karak toward the southeast, into Saudi Arabia more than 300 km away. Nakhl, interestingly enough, is located less than 9 km from the northern rim of Wādī al-Ḥasa, even though it is in the Wādī al-Mūjib drainage basin (see Koucky 1987: 31). This, of course, is due to the nature of the gentle north-easterly dipping strata making up the sedimentary rocks of the plateau.

The site of Nakhl is located on fairly resistant caprock known as the Bahiya Coquina. Beneath the limestone caprock the strata grades into a softer phosphatic chert formation which is more easily eroded. It also can be easily carved out to form cisterns or wells. Some caves, particularly on the eastern side of the site, are evident below the caprock as well. The "acropolis", upon which a Nabataean temple is situated, appears to be the center of the ruins. To the northwest of the temple, the headward erosion of Wādī Nakhl has penetrated the site. It is possible that this area has been subject to quarrying activities as well as other areas on the fringe of the site.

Nakhl, one of the larger antiquities sites on the al-Karak Plateau, required a considerable amount of water for its population, intensively cultivated crops and domesticated animals. The annual rainfall in this area is about 300mm, primarily falling during

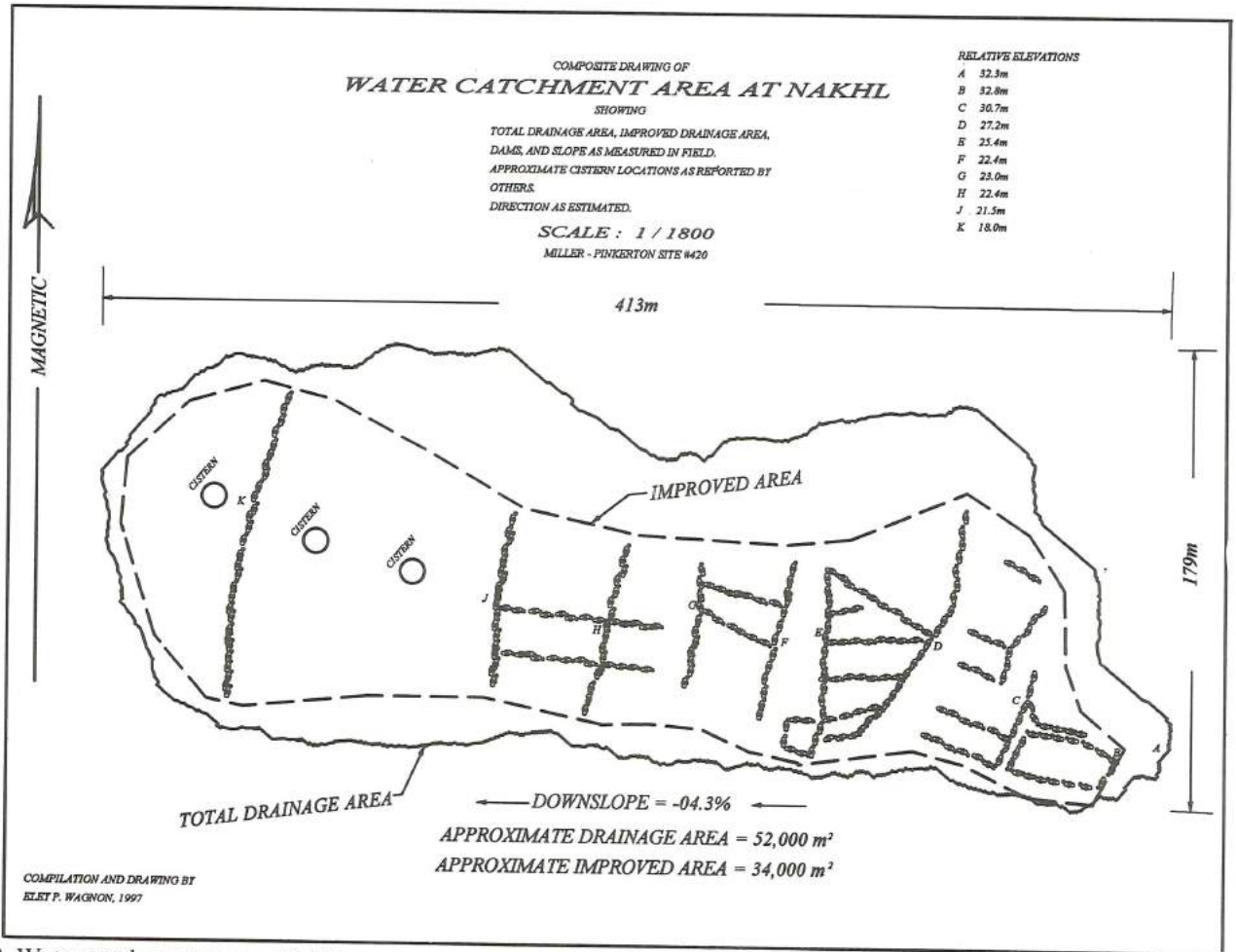
the winter months. Consequently, for centuries the inhabitants have sought a variety of ways to store water for the dry period during the summer when the temperatures and evapotranspiration achieves the highest levels.¹ Wells or cisterns were preferred more than surface water storage as their water loss by evaporation was considerably less. In the case of Nakhl, it is believed that the headwaters of the Wādī Nakhl were used in several ways (Figs. 2 and 3): (1) several lowlying dams were built to store water, usually filling the highest dam first, and then allowing the overflow to fill the next lower dam downstream; (2) several cisterns were strategically located and constructed to allow for subsurface storage of water from the surface run-off of streets and building; (3) several wells were constructed which allowed for groundwater inflow as well as overland flow for replenishment; and (4) lateral walls were constructed in the catchment area to retain moisture for crops or animals use.

Early Observations

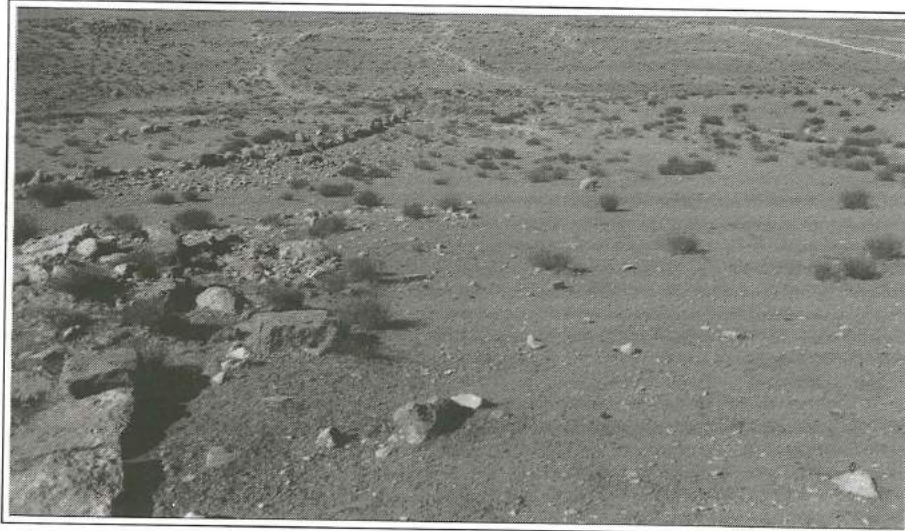
Alois Musil, who explored this area in 1896 and 1902, described Nakhl as "one of the most extensive ruins in the area" (1907: 324). Musil noted a wadi on the west side of the site with dams across it forming reservoirs. While commenting on the numerous cisterns in the area, he was most impressed by the masonry of the temple and fortifications on the east, which he compared to the pyramids of Egypt (1907: 324). In the thirties, Nelson Glueck observed numerous cisterns and walls on the site, and he dated them to Nabataean times. Like Musil, however, he was attracted to the large stone structures on the site. He wrote about seeing "a large building made of evenly cut limestone blocks, similar in the style of construction to the temple at Qasr Rabbah" inside of which a church had been

1. For recent research on the water catchment system in Wadi Faynan in southern Jordan, see Barker *et*

al., 1998: esp. 9-17.



2. Water catchment area at Nakhl.



3. The Nakhl catchment area from the north. The lighter areas are the walls across the wadi (Photo by Reuben G. Bullard, Jr).

built (1934: 66). Miller's survey confirmed the presence of two major buildings, a Nabataean temple and nearby, a Nabataean/ Roman building with a Byzantine church inside (1991:155). The pottery that he collected there dated from EB 1 to modern times,

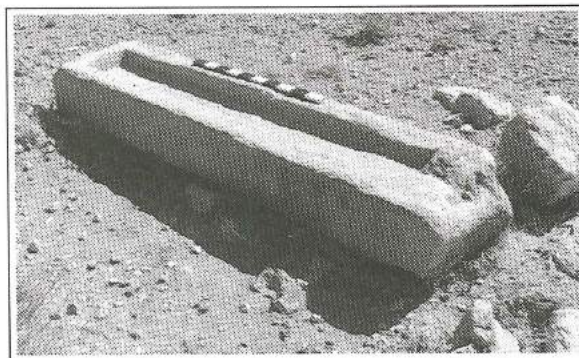
but the concentration was clearly Nabataean and Late Islamic (1991:154).

The Walls of the Western Slope of Nakhl

Miller's plea for closer examination of Nakhl was acknowledged by Robert Schick

and Mu'ta University, who recently conducted excavations of the impressive Nabataean buildings on the site. To date, however, no attention has been given to the walls across the wadi on the western side of Nakhl, beyond Musil's and Miller's acknowledgment that they are there (Fig. 4). For that reason, KRP spent a large portion of the two days of its 1995 season at Nakhl measuring, drawing, and photographing these walls. Additional data was gathered on a return visit in 1997.

The low walls were constructed perpendicularly across a wadi that forms a trough down the western side of the ruins, sloping in a southeast to northwesterly direction at a -04.3% grade (see Fig. 2). The total catchment area is about 52,000 m², while the walls themselves span an area of 34,000 m². They are 115 m to 70 m long, depending on the breadth of the depression at the point where they cross it (see Figs. 3 and 4). The width of each wall is about 4 m. Three cisterns (or wells) lie at the western end or bottom of the slope (Fig. 5). Adding to the complexity of this system are the low walls constructed perpendicular to the series of walls across the wadi, dividing the areas between the walls into smaller sections that may have been pools or reservoirs. Founda-



5. Stone watering trough near one of the cisterns at the lower end of the catchment area (Photo by Reuben G. Bullard, Jr).

tions of buildings surround the wadi on all sides but the northwest, which is open and fans out to the cultivated land beyond. Thus the system of walls is remarkably close to the city itself, apparently part of it. Because the stones of the buildings along the perimeter of the wadi are more carefully worked, they stand in marked contrast to the building material of the walls in the wadi, which appear to be constructed of small unquarried stones that lay naturally in the area. In their present condition, the walls appear to be low dams that would retain run-off from rainfall and yet allow excess water to flow over into the area behind the next wall below. While soil may have been retained behind the walls at one time, there is none today; only depressions that



4. The Nakhl catchment area from the northwest (Photo by Reuben J. Bullard, Jr).

look like pools or reservoirs lie behind the walls today. Each wall is a rather crude line of rubble clearly higher than the land behind and in front of it.

Similar Systems of Walls in the Levant

Walls across wadis have been observed on both sides of the Jordan Rift and are understood to be systems for harvesting water in areas so arid that agriculture would not be possible without them. They are praised as examples of ancient ingenuity as well as models for the future development of land dependent solely on water provided by the run-off of seasonal rains (Shanks 1988: 40-42). The classic study of the use of walls in water catchment systems can be found in Evenari, Shanan, and Tadmor's interdisciplinary study of the an-Naqab. Using aerial photographs, they were able to locate a "dense network of ancient fields, farms, terraced wadis, and floodplains" associated with the six desert cities of Avdat, Shivta, Nitzana, Kurnub, Khalutza, and Rukheibe (1982: 97). The walls, which were all associated with agriculture, can be classified into three categories: (1) individual terraced narrow wadis, (2) groups of terraced fields found in conjunction with farmsteads, and (3) extensive water diversion systems on the floodplains of large wadis (1982: 97).

The "individual terraced wadis" look like ladders from the air. They are terraces formed by walls at right angles to the wadi. Concerning the function of these terraces the authors make the following observation:

The agricultural function of the terraced wadis may be deduced from their structure and from observations of flash floods. In these terraced wadis, floodwater cascades gently down from terrace to terrace. During the flow some water sinks directly into the terrace soil, and some is ponded behind the terrace wall and later penetrates into the ground. These terraces are therefore ancient erosion and flood-control structures. The wetting of the terrace soils enables them to be put to agricultural use. Even

today some enterprising Bedouins sow some of these areas to barley after an early winter flood. In many cases yields can be considered good by the standards of the Bedouin (1982: 97).

The authors speculate that the terraced wadis date to Middle Bronze 1 since sites dating to that period were found on the nearby Ramat Matred (1982:99). Thomas Levy has found terracing at Shiqmim and along the Nahal Beersheba drainage basin dating to the Chalcolithic period (1990: 25).

A more common occurrence in the an-Naqab is the second category, groups of terraced fields surrounded by a stone fence which also often encloses a farmhouse or watch-tower. These farms, called "run-off farms" by Evenari, Shanan, and Tadmor, all exhibit two basic features: cultivated terraces in the wadi bottom and water conduits directing water from the hillsides in the area. It is estimated that during the Byzantine period run-off farming supported "tens of thousands of people and encompassed practically all of the usable bottomlands (the vales and wadi beds) in the northern Negev" (Hillel 1994: 68).

To the north, in the Buqe'ah, a small isolated basin in the northeastern Judean desert, Lawrence Stager has noted similar structures used by ancient farmers (Stager 1976). He describes a farm consisting of seven terrace dams across the wadi 150 m south of Khirbat Abū Ṭabaq. The seventh century BC pottery found at Khirbat Abū Ṭabaq led Stager to date the adjacent fields and dams to the Iron Age. He claims that this area became part of the political and economic sphere of Judah during in the seventh century BC because it allowed access to the mineral rich Dead Sea and its western littoral plantations stretching from Khirbat Qumrān to En Gedi. Khirbat Abū Ṭabaq, along with Khirbat as-Samrā' and Khirbat al-Maqari formed a line of "paramilitary outposts" to protect the Buqe'ah route from robbers. Farms such as the one near Khirbat Abū Ṭabaq were established in

connection with these outposts. All of this was abandoned with the Babylonian conquest early in the sixth century BC (1976: 145). He rejects the dating of the farms in the an-Naqab to the Middle Bronze Age, maintaining that the earliest farms at Ramat Matred date to the late tenth and early ninth century BC (1976: 157).

Regardless of the time of its inception, water harvesting by networks of terraced wadis, most likely reusing older structures, continued and reached peak usage in the Byzantine and Umayyad Periods (Haiman 1996: 34; Hillel 1994: 72). Abandonment of the farms coincided with the move of the Abassids to Baghdad. This pattern indicates that the ebb and flow of agricultural settlements in the an-Naqab highlands represents deliberate incentive programs of strong central governments with invested interests in the frontier. Hence Mordechai Haiman concludes that "nomadism and sedentarism were affected more by geopolitical conditions than by natural environment" (Haiman 1996: 47; Abujaber 1995: 740).

An example of Evenari's third category of agricultural water systems is found near Kurnub (Glueck 1959: 207-213). At the point where the Wādī Kurnub enters the Turibe plain, ancient settlers built a large channel to divert water into a series of terraced fields. These diversion systems in wadis differ from the farm units in size. Whereas the small farm units rarely exceed five hectares, the diversion units cover tens and even hundreds of hectares (1982: 110). The Kurnub system was found to have been constructed in three stages (1982: 112). Similar diversion systems can be found in Nahal Avdat (Wādī Ramliye) and in Nahal Lavan (Wādī Abiad). On the basis of pottery sherds found in the vicinity, these systems can be dated from the Middle Bronze 1 to the Nabataean-Roman-Early Byzantine period, with the complex wall systems dating most likely to the latter. An inscription was found *in situ* in the Ramliye area say-

ing: "This is the dam which Garmo and his friends built in the 18th year of our Lord Rabbel who brought life and deliverance to his people." This is Rabbel II, who ruled in AD 88-89 (Evanari, Shanan, and Tadmor 1982: 119).

Systems of dams occur at numerous sites in Jordan. An earthen dam that may have been constructed to slow run-off and increase infiltration was found in the al-'Umayrī region by the Mādabā Plains Project (Cole 1984: 42). Likewise, ancient looking terracing at irrigated areas near springs like 'Ayn Ḥisbān and 'Ayn Mūsā have been observed in the Tall Ḥisbān area (Lacelle 1986: 64).

Nelson Glueck recorded both dams and terraces in the area south of the al-Karak Plateau. He found Early Bronze 1, Early Bronze 3 and Middle Bronze 1 sherds on the terraces on the north slope of the western part of the Wādī al-Ḥasa at Khirbat Umm as-Sedeirah. He claimed that "the presence of this site on the slope of the Wādī al-Ḥasa was made possible so far as the practice of agriculture by its inhabitants is concerned first of all through careful terracing, laboriously carried out throughout many generations and centuries" (1970: 145). Glueck described similar systems of walls at aṭ-Ṭilāḥ and dams at Sela' near Buṣayra and at Rukhemtein in the Wādī Ramm (1970: 61, 197, 195).

John Peter Oleson describes dams across wadis in the area of al-Ḥumayma, ancient Auara, a Nabataean and Roman site in southern Jordan:

Although the Bedouin around Humeima now commonly make use of earth and stone wadi barriers to slow the progress of erosion and foster the infiltration of run-off water into the fields during the winter, only two possibly ancient structures of this type were catalogued. By their very nature, such barriers are vulnerable to complete destruction, and in the immediate vicinity of Humeima the recent use of tractor-drawn ploughs in the ancient fields has obliterated any

traces. One of the two sets of barriers tentatively accepted as ancient differs from the modern examples in being constructed of large boulders rather than of earth or small stones. The antiquity of the other is suggested by the presence nearby of ancient architectural remains (Oleson 1991: 49-50).

He distinguished the dams across wadis from the terracing of slopes, which also served the purpose of holding back rain water to increase absorption and, at the same time, created level surfaces for planting crops (Oleson 1991: 50; 1992: 890; 1995: 709, 713). Oleson recorded six sets of terraces in the al-Ḥumayma region (1991: 48).

Conclusion

The walls across the depression on the eastern slope of Nakhl bear all of the markings of being another example of water management by the ingenious inhabitants of arid lands. At present we can surmise that they are similar in function to those at al-Ḥumayma in southern Jordan. The factors common to both sites are the presence of the Nabataeans, low dams across the wadi, walled terraces on the slopes of the wadi, and additional cisterns in the area. The catchment facility at Nakhl, however, is unusual in that it penetrates the city itself.

Several questions remain, however. The first concerns the dating of the system. While it is enticing to date the structures in the wadi to the Nabataean period, there is no evidence to do so positively. The walls could have been built at any period. Regardless of when they were constructed, it is very likely that they were reused by the inhabitants of the area, possibly even after the city ceased to be occupied. This may account for the location of the series of walls so close to the city ruins. Possible modification of the walls as sheepfolds in recent times also confuses the matter.

A second question concerns the purpose of the system of walls. In light of other examples of runoff farming in similar adjacent areas, the walls most likely functioned as low dams for agricultural terraces. Water would be retained by the wall, which served as a low dam, allowing it to percolate into the soil. Excess water would flow over the dam to the next terrace downslope. Such a water management system would provide enough moisture for crops or orchards to grow close to the city. Also possible, but less probable, is that the walls simply held rainwater in pools or reservoirs for watering animals and for non-drinking purposes of the humans occupying the site.

The answer to these questions must await excavation and the analysis of soil samples from the area of the wall complex. Regardless, Nakhl is one of the most spectacular ruins on the al-Karak Plateau. Its natural location provided numerous opportunities for water resources development. That the ancient inhabitants of Nakhl were skillful in exploiting their natural environment to supply their water needs is attested by the numerous cisterns and wells that can be found there. It stands to reason that the water catchment system on the western slopes of Nakhl was another example of their ingenuity.

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Bibliography

- Abujaber, R. S.
 1995 Water Collection in a Dry Farming Society. Pp. 737-744 in *SHAJ V*. Amman: Department of Antiquities of Jordan.
- Barker, G.W. *et al.*
 1998 Environment and Land Use in the Wadi Faynan, Southern Jordan: The Second Season of Geoarchaeology and Landscape Archaeology (1997). *Levant* 30. 1-83.
- Cole, Jon A.
 1989 Available Water Resources and Use in the el-'Umeiri Region. Pp. 41-50 in Lawrence T. Geraty, *et al.* (eds) *Madaba Plains Project I: The 1984 Season at Tell El-'Umeiri and Vicinity and Subsequent Studies*. Berrien Springs, MI: Andrews University Press.
- Evanari, M., Shanan, L. and Tadmor, N.
 1982 *The Negev: The Challenge of a Desert*. 2d ed. Cambridge, MA: Harvard University Press.
- Glueck, N.
 1934 *Explorations in Eastern Palestine I*. AASOR 14: 1-113.
 1959 *Rivers in the Desert*. New York: W. W. Norton and Co.
 1970 *The Other Side of the Jordan*. Cambridge, MA: ASOR.
- Haiman, M.
 1996 Agriculture and Nomad-State Relations in the Negev Desert in the Byzantine and Early Islamic Periods. *BASOR* 297: 29-53.
- Hillel, D.
 1994 *Rivers of Eden: The Struggle for Water and the Quest for Peace in the Middle East*. New York: Oxford University Press,.
- Koucky, F.L.
 1987 The Regional Environment. Pp. 11-40 in S. T. Parker (ed.) *The Roman Frontier in Central Jordan: Interim Report on the Limes Arabicus Project, 1980-1985*. London: BAR.
- Lacelle, L.
 1986 Surface and Groundwater Resources of Tell Hesban and Area, Jordan. Pp. 61-73 in L. T. Geraty and O. S. LaBianca (eds) *Hesban 2*. Berrien Springs, MI: Andrews University Press.
- Levy, T. S.
 1990 How Ancient Man First Utilized Rivers in the Desert. *BAR* 16(Nov./Dec.): 20-31.
- Miller, J.M.
 1991 *Archaeological Survey of the Kerak Plateau*. Atlanta: Scholars Press.
- Musil, A.
 1907 *Arabia Petraea*. Band I: Moab (Topographischer Reisenbericht). Vienna: Alfred Holder.
- Oleson, J.P.
 1991 Aqueducts, Cisterns, and the Strategy of Water Supply at Nabataean and Roman Auara (Jordan). Pp. 45-62 in Trevor Hodge (ed.) *Future Currents in Aqueduct Studies*. Leeds: Francis Cairns.
 1992 Water Works. Pp. 883-893 in D. N. Freedman (ed.) *The Anchor Bible Dictionary* 6. New York: Doubleday.

- 1995 The Origins and Design of Nabataean Water-Supply Systems. Pp. 707-719 in *SHAJ* V. Amman: Department of Antiquities of Jordan.
- Shanks, H.
1988 Nabatean Farms Reconstructed in the Desert. *BAR* 14 (Nov./Dec.): 40-42.
- Stager, L. E.
1976 Farming in the Judean Desert during the Iron Age. *BASOR* 221: 145-158.



EVALUATION OF WEATHERING DAMAGES ON MONUMENTS CARVED FROM ROCKS IN PETRA/JORDAN - RESEARCH PROJECT 1996-1999

by

Bernd Fitzner and Kurt Heinrichs

Abstract

Severe weathering damage can be noted on monuments carved from bedrock in ancient Petra/Jordan. Interventions for preservation of this important cultural heritage are necessary. Precise damage diagnosis is required for effective and economic monument preservation. Within the framework of a research project (1996-1999) systematic studies are executed in Petra for better understanding of stone weathering and damages of the monuments. Aims of the project and preliminary results are described.

Introduction

The ancient Nabataean city of Petra is situated in the mountainous region of southwestern Jordan. The monuments of Petra rank among the most important cultural monuments of the world. In 1985 UNESCO inscribed Petra on the list of World Cultural Heritage. The complex of historical monuments at Petra is very significant for the cultural identity of Jordan. Today Petra is an important region with ever increasing tourism in Jordan.

The monuments in Petra can be subdivided into three groups:

Group I - The central part of Petra was covered by residential and public buildings, markets and sanctuaries like temples constructed with cut stone. Most of the buildings are severely damaged or partially destroyed and covered by debris. During the last years several archaeological sites have been excavated.

Group II - At the sides of the mountain ridges many hundred monuments - tombs, sanctuaries, places of worship - were carved from sedimentary bedrock. The rock-cut

monuments represent today the most conspicuous evidence of Nabataean culture and are the main attraction for tourism. At many rock monuments severe weathering damage can be noted.

Group III - Numerous technical structures like water channels, cisterns, dams or stairways were either built with cut stones or carved from bedrock. Many of these technical structures are partly destroyed and can no longer be utilized.

In 1998 the World Monument Fund (WMF) has inscribed Petra on the list of the one hundred most endangered monument assemblies of the world. Remedial and preventive preservation measures are required. Experts agree, that a reliable damage analysis is the fundamental prerequisite for characterization, interpretation and valuation of damages and for planning and execution of effective and economic preservation measures. Strategy for monument preservation should follow three main lines:

- 1) Monument characterization
 - object identification
 - description of location
 - environment
 - art-historical assessment
 - case history
- 2) Diagnosis
 - stone inventory
 - stone properties
 - damages
 - causes and processes of deterioration
 - prognoses of damages
- 3) Preservation measures
 - conception, management
 - test application
 - cost calculation
 - execution

certification
monitoring, long-term control
maintenance.

Research Project

The research group "Natural stones and weathering" at the Geological Institute of the Aachen University of Technology / Aachen-Germany started first investigations in Petra more than ten years ago. These studies - concentrated on monuments carved from bedrock - were executed in cooperation with the late Prof. K. Khdeir (Yarmouk University/Irbid), Prof. T. Akasheh (Yarmouk University/Irbid; Higher Council for Science and Technology/Amman), the Department of Antiquities, Amman/Petra (S. Tell, Dr G. Bisheh, Dr F. Zayadine, Dr S. Farajat) and the Petra National Trust. The research activities were supported with funds from the German Foreign Ministry and from Deutscher Akademischer Austauschdienst (DAAD). Results of these first studies are published in Fitzner and Heinrichs (1994). Furthermore, scientific reports were distributed to the participating institutions. In 1995 the authors submitted a project proposal to Deutsche Forschungsgemeinschaft / Bonn-Germany (DFG) entitled "Systematic registration and evaluation of damages at monuments in Petra". The project planned for three years started in 1996 with funds from DFG. Main items of the project are:

- I - documentation of the actual state of monuments carved from bedrock
- II- evaluation and correlation of information on the state of monuments
- III - approach to a weathering model
- IV - evaluation of results for monument preservation

These four items are further differentiated in Table 1. The research shall contribute to:

- improvement of scientific knowledge of stone weathering at Petra monuments

carved from bedrock

- detection of urgency and appropriate types of preservation measures

Based on a survey of monuments, considering variety of stone types and monument characteristics, and interdisciplinary discussions with Jordanian scientists, 22 monuments were selected for detailed investigation. These monuments are listed in Table 2. According to the project programme four field campaigns were carried out in 1996/1997.

Investigations - Methodology and Results

The investigation programme combines *in situ* investigation and laboratory tests. The *in situ* activities comprise description of stone types, description of monuments, monument mapping, measurements sampling and photographic documentation (Table 3).

The Petra area is predominantly composed of Cambrian and Lower Ordovician sedimentary rocks. In Figure 1 different lithostratigraphical classifications of this Lower Palaeozoic clastic series in Jordan and Petra are compared. Comparing the lithostratigraphical classifications by Pflüger (1990, 1995) and Jaser and Barjous (1992), "Nabataeica Sandstone" and "Siyagh Sandstone" (Pflüger) and "Umm Ishrin Sandstone - lower part" (Jaser and Barjous) are probably equivalent, although they were attributed by these authors to different stratigraphical units.

For detailed investigation on weathering damages as regards stone types, a more differentiated lithological classification is necessary. Based on a detailed survey of lithotypes in Petra - as far as they concern the rock-hewn monuments - a subdivision of twenty-five lithotypes was made considering stratigraphic age, stone colour, grain size and bedding structure. The lithological classification will be presented as soon as supplementary petrographical studies are completed.

Table 1. Project activities.

I	Registration and documentation of the actual state of the monuments carved from bedrocks	<ul style="list-style-type: none"> ■ Identification, characterization and classification of stone types occurring at Petra monuments ■ Registration and documentation of stone types at monuments according to type and distribution ■ Registration and documentation of weathering forms at monuments according to type, intensity and distribution ■ Registration of monument characteristics such as position, geometry, tooling of stone surface, remains of stucco, fissures/joints, microclimatic conditions, exposition characteristics regarding rain and water run-off etc. ■ Determination of stone properties
II	Evaluation and correlation of information on the actual state of the monuments	<ul style="list-style-type: none"> ■ Evaluation of interrelations between the groups of weathering forms „loss of stone material“, „detachment of stone material“ and „deposits“ ■ Evaluation of chronological sequences of weathering forms ■ Correlation of weathering forms and stone properties ■ Evaluation of weathering behaviour of the different stone types ■ Characterization of weathering profiles ■ Evaluation of weathering factors and processes
III	Approach to a weathering model	<ul style="list-style-type: none"> ■ Compilation of results on weathering factors, weathering processes and weathering characteristics (forms, products, profiles) ■ Consideration of latest scientific findings regarding stone weathering ■ Deduction of a weathering model which describes the development of weathering damages, considering causes, processes, phenomena and rates of weathering
IV	Evaluation of results for monument preservation	<ul style="list-style-type: none"> ■ Valuation of damages ■ Valuation of stone types regarding susceptibility to weathering ■ Damage prognosis ■ Estimation of urgency of preservation measures ■ Definition of requirements for remedial and preventive preservation measures ■ Proposals of effective types of preservation measures

Table 2. Monuments under investigation.

Tomb-No.*	Name	Position	Altitude (m above sea level)	Orientation in ° (360°-division)	Investigation area	Dimension of investigation area (m²)**
9	Sahrij Tomb	Southern flank of Ar Ramla	975	A: 330 (NNW) B: 60 (ENE) C: 150 (SSE) D: 240 (WSW)	4 facades (A-D)	A: 7,3 B: 9,2 C: 10,5 D: 9,2
12	-	Southern part of Ar Ramla	980	240 (WSW)	Entire facade	127,2
70	-	Outer Siq	890	A: 354 (N) B: 84 (E)	2 facades (A,B)	A: 107,7 B: 117,8
90	Obelisk	Near to the High Place	1070	A: 346 (NNW) B: 60 (ENE) C: 170 (S) D: 260 (W)	4 sides (A-D)	A: 7,3 B: 9,2 C: 10,5 D: 9,2
137	-	Near to the Main Theater	900	155 (SSE)	Entire facade	19,8
229	Renaissance Tomb	Wadi al Farasa	900	244 (WSW)	Entire facade	101,2
239	Soldier's Tomb	Wadi al Farasa	920	60 (ENE)	Entire facade	132,3
450	-	End of M'arras Handan / way up to Ad Dayr	910	80 (E)	Entire facade	5,5
452	Lion Triclinium Lion Tomb	End of M'arras Handan / way up to Ad Dayr	910	130 (SE)	Entire facade	54,9
455	-	Wadi Kharrouba	950	242 (WSW)	Entire facade	69,0
462	Ad Dayr Monastery	Western flank of al Qatraf	1050	230 (SW)	Lower left part	498,3
634	-	Wadi Turkmaniya	900	90 (E)	Entire facade	225,6
649	Tomb with the Armour	Mughur an Nasara	950	252 (WSW)	Entire facade	235,7
675	-	Mughur al Maraha	950	96 (E)	Entire facade	75,2
676	-	Mughur al Malaha	950	74 (ENE)	Entire facade	122,5
731	Carminie Tomb	Northwest flank of al Khubtha	925	296 (WNN)	Entire facade	239,8
763	Tomb of Sosius Florentinus	Northwestern flank of al Khubtha	915	344 (NNW)	Entire facade	149,9
765	Palace Tomb	Western flank of al Khubtha	920	290 (WNN)	Lower left part (A), lower right part (B)	A: 236,1 B: 233,3
770	Siik Tomb	Western flank of al Khubtha	910	280 (W)	Entire facade	200,2
771	-	Western flank of al Khubtha	905	280 (W)	Entire facade	240,3
778	-	Western flank of al Khubtha	940	270 (W)	Entire facade	215,3
813	Unaishu Tomb	Southwest flank of al Khubtha	920	260 (W)	Entire facade	234,9

* according to BRÜNNOW & VON DOMASZEWSKI (1904)
** considering two-dimensional projection of the surface

Position, orientation and environment of the monuments were described. Furthermore, it was recorded, whether the monu-

Table 3. Field work.

<p>Description of lithotypes</p> <p>color, grain size, bedding structure, stratigraphy</p>
<p>Description of monuments</p> <p>position, orientation, dimension, architecture, use, environment</p>
<p>Monument mapping</p> <p>lithology, weathering forms, joints</p>
<p>Measurements</p> <p>profile of stone tooling patterns, drilling resistance, water uptake, climate/microclimate</p>
<p>Sampling</p>
<p>Photodocumentation</p>

ments were cut into existing near-vertical rock sections - *little removal of outcropping rock, stone material already affected by weathering* - or into gentle slopes - *considerable removal of outcropping rock, "fresh" stone material* (Pflüger 1995). For example, according to our calculations about 7,500 cubic metres of stone material were removed for carving the two obelisks near to the High Place.

Information on surface tooling, stucco/plaster, channels for water run-off and use of monuments was registered additionally. Remains of stucco/plaster can be found at many monuments in Petra. Frequently, finer low-relief tooling patterns of stone surface correspond to thin layers of stucco, whereas

		JORDAN				PETRA			
		POWELL (1989)	BENDER (1968, 1974)	LLOYD (1969)	WETZEL & MORTON (1959)	QUENNEL (1951) BURDON (1959)	PFLÜGER (1990, 1995)	JASER & BARJOUS (1992)	
CAMBRIAN	Ram-Group	Umm Sahn Sandstone Formation	Bedded, brownish weathered sandstone	Um Sahn Formation	Grès d'Um Sahn	Umm Sahn Sandstone			
		Disi Sandstone Formation	Massive whitish weathered sandstone	Disi Formation	Grès de Ram	Ram Sandstone	Disi Sandstone	Disi Sandstone Formation	
		Umm Ishrin Sandstone Formation	Massive brownish weathered sandstone	Disi Group	Ishrin Formation	Grès de Quanaya	Upper Quweira Sandstone	Ed-Deir Sandstone	Umm Ishrin Sandstone Formation
								Habis Sandstone	
								Temple Sandstone	
								Siyagh Sandstone	Lower part
		Burj Dolomite Shale Formation	Abu Kusheiba Sandstone Formation	Dolomite-limestone-shale formation	White fine-sandstone	Calcaire et marne gréseuse de Burj	Burj Series	Nabataeica Sandstone	
		Salib Arkosic Sandstone Formation	Bedded arkose sandstone, Basal conglomerate	Saleb Arkose	Grès et Conglomérats de Quweira	Lower Quweira Sandstone	Saleb Arkose	Salib Arkosic Sandstone Formation	

1. Lithostratigraphy of Cambrian and Ordovician sedimentary rocks in central and south Jordan. Nomenclature and correlation.

coarser high-relief tooling patterns correspond to thicker layers of stucco coating. Today, most of the stucco/plaster coating is lost.

Dimension of chambers in monuments and the thickness of the front chamber wall were registered with respect to the static situation in the lower parts of the monuments.

Detailed information on weathering factors like climate, biosphere, pollutants or technical influences, on weathering processes and on weathering characteristics like weathering forms, weathering profiles and weathering products would be an optimal basis for understanding stone weathering.

As experience has shown, investigation on weathering factors and weathering processes is very difficult and results obtained are unsatisfactory. Therefore, it appears more suitable to approach characterization and interpretation of stone weathering by

evaluating weathering characteristics. 'Phenomenological' methods and measuring procedures can be applied for *in situ* investigation of weathering characteristics at stone monuments. Based on investigation in Petra and at numerous stone monuments worldwide, the working group "Natural stones and weathering" at the Geological Institute of the Aachen University of Technology has developed the monument mapping method as a reliable phenomenological procedure for investigation on weathering forms (Fitzner, Heinrichs and Kownatzki 1995 and 1997; Fitzner, Heinrichs and Volker 1997, Kownatzki 1997). This method provides precise information on the weathering state of stone monuments. At present, monument mapping represents the only method, which allows to describe, document and evaluate entire stone surfaces according to type, intensity and distribution of

visible weathering damages. Monument mapping can be applied to all stone types and stone objects. The mapping method is based on a detailed classification of weathering forms according to phenomenologic-geometric criteria. The complete classification scheme with definitions and photo-catalogue of weathering forms is presented in Fitzner, Heinrichs and Kownatzki (1995). The classification scheme has a hierarchical structure. It comprises four "groups of weathering forms" in the uppermost level: "loss of stone material", "discolouration/deposits", "detachment of stone material" and "fissures/deformation". In the second level a subdivision into 29 "main weathering forms" is made. In the third level of the classification scheme several main weathering forms are further differentiated into "individual weathering forms", 60 in total. In the case of main weathering forms without further differentiation into individual weathering forms, the main weathering form serves at the same time as individual weathering form. In the fourth level all individual weathering forms can be further differentiated according to intensities. A standardized intensity classification is not feasible. It has to be adjusted to monuments under investigation. Intensity parameters are discussed in Fitzner, Heinrichs and Kownatzki (1995) and Kownatzki (1997). In Tables 4a and 4b all weathering forms are listed with number codes. The first number refers to the group of weathering forms, the second number to the main weathering form, the third number to individual weathering forms. Additionally, symbols are proposed for recording the weathering forms in mapping documents and for computer-supported processing of mapping information (Kownatzki 1997).

Plans of the monuments under investigation were prepared as documents for monument mapping in Petra. The elevations - drawn to scale - show the original geometry of the monuments. Available photo-

Table 4a. Classification of weathering forms.

No.	Weathering form	Symbol
1	LOSS OF STONE MATERIAL	
1.1	Back weathering	W
1.1.1	Back weathering due to loss of scales	sW
1.1.2	Back weathering due to loss of stone elements dependent on stone structure	xW
1.1.3	Back weathering due to loss of crusts	cW
1.1.4	Back weathering due to loss of undefinable stone elements	zW
1.2	Relief	R
1.2.1	Rounding / notching	Ro
1.2.2	Alveolar weathering	Ra
1.2.3	Weathering out dependent on stone structure	tR
1.2.4	Weathering out of stone components	rk
1.2.5	Clearing out of stone components	Rh
1.2.6	Roughening	Rr
1.2.7	Microkarst	Rm
1.2.8	Pitting	Rt
1.3	Break out	O
1.3.1	Break out due to direct anthropogenic influence	aO
1.3.2	Break out due to constructional cause	bO
1.3.3	Break out due to natural cause	nO
1.3.4	Break out due to non-recognizable cause	oO
2	DISCOLORATION / DEPOSIT	
2.1	Discoloration	D
2.1.1	Coloration	Dc
2.1.2	Bleaching	Db
2.2	Soiling	I
2.2.1	Soiling by pollutants from the atmosphere	pl
2.2.2	Soiling by particles from surface water or bottom water	wl
2.2.3	Soiling by droppings	gl
2.2.4	Soiling due to direct anthropogenic influence	al
2.3	Loose salt deposits	E
2.3.1	Efflorescences	Ee
2.3.2	Subflorescences	Ef
2.4	Crust	C
2.4.1	Dark-colored crust tracing the stone surface	dkC
2.4.2	Dark-colored crust changing the surface	diC
2.4.3	Light-colored crust tracing the stone surface	hkC
2.4.4	Light-colored crust changing the surface	hiC
2.4.5	Colored crust tracing the stone surface	fkC
2.4.6	Colored crust changing the surface	fiC
2.5	Biological colonization	B
2.5.1	Microbiological colonization	Bi
2.5.2	Colonization by higher plants	Bq
2.6	Discoloration to crust	D-C
2.7	Soiling to crust	I-C
2.8	Loose salt deposits to crust	E-C
2.9	Biological colonization to crust	B-C

grammetric plans (e.g. in McKenzie 1990) and larger-sized photos, supplemented by measuring at the monuments, served for plan preparation. Consideration of original monument architecture was necessary as reference for quantification of weathering damages and weathering rates and for evaluation of damage chronology.

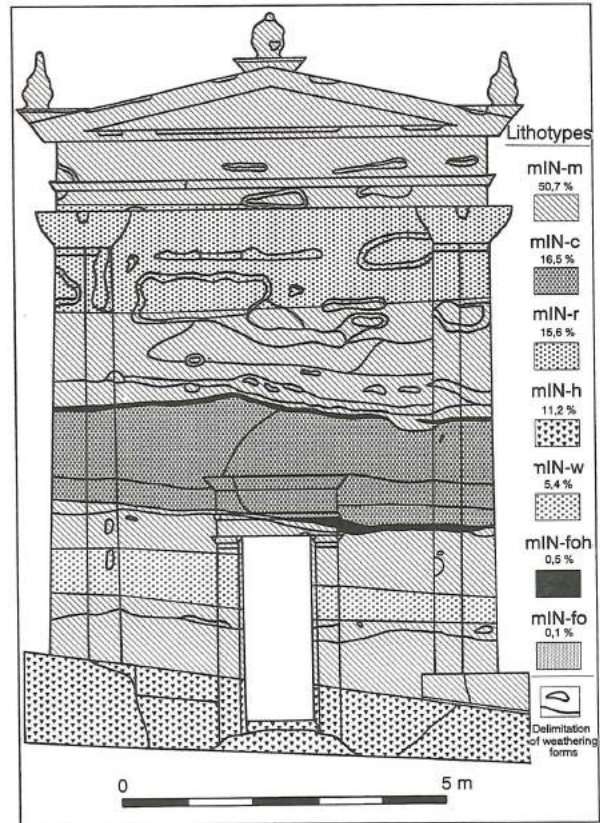
Based on stone inventory and classification of weathering forms, *lithological mapping* and *mapping of weathering forms* were executed at 22 monuments. Areas of different lithotypes and weathering forms were delimited in monument plans. At large monuments, up to 1000 areas were distinguished.

Table 4b. Classification of weathering forms.

No.	Weathering form	Symbol
3	DETACHMENT	
3.1	Granular disintegration	G
3.1.1	Granular disintegration into powder	Gp
3.1.2	Granular disintegration into sand	Gs
3.1.3	Granular disintegration into grus	Gg
3.2	Crumbling	P
3.3	Splintering	Q
3.4	Flaking	F
3.4.1	Single flakes	eF
3.4.2	Multiple flakes	mF
3.5	Contour scaling	S
3.5.1	Scale due to tooling of the stone surface	qS
3.5.2	Single scale	eS
3.5.3	Multiple scales	mS
3.6	Detachment of stone elements dependent on stone structure	X
3.6.1	Exfoliation	XI
3.6.2	Splitting up	Xv
3.7	Detachment of crusts with stone material	K
3.8	Granular disintegration to flaking	G-F
3.9	Flaking to contour scaling	F-S
3.10	Flaking to crumbling	F-P
3.11	Granular disintegration to crumbling	G-P
3.12	Crumbling to splintering	P-Q
3.13	Crumbling to contour scaling	P-S
3.14	Splintering to contour scaling	Q-S
4	FISSURES / DEFORMATION	
4.1	Fissures	L
4.1.1	Fissures independent of stone structure	vL
4.1.2	Fissures dependent on stone structure	tL
4.2	Fissures dependent on stone structure to splitting up	tL-Xv
4.3	Deformation	V

A computer software - VIA - has been developed for processing, illustration and evaluation of mapping information. The monument plans with delimitations of stone surface units are digitalized. The computer programme numbers all stone surface units and calculates their surface area. A data file with number, coordinates and surface area of all stone surface units has been created and all mapping information is integrated. The information can be organized systematically, can be illustrated in plans with colours and symbols and can be evaluated quantitatively for scientific aims and monument preservation purposes. Figure 2 shows the lithological mapping of Tomb 455 (Wādi Kharrūba) with quantitative evaluation. Seven different lithotypes - slightly inclined to ENE - occur at this monument. Documentation of lithotypes is necessary for evaluation of weathering characteristics as regards lithotypes.

For Tomb 778, a monument located at the western slope of al Khubtha, illustration



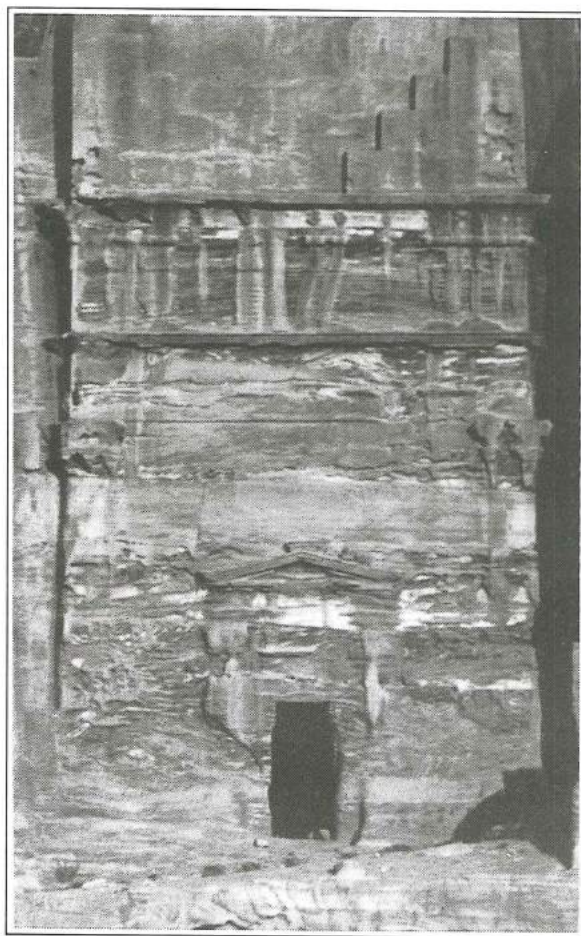
2. Tomb 455. Lithological mapping with quantitative evaluation of lithotypes.

and evaluation of mapping information are presented (Fig. 3). Figure 4 shows the original architecture of the monument façade and the projection of the front chamber wall. In Figure 5 the monument plan with all delimited and numbered areas is presented.

Weathering forms can be illustrated in plan according to different modes. Three main modes can be distinguished:

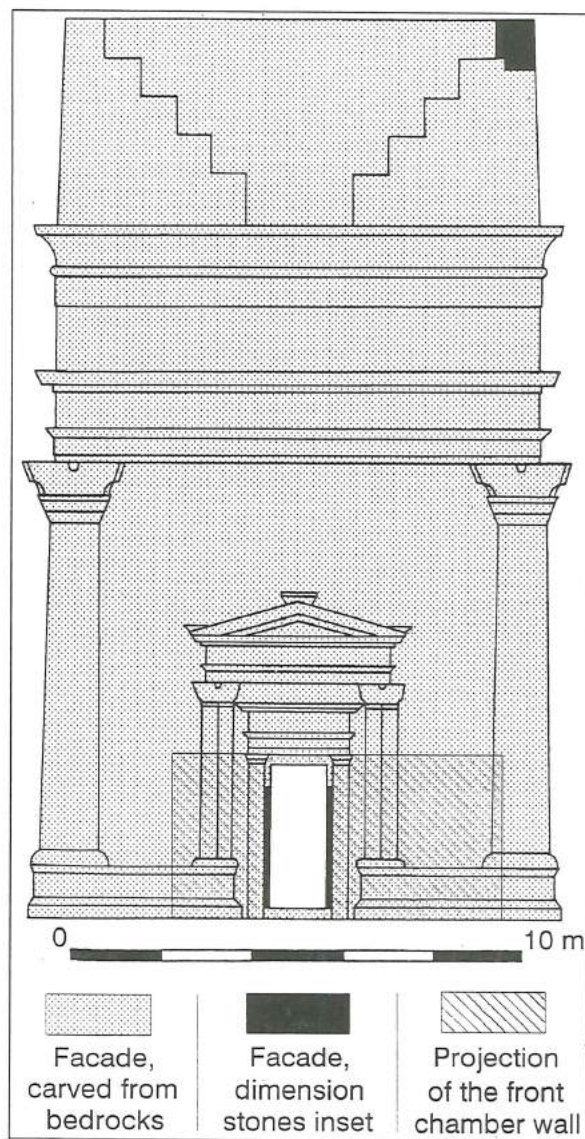
- 1) All weathering forms are illustrated in the same plan
- 2) Weathering forms are illustrated according to "groups of weathering forms"
- 3) Single weathering forms or combinations of weathering forms are illustrated.

Figures 6 and 7 present illustrations of weathering forms according to groups of weathering forms. In Figure 6 all weathering forms attributed to "loss of stone material" are shown. The weathering forms are marked with symbols. Intensities are marked by different grey tones. The plan



3. Tomb 778.

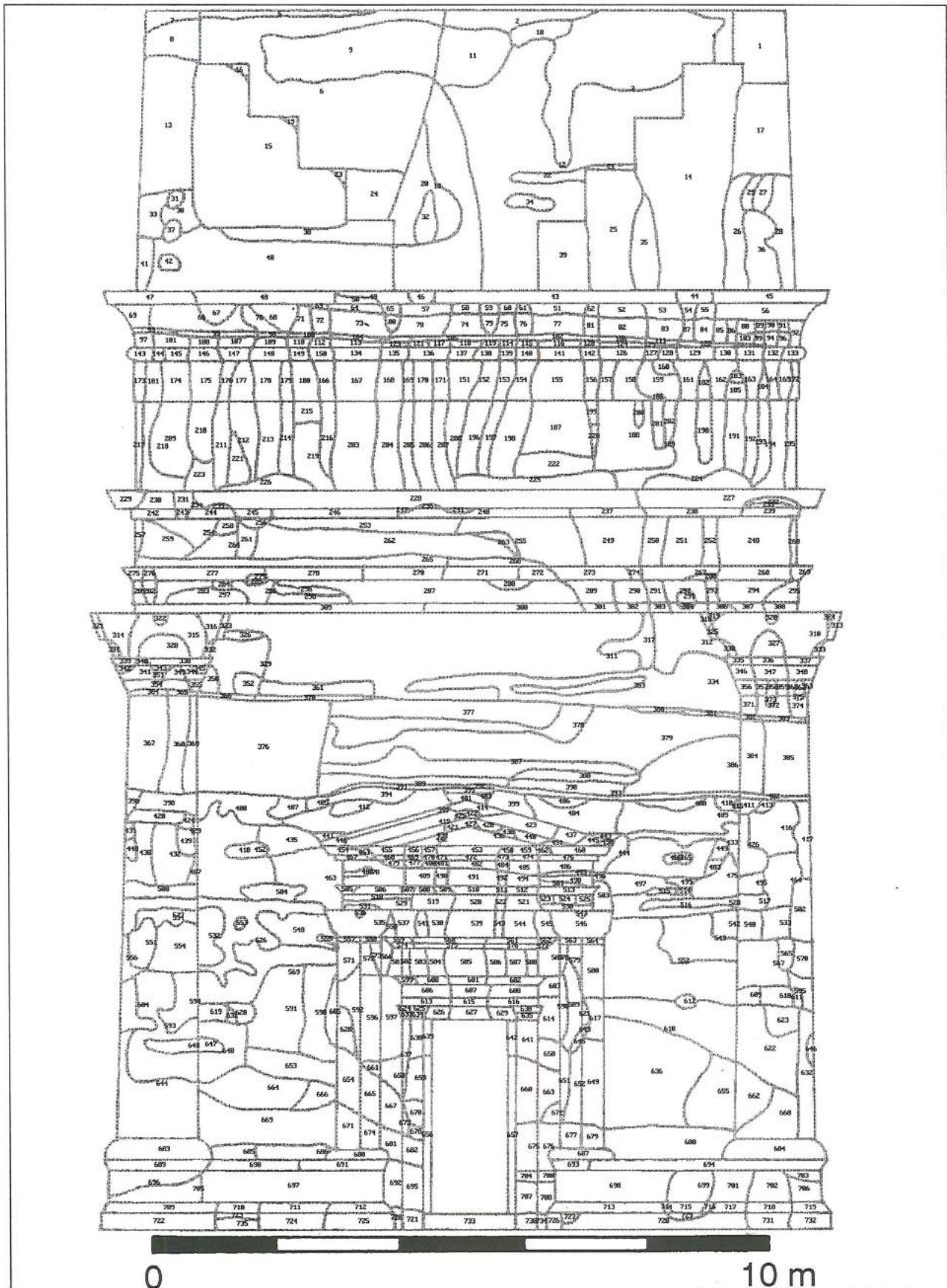
“loss of stone material” can be used for calculation of weathering rates. Necessity of interventions such as stone repair or structural interventions can be evaluated. In Figure 7 all weathering forms attributed to “deposits” are marked. In the same way, a plan with all weathering forms describing “detachment of stone material” can be made, which would characterize stone surface areas in danger of losing stone material and which would indicate future progress of weathering. Additionally, this plan would allow first information on weathering profiles and mechanical behaviour of stone. Urgency and suitability of interventions such as fixation of loose stone elements, stone treatment or surface coating could be evaluated. All plans illustrate type, intensity and distribution of weathering forms as function of lithotypes and exposition. Zones of weathering forms are delineated, which in-



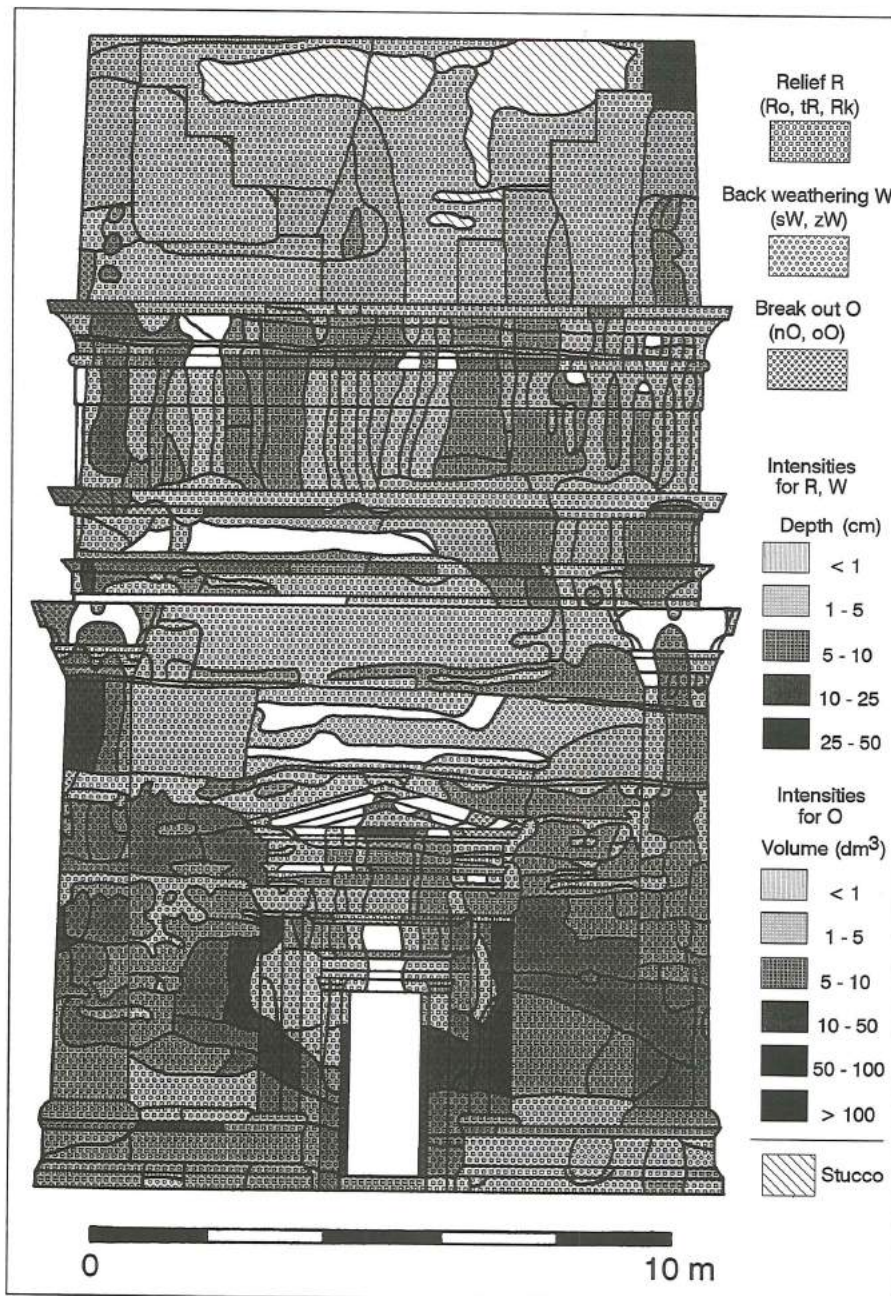
4. Elevation of Tomb 778 with original architecture.

dicate weathering factors like humidity, salt load or mechanical stress. Calculation of average weathering rates - based on evaluation of weathering forms attributed to “loss of stone material” - is shown for the façade of Tomb 778 in Figure 8. Abu Safat (1988) determined maximum weathering rates of 11 mm / 100 years for carved stone surfaces in Petra. Our results show, that the average rate can be significantly higher.

All weathering forms can be evaluated quantitatively. In Table 5 and Figure 9 quantitative evaluation of weathering forms refers to the entire façade of Tomb 778. This type of evaluation allows to compare



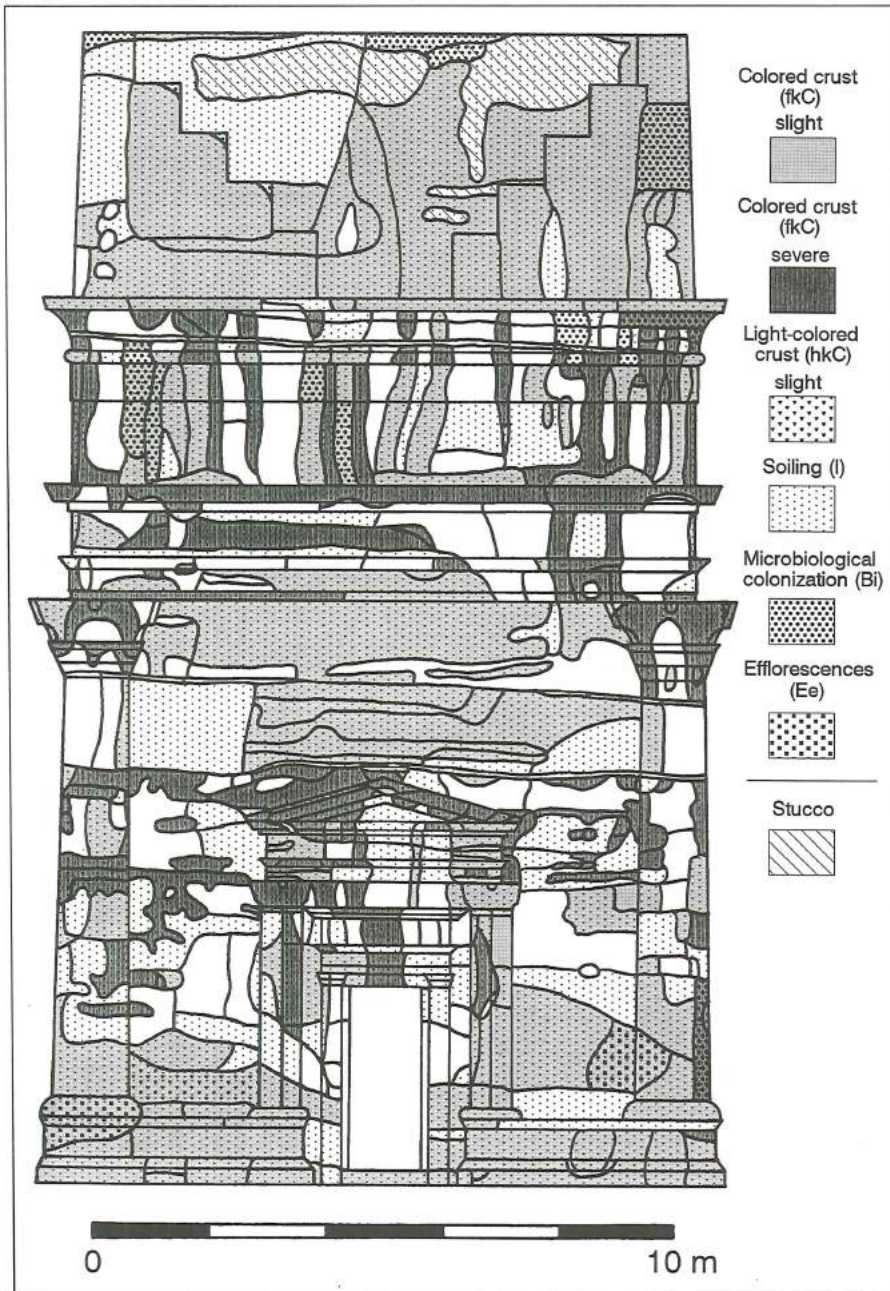
5. Tomb 778. Numbered surface areas.



6. Tomb 778. Mapping of weathering forms. Group of weathering forms: "Loss of stone material".

weathering forms at different monuments as function of monument characteristics and environment. For each monument quantitative evaluation of weathering forms has been made as function of lithotypes. Weathering behaviour of different lithotypes can be compared. The computer programme allows quantification of single weathering forms and combinations of weathering forms. Precise information on interrelations between weathering forms is guaranteed, especially on interrelations between "loss of

stone material", "deposits" and "detachment of stone material". This type of evaluation allows the identification of chronological sequences of weathering forms. A chronological sequence is shown in Figure 10 for the multicoloured, fine- to medium-grained sandstone (middle part of the Cambrian Umm Ishrin Sandstone Formation) - the predominant lithotype at Tomb 778 covering 90 % of the façade. Four weathering forms describing recent "detachment of stone material" can be stated: "*contour scal-*

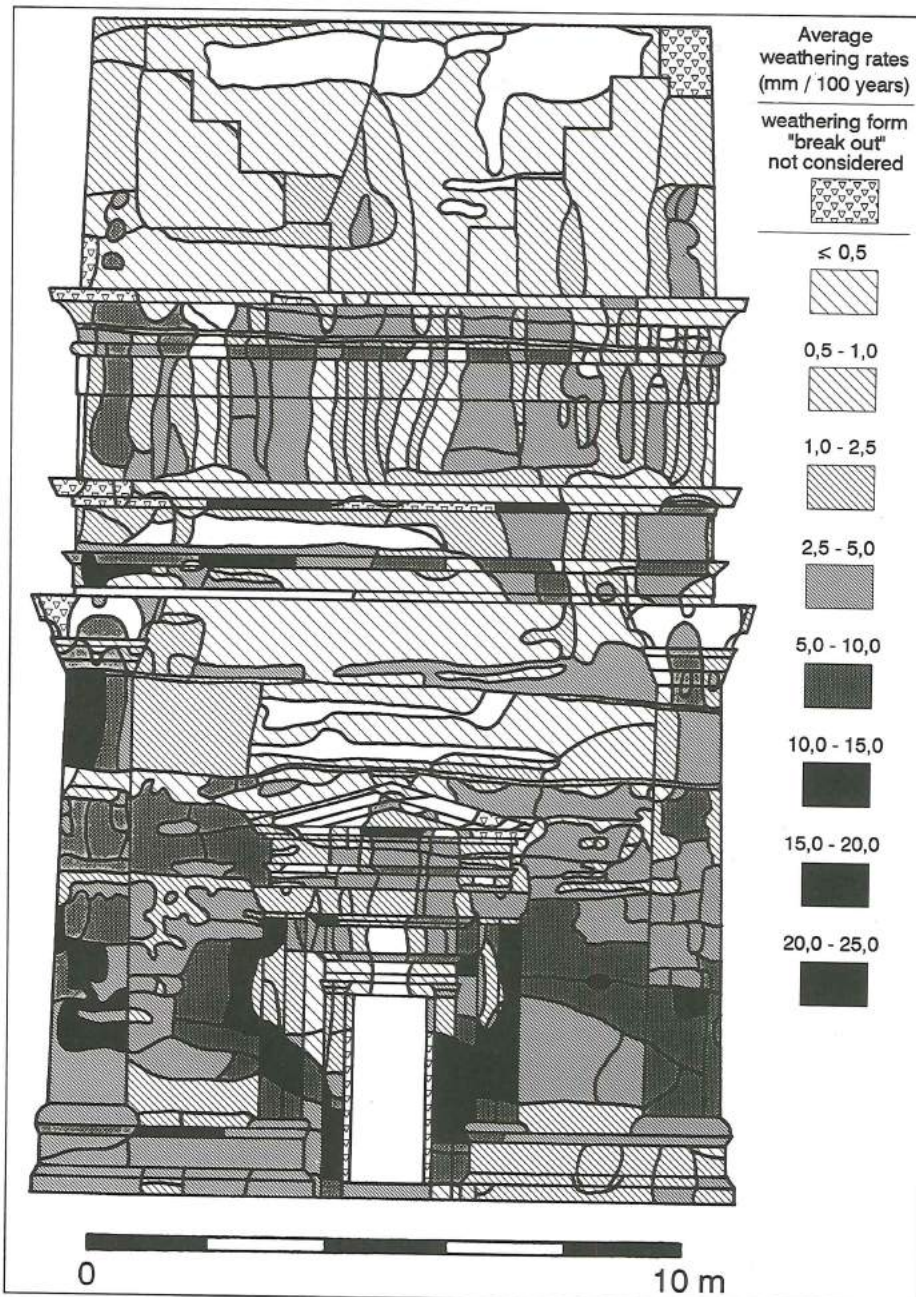


7. Tomb 778. Mapping of weathering forms. Group of weathering forms “discolouration/ deposit”.

ing”, “flaking to contour scaling”, “granular disintegration to flaking” and “granular disintegration”. Figure 10 shows the sequence of these weathering forms as function of weathering progression. The progression of weathering intensity is characterized by increase of loss of stone material, decrease of deposits and decreasing size of detaching stone elements. Velocity of detachment and loss of stone material increase in this chronological sequence. This chronological sequence can be

further specified considering intensities of the weathering forms attributed to “detachment of stone material”. In Figure 11 the intensities of these weathering forms again are presented as function of increasing loss of stone material and decrease of deposits. “Contour scaling”, “flaking to contour scaling”, “granular disintegration to flaking” and “granular disintegration” reach their highest intensity during the stage of predominance.

Chronological sequences of weathering



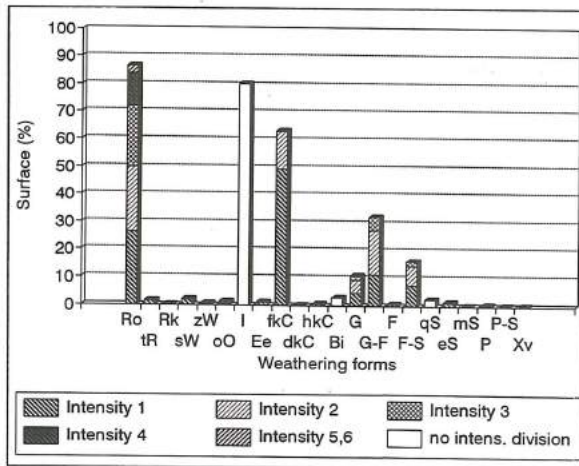
8. Tomb 778. Weathering rates.

forms are important for understanding the development of weathering damages. Considering exposition characteristics, this evaluation can be made even more detailed. During the field campaign in winter, surface areas exposed to rain and surface areas sheltered from rain by mouldings or protruding architectural elements were documented (Fig. 12). Zones affected by intense rain-water run-off and weathered surface areas nearby or between such water run-off zones are marked additionally. In Figure 13 a

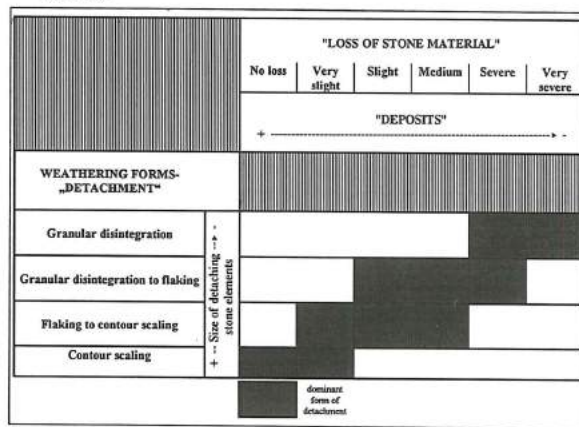
quantitative evaluation of weathering forms as function of exposition characteristics is presented. The weathering forms “granular disintegration” (G), “granular disintegration to flaking” (G-F), “flaking to contour scaling” (F-S) and “contour scaling/single scale” (eS) are evaluated quantitatively referring to surface areas next to water run-off zones (see A) and to the total façade of Tomb 778 (see B). Area (A) is characterized by above-average susceptibility to stone detachment. Based on such evaluations, ex-

Table 5. Tomb 778. Quantitative evaluation of weathering forms.

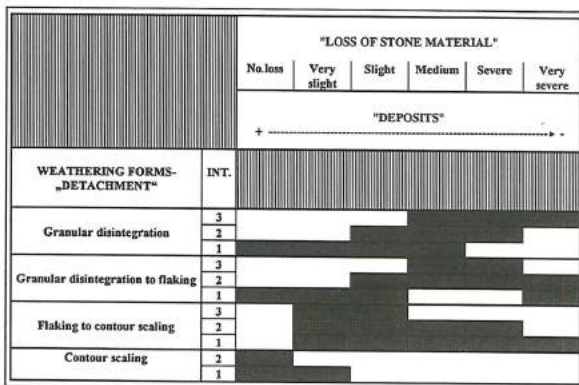
	1, 2, 3... Intensity degrees					
LOSS OF STONE MATERIAL						
Relief (R)	1	2	3	4	5	
Rounding/notching (Ro)	26.35 %	23.78 %	22.30 %	12.10 %	2.56 %	
Weathering out dependent on stone structure (tR)	1.26 %	0.41 %				
Weathering of stone components (Rk)			0.03 %	0.02 %		
Back weathering (W)	1	2	3	4	5	
Back weathering due to loss of scales (sW)	1.91 %	0.37 %				
Back weathering due to loss of undefinable stone elements (zW)		0.35 %	0.30 %			
Break out (O)	1	2	3	4	5	6
Break out due to non-recognizable cause (oO)	0.01 %	0.20 %	0.23 %	0.50 %	0.26 %	0.50 %
DISCOLORATION / DEPOSITS						
Soiling (I)	no differentiation of intensities					
	80.23 %					
Crust (C)	1				2	
Colored crust tracing the surface (fkC)	49.40 %				13.92 %	
Dark-colored crust tracing the surface (dkC)	0.15 %					
Light-colored crust tracing the surface (hkC)	0.70 %					
Loose salt deposits (E)	1				2	
Efflorescences (Ee)	1.17 %					
Biological colonization (B)	no differentiation of intensities					
Microbiological colonization (Bi)	2.92 %					
DETACHMENT						
Granular disintegration (G)	1	2	3			
Granular disintegration into sand (Gs)	4.45 %	4.78 %	1.60 %			
Crumbling (P)	1	2	3			
	0.22 %	0.01 %	0.43 %			
Flaking (F)	1	2	3			
Single flakes (eF), multiple flakes (mF)	0.72 %	0.06 %				
Contour scaling (S)	no differentiation of intensities					
Scale due to tooling of the stone surface (qS)	2.26 %					
	1	2	3	4	5	
Single scale (eS)	1.00 %	0.26 %	0.01 %	0.18 %		
Multiple scales (mS)			0.13 %			
Detachment of stone elements dependent on stone structure (X)	1				2	
Splitting up (Xv)					0.16 %	
	1	2	3			
Granular disintegration to flaking (G-F)	11,29 %	16,16 %	4,94 %			
Flaking to contour scaling (F-S)	7,58 %	6,82 %	1,74 %			
Crumbling to contour scaling (P-S)	0,14 %	0,05 %	0,03 %			



9. Tomb 778. Quantitative evaluation of weathering forms.



10. Tomb 778. Chronological sequence of stone detachment.



11. Tomb 778. Intensities of weathering forms of the group "detachment".

position characteristics can be judged. Weathering factors and weathering processes can be evaluated and intervention such as control of water run-off can be planned.

Evaluation of mapping information provides precise information on the development of weathering forms as function of litho-

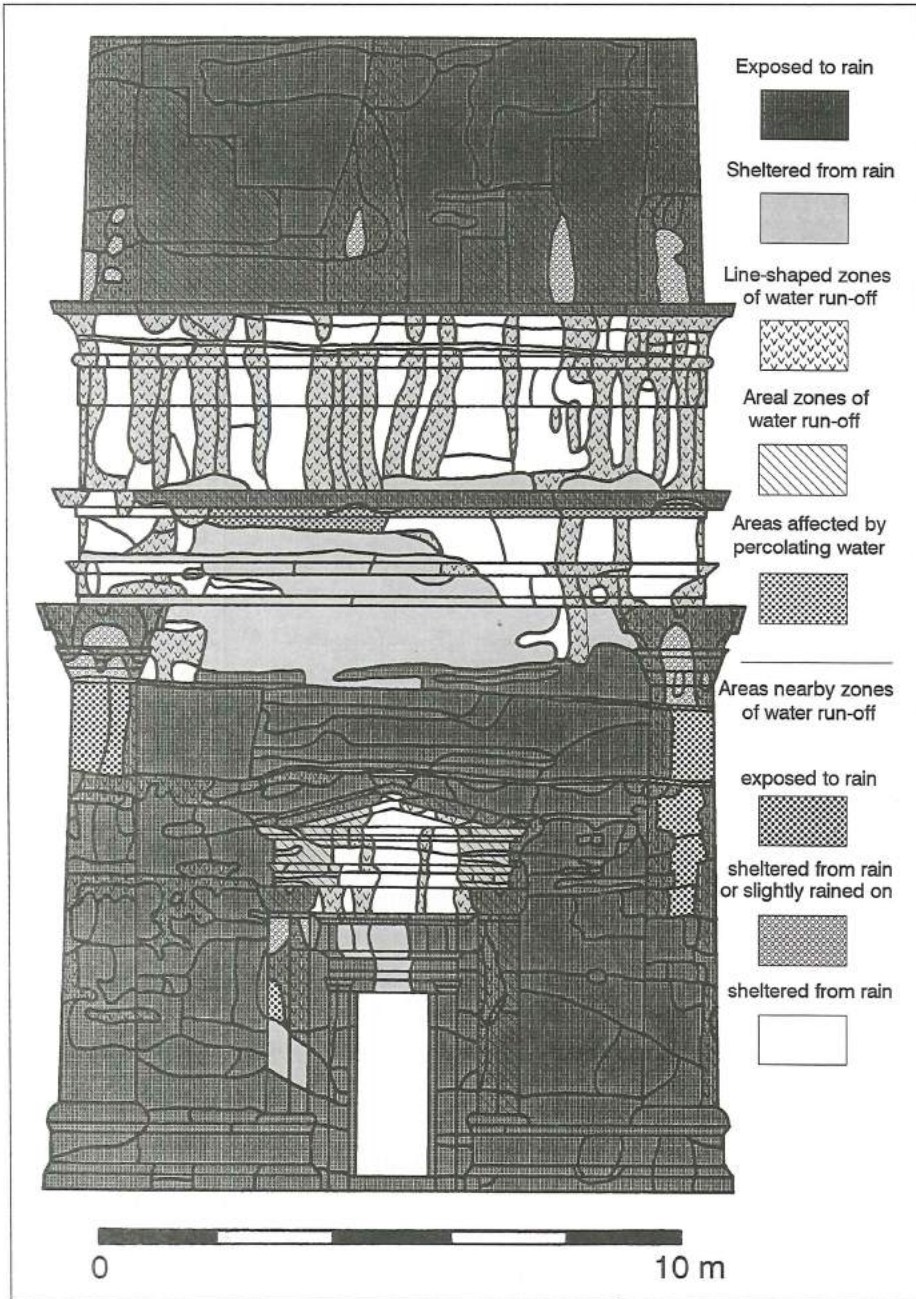
types, exposition, monument characteristics and time. Judgement of damages is a further practical research aim. For this purpose damage categories have been established. Contrary to measurable weathering forms, damage categories do not provide information on type or intensity of individual weathering phenomena. Damage categories consider and summarize all registered weathering forms and their intensities in form of a conclusive rating. Six damage categories have been established: 0 = no visible damage, I = very slight damage, II = slight damage, III = moderate damage, IV = severe damage, V = very severe damage. A correlation scheme has been developed for weathering forms and damage categories. The transformation of weathering forms into damage categories can be done by means of computer programme VIA considering defined correlation. The damage categories can be illustrated graphically and can be evaluated quantitatively (Fig. 14). Based on quantitative evaluation of damage categories, the linear damage index and progressive damage index can be calculated, both ranging from 0 to 5 (Fig. 15). Linear damage index corresponds to average damage category, whereas the progressive index emphasizes proportion of higher damage categories. Considering damage indices, monuments can be compared with respect to urgency of monument preservation measures (Fig. 16).

In addition to mapping procedure, measurements were executed at carved stone surfaces in Petra:

- profile measurements
- drilling resistance measurements
- capillary water uptake measurements
- microclimatic measurements.

Based on mapping results, measurements could be well-directed and executed at representative monument areas.

Profile measurements were made at monuments with remains of original stone-tooling patterns. Surface morphology was

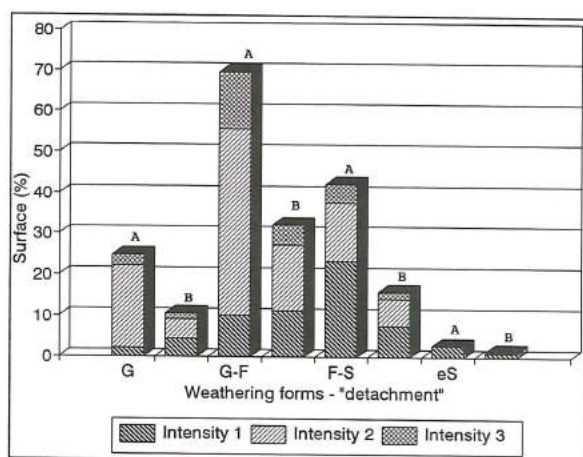


12. Tomb 778. Exposure characteristics.

measured. Original morphology of stone surface and geometry of detaching stone elements were evaluated. Fine, low-relief surface tooling frequently was followed by detachment of thin scales. Coarse, high-relief surface-tooling was often followed by detachment of thicker scales.

Drilling resistance measurements were carried out with a drilling equipment developed in Germany. The procedure is almost non-destructive. Drilling resistance profiles are calculated from drilling time and

drilling depth. Drilling resistance profiles provide information on material strength and can be used for characterization of damage development. In Petra many macroscopically sound rocks are characterized by rather low drilling resistance. This result confirms the weak grain bond of most lithotypes, described in literature as “friable stones”. Drilling resistance profiles as function of weathering forms are shown in Figure 17. “Granular disintegration” shows continuous increase of drilling resistance from stone



13. Tomb 778. Quantitative evaluation of stone detachment. A: surface areas next to zones of water run-off, B: entire façade. Weathering forms: G = granular disintegration, G-F = granular disintegration to flaking, F-S = flaking to contour scaling, eS = contour scaling/single scale.

surface to stone interior. For “contour scaling - single scale” the profile quantifies thickness of scale and width of the zone of detachment.

Water intake measurements were made for quantification of water uptake and water penetration depth as function of time and used for characterization of water migration. Lithotypes in different states of weathering were considered. The non-destructive Karsten tube method was applied. Water intake measurements are presented in Figure 18. Water intake rates corresponding to three different weathering states of a whitish, medium- to coarse grained sandstone (upper part of Umm Ishrin Sandstone Formation) are presented. By means of a computer programme, time of water intake and penetration depth can be calculated. An improved version of the computer programme has been recently developed by Rapp, Wendler and Snelthage (1997).

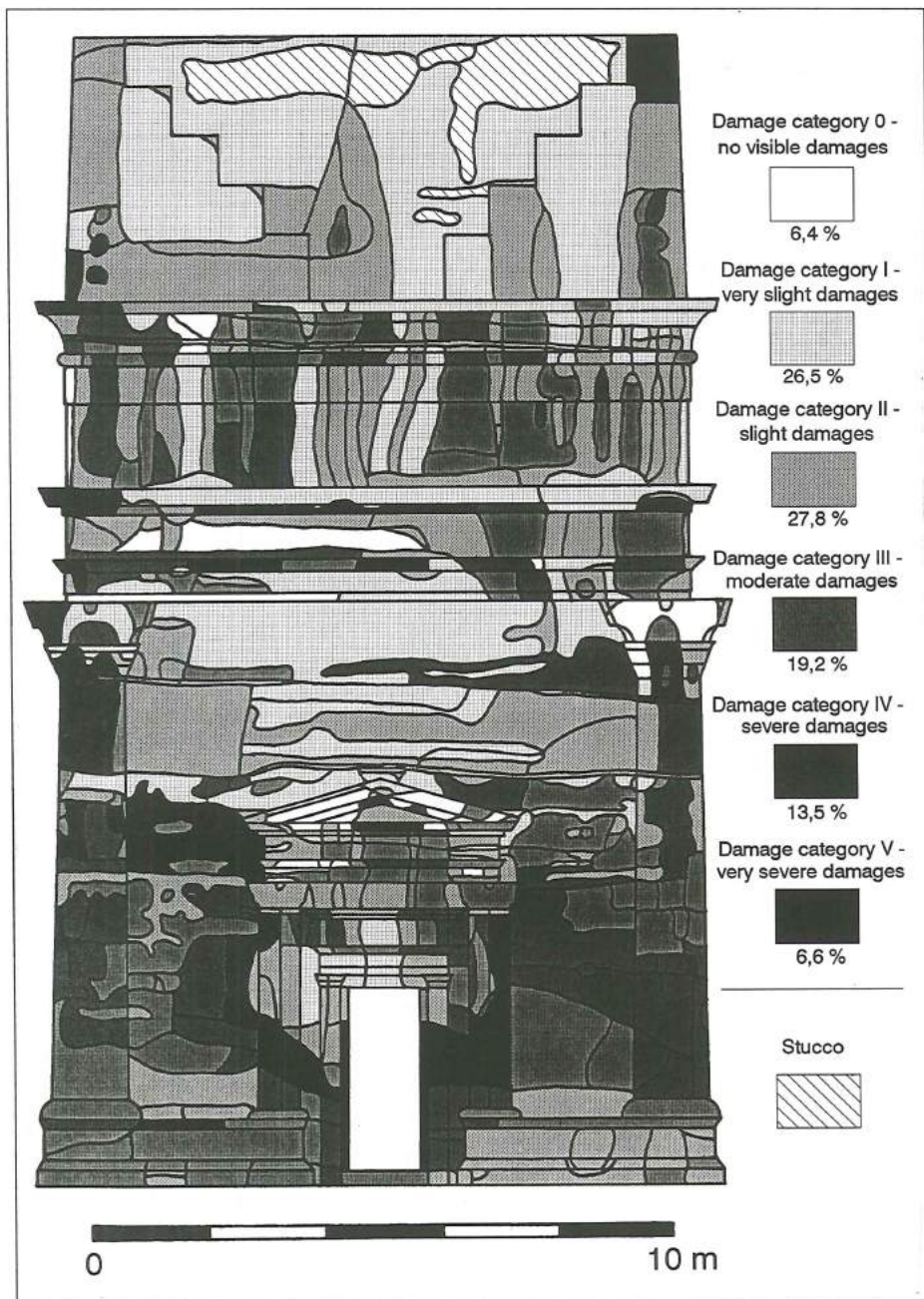
During the four field campaigns in Petra climatic and microclimatic measurements were taken. Air temperature, air humidity (Petra region, monuments) and stone surface temperatures (monuments) were measured. Stone surface measurements were made at the monuments in a period of 24

hours. For each monument a measuring grid was recorded on a monument plan. Stone surface temperatures were measured with an infrared thermometer. Corresponding air temperature and air humidity were also registered. Stone surface temperatures can be illustrated as temperature curves (course of temperature) or by means of isotherm plans (distribution of temperature). Temperature curves of minimum, maximum and average stone surface temperatures are shown in Figures 19 and 20 for the Silk Tomb (exposed W) and the Sextius Florentinus Tomb (exposed N). The higher variation of stone surface temperature at the Silk Tomb is a consequence of direct sun radiation. The average difference between maximum and minimum stone surface temperature at the Sextius Florentinus Tomb was 8°C, at the Silk Tomb 20°C. Heating and cooling rates can be calculated.

The climate measurements allow characterization of seasonal and daily variation of climatic conditions in Petra. They provide detailed information on microclimatic conditions at the monuments. The results can be evaluated as regards seasons, lithotypes, weathering state, and exposure characteristics. The climatic data are very important for nature-adapted weathering simulation tests. However, for judgement of climatic weathering factors not only recent climatic conditions should be considered. Climate variations during the last 2000 years should also be taken into account. Variations in the past have been described by Shehadeh (1985).

At the moment petrographical studies and weathering simulation tests are carried out on stone samples from Petra. Table 6 shows stone properties being analysed. Main aims of these laboratory analyses are:

- petrographical classification of all lithotypes,
- characterization and comparison of stone properties as regards lithotype and state of weathering,



14. Tomb 778. Damage categories with quantitative evaluation.

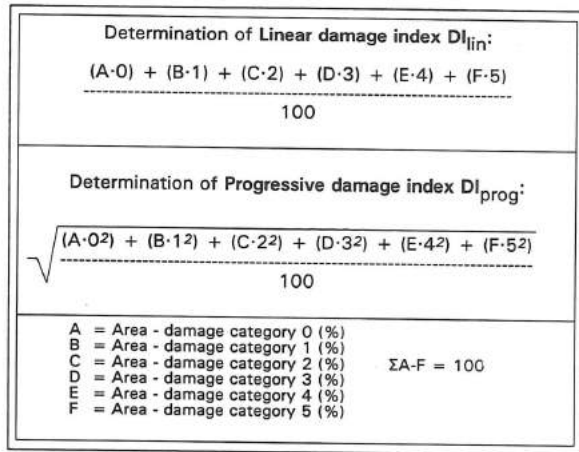
- identification of weathering products,
- characterization of weathering profiles,
- chronology of stone alteration,
- characterization of weathering behaviour of stone properties,
- rating of lithotypes regarding susceptibility to weathering,
- information on weathering factors and weathering processes.

Final Aims

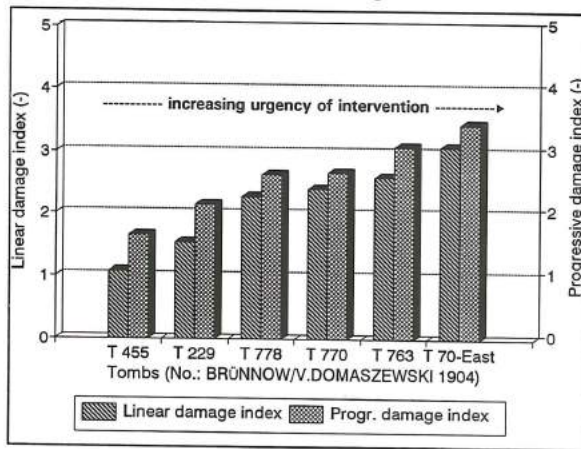
The project has a scientific and a prac-

tical aim. Based on compilation of all results obtained from *in situ* investigation and laboratory studies and considering latest scientific findings, a weathering model for the Petra monuments carved from bedrock shall be developed. This model shall describe and explain the development of weathering damages at the monuments considering weathering factors, processes and characteristics as well as stone types and monument characteristics.

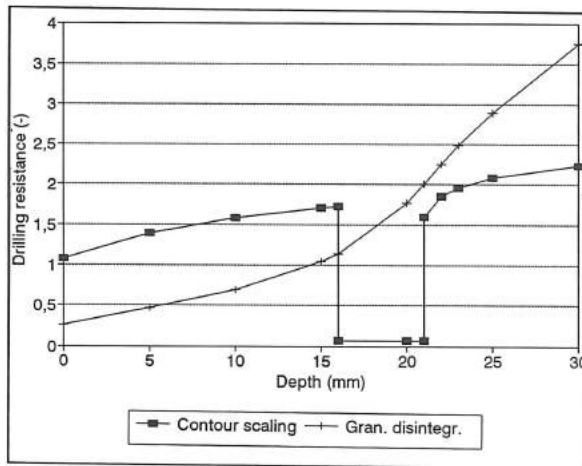
The second aim of the project is an ef-



15. Linear and progressive damage index.

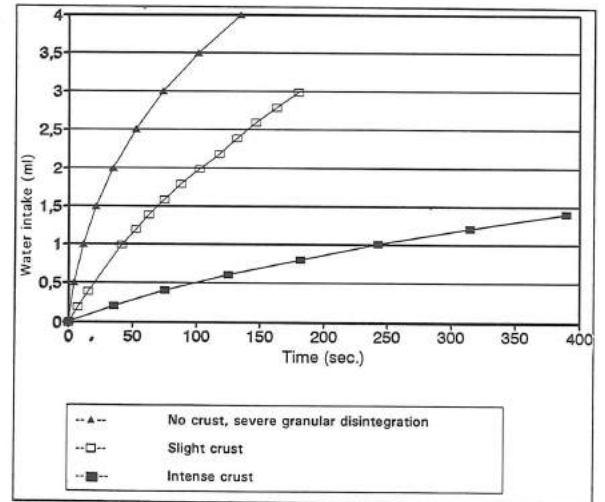


16. Damage indices for Petra monuments.

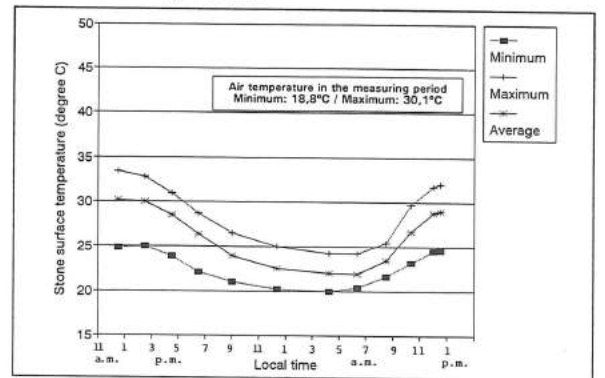


17. Drilling resistance profiles. Weathering forms: "granular disintegration" and "contour scaling".

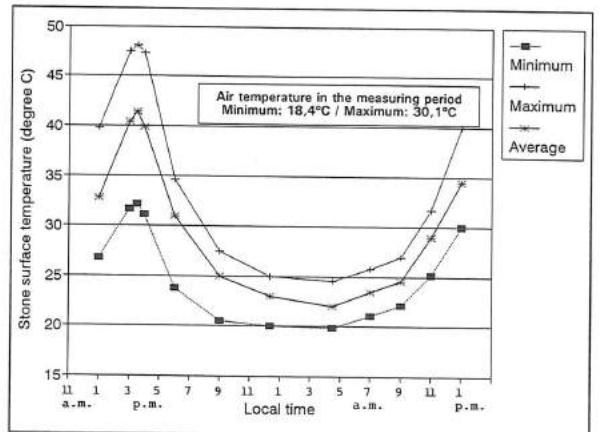
fective contribution to the monument preservation. Reliable characterization, interpretation and evaluation of damages will allow to calculate the urgency of interventions, to define requirements for re-



18. Soldier's Tomb. White medium- to coarse-grained sandstone. Water intake as regards weathering forms.



19. Silk Tomb. West-exposed façade. Stone surface temperatures in a period of 24 hours. Measurement in October 1996.



20. Sextius Florentinus Tomb. North-exposed façade. Stone surface temperatures in a period of 24 hours. Measurement in October 1996.

medial and preventive preservation measures and to propose effective types of preservation measures.

Table 6. Laboratory tests.

COMPOSITION		- Mineral composition - Chemical composition
TEXTURE	GRAIN CHARACTERISTICS	- Grain size - Shape, roundness
	FABRIC	- Grain contacts - Grain orientation
	POROSITY PROPERTIES	- Density - Total porosity - Pore size distribution - Specific surface area
HYGRIC PROPERTIES		- Water adsorption - Water desorption - Water vapour permeability - Hygric dilatation
THERMAL PROPERTIES		- Thermal conductivity - Thermal dilatation
MECHANICAL PROPERTIES		- Strength - Hardness
WEATHERING BEHAVIOUR		- Change of stone properties as function of weathering processes <i>weathering simulation</i>

Acknowledgements

The authors would like to thank the Director-General of the Department of Antiquities, Dr Ghazi Bisheh, the representative of the Department of Antiquities in Petra, Mr Sulaiman Farajat, and Prof. T. Akasheh (Hashemite University/az-Zarqā') and Dr K.O. Mahadin (Petra Regional Council) for cooperation, discussions and advise and for logistical support during the field campaigns. Furthermore, we give our thanks to the DFG, Deutsche Forschungsgemeinschaft, for the project funds.

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Bibliography

- Abu Safat, M.
1988 *Verwitterung und Hangabtragung im "Nubischen Sandstein" Südjordaniens. Erlanger Geographische Arbeiten*, H. 49, Erlangen: Palm & Enke Verlag.
- Bender, F.
1968 *Geologie von Jordanien*. Beiträge zur regionalen Geologie der Erde, Bd. 7. Berlin-Stuttgart: Borntraeger.
- Bender, F.
1974 *Geology of Jordan*. Contributions to the Regional Geology of the Earth, Supplementary Edition of Vol. 7, Berlin-Stuttgart: Borntraeger.
- Burdon, D.J.
1959 *Handbook of the Geology of Jordan*. Colchester-Great Britain: Benham and Company Limited/ Government of the Hashemite Kingdom of Jordan.
- Brünnow, R. and von Domaszewski, A.
1904 *Die Provincia Arabia*. Vol. 1. Strassburg.
- Fitzner, B. and Heinrichs, K.
1994 Damage diagnosis at monuments carved from bedrocks in Petra/Jordan. Pp. 663-672 in *Soprintendenza ai Beni Artistici e Storici di Venezia*. Proceedings of the IIIrd International Symposium on the Conservation of Monuments in the Mediterranean Basin, *Stone and Monuments: Methodologies for the Analyses of Weathering and Conservation*, Venice, 22-25 June 1994.

- Fitzner, B., Heinrichs, K. and Kownatzki, R.
 1995 Weathering forms - classification and mapping. Pp. 41-88 in Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, *Denkmalpflege und Naturwissenschaft, Natursteinkonservierung I*. Berlin: Ernst und Sohn.
- 1997 Weathering forms at natural stone monuments - classification, mapping and evaluation. Pp. 105-127 in *International Journal for Restoration of Buildings and Monuments*, Vol. 3, Stuttgart: Aedificatio Verlag/Fraunhofer IRB Verlag.
- Fitzner, B., Heinrichs, K. and Volker, M.
 1997 Monument mapping - a contribution to monument preservation. Pp. 347-355 in F. Zezza (ed.), *Proceedings of the E.C. Research Workshop : Origin, mechanisms and effects of salts on degradation of monuments in marine and continental environment*, Bari, 25-27 March: C.U.M. / University School of Monument Conservation. Bari.
- Jaser, D. and Barjous, M.O.
 1992 *Geotechnical studies and geological mapping of ancient Petra city*. Town Mapping Project, Bulletin 1, Amman: Hashemite Kingdom of Jordan / Ministry of Energy and Mineral Resources / Natural Resources Authority / Geological Directorate / Geological mapping division.
- Kownatzki, R.
 1997 *Verwitterungszustandserfassung von Natursteinbauwerken unter besonderer Berücksichtigung phänomenologischer Verfahren*. Dissertation, RWTH Aachen, Aachener Geowissenschaftliche Beiträge, Band 22. Aachen: Verlag der Augustinus Buchhandlung.
- Lloyd, J.W.
 1969 *The hydrogeology of the southern desert of Jordan*. UNDP/FAO 212, Technical Report No. 1. Rome.
- McKenzie, J.
 1990 *The Architecture of Petra*. British Academy Monographs in Archaeology, No. 1. New York: Oxford University Press.
- Pflüger, F.
 1990 *Flash flood conglomerates and Cambrian transgression in Petra/Jordan*. Unveröffentlichte Diplomarbeit, Universität Tübingen.
- 1995 Archaeo-geology in Petra, Jordan. *ADAJ* 29: 281-295.
- Powell, J.H.
 1989 *Stratigraphy and sedimentation of the phanerozoic rocks in central and south Jordan - Part A: Ram and Khreim Groups*. 1:50.000 Geological mapping series, Geo. Bulletin No. 11, Amman: Hashemite Kingdom of Jordan / Ministry of Energy and Mineral Resources / Natural Resources Authority / Geological Directorate.
- Quennel, A.M.
 1951 The geology and mineral resources of (former) Trans-Jordan. Pp. 85-115 in *Colonial Geology and Mineral Resources*, Vol. 2, No. 2. London.
- Rapp, K., Wendler, E. and Sneathlage, R.
 1997 Zerstörungsfreie Messung der Wasseraufnahme - Verbessertes Auswerteverfahren für die Messmethode nach Karsten. P. 288 in *Berichte der Deutschen Mineralogischen Gesellschaft*. Beihefte zum *European Journal of Mineralogy* Vol. 9, No. 1. Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung.
- Shehadeh, N.
 1985 The climate of Jordan in the Past and Present. Pp. 25-37 in *SHAJ II*. London: Rout-

ADAJ XLII (1998)

lege and Kegan Paul Ltd/Amman: Department of Antiquities.

Wetzel, R. and Morton, D.M.

1959 Contribution à la géologie de la Transjordanie. Pp. 95-191 in *Notes et Mémoires sur le Moyen-Orient*, Tome VII. Paris: Musée National d'Histoire Naturelle.

**A NEW BUILDING ON THE MAIN STREET
IN GERASA NORTH OF THE SANCTUARY OF ARTEMIS
A PRELIMINARY REPORT OF AN ARCHITECTURAL STUDY**

by

Roberto Parapetti

In the period between winter 1991 and spring 1992, the area beside the northernmost shop of the Sanctuary of Artemis' frontage, to the west of the Main Colonnaded Street, was investigated.¹ The aim of the work was to understand the architectural design for the access to the upper storey of shops O, P, Q, R, since door S, to the north of them, suggested to serve that purpose (Figs. 1 and 2).² Furthermore, the existence of a building, Building X, adjacent to the north of the Sanctuary, was considered vital to the study of the city's topographic layout at that point. Considering the 'urban scale' of the Sanctuary one could have presumed the existence of a side street, like the one to the south, defining the Sanctuary's northern side.

Building X, whose very presence could be also deduced from the difference in style of the columns in contrast to those of the Main Street in front of the Sanctuary shops, protrudes 2.70 m from the alignment of the frontal façade, thus reducing the width of the *ambulacrum* from 8,50 to 5.80 m.³

The recent retrieval, in the archives of ACOR in Jerusalem, of a plan to the scale

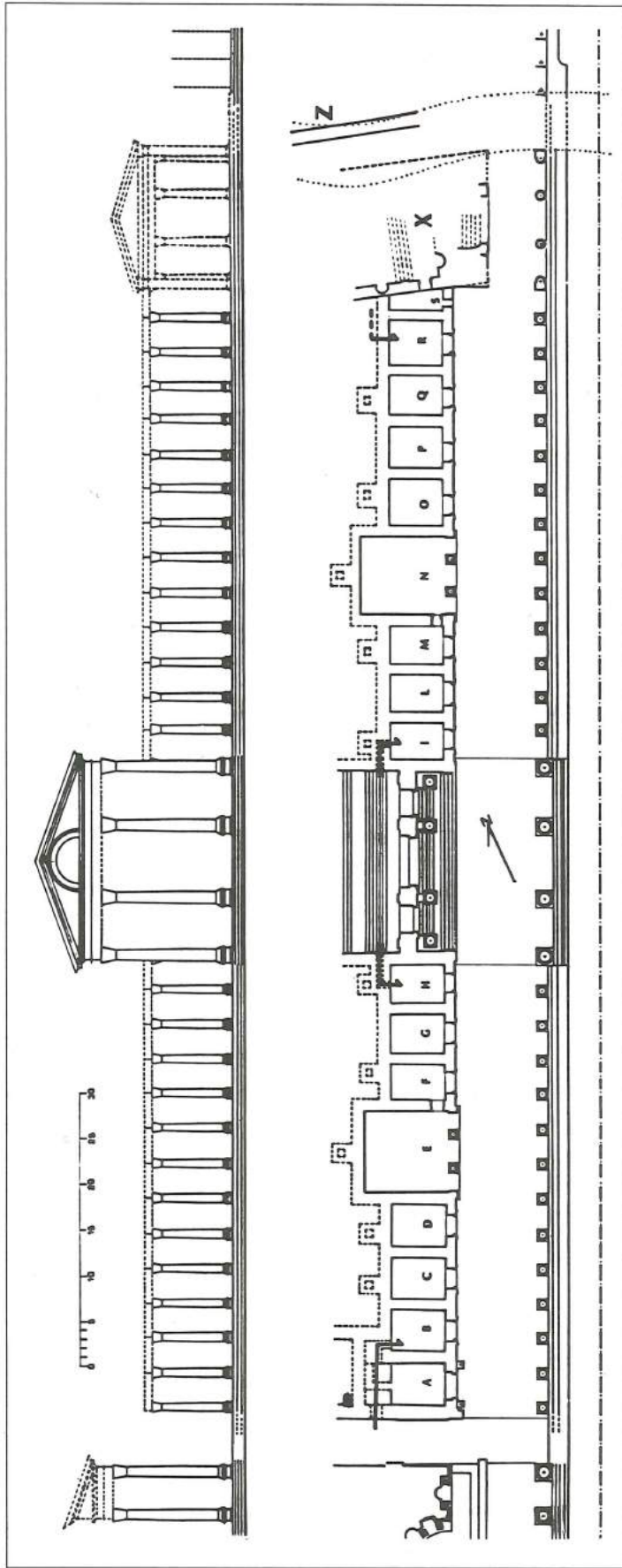
of 1:100, labelled "Area N-E of Mr. Horsfield house" (the present Jarash Department of Antiquities Office), is of remarkable interest. It shows a long wall, Z (Figs. 1 and 2), which forms an oblique angle with the Main Street. It is most likely, that this wall must have delineated one of the sides of the ancient street north of Building X - a street to serve both the northern entrance of the Sanctuary and of the North Theatre, the *summacavea*. This orientation of the street is in keeping with the one of the main North Transversal Street (the so-called North Decumanus) and signifies a common plan for this sector of the city, already established in the late first century AD.⁴ The recovery represents, indeed, the only record of the sounding done by the early American Expedition in this spot which has not been reported in publications.

The area excavated by the Italian Mission, ca 18 m (north-south) x 14 m (east-west), was limited to the north by the modern car track leading to Horsfield's house to the west, by an enormous dump, of the 1931 excavations.⁵ The *ambulacrum* between the street colonnade and the sanc-

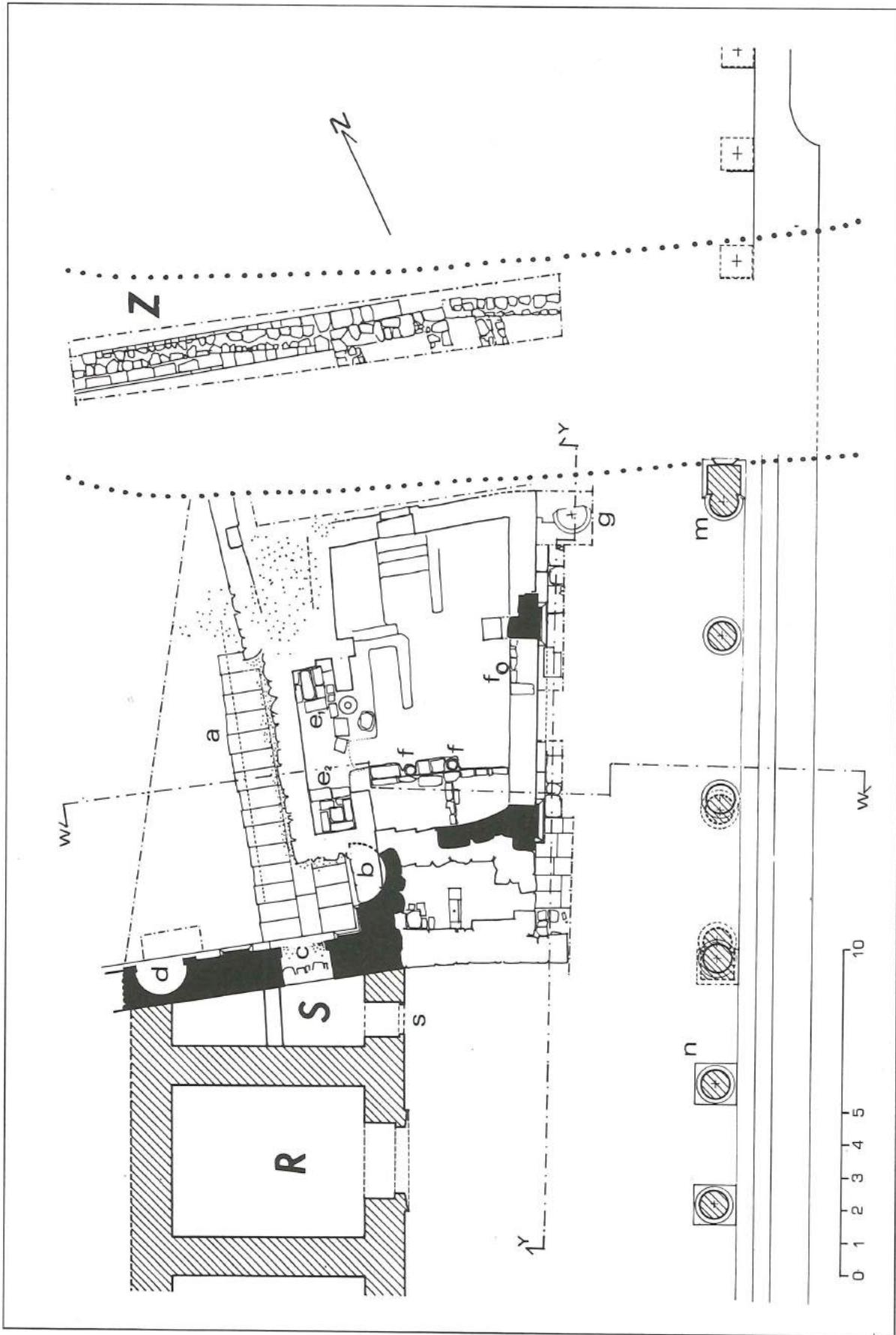
1. This work was part of the Italian-Jordanian Cooperation Project for the conservation of Historical Heritage. The excavation, that was begun by the author, was thereafter continued by Edoardo Pantanella. The preliminary study and dating of the pottery and other finds was done by Ina Kehrberg.
2. The upper storey of shops B, C and D, at the south end of the Sanctuary's frontage, are posited by a staircase that goes from room A and reaches the rear wall of shop B's upper storey; access to C and D upper storeys was, very likely, through doors in the partition walls between B and C, and C and D (Parapetti 1989: Tav I).
3. Parapetti 1983-84: 46, Cw3, plan in Pl. IV.
4. Ball *et al.* 1986: 392. Cuts in the bedrock for founda-

tion trenches, below the floor level of shops B, C, D, with a similar orientation have also been observed (Parapetti 1989: 5, plan in Tav. I).

5. Following is an abstract from C. S. Fisher's diary, co-director of the expedition:
October 15th 1931, Thursday,a third group of men have been set to work laying the railroad along the eastern face of the Artemis East Colonnade (the 'deconville' trolleys can still be seen in the northern part of the upper terrace). Just north of Mr. Horsefield's house is a large break in the Artemis enclosure. Both the east and north retaining walls of the great terrace on which the temple stood are here broken away..... We intend to use this place for a dump....



1. Jarash, the front of shops of the Sanctuary of Artemis on the Main Colonnaded Street, Building X and wall Z.



2. Jarash, Building X-thermopolium and wall Z excavated in 1931. Dotted line is the suggested original position of the tripartite colonnade in front of Building X.

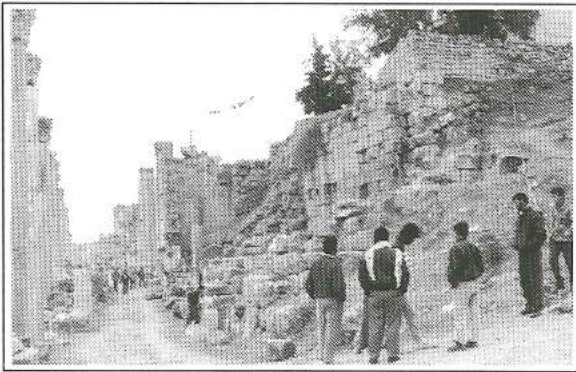
tuary Building X, was left unexcavated to permit passage for the equipment needed for our restoration works in the West Propylaeum area southwards, which was in progress at the same time (Figs. 3 and 4).

When the architectural elements were removed from the surface of the area, accumulated there from previous clearing operations,⁶ and the layers below that formed by multiple collapses, it appeared that the Sanctuary's frontage was built against Building X, evidently an earlier construction. Both front and rear walls of the last room of the Sanctuary, room S, were abut-

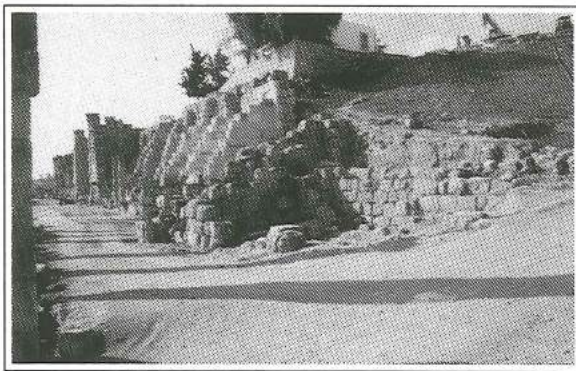
ting against what was in reality the south side wall of Building X. The latter wall formed an angle of 80° with the Main Street alignment, similar to the one estimated for Wall Z, mentioned above; the east front was aligned parallelly. Thus, Building X must have had a rhombic layout and room S was wedge-shaped (see Fig. 2).

Due to the precarious state of preservation of a partition wall, that divided in a later period the original room S, the excavation of that space was left unfinished, leaving unanswered the question of how the staircase reached the upper storey of the northernmost shops.

Likewise, the limited excavations of Building X and the poor state of preservation, did not reveal conclusive information about its original architectural design and function. From what can be detected by the structural remains, the front of the building on the Main Street had a tripartite design, the central part of which was a 5 m wide opening framed by pilasters (Fig. 5a). The interpretation of the western and northern sides remains uncertain. The central opening entered into an irregular trapezoid vestibule, designed to rectify the inner layout, only the south side of which is relatively well-preserved. Traces on the curvilinear wall of the latter indicate that there was a flight of steps which led to a second storey (Figs. 2 and 5). This upper vestibule, whose threshold is not preserved, was actually a narrow landing. A line, **a**, carved on the stone pavement of the landing provides evidence for a second flight of stairs, that must have been originally as wide as the entire inner width of the building. A semi-circular niche, **b**, and a door, **c**, are visible in the



3. Jarash, Building X north of the Sanctuary of Artemis' frontage on the Main Colonnaded Street, in 1991 before excavations.



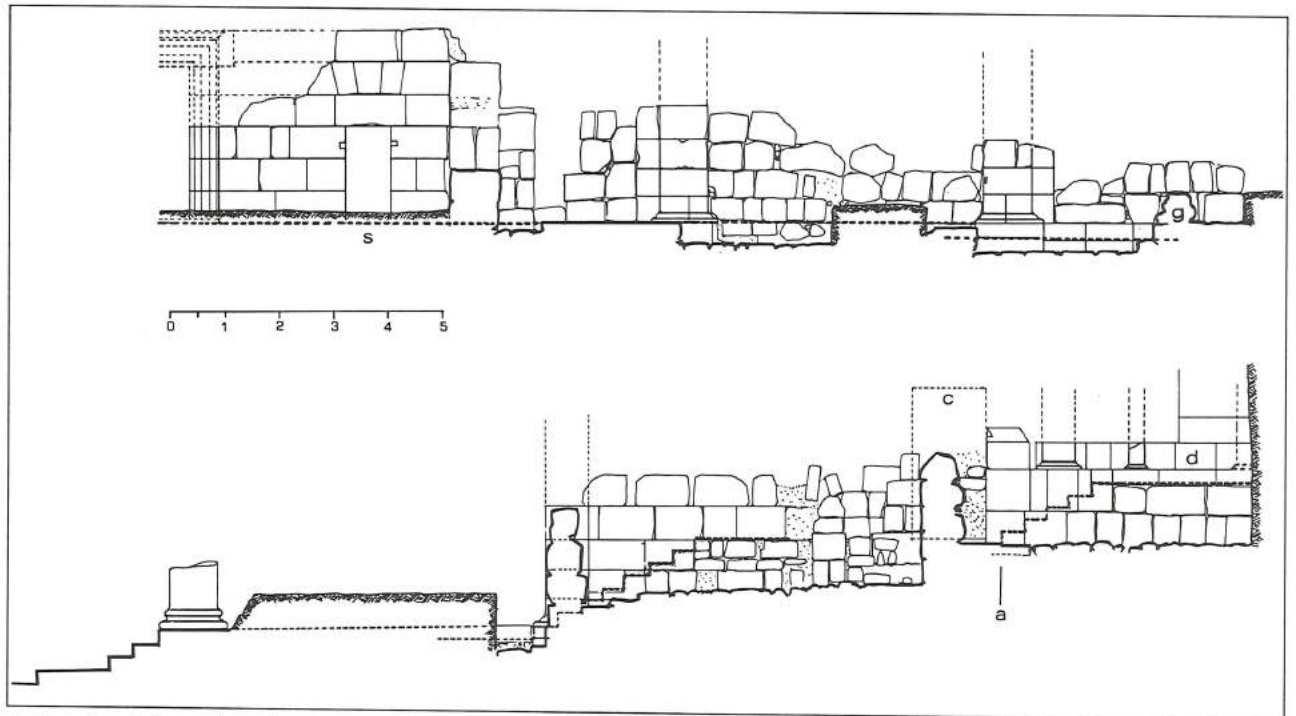
4. Jarash, Building X, after excavations. In the background are the reconstructed transversal walls of the northern shops.

= October 17th.....a few men have been set to work trenching for walls in the hollow below Mr. Horsefield's house in the spot which will ultimately be concealed under the dump.
October 19 -21st Below Mr. Horsefield's house a heavy wall of fine masonry has been found running east end west (what we call wall Z) and they are now following this up toward ei-

ther ends.....

October 23rd We have reached the lowest step of the long flight of the Artemis Temple.....All this earth will have to be carried up hill to the railway line).

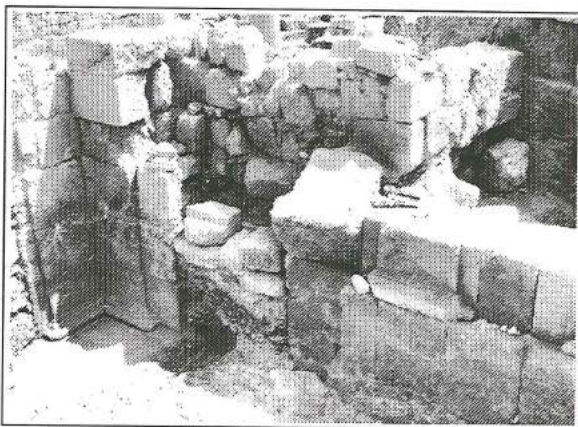
6. by G. Horsfield in 1925-31 and by the Department of Antiquities in 1960-62 and 1976-82.



5. Jarash, a) front elevation (y-y) of door s and Building X; b) cross section (w-w) of Building X-thermopolium. Dotted line is the reconstruction of the staircase.

south-eastern corner of the landing at the sides of a hinge-like pilaster (Fig. 6). A second semi-circular niche, **d**, flanked by slender pilasters (Fig. 7) and also situated on the south wall of the building, suggests a further landing higher up. The base of an isolated pilaster on a high skirting board, between the door and this latter niche, indicates the level of this upper landing (Figs. 2 and 5).

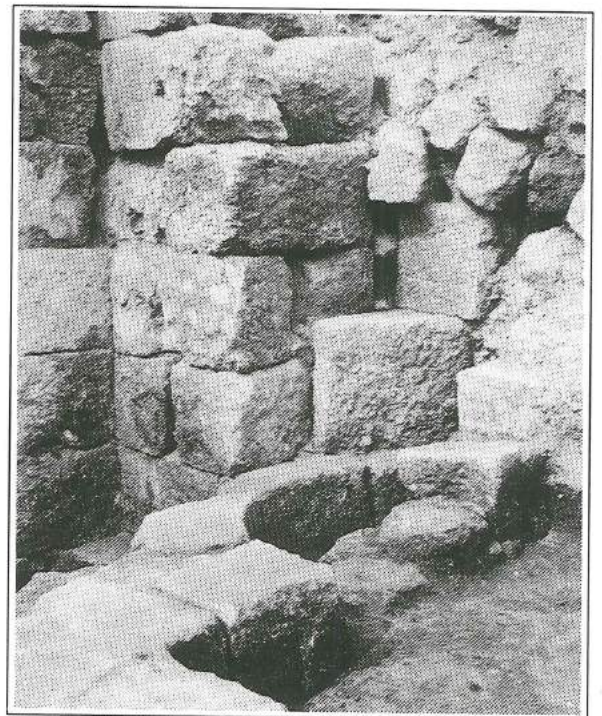
The function of such a monumental building, as indicated through its architecture may have been reserved for cultic



6. Jarash, Building X, the south-east corner of the upper vestibule.

purposes.

The trial trench, that was dug in front of the upper niche down to 1.20 m below the level of the stone pavement mentioned above, supplied evidence for a *terminus*



7. Jarash, Building X, the niche in the south wall; in the background the rear wall of room S.

post quem of, at the latest, the period within the first decades of the second century AD. Building X was thus built shortly before 150 AD, the date of the Sanctuary's frontage west of the Main Colonnaded Street.⁷ The soft calcareous *nari* stone used for the construction, even in the moulded parts of the building, may be a further indicator for an earlier date. Such a building practice was much reduced from the Trajanic period on, when the *malaki* hard stone was often preferred.⁸

According to the chronological span of dated material from the excavation in Building X, sometime between 551 and 659 - the dates of two earthquakes that devastated Gerasa,⁹ a thermopolium was established in the lower sector of the building. This drastic change of Building X, that in all probability followed a long period of abandonment, which in turn had been brought about by seismic events between the fourth and sixth centuries.¹⁰ The latter complicates a comprehensible study of the transformations of the building, associated with the Sanctuary. One can but wonder, for example, whether door *c*, which was sealed at an unknown date, was in use during the Sanctuary's life. If so, it could have served to reach the upper storey of the shops through the staircase of Building X. Furthermore, in observing the layout of the door *c* jambs of, one should deduce that, from a technical point of view, such a door must have led to a room adjacent to the south. That room that must have been demolished when the shops of the Sanctuary were built.

During the later reorganization of the site

in the Byzantine period, the steps as well as the north side of the first vestibule were demolished and a retaining wall was built against the upper vestibule, thus defining the space of the new commercial activity. The large opening to the east was sealed and an entrance was provided from the north (Fig. 2 and below Fig. 9). Judging from the evidence of the ceiling visible in door *c*, and starting 1 m above the threshold, it can be presumed that also the area of the upper level of Building X, though not otherwise preserved, was reused (see Fig. 5).

Internally, on either side of a recess situated against the inner west wall, were two places for cooking (*e1*, *e2*) (Fig. 8). Plastered benches and platforms were organized in the inner space for the comfort of the customers (Fig. 9). Three containers (*f*) were also available for waste (see Fig. 2). In the absence of material after the seventh century, it should be assumed that the thermopolium suddenly ceased to operate as a result of the earthquake in 659 AD.

A narrow trial trench dug in the *ambulacrum* along the east front of Building X brought to light the moulded bases of the pilasters originally flanking the central opening, that were partly concealed by a later *malaki* pavement. A gap in the pavement allowed excavations to reach - 45 cm below - the original *nari* pavement connected to the building, and to design the bases with a *cyma recta torus*. Furthermore, resting on the upper pavement, the base of an engaged three-quarter column, *g* (Fig. 10), similar to the one *in situ* (*m*) (see Fig. 2) belonging to the northern pillar of the colonnade in front

7. The inscription on the West Propylaeum of the sanctuary (Kraeling 1938: 402) likely dates the entire frontage including the street colonnade.

8. The use of *nari* stone in ancient Jarash for moulded or decorated architectural members is considered by some as a subsidiary 'boundary element' between the first and second centuries AD (cf. Seigne and Morin 1995: 179; Brenk *et al.* 1995: 214 and 219, *idem*, in this volume). Later second century architecture built of *nari* stone

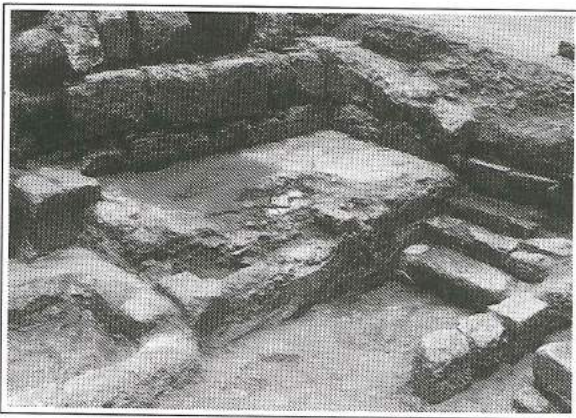
are e.g. the entire building of the hippodrome (Ostrasz 1989:71) and the temenos wall of the upper Temple of the Zeus Sanctuary (Braun 1997: 24 and 1998).

9. The two seismic events are elsewhere witnessed in Jarash (Ostrasz 1989: 74-76).

10. The earthquake of 363 can be actually assumed as the main causes of dedeciation of the building decay; see above.



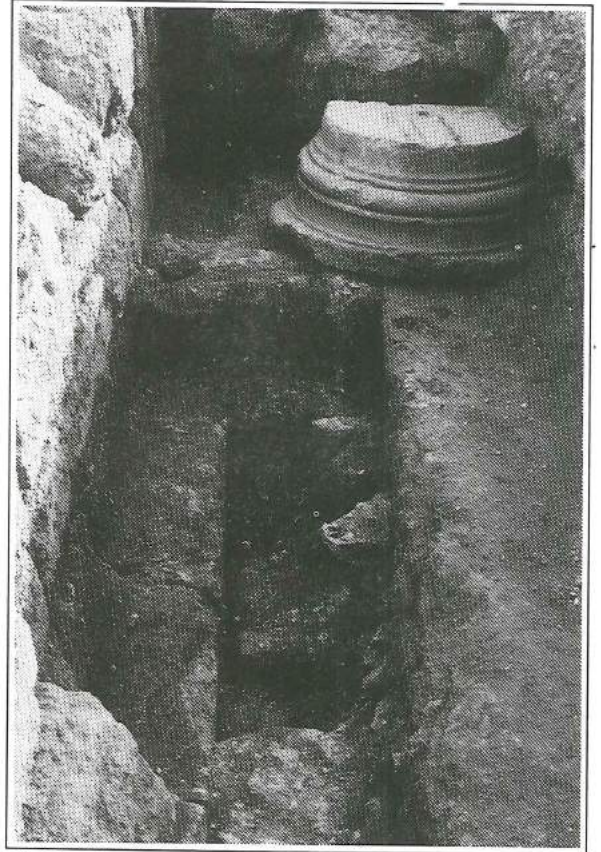
8. Jarash, thermopolium, benches, platform and steps to the northern door.



9. Jarash, thermopolium, cooking place e1.

of Building X, was discovered. This find made possible to revise the reconstruction of the architectural organization of this last segment of the colonnade, reasserting that the reassembly work of the early '60s on the colonnaded streets was often erroneous. At present, in front of Building X are three columns and a three-quarter column en-

11. A similar embarrassing misplacement of architectural elements was observed (and repaired) in



10. Jarash, the original pavement in front of Building X and the 3/4 column base g.

gaged in a square pillar, north of the former. The four-pillar system is distinguishable from the long colonnade facing the shops of the sanctuary frontage (whose columns rest on pedestals), by the plinthless Attic type base of the four vertical elements resting directly on the stylobate. The original layout of this tripartite system must have been a couple of columns sided by three-quarter columns engaged in square pillars, spaced according to the tripartite façade of Building X (see Fig. 2). The southern column base of the group, put in position in the '60s, belongs in reality to the northernmost column (n) of the colonnade facing the shops, whose base was replaced by one of cast cement.¹¹ Thorough exploration on the ground, could have located two three-quarter capitals and two whole ones. Further careful examination would have made

the Tetrastyle Gateway in front of the West Propylaeum (Parapetti 1997: 111).

clear the similarity of the column bases of both the colonnaded system (identical profile and dimensions), and could have avoided the errors made in the restoration.¹² Furthermore, the bases' similarity (see above) proves the contemporary manner of construction of the two colonnades: the four-pillar system in front of Building X

was built during the construction of the colonnade in front of the Sanctuary shops.

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Bibliography

- Ball, W. Bowsher, J., Kehrberg, I., Walmsley, A. and Watson, P.
1986 The North Decumanus and North Tetrapylon at Jarash. Pp. 351-410 in F. Zayadine (ed.), *JAP I*, Amman: Department of Antiquities.
- Brenk, B., Jäggi, C. and Meier, H.R.
1995 The Buildings under the "Cathedral" of Gerasa: The Second Interim Report on the Jarash Cathedral Project. *ADAJ* 39: 211-220.
- Braun, J.-P.
1997 The Upper Temple of the Sanctuary of Zeus, Gerasa (Jarash). *Occident and Orient* 2/2: 22-24.
1998 Jarash/Gerasa, the Sanctuary of Zeus: The Upper Temple Complex. In *Archaeology in Jordan*. *AJA* 102/3: 597-599.
- Kraeling, C. H. (ed.)
1938 *Gerasa City of the Decapolis*. New Haven.
- Ostrasz, A.
1989 The Hippodrome of Gerasa. Pp. 51-78 in *JAP II* (Syria 66). Amman / Paris: Department of Antiquities and IFAPO.
- Parapetti, R.
1983-84 Architectural and Urban Space in Roman Gerasa. Pp. 37-84 in *Mesopotamia XVIII-XIX*. Firenze.
1989 Scavie restauri italiani nel Santuario di Artemide 1984-1987. Pp. 1-39 in *JAP II*, (Syria 66): Amman / Paris: Department of Antiquities and IFAPO.
1997 The Restoration of the Propylaeum of the Sanctuary of Artemisin Jarash. Pp. 109-114, in *SHAJ VI*. Amman: Department of Antiquities.
- Seigne, J. and Morin, T.
1995 Preliminary Report on a Mousoleum at the Turn of the BC/AD Century at Jarash. *ADAJ* 39: 175-192.

12. Such a misplacement, that I thought correct at first sight, brought about my wrong recons-

truction on paper (Parapetti 1983-84: 46, Cw2, elevation in *TAV*. IV, C w 2, Cw3).

LA PEINTURE DUN TOMBEAU À AS-SALT

par

Claude Vibert-Guigue

Introduction

A la suite de G. Schumacher qui explora la région de as-Salt en octobre 1891,¹ R. de Vaux a signalé dans un article publié en 1938 l'existence d'un groupe de tombes au sud du Tall de as-Salt, au lieu-dit Sara, dans le Wādī Shadjara.³⁷⁰ L'auteur précise : "Parmi elles se distingue une grotte aménagée, qui a dû servir de chapelle funéraire à l'époque byzantine. Elle appartient aux Grecs orthodoxes, qui ont devant elle un petit cimetière... Les parois étaient recouvertes d'un enduit avec des peintures ; on reconnaît encore sur la paroi de gauche un personnage à mi-corps et un bras."

Le développement urbain que connaît la ville de as-Salt depuis 1950 aurait pu faire croire à la disparition de cette peinture. Il n'en est rien puisque les descriptions anciennes correspondent à ce que l'on peut encore voir sur place.³ De la calcite recouvre le lambeau de peinture mais un relevé de ce dernier, sans nettoyage ni restauration, a permis de reconnaître des décors supplémentaires. Ce relevé *in situ* est à l'origine de cet article qui a pour objectif principal de rappeler l'existence d'un témoig-

nage pictural unique à ce jour à as-Salt.⁴

Description du lieu

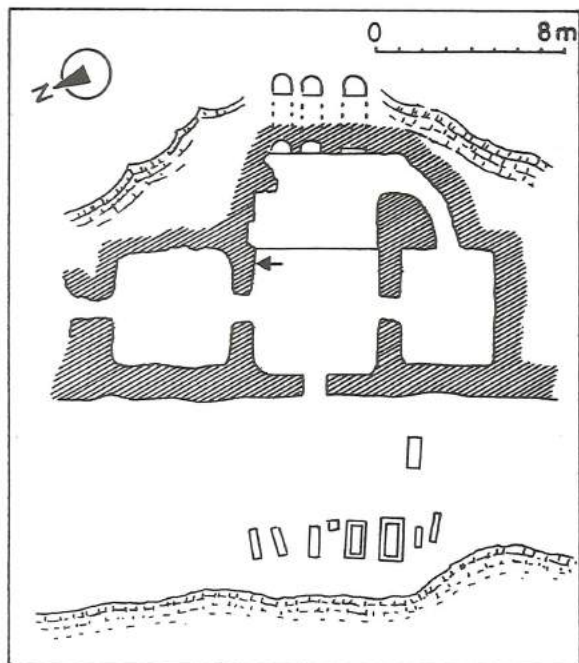
Le tombeau s'élève à la sortie de la ville, sur la rive est du Wādī Shadjara qui descend vers la vallée du Jourdain et qui devient ensuite le Wādī as-Salt. Il fait partie d'un groupe de tombes annonçant l'une des nécropoles de l'ancienne cité de as-Salt. Encore en élévation, ce tombeau a la particularité d'être à la fois construit et creusé dans le rocher (Fig.1).

L'entrée du monument considéré comme un mausolée par Schumacher est constituée d'un encadrement en pierres calcaires travaillées en *fasces*. Le tout est coiffé d'un linteau orné de godrons verticaux parallèles. Cette porte ouvre sur une salle construite, presque carrée et faisant environ 30 m² (Fig. 2). Elle est couverte d'une voûte en berceau appareillée. Une corniche en pierre couronne les parois constituées de blocs bien ajustés. Deux arcs sont aménagés sur les côtés. D'un diamètre proche de 2,50 m et de nos jours bouchés, ils correspondraient à des *arcosolia* (Fig. 3).

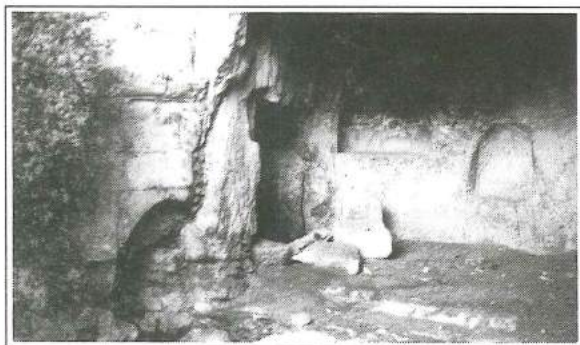
L'analyse architecturale de ce tombeau est rendue délicate en raison d'une seconde

1. G. Schumacher, Es-Salt, ZDPV XVIII, 1895: 65-72.
2. R. de Vaux, Exploration de la région de Salt, Chronique, RB 47/ 3, 1938 : 398-425. Plus récemment cette peinture a été signalée par D. Homès-Fredericq et J.B. Hennessy, Archaeology of Jordan, II. 2, Akkadica, sup. VIII, 1989. A la page 549, on lit : "A byzantine burial chapel which G. Schumacher first described in 1895 had in it paintings and human remains."
3. Nous avons retrouvé le tombeau en juin 1980 et confirmé la présence d'un enduit peint. En septembre 1981, nous avons réalisé un relevé

- sur feuille plastique transparente à l'échelle réelle, reprenant les grandes lignes du décor sans les lacunes. En juillet 1989, aidé par Pierre-Louis Gatier, un second facsimilé a pu être fait. Des détails ont été notés grâce à une meilleure lumière.
4. Du fait de l'état général du décor et de la difficulté de le photographier, il a paru inutile d'en publier ici un cliché en noir et blanc. Un nettoyage de surface pourrait un jour se révéler suffisant pour des prises de vue en couleur: lui seul pourrait confirmer l'interprétation graphique proposée dans cet article.



1. Facsimilé du plan du tombeau publié par G. Schumacher (1895: fig. 3). Ce plan ne fait pas la différence entre la partie construite et la partie taillée dans le rocher. La flèche noire indique la plaque d'enduit peint.



2. Vue intérieure du tombeau : extrémité de la paroi avec peinture (à droite du caprier) et fond de la grotte.



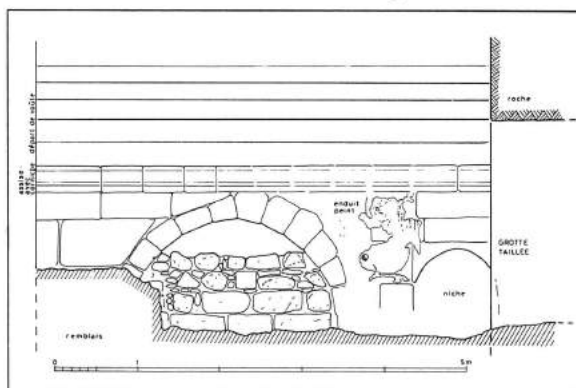
3. Vue intérieure du tombeau : détail de l'arc ouvert dans la paroi avec peinture.

salle creusée dans le rocher. En pénétrant plus en profondeur et après avoir passé deux marches, on arrive dans une grotte bien taillée. De forme quadrangulaire, elle est légèrement moins profonde que la première salle et la paroi supérieure taillée est plate. Trois niches sont creusées dans la paroi du fond. Arquées, elles ont des fonds arrondis ou plats. Par ailleurs, d'après le plan de Schumacher, des passages conduisaient dans des chambres latérales. Ces aménagements rupestres ont amené R. de Vaux à voir ici un tombeau antique réutilisé à l'époque byzantine: il était conforté dans cette idée par la présence de deux croix gravées.

La seule plaque d'enduit peint se trouve sur la paroi gauche en entrant dans la première salle, à peu près au niveau de l'écoinçon droit de l'arc (Fig. 4). Un peu d'enduit, sans peinture, est conservé dans la grotte, sur la partie gauche de la paroi du fond. Contrairement à ce que signale R. de Vaux, il est impossible d'affirmer que toutes les surfaces du monument construit et de la grotte taillée étaient enduites et peintes.

L'enduit peint

La plaque d'enduit peint fait 0,5 cm d'épaisseur. Le mortier est appliqué avec soin et vient au contact du bas de la corniche moulurée. Le motif figuré est peint à l'intérieur d'un cadre rectangulaire de 101



4. La paroi du tombeau à gauche en entrant. Dessin de l'état actuel restitué d'après quelques mesures prises sur place et des photographies.

cm de haut et 86 cm de large délimité à droite, à gauche et en bas par une bande rouge large de 5 cm, partiellement conservée. L'angle inférieur droit du cadre touche l'ouverture d'une niche. Le tiers supérieur du champ garde des couleurs et un vestige de décor subsiste au bas du panneau. La description de la peinture commence par le buste, se poursuit par le motif à droite du personnage et s'achève par le bas de la composition (Fig. 5).

Le buste

La partie la mieux conservée du décor présente le haut d'un personnage dont il ne reste du visage que la forme du menton cernée d'un trait. Une petite zone sombre du côté droit indique une chevelure noirâtre. Sur le buste, une quinzaine de traits rouges fournissent des indications sur les vêtements. On devine une tunique à col rond qui laisse apparent le départ du cou. L'encolure est marquée par un trait rouge d'où partent vers le bas six traits verticaux parallèles et de même couleur. Un manteau recouvre la tunique. Du côté gauche, des traits courbes et rouges convergent vers un point au centre du buste. La symétrie des plis du côté droit existe mais elle est mal conservée. Au point de convergence des lignes, une lacune ainsi qu'une usure de l'enduit ne permettent plus de voir s'il y avait un système pour retenir les pans du vêtement, par une épingle ou par une broche par exemple. Deux traits croisés sur le bras à droite ainsi que sur la tunique attestent un décor plus compliqué que celui actuellement visible. Sur le bas, la trace des tissus disparaît dans les lacunes. Ce n'est qu'au niveau de l'avant-bras droit représenté à l'horizontale qu'apparaissent d'autres indices vestimentaires. L'avant-bras se devine facilement ainsi que la main. Les quatre doigts sont collés, le pouce a disparu. La manche de la tunique est serrée au poignet. Une série de fines lignes indique un décor de tissu soigné. Un trait plus long se poursuit vers le bas. Au-delà de la main, il y

a des lignes dont on cerne mal le sens. Seul un trait noir à l'oblique se distingue de l'ensemble par sa forme régulière. Un autre segment de trait similaire se poursuit derrière l'épaule du personnage. En tirant une ligne, on remarque que ces traits appartiennent à une même droite. Il s'agirait d'une lance tenue dans la main gauche de la figure. La main droite a disparu.

Derrière l'épaule gauche du personnage se développe une bande courbe de 2,5 cm d'épaisseur et cernée de noir à un endroit. Cette bande démarre du haut de l'épaule pour retomber en un cercle imparfait derrière le coude du bras. Une éventuelle symétrie à cette forme n'est plus vérifiable, l'enduit ayant disparu à gauche de la tête. Seul le départ d'un trait courbe à gauche du cou laisse supposer un développement semblable. Mais ce n'est qu'une hypothèse, car le trait conservé semble s'incurver du côté de la tête, comme s'il y avait ici le départ d'une auréole.

Le motif à droite du buste

On remarque un bandeau courbe, bordé de rouge et de noir et garni de ronds de couleur ocre rouge sur un fond ocre jaune. Des deux extrémités partent des lignes allant du côté gauche comme du côté droit. Les premières, fines et de couleur noire, vont en s'écartant l'une de l'autre. Leur finesse suggère des tracés préparatoires réapparus sous la peinture, ici usée. Au bas de cette forme qui s'évase, débute une bande de couleur ocre jaune, légèrement courbe. Les autres lignes, du côté droit cette fois-ci, sont plus épaisses et rouges. On les suit sur le bas, là où se dessine une forme fermée. A cet endroit, des traits sont mal conservés. Notre impression est d'avoir ici une forme animée, peut-être celle d'un animal.

Le décor en bas de composition

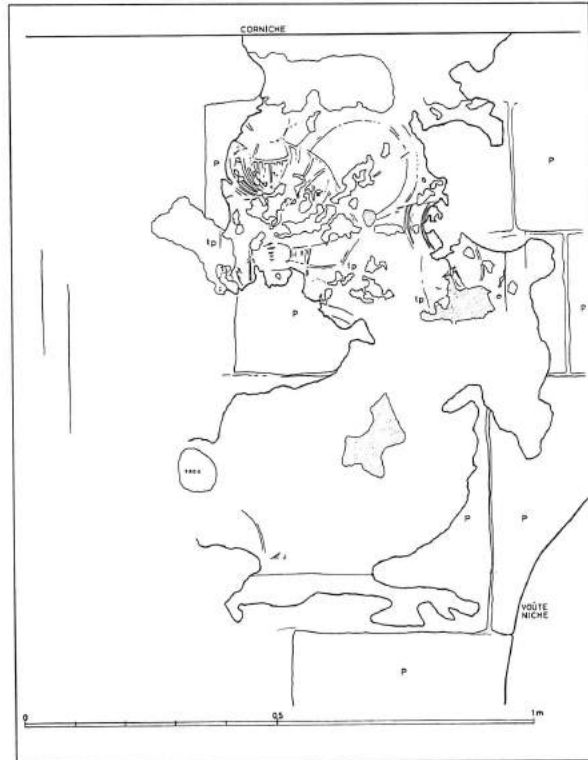
Le décor est détruit mais quelques coups de pinceau se devinent encore. Ils prouvent que la peinture figurée descendait jusqu'au

bas du panneau.

Analyse picturale et essai de restitution du décor

Cette peinture est lacunaire, usée et partiellement recouverte de calcite. Il est cependant possible d'en analyser plusieurs aspects. Le peintre a utilisé des tracés préparatoires. A ceux sinueux signalés plus haut, ajoutons un trait de couleur grisâtre, vertical et imprimé dans l'enduit grâce à une ficelle. Il se situe à gauche de la main du personnage. Il ne correspond à rien de précis par rapport au décor conservé. Il peut s'agir d'un trait de proportion, puisqu'il délimite une bande verticale dont la largeur atteint le tiers de la largeur totale du panneau. La qualité de la peinture est bonne et le peintre a eu le souci de bien réaliser un décor, sans doute plus détaillé qu'il ne l'est actuellement. Les couleurs ocrées dominent la composition. Le bleu et le vert n'apparaissent pas sur la partie conservée, du moins dans son état actuel, ni nettoyé et ni restauré.

Le buste reconnu par R. de Vaux est encore visible et le cadre rouge que nous avons repéré permet d'amorcer une restitution intéressante (Fig.6). Ce cadre révèle que le buste occupe la partie haute du panneau et que nous avons là un personnage vu en entier. Ses jambes ont disparu mais la bande jaune remarquée sous le bras rappellerait le passage de la cuisse droite du personnage. C'est peut-être à un détail vestimentaire du même type qu'appartiendrait la bande de couleur faisant une boucle au-dessus de l'épaule droite du personnage. On pense à une cape flottante mais l'hypothèse d'un objet suspendu au dos n'est pas non plus exclue. Par ailleurs, la position décalée du personnage, à gauche du panneau, invite à deviner devant lui un autre élément dans la composition. Il s'agirait d'un cheval dont il y aurait ici la tête. Les traits observés en bas de la composition appartiendraient aux jambes et aux sabots de l'animal.



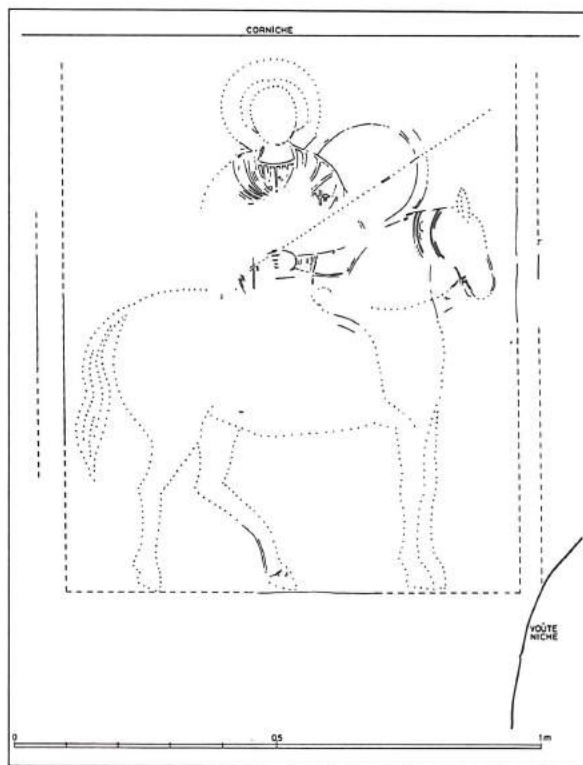
5. État actuel de la zone enduite et peinte. La lettre "P" désigne les pierres. Les tracés préparatoires sont signalés par l'abréviation "tp".

Nous serions en présence d'un cavalier à tête nimbée, vêtu d'une tunique couverte d'une cape, tenant une lance et montant un cheval harnaché. Avec moins de certitude, on pourrait suggérer qu'il porte dans son dos un bouclier.

Essai d'interprétation de la peinture

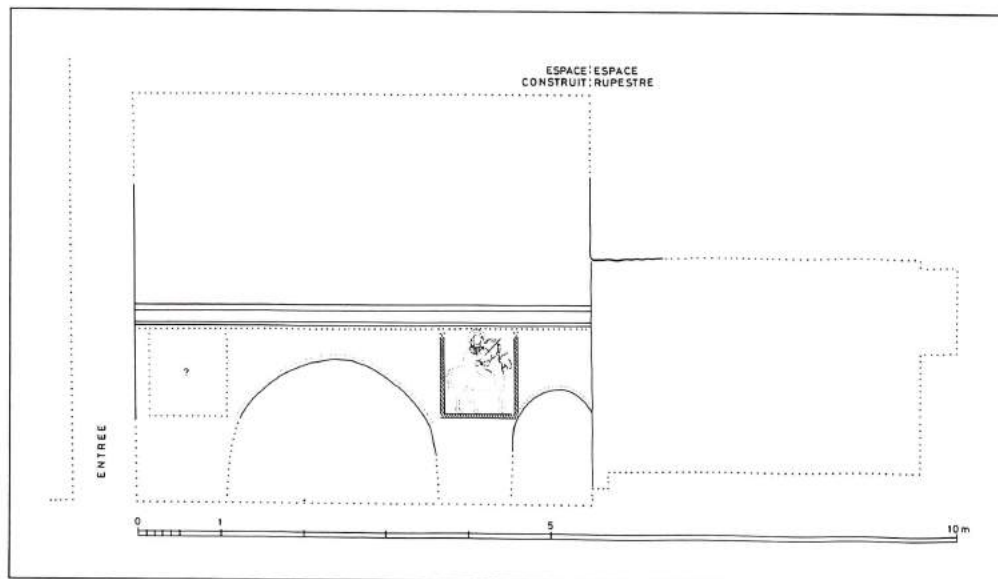
Des empereurs romains déifiés jusqu'aux effigies équestres, saints cavaliers ou militaires, de l'époque byzantine, le thème du cavalier est courant dans l'iconographie classique. Les représentations de saints vainqueurs d'animaux monstrueux sont également fréquentes, comme celle de Saint Georges terrassant le dragon. Cependant, à as-Salt, la frontalité du buste caractérise le sujet. L'absence de mouvement donne à la scène un caractère solennel et religieux.

Le problème est de savoir si cette peinture était isolée ou bien inscrite dans une composition picturale couvrant l'ensemble du monument. La position de l'enduit peint sur la paroi permet de restituer six panneaux



6. Les vestiges de peintures sans les lacunes. Les lignes en pointillés suggèrent une restitution du décor.

semblables, de quatre-vingt-dix centimètres de largeur. De plus, le panneau conservé étant en retrait par rapport à l'écoinçon droit du grand arc élevé dans la paroi, il est pos-



7. Élévation schématique et restituée de la paroi à gauche en entrant. Ce dessin rappelle les proportions du décor peint conservé, tout en suggérant une organisation du décor dans l'hypothèse où un enduit couvrait toute la surface murale.

5. Ce type d'installation se retrouve souvent dans les tombeaux rupestres romains de la région. Face à l'entrée, la paroi du fond de l'hypogée peut être légèrement surélevée afin de mettre

sible d'imaginer deux panneaux rectangulaires entre lesquels il y aurait eu les espaces des écoinçons, soulignés en rouge par exemple. Un troisième panneau aligné sur les précédents aurait coiffé la petite niche à l'extrémité de la paroi. Des imitations de marbres pourraient avoir décoré les surfaces en bas des deux premiers panneaux figurés. Il faudrait alors imaginer quatre figures réparties sur deux parois en vis-à-vis (Fig.7).

La transformation du monument nous interroge également. On imagine que la salle principale d'un tombeau romain construit et à deux *arcosolia*, complété par un espace funéraire rupestre légèrement surélevé,⁵ a été réutilisée à l'époque byzantine. Il y aurait eu alors quelques modifications dans le fond du monument et sur les côtés. Cela sans doute afin de mieux circuler dans cette nécropole devenue chapelle, ermitage ou cimetière. Mais à quelle époque appartient le cavalier peint ? Il ne subsiste pas d'indices archéologiques permettant d'affirmer que le décor remonte à l'Antiquité ou au Moyen Age. L'hypothèse que ce décor a été laissé dans son état à la période paléochrétienne

en importance les sépultures les plus honorées. Le traitement de la paroi du fond en alcôve personnalise ces sépultures, les corps souvent déposés dans de beaux sarcophages.

ne peut pas non plus être écartée.

Conclusion

Il subsiste assez de détails sur cette peinture pour signaler à nouveau sa présence, arriver à une restitution graphique partielle et proposer un début d'interprétation. Modeste, ce témoignage est à replacer dans le domaine de la peinture murale funéraire ou religieuse en Jordanie. Les vestiges de peinture d'époque byzantine restent peu nombreux⁶, comparés à ceux de l'époque romaine ou omeyyade. L'exemple de as-Salt est d'autant plus intéressant à noter qu'il soulève le problème du passage du monde romain au monde byzantin et du rôle de

l'image dans ce contexte nouveau, celui d'un tombeau païen réutilisé dans un lieu religieux chrétien. Seule une exploration systématique de la nécropole en bordure du wadi permettrait de mieux situer ce témoignage. Aussi réduite soit-elle, cette peinture témoigne des croyances d'un monde bien vivant qui peuplait l'ancienne Gadara de Pérée, dont les murs seraient représentés sur un pavement d'église du début du VIII^e siècle à Ma'in.⁷

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6. Voir un tombeau peint trouvé à Amman en janvier 1981. Fawzi Zayadine, *Jebel el Jôfeh: Une tombe byzantine peinte*, *Chronique archéologique, Syria*

62, 1985: 153.

7. Michele Piccirillo, *Les mosaïques de Jordanie*, 1993: 35.

THE ROMAN 'AQABA PROJECT: THE 1996 CAMPAIGN

by

S. Thomas Parker

Introduction

The second campaign was conducted from May 16 to July 4, 1996 under a permit from the Department of Antiquities.

The field team consisted of 16 staff members, 32 students, and 75 Jordanians: Sawsan Fakhiry, Inspector of the 'Aqaba Region, again participated as representative of the Department of Antiquities. Other senior field staff included Christopher Gregg as assistant small finds specialist, Nelson Harris as assistant camp manager, Mary Mattocks as landscape architect, Joann McDaniel as small finds specialist and registrar, Tina M. Niemi as geologist, S. Thomas Parker as director, stratigrapher, and ceramicist, Megan Perry as human osteologist, John Rucker as camp manager, Colleen Shannon as architect and surveyor, Andrew M. Smith II as director of the survey, Jonathan Tedder as photographer, and Peter Warnock as archaeobotanist. Area supervisors were Jeff Blakely (Area B), Mary Louise Mussell (Area J), Megan Perry (Area A), Alexandra Retzleff (Area M), and Joseph Stumpf (Area K). Senior staff not in the field in 1996 included John Betlyon as numismatist, Vincent Clark as Semitic epigraphist, Dorianne Gould as a small finds specialist, Janet Jones as glass specialist, David Reece as shell specialist, Michael P. Speidel as classical epigraphist, Michelle Stevens as lithics specialist, and Michael Toplyn as faunal analyst. Blakely also offered invaluable assistance in field analysis of the ceramics.

Student staff serving as trench supervisors included Jennifer Beaver, Claudia Christen, Nathan Craig, Elena Dodge, Susan Gelb, Catherine Goodman, Geri Greenspan, John Haynick, Susan Hull, Kristine John-

son, Ellen Kenney, Klaus Krohn, Joanne Laird, Christopher Lambert, Elizabeth Ann Pollard, Kimberly Mastenbrook, Linda McRae, Shannon McCormick, Erko Mikola, Sarah Morgan, Kim Nguyen, Jane Oltmann, Brian Overton, Michael Orr, Kenyon Reed, Angela Roskop, and Chaffee Viets. Sabina Mirabelli was assistant architect/surveyor. Carol Frey, James Christian Giercke, and Heather Walters served on the survey. Elizabeth Ann Pollard was pottery registrar. Claudia Christen supervised field processing of faunal remains, including shell. Elena Dodge and Joseph Stumpf supervised field processing of glass.

Regional Survey

Although the project's main focus is the classical period, all sites of all periods were recorded.

In 1996 another 73 archaeological sites were recorded by the survey. The number of sites recorded during the first two seasons now totals 234. Of the 73 new sites visited in 1996, 39 yielded pottery sherds, 23 produced lithics, and 17 yielded both sherds and lithics from the surface. Some 25 sites produced no surface artifacts. In 1996 the periods best represented in preliminary analysis of the collected artifacts were Chalcolithic/Early Bronze (31 sites) and Early Roman/Nabataean (15 sites). There was much more limited evidence for other periods, including Neolithic, Byzantine, and Early Islamic. These sites are diverse in nature, ranging from isolated graves to large cemeteries and from single stone rings to complexes of structures. A structure near the mouth of Wādī al-Yutm apparently was designed to monitor traffic moving along

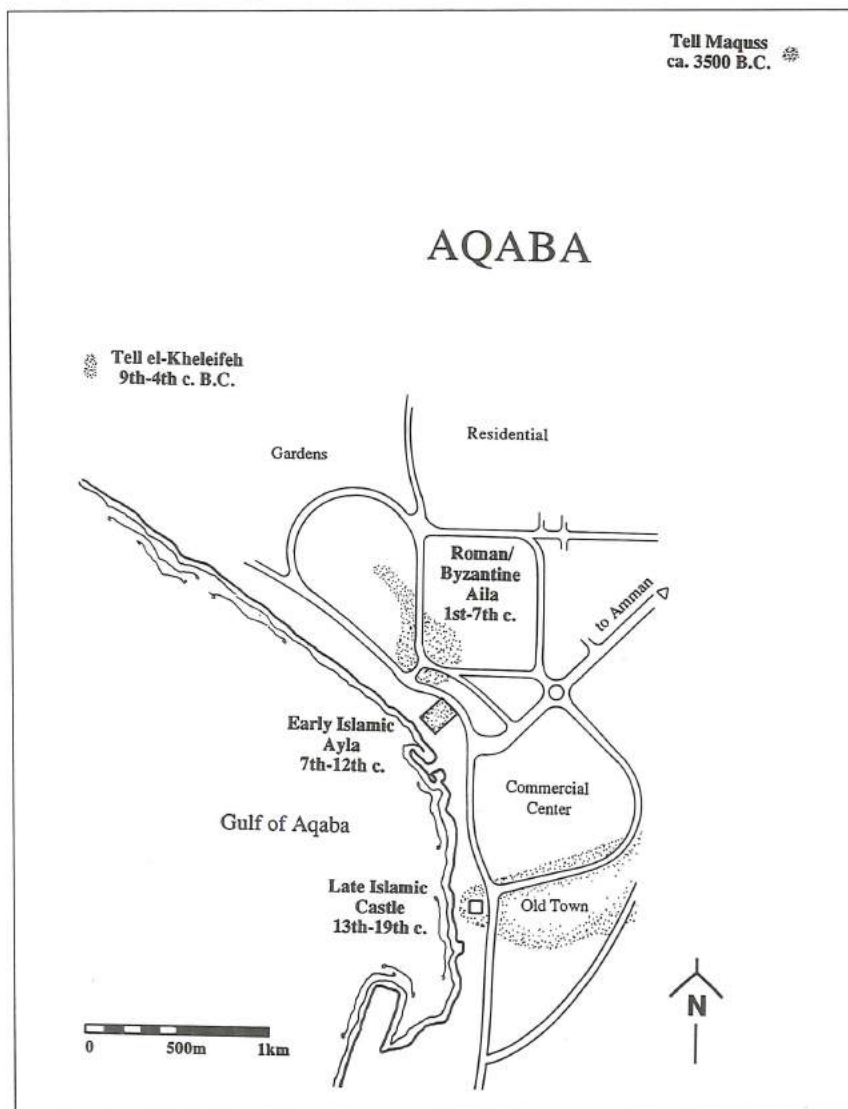
the *via nova Traiana* north of Aila.

The principal Iron Age and Persian period site visited was Tall al-Khalayfi (Fig.1), from which a surface ceramic sample of 824 sherds was collected. Analysis of the pottery supported Pratico's suggested date for the site, that is with occupation beginning in Iron IIB/C and continuing through the Persian period. Although only four sherds were dated Hellenistic, these included a stamped Rhodian amphora handle. This was notable in light of another Rhodian amphora handle dated ca. 200 BC from the surface of al-Khalayfi (Pratico 1993: 62). This suggests some kind of occupation at al-Khalayfi continuing into the early Hellenistic period (332-63 BC), es-

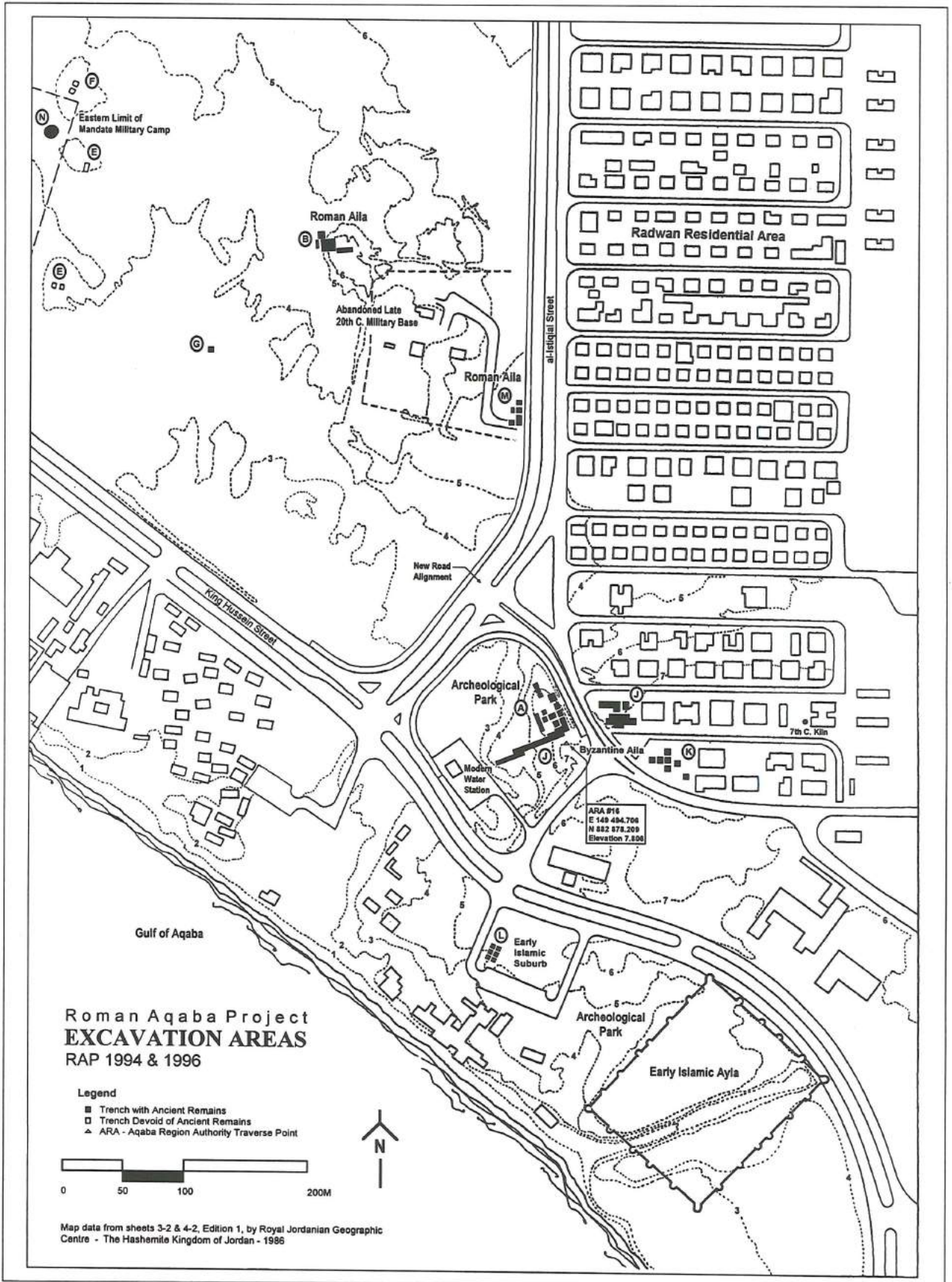
pecially since the current excavations of Aila have thus far yielded no evidence earlier than the first century BC.

Excavation of Aila

Excavation in 1996 continued in all six areas which had proven productive in 1994 (Fig. 2). These excavation areas extended from the Circular Area to near the beach, just west of Early Islamic Ayla. The only new area opened (Area N) was a geological probe in the central Circular Area, which yielded some important archaeological evidence. The following discussion of these excavation areas will proceed from north to south, which also corresponds roughly with the chronological order of the remains.



1. Map of the modern city of 'Aqaba, with ancient and medieval archaeological sites.



2. Excavation Areas of the Roman 'Aqaba Project, 1994-1996.

Area N and the Circular Area. Because the 'Aqaba Regional Authority intends to develop the Circular Area, the search continued for evidence of cultural remains to guide development in this area. In 1994 a series of soundings (Areas C, D, E, F) and trenches excavated by mechanical equipment to a depth of up to 3.5 m had failed to recover ancient remains. But scatters of Roman pottery over the surface of the Circular Area and excavation of a mud-brick slump in one mound (Area G) suggested the possibility of significant ancient remains in the Circular Area. Further, excavation in 1994 of a mound (Area B) near the eastern edge of the Circular Area had yielded mud-brick structures and other evidence of the Early and Late Roman periods (Parker 1996: 241-43).

Therefore, and in light of impending development, more probes were excavated by mechanical equipment in the Circular Area. Probes of the northern Circular Area revealed alluvial fan sediments apparently sterile of human occupational remains, although it is possible that these lie at greater depths (i.e. more than 2-3m below the modern ground surface). It now seems that, as Meloy suspected, most if not all the mounds of the Circular Area contain remains of ancient structures.

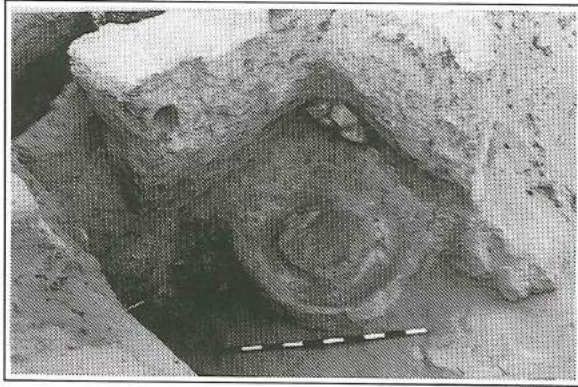
After abandonment the collapsed remains trapped wind-blown sand which covered and created the mounds. The low-lying areas between the mounds seem devoid of structures. But microscopic analysis of sample sediments revealing tiny fragments of charcoal, shell, bone, and possibly mud-brick, suggest redeposition or coeval deposition of cultural material. Some of these deposits may be agricultural soils.

A large existing bulldozer trench excavated up to 3 m in depth by others was studied by cutting back its existing balk sections (Area N). Here were several thick beds of natural clay with evidence of mining in antiquity. A pottery sample of ca. 1,000 sherds from these clay pits was entirely Ear-

ly Roman/Nabataean. This evidence, combined with the ceramic slag and Early Roman/Nabataean kiln wasters from Area M discussed below, suggests that these clay beds were exploited for a local pottery industry in the Early Roman period.

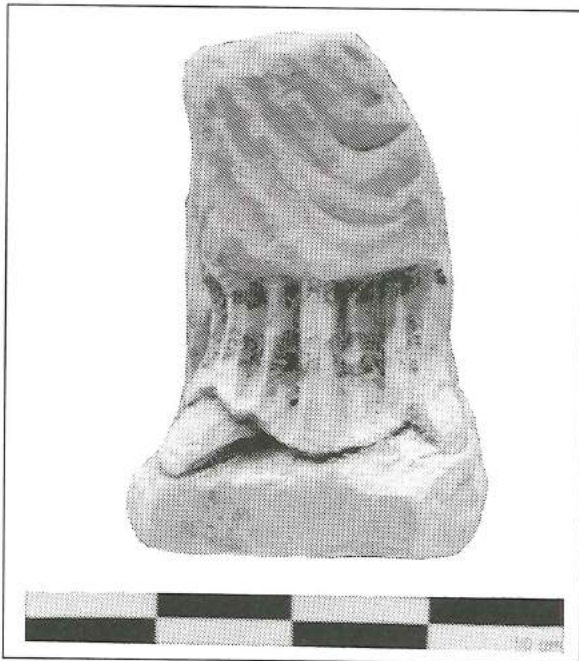
Area B. In 1994 this mound in the eastern Circular Area produced evidence of Late Roman mud-brick structures, with hints of an earlier (Early Roman/Nabataean) phase. In 1996 excavation continued in all three trenches opened in 1994 (B.1-3) and in three new trenches (B.4-6). These six trenches were laid out to complete an E-W section through a large portion of the mound. All six trenches reached the natural alluvial fan, thus providing a complete profile of occupation of the mound. It was originally occupied in the Early Roman/Nabataean period, when mud-brick structures, apparently domestic in nature, were constructed in the first century AD. Some walls were standing nearly 2 m high in places. Pottery included 247 sherds of terra sigillata, mostly Eastern Sigillata A. These structures were abandoned in the late first or early second century AD, then quickly filled with wind-blown sand.

The mound was soon reoccupied in the Late Roman period, perhaps as early as the mid- to late second century AD, when new mud-brick structures were erected. Some were founded on wind-blown sand, others atop the surviving walls of the Early Roman/Nabataean period. During three phases of Late Roman occupation the original structure was expanded twice by adding rooms to the southern end of the complex, creating a building of at least three rooms by the end of this period (see the plan in Parker 1996: 242, Fig. 5). Late Roman occupation in Area B also witnessed intensive baking activity, as evidenced by many ovens (*tawābin*) and the foundations of two circular installations interpreted as foundations for flour mills (Fig. 3). Among the



3. Foundation of a plastered circular installation (flour mill?) in the corner of a room in Trench B.1. View to SE (photo by Jonathan Tedder). B69-6.

more significant finds was a painted sandstone statuette of a Roman matron (Fig. 4), apparently of local manufacture. The statuette is Roman provincial in style and seems to date to the late second or early third century. Occupation clearly extended into the fourth century, as reflected by a handful of African Red Slip sherds and a few fourth century coins recovered near the surface. Two sixth century coins (one unstratified) from Area B in 1994 might suggest some human presence in the Late By-



4. Fragment of sandstone statuette of Roman matron from a Late Roman context in Area B. Traces of red paint are visible on the lower drapery (photo by Jonathan Tedder). B87:20-25.

zantine period, but the absence of sixth century pottery from Area B suggests the coins are stray finds. Area B was then largely abandoned until disturbed by modern military trenching.

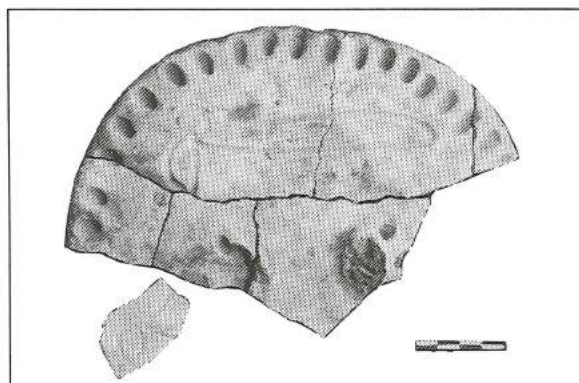
Area M. This lies on the west side of al-Istiklāl Street on the eastern edge of the Circular Area (Fig.2). Excavation of three trenches (M.1-3) in 1994 revealed a mud-brick complex with rich cultural remains. Occupation began in the Early Roman /Nabataean period and continued in the Late Roman period, perhaps with an intervening period of abandonment (Parker 1996: 243-44).

Whereas work in 1994 produced a vertical stratigraphic profile of occupation in this area, excavation in 1996 aimed for horizontal exposure, specifically to elucidate the plan of the later (Late Roman) occupation. Therefore this area was expanded to six trenches (M.1-6; cf. Fig. 5). Excavation suggested that the Late Roman complex was founded after a period of abandonment of at least the southern portion of the Early Roman/Nabataean complex (M.1, M.5, M.6), perhaps in the second century. The Late Roman structures extended throughout Area M and seemingly beyond. The walls were mostly mud-brick, with some use of stone. Some walls were built of both brick and stone, with stone masonry courses atop mud-brick, such as the wall extending from M.1 into M.5. Several *ṭawābin* were excavated, including a line of four such ovens built against a wall in one trench (M.2). An important discovery was a jar filled with natural clay (like that from Area N described above) in the east balk of trench M.4 (Fig. 5). This, combined with much ceramic slag and kiln wasters, suggested the continuation of local pottery production in the Late Roman period. A complete wheel-made lamp and several other Egyptian lamp fragments (so-called 'frog lamps') attest connections with Egypt in this period. A notable find was a mirror handle of iron and

ivory, clearly an import. Occupation seems to have ended in the fourth century AD as attested by a few African Red Slip sherds and fourth century coins found at or near the surface. Later several intrusive human burials were laid into pits among the mud-brick structures.

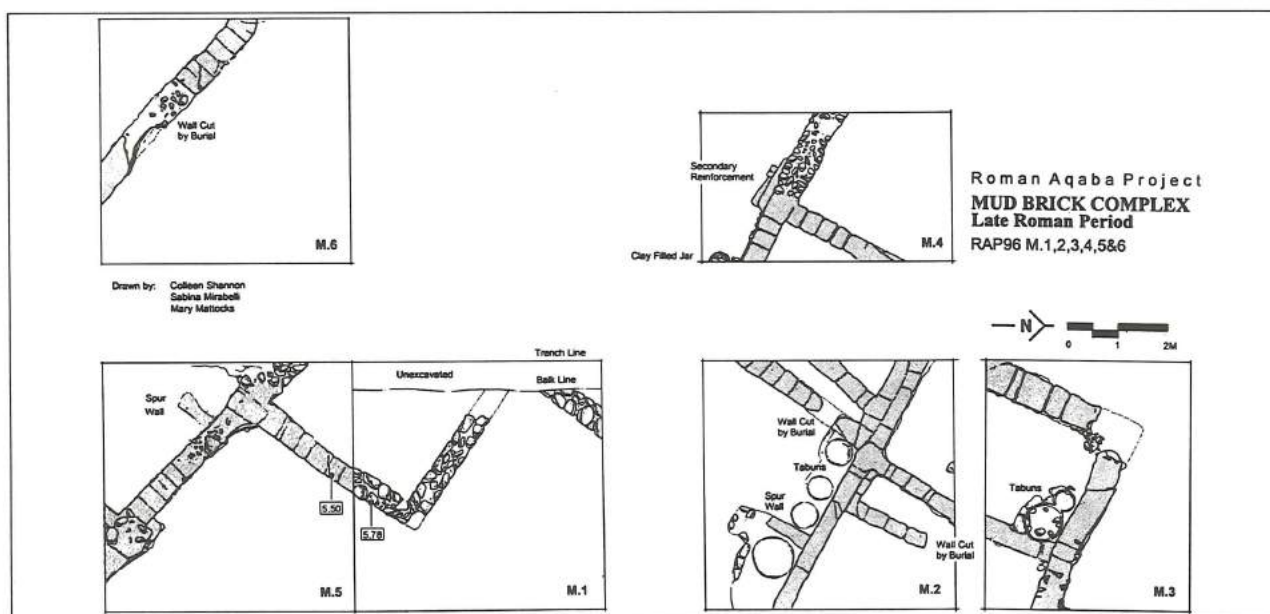
Area A. This lies ca. 300 m south of Area M and also just west of al-Istiklāl Street (Fig. 2). Excavation in nine trenches (A.1-9) in 1994 had revealed several phases of occupation extending from Late Roman to Early Islamic. Excavation in 1996 continued in three of the 1994 trenches (A.1, 8, 9) and in three new trenches (A.10-12) to further elucidate these remains.

The earliest evidence of occupation in Area A in 1996 was again from A.8, one of three trenches (A.8-10) opened in the bottom of a cut excavated by mechanical equipment in 1994. A.8 yielded Late Roman domestic evidence, including two L-shaped stone walls, a *tābūn*, and a clay-built coping structure, apparently for storage. Among the notable finds was a ceramic lid decorated with two incised phalli (Fig. 6). About half the lid was recovered lying face down in a *tābūn*, where it was deposited after being



6. Reconstructed fragments of a ceramic lid with incised phalli from Trench A.8 (photo by Jonathan Tedder).

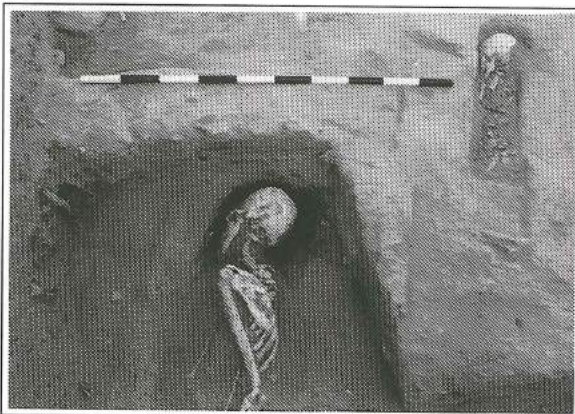
broken. It is of coarse fabric, hand-made, and probably of local origin. It is especially intriguing because of the apotropaic role of the phallus in Roman art. The lid might have originally sealed a large storage vessel whose contents were thought protected by the apotropaic qualities of the phalli. Excavation in A.8 reached the water table, where pottery from the deepest excavated locus suggested a transition from the Late Roman to Early Roman periods (second century AD). More stratified remains may well lie under the water table. Trench A.8 is thus far the only sector of the southern excavation areas (Areas A, J, K, and L) to yield stratified evidence of Roman occupa-



5. Plan of the Area M building complex in the Late Roman period.

tion.

In Trenches A.9-10 just to the north is a cemetery of the fourth century AD, overlying the Late Roman occupation described in A.8 above. Three simple mud-brick tombs, each with a single articulated skeleton, were excavated in 1994. In 1996 eight more tombs were excavated, for a total of eleven excavated tombs to date (Fig. 7). Two more tombs in the balk between trenches A.8 and A.9 remain unexcavated. Most of the tombs were constructed as follows: A vertical shaft ended in a pit with walls ca. 0.70 m deep. The lower walls of the shaft were lined with mud-brick to create a cist, with no prepared floor. The corpse then was placed in the cist. In some cases a mud-brick cap was built over the cist before the tomb shaft was back-filled. In one case the corpse was placed in a pit sealed by a mud-brick cap but lacking mud-brick walls. In three other cases the deceased were simply placed in simple pits without any structure. Preliminary analysis of skeletal remains suggests that the burials included two infants, two children, and seven adults. The cemetery population included three males, two females, and the rest of indeterminate sex. The tombs were largely devoid of grave goods, although associated pottery sherds and several coins support a fourth century date. Most of the tombs were

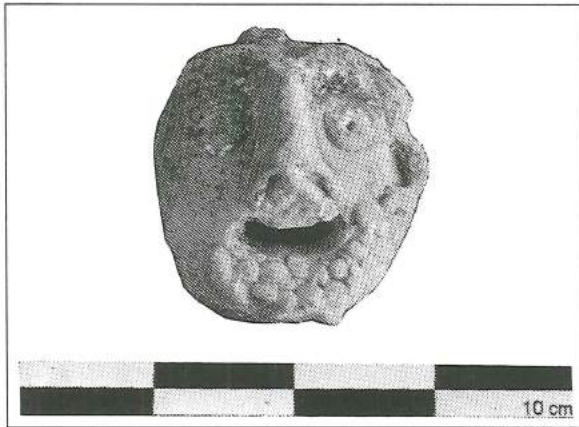


7. Two of the tombs from the 4th century cemetery in Area A. The upper right skeleton is a four year old child. The lower right skeleton is an adult male. View to west (photo by Jonathan Tedder).

oriented E-W on the same orientation as the contemporary mud-brick structure (church?) just to the east in Area J (discussed below). Thus it is tempting to associate this cemetery with the putative church.

The abandonment of the cemetery in the fourth century AD was followed by the deposition of thick layers of wind-blown sand. Then, during the Late Byzantine period (sixth/early seventh centuries), the area south of the cemetery was reoccupied by construction of a stone and mud-brick domestic complex, first discovered and elucidated in 1994 in Trenches A.1-7. In 1996 the stratigraphic relationship in Area A between the Late Roman/Early Byzantine phases in A.8-10 and the Late Byzantine/Early Islamic phases in A.1-7 was clearly defined by excavation of Trench A.11, located between these two sectors of Area A. This Late Byzantine domestic complex was apparently abandoned for about a century and then reoccupied in the late Umayyad or early Abbasid period (mid-eighth century). In 1996, excavation of this complex was confined to Trenches A.1 and A.12, primarily to understand its relationship with the stone-built structures just south in Area J (J.9-10), discussed below. Among the finds from A.1 was a miniature ceramic comic actor's mask (Fig. 8). The mask derived from a Late Byzantine context but may be earlier in date.

Area J. This area is located along both sides of al-Istiklāl Street (Fig. 2). The western sector lies immediately south of Area A; the eastern sector lies east of al-Istiklāl Street. Excavation began in the eastern sector in 1994 in Trenches J.1-8, where two major structures were discovered. The northern range of trenches (J.1-3) revealed a massive mud-brick structure of the Early Byzantine period (fourth century AD). This structure clearly extended to the south, where it was cut into and partly built over

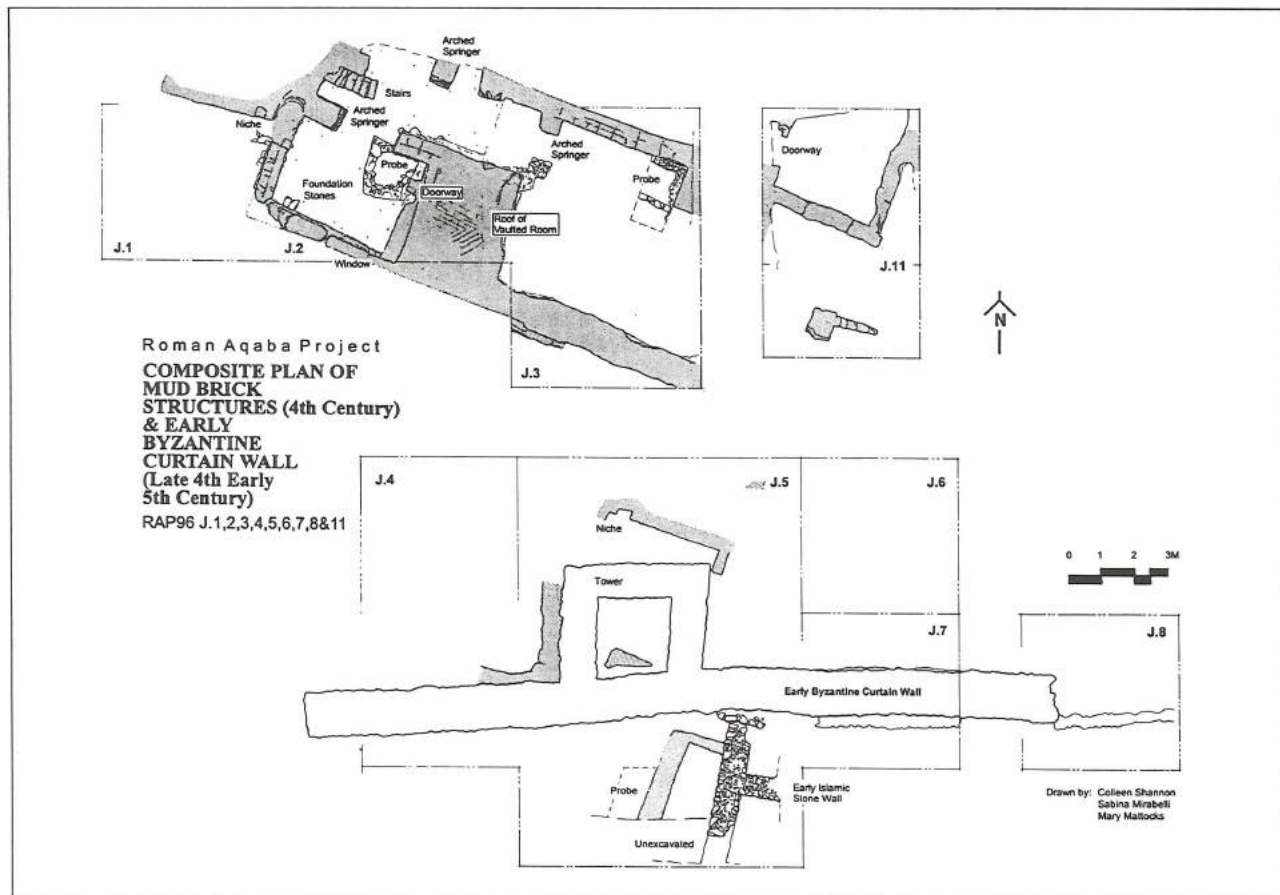


8. Miniature Comic actor's mask of handmade ceramic from Area A (photo by Jonathan Tedder).

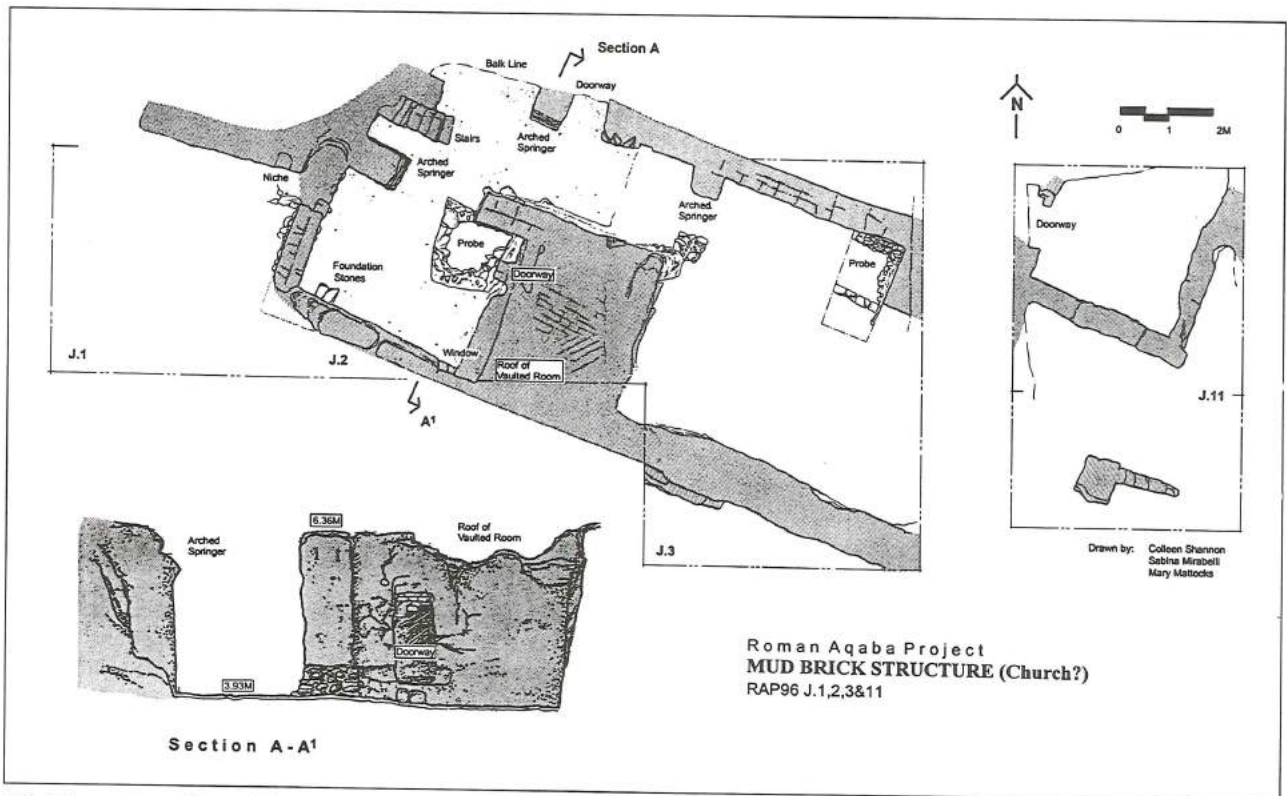
by a stone curtain wall and projecting rectangular tower in the late fourth or early fifth century, as exposed in Trenches J.4-7 (Fig. 9). This seems to be the city wall of Byzantine Aila. Late in the 1994 season two additional trenches (J.9-10) were opened west of al-Istiklāl Street to trace the city wall

westwards. These trenches revealed more of the Late Byzantine/Early Islamic domestic complex uncovered in Area A but failed to find the westward extension of the city wall. Thus, the goals in 1996 were to uncover more of the massive mud-brick building, identify its function, and continue to trace the city wall west of al-Istiklāl Street.

Excavation in 1996 revealed more of the plan and architectural details of the mud-brick structure in J.1-3 and in J.11, opened farther east along the line of J.1-3 (Fig. 10). Further, excavation in J.5 along the south face of the later city wall revealed that the mud-brick structure had once extended south of the later city wall. The mud-brick structure now seems to have measured at least ca. 22 m E-W by ca. 20 m N-S, oriented along an E-W axis. Some walls supported arched doorways and there was also evidence of vaulting within the structure. A



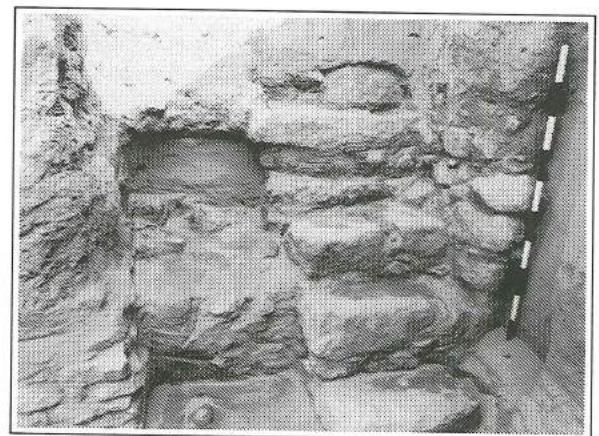
9. Composite plan of mud-brick structures (fourth century) and Early Byzantine Curtain Wall (late fourth/early fifth century).



10. Plan and section of fourth century mud-brick structure (church?) in Area J.

stone-built staircase in J.2 suggested the possibility of a second story (Fig. 11). The building yielded rich artifactual remains, including African Red Slip fine ware, fragments of glass lamps, metal objects, and over 100 coins. Some walls were decorated with painted plaster. The original floors seemed to have been largely robbed out, but appeared to have been composed of pavers of a concrete-like composite. The building seems to have been destroyed in the late fourth century, perhaps in the 363 earthquake. The partially collapsed walls were then quickly covered by wind-blown sand.

All this evidence, combined with the eastward orientation of the structure and associated cemetery in Area A, suggests that it was designed as a Christian basilica. Parallels for similar mud-brick Christian basilicas are known from Egypt. Many sherds of imported Egyptian amphorae from both the mud-brick structure and associated cemetery attest connections with Egypt and may even imply the presence of an Egyptian Christian community at Aila in the fourth



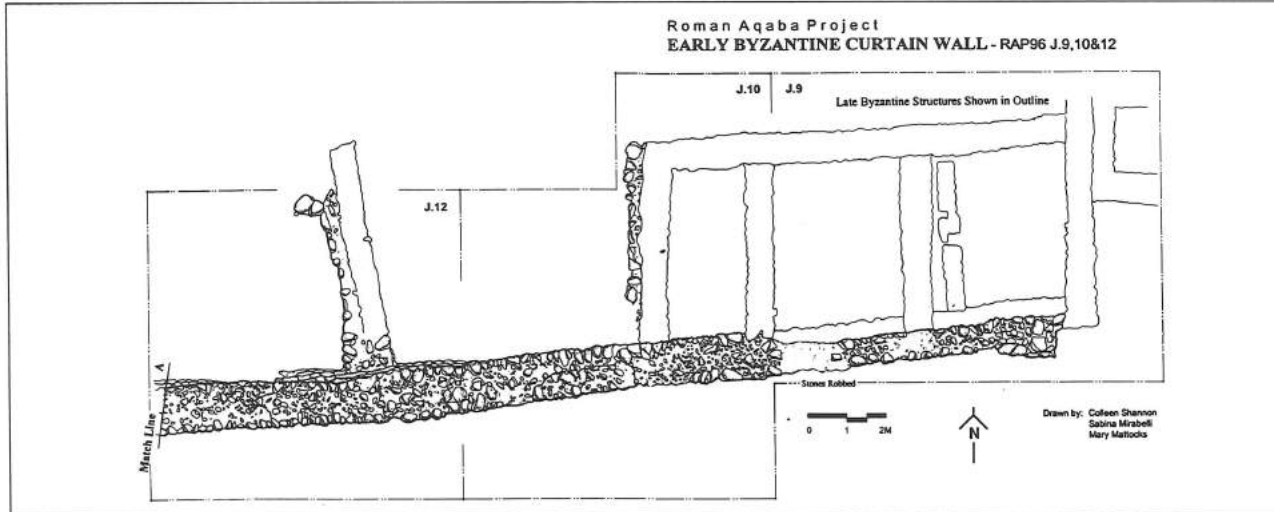
11. Stone staircase within the mud-brick structure in Area J. View to NW (photo: Jonathan Tedder).

century. A bishop of Aila is attested in documentary sources in 325. If this structure is in fact a church (and this remains unproven), it is the earliest church yet known in Jordan and one of the earliest known in the world.

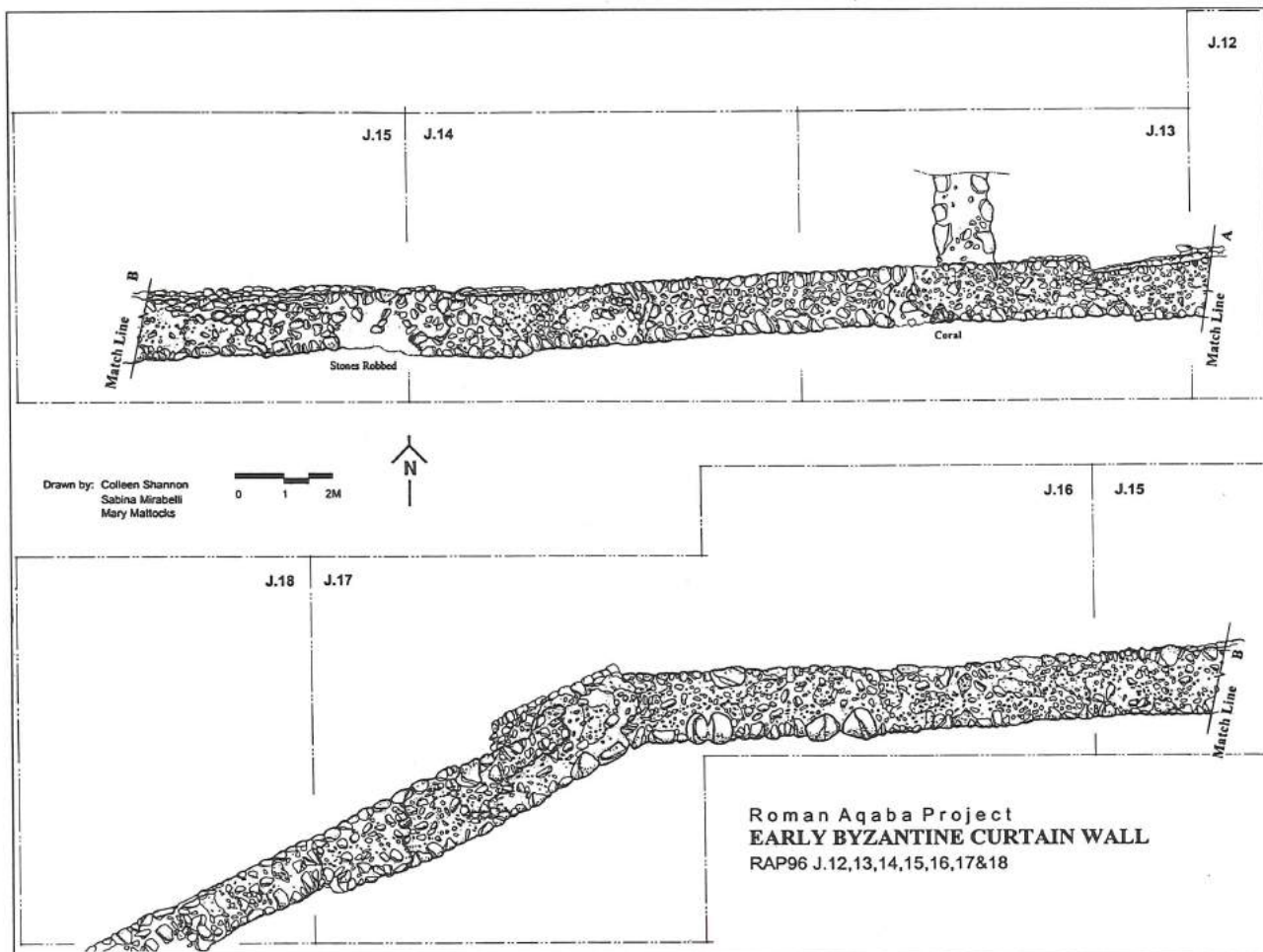
A ca. 30 m. segment of the Byzantine city wall east of al-Istiklāl Street was uncovered in 1994. This season excavation continued west of al-Istiklāl Street in Trenches J.9-10 (opened in 1994) and in Trenches J.12-18 (opened in 1996) west of

J.10. Excavation in J.9-10 revealed that the Late Byzantine/Early Islamic stone building had been partially built over and against the earlier city wall (Fig. 12). The city wall was

then traced another 50 m to the west, nearly to the modern pumping station on King Hussein Street by season's end (Fig. 13). The wall was built mostly of mortared gran-



12. Plan of the Early Byzantine curtain wall in trenches J.9, 10, and 12. The Late Byzantine structures built against the north face of the earlier curtain wall are show in outline.



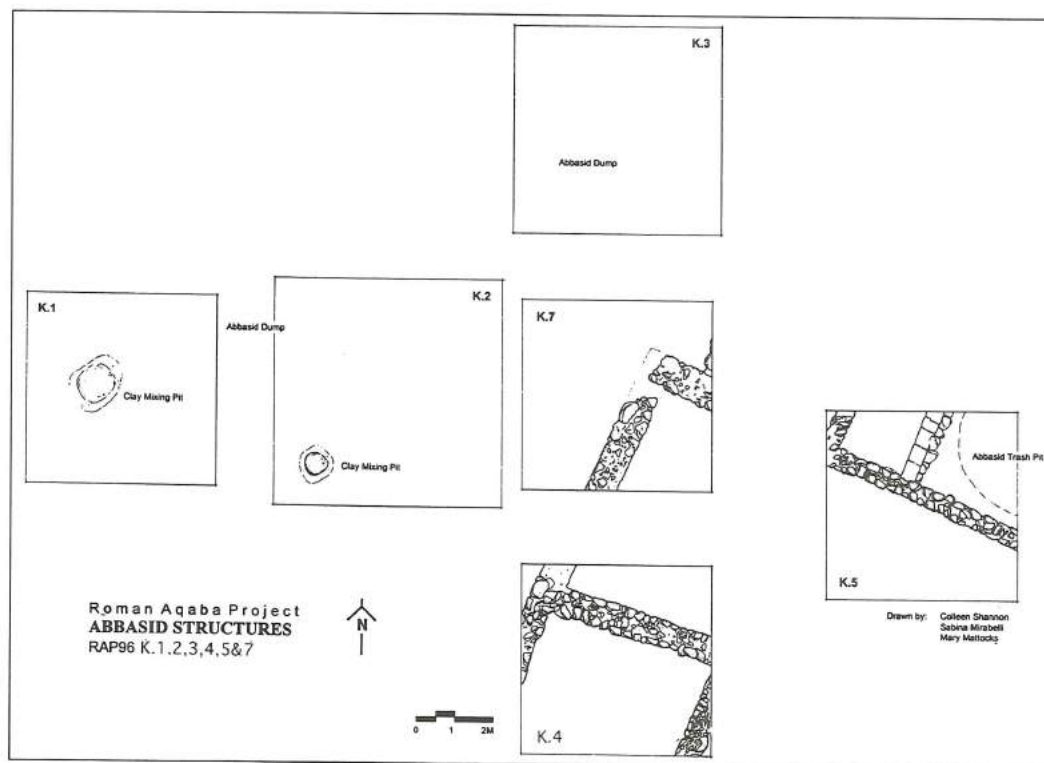
13. Plan of the western extension of the Early Byzantine curtain wall in trenches J.13 through J.18.

ite, with some diorite and occasional chunks of coral. It averages 1.10 to 1.40 m in width and is preserved up to 1.50 m in places. Two perpendicular walls abutting and projecting from the north face of the curtain wall were partially exposed and may be remnants of interval towers, like that uncovered east of al-Istiklāl Street in 1994. But more excavation is required to test this suggestion. The wall extended west through Trenches J.9-10 and J.12-16 for ca. 50 m, then began to curve towards the south in Trenches J.17-18 for another ca. 10 m. In toto, counting the segment now buried under al-Istiklāl Street, the line of the Byzantine city wall has now been traced for over 100 m. The city wall went out of use in the Late Byzantine period, when mud-brick and stone structures in J.9-10 were built against the north face of the city wall. The wall was extensively robbed in the Umayyad period.

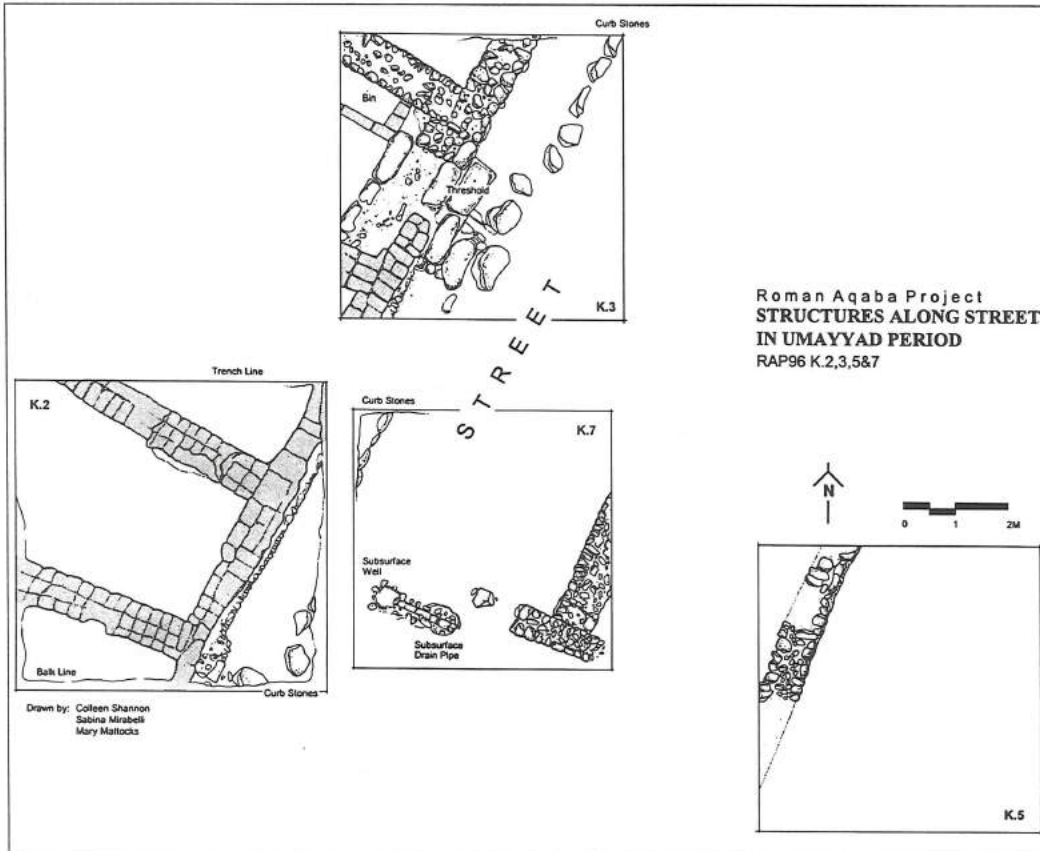
Area K. This lies ca. 50 m southeast of Area J in a vacant lot east of al-Istiklāl Street. Six trenches (K.1-6) were opened in 1994 to recover evidence of the Byzantine

city. Excavation in 1994 instead revealed significant remains of the Umayyad and Abbasid periods (late seventh to tenth centuries AD). Excavation continued in four of these trenches in 1996 (K.2-5) and in one new trench (K.7) opened within the square formed by K.2-5. In 1994 excavation revealed stone and mud-brick structures underlying thick layers of Abbasid dump (Fig. 14). Removal of the Abbasid structures, apparently domestic in nature, was completed this season. This revealed substantial stone and mud-brick structures occupied in the Umayyad period (Fig. 15). These structures were laid out along both sides of a street that ran northeast to southwest through Area K. The street was once paved by cobbles, although most of these had been subsequently robbed. The northwest side of the street was demarcated by a string of irregular granite monoliths closely spaced to separate the street from the buildings. Under the street level was a stone-lined well fed by a ceramic drain-pipe extending from the southeast side of the street.

Beneath the street several significant ob-



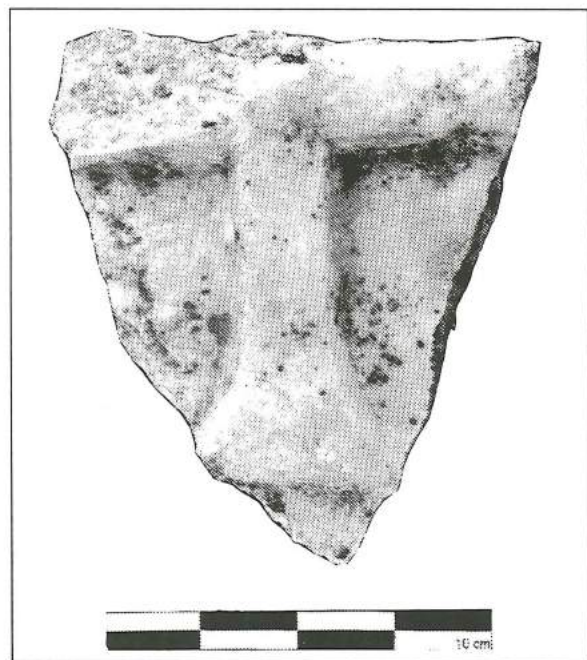
14. Plan of the Abbasid structures in Area K.



15. Plan of structures occupied during the Umayyad period along a street in Area K.

jects were recovered from Umayyad contexts (late seventh/early eighth centuries AD). These included a large fragment of a Byzantine cross carved on a slab of marble, perhaps part of a chancel screen (Fig. 16). Also from this context was an Arabic ostrakon written in black ink on both sides of a sherd, the text of which survives largely, although not entirely, intact. The following summary is based upon a report submitted by F. Imbert, who kindly examined photographs of the ostrakon (Imbert 1997). Side A appears to be a personal message from a certain Ḥassān to someone named Ḥusayn. Both men were clearly Muslims but cannot otherwise be identified. Side B, only partially decipherable, appears to be a Muslim invocation. The ostrakon is dated on paleographic grounds to ca. AH 50-100 (ca. AD 670-718), which agrees closely with its stratigraphic context.

Although pre-Islamic levels were not reached in Area K before season's end, these will likely be encountered next sea-



16. Fragment of a Byzantine cross carved on a marble slab, perhaps originally part of a chancel screen (photo: Jonathan Tedder).

son, particularly since the area lies just inside the Byzantine city wall. In fact, the foundations of the buildings along the street

have not yet been reached and these may date to the Byzantine period. It is noteworthy that the street and its associated structures are aligned on the same axis as the mud-brick structure in Area J, securely dated to the fourth century.

Area L. This lies ca. 200 m south of Area K and less than 100 m from the modern shoreline. Six trenches (L.1-6) were opened in 1994 to locate ancient harbor facilities. These trenches uncovered a domestic complex dating to the late Abbasid period (tenth century AD). In 1996 excavation was limited to two of these trenches (L.2, L.5) to determine the depth of the Islamic remains and reach pre-Islamic levels. Excavation was halted in Trench L.5 at a depth of ca. 2 m while still within the Abbasid stratum. But Trench L.2, excavated as a deep sounding, penetrated through the Abbasid stratum and deep within the Umayyad stratum, reaching the modern water table at a depth of over 4 m below the modern surface. The sounding reached seventh century levels before excavation was halted by the water table. Despite the restricted area of excavation, Area L yielded rich artifactual remains, including glazed pottery from Hijāz, Egypt, and Iraq, glass, fragments of steatite vessels, basalt mortars and grinding stones, and many animal bones, especially fish. This new evidence, combined with recent soundings by Sawsan Fakhiry between Area L and the western wall of Early Islamic Ayla, suggests the presence of an extensive extramural settlement in the Early Islamic periods. It is possible that the Byzantine city extended this far south, as the quantity of Byzantine pottery increased at deeper levels of the sounding.

Analysis of Artifacts and Organic Remains

Archaeobotanical Evidence. These remains were recovered by hand during excavation, soil sieving, and flotation of soil samples.

About 500 soil samples were processed for botanical remains during the first two seasons. Although soil conditions at 'Aqaba are not conducive to preservation of botanical remains, more remains were recovered in 1996, supplementing the evidence from 1994 (Parker 1996: 251).

The relative scarcity of wood (apart from palm) and the abundance of dung suggest that timber was not readily available in the local region. Although some wild flora, such as chenopods, were also exploited for fuel, dung was the principal fuel for most purposes. Some palm wood was used for construction and fuel. Most of the remaining wood derived from shrubs. In short the botanical evidence suggests that the local environment in the Roman and Byzantine periods was not significantly different from contemporary conditions. Most dietary plants recovered were grains, especially barley, with some wheat attested. The first evidence of several other domesticates was recovered in 1996, including date, olive, almond, and various legumes, along with more evidence of grape.

Faunal Evidence. Thousands of animal bones were recovered in 1996, with caprines forming the overwhelming majority of domesticates. Camel bones again formed a significant minority of the corpus, with small numbers of cattle, pig, and chicken. Preliminary analysis of the 1994 caprine remains suggest a model of importation from external sources for urban consumption, rather than exploitation of locally raised herds (Parker 1996: 251-52). Hunting made little contribution to the local diet. Both fish and marine invertebrates were important food sources. The thousands of marine shells recovered derive from only a few species, particularly *Tectus dentatus* (toothed topshell), *Pinctada margaritifera* (pearl oyster), *Tridacna* (giant clam), *Strombus* (stromb or lineated conch), various species of *Cypraea* (cowries), and coral. Most shells pro-

bably represent food refuse, although some were holed for use as ornaments and others were worked into implements. Some *Pinctada* shells may have been used for inlay.

Pottery. Over 130,000 ceramic artifacts were recovered in 1996, mostly pottery sherds from excavation. The vast majority were locally made common wares. Recent excavation of seventh century kilns proves the existence of local pottery production in this period (Melkawi, 'Amr, and Whitcomb 1994). The recovery of ceramic slag and kiln wasters in a variety of forms from Roman and Byzantine contexts suggests local ceramic production in these periods. The evidence from Area N for mining raw clay during the Early Roman/Nabataean period is cited above.

Quantities of imported pottery suggests Aila's role as a nexus of commercial exchange. Aila has thus far yielded over 800 sherds of terra sigillata (mostly Eastern Sigillata A) dating primarily to the first centuries BC and AD. Much Nabataean painted and unpainted fine ware was also recovered in similar contexts. So-called Cypriote Sigillata, although rare, was also present. Later imported fine wares include over 760 sherds of Late Roman Red wares and Byzantine wares dating from the third to the early seventh centuries. African Red Slip (ARS) wares are the earliest attested and the dominant imported fine ware from the third through fifth centuries. Egyptian Red Slip (ERS) pottery was imported to the site in some quantity beginning in the fifth century, when the amount of ARS begins to decline. Small quantities of Phocaeen (Late Roman C) and Cypriote Red Slip (CRS) begin appearing in the fifth and sixth centuries respectively. By this time it appears that all four types of imported fine wares (ARS, Phocaeen, ERS, and CRS) competed in the local market until the Muslim conquest. Two sherds tentatively identified as painted Jerash Bowls also appeared in 1996, the first

attestation of this ware south of the al-Karak plateau. Finally a few sherds of hand-made vessels, tentatively identified as imports from south Arabia, also appeared in 1996.

The other major category of imported pottery recovered is 'transport jars' (amphorae). Nearly 1,000 fragments of imported amphorae have been recovered from Aila thus far. Most have been assigned to the classification system developed by Peacock and Williams (Peacock and Williams 1986). From the earliest period in the city's history, a few more sherds of the Class 10 amphora were recovered, in addition to the largely reconstructable example found in 1994 (Parker 1996: 244, Fig. 8). These appear to be wine containers from the western Mediterranean of the first centuries BC/AD (Peacock and Williams 1986: 105-06). From the Late Roman period, more than two dozen sherds of the Class 47 amphora have been recovered. This vessel dates primarily to the third and fourth centuries AD and possibly carried Aegean wine (Peacock and Williams 1986: 193-95). Other Late Roman and Byzantine period amphorae attested at Aila include Class 44, possibly an olive oil container from northern Syria, and Class 45, possibly from Asia Minor (Peacock and Williams 1986: 185-90). Many sherds of the classic Palestinian bag jar (Class 46) have also been recovered (Peacock and Williams 1986: 191-92).

By far the two most common imported amphorae attested at Aila in the Byzantine period are the famous Gaza wine jars (Classes 48-49) and Egyptian amphorae (Classes 52-53). Nearly 200 sherds of the Gaza variety have been identified thus far, including both the hole-mouth (Class 48) and short-necked (Class 49) versions. Although many of these vessels almost certainly carried wine, recent analysis also suggests that some transported olive oil or sesame oil (Peacock and Williams 1986: 196-99). The most abundant imported amphorae at Aila are Egyptian. Over 400

sherds have been identified to date, including examples of Classes 52 and 53. Both are thought to be wine containers (Peacock and Williams 1986: 204-07). These first appear at Aila in the fourth century and continued to be imported into the seventh century at least.

The above discussion excludes several thousand fragments of so-called "Ayla-Axum amphorae", which were produced locally in the seventh century (Melkawi, 'Amr, and Whitcomb 1994), if not earlier. These jars are attested throughout much of the Red Sea basin, including Egypt, Yemen, Eritrea, and Ethiopia. Recent stratified examples from the Egyptian Red Sea port of Berenice date to the early fifth century (Hayes 1996: 159-61). Thus it is notable that this type of amphora also first appears at Aila in fifth century contexts and is common thereafter. The original contents of these jars remain unknown. It has been reasonably supposed that Palestinian agricultural products carried on land to Aila, then transferred to these amphorae for sea transport farther south (Melkawi, 'Amr, and Whitcomb 1994: 463-64).

Glass. Thousands of fragments of glass have been recovered from Aila, but there is as yet no evidence of local glass production. Some seems to be of Egyptian manufacture (Parker 1996: 252), but it now appears that the bulk of the glass is of Syro-Palestinian origin. There is also some evidence of luxury imports. Perhaps the most significant of these are three fragments from Area M of a cylindrical cup, decorated with stylized wreaths and palm leaves in relief. Similar cups also often contain Greek inscriptions, although none survives on these three fragments. Although these derive from a Late Roman context, they are dated on stylistic grounds to the early first century AD and may come from Sidon (Stern 1995: 98-99).

Stone. Varieties of imported stone also

reached Aila in the Roman and Byzantine periods. Some 20 fragments of marble, mostly architectural elements, were recovered in 1996. Basalt was imported for mortars, mills, and grinders. Steatite (schist) vessels, probably from the Arabian peninsula, were imported beginning in the fourth century as cooking bowls and later also as lamps and other types of vessels. Objects of alabaster, limestone, and sandstone are also attested.

Metals. Hundreds more fragments of copper and bronze were found in 1996, supplementing the large corpus of over 500 items from 1994 (Parker 1996: 253). This evidence, combined with more remains of copper ore, copper slag, and iron slag, provide further evidence of metal-working at Aila in the Roman and Byzantine periods. Much of this copper probably derived from the mines of Wādi 'Arabah, where intensive exploitation apparently resumed after the Roman annexation of Nabataea in 106 (Hauptmann and Weisgerber 1987; 1992; Rothenberg 1993). The most common metal artifacts were nails, mostly iron. Interestingly, the few fragments of lead recovered all derive from Roman contexts. For reasons that remain unclear, lead is entirely absent in Byzantine and later contexts.

Conclusions

The following are some preliminary remarks about the history and economy of Aila in light of this new evidence. There is substantial evidence for a flourishing Nabataean settlement by the first century BC, including domestic and possibly industrial occupation in Areas B and M. There is clear evidence of ceramic production in this period, apparently Nabataean common wares. There are also hints of possible agricultural activity in low-lying portions of the Circular Area among the structures now buried by sand. How far south the Nabataean settlement extended is unclear. The deepest lev-

els reached in Area A suggest possible Nabataean occupation in this sector. Fine table wares from the eastern Mediterranean, wine amphorae from the western Mediterranean, and luxury glass from Phoenicia all attest to Aila's extensive commercial contacts in this period.

The Late Roman period (second to early fourth centuries) seems to reflect conditions of prosperity, no doubt aided by completion of the *via nova Traiana* in 111-114. Extensive domestic occupation is attested in Areas A, B, and M, including installations for grinding flour (Area B) and ovens for baking bread (in Areas A, B and M). A portion of the Area M complex may have served industrial purposes, including manufacture of pottery. The Nabataean ceramic tradition continues into this period, although degeneration of the painted fine ware is apparent. Importation of terra sigillata ceases, although precisely when is unclear. Importation of fine table ware from north Africa (African Red Slip) begins in the third century. Class 47 amphorae, possibly reflecting importation of Aegean wine, begin appearing in small numbers in the third century.

The fourth century clearly marks a turning point in the history of Aila. The domestic and industrial complexes in the northern sector of the site (Areas B and M) were permanently abandoned. There seems no obvious explanation for this abandonment other than the continued process of site migration from northwest to southeast that is apparent as early as the fourth century BC with the abandonment of Tall al-Khaylayfi (Parker 1997b). Although admittedly fragmentary, the evidence suggests that the focus of settlement shifted several hundred meters to the south. A large public building (church?) was erected in Area J and an adjacent cemetery established in Area A. The presence of a bishop by 325 must also have had economic implications for the city. The *legio X Fretensis* was trans-

ferred from Jerusalem to Aila. This unit by then may have numbered only 1,000 - 2,000 troops, the estimated strength of contemporary frontier legions. This force, plus the soldiers' families and camp followers, must have represented a sudden substantial increase in the city's population with some impact on the urban economy. The legionary presence guaranteed a regular influx of cash into the local economy and served as a major market for diverse products and services.

The quantity and diversity of various artifacts at Aila are suggestive of the city's far-flung commercial connections in the Byzantine periods. These extended from the western Mediterranean to southern Arabia and probably beyond. Although Aila's long-range commercial network in luxury products had long been known from literary sources, RAP has greatly expanded the list of known imports and exports to include fine ware pottery, wine, oil, glass, metals, and various kinds of stone. Egyptian and Gaza amphorae now begin to appear in large quantities, suggesting importation of wine and other agricultural commodities from Egypt and Palestine. Importation of African Red Slip pottery continues. Recovery of kiln wasters of fourth century vessels suggests that local pottery production continued. Notably, the Nabataean ceramic tradition seems to have largely disappeared by the fourth century, a phenomenon noted elsewhere in parts of the former Nabataean kingdom (Villeneuve 1990: 375; Parker 1987b: 529-37). This contrasts sharply with evidence from Petra of the Nabataean ceramic tradition continuing into the sixth century ('Amr 1991).

Recent analysis of the remains of fish sauce (*garum*) in a ceramic vessel from an early fifth century context at Petra suggests its contents derived from the Red Sea (Studer 1994). This *garum*, if not actually produced at Aila, probably passed through the port en route to Petra. Most fish remains re-

cently studied from both Petra and several Byzantine forts in southern Palestine also derived from the Red Sea (Lernau 1986; Desse-Berset and Studer 1996). Again, these fish products either reflect Aila's own fishing industry or probably transited through Aila.

In the late fourth century the mud-brick complex (church?) in Area J and its associated cemetery in Area A were abandoned, apparently after some sort of destruction. It is tempting to associate this event with the earthquake of 363, particularly since the latest associated coins thus far identified date to the later years of Constantius II (337-361). Soon thereafter, in the late fourth or early fifth century, the stone curtain wall partially cut through and built over the mudbrick building, which quickly filled with wind-blown sand. The curtain wall appears to have been built hurriedly and rather haphazardly, without regard to the existing Byzantine urban grid. Its construction may have been a response to the threat posed by the revolt of Mavia, during the reign of Valens (364-378), the major Saracen incursion reported in 410, or some other emergency in this period (Parker 1986: 143-47). The location of the city wall, well south of the now abandoned structures in Areas B and M, provides further evidence for the shift of the central focus of the Byzantine city to the south.

The subsequent history of Aila in the later Byzantine period (late fifth to early seventh century) is obscured by the fact that much of Byzantine city now underlies massive Early Islamic occupation. Continued economic prosperity is suggested by quantities of imported goods, such as fine tableware pottery from North Africa, Asia Minor, Cyprus, and Egypt. Importation of amphorae from Egypt and Palestine also continued. By the early fifth century Aila seems to have been producing its own transport containers (the so-called "Aila-Axum amphorae"). These reached the entire length

of the Red Sea and lend support to the picture of vigorous commercial activity in literary sources. The pilgrim traffic to Mt. Sinai probably increased demand for goods and services in the city.

The city wall seems to have gone out of use by the sixth century, when domestic structures were erected against its northern face in Area J. The neglect of the city's defenses may relate to the disappearance of Aila's garrison legion, still attested at Aila in the early fifth century but apparently long gone by the arrival of Muslim forces in 630. Although there is no direct evidence, the legion possibly disappeared about 530, when Justinian demobilized many of the Roman frontier forces and abandoned many forts along the eastern frontier (Parker 1986: 151-54; 1987a: 822-23).

The transition to Muslim rule was peaceful. And, despite the foundation of the new Early Islamic Ayla nearby ca. 650, the results from Area K suggest that the Byzantine town continued to flourish through the Umayyad period (661-750). Extensive robbing of the Byzantine city wall in the seventh century was presumably for construction of Early Islamic Ayla. The Late Byzantine domestic complex in Area A was abandoned. Yet there are signs of renewed vitality in what was now essentially a suburb of Early Islamic Ayla. The Byzantine domestic complex in Area A was re-occupied in the eighth century. Similarities in alignment between the structures exposed in Area J (the possible church) and Area K suggest that the basic plan of the Byzantine city survived through the Umayyad period and even into the early Abbasid period. But by the 10th century it appears that all these areas (A, J, K, and L) had been largely abandoned and were being used as dumps. There was no evidence of Fatimid occupation.

Acknowledgements

RAP is sponsored by North Carolina

State University and is affiliated with the American Schools of Oriental Research and the American Center of Oriental Research (ACOR). Principal funding for the 1996 season was provided by the National Geographic Society, Joukowsky Family Foundation, Samuel H. Kress Foundation, Lockheed Martin Corporation, North Carolina State University, University of Helsinki, and private donors. Other grants enabled three students to participate in the project. Carol Frey was a Jennifer C. Groot Fellow in the Archaeology of Jordan. Elizabeth Ann Pollard and Chaffee Viets received fellowships from the Endowment for Biblical

Research. Assistance was provided by Dr Ghazi Bisheh, 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. The author is grateful to all these agencies and individuals for their support.

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Bibliography

- 'Amr, K.
1991 Preliminary Report on the 1991 Season at Zurrabah. *ADAJ* 35: 313-23.
- Desse-Berset, N. and Studer, J.
1996 Fish Remains from ez-Zantur (Petra, Jordan). Pp. 381-87 in R. A. Stucky (ed.) *Petra. Ez-Zantur: Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen 1988-1992. Terra Archaeologica*. v. II: Monographien der Schweizerisch-Liechtensteinischen Stiftung für Archäologische Forschungen im Ausland (SLSA/FSLA). Mainz: Von Zabern.
- Hauptmann, A. and Weisgerber, G.
1987 Archaeometallurgical and Mining-Archaeological Studies in the Area Feinan, Wadi 'Arabah (Jordan). *ADAJ* 31: 419-31.
1992 Periods of Ore Exploration and Metal Production in the Area of Feinan, Wadi 'Araba, Jordan. Pp. 61-66 in *SHAJ IV* Amman: Department of Antiquities.
- Hayes, J. W.
1996 The Pottery. Pp. 147-178 in S. E. Sidebotham, and W. Wendrich, (eds), *Berenike '95. Preliminary Report of the Excavations at Berenike (Egyptian Red Sea Coast) and Survey of the Eastern Desert*. Leiden: School of Asian, African, and Amerindian Studies.
- Imbert, F.
1997 Analyse épigraphique et paléographique d'un ostracon trouvé à Aqaba (Jordanie). unpublished manuscript.
- Khoury, R. G. and Whitcomb, D. S.
1988 'Aqaba: *Port of Palestine on the China Sea*. Amman: Al Kutba.
- Lernau, H.
1986 Fishbones excavated in two late Roman-Byzantine castella in the southern desert of Israel. Pp. 85-102 in D.C. Brinkhuizen, and A.T. Clason, (eds), *Fish and Archaeology. Studies in osteometry, taphonomy, seasonality and fishing methods*. BAR Int. Ser. 294. Oxford.

- Melkawi, A., 'Amr, K. and Whitcomb, D. S.
 1994 The Excavation of Two Seventh Century Pottery Kilns at 'Aqaba. *ADAJ* 38: 447-68.
- Parker, S. T.
 1986 *Romans and Saracens: A History of the Arabian Frontier*. ASOR Dissertation Series 6. Winona Lake, IN: Eisenbrauns.
 1987a History of the Roman Frontier East of the Dead Sea. Pp. 793-823 in S. T. Parker, (ed.), *The Roman Frontier in Central Jordan: Interim Report on the Limes Arabicus Project, 1980-1985*, 2 vols. BAR Int. Ser. 340. Oxford.
 1987b The Pottery. Pp. 525-619 in Parker 1987a.
 1996 The Roman 'Aqaba Project: The 1994 Campaign. *ADAJ* 40: 231-57.
 1997a Preliminary Report on the 1994 Season of the Roman 'Aqaba Project. *BASOR* 305: 19-44.
 1997b Human Settlement at the Northern Head of the Gulf of 'Aqaba: Evidence of Site Migration. Pp. 189-93 in *SHAJ VI* Amman: Department of Antiquities.
- Peacock, D. P. S. and Williams, D. F.
 1986 *Amphorae and the Roman Economy: An Introductory Guide*. New York: Longman.
- Pratico, G. D.
 1993 *Nelson Glueck's 1938-1940 Excavations at Tell el-Kheleifeh: A Reappraisal*. ASOR Archaeological Reports 3. Atlanta: Scholar's Press.
- Rothenberg, B.
 1993 Timna. Pp. 1474-86 in E. Stern, (ed.) *The New Encyclopedia of Archaeological Excavations in the Holy Land*, vol. 4, Jerusalem: IES.
- Smith, A. M. II, Stevens, M. and Niemi, T. M.
 1997 The Southeast Araba Archaeological Survey: A Preliminary Report on the 1994 Season. *BASOR* 305: 45-71.
- Stern, E. M.
 1995 *Roman Mould-blown Glass. The First through Sixth Centuries*. Rome and Toledo: L'Erma di Bretschneider and Toledo Museum of Art.
- Studer, J.
 1994 Roman Fish Sauce in Petra, Jordan. Pp. 191-96 in W. Van Neer, (ed.), *Fish Exploitation in the Past. Proceedings of the seventh Meeting of the ICAZ Fish Remains Working Group*. Annales du Musée Royal de l'Afrique Centrale, Sciences Zoologiques 274. Tervuren.
- Villeneuve, F.
 1990 The Pottery from the Oil-factory at Khirbet edh-Dharih (second Century A.D.). A Contribution to the Study of the Material Culture of the Nabataeans. *Aram* 2: 367-84.
- Whitcomb, D. S.
 1987 Excavations in 'Aqaba: First Preliminary Report. *ADAJ* 31: 247-66.
 1988 A Fatimid Residence in 'Aqaba, Jordan. *ADAJ* 32: 207-24.
 1989a Evidence of the Umayyad Period from the 'Aqaba Excavations, pp. 164-84 in, M. A. Bakhit and R. Schick. (eds.) *The Fourth International Conference on the History of Bilad al-Sham during the Umayyad Period. Proceedings of the Third Symposium 2-7 Rabi' I 1408/24-29 October 1987*. vol. 2. Amman: University of Jordan.
 1989b Coptic Glazed Ceramics from the Excavations at 'Aqaba, Jordan. *Journal of the*

- American Research Center in Egypt* 26: 167-82.
- 1989c Mahesh Ware: Evidence of Early Abbasid Occupation from Southern Jordan. *ADAJ* 33: 269-85.
- 1993 The Fourth Gate at Ayla: A Report on the 1992 Excavations at 'Aqaba. *ADAJ* 37: 533-47.
- 1994 *Ayla: Art and Industry in the Islamic Port of 'Aqaba*. Chicago: Oriental Institute of the University of Chicago.
- 1995 The Miṣr of Ayla: New Evidence for the Islamic City. Pp. 277-88 in *SHAJ* V. Amman: Department of Antiquities.

THE ROMAN STREET OF THE PETRA PROJECT, 1997 A PRELIMINARY REPORT

by

Zbigniew T. Fiema

The Roman street Project organized by the American Center of Oriental Research (ACOR) under the direction of Pierre M. Bikai, was carried out in Petra between March 5 and July 3, 1997. The author directed the fieldwork. The staff included Jeanette Lindblom, Erko Mikkola, Jan Vihonen, and Vesa Putkonen, all students of archaeology or architecture from Finland. Up to thirty local workmen were employed at the site.

The purpose of the project was to enhance the touristic attraction of Petra and to explore the city's urban history by exposing a part of the civic center. Specific research issues included the dating and phases of use of the colonnaded street and the associated entities which include the portico, the grand stairway, and the other structures in the area. To this purpose, the remains of three rooms, located at the eastern end of the colonnaded street and on its southern side, were excavated. These rooms are situated directly to the west of the stairway which leads up to the so-called Upper Market. Two more rooms were fully exposed to the east of the stairway. Judging from their location in the city center, all five rooms, as well as the other enclosed spaces whose entrances opened on the portico of the street, must have been commercial establishments such as shops or taverns. The project included total clearance of the stairway, the associated sidewalk, and the street's pavement in the area of the excavated shops. Also, the secondary structures located on the pavement of the portico were studied and fully recorded. The second phase of the project, to be conducted later in the 1997, will include the anastylosis of the exposed

entities, and the conservation of the extant walls. The excavation, clearance and consolidation of the area provided a wealth of archaeological material which will permit a better understanding of Petra's phases of development. These activities also greatly enhance the architectural panorama of the city center and create an optimal visual background to the colonnaded street itself.

colonnaded streets were a well-established feature in many cities in the Eastern Mediterranean during the Classical and Byzantine periods. Despite a popular opinion that this architectural type developed mainly for aesthetic reasons, colonnaded streets played an important role in the political, economic, and social life of ancient cities. Being usually the main, or one of the main thoroughfares, colonnaded streets were associated with the most important commercial and social establishments in ancient cities, such as temples, markets, baths, theaters, taverns and shops. In Petra, the capital of the Nabataean kingdom and subsequently the most important city, if not the capital, of the Roman Province of Arabia, the colonnaded street is the main east-west axis, sometimes awkwardly referred to as *cardo maximus*. In addition to the magnificent rock-cut façades, the colonnaded street is one of the main witnesses of Petra as the once grandiose city of Arabia. This urban character of Petra is still inadequately addressed through archaeological exploration which in the past mainly concentrated on spectacular, but isolated monuments.

Previous Exploration and Interpretation

Throughout this text, the designation

'Room', followed by a Latin numeral (I-XXX), is equivalent to 'Shop', or 'Door' which provides entry to a specific enclosed space. All these rooms are located on the southern side of the colonnaded street. They are separated from the street by a spacious sidewalk, over 5 m wide, which ends with a two-stepped stylobate for the southern colonnade. The portico wall which contains doors into the shops, extends from the so-called South Nymphaeum in the east to the Temenos Gate in the west, and includes two stairways; the western one which leads up to the Great South Temple, and the eastern one which provides access to the Upper Market. Although a more detailed description will have to await an intensive exploration of the central and western parts of the portico wall, it appears that the shops are clustered in three distinctive groups, roughly corresponding to the structures located behind them and farther south, that is the Lower, Middle and Upper Markets. There is a substantial, almost 6 m wide gap in the portico wall, which separates the western from the central cluster of shops. The exact number of separate units is unclear at this moment, but probably amounts up to 30 room spaces. It is possible that some of the entities were, in fact, empty spaces between rooms, and/or small stairways leading up to the southern area. Currently, most of the doorways are either blocked by stone tumble, or have been intentionally blocked in the past, using column drums and ashlar. The blockings are often partial, thus leaving a smaller entry to the rooms. The inner (southern) walls of the shops are well defined in the eastern and western clusters.

The southern side of the colonnaded street in Petra has already been subjected to archaeological exploration. During the years 1955-57, the Department of Antiquities of Jordan had cleared the area south of the Wādī Mūsa depression revealing some 240 m of the well-preserved pavement of the

main street, from the Nymphaeum in the east to the Temenos Gate of the Qaşr al-Bint temple in the west. That clearance project, directed by the late Diana Kirkbride, was associated with the uncovering of the southern sidewalk, the portico wall with its doors, and the remains of later secondary structures on the pavement of the portico, which had often encroached upon the street itself (Kirkbride 1960). One of the most important inscriptions ever found in Petra, that which mentions Petra as the *metropolis* of Arabia, and dates to AD 114 (Bowersock 1983: 84-85, n. 28), was found during this clearance. Three large fragments of that inscriptions were scattered on the lower steps of the stairway, or in front of it. The inscription which also preserves the name of C. Claudius Severus, the first governor of the Roman province of Arabia, was thought to have belonged to a monumental arch which once stood in the front of the stairway. In 1960, the Department of Antiquities re-erected a handful of columns in the southern portico of the colonnade.

Petra Parr's important excavations in 1958 -1964 of some structures facing the street, gathered information about the date and phases of the street's use (Lankester Harding 1958:13; Parr 1960, 1970). The work initially concentrated on the northern side of the street, facing the wadi, where the previously removed pavement allowed for exposing the early phases of the street's existence. Series of small rooms and a two-storey high building were also explored there. Later, the work expanded into the south side of the street to expose a complete cross-section of the street and the entities on either side of it. A large portion of the interior of one of the shops was fully excavated at that time. Although the final publication of that project still awaits completion, a thorough stratigraphic description of the deposits on the south side has already been published (Parr 1970: 352-381). In total, Parr has distinguished 18 phases of de-

velopment, occupation, and disuse on the south side of the street. The initial period featuring small buildings of simple construction and plans (Phases I-VIII) was followed by the considerable expansion at the site marked by the monumental design of the portico wall and the rooms accessed through the doors in that wall (Phase IX).

That expansion was dated by Parr to the period following the accession to the Nabataean throne by the King Aretas IV (9 BC-40 AD). The stone pavement on the street was laid out later (Phase XIII), that is sometime after AD 76, according to numismatic evidence (Parr 1970: 369-70). The excavations also revealed a series of gravel-surfaced roadways which antedated the pavement of the colonnaded street. The solid foundation of the latter, over a meter and a half deep, clearly cut through these roadways. The post-AD 76 date and the appearance of "Roman workmanship and design," prompted Parr to lean toward the early post-annexation (AD 106) period for the construction of the paved street (1960: 130). This was also supported by the numismatic material found underneath the sidewalk, which did not include coins later than the fourth quarter of the first century AD. Incidentally, Kirkbride suggested the *ante quem* date of AD 114, for the colonnaded street, based on the aforementioned Trajanic inscription which presumably belonged to an arch in front of the stairway to the Upper Market. Her argument was that the arch could not have been erected beside an unpaved street (1960: 119-120).

Judith McKenzie, while rejecting Kirkbride's argument, and generally agreeing with the dating by Parr, suggested a possibility of an even earlier date, that is *terminus post quem* of 9 BC for the construction of the paved street (1991: 35-36). Both scholars differ as to which deposit should be considered a foundation trench for the paving, and through which strata that trench had been cut. That early date was recently

contested by Parr on the basis of the stratigraphic analysis, and the comparative material of architectural designs from elsewhere in the Near East (1996: 65, 67). The issue remains unresolved since Parr's conclusions were obviously based on the stratigraphic information prior to that published in 1970. Regardless of this dispute, there are some other issues which were not adequately addressed yet. For example, equally important are the temporal variations in spatial associations of the portico wall once it was constructed. Since the blocks of the colonnade's stylobate appear to overlay the edge of the street's pavement, the colonnade and the paved sidewalk appear to have been constructed at the time, or slightly after the street was paved. Following the dating and analysis presented by Parr, these two elements would have come into being in or after AD 76. What remains unknown is the appearance of the space directly north of the portico wall during the time when the gravelly roadways preceded the paved street, but after the construction of the portico wall, that is sometime in the early to mid-first century AD, according to Parr. From his description it appears that the monumental design of the portico wall and the rooms beyond it, was, at that time, not associated with a colonnade or a paved sidewalk, although Parr vaguely mentions "another terrace wall" to have been located somewhere north of the portico wall (1970: 363-64; also Fig 1, trench 35).

Most recently, M.S. Jourowsky's excavations of the Great South Temple have contributed to the discussion concerning the architectural development of the street complex, by fully exposing the Propylaea steps which lead from the sidewalk up to the lower temenos of the temple. The preliminary observation stemming from that research concludes that the Propylaea steps in their extant form represent a rebuilding of the original access to the temple, probably at the time or slightly later than the paving

of the colonnaded street (Joukowsky 1994: 309-311; 1996: 180-181).

This short recapitulation of the current interpretations sufficiently demonstrates the lack of consensus concerning not only the absolute dating of the colonnaded street design, but also the relative dating of its components. The entire complex appears to be a composite design of different aggregates which could have come into existence anytime between the end of the first century BC and the early second century AD.

The disastrous earthquake which affected Petra on May 19, AD 363 (Russell 1980), would have spelled the end to some of the shops, or at least seriously limited their function. The shop excavated by Parr was definitely abandoned then, displaying a layer of destruction debris - Phase XV (Parr 1970: 366-368). The street appears to have been only partially cleared after the earthquake, and following was an encroachment of private structures into public space (Parr 1970:351;1986:196). Secondary walls were erected between the portico columns, using earlier construction material such as column drums, and even inscribed blocks, while the connecting cross-walls created small spaces on the sidewalk, probably used as shops. Some of these simple structures extended well out into the street, as in the example presented by Kirkbride (1960: 117-119; plate VII.1). The existence of these secondary structures, often referred to as the "Byzantine shops," may indeed indicate that the main shops behind could have been either filled up by the collapse, or intentionally blocked and abandoned, either fully or only partially. Intentional blocking seems also to have been made across the stairway leading up to the Great Temple.

This image of affairs as shown in the colonnaded street area and postulated for the period following the earthquake of AD 363, was previously interpreted as the indication that Petra was neither economically nor socially able to fully recover from that di-

saster, although it continued its existence as an urban center (Fiema 1991: 144-48). Indeed, one may view this situation as representing a decline in municipal standards, which continued in Petra throughout the fifth and sixth centuries AD. However, recent studies advocate caution in the interpretation of Byzantine urbanism, pointing to its close association with considerably changed socio-economic and cultural patterns of the Byzantine period. These patterns reflect a reality different from that represented by the norms of classical aesthetics and orderliness. Especially Late Byzantine urbanism signalizes the transformation of the standards of urban design and existence from these embodied by classical *polis* to those of Near Eastern *madina* (Kennedy 1985: 162, 176). Features of Late Byzantine urbanism - the encroachment of private structures into public space, blocking and/or disuse of earlier public buildings, abandonment of whole areas within city limits, spontaneous development of suburbs, massive reuse of construction materials, and disappearance of certain civic institutions - are all well-attested in the urban contexts of the Near East, especially in the sixth century AD and later (Tsafrir and Foerster 1994). It is then debatable whether the urban features observed in the Byzantine Petra or elsewhere may be considered as realistic diagnostics of the economic standing of a city. Similarly, and in the same context, the information derived from the recently discovered Petra Papyri, which indicates relative prosperity among some of Petra's citizens in the sixth century, and the existence of local fiscal administration (Koenen 1996), should be treated with caution. The economic standing or well-being of certain citizens should not be automatically equalized with the state of the economic affairs of Petra as an urban center.

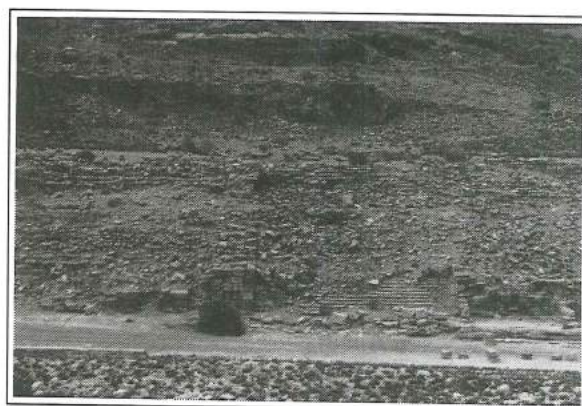
The final demise of the shops along the colonnaded street, and of urban Petra, are shrouded in uncertainty. The British ex-

cavations recovered a series of silting and stone collapses (Phases XVII-XVIII) which had covered both the original shop space as well as the secondary structures on the sidewalk (Parr 1970: 369). The precise dating of these tumbles could not be determined. While another earthquake, that of AD 551, was in the past postulated to have effectively ended the existence of the city (Russell 1985: 45), the overall impact of that disaster on Petra remains largely unproven. The city continued throughout that century, as evidenced through the Petra Papyri. Furthermore, the recent excavations of a Byzantine church with the mosaic floors, indicate that the occupation of the complex, although non-ecclesiastical, would have continued for some time also during the seventh century AD (Fiema, forthcoming).

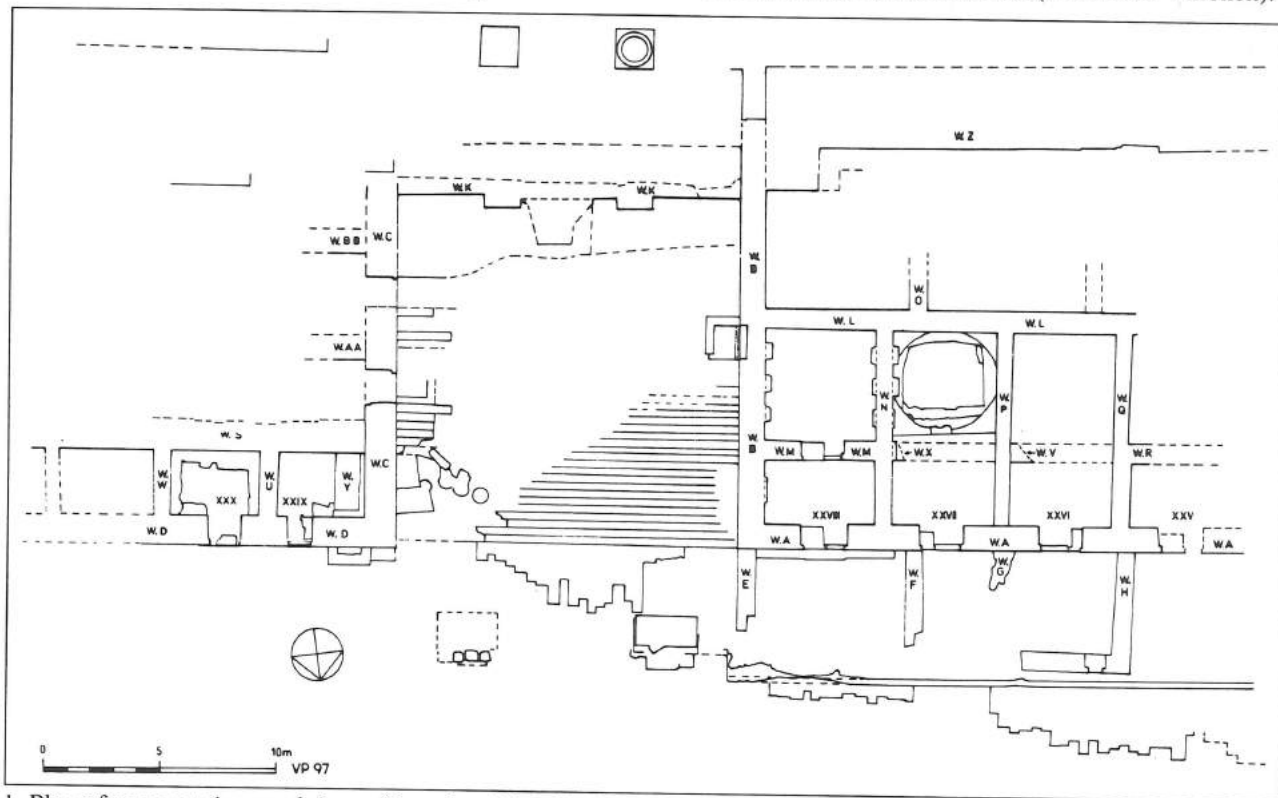
RSP Excavation Site

The work of the Roman street Project concentrated on the southern side of the colonnaded street, and included roughly half of the eastern cluster of rooms (XXVI -

XXX), as well as the grand stairway situated between Rooms XXVIII and XXIX (Fig. 1). The preliminary studies were conducted on behalf of ACOR by the author in 1993, and later by Chrysanthos Kanellopoulos (1996), the architect of the project. Before the excavation work began, the site has been surveyed and thoroughly photographed (Fig. 2). Since the general extent of the relevant rooms could only be roughly outlined, the excavations first proceeded in a wide-exposure manner over the entire area. Once the delimiting walls of the



2. The area before excavation (Photo: Jan Vihonen).



1. Plan of excavated area of shops (Drawing: Vesa Putkonen).

rooms were exposed, the work was continued using the non-arbitrary excavation units, that is the room spaces. The main lapidarium for architectural elements was established on the southern bank of the Wādī Mūsa depression, while lapidaria for ashlar were temporarily set on the lower embankment wall, and behind the Nymphaeum. The entire site has been divided into three main areas of excavations, clearance or intensive prospection. These are the following:

Stairway the main, central feature of the excavated area. It also included the landing space in front of the stairway, and the remains of two large pedestals for the postulated arch.

Area South located south of the extant portico wall (A) and west of the stairway. As mentioned above, this area has been later subdivided into the excavation units corresponding to the spaces of Shops XXVIII-XXVI.

Area East located east of the stairway. This area was only partially cleared, with the exception of fully excavated Shops XXIX-XXX located on its northern side.

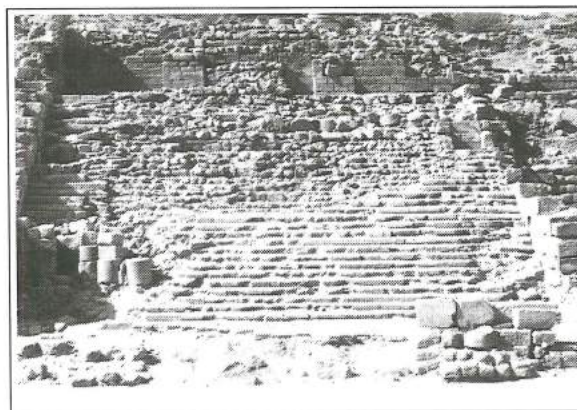
The entire excavated or cleared area measures ca. 40 (E-W) x 20 (N-S) m. The depth of removed deposits ranged from ca. 6 m in the southern part of Room XXVIII to less than 0.5 m of wind-blown accumulation cleared from the portico's pavement.

The Stairway

The stairway (see Fig. 2), contained between Walls B, C, and K, is 14.65 m wide (E-W) in the north and ca. 14.75 m at the top. The difference in the absolute level between the pavement at the foot of the stairway, and the wide landing which stretches across the top of the stairway, just below Wall K, exceeds 7 m. Wall K features four pilasters – two smaller and two larger ones. A colonnaded entrance portico (Upper Propylaea) to the Upper Market is situated above this wall. At the present, the portico consists of two large square plinths of the

stylobate, which correspond to the larger pilasters in Wall K. A column base still rests upon the western plinth. The Upper Market is probably a large artificial plateau, ca. 55 m square, held in place by series of massive retaining walls on the northern side, such as Walls Z and BB.

The initial work concentrated on the full clearance of the stairway (Fig. 3). Several very large architectural elements, including drums and capitals from the colonnade or propylaea of the Upper Market, have been removed from the surface. The removal of surface deposits of soil and small stones revealed that the limestone steps were preserved only in the NW quadrant of the staircase's space, and partially in the central area. Most of the courses of steps seem to have somewhat slipped off their original position, and they often slightly tilt downward. That may be due to the slope thrusts, but may be intentional and related to the noted northward inclination of the pavement located in front of the stairway (Kannelopoulos 1996: 7). Farther up, in the central-south and southern parts, the flagstones of the steps were absent, and not even a single fragment was found there *in situ*. Evidently, the steps suffered serious damage by stone material which tumbled down from the Upper Market area. But the complete absence of steps or fragments in that area of the stairway may also indicate that the slabs had been intentionally removed in antiquity before the collapses. The removal would



3. Stairway after clearance (Photo: Jan Vihonen).

have started at the top and continued downward, but the reason why that activity was not completed is unknown. This removal revealed the stone and mortar/sand bedding for the flagstones of the steps. In many places, the bedding still preserves the grades of steps.

No traces of intermediate landings which would stretch across the stairway, have been noted. The only exception is the uppermost area which abuts Wall K and stretches from Wall C to Wall B. No pavement is preserved there, but the area is occupied by a layer of small flat stones tightly embedded in the surface, which must have served as a substructure of the actual pavement. The main feature of that landing is a platform or "podium" built of irregular stones and boulders, but laid in rough courses. The podium is centrally situated, just in the front of the part of Wall K which is flanked by the two larger pilasters. The platform which tightly abuts the wall, may be a substructure build-up for a flight of steps which were narrower than the overall width of the stairway. If so, the stairway at its top would have been reduced to a central, steep flight of steps, maximum 4 m wide, which led directly to the Upper Propylaea. That discovery would solve the previously observed phenomenon that "the steps [of the stairway - ZTF] lead up at too shallow an angle to reach the great platform at the top in the required distance." (Kirkbride 1960: 122, also Kanellopoulos 1996: 7-8).

The clearance of the stairway also revealed the remains of three small landings which facilitated the access to the second storey rooms situated to the west of the stairway, and to the gallery-like spaces to the east of it. Two east landings are located against Wall C, corresponding to the two doors in this wall. These landings have the appearance of rectangular spaces which interrupt the grading of the steps but still integrate with the overall design. Both landings seem to have had flights of small steps

which led up directly to the doors. The third (west) landing is located against the single door in Wall B. This landing consists of the flat paved area surrounded on two sides by low walls. These walls were also integrated with the stairs, with the entire landing having an appearance of a "sunken" space within the stairway. There is little doubt that the east upper door and the single west door which were accessed from these landings, had been already blocked in antiquity. The east door preserved a layer of small irregular stones laid directly upon the surface on which the threshold was originally placed. As for the west door, one large ashlar still stood in the doorway. The lower east doorway and the associated landing are very poorly preserved.

Surprising is the asymmetrical relationship and construction differences noted between the west and the east landings. Notable is also the difference in construction of Walls B, C, and K which limit the stairway. Wall B (east face) is built with ashlar of roughly uniform size (ca. 0.8 x 0.5 m on average), which display tightly spaced, "Nabataean" diagonal dressing. Its average width is ca. 1.1 m. Wall C is made of very huge blocks with irregularly dressed or embossed faces, which often approach the size of ca. 1 x 0.6 m. In the area of Room XXIX, the width of Wall C exceeds 1.4 m. The ashlar of Wall K are relatively smaller than those from Wall B, and of a very heterogeneous manner of dressing.

The structure of the stairway can be restored on the basis of the evidence yielded by the excavations. It is unknown whether the extant stairway was preceded in date by another structure of this kind, but this hypothesis seems to be less likely and largely deprived of supporting evidence. Probably, the natural slope (bedrock?) in the area had been roughly "shaved off," before the construction began. Any areas with natural cavities and depressions would have been filled up with soil and stones. Then, the main base

of the substructure of the stairway had been imposed upon the slope. This base consists of several very large "steps," each at least 1 m wide and less than 1 m high. These steps appear as low walls gradually superimposed on the slope, and made of boulders, ashlar, reused drums, and capital elements, all bonded by mud mortar. The spaces between the walls were filled up with stone debris, and flattened. This substructure was superimposed by the series of small steps made of irregular but relatively flat stones bonded by blueish grey mortar. The small steps which are ca. 0.22 to 0.26 m high, and up to 0.38 m in depth, are the direct bedding for the flagstone steps. The latter, made of limestone slabs, are up to 0.4 m wide and ca. 0.14 to 0.16 m high.

Several secondary installations have been found in the stairway area. Particularly, the eastern side of the stairway is poorly preserved and in much worse state than its western counterpart. While the steps are still preserved there, these are much tilted downward, and often broken. It is then not accidental that a substantial retaining installation was found located in the NE corner of the stairway. The installation is ca. 3.85 m long and at least 1.4 m high. It can be described as the east-to-west barrier made of several column drums set one upon the other in pairs, and capped by large stones which include ashlar, a cornice and two voussoirs, the latter probably belonging to an arch which had presumably been located in front of the stairway. The eastern end of the barrier leans against Wall C. Since the natural deterioration and damage is much more evidenced on the eastern side of the stairway, the barrier might have been erected to prevent the stone and soil material to tumble farther down and upon the street. Of interest is the fact that the barrier appears to have been dug into the stairway, that is the flagstones of the steps, and the elements of the substructure seem to have been removed or washed away prior to the

construction of the barrier. The remains of small obscure walls or structures located directly to the north of the barrier, may have belonged to the installation.

A similar installation but less defined occupied the central-southern area. That stone barrier (Wall J) made of irregular stones laid in two rough courses, was fully recorded and then dismantled since it hampered the progress of excavations. Most probably, Wall J is a relatively modern structure. Somewhat directly above it, the remains of a water channel were discerned. The channel passed E-W across the stairway and into Area South. The construction of the channel is exceedingly simple; basically a shallow trough-like depression in ground, sometimes lined up with clay. Some sections of that conduit were carried upon a frame made of stones. Local informants confirmed that the channel installation is modern (early 20th century), and that it probably runs from the vicinity of the Theater westward up to the area of the Great South Temple.

The landing in the front of the stairway seems to be of the same width as the combined sidewalk and the stylobate in front of the shops. Its pavement is preserved only on the west side, abutting on two sides the large western pedestal of the arch. The moulded pedestal is ca. 2.6 x 1.22 m, but its northern part is entirely missing. The features of the pedestal as well as its dimensions, whether actual or estimated, suggest that there may have been some association between the colonnade's stylobate and the pedestal (Kanellopoulos 1996: 8). The eastern pedestal was almost totally washed away or removed, so only the poorly preserved foundation courses remain *in situ*. The soundings carried out against the sides of both pedestals appeared inconclusive for the dating of the pedestals and their ancient appearance (square or rectangular). Yet, these provided some data concerning the early history of this area in general. If the

pedestals indeed supported an arch with the Trajanic inscription as its frieze, the diameter of the arch would have approached 6.2 m, being one of the largest known from Jordan (Kanellopoulos 1996: 8-9).

Area South

Initially, the work was concentrated in the southern (upper) part of this area, to remove a considerable bulge of earth and stone material located there, and to relieve the pressure of that material upon the back walls of the rooms to be excavated. That operation revealed the continuing course of the 20th century channel coming from the stairway area, as well as a simple flight of seven stone steps running from NW up in the SE direction. No clearly defined surface associated with these steps could be discerned, but the occupational remains associated with ashy deposits were found to the north of the steps.

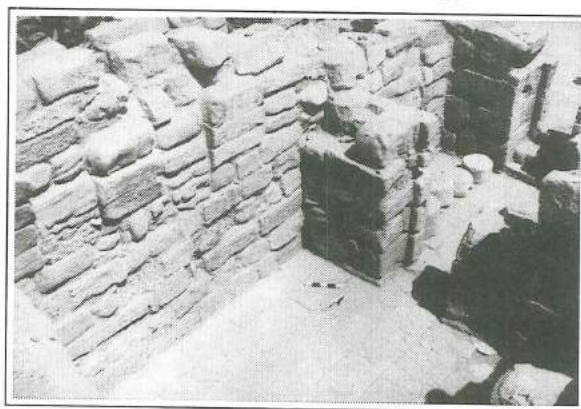
Following, the excavations proceeded in a wide-space manner, with the removal of the upper 0.5 to 1.5 m of soil and stone deposition. The goal of this procedure was to expose the walls which defined the room spaces in this area. Wall L, the back wall of the shops, which runs E-W, was exposed first. It is a massive structure, ca. 1.2 m wide. The top of the wall at its highest point is over 4.5 m above the associated room pavement. The tops of Walls M and N, P and Q became exposed too, which allowed to delimit the areas of Rooms XXVIII-XXVI. As opposed to the former, Walls P and Q were found to be extremely poorly preserved, sometimes no higher than 2 m above the floor of the adjacent rooms. Once the top of the aforementioned walls, as well as the strata which contained the collapsed arches, became apparent, the recording system as pertaining to Area South was discontinued. The only exception are the south arches in Room XXVIII which were recorded as belonging to Area South, due to their unusually high level of deposition. In general,

large quantities of stones, often in tightly packed clusters, were removed during the excavations of Area South. These stones belonged to the upper parts of walls surrounding the shops, but many came down from the area of the Upper Market. The latter is supported by the presence of very large column drums, capital fragments and ashlar blocks. Several major layers of collapse could be distinguished, interspersed with silting and mud-slide layers.

Room XXVIII (Fig. 4)

This shop is directly adjacent to the stairway on its west side, and is the best preserved in the entire excavated complex. It also features certain details which do not occur in other shops. Two niches which are semicircular in section, flank the the door in the portico wall (A). The niches are ca. 1 m wide. Shop XXVIII consists of two compartments - the northern (front) and the southern one (back) - separated by Wall M. The back room is almost square - 4.75 (E-W) x 4.95 (N-S) m, while the front room is a rectangle, 4.73 x 2.72 m. The door in Wall M, which is symmetrical to the door in the portico wall, allows for an uninterrupted communication between the portico space and the back room. The original width of the doorway in Wall A is equal to 1.7 m, while that of the doorway in Wall M is 1.61 m.

Evidently, there was an upper floor



4. Room XXVIII. The back room. View from SNE (Photo Jan Vihonen).

room(s) over Room XXVIII, accessible through the west door located in the stairway. The upper floor was supported by arches - three in the back room and one in the front space - and Wall M. The arch springers are well preserved in the back room, and the entire design of arches and springers is very uniform. Each arch/springer is ca. 0.76-8 m wide, and the interspringer spaces, including also the spaces between Walls L and M and the adjacent springers, are uniformly 0.65 m long. The single arch in the front room is known only from the empty spaces in the northern portions of Walls B and N, where the corresponding arch springers should have been located. It is clear that the arch springers here were set higher than in the back room, the distances between the springers of the single arch and the adjacent walls (M and A) were longer and unequal, and the arch itself probably exceeded the width uniform for the arches in the back room. It is also notable that the manner of bonding versus abutting observed in the north corners of Walls B and M, and M and N is highly irregular, and this may suggest that the northern portions of Walls B and N, that is beyond their contact with Wall M, could have been added later, or a least substantially remodelled at a certain point in time.

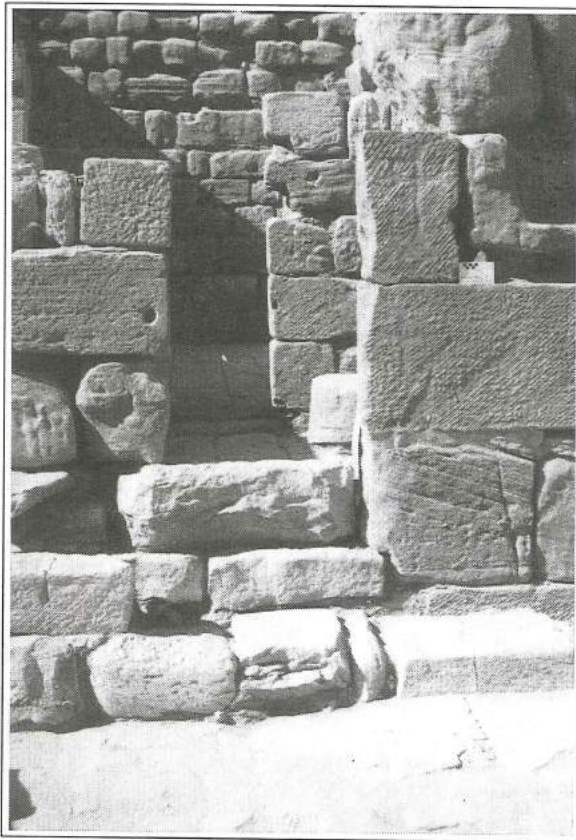
The exposed pavement in the front and back compartments is made of rectangular sandstone pavers, and is relatively well preserved. Puzzling are a series of rectangular sockets in the pavement all along the south, west, and east walls which limit the space of the backroom. The sockets are grouped in pairs; within each pair one socket is set directly against the wall and the corresponding one is in a distance of ca. 0.4-0.43 m away. Each socket is approximately 0.09 x 0.09 x 0.05 m, but some are more rectangular or trapezoid in shape. Most of the sockets are cut in the edges of the paving slabs, thus totally contained within a single slab. However, some are drilled in

the central part of the pavers, or cut half-and-half exactly on the edge between two adjacent pavers. That generally occurs in the case of sockets located against Wall L, since the pavement of the back room was laid out in the N-S orientation pattern. All this indicates that the regular spacing within each pair of the sockets had to be retained, and that the sockets were cut or drilled when the pavement of the room was already *in situ*. Altogether, 20 sockets (=10 pairs) were noted in the back room. Presumably, these served to fasten a bench along and against the walls, or series of pedestals. Only two pairs of sockets were found in the front room; both were set against Wall M.

Both external and internal doors in Room XXVIII had been partially blocked at some point in time. The masonry blockage in Wall A is 1.03 m wide, leaving the entrance reduced to 0.67 m. The corresponding dimensions related to the door blockage in Wall M are 0.82 m and 0.78 m. Both blockages occupy the eastern side of the doorways, and are carefully built. The blockage in Wall A features the door-jamb stones facing west to correspond to the original door-jamb stones facing east. This indicates that a door was inserted in the doorway space left by the blockage. No such arrangement exists in the door in Wall M. Notably, a chiselled out drum is a part of that blocking. A new, higher threshold was added in the doorway in Wall A apparently just before the blocking occurred. Probably, the occupation level in the exterior of the room, on the sidewalk, had sufficiently risen to warrant a new threshold. This should relate to the secondary "Byzantine shop" associated with Walls E and F which were built on the sidewalk apparently in the same time period. The western side of Wall E stands directly on the soil bedding of the pavement which is missing here. It means that these secondary walls were built when parts of the pavement in the front of the stairway and the shops had already been washed

away. The low bench built in front of the portico wall may also be secondary and dating from the time when Walls E and F were erected. The sidewalk in front of Shop XXVIII is ca. 5.68 m wide, including the front step, the stylobate for the colonnade, and the bench. The north edges of the sandstone stylobate and the front step are heavily eroded, presumably as a result of heavy floods. The damage is particularly substantial in the intercolumnar spaces, which suggests that it had happened when at least some columns were still *in situ* (Kanellopoulos 1996: 17).

Two crosses incised on the façade wall, and one on Wall M (Fig. 5) should also be associated with the later history of this shop. No other crosses have been noted anywhere in the excavated complex, nor elsewhere on the portico wall. One wonders if Room XXVIII was initially a commercial establishment at all. Perhaps, this particular



5. Room XXVIII. Two crosses on the outer façade and a cross on the inner partition wall (Photo: Z.T. Fiema).

room was originally planned and used as a small edifice of a non-mercantile function. The presence of the niches in the front wall, and the general proximity of the arch with the monumental imperial inscription of Trajan may be of significance. The crosses, put there during the Byzantine period, could have been meant to “christianize” the previous non-Christian character of the edifice. Alternatively, the crosses might have marked the church ownership of Room XXVIII during the Byzantine period.

No finds of significance, or attesting to the latest function and the nature of occupation were found in the back room of Shop XXVIII, except for a few broken storage jars recovered from the corners of the room. As for the front room, a small rectangular bin built of roughly dressed ashlar was found in the SE corner, as well as a round stone basin (mortar?). Three column drums and one very weathered capital or base, of a diameter ranging between 0.48 and 0.63 m, were found seemingly *in situ* in the western part of that room. These were presumably brought in to serve as tables or seats. Generally, there is more evidence for the latest occupation in the front room than in the back room.

The interior of both rooms were filled with stone and sandy-loamy material. The ceramics on the floor and in the fill were not abundant here, in contrast to the other excavated units. No well-defined occupational surfaces could be recognized in the fill between the floor and the layer of the collapsed arches, although traces of casual occupation are attested. Moderate numbers of paving stones from the upper floor as well as roof tiles were encountered mostly in the lower strata. In contrast to the other rooms, especially Room XXVII where the collapsed arches preserve their voussoirs in the E-W rows resembling a domino pattern, the arches in Room XXVIII are poorly evidenced. Only the eastern half of the southernmost arch and several voussoirs from the

eastern half of the next arch were recovered in relatively orderly rows and extremely high above the pavement. The top of the voussoirs of the southernmost arch was at the level of 878.75 m, that is 3.5 m about the floor level (875.22 m). In case of the voussoirs of the next arch, this distance is ca. 4 m above the floor. The preserved part of the southernmost arch still shows the original curvature of the arch. Besides these mentioned above, no other clearly distinguished voussoirs were recovered from the back or front room, although many badly eroded and/or broken rectangular blocks found there could originally have served as voussoirs.

This evidence suggests several possible scenarios of a gradual process of abandonment and disuse in Room XXVIII, all of which will be carefully reviewed and confronted with datable ceramic material from the fill. The level of the arches' collapse in the back room (Fig. 6) indicates that the arches were probably still intact when the room was abandoned and in process of being slowly filled up with debris and natural deposition. Perhaps, voussoirs from the other arches were not recognized during the excavations, being too weathered and broken. But it is also possible that the initial destruction had brought down the upper floors and the roof as well as most of the arches, and only the two southern arches were left still standing. Then the space below was at



6. Room XXVIII. Collapsed arches (Photo: Jan Vihonen).

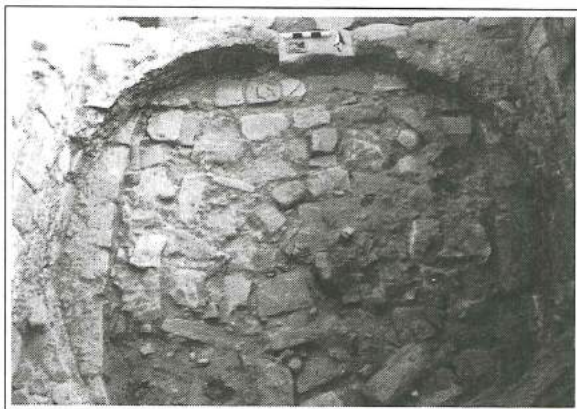
least partially cleared - especially the front room - and both rooms used for a limited occupation. That would account for the lack of voussoirs during the excavations. In fact, possible traces of a makeshift roofing support over the front room were noted in its surrounding walls. Such limited occupation could have continued, except for the breaks for later major episodes of collapse caused by natural deterioration or earth tremors. Alternatively, following the first tremor-caused collapse, only the front compartment was cleared and utilized for some time, while stone and sand material was naturally accumulated in the back room where at least two southernmost arches were still standing.

Room XXVII (Figs. 7 and 8)

As opposed to the partitioned Room XXVIII but similar to Room XXVI, this room is currently a single, rectangular unit. The width of Room XXVII is 4.34 m on the north side, and ca. 4.47 m on the south side. The length is ca. 8.45 m. The pavement in the north half of the room is relatively well-preserved; the paving slabs were laid out in the N-S orientation pattern. Only in the west-central part of the room, especially in the area adjacent to a large installation which is situated in the southern half of the room (*infra*), the pavement had been removed. That exposed an irregular stone bedding or an earlier pavement (?) there.



7. Room XXVII. The 'installation'. View from NE (Photo: Z.T. Fiema).



8. Room XXVII. The octagonal 'installation' (Photo: Jan Vihonen).

The original width of the entry door in Wall A is 1.63 m.

The room was spanned by five arches which supported the upper floor. The existence of an upper storey with a stone-paved floor is also evidenced through the presence of numerous paving slabs in the debris inside the room, being often of a large size. The arrangement of the arch springers on the west face of Wall N partially mirrors that on the east face of this wall toward the interior of Room XXVIII. The three southern arch springers are each ca. 0.77-0.8m wide. However, instead of a partitioning wall, as featured in Room XXVIII, there is an arch springer here, being the fourth from the south. This poorly preserved springer appears to be at least 0.85 m wide. The fifth, northernmost arch springer is about 1.10 m wide. The distance between these two springers is ca. 0.95 m. The five arches presumably correspond in size and location to the five arches of Room XXVI which is also deprived of a partitioning wall. The wall (P) which divides these rooms is rather insubstantial in width. It means that the arches in both rooms were very well balanced to prevent buckling of the wall in either way.

A puzzling feature is a quadrangular enclosure which occupies the entire southern half of the room (Figs. 7 and 8). The structure is ca. 4.4 m wide (E-W), and its length varies from 4.66 m (east) to 4.44 m (west). The structure appears to be a wall to wall,

masonry-built, tank or basin with slightly curved internal sides and rounded internal corners. The construction material includes large ashlar, roughly dressed stones, as well as column drums or even halves of capitals. The construction is rough in appearance but sturdy and solid. The curvature of the corners was further enhanced by the four mixed masonry/clay-built triangles with slightly concave long sides, located on the top of the stone frame. The greenish-grey mud mortar was found still adhering to the concave surfaces facing the interior of the installation. The triangles fully integrate with the front wall of the installation, which also supports its northern side. Resulting uppermost internal form of the installation is almost rounded, but for its slightly flattened sides which produce a somewhat octagonal effect and a rough diameter of ca. 4.4 to 4.5 m. The north wall of the installation stands directly on the pavement of the room on the east side. On the western side, however, the wall appears to have been built directly on a soil layer which might or might not be a component of the bedding for the room pavement. In general, the western area alongside this wall seems to have been much disturbed, presumably before the installation was built.

The bottom of the installation consists of a stone pavement made of irregular slabs put tightly against each other but without any particular pattern. The absolute level of this floor is only slightly lower than that of the pavement in the north part of the room. Two layers of large stones and ashlar in loamy soil were intentionally deposited on this floor, in a very tightly packed but unpatterned order. A roughly flat stone surface was laid out on top of these layers, which totally sealed the interior of the installation. This stone surface, rather irregular in appearance although tightly packed, was placed at the level equal to that of the bottom of the triangular corners. Close to the center of the area, a single upright-standing

stone was found which integrated with the surface. Thus the final appearance of the interior of the installation is that of a raised, slightly octagonal stone-paved area surrounded by a low, quadrangular masonry-and-clay frame. The top of the frame is ca. 1 m above the floor level of the north part of the room, and ca. 0.3-.35 m above the stone-paved surface inside the installation.

The installation is probably composite in both the components and the date. For example, the combined masonry/clay superstructure which includes the corner triangles and which makes the internal form roundish-octagonal at the top, could have been added later. Also the fill of the interior, that is the tightly packed stone layers and the stone surface which sealed the interior, might be a later addition, after the initial function of the installation ended or was altered. This hypothesis is seemingly supported by the fact that the second to fourth century sherds were found within the masonry structure of the installation, while the fourth/fifth and perhaps early sixth century pottery was recovered from the fill underneath the sealing surface. Alternatively, the entire structure—the stone frame, the stone/clay superstructure and the fill including its sealing surface—could have been built in the same time, probably relatively late in date although differences in the quality of construction of particular components are notable.

So far, the purpose of this installation, whether initial or secondary, remains elusive. The structure appeared at first like a lower part of a large kiln, with the entire brick-made superstructure (the upper chamber where ceramics were fired) completely missing. Admittedly, large numbers of bricks or tiles, many either poorly or over-fired, were found in the strata directly above the stone surface of the installation, and generally in Room XXVII. Also, a surprising number of the mixed ore, and copper smelting process by-products was found in

these strata. These included partially melted ore pieces and fully vitrified slags. However, the strata contained a very small amount of ash or charcoal, which would be hardly compatible with a kiln function. It is possible that once the installation was abandoned, the space could have become a convenient dump for debris generated from elsewhere. Incidentally, the slag material was found only in Room XXVII. On the other hand, it is evident, that the roughly flat stone surface inside the installation was meant to have a rounded form to facilitate some kind of industrial operations to be conducted within. The function of the installation as a press, either wine or oil, cannot be entirely excluded, although no elements of the mechanism nor the outlet channels were found. A threshing floor is less likely due to the indoors location of the installation. It must be assumed that either this installation was never finished, or its elements belonging to the upper or interior mechanisms were totally dismantled, and all other traces obliterated. Four drums have been found in the northern half of the room. Three occupy the position in front of the installation and more or less in the central position. One is a very large drum, ca. 0.75 high, with a diameter of ca. 0.68 m. The other two are stacked up reaching altogether the height of ca. 0.72 m. It is possible that these three drums had something to do with the function of the installation.

Remains of a small door (?) in Wall P are also difficult to explain. The door occupies the space almost exactly on the line of the second arch from the north. This arch is suspected to be secondary, being a replacement of a transversal wall which originally divided the room (*infra*), not unlike to, and exactly on the same line with Wall M in Room XXVIII. Therefore, this door could not belong to the early phase of the room. On the other hand, if the door was constructed later, when the arch replaced the wall, the location of the arch somewhere

over the door lintel is hardly practical or structurally stable.

Similarly, the door in Wall A was blocked by a masonry construction at a certain point in time. The blockage is ca. 0.66 m wide, reducing the doorway opening to ca. 0.97 m. It is possible that once the aforementioned installation went out of use, the front part of the room was adapted for domestic use. A small irregular bin, filled with numerous sherds, bones, ash and charcoal, is located in the front half of the room, directly against the north wall of the installation. The bin seems to be a disposal place for rubbish from a cooking place which was not located but which would appear unrelated to the function of the installation in the back of the room. The bin contained mostly the fifth century sherds. Another bin which consists of three stones forming a rectangular enclosure in the NE corner of the room, is similar to these from Rooms XXVIII and XXVI. Among few sherds found inside the bin were the early sixth century pieces and some fragments of storage jars.

The interior of the room up to the level of the collapsed arches was filled with large stones, sandy soil and abundant debris including semi- or overfired bricks, slags and semi-slugs, as well as large-size roof tiles. While the roof tiles, and paving stones concentrated in the lower layers, the slags and the ashlar were more evident in the upper strata. That may indicate that following a limited later occupation, the room might have become a convenient disposal area. The first major collapse occurred when the room was already filled to some extent with debris, but this event did not seemingly bring down the arches. The collapse surface was smoothed over and reused for some kind of occupation leaving bones and small ceramic fragments embedded in the surface. That occupational layer was in turn sealed by a thin sand layer upon which most of the arches collapsed. The five arches fell in or-

derly rows, and most of their voussoirs have been recovered. It is possible that the three southern arches collapsed first, followed then by the two in the front, although their deposition levels represent a difference hardly exceeding 0.5 m. In particular, the top of the three southern arches were found ca. 2.0-1.7 m above the floor level (= ca. 1.35 -1.0 m above the stone surface of the installation), while for the northern arches that distance was ca. 2.5-2.2 m.

Room XXVI

This is a large, long room comparable to Room XXVII interior in dimensions and other features. Room XXVII. The original doorway in Wall A is 1.61 m wide. is also the least preserved of all excavated rooms. Wall Q which limits the room on the west side, is almost completely destroyed in the southern part. Apparently, that section of the wall bore the brunt of a powerful destruction. Unfortunately, neither Wall P (both east and west faces) nor Wall Q (east face) are preserved to the height marked by the arch springers.

The main feature of the room is the flagstone pavement which features two well-defined but considerably differing sections. In the southern part which is ca. 4.6 m long (N-S) and of the width which equals that of the room, the pavement is exceedingly worn and poorly preserved. Mostly rectangular, but sometimes almost oval slabs are oriented in the E-W pattern. Many slabs are broken or sunken, and in some places the orientation pattern appears to have been replaced by a highly irregular design. In the north part of the room, which is 3.85 m long, the pavement made of rectangular slabs is much better preserved, and its orientation pattern is N-S. The borderline between both pavements follows exactly the line represented by the north face of Wall M in Room XXVIII, and the north face of the arch springer in Wall N, which is unusually wide and which belongs to the sec-

ond arch from the north in Room XXVII. Furthermore, considerable disturbances of the ashlar coursing have been noted in Walls N (west face), P (both faces) and Q (east face) exactly in the area of the second arch from the north. It is also significant that the line of Wall M is exactly followed by Wall R in the unexcavated Room XXV (see Fig. 1). While either one of these facts could be accidental when considered separately, the combination of all of them is not. Soundings opened in Room XXVII in the area under the second arch, and in Room XXVI in the area where both pavements meet, revealed clear remains of walls which originally run E-W, following the line of Wall M in Room XXVIII. These walls, known only from the soundings, are marked on the plan as Walls X (Room XXVII) and V (Room XXVI). As demonstrated below, the existence of these walls has a capital importance for the restoration of the early appearance of the shops, which obviously differed from the extant kind.

Sometime during the later period, four secondary installations had been built in association with Room XXVI. These are the sidewalk's cross-walls (G and H), the elevated surface limited by these walls, the partial blocking of the door in Wall A, and the new, higher threshold with the flight of steps leading down to the interior of the room. The walls and the platform in front of Room XXVI represent one of the best examples of what scholars termed as the "Byzantine shops" in Petra. Walls G and H extend northward from the face of Wall A. They enclose the area which is ca. 0.5 m higher than the neighboring pavement of the portico. The platform, ca. 0.5 x 0.63 m, was built of large stones and ashlar which were set directly upon the sidewalk. The surface of the platform is paved with variety of flat stones, including regular pavers, with a tendency for the N-S pattern but not strictly observed. So defined room or shop occupied the entire portico space in front of Room

XXVI, and perhaps encroached upon the street as well. The intended elevation of the floor of that room versus the original sidewalk may indicate concern over flooding which, as demonstrated below, was a significant threat in the entire eastern end of the colonnaded street. The new threshold in the door, and the secondary blocking could have been made before the construction of the platform but certainly not afterward. Most probably, these were constructed in the same time as the raised area. Since the top of the area in front of the Room XXVI was now to be more than ca. 0.5 m higher than the floor in the room, a new threshold which consists of the front slab and three shallow steps, was inserted in the doorway. Only upon that threshold, the masonry blocking was constructed on the western side of the doorway. The blocking is 0.48 m wide, and it reduced the doorway to the width of ca. 1.13 m.

The following elements found inside Shop XXVI are either contemporary with the development described above, or should be dated to the later period. These are five column drums and two extremely weathered small capitals or bases, all of which were found standing on the floor in the southern part of the room, to serve as either seats or tables. A small bin, ca. 1 x 1.2 x 0.45 m, built of rough stone blocks in the NE corner of the room, bears resemblance to that from Room XXVIII. It is possible that even after the initial collapse, the northern half of Shop XXVI was still occupied together with the "Byzantine shop" located in front of Wall A. The differential collapse of the five arches which spanned the width of the room might have facilitated such situation. As in Room XXVII, many voussoirs were found inside, but in much less defined clusters. Instead of orderly rows of complete arches, the voussoirs here were more stacked up in broken rows and clusters, which gave these deposits a greater depth. Nevertheless, it is obvious that the three

southern arches could have fallen down relatively early, being deposited ca. 1.6-0.9 m or less above the floor level. As for the two northern arches, these are poorly evidenced, especially the northernmost one. Yet, their deposition is estimated for ca. 2.3 - 2.1 m above the floor of Room XXVI.

Rooms XXV and XXIV

Limited work was conducted in front of Rooms XXV and XXIV. That included the clearance of their doorways and the adjacent area of the portico. The doorway to Room XXV was originally ca. 1.62 m wide, but was later blocked by the masonry wall which left the entrance reduced to 0.54 m. The blockage features door jambs fitted to correspond to the original western door-jambs of the doorway. Elements of a Doric frieze, including triglyphs and metopes were found reused in the blockage, or scattered in front of the room. The door to Room XXIV is ca. 1.61 m wide, but no traces of a secondary blocking are preserved there. The portico area in front of both shops had received a new surface raised by ca. 0.2 m with regard to the original sidewalk level. That secondary surface was presumably paved, although not much is left of the pavement. The raised area is limited by Walls H and I which run north from the portico wall. There are remains of a rectangular installation (?) in the east-central part of this area and roughly in front of the door to Room XXV. The installation consists of four paving stones surrounded on three sides by stone blocks slightly higher than the adjacent secondary pavement.

Area East

The work in this area included only a general ground clearance, thus the interpretation offered here is largely hypothetical. This preliminary assessment confirmed some observations generated by the previous prospection of the area. There are two doorways in Wall C, and two small

room spaces (XXIX-XXX) on the lowest level. Area East is characterized by the series of parallel E-W walls which enclose long and rather narrow spaces or galleries on the increasingly higher ground. Three parallel E-W walls are well visible. The lowermost is Wall S, ca. 1.2-1.3 m wide, which is also the back wall of Rooms XXIX-XXX. This wall is exactly on the same line as Wall M in Room XXVIII, and Walls X and V found in the soundings opened in Rooms XXVII-XXVI. Wall S was evidently cut and patched to abut Wall C of the stairway. It seems therefore that Wall S may be one of the earliest walls at the site.

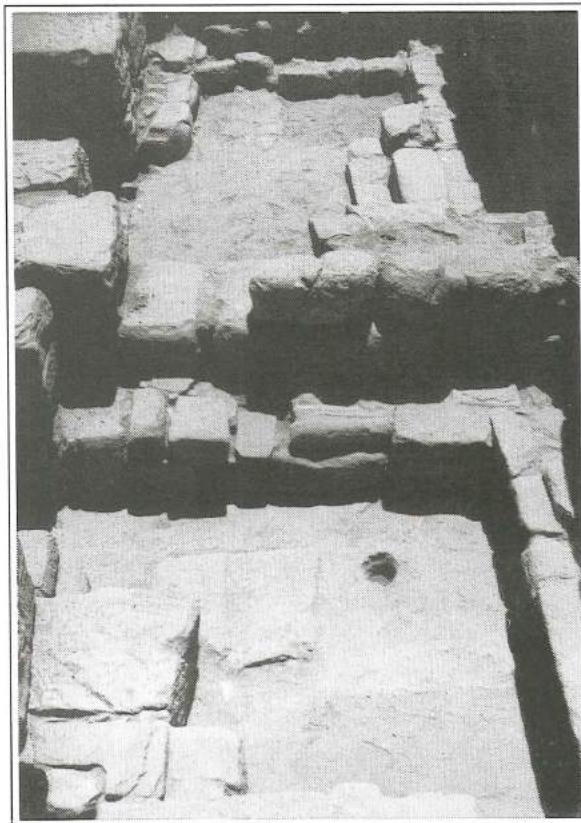
In particular, Wall S serves as a retaining wall of a structure substantial in size and made of small and irregular stones, the remains of which can be seen directly behind the wall. That structure must have been a basis for a long and narrow space between Walls S and AA. The opening to that space which is only ca. 3.2 m wide, is the lower doorway on the eastern side of the stairway. Wall AA preserves two pilasters on its north face. Some retaining installations or barriers, probably secondary, appear to have been built in the gallery. Farther up the slope is another space or gallery of the same length and width, and contained between Walls AA and BB. That gallery was accessible from the upper door located on the east side of the stairway. Two columns are located in that gallery, standing directly against the north face of Wall BB. Each column has three drums visible above the ground, with the bases of these columns being under the uncleared sandy deposits. It appears, however, that the columns are *in situ* because each corresponds in a straight N-S line to a pilaster in Wall AA. All drums seem to be of the same diameter, being ca. 0.85-0.86 m. Since the doors which provide entries to both lower and upper galleries have been completely exposed during the clearance of the stairway, it is evident that

the deposition on the floors of the galleries is not excessive, and approaching a maximum depth of 1-1.2 m. Wall BB appears to be ca. 1.1 m wide, but obviously it is only an outer part or shell of the succession of the parallel wall courses which formed the retaining structure of the Upper Market. The width of this entire space between the north edge of wall BB and the stylobate of the portico of the Upper Market is ca. 3.9 m.

One wonders whether the appearance of the entire area should be reconstructed as a set of two-storeyed shops or rooms, parallel in appearance to that on the western side of the stairway. The row of shops in the north, to which Rooms XXIX and XXX belong, appears to be an added feature against the backdrop of the massive structure of Wall S. With one possible exception which may, in fact, be an eastern limit of the lower gallery, both galleries do not seem to feature any cross or partitioning walls. The two columns *in situ* in the upper gallery, and the two pilasters of the lower gallery are particularly intriguing as they do not seem to fit the interior of an ordinary room or shop. It is possible that the entire architectural design of Area East was intended to hide the irregularity of the bedrock which is probably substantial in here, and to provide an aesthetically acceptable eastern frame for the monumental stairway. The two long and narrow spaces were perhaps open or covered porticoes, a hypothesis particularly fitting the upper gallery. The general impression of the entire area is that of a huge façade-in depth, as in an elaborate, theatrical backstage building with two gradually superimposed and offset stages.

Rooms XXIX and XXX (Fig. 9)

These two rooms are located directly east of the stairway. Considering their size, and appearance, these could be termed as twin-rooms. Their size and parallel location makes them roughly similar to the front room of Shop XXVIII. The façade wall (D)



9. Rooms XXIX-XXX. View from W (Photo: Z.T. Fiema).

which is ca. 1.28-1.34 m wide, resembles Walls A and C in the manner of construction, however, it is in line with neither Wall A nor with the edge of the stairway's lowermost step. Also, the NW corner of Shop XXIX, which features extremely thick walls, is not at a right angle, a fact already observed before (Kanellopoulos 1996: 6). Both rooms are hardly symmetrical or regular, as opposed to the shops west of the stairway. Room XXIX is ca. 2.8 m wide (N-S), but the length differs from 3.6 m in the south to 3.76 in the north. The width of Room XXX varies from 2.6 m on the eastern side to 2.8 m on the western side, and its length is a little greater in the north (3.9 m) than in the south (3.8 m). The doorway to Room XXIX is ca. 0.9 m wide while that to Room XXX is 1.23 m wide. There are remains of a blocking in the doorway of Room XXIX but no such element was found in Room XXX.

The main feature inside Room XXIX are

the benches, or low counters built against the south (S) and east (U) walls. The benches are ca. 0.5 m wide and up to 0.53 m high. They are made of stone blocks of varying size, and capped by slabs which might have served as seats. The final (please change for main) occupational surface exposed in this room is a floor made of hard-beaten clayish soil. The benches appear as if standing on this floor, but in fact their foundations made of small irregular stones and exposed by the soundings, are clearly below the floor level. The other features are two postholes dug in the clayish floor, one located in the SE corner, and the other slightly farther to the NW. The first hole is ca. 0.1 m deep, with the diameter of 0.16 m. The corresponding dimensions for the second hole are 0.15 and 0.2 m.

As for the structure at the western side, its initial function was probably other than a bench, thus its appearance warrants a more detailed description. This bench-like structure is ca. 0.5 high above the floor level, but it is not located directly against Wall C, nor does it extend all the way north toward Wall D. Instead, a gap ca. 0.22-.28 m exists between the structure and Wall C, while the structure clearly stops ca. 0.24 m south of Wall D. Furthermore, the construction of this structure notably differs from the other benches. Large blocks have been used here, including well-dressed ashlar and one reused door jamb set in the NE corner of the structure. Therefore, it appears to have originally been a wall (Y), probably a part of another, larger construction, perhaps an anta. Although it must have been cut down to the extant height, Wall Y does not seem to have been cut when Wall D was constructed. Since the north side of the former is plastered, it appears that its presence had little impact on the construction of Wall D. Curiously, what is left of Wall Y is abutted on its NE side by other stones which continue north-east to be integrated with Wall D. Wall Y seems to abut Wall S on both

sides. The relationship between Walls S, Y and Wall C is apparent. Walls S and Y had already been *in situ* before the construction of Wall C and thus the stairway. Wall S currently abuts Wall C but the contact area displays a secondary plug made of stones. It means that Wall S was cut before Wall C and the stairway were built. Obviously, the planned width of the stairway was a matter of importance. Otherwise, Wall Y might, at least partially, have been utilized as the eastern side of the stairway. At any rate, the new wall (C) was built, and Wall Y was demolished down to the level corresponding to the planned benches in Room XXIX, and thus utilized as another bench. At its current state, Wall Y is ca. 1 m wide expanding to ca. 1.1 m at its southern end.

The elements of one arch were found inside the room, but the arch springers were not present at the preserved level of either one of the surrounding walls. Instead, a curious arrangement exists in the NW corner of the room, which consists of two stones located side by side in Wall C and projecting into the room's interior by ca. 0.2 and 0.23 m respectively. Although these stones could have something to do with the arch springer, they may be better interpreted as supports for some kind of installation allowing access to the upper floor. There are also some irregularities in the construction of Wall D, visible in its southern face. One suspects that all that may have some relation to the old Wall Y, as well as to other elements which could have preceded the construction of the room but were retained when Room XXIX received its current appearance.

Benches are also prominent in Room XXX, although these are less preserved here, and mostly missing the seat slabs. The eastern, northern and western benches are all ca. 0.45 m wide, with the height about the floor level ranging from 0.25 m (east bench) to 0.38 m (west bench). The southern bench is somewhat different. Its height

is 0.38 m but the width changes from 0.75 m in the western and central parts to 0.42 m in the eastern part. That may be due to stones missing in that part. Additionally, this bench has a low step situated in the front, being ca. 0.26 m wide and 0.1 m high. All benches have foundation courses which continue under the extant floor level. The floor itself is also made of hard-beaten clay. It is possible that both rooms had originally had stone paved floors, but these were removed or completely washed away and never replaced. Instead, the clayish soil bedding served as the latest occupational surface. The threshold of the door in Shop XXX is not preserved - either removed or washed away - exposing the stone substructure of the doorway.

The significant numismatic finds inside Rooms XXIX-XXX warrant a more detailed description of the extant stratigraphy. Upon the floor of Room XXIX, a thin homogeneous layer of ashy soil (locus 13) was encountered, which yielded 53 coins, seven of which were certainly minted after AD 363. Directly above, was a layer of sparsely distributed construction stones (locus 11), without any definite pattern, but seemingly not originating from a collapse. Rather, some attempt on creating a stone bedding (?) level may be postulated. There was some ash in the lower part of the soil matrix of this layer. Thirteen pre- and one post-363 coins were found in locus 11. Following was locus 07 - a layered deposit of sand and coarse clayish silt, ca. 0.15-.28 m deep. That deposit, characteristic for flood event morphology, contained four coins. All three loci occupied only the central space of the room, surrounded by the benches and Wall Y. All contained the pottery of the fourth century AD, which could easily date to the pre-AD 363 period. The entire area was, in turn, covered by locus 05, a very heterogeneous layer of silt with the abundance of cultural material, including four coins. The more ashy locus 05A, contiguous to 05, was spe-

cifically located only over the benches and Wall Y, and it yielded 57 coins, with 13 post-363 issues. Locus 05 (including sub-locus 05A) and the superimposed locus 04 had sealed the entire interior of the room. Loci 05 and 04 seem to represent disuse, natural deposition, and probably the tumbled or washed down material from the area farther south. The combined depth of loci 05 and 04 was ca. 1 m. Loci 05, 05A and 04 had the fourth century sherds as well as these which might be dated to the later fourth/early fifth century AD. All these loci also yielded roof tiles. A number of early sherds (e.g. first century AD) was found in locus 04, probably washed down from Area East. The collapse of the arch in Room XXIX had occurred on the top of locus 04.

While this stratigraphic situation is relatively straightforward, the datable coin and ceramic finds are paradoxically making the interpretation more difficult and requiring further studies toward its refinement. The lower part of the stratigraphic sequence falls within the time of the AD 363 earthquake the impact of which, however, is not readily apparent here. The two main coin-rich deposits, loci 13 and 05A, contain pre- and post-363 issues, but they somewhat differ with regard to the dating of their respective ceramic contents. It is possible that the final occupation before the flood, characterized by the deposits on the floor *and* on the benches (i.e., 13, 11, and 05A), may have been somehow associated with a disturbance and/or its aftermath, as represented by ash, debris (probably related to the dumping inside the room), and stone blocks. The physical connection between the coin-rich deposits - locus 13 on the floor and locus 05A over the benches - could not be established with certainty during the excavations, although locus 05A sloped down from the top of the bench. Such connection could, theoretically, have been obliterated by the flood-generated material, locus 07. The flood physically separated the deposits

by covering these on the floor, but it was not substantial enough to cover the area higher up over the benches. Such flooding might have happened sometime in the early to mid-fifth century AD, and was apparently followed by the collapse of the arches soon afterward. On the other hand, it is possible that the coin hoards in loci 13 and 05A belong to two completely separate phases of the shop's occupation, isolated from each other both spatially and temporally by the flooding incident.

The situation in the adjacent room is less complicated, but equally in dearth of a plausible explanation. The alluvial, flood-related sand and gravel (locus 10) was found deposited directly over the beaten-earth floor. That locus was sealed by locus 06 which stretched all over the interior. A total of 44 coins was found only in locus 06A, a slightly ashy soil deposit located directly over the southern bench, and contiguous to locus 06. Out of 44 coins, 14 were minted after AD 363 - a ratio somewhat higher than that from Shop XXIX. Loci 06 and 06A contained the fourth century sherds, in addition to some dated probably to the early fifth century. The voussoirs of the arch in Room XXX collapsed on top of locus 06. It appears that the coins could have been deposited in the area over the bench either before or after the flood. Again, the impact of the earthquake of AD 363 upon this room remains elusive.

Considering the relatively narrow width of both rooms (ca. 2.6-2.8 m), long wooden beams could have been used instead of stone arches to support the roof. The presence of arches may relate to the existence of the upper floor and its stone pavement, thus a need for a more sturdy support of a heavy load above. Both the roof tiles and the paving slabs were found in the collapse layers. The fall of the arches may not have been simultaneous in both rooms. Voussoirs found there are generally smaller (shorter) than those from Rooms XXVIII-XXVI.

Their deposition patterns was also peculiar. The voussoirs collapsed in a single row in Room XXIX, close to Wall D, and with their tops over ca. 2 m above the floor level. In Room XXX, the voussoirs were grouped in two parallel rows of 5-6 stones each. One row was close to Wall D, and the other was located by the southern bench. The tops of both rows were at ca. 1.1 m above the floor. The uppermost strata contained multitude of stone material, much of which would have tumbled down from the Upper Market and from the galleries of Area East. Among the finds was a large fragment of a column drum with a thick layer of plaster forming the fluting design.

The sidewalk pavement is not preserved in the front of these rooms, nor the portico itself is evident there. Instead, there is a substantial outcrop of reddish sandstone in front of Room XXIX, which was partially chiselled out to form a horizontal surface. Periodical floods had further smoothed out the surface. The limits of the outcrop's extension northward were not detected. A rectangular base or pedestal for a statue or any other architectural element, is situated in the front of Shop XXIX.

The Soundings

Nineteen soundings were opened in the excavated area. These were located inside the rooms, on the sidewalk, in the front of the stairway and under its steps, and on the paved street. These soundings produced a substantial and relatively well-sealed ceramic material which will allow for substantive statements concerning the history of the area, by providing the dating for phases of architectural development. Several coins were also found in these contexts. Furthermore, some soundings exposed the remains of the earliest walls and structures in the area. It needs, however, to be stressed that in case of several soundings, these were opened in the spots where pavements were badly cracked or partially gone. It means

that some material from these soundings, especially from their uppermost layers, may be partially contaminated. That seems to be apparent in the case of soundings where uniformly dated early ceramics were suddenly accompanied by a coin dated late.

Sounding 1 has been opened in the NW corner of the stairway, under the flagstone steps which were *in situ*. This sounding revealed the manner of construction of the stairway, and provided material which helps to date the entire structure. The ceramics recovered from there date from the fourth quarter of the first century BC up to and including the first half of the first century AD, with hardly any later material. Sounding 4 was located on the street, directly against the lower step of the stylobate. The street pavement there was partially broken but even the uppermost strata seemed hardly contaminated, and the lower ones were certainly undisturbed. The sounding revealed at least two hard-packed surfaces, partially paved with small irregular cobbles. These might be the tracks or roadways suggested by Parr, which preceded the paved street. The locus directly beneath these yielded sherds dated only to the first half of the first century BC. Both tracks had ceramics dated to the first century BC and possible early first century AD sherds. All three layers were cut by the foundation trench for the stylobate of the colonnade. Sherds dated to the first half of the first century BC through the second half of the first century AD were found inside that trench. The foundation trench and the roadways were then sealed by the superimposed strata of soil and stone bedding for the extant pavement of the street. These strata -locus 33 D, C and B (from bottom to top) - yielded the sherds from the first century BC through the beginning of the second century AD, with no later material. Additionally, locus 33 D had a coin of Rabbel II dated to AD 76 -101. All that strongly suggests that not only the pavement of the street but also the co-

lonnade and presumably the sidewalk should have come into existence toward the end of the first century AD, or in the early second century AD

Soundings 2 and 3 were opened in the areas abutting the pedestals for the postulated arch in front of the stairway. The results were inconclusive, especially since the entire area must have much suffered through the natural processes of flooding, mud-sliding, tumbling, and washing away. As for the western pedestal, the pottery which seems to be associated with its foundation trench or was in a layer cut by it, appears to be no later than the early second century AD. The sounding set against the NE side of the badly preserved remains of the eastern pedestal, revealed extensive bedrock formation which, in places, was reshaped in way to accommodate the construction of the pedestal. The recovered ceramics ranged from the first through the fourth century or later. No connection with the expected pre-paved street stratification was established.

Soundings opened in the clayish floors of Rooms XXIX and XXX revealed pottery which ranged from the later first century BC until the early second century AD. Sounding 7 which was opened in the corner of Walls M and N (= SW corner of the front room of Shop XXVIII), produced sherds dated only to the second half of the first century AD. However, soundings sunk through the pavement of the back room of Shop XXVIII were less conclusive. For example, Sounding 5 under the seemingly undisturbed pavement, yielded the post-mid-first century AD sherds and no later material. Yet, directly under the paving stone, two Byzantine mid-fourth century coins were found. Sounding 6 was dug in the corner between Walls B and M, where the pavement was missing. The upper strata have yielded several fourth century coins in addition to ceramics which dated up to the end of the third century AD. But the lower strata which represented the foundation courses

and trenches for Walls B and M provided ceramics uniformly dated to the end of the first century BC - early first century AD. Sounding 10 inside Room XXVII, which revealed the remains of the demolished Wall X, produced sherds dated to the end of the first/beginning of the second century AD only. On the other hand, Sounding 13, inside Room XXVI, which exposed the remains of Wall V (in line with Walls M and X), yielded sherds of exactly the same date but also a coin of Justinian I. Soundings 15 and 16 opened in the southern half of Room XXVI, under very poorly preserved pavement, produced ceramics dated to the period between the second century AD and the early fourth century AD. All that may indicate that, while some substantial construction activities apparently took place at the site in the first and the early second century AD, later periods also saw some activities, perhaps associated with a remodelling, or replacing of pavements.

Preliminary Interpretation

Detailed studies of the excavated material, including the ceramic and numismatic material, as well as the architectural research, are yet to be conducted. Therefore, a preliminary attempt to interpret the site in terms of spatial and temporal changes must be treated as tentative and most likely to be substantially modified through the future studies. There is no doubt that the phases of development at the site outlined here will multiply or be subdivided during the subsequent research. At this point of time, the interpretation presented below concentrates on the excavation site itself, largely excluding the comments, parallels, or conclusions which stem from the previous excavations in the street area. While these will have to be reviewed, it is unknown now to what extent the results of the previous work in the western part of the colonnaded street are applicable to the situation at the eastern end of the street.

The natural factors, such as seismic events, always played an important role in the interpretive research on the history of Petra. While the impact of ancient earthquakes is also a prominent factor in this interpretation, another important factor which bears heavily on the history of the site is its proximity to the Wādī Mūsā-Wādī al-Matāha confluence in the area of the Nymphaeum, and thus the occurrence of flooding. Considerable flood-related deposits are well evidenced on the banks of the Wādī al-Matāha. The entire area east of the stairway must have been particularly prone to such disasters, and would bear brunt of the initial water onslaught. The flooding is indeed well-evidenced inside Rooms XXIX-XXX. Floods must be also responsible for the total disappearance of the pavement in front of these shops, for the substantial damage inflicted upon the pavement in front of the stairway, and upon the eastern arch pedestal. Notably, the western side of the stairway, the shops to the west of it, and the street pavement toward the west display a gradually decreased destructive impact of flooding. It is so because the deflection of water from the walls east of the stairway channeled it back toward the Wādī Mūsā depression. The substantial stone erosion of the stylobate of the colonnade may equally reflect mud-slides as well as floods. Strata which may represent minor flooding episodes were also found inside Rooms XXVIII and XXVII.

Heavy alluvial deposits were encountered in most of the soundings inside the rooms. It appears that the Wādī Mūsā natural drain depression which runs E-W, was originally much wider, and that the continuous flooding of the area eroded the lower parts of the sandstone formations while continuously carrying in riverine material and depositing it against the southern side of the wadi. That alluvial character of the lowermost deposits in the area is common everywhere within the excavated area.

As such the width of the Wādi Mūsā depression would gradually decrease throughout the ages, while the width of the southern bank of the wadi would increase. Possible traces of ancient meandering of the wadi banks were noted inside Sounding 8 (Room XXVII).

The urban beginnings at the site are shrouded in obscurity. Pottery recovered through the soundings is nowhere earlier than the beginning of the first century BC. Certain architectural remains are strongly suspected to belong to an earliest and poorly unknown phase of the development, which should have taken place at the southern part of the site, presumably against the outcrops of red sandstone formations there. While there is no shortage of the Nabataean pottery at the site, a general scarcity of Nabataean coins is puzzling. Out of 243 coins, only eight could be recognized as Nabataean, but ca. 22% coins remain unidentified.

One of the basic questions in this preliminary interpretation is whether Rooms XXVIII-XXVI had received their extant form already at the beginning of their existence, or were substantially modified later on through the addition of the northern extensions. Either hypothesis has its advantages and drawbacks. It is tempting, however, to suggest that the first recognizable phase at the site featured the construction of three almost square rooms which would correspond to the backspace of Room XXVIII and the southern parts of Rooms XXVII-XXVI. The extant Walls B, L, Q and M and the subsequently demolished Walls X and V would have been the external limits of these rooms. The latter three walls and Wall R would have served as the façade walls in this phase. If this hypothesis is correct, only the southern parts of Walls B, N, P, and Q belong to this phase. The line represented by Walls M, X, V, and R is identical with that of Wall S. That wall definitely precedes the extant stairway in date,

and it is possible that it then extended all the way west and across the stairway area, in way to join the course of Wall M. It is equally possible, however, that a stairway, in whatever form, could have already existed there, even during this early phase. What was in the front of so defined rooms is unknown, but an early portico situated where Wall A was later built, is an attractive hypothesis. Cobble-paved or beaten-earth tracks, being the predecessors of the extant paved street, would have stretched farther north. As for the eastern part of the excavated area, some structures should definitely have existed there in association with Wall S, and probably, Wall Y. This phase should date to the Nabataean period, presumably sometime in the first half of the first century AD, or somewhat later, on the basis of the ceramics recovered from the foundation courses in the corner of Walls B and M.

The following phase witnessed a grand expansion at the site. The stairway was presumably constructed - if not existent before, in a less grandiose form - and the monumental arch was built in front of it. Presumably, the requirements of the size and the gradient of the planned stairway deemed it necessary to add northern extensions to the original Shops XXVIII-XXVI. Newly constructed Wall A served as a façade/portico wall. While Walls M and R were retained in Shops XXVIII and XXV, Walls X and V were completely demolished in Shops XXVII-XXVI, at this point in time or perhaps later. The main evidence for this postulated northward expansion includes the different appearance of the northern parts of Walls B, N, P, and Q, the variations in the arrangement and dimensions of arches in the northern parts of the rooms vs. the southern parts, and the details which emerged from the soundings. Probably also Rooms XXX-XXIX, if these existed before, were now substantially remodelled in association with the construction of Walls C and D.

The architectural studies conducted before the fieldwork began, prompted an opinion that the colonnade could also have stretched in front of the stairway, and that only in the later period its portion facing the stairway was demolished to make place for the postulated arch (Kanellopoulos 1996: 20-21). That hypothesis still remains a distinct possibility which will require further studies. The excavation results would favor the opinion that the stairway is contemporary with the sidewalk, the stylobate and the colonnade, and the remodelled shops. There is also no compelling reason to dissociate the extant pavement of the colonnaded street with the development postulated above. In fact, this entire new design would make perfect sense also in connection with the arch in the front of the stairway, and the flagstone pavement of the street. The ceramics crucial for dating of these elements, uniformly indicate the later first century AD - beginning of the second century AD for this development. For example, Sounding 11 in the portico's pavement in front of Room XXVII yielded sherds which do not date beyond the second half of the first century AD. The fortuitous coin find (Rabbel II) in the bedding for the street's flagstone pavement, which sealed the foundation trench of the stylobate, also conforms to the chronological reconstruction proposed here. The sounding in the stone substructure of the uppermost, narrow section of the steps of the stairway, revealed only the first century AD sherds. Admittedly, this development could be dated to the last decades of the Nabataean independence, or could, at least, have begun then. However, with the inclusion of the dating evidence presented by the AD 114 inscription, the entire design might as well date to the Trajanic, or generally the post-annexation period, and this date is preferred here. Incidentally, it was already observed that the structures generally associated here with this phase often feature reused and recycled

stones that must have belonged to earlier classical buildings (Kanellopoulos 1996: 5, 11). It will require further studies to determine if this expansion at the site was in response to the postulated early second century destruction noted at az-Zanṭūr habitation quarter (Stucky 1996: 14, 21). A notable rapid and substantial development of the Petra's civic center in the early second century AD might also fully or partially have been related to the newly attained provincial capital status (Fiema 1997: 147).

During the following two centuries of the Roman period, modifications, repairs and remodellings could have taken place in the excavated complex. The enigmatic installation in Room XXVII could have been constructed then, at least in its initial form, although it was probably modified later on. The most common ceramic types found at the site included storage jars (large and small), amphorae, and unused cooking pots. Casseroles and pans were rare. This repertoire is characteristic for Rooms XXVIII-XXVI, supporting their commercial function, but not for Rooms XXIX-XXX. On the other hand, the abundance of coins found in Rooms XXIX-XXX also cannot be accidental, and it should somehow relate to the form of occupation there, perhaps including specific mercantile operations. The overwhelming majority of the coins found there is dated to the fourth century AD. The fifth century types are also present although these cannot be precisely dated. The dating brackets of numerous coins end just before AD 363, which may or may not be accidental. However, until the ceramic material is fully studied and understood in terms of stratigraphic sequence and relationships, the impact of the 363 earthquake on this area cannot be fully ascertained or defined. Historical sources clearly indicate that the city was affected (Russell 1980), and the corresponding archaeological data from other sites in Petra fully corroborate this fact. For example, the Late Roman occupation at

the nearby hillside of az-Zantūr was certainly ended by that earthquake (Kolb 1996: 51, 89). In case of Shops XXVIII-XXVI, damage could have included shifted walls, collapsed arches, and damaged pavement. Yet, at least some of the damage must have been repaired afterward, as the final collapse of the arches inside these rooms had certainly occurred later. The staircase and the arch in the front could have suffered as well, although to an unknown extent. It is evident that some parts of the arch were used in the construction of the retaining wall in the NE corner of the stairway, but the precise date of this structure is unknown. Also Rooms XXIX-XXX might have suffered damage in the later fourth century AD. Some kind of a post-earthquake occupation, interrupted by a flood episode, continued there until the mid-fifth century AD or slightly later, when the arches finally collapsed.

Possibly, the earthquake also resulted in a damage to some flood-control installations in the valley, as well as it affected the stability of the hillsides. Not surprisingly, the flooding is attested in Rooms XXIX and XXX, probably in the early fifth century. Both alluvial and colluvial material is present in the rooms west of the staircase, and the landslide material also prominently figures in the shop excavated by Parr. The construction of the secondary structures ("Byzantine shops") on the pavement of the portico and often encroaching upon the street itself, as well as the blockings of the doorways of the shops may all be related to both the earthquake damage and to the increased threat of flooding. Blockages could have been a response to broken door lintels and to a generally weakened structural stability. Several shops along the street feature only partial blockings which were relatively well-done. While restricting the access, these blockages attest to the continuity of the occupation of the interiors. At least some of the secondary structures on the sidewalk were constructed on the elevated

surfaces, and these in front of Shops XXVI and XXV-XXIV are the best examples. That northward expansion and raised floors probably meant an increased concern over the proximity of the landslide affected area, as well the protection against periodical flooding of the street area. The sherds preserved on the top of the raised area in front of Room XXVI, or embedded in its surface, were dated to the fourth, fifth and probably sixth century. But the ceramics recovered from the sounding in this area were more uniformly dated to the fourth and the early fifth century AD. Drums, ashlar and architectural elements were extensively used in the construction of these secondary structures. That means that at least some parts of the colonnade had already fallen down and were not restored.

The occupation in the eastern part of the colonnaded street had then continued in some form during the later Byzantine period. The commercial activities postulated to have been conducted there, might have dwindled though. Late Byzantine coins are not present at the site, with a single exception of an issue of Justinian I. That general scarcity of Late Byzantine coinage confirms the pattern already noted during the previous excavations in the street area (Kirkbride 1960: 112). It is tempting to suggest the gradual abandonment of the shops as progressing in a linear pattern from the east to the west. The earliest abandonment within the excavated site is attested for Rooms XXIX-XXX which were definitely abandoned sometime in the fifth century. The collapse of arches there, either due to the weakened structural stability or to another earth tremor, had sealed the interiors. The landslides continued occurring there, depositing the cultural material from the higher parts of Area East.

But the latest ceramics, dated to the sixth/seventh century AD, were found on the floor of Room XXVI - the westernmost excavated shop. That late occupation may

also have been aided by the differential manner of the arches' fall in the three rooms west of the stairway. The southern arches there, with the exception of Room XXVIII, were generally first to collapse. Thus the last to be utilized were most certainly the front spaces of the rooms, and the occupation could have continued there despite a depressing appearance of the half ruined or half-abandoned spaces. That occupation was presumably in connection with the secondary structures located in the portico area. Not surprisingly, all three northern spaces of Rooms XXVIII-XXVI contained simple storage or refuse bins. The best example is again Room XXVI where the southern arches collapsed relatively early and close to the floor, while the northern ones were probably still unaffected. That would have allowed the northern half of the room to be occupied longer, together with the "Byzantine shop" in front of this room. The collapses tend to appear as due to an earth movement directed toward SWW. The preservation of the springers and directly adjacent stones and voussoirs' rows is always better at the eastern side, while the western parts are usually more scattered.

Late occupation is also attested to the west of the stairway and south of Shop XXVIII. A simple flight of seven stone steps, associated with poorly defined occupational surfaces, was found there. Ceramic deposits from that area are dated to the sixth and the seventh century AD. The steps appear to have been constructed when the stairway, and at least some of the shops were already abandoned. Perhaps, the steps provided the access to the Upper Market area when the stairway was no longer in use. A fragment of a cooking pot dated to the Crusader period was found in the top layer over Room XXIX. This may suggest that the Crusader period occupation took place somewhere in this area. The most recent activities at the site are evidenced by simple retaining walls obviously related to

the limited cultivation in the area, as well as by the water channel which runs across the upper parts of the stairway.

The Finds

Generally, small finds recovered during the excavations were not substantial. These included several ceramic lamps, a few complete vessels, and moderate quantities of ceramic sherds. One intact large deep platter with a decorated rim has been recovered from the interior of Shop XXX. A small bronze, silver-washed cross, obviously meant to be worn on a pendant, was found on the floor of Room XXVI. Small quantities of metal objects, including iron nails, were recovered too, but most objects were badly corroded, broken, and generally indistinguishable. Glass sherds were not abundant, but these included fragments of bowls. Altogether 243 coins have been found, including 138 from Room XXIX and 48 from Room XXX.

The number of architectural fragments collected at the entire site approaches 400. These are primarily column drums and their fragments, capital decoration fragments, pieces of mouldings, and fragments of door jambs. Most of them came from the stairway and the upper strata of Area South. Thus much of that material represent the washed-down architectural elements originally associated with the Upper Market. To that must belong a very large half-capital which probably weights more than one ton. The stone rested in the upper part of the stairway, and has been moved aside during the current clearance of the stairway. Several pieces of marble mouldings were recovered too. The architectural elements also include at least 100 voussoir stones recovered from the shops' interiors. Some are simple, rectangular ashlar, up to 1 m long, but quantities of them displayed an underside concave surface. It is apparent that the spaces in the upper surface of the arches resulted from using not tapered stones, were

closed by mortar or plaster plugs to achieve a specific angle between the neighbouring voussoirs in the arch. These plugs hardened into chunks which are roughly triangular in section. The same technique had been noted in the buildings belonging to the Byzantine ecclesiastical complex excavated by ACOR at Petra.

On-site Conservation

Extensive consolidation of the extant ruins has already been conducted during the excavations. All extant arch springers in Rooms XXVIII and XXVII were secured, and numerous badly deteriorated ashlar in the walls were replaced or strengthened with mortar. Two large door-jamb stones (at least 1.7 x 1.3 x 1m) have been hauled up on top of the doorways leading to Rooms XXVII and XXVI, and secured there. The parts of the front wall (A) have also been reinforced with new stones and cement. The consolidation of walls in Rooms XXX-XXIX was not undertaken, but the wall condition there is generally satisfactory. Further consolidation and limited restoration work at the site will be conducted later in 1997 under the supervision of Chrysanthos Kanellopoulos, the architect of the project.

Further Research

The Roman street Project has considerably expanded the previous understanding of the urban development and phases of history of the Petra's center. The continuity of occupation in the excavated area is well attested for the period between the first century BC and the sixth/seventh century AD. But there is also no doubt that the research on the results of the project is still in its initial stage, and it will require more work in way to arrive at more definite statements. The immediate task will be to review all recorded strata with regard to their ceramic and numismatic contents, and to establish more precise relative and absolute chronology of the construction, occupation,

abandonment and destruction phases. It is already apparent that each excavated shop features some notable variations in the course of its occupational and depositional history. Furthermore, the determination of the function and the extent of occupation of each shop throughout its history will have to be established. Equally important will be the comparative review of the excavation results with the architectural studies to be conducted soon at the site, in way to establish a relative chronology of the development at the site as a whole.

The studies to be conducted in the future will also attempt to find elements of parallel development at the sites in the vicinity of the shops, that is the az-Zanṭūr domestic quarter and the Great Southern Temple, as well as at other sites in Petra. Comparative ceramic and architectural studies should prove most rewarding. As for the form, development and function of ancient shops in the Classical-Byzantine Middle East, architectural and historical parallels are fortunately not lacking. For example, well-documented examples of shops associated with colonnaded streets were excavated in Jarash-Gerasa, Umm Qays - Gadara (Jordan), Palmyra (Syria), Scythopolis-Beit Shan (Israel), Hierapolis-Pamukkale, Perge, and Sardis (Turkey). These should provide an adequate comparative material (see selected items in the bibliography).

Acknowledgements

The author should like to express his thanks to the American Center of Oriental Research in the persons of Drs Pierre and Patricia Bikai, for the opportunity to conduct this important project in the field, and for their constant support and assistance. Their Department of Antiquities of Jordan and the Petra Regional Council, in the persons of Dr Ghazi Bisheh, Dr Kamal Mahaddin, and Suleyman Farajat should be thanked for the assistance, especially in the matter of lending the services of the front-

loader. The author is very grateful to Yvonne Gerber and Helena Sokolov for their work on the preliminary reading of the ceramic and numismatic material, respectively. The author is also thankful to Drs Pierre M. Bikai, Chrysanthos Kanellopoulos, Thomas Paradise and Philip Freeman for their valuable comments and advice offered during the preparation of this text. Finally, the warmest thanks should be offered to Jeanette, Erko, Jani, and Vesa, the staff members of the Roman street Project, for their most devoted work at the site,

which made this project a success. The project is funded by the United States Agency for International Development (USAID) and supported by the Department of Antiquities of Jordan.

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Bibliography

- Asad, Kh. and Stepniowski, F.
 1989 The Ummayyad Suq in Palmyra. *Damaszener Mitteilungen*, 4: 205-223.
- Bowersock, G.
 1983 *Roman Arabia*. Harvard University Press.
- Fiema, Z.T.
 1991 *Economics, Administration and Demography of Late Roman and Byzantine Southern Transjordan*. Ph.D. Dissertation, University of Utah.
 1997 Petra Romana, Byzantina et Islamica. Pp. 145-157, 159-160 in T. Weber and R. Wenning (eds), *Petra. Antike Felsstadt Zwischen Arabischer Tradition und Griechischer Norm*. Mainz: von Zabern.
 f.c. Reconstructing the Culture History of the Petra Church: the Data and Phasing. In *The Petra Church Project*, Monograph in preparation by the American Center of Oriental Research.
- Guinee, R.L.J.J., Mulder, N.F. and Vriezen, K.J.H.
 1996 The Façade of the Vaulted Rooms along the so-called Cardo in Umm Qays (ancient Gadara), Area III: Architectural Design and Reconstruction. *ADAJ* 40: 207-216.
- Joukowsky, M. S.
 1994 1993 Archaeological Excavations and Survey of the Southern Temple at Petra, Jordan. *ADAJ* 38: 293-333.
 1996 1995 Archaeological Excavation of the Southern Temple at Petra, Jordan. *ADAJ* 40: 177-206.
 1997 *The 1996 Brown University Archaeological Excavations at the "Great" Southern Temple at Petra*. Unpublished manuscript in possession of the author.
- Kanellopoulos, Ch.
 1996 *Report on a Feasibility Study for Site Conservation of the Roman street at Petra and of the Petra Church under the CERM Project*. Manuscript submitted to the United States Agency for International Development by the American Center of Oriental Research.

- Kennedy, H.
1985 The Last Century of Byzantine Syria: A Reinterpretation. *Byzantinische Forschungen* 10: 141-185.
- Kirkbride, D.
1960 A Short Account of the Excavations at Petra in 1955-1956. *ADAJ* 4-5: 117-123.
- Koenen, L.
1996 The Carbonized Archive from Petra. *JRA* 9: 177-188.
- Kolb, B.
1996 Die spätrömischen Bauten. Pp. 51-90 in *Petra. Ez Zantur I*. Mainz: von Zabern.
- Harding, L.G.
1958 Recent Discoveries in Jordan. *PEQ* 90:7-19.
- McKenzie, J.
1991 *The Architecture of Petra*. Oxford: Oxford University Press.
- Parr, P.
1960 Excavations at Petra, 1958-59. *PEQ* 92: 124-136.
1970 A Sequence of Pottery from Petra. Pp. 348-381 in J. A. Sanders (ed.), *Near Eastern Archaeology in the Twentieth Century*. Garden City.
1986 The Last Days of Petra. Pp. 192-205 in M.A. Bakhit and M. Asfour (eds), *Proceedings of the Symposium on Bilad al-Sham during the Byzantine Period* (November 1983) II. Amman.
1996 The Architecture of Petra: Review Article. *PEQ* 128: 64-70.
- Russell, K. W.
1980 The Earthquake of May 19, AD 363. *BASOR* 238: 47-64.
1985 The Earthquake Chronology of Palestine and Northwest Arabia from the second through the Mid-eighth Century AD. *BASOR* 260: 37-59.
- Stephens Crawford, J.
1990 *Archaeological Explorations of Sardis, 9: The Byzantine Shops at Sardis*. Cambridge, MA.
- Stucky, R.
1996 Die Nabatäische Bauten. Pp. 13-50 in *Petra. Ez Zantur I*. Mainz: von Zabern.
- Tsafrir Y. and Foerster, G.
1994 From Scythopolis to Baysan - Changing Concepts of Urbanism. Pp. 95-116 in G.R.D. King and Averil Cameron (eds), *The Byzantine and Early Islamic Near East 2*. Princeton.

**TEMPLE, KILN AND CHURCH – FOURTH INTERIM REPORT
ON THE JARASH CATHEDRAL PROJECT
(AUTUMN 1997)***

by

Carola Jäggi, Hans-Rudolf Meier and Beat Brenk
with a contribution by Ina Kehrberg

Considering that the main interest of our research project on the Early Christian “Cathedral” of Jarash was always the *process of christianization* in ancient Gerasa, the question of the predeceasing building on the site of the church was, from the beginning, of crucial importance. In 1994 we found about 10 m east of the former entrance façade of the Cathedral the foundation and the base moulding of the western wall of a temple which since the British-American excavations of the 1920’s has frequently mentioned in the literature, but has never been documented in plans or photographs.¹ After having excavated the same features of the adjoining South and North walls in 1996 we were able to trace the outlines of this temple more precisely.²

Nevertheless, the eastern part with the original entrance still remained unclear. The possible eastern edge of the podium of the temple was found in 1996 and seemingly manifested by a huge one-faced wall made of large stones; but the mentioned foundations of the side walls including their base moulding “ignored” this alignment and continued to the east where they disappeared in the eastern profiles of our 1996

trench. We therefore planned for 1997, to dig in the south-eastern angle of the nave of the Cathedral just to clear this point and to get some information on the original layout of the entrance to the temple. Our interest was especially focused on the question whether there was a continuation of the stairs found in the 1920’s by the American team east of the rear wall of the apse.³

Besides this we hoped to get some new evidence for the date and the reason of the abandonment of the temple and the building of the church. We decided to make a sounding in the southern aisle outside the podium of the temple, that is, in an area where we could still expect an undisturbed stratigraphy of the pre-church phase. Some further soundings were made in the so-called glass court, other probes were required for the drawing of the new ground plan of the church and its surroundings.

The Temple

As expected, we found the south-eastern corner of the temple podium just inside the south-eastern angle of the nave of the Cathedral. But the most striking feature in this area was a monumental staircase originally

* In collaboration with the Department of Antiquities of Jordan and with the generous financial support of the Gerda Henkel-Stiftung Düsseldorf, the Goethe Stiftung für Kunst und Wissenschaft Zürich and the Max Geldner Stiftung Basel. We are greatly indebted to Dr Ghazi Bisheh, Director-General of the Department of Antiquities, for his always friendly support of our project. Furthermore, we owe our gratitude to Adnan and Abdel Majid Mjelli, to our collaborators on the field Ina Kehrberg, Giorgio Nogara, Simone Schoenenberger and Darko Milosavljevic, to our workmen Kadr, Ahmed, Ibrahim and Metwalli as well

as to Dr Hans-Dieter Bienert and his staff of the German Protestant Institute for Archaeology of the Holy Land in Amman.

1. B. Brenk, C. Jäggi and H.R. Meier, The Buildings under the “Cathedral” of Gerasa. Second interim Report on the Jarash Cathedral Project, *ADAJ* 39 (1995): 211-220.
2. C. Jäggi, H.R. Meier and B. Brenk, New Data for the Chronology of the Early Christian Cathedral of Gerasa: The Third Interim Report on the Jarash Cathedral Project, *ADAJ* 41 (1997): 311-320.
3. C.H. Kraeling (ed.), *Gerasa: City of the Decapolis*. New Haven 1938:206.

flanked by narrow *antae* (Figs. 1 and 4). While the foundation walls and the base moulding consist of ochre limestone and show many traces of destruction and use, the steps of this staircase are made from pink hardstone and seem hardly used. Are these differences in material and state of preservation an indication of different building phases? Indeed, the ochre limestone of the podium walls was mainly used in early Roman Jarash, and also the fact that the outside of the building was originally plastered and decorated by three-dimensional details in stucco speaks in favour of quite an early date for the main body of the temple. The pink hardstone, however, came in vogue about the middle of the second century and was used in many of the huge building projects of the Antonines (e.g. the Temple of Artemis). In this context we have to remember the fact that in our 1996 campaign we found in the filling between the *antae* a

coin of Alexander Jannaeus Hyrcanus II.⁴ But the pottery found with it dates from the first century BC/AD and the first half of the second century AD⁵— a gap we were not able to explain then. Today we think that this pottery was filled in with the installation of the staircase around the middle of the second century AD. In this period the colonnades seem also to have undergone some alterations: for the most part the reused capitals and columns in the Cathedral have their origin in this period. The founding of the temple however seems to be much older; it probably dates back to the first century BC. The numerous fragments of Late Hellenistic architectural sculpture found in the fill of the Cathedral might well have belonged to this first building. If this hypothesis is right it would be the same scenario as in the temple of Zeus and the sanctuary of Artemis: the complete remodelling of a much older structure in the second half of the second century AD, which however in the latter cases seem to have been much more far-reaching than in the temple under the cathedral.



1. Jarash. Top view from the crane onto the apse of the cathedral with the excavated steps of the temple.

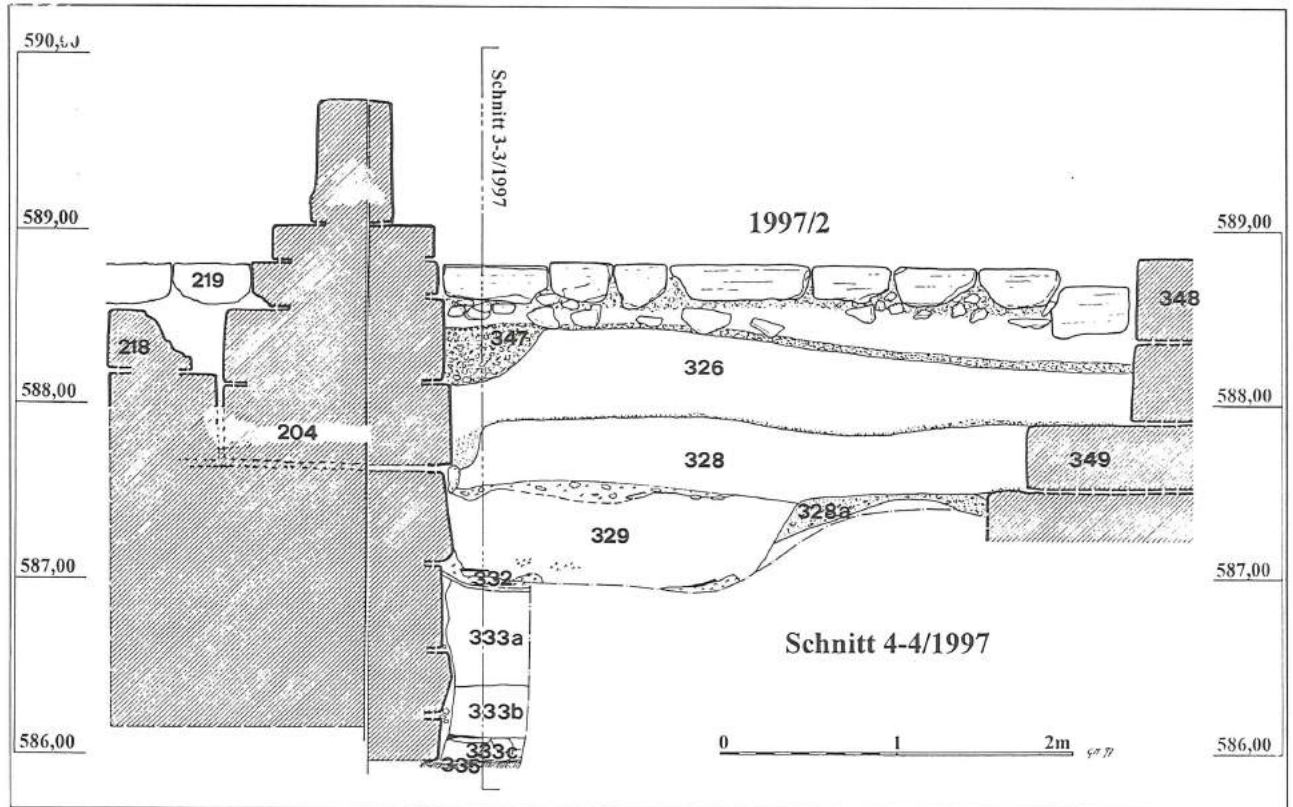
Abandonment of the Temple

The sounding in the south aisle provided important information for the abandonment of the temple on the site of the later Cathedral (Fig. 2). About 1.8 m below the floor of the church we found the remains of a circular kiln (Fig. 3) which was once used for bronze smelting as we found some fragments of crucibles in part still with traces of malachite. From the stratigraphical context it is clear that the kiln had been constructed when the podium wall of the temple was still upright. Even if it is not completely impossible that the kiln was implanted in the ambulatory of the temple when the temple, was still used for its original sacred function, we tend to see in this bronze kiln a testimony for an intermediate phase between

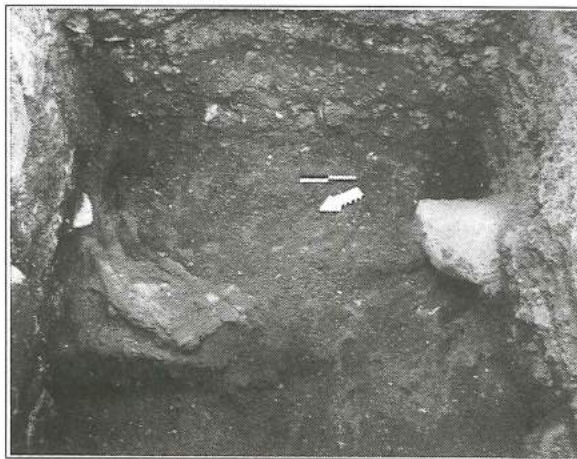
4. No. 96.113.1. For the classification of the coins we are grateful to Markus Peter as we are for their

conservation to Christine Pugin.

5. Cf. I. Kehrberg, in Jäggi *et al.*, *ADAJ* 41: 316-319.



2. Jarash Cathedral. South aisle Section North-South (east-profile). 326: Building level of the church 328a: Used level of the temple 329: layer with fragments of the kiln 332: Remains of the kiln *in situ*.



3. Jarash Cathedral: Rests of the kiln *in situ*.

the abandonment of the temple and the construction of the church. It would, therefore, not have been hostile intervention by Christians against the pagan cult which caused

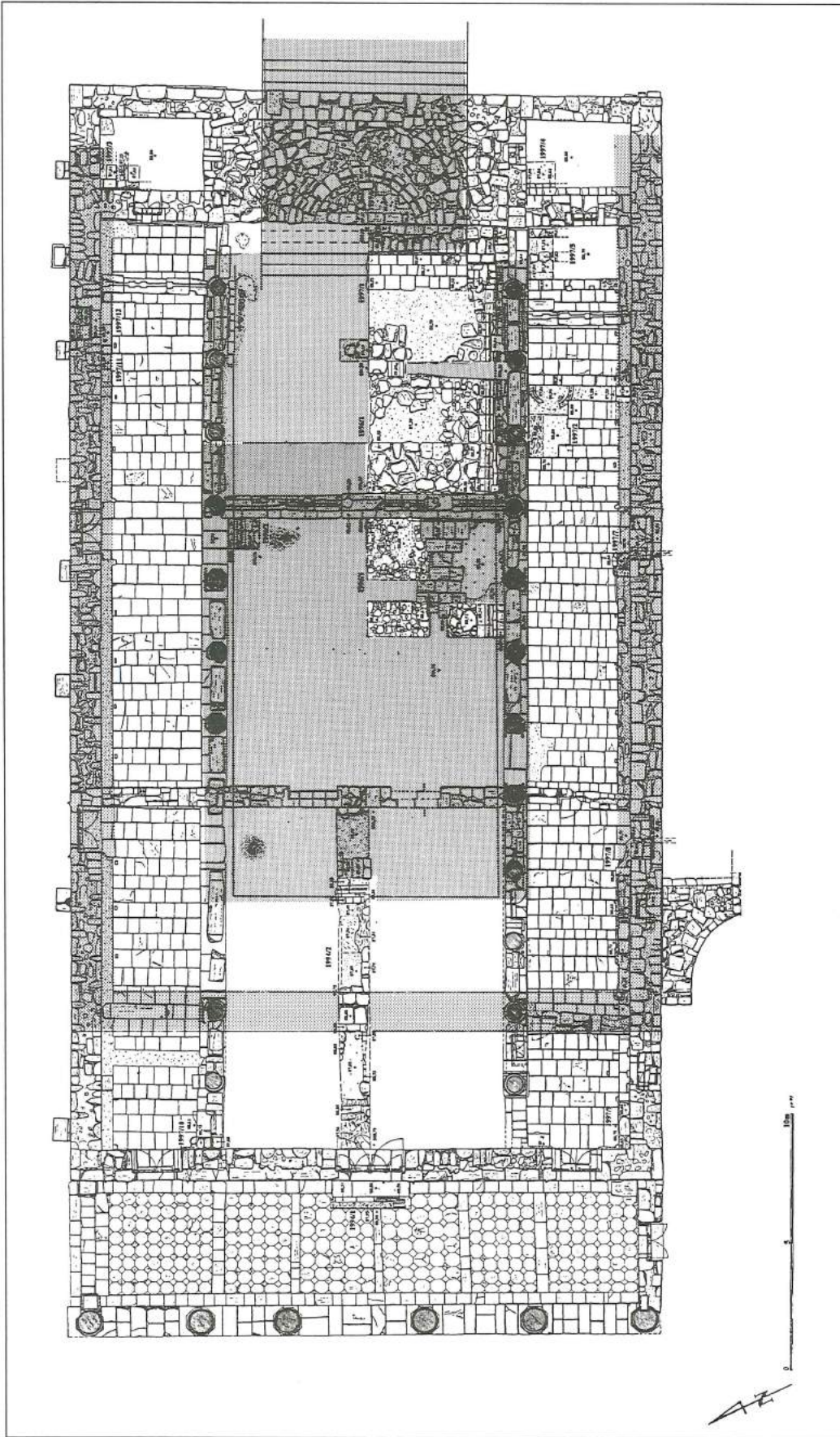
the destruction of the temple but rather other reasons which led to its demise. Perhaps the deity to which the temple was dedicated lost gradually its attraction and its followers in favour of the main gods of the city, that is Artemis and Zeus.⁶

The Construction of the Church

Even if the temple was no longer intact when the Christian community took over the site and caused a kind of urban revitalisation, the earlier building determined nevertheless the size of the Cathedral (Fig. 4): the width of the nave and the aisles was predetermined by the width of the podium of the temple (218) and its ambulatory (349). As we were already able to state in our 1994 campaign, also the western façade

6. Cf. in this context the Hypothesis of Crowfoot and Kraeling (1938: 37: 63-64) that the temple under the Cathedral was dedicated to local gods ("theos arabikos"). To the crisis of the third century see recently K. Strobel, *Das Imperium Romanum im*

3. Jahrhundert. Modell einer historischen Krise? Zur Frage mentaler Strukturen breiter Bevölkerungsschichten in der Zeit von Marc Aurel bis zum Ausgang des 3. Jh. n. Chr. Stuttgart 1993.



4. Jarash Cathedral. Top plan of the church with the excavated parts of the temple and (in half-tone) its schematic reconstruction.

of the Cathedral is constructed on an older wall.⁷ In the 1997 campaign we found that the eastern wall must have been constructed on a small terrace in between the flight of steps leading up from the *Cardo*. Despite this careful reuse of existing structures there must have been shortly after some static problems in the area of the presbytery. The actual masonry of the apse and its flanking rooms date from a comparatively late date and seem to be the product of remodelling after at least two destructions of this eastern part. These destructions might have been caused by earthquakes but the basic reason was the fact that only the apse was founded sufficiently well on the preexisting stairs while the flanking rooms rested on new and poorly built foundations. Together with the second of these reconstructions, the floor of the bema was raised and later still the nave and aisles were shortened by dividing walls as mentioned in earlier reports.⁸

Notes on Some Remarkable Finds and on the Date of the Cathedral

As in our earlier campaigns the excavated layers contained a lot of pottery sherds,⁹ fragments of window-glass and glass vessels, and amounts of mosaic tesserae fragments partly stuck in their original mortar bed and numerous fragments of Hellenistic and Roman architectural sculpture. The most outstanding piece among these is probably the fragment of a second century marble head of a male figure (Apollo?), which seems to have once been part of a relief.¹⁰ But even more important in view of our special interest are the more than 150 copper coins we found during our 1997 campaign,

mostly in stratigraphical context. Quite a lot of them were imbedded in the layers brought in for the original floor of the Cathedral. One of them gives us a *terminus post quem* for the church in the year 404, but we have to await the final report on the coins to get more detailed information in answer to this crucial question.¹¹

The Pottery and other Finds (Ina Kehrberg)

In general, the material reflects the findings of the 1996 campaign: three phases of occupation can be clearly identified by the finds, that is (1) the construction phase and "repair" of the temple, (2) the reoccupation of the temple space after the temple's abandonment and (3) the construction of the cathedral and later rebuilding. Chronologically the same picture emerged (see Kehrberg in Jäggi *et al.* 1997:316-320).

However, unlike previous campaigns, the 1997 season revealed rich material and artefacts which can be associated with various manufacturing activities during the Late Roman and Late Byzantine occupation of the site (*infra*).

Description of Assemblages in Chronological Context

The Temple (Figs. 1, 2, 5a and b)

The Temple phase: The pottery shown in Figure 5 is representative of types common at Jarash and other contemporary sites in northern Jordan during the first centuries AD. It was not possible to clearly isolate the Early Roman assemblages from those of Late Roman sequences due to the series of

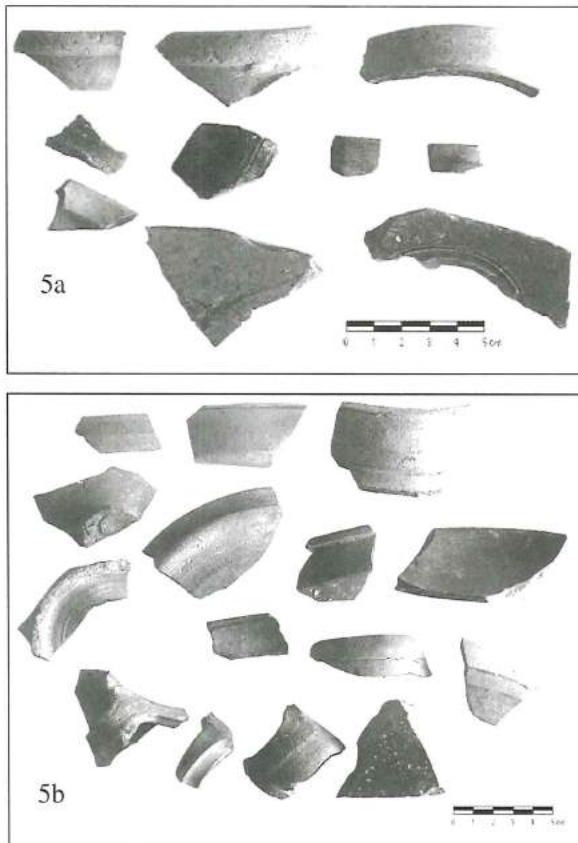
7. Brenk *et al.*, *ADAJ* 39: 212-214; B. Brenk, C. Jäggi and H.R. Meier, *Neue Forschungen zur Kathedrale von Gerasa: Probleme der Chronologie und der Vorgängerbauten*, in: *ZDPV* 112/2 (1996): 142-143.

8. Cf. Brenk *et al.*, *ADAJ* 39: 218-220; Jäggi *et al.*, *ADAJ* 41: 315-316; see also J.W. Crowfoot, *Recent Work round the Fountain Court at Jerash*, *PEQ* 1931: 145.

9. See below, Ina Kehrberg.

10. The publication of this piece, by Rudolf Känel, is in preparation.

11. See n. 4. The final analysis of the coins of the 1996 campaign has changed the *terminus post quem* given in the third report (Jäggi *et al.*, *ADAJ* 41: 314): the latest coin from the foundation trench of the stylobates dates from 404-435.



5. Roman period: a. JCP 97. 328/329; b. JCP 97. F3.

rebuilding / 'reparation' and subsequent occupation/use of the temple site. Most of the 'classical' forms can be compared with the profiles shown in the last report (see Kehrberg, in Jäggi *et al.* 1997: Fig.7, p. 318) pertaining to the temple phase and dating to the first and second centuries. Although eastern sigillata A and B have been found this cannot be used as reliable parallels for the dating of local material since original contexts had been disturbed by subsequent activities (see *supra*, "Temple phase"): it is thus one finds the intrusive pottery types usually associated with the Late Roman period (third to fourth century AD).

Other artefacts are glass and lamp fragments (too small to be illustrated) which date to the first and second century at Jarash. Local imitations of the imported pot-

tery (for the first century BC/AD, see Braemer 1989)¹² occurs together with later versions common in the second century.

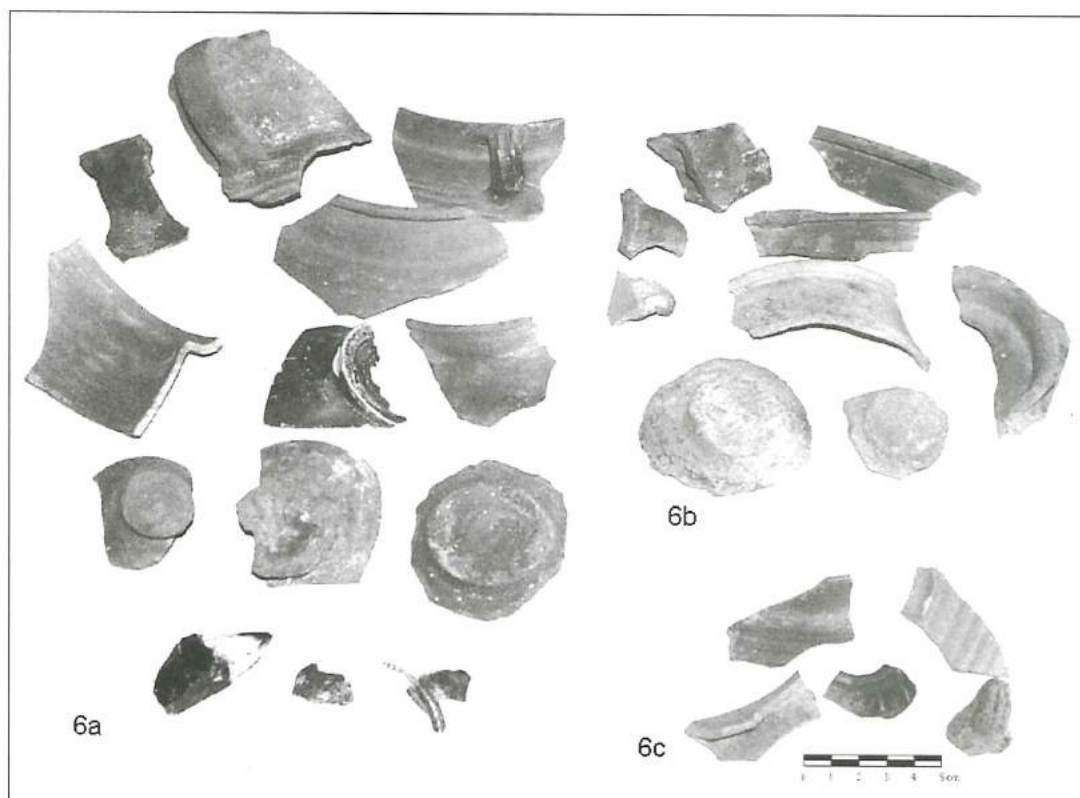
The Third/ Fourth Centuries (Fig. 6a-c)

The post-Temple phase: Pottery and glass sherds, marble, bits of red and yellow painted plaster, roof tile fragments, glass tesserae; lead piping, mammalian bones and lamp fragments make up the assemblages of this level throughout the excavated areas of the Cathedral, confirming the date and typology of the previous seasons. As is usual in ancient Gerasa, where little is homogeneously sealed off, Early Roman (and earlier) artefacts are found in third and fourth century contexts, the reverse as found in the underlying levels. Assemblages of the Late Roman contexts of the 1997 excavations identified loci associated with manufacturing activities, the foremost find having been the remains of a metal kiln (*supra*, Figs. 2 and 3 and text).

In the same context, and together with Late Roman pottery and glass fragments, were found fragments of a crudely made crucible with a long 'pouring rod' for hot flowing metal: the coarse ware is deeply burnt around the circumference of the twin closed 'channels' from the heat of the liquid metal which indicates repeated use. Little slag has been found which is, probably, rather due to the restricted area of excavation than representative of intensity of production. The repeated finds of overfired ceramics (*infra*) reinforce the Late Roman history of industrial reuse, mirroring on a modest scale the changes that took place at other Roman public sites of Gerasa. The glass fragment seen in Figure 6a may be linked with one or the other of these industrial activities as it has been deliberately flaked for use as a tool (Kehrberg 1995; see also tool in Fig. 7a).¹³

12. F. Braemer, 1989: Une fabrique (locale?) de céramique fine à Jerash au tournant de l'ère. Pp. 153-168 in Jerash Archaeological Project 1984-

1988, II. Special series Syria 66. Amman/ Paris: Department of Antiquities/ IFAPO.



6. Third-fourth century: a. JCP 97. F4; b. JCP 97. 325/6; c. JCP 97.326.

The Church (Fig. 7a-d)

The ceramic repertoire and the glass which are from loci of levels pertaining to 1) the construction of the church and 2) its second phase of repair falls neatly into two chronological and cultural groups of assemblages: the former is mostly made up of types still belonging to the Late Roman period of the third and fourth centuries (cf. Fig. 6 and Kehrberg, in Jäggi *et al.* 1997: Fig. 8, p.319), positing a *terminus post quem* which is supported by fourth - fifth century AD coins from the same contexts (cf. n.11). This season held no surprises with regard to ceramics pertaining to this period but assemblages from contexts of the second phase of the church complex (Fig. 7a-d) revealed interesting information. In Figure 7a and b are shown sherds which are thickly coated with a mixture of undercoat wall plaster covered in red (7a) and yellow

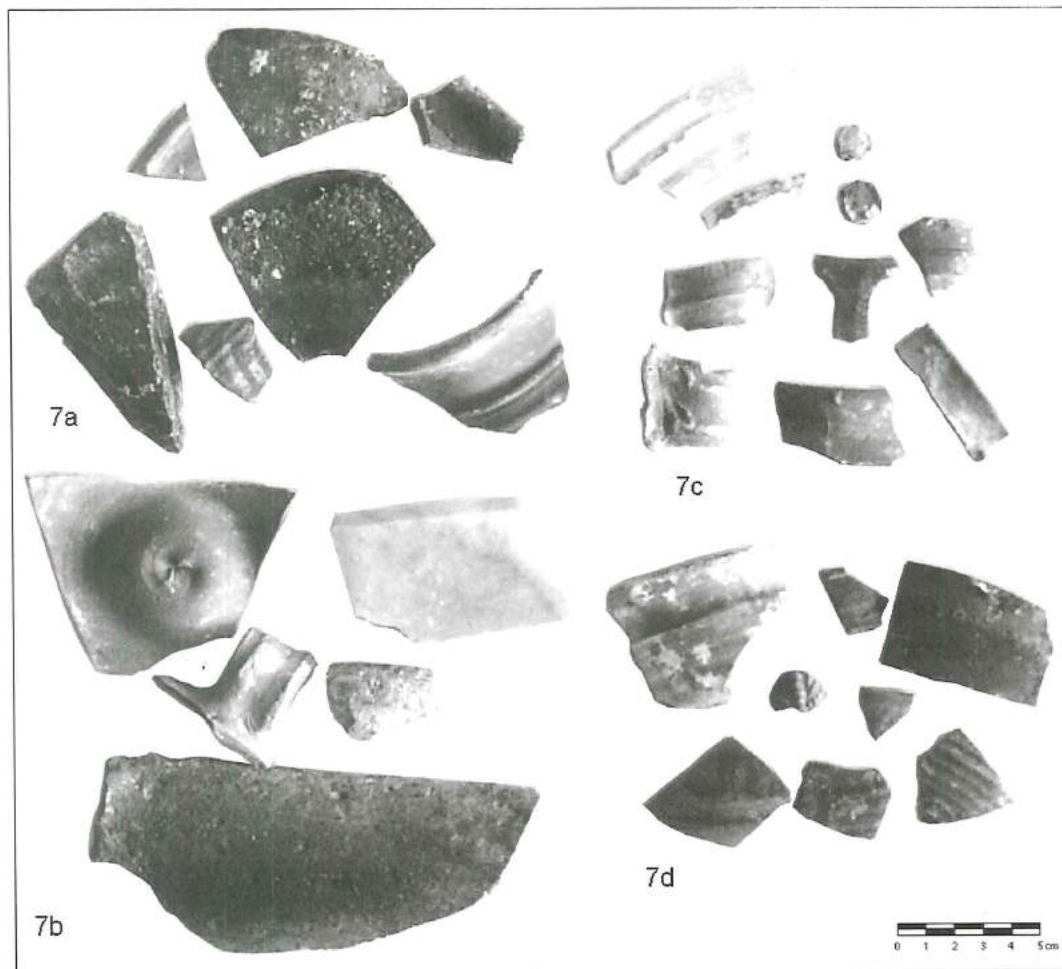
(7b) paint.

The contexts of the artefacts shown in Figure 7 are securely dated to the latter half of the sixth century AD by the bulk of the pottery. The glass (Fig. 7c), which includes other fragments of window panes and lamp fragments not shown here, is 'classical' for the Late Byzantine period and found at other church sites at Jarash. Small finds include typical medium -large white tesserae, roof tile fragments, recycled marble, iron nails, and of course coins fitting within the fourth to sixth century AD.

The two bowls, or large bowl fragments, containing the plaster base and paints clearly served as a palette and it is interesting to note that the actual bowl type belongs to the fourth century category – rejected ware of potters who occupied the site during the fourth century? With it were found simple tools, again made of unconventional material like the slate 'knife' in Figure 7a. In the

13. I. Kehrberg, 1995: Jerash/Gerasa, hippodrome. Second Report on pottery and glass sherd tools.

AJA 99/3 (Archaeology in Jordan): 525-528.



7. Late Byzantine period: a. JCP 97. 308/OK312; b. JCP 97. 311/312; c. JCP 97. 312; d. JCP 97. 318/319.

late Byzantine deposits, too, were found misfired (malformed) ceramic and slag which attest to a kiln nearby. The palettes seem, however, to be best associated with ancient restoration work on the church building (cf. *supra* p. 5). In all, the best stratified material comes from contexts of the sixth century, with a rich repertoire of artefacts accumulated due to building, reparation and occupation activities like those of potters in the same quarter.

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GHARANDAL IN JIBĀL: FIRST SEASON REPORT

by

Alan Walmsley

With contributions by Malcolm Choat and Norman Ricklefs

Introduction

Settlement processes in the south of Jordan between Roman Late Antiquity and the Islamic Middle Ages (ca. sixth–fifteenth century) have, until recently, attracted only cursory interest. Little attention has been paid to issues of rural–urban interchange, the use of public space in towns and the role of local Arab elites during the Roman and Byzantine periods, at the time of the Islamic conquest (630 CE) and in the Islamic period up to and after the devastating Crusader interlude of the twelfth century. Was there a smooth continuum from one period to the next, or periods of rapid change, growth and decline? Did existing social structures adapt easily to new circumstances or were they overturned by the arrival of new ruling elites and beliefs?

These issues have been hardly addressed for the south of Jordan, especially from an archaeo-historical perspective. The emphasis has been on closely defined work at a few main sites, while surveys have found scant evidence for occupation after the sixth century – an observation clearly contrary to Arabic and Crusader sources. The Gharandal Archaeological Project (GAP) has adopted a comprehensive approach to the investigation of Gharandal by combining specific site work (survey, excavation) with regional, environmental and settlement studies. The intention is to form a “whole view” of socio-economic develop-

ments in the Gharandal region from Antiquity until the Islamic Middle Ages.

The first field season of the Gharandal Archaeological Project, a collaborative enterprise between the University of Sydney, Australia, and the Department of Antiquities of Jordan, took place between 12 April and 22 May, 1997. A team of ten was engaged in the work under the direction of Alan Walmsley.¹ The Department of Antiquities was ably represented by Jihad Darwish, Inspector of the at-Tafilah District. David Kennedy of the University of Western Australia, Perth, joined the project for a few days to evaluate the aerial photographs of the survey area.

Geographical and Historical Location

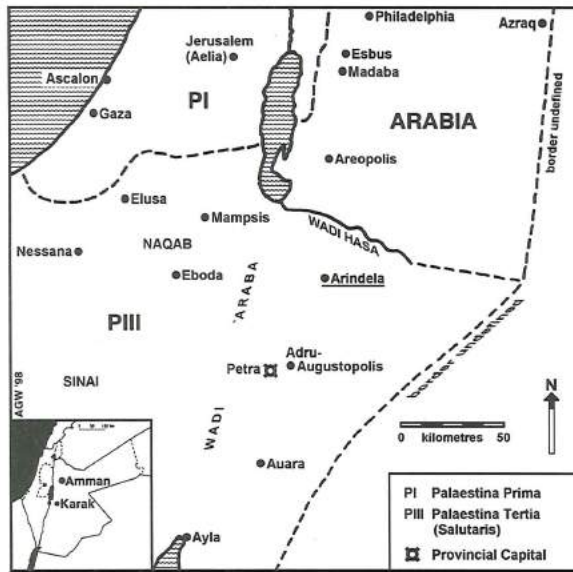
Gharandal is most probably a Nabataean town, and it quickly replaced Buṣayra, Edomite Bozra, as the main political centre of al-Jibāl (Graeco-Roman Gabalitis), a mountainous district as the name would suggest. The town came to historical prominence in Byzantine and Early Islamic times when it was called Arindela and ‘Arandal respectively. It was the third ranking town of *Palaestina Tertia*, capital of Jibāl and the seat of a bishop (Fig. 1).

Literary evidence for Christian Arindela is sparse.² Conciliar records register only two bishops for Arindela. The first, Macarios, attended a synod of bishops from the three Palestines called by Peter of Jerusalem

1. The team members were: Hugh Barnes (Surveyor), Noël Siver (Conservator and Finds Registrar), Malcolm Choat, Philip Karsgaard, Kathryn King, Penelope Middleton and Lawrence Pontin (Field Archaeologists), Norman Ricklefs (Field Archaeologist and Survey Assistant) and Betty Heading (Finds Assistant); my thanks go to all of

them for making the first GAP season such a success. A team of 20 labourers was provided by the Department of Antiquities.

2. The following information on the bishops of Arindela is taken from an extended report written by Malcolm Choat, to whom thanks are due.



1. Map of *Palaestina Tertia* showing the location of Gharandal (Arindela).

in 536 to approve the decisions of a Council held earlier that year in Constantinople (Hefele 1883-96, vol. IV: 204). More interesting is an earlier bishop whose existence is not noted in Jones (1971: 547). A certain Theodore of Arindela was present at the Ecumenical Council of Ephesus in 431, where he supported the orthodoxy of Cyril of Alexandria against the "heresy" of Nestorius of Constantinople. Apart from Theodore, *Palaestina Tertia* was represented by the bishops of Elusa, Phaino and Augustopolis (Adu/Udhruh).

Gharandal surrendered early to the armies of the Islamic conquest (635 ce), and thereafter was placed, along with much of central and south Jordan, in the large Province of Damascus, the *Jund Dimashq* (Walmsley 1987). This arrangement reflected the considerable importance of south Jordan to the Early Islamic state, as the pilgrimage route passed through this region from Damascus to Mecca and al-Madinah in the al-Hijaz. Superseded by adjacent Ruwāth as the political centre of Jibāl in the tenth century, the subsequent

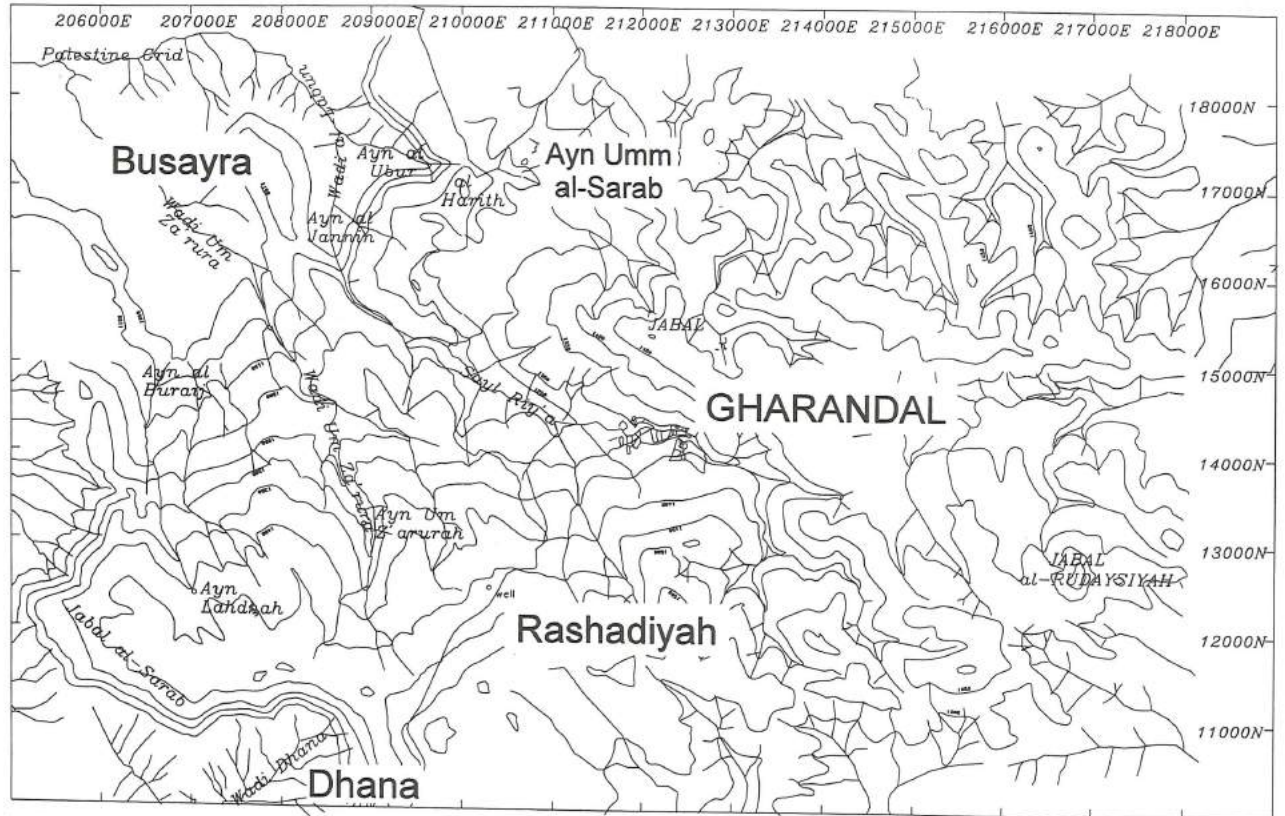
history of Gharandal is unknown but the continuation of the name suggests a long span of settlement. However, Jibāl, along with neighbouring districts, continues to be mentioned in historical sources dating to the Saljuk, Crusader and Early Mamluk periods.

Located some 15 km SSE of aṭ-Ṭafilah and 5 km SE of Buṣayra, Gharandal lies at 1300 m asl in the heart of the mountains of Jibāl where it holds a strategically advantageous position next to a spring at the head of a broad valley system named the Sayl Riy'a (Fig. 2). The spring water is used to irrigate agricultural fields in the wadi to the west, where the principal produce is grapes, apricots and figs. The expanding fan of cultivable land in the wadi below the spring can be clearly seen in the aerial photograph of 1953 (Fig. 3), and is a feature of the wadi to this day. Water is distributed by way of open channels along the north and south banks of the wadi, and distributed as required amongst the fields below.³ The substantial remains of a late period water mill, also once fed by a channel, are located on the north bank of the wadi. The valley continues by descending rapidly to the west, passing to the north of Buṣayra as the precipitous Wādī al-La'bān before continuing into the expanse of the Wādī 'Arabah.

The largely non-studied remains of Antique and Islamic Gharandal are spread over the sloping south bank of the Sayl Riy'a between a ridge summit and the spring in the wadi (Figs. 4 and 5).⁴ The archaeological remains include a Byzantine church with prominent upright monolithic columns, a large double-rectangular enclosure south of the church on the ridge summit, remnants of other substantial public buildings, and extensive domestic quarters. The modern village of Gharandal, consisting almost en-

3. Much more water-efficient drip irrigation is being progressively introduced to the valley, especially in recently opened areas of cultivation.

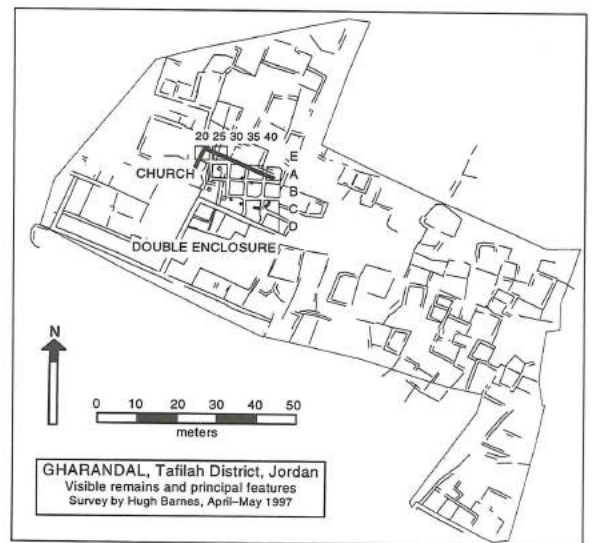
4. For the description of earlier travellers to Gharandal see Walmsley (1989).



2. Contour map showing the location of Gharandal in relation to Buşayra and Dānā.



3. Aerial photograph of Gharandal in 1953, north to left. The site is located in the upper right quadrant of the photograph; irrigated fields fan out in the wadi below the spring (by courtesy of David Kennedy).



4. Plan of surface remains in the Department of Antiquities area, Gharandal. The excavated squares in Area A (the church) are also shown (H. Barnes).

tirely of relocated residents of Buşayra, has encroached severely upon the archaeologi-

cal site. By comparing the fenced antiquities area of today with the extent of ruins on the aerial photograph of 1953, it is clear that less than 25% of ancient Gharandal is preserved under the ownership of the Jordanian Government. The rest of the site has been



5. View of the Department of Antiquities area (upper centre of photograph). The site extends to the floor of the wadi (L. Pontin).

built over by modern housing, mostly in the last 15 years, and is now privately owned land.

Objectives

Particular attention was paid in the 1997 season to the recording, through maps and photography, of the topography and standing remains of Gharandal and its immediate environs. This was a major priority, given that the rapid development of the area has damaged many sites, including Gharandal itself, and threatens many others. Maps of three types were produced.⁵

1. A regional map encompassing the area from Ḍānā to north of 'Ayn Umm al-Sarāb and east of Gharandal (Fig. 2). This map comprises the area to be intensively surveyed in a later season with the intention of placing Gharandal within its regional context.
2. A detailed five-metre contour plan of the valley immediately adjacent to Gharandal, marking contemporary features, roads and the antiquities site.
3. Detailed plans of the Department of Antiquities property including all visible

wall lines (Fig. 4) plus any remaining ruins visible on adjoining ground.

A second objective was the investigation of the Byzantine church, which was designated Area A (Fig. 4). In 1994 Jihad Darwish undertook initial work on the church, excavating fifteen 5 x 5 m squares in four rows labelled A-D. Rows A and B had five squares each, ascending from a fixed point by 5 m beginning at 20 (hence A20, A25, A30 etc.). Row C had three squares (30, 35 and 40) while Row D had two squares (35 and 40). These excavations uncovered a maze of Middle Islamic stone structures built around the still standing monolithic columns of the church, an underlying yellow clay deposit, and below that the largely intact floor of the church including mosaics and a paved nave. A first priority in 1997 was to further investigate and emend the occupational sequence of the church area by continuing the excavations and by commencing the systematic removal of the baulks and most of the later walls (many of which are unstable).⁶ Two new squares were opened north of row A, and were designated E20 and E25.⁷ They were intended to

5. This work, which took six weeks in all, was undertaken by Hugh Barnes with the able assistance of Norman Ricklefs.

6. The difficult task of excavating the church baulks

was undertaken with much dedication by Penny Middleton and Philip Karsgaard.

7. The excavations were ably supervised by Kathryn King and Malcolm Choat respectively.

complete the excavation of the church's north aisle and to sample the outside areas immediately to the west and north.

Also central to the first season was a first assessment of outlying sites in the Gharandal catchment area, initially by reference to the aerial photographs of the region but also by visiting some of the sites on the ground. Undertaken with David Kennedy, this work shows great promise, not only for the valuable contribution of the aerial photographs (47 sites have been identified - see the report by David Kennedy, in this volume), but also the tremendous promise of locating numerous other sites in the vicinity through a systematic programme of site reconnaissance.

Results

The excavations and surface survey of Gharandal have identified a long and complex sequence of continuous occupation at the site, probably beginning in earnest under the Nabataeans and continuing into Islamic times. The 1997 season successfully isolated a series of significant structures and deposits very provisionally dated at this stage to the later fifth to sixth centuries, the eighth to (perhaps) early ninth century, possibly sometime around the late tenth to eleventh centuries, and the later twelfth/early thirteenth to fifteenth/sixteenth centuries. Ceramics also suggest widespread Nabataean (classic painted fine ware) and Roman (Sigillata and later Red Slipped wares) period occupation at Gharandal.

Area A: The Church

The excavations in Area A have revealed a detailed sequence which starts with the original Byzantine construction of dressed stone, the subsequent conversion of the building, and finally a progressive infilling with major stone walls for domestic structures. The summary that follows incorporates the results of the systematic excavation of a number of baulks in the body

of the church, and those from the two new squares, E20 and E25, in the north-west corner of the building.

The Byzantine Building

The church, probably the cathedral of Arindela, turns out to be a well-constructed single-apsed colonnaded basilica announced by an impressive narthex. From a cobbled courtyard to the west three doorways, all blocked at a later date, opened into the narthex, the floor of which was laid with a geometrically decorated mosaic featuring three panels (see below). Both aisles were also floored with mosaic, while the nave was laid out with evenly spaced pavers. The one-piece columns of the aisle-nave colonnades, many of which still stand, are closely spaced, and suggest that flat lintels, probably of wood (no stone lintels have been identified), spanned the space between the columns as in, for example, the Justinianic Church of the Nativity in Bethlehem, Palestine. Two further columns, now represented solely by bases, separated the paved nave from the mosaic-floored narthex, and were linked to the aisle-nave colonnades by three-way facing piers. The recovery of numerous glass tesserae indicates that the internal wall faces above the colonnades were decorated with glass mosaic, while the mass of tile fragments found in the church area indicate that the church roof was certainly tiled. The raised sanctuary, at least in part surfaced with a plain light-brown mosaic, extended deeply into the body of the church in front of a well constructed apse. Slots for sanctuary screens and upright dividers are partially preserved around the edge of the sanctuary platform. Twenty-four pieces, some large, of the fine white marble screens that embellished the sanctuary were recovered in 1994 and 1997, and from these at least six different screens have been identified to date. Open lattice screens were particularly favoured.

The Mosaics

The main area of mosaic in the church is to be found in the narthex, and consists of three rectangular panels enclosed by a guilloche (Fig. 6).⁸ The three rectangular panels comprise two identical outer panels and a central panel of a different type. The central panel has a vine leaf in each corner, the north-east and south-west being made up of yellow tesserae and the other two of red, with the tip facing towards a central motif. The central motif is a complex geometric pattern of interlacing squares and ribbons forming an octagon around a bunch of grapes. The two outer panels are made up of a central motif of a three-stranded 'Solomonic' knot in deep red tesserae within a diamond intertwined with a ribbon in a wide open figure-of-eight pattern. The central motif of each panel is lined on either side

(north and south) with three patterned diamonds. The three panels are placed within a wide rectangular frame made up from a single line of red-purple stones, which also serves as the inner border of a guilloche, composed of red, yellow and white tesserae. The guilloche is further enclosed by a bold, triple-stranded outer border of deep red-purple tesserae.

At the south end of the narthex mosaic, positioned in line with the south colonnade of the church, is a pattern of three roundels, each composed of six strands of different coloured mosaic. The three roundels are surrounded by a frame of two strands of brown tesserae. It can be assumed that, to maintain symmetry, there would have been a similar pattern on the north side (unusually, a later wall has been dug into the mosaic at this point; see to the top in Fig. 6).

The north aisle of the church was also paved with a geometric mosaic. The uncovered section of this mosaic comprises a central roundel, in the centre of which is a diamond made up of red and yellow and white tesserae on a white background, surrounded by four intertwining strands of yellow tesserae and a strand of white tesserae between the ultimate and penultimate strand of yellow. The mosaics of the Gharandal church are not provided with any inscriptions to assist in establishing the date they were laid.

Later Use of the Church

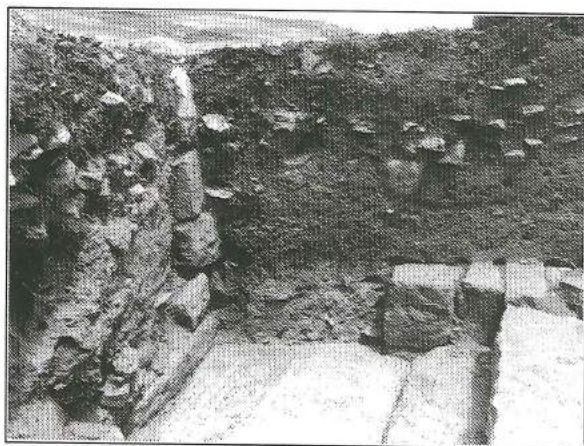
At some later date the ceramics suggest well after the mid-eighth century the sanctuary was stripped of its architectural detail and a thick chippy yellow clay fill placed within the church to raise the floor level to that of the sanctuary (Fig. 7). Seemingly the building no longer functioned as a church, but its subsequent role is not yet under-



6. The narthex mosaic of the Gharandal church, view to the north. Late walls are visible to the right, top and in the foreground; the west wall of the church, with blocked doorways, is visible to the left. The south narthex column base is visible under the late wall in the lower centre right. Squares E20 and E25 are visible at the top (L. Pontin).

8. The mosaics were cleaned by Noël Siver and Norman Ricklefs. The following report on the mosaics is an abridged version of a paper written by

Norman Ricklefs, to whom thanks are due. A full report is due to appear in a future issue of *LA*.



7. View of baulk over the raised sanctuary of the church. A section of the north aisle mosaic is visible in the foreground, above which and running up to the sanctuary platform (right) is a thick yellow clay fill. Later structures and deposits lie over the fill (L. Pontin).

stood. Most doorways into the church were blocked at this time except, it seems, a central door in the north wall. A small installation was built between piers against the south wall of the building, consisting of a line of stones and upturned roof imbrices, but its function is unclear. The use of the building would seem to be more industrial than religious. The general absence of roof tiles in the fill suggests the roof of the building was still intact.

At a later stage dividing walls begin to appear and a continuous stratigraphical build-up can be identified throughout the church. Much tile material is now found, suggesting the collapse or removal of the church roof. An initial assessment of the pottery in the build-up suggests a date into the twelfth century when the first handmade ware appears, a relatively thin ware containing much short-cut chaff and similar to Robin Brown's Ayyubid painted ware from ash-Shawbak and al-Wu'ayra but without the paint (Brown 1987, 1988). Shortly after, a more characteristic Ayyubid pottery, painted in red with wavy thin lines and dots, appears at Gharandal, and this occupation phase is marked by further wall construction over the yellow build-up. In what can be roughly described as the Mamluk period

plainly domestic occupation intensifies within the church, and is characterised by the erection of many more walls (sometimes built over fallen monolithic columns), numerous bread *ṭawābīn* and the prevalence of Hand Made Geometric Painted Wares (HMGPW). Fortunately the stout Mamluk walls mostly sit on the yellow fill and build-up and have not penetrated the mosaics.

The pottery sequence from the church at Gharandal promises much for increasing our understanding of Byzantine and Islamic ceramics for the south of Jordan. Links to the firmly dated north Jordan sequence, including pale faced, red-painted jars, reveal the overriding dissimilarity of southern pottery types, with Byzantine-style light orange to reddish blooms and wavy combing continuing well into the Islamic period. Darker reddish-orange to grey fired wares and handmade grey wares are conspicuous by their absence. The suspected misdating of southern ceramics (and the purported "decline" in Early Islamic settlement) seems supported by these initial working conclusions. Later ceramics of the late eleventh/early twelfth to thirteenth century feature the appearance of early handmade wares, at first unpainted but followed by Ayyubid red-painted handmade ware. These early handmade wares display distinctive regional variability (the Gharandal examples are dissimilar from those found at 'Aqaba and 'Ammān Citadel), but later HMGPW at Gharandal conforms to the types found throughout much of Bilād ash-Shām.

Although work has not finished in the church, it is now possible to outline a provisional chronology of the successive phases in the church since its construction (Table 1). In a future season it is hoped that a probe below the church floor (in an area where the mosaics are destroyed) will reveal pre-church occupation in Area A.

The Double Compound

The large Double Compound south of the

Table 1. Provisional levels and archaeological features in Area A.

Level	Features	Date
Level 1	Post-occupation collapse.	?Seventeenth–twentieth centuries
Level 2	Houses. Thick uncoursed two-faced stone walls, doorways, packed earth floors, <i>ṭawābīn</i>	Fourteenth–?sixteenth centuries
Level 3	Houses. Uncoursed stone walls.	Twelfth–thirteenth centuries.
Level 4	Yellow clay fill within church; dividing walls; build-up.	?Ninth–eleventh centuries.
Level 5	Monoapsidal Church with nave paving and mosaics in the aisles and narthex.	?Fifth–eighth/ninth centuries.

church, measuring ca. 65 x 25 m and labelled Area B, has yet to be investigated in detail (Fig. 4). In 1997 attention was paid to mapping surface remains, and planning and photographing all exposed wall faces. Major excavations within the compounds are scheduled for 1998.

As the structure clearly predates the church, which abuts the massive north wall of the enclosure, it is either a Nabataean or Roman construction, most likely the former. The common occurrence of fine Nabataean pottery at Gharandal suggests a major presence in this period, and the masonry of the massive enclosure walls of the compounds share many architectural features with the temples at Khirbat adh-Dhariḥ, Khirbat at-Tannūr and al-Qaṣr to the north. Later structures within the Double Compound attest to its continuing function in the Late Antique and Islamic town, and the changing nature of this use is one of the most exciting prospects for future research at Gharandal: how did a Christian(ised) town deal with a large pagan structure in its centre (reuse, neglect?) and, following the change to Islamic hegemony, what further conversions were made to the structure?

Other Structures

To the east of the church and Double Compound the land falls away to an open area and, beyond that, a mass of exposed

wall lines that probably represent houses of the Mamluk village (Area C, Fig. 4). An access route can be traced through the remains going down the hill to the north-west in the direction of the spring, and probably represents a passageway through the Islamic village. In the far south-east corner of the antiquities area another stout wall made of large stone blocks like the double enclosure stands a couple of courses above ground level. This wall seemingly represents another major Nabataean structure at Gharandal. A corner of a third large Nabataean building has been exposed immediately to the north of the church, indicating that the summit of Gharandal was the focal point of the town and endowed with at least three major public buildings in the first and second centuries CE.

Acknowledgements

Funding for the project was provided under the terms of the Large Research Grants Scheme of the Australian Research Council (Project number A59601327), and by the Department of Antiquities of Jordan. I am especially grateful to the Director-General, Dr Ghazi Bisheh, for offering major financial, logistic and academic backing. The active support of Mr Jihad Darwish considerably facilitated the important first year of the project. The interest and encouragement of HE Ms Merry Wickes, Australian Ambassador in Jordan, is also much appreciated. Ms Alison McQuitty, Director of BIAAH, and the Assistant Director Mr George Findlater also lent considerable support. The assistance of Royal Jordanian Airlines, Sydney, is thankfully acknowledged.

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Bibliography

- Brown, R.
1987 A 12th century A.D. sequence from southern TransJordan: Crusader and Ayyubid Occupation at el-Wu'eira. *ADAJ* 31: 267-88.
1988 Summary Report of the 1986 Excavations: Late Islamic Shobak. *ADAJ* 32: 225-45.
- Hefele, C. J.
1883-96 *A History of the Councils of the Church*. Edinburgh.
- Jones, A. H. M.
1971 *The Cities of the Eastern Roman Provinces*, second ed. Oxford: OUP.
- Walmsley, A. G.
1987 The Administrative Structure and Urban Geography of the Jund of Filastin and the Jund of al-Urdunn: the cities and districts of Palestine and east Jordan during the early Islamic, 'Abbasid and early Fatimid periods. Unpublished PhD thesis, University of Sydney. Sydney NSW.
1989 Khirbet Gharandal. Pp. 228-30 in D. Homès-Fredericq and J. B. Hennessy (eds), *Archaeology of Jordan II,1. Field Reports: Surveys & Sites A-K*. Leuven: Peeters.



GADARA 1998 THE EXCAVATION OF THE FIVE-AISLED BASILICA AT UMM QAYS: A PRELIMINARY REPORT

by

Thomas Weber

with a contribution by Ulrich Hübner

Resuming the archaeological activities undertaken by the German Protestant Institute at Amman between 1986 and 1990, the excavation was reopened at Umm Qays in 1998 under the directorship of the author.¹

The excavation in April and May at Decapollitanean Gadara (modern Umm Qays) revealed an Early Christian basilica with five aisles. This type of Late Antiquity sacred architecture, attested by the Gadarene example, is the first example east of the Jordan.

In addition, two sites outside the city wall, within the lands (chora) of the Gadarenes, were investigated as part of this campaign: Ibrahim Zu'bi of the Department of Antiquities uncovered a fine building at the eastern Gadarene border point of al-Manāra. Ulrich Hübner reports on a recently discovered Late Hellenistic fortress at the site of Lahluh.

In close cooperation with the Amman branch of the Institute, this campaign was put within a wider research programme (Sonderforschungsbereich 295 "Kulturelle und Sprachliche Kontakte") of the Johannes Gutenberg-University at Mayence, Ger-

many.

Topography of the Site

The excavation area of the 1998 season was located in the lower city of Gadara west of the Acropolis hill. Work focused on the Byzantine Basilica, first excavated in various squares in 1989.² This ecclesiastical structure covers the area on top of a Roman hypogeum and a Christian crypt extending towards west. The whole complex of these three buildings lies close to the decumanus maximus to the south-west of the southern circular tower of the Tiberian gate (Fig. 1). The gate was an important urban monument, a free-standing archway with a single barrel-vaulted passage and cylindrical flanking towers. It was erected in the first century AD and probably served as a customs toll station from the Early Imperial period to Late Antiquity.³ During the late second or early third century AD the Tiberian gate was replaced by a more 'sumptuous' arch⁴ located in the western outskirts of the enlarged city area. Having been abandoned, possibly also due to damages caused by an earthquake, the Gadarenes decided to quarry

1. The 1998 season at Umm Qays was supervised and assisted by Ibrahim Zu'bi, Inspector of the Department of Antiquities. Nawzat Abida, Director of the Department of Touristic Development, participated on behalf of the Ministry of Tourism. Wajeeh Karasneh, of the Department of Antiquities at Irbid kindly provided help in the restoration of the mosaic.

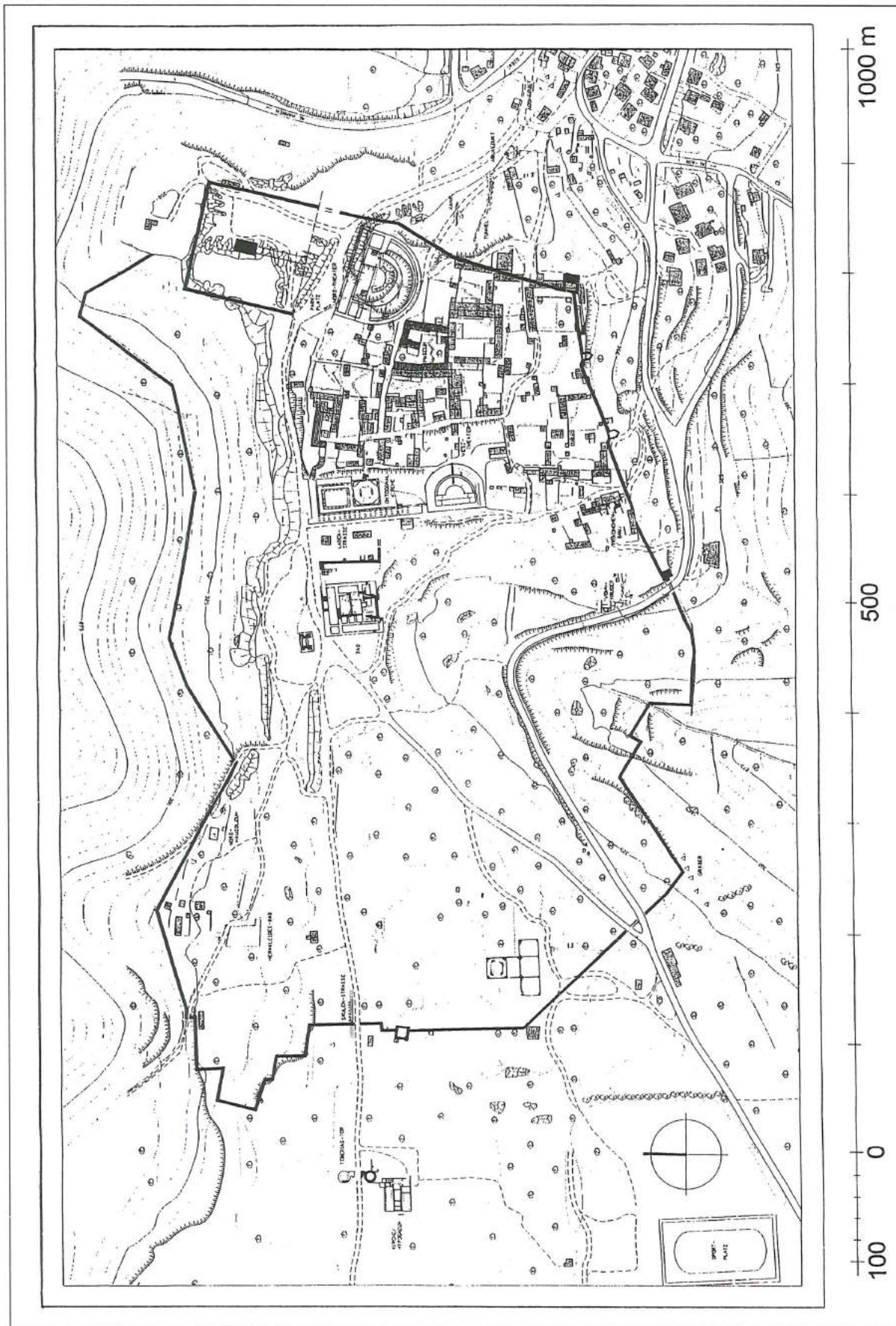
The team of the German mission consisted of: Muhammad al-Daire, (archaeologist, Mainz University), Ulrike Denis (draftswoman, Trier University), Arn Gyldenholm (biologist and Photographer, Aarhus University, Denmark), Ulrike Hess (architect, Technische Hochschule Munich), Ul-

rich Hübner (Biblical Archaeologist, Kiel University), Muhammad al-Husban (student of archaeology, Università degli Studi - La Sapienza, Rome), Birgit Mershen (ethno-archaeologist, Sultan Qaboos-University, al-Khod, Oman), S. Felicia Meynersen, (archaeologist, Mainz University), Wolfgang Selesnow (archaeologist, Bochum University) and Helle Strehle (restorator, Forhistorisk Museum, Moesgard, Denmark).

2. cf. Weber, Hoffmann *et al.* 1990: 324f. and 327f., Fig. 3.

3. Weber 1998.

4. Weber, Hoffmann *et al.* 1990: 328ff., Fig. 4-5.



1. Topographical map of Gadara of the Decapolis. The Tiberian gate, the Roman mausoleum, the Byzantine crypt, and the five-aisled basilica form an architectural unit located west of the Early Roman city wall (map by W. Boeser).

this monumental arch for blocks to build an Early Christian underground crypt adjacent to the east of the front of the Roman mausoleum. This burial place was dedicated to a prominent local saint, probably the Gadarene Diacon Zachaios who suffered martyrdom in the years of the Diocletian persecutions.⁵ His apse-framed tomb was considered as being a holy place, and became a place of Early Christian pilgrimage. For this reason one would assume that the whole complex, including the Roman Mausoleum and the superstructures of the underground sepulchral buildings, had a memorial character. As already shown in the 1988 campaign, the rest of the crypt was used for burials of other notables of the Early Christian Gadarene society to be close to the venerated corpse (*ad sanctum*).⁶

This topographical and architectural setting is essential for the understanding of the basilical building located above the Roman hypogeum and the Early Byzantine coemiterium.

The 1989 Campaign

21 square trenches opened in 1989 separated by 1 m profile balks uncovered the entire area of the altar zone with the bases of marble screens and poles, as well as parts of the central and lateral naves of the church with outer walls along the northern, western and southern side of the structure. All walls and the mosaic floors were found in poor condition; serious damage of the mosaic floors was caused by an earthquake. Burned mosaic tesserae indicate local fires at various points. The outer walls preserved only two layers of basalt masonry of older origin, raised on a foundation layer of limestone slabs resting on a slightly protruding, thick bancett made out of greyish mortar mixed with stone chips. Much of the building material was quarried and reused for later con-

structions: No fallen material could be observed in the trenches apart from several column drums, capitals and a long basalt lintel with the frontal relief of an eagle framed by two rosettes.⁷ The western wall showed three entrances corresponding axially with the central and the adjacent lateral aisles. To the west of these, a paved floor consisting of smooth rectangular marble slabs and smaller oblique tiles extended westwards. The intercolumniation of the central nave consisted of marble and basalt bases of Attic-Ionic type. They could not be studied because most of them remained covered by the profile balks or by the spolia walls of a later building which has been preliminarily interpreted as an open-air mosque (*musalla*) at that time.

Former Proposals on Type and Date of the Basilica

Relying on the square plans drawn already in the 1989 campaign and on the style of the polychrome mosaics, the author regarded the structure as a basilica of the common three-aisled type, and proposed the first half of the sixth century AD as the period of construction (1990). The intercolumniation remained still hidden under the 1 m profile balks. Clearance was planned for a final season in 1990 which was postponed due to the Gulf war.

Chronology of the Crypt

Further study of the documents from the 1989 season led to the conclusion, that the underlying crypt was constructed in the first half of the fourth century AD: According to archaeological and numismatic evidence the neighbouring towers of the Tiberian gate were destroyed for the reason mentioned above during the first half of the fourth century AD. A Byzantine storage building erected on the limestone founda-

5. Eusebius, *acta Mart. Palaest.* (ed. Cureton, *History of Martyrs in Palestine* [1961]).

6. Duval 1988. E. Rebillard, *MEFRA* 105 (1993):

975ff.

7. cf. Weber (1995, in press): pl. 91, 3.

tions was abandoned in the fifth century, possibly due to damage caused by the severe earthquake of AD 479. Coins found in the joints between the cover slabs of a tomb within the coemeterium indicated that the last burials in this privileged area were put there in the late fourth or in the first half of the fifth century AD. Further, the polychrome floor mosaic on top of tomb 6, which was lifted in 1987 by P. Michele Piccirillo and conserved for display in the Umm Qays Museum,⁸ can be dated prior to the edict of Emperor Theodosios II issued in AD 427.⁹

The 1998 Season

The campaign started on April 18th and ended on May 24th, 1998. In this period excavation work was carried out with an average number of 22 local workmen, occasionally supported by labourers employed by the Department of Antiquities.

Systematic Excavation in the Grid

It was the aim of the 1998 campaign to uncover the complete basilica area including the westwards adjacent narthex and atrium in order to confirm the type and the date of this important church. During the first two weeks the squares already excavated in 1989 were cleared of recent refill. After this, the profile balks were removed in order to get a clear picture on the position of the columniation of the central and the lateral naves. In the progress of work, the excavation area was gradually extended according to the grid-system in order to uncover the outer walls of the church at its northern, western and southern flank.

Soundings

Eight trial trenches (I-VIII/98) in the southern, northern, western and in the central parts were dug in order to get in-

formation on the construction of the foundation (Sondage I/98), the dimensions of the atrium (Sondage III/98) and the eastern limits of the complex (Sondage VI/98). The stratigraphy of older floor levels underneath the sixth century AD mosaics was studied in Sondage VII/98. A dump area close to the southern wall of the basilica produced a number of fragments of a coloured wall mosaic with a Greek inscription (Sondage IV/98). In order to prove the link between the basilica complex at its western end with the *decumanus maximus*, another trench was opened at a corresponding stretch of the 'darb al-rasefiye' (Sondage V/98). Finally, a small artificial cistern in the crypt was emptied in the hope of obtaining more dated strata for the chronology of the structure.

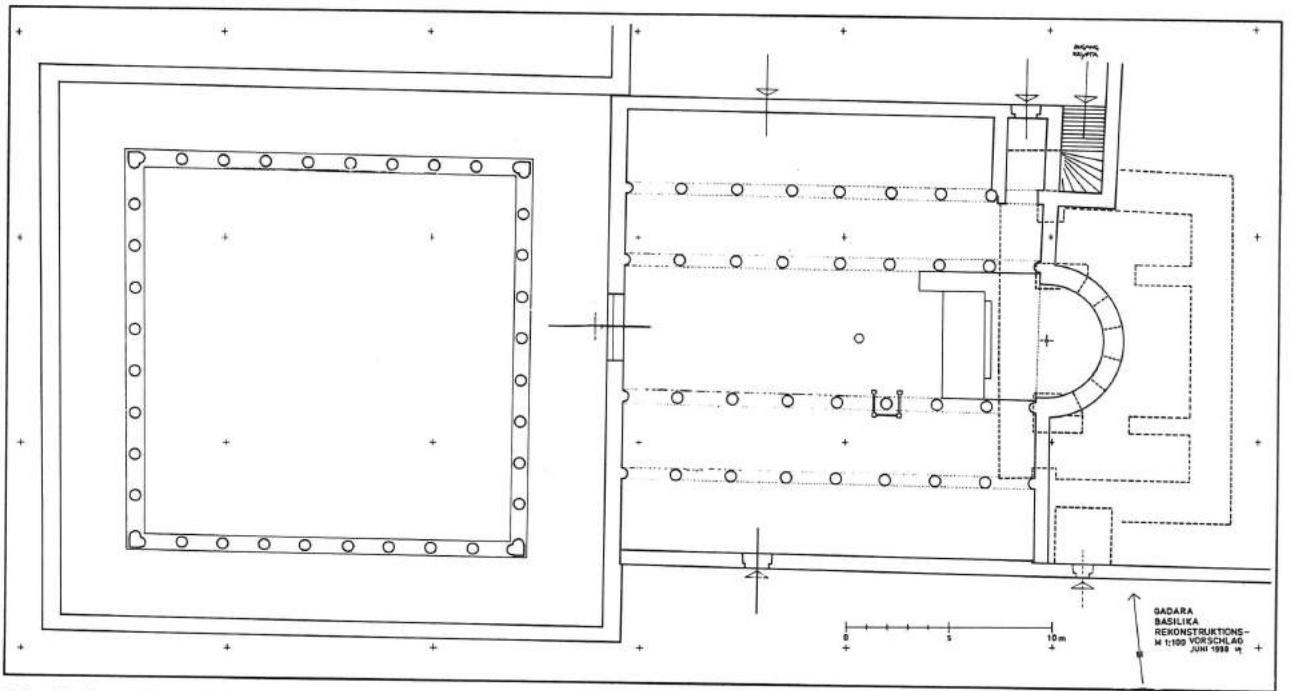
The Plan of the Church

The church has a ground plan (Fig. 2) of nearly square shape measuring 21.50 m in the east-west and 20.10 m in the north-south direction. Well fitting into the urban *cataster-system*, this huge ecclesiastical complex is oriented from east towards west with an entrance hall and a large open air colonnaded courtyard (atrium, 26.47x 26.00m) in the west. The complex was framed by paved passageways along its southern and western façade. The western street was most probably interconnected perpendicularly as a *cardo* of minor rank to the main traffic axis of the city (*decumanus maximus*) running at a distance of about 30 m from the northern wall of the basilical complex in an east-westerly direction. The building material of the whole complex consists of older (i.e. Roman) basalt and limestone materials from buildings in the immediate environs. The foundations of the outer walls consist of a thick layer of *opus caementicium* and a row of well-cut limestone ashlar.

As a common feature in Christian archi-

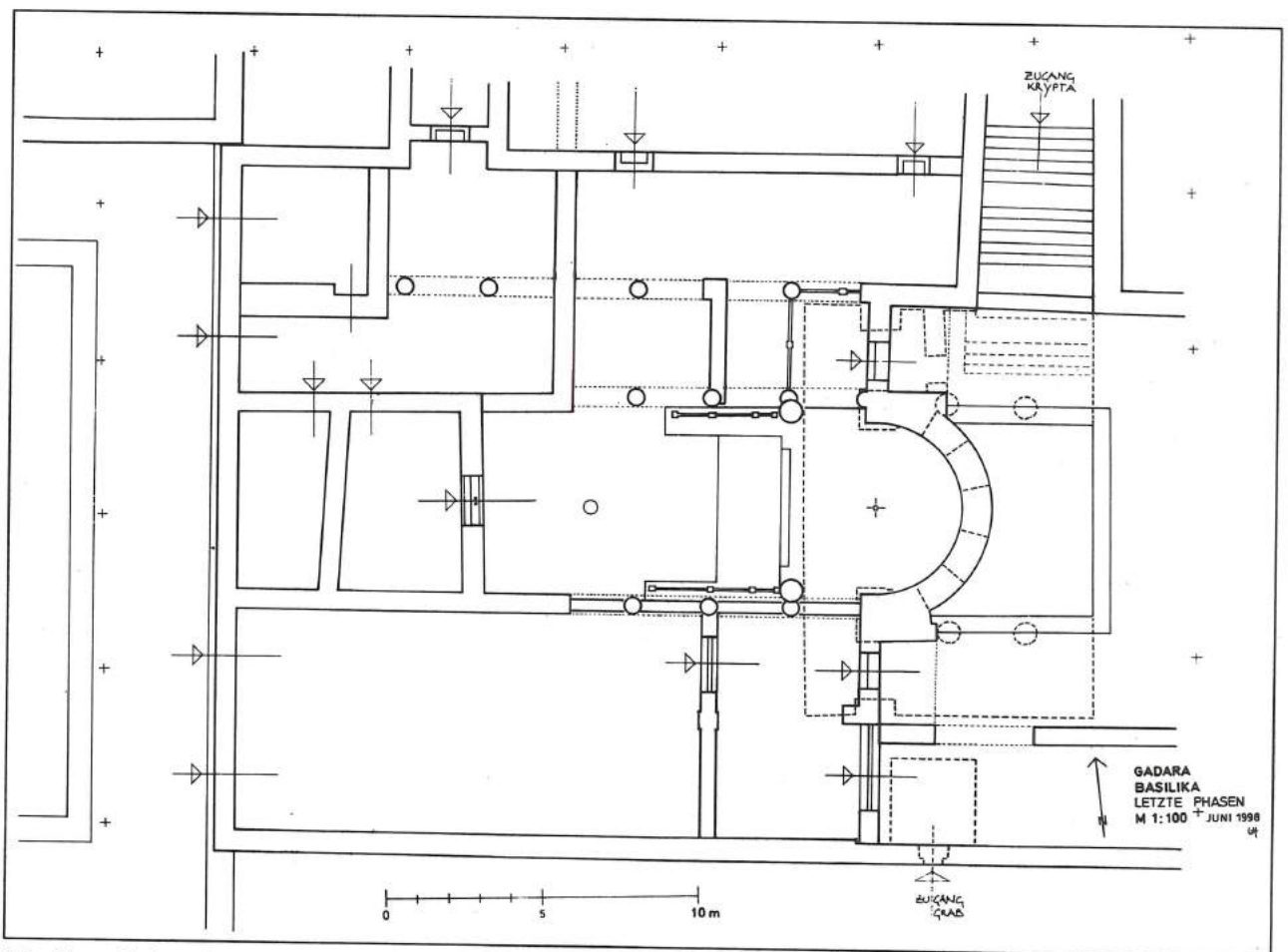
8. cf. *ADAJ* 31 (1987): 640 Pl. XCV. For the inscriptions cf. Weber (1995, in press): 267f. No. IS 41.

9. *Corpus Iuris Civilis* II: *Cod. Just.* I, VIII 2 (P. Krueger (ed.) [1914]); cf. J. Green, Y. Tsafirir, *IsrexplJ* 32 (1982): 82 n. 13.



2A. Gadara, five-aisled basilica, ground plan:

A reconstruction on paper of the original phase (fourth century AD). Plan with later occupations, (Drawings: U. Hess, Technische Hochschule München).



2B. Ground plan of the basilica with later occupations. (Drawings: U. Hess).

ecture, the orientation of the church was given by its apse which was entirely quarried for stone after the final destruction. It was constructed on top of the semicircular base of the crypt. The purpose of this structure was to frame the central tomb of the Early Christian cemetery. The apse of the church provided the eastern border of the slightly raised altar zone (sanctuarium). From the sanctuarium (Fig. 2: A) the central nave (aisle I) extends axially towards the west and the light-window of the domed burial chamber of the pagan Roman mausoleum marks precisely its half length (Fig. 3). The central nave of the church was separated from the lateral aisles on both long sides by an arcade consisting each of seven columns. The adjacent areas south and north of it were subdivided by one row of pilasters corresponding to the colonnades of the central nave. Thus, the northern and the southern sections of the church hall were divided on both sides into two lateral aisles (north: aisle II-III; south: aisle IV-V, Fig. 4).

On both sides of the apse, two doors gave access from the aisles III and IV on to a balustrade (Fig. 2: B), probably made out of wooden beams, leading around the sacred



3. The five-aisled basilica of Gadara, detail of the central nave: light-hole (oculum) of the Roman Mausoleum (Photo: A. Gyldenholm).



4. The five-aisled basilica of Gadara, overview from south-east (Photo: Arn Gyldenholm).

space of the crypt on an elevated level. This construction allowed processions of pilgrims from inside the church around the venerated tomb which could be seen within the rectangular frame of the apse through the large rectangular openings. The southern and eastern limits of this processional walkway were marked by walls. They separated procession area from an outer passageway, which gave access to a baptisterium in the south-eastern corner of the complex. At the southern side, the floor of this passageway is partly supported by the ceiling of a barrel-vaulted chamber which could be entered from the southern façade of the church by a small door with a lockable monolithic basalt wing still *in situ*.

The interior of the basilica was originally made accessible through various entrances, the main one opening axially to the central nave. Additional doors, probably dating to a later use of the basilica, were found in the northern and in the southern walls.

The relatively narrow entrance was in front of the western façade of the building, that is the eastern colonnade of the atrium which extends over an overall length of 26.00 m immediately west of it. Its assumed width is estimated at ca. 26.50 m, so an approximately square courtyard may be reconstructed. The interior space in the courtyard was framed on all sides by a colonnaded hall, the stylobate of which came to light in the section of the long

probe, Sondage III/98: The cross-section of these halls measured 3.80 m. While the floor of the atrium was entirely destroyed by recent army bulldozing, the floor level of the narthex (and probably of the colonnades of the atrium) was once covered by a fine pavement made of smooth rectangular basalt slabs.

Date of Construction, Phases of Use and Abandonment of the Five-aisled Basilica

Even though stratigraphy was disturbed by war actions of 1967 and bulldozing by the Royal Jordanian Army in the following years, there is no contradicting archaeological evidence against the assumption that the church has been erected during the fourth century AD, together with the crypt. Apart from that, one has to take into consideration that, according to the structural layout of the plan, the Roman Hypogeum and the Crypt had been deliberately adopted by the Early Christian community of Gadara in the worship.

A date of construction within the first half of the fourth century AD would typologically fit well other building activities of the Constantine era in neighbouring Palestine. Due to the lack of epigraphical information or other archaeological evidence, neither the Saint nor the commemorated holy event venerated in the Gadarene five-aisled basilica can be identified with certainty.

As it had already been stated in the previous excavation report (season of 1989), the existing mosaic floor dates to the sixth century AD. This floor shows later repairs in many spots, most probably due to damages caused by earthquakes or iconoclasm. An older plain plaster floor level, dated by the pottery to the phase of construction (fourth century AD), was uncovered ca. 30 cm under it.

The original fourth century AD church

was converted into smaller chapel after its sixth century renovation. This sacred building was used over a long period for the Christian liturgy. The first substantial alteration of the architecture was most likely executed when the basilica was partially destroyed by one of the earthquakes in the Late Byzantine or Early Islamic periods, probably the fatal catastrophe of AD 749 by which most of the buildings were laid into ruin. Despite its reduced size, practice of Christian liturgy continued inside the building during Early Islamic rule.

The relatively large amount of Ayyubid-Mamluk pottery, suggests that the central nave was transformed into a mosque during or shortly after the time of the Crusades. The main entrance, divided by a column of the southern arcade of the central nave in the former basilica, has been located in that phase to the north in order to form an axial layout oriented towards the prayer niche (*mihrab*). In the new entrance area the sixth century mosaic was still relatively well-preserved. Two smaller rooms were attached to the prayer hall towards the west. A storage vessel lowered into the floor at the corner of the extreme western hall may indicate, that this part of the building had been used for dwelling. In the south-eastern corner of the former church a kiln was built in order to burn the marble fittings to lime.

When and why this complex was entirely abandoned remains unknown. It may be explained with the establishment of a new sepulchral shrine for the local saint Mohammad Abū an-Naml. This structure and the adjacent burial ground may be attributed to a village still visited by travellers of the early 19th century.¹⁰ G. Schumacher¹¹, on his topographical map published in 1890 refers to "ruins of villas and villes" in this part of the former city area, which is still known to the local population of Umm Qays under the name "al-knas ("churches").

10. B. Merschen, in Kerner (ed.) 1991: 135ff.

11. Schumacher 1890: map on p. 46.

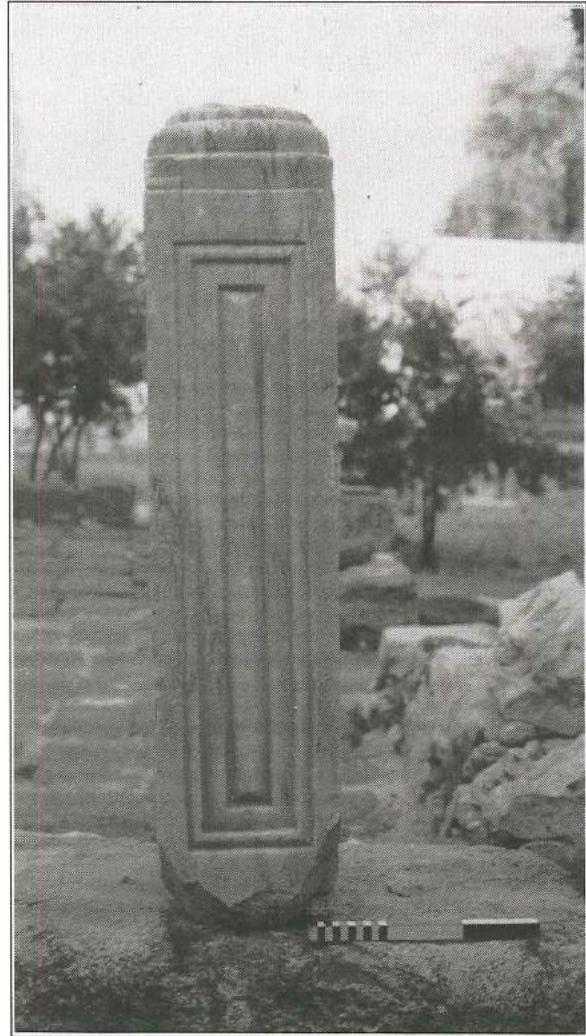
Finally, the site was occupied by the Royal Jordanian Army during the Arab-Israeli conflict.

Architectural Features in the Interior of the Basilica

During the 1998 campaign four marble column bases of Attic-Ionic type were uncovered in the central aisle, flanking the western end of the altar zone. These marble bases supported column drums of Troas granite with Corinthian capitals made out of marble from Proconnessesus.¹² The same arrangement of imported column drums, bases and capitals of western Asia Minor origin is preserved in the caldarium of the fourth century AD baths close to the city centre.¹³ Grooves chiselled into the upper surfaces of limestone blocks testify marble chancel screens, three poles of which (Fig. 5) have been found reused in masonry put in the western part of the central nave. Fine marble slabs originally screened not only the altar but were extended on both sides to the west towards the central nave. The third column base (counted from the east) of the southern arcade was surrounded by marble slabs as well. One could assume that this has been done in order to support a reliquary or tabernaculum fitted to the column at this emphasized spot of the church. Some of the marble slab fragments, found in the mosaic floor close to the main entrance, could be identified as part of a mensa (Fig. 6) placed on top of the altar.

Mosaics

The interior of the basilica was embellished with a large mosaic pavement. The style of its geometric ornamentation and the few figural motives suggests a date in the sixth century AD: The Gadarene mosaics are closely related, for instance, to those in the church of Gergesa-Kursi on the



5. Marble pole from the chancel screen found in the five-aisled basilica (Photo: A. Gyldenholm).

eastern shore of Lake Tiberias.¹⁴

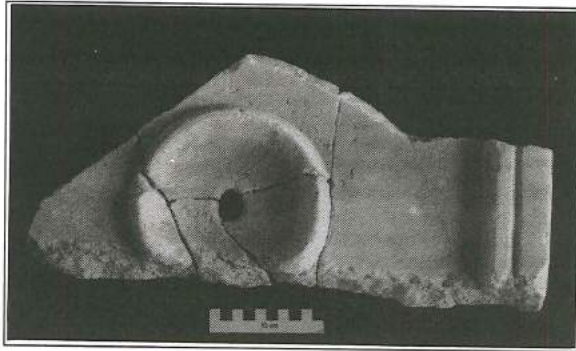
The central and the two adjacent lateral naves (III and IV) were covered by a floor showing a simple feather ornament of white tesserae framed by a frieze of alternating lotus buds. In the western half a line of octagonal fields was partly destroyed by the stylobate of a later alteration of the church interior. In one of the fields one reads in Greek characters the word (ΠΡΟΣΦΟ Πρεσφο[εά] dedication of ...”), indicating personal involvement of a cleric or a pilgrim in financing the mosaic floor. The two outer aisles (II and V) are covered by el-

12. For the combination of Troade granite with Proconnesian marble capitals and bases, cf. H. Dodge, *Oxford Journal of Archaeology* 7 (1988):

76, Fig. 7.

13. Nielsen, Andersen, and Nielsen 1993: 234, Fig. C.

14. Tsaferis 1983: 23ff.



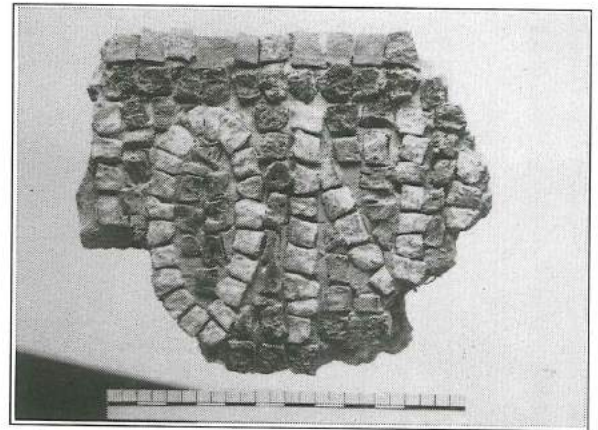
6. Marble fragments of the altar plate (mensa) from the five-aisled basilica (Photo: A. Gyldenholm).

ongated fields filled with stylized geometric scrolls, in the vignettes of which small figural motives such as an empty bird cage¹⁵ or ivy leaves are displayed. In the intercolumniation between aisles II-III and IV-V single birds¹⁶ or trees are represented.

Apart from the floor pavement a lot of fragments of a coloured wall mosaic framed by a narrow band in fresco technique was found in a dump pit beyond the southern wall of the basilica. They could be restored as a coloured panel with at least two lines of a Greek inscription (Fig. 7) executed in white tesserae on a light blue background. Small portions of the letters could be conjectured, but the full reading of the epigram remains obscure due to the fragmentary state of preservation.

Small Finds

A relatively large number of coins has been found together with pottery sherds, glass and minor objects made of bone or metal. Especially Sondage IV produced an amount of more than 100 bronze coins found underneath coloured mosaic fragments, tesserae or pieces of *opus sectile*. The evidence of pottery for the chronology has to be considered as rather scarce since a major portion of it comes from recent refills of the square trenches or from disturbed



7. Fragment from a coloured wall mosaic with Greek inscription, from a dump pit south of the southern wall of the five-aisled basilica (Photo: A. Gyldenholm).

stratigraphical contexts.

The interior of the basilica produced a considerable number of glass lamp fragments (polycandela). Amongst the metal finds a clay core of a bell with horizontally ribbed body should be noted. One of the burials in the crypt (Tomb 12) already excavated in 1988¹⁷ contained two bronze chains with bells fixed to them by wire. One of these chains¹⁸ preserves bells of the type represented by the core. This find indicates that bronze objects of this sort are of local origin, manufactured in the immediate environs of the church complex. One building of this type, a simple storage room with *dolia*, was examined north of the *decumanus maximus* in the 1989 campaign at the foundations of the Tiberian gate. A fragment of an incense-burner (Fig. 8) was found in the area of the main street within unstratified debris and may be classified as one of the few pre-Hellenistic items from Gadara.

After the division all small finds were handed over to the Department of Antiquities. After anthropological examination all human bones were reburied in one of the stone-lined shaft tombs of the crypt.

15. Piccirillo 1993: 248, Fig. 422; 280, Fig. 514. Cg. Asemakopoulou-Atzaka, *Archaiologiko ergo Makedonias kai Thrakes* 3 (1989): 625ff.

16. Piccirillo 1993: 329, Fig. 690.

17. Th. Weber, *Jahrbuch der Österreichischen Byzantinistik* 42 (1992).

18. Weber (1999, in press).



8. Fragment of a stone incense-burner, found in the debris upon the pavement of the decumanus maximus, pre-Hellenistic, mid 6th century BC, local origin? (Photo: A. Gyldenholm).

The Five-aisled Basilica and the Miracle of the Gadarene Swine

The topographical setting of the basilica in the immediate vicinity of the Early Imperial city gate and the integration of a pagan Roman mausoleum in the early Christian cult may perhaps be connected with details in the New Testament about the miracle of Gadara (Matthew 8, 28). Both Roman monuments were visible during the life-time of Jesus. In respect of other basilicas of the five-aisled type it is evident, that the Gadarene structure must have been dedicated for a outstanding event or person of the Bible or early church history. Despite the lack of inscriptions or other striking evidence, it should not be excluded, that a pilgrim church of this size was built on the spot, where Byzantine tradition recalled that Jesus had performed the miracle of the Gadarene swine.

Consolidation and Future Presentation of the Ruin to the Public

Urgent measures had to be undertaken in

order to guarantee security for excavators and visitors. Cracks in the basalt slabs of the ceiling of the crypt were temporarily supported by a scaffold and are going to be restored by the Department of Antiquities.

In the course of the current fieldwork, the author together with Nawzat Abida, Director of the Department of Touristic Development in the Ministry of Tourism, worked on a proposal for the consolidation and preservation of the five-aisled basilica complex at Umm Qays. First steps for the consolidation were undertaken immediately at the onset of the excavation. To the east of the retaining walls of the underground complex a soil package of a thickness up to 80 cm contains materials deposited after 1967, when the area of the Tiberian Gate, the underground burial places and the five-aisled basilica was occupied by a military unit. Since only the upper stratum of this thick earth layer could be removed during the 1998 campaign, further bulldozing is recommended in order to facilitate access for the visitor. By the end of the fieldwork all deep soundings, which may cause danger to men and cattle as well, were refilled. It has been agreed with the Department of Antiquities to raise the outer walls of the basilica by two layers of masonry. For these works ancient ashlar which are available in the area, should be used, held in place with a mixture of sand-lime mortar. For the consolidation of the fragmented mosaics, the Irbid branch of Department of Antiquities provided rescue help. Only small portions such as those with the inscription fragment or with vignettes of birds were lifted for presentation in the Museum. After the end of the excavation, the remaining basilica's mosaic floor was covered by a 20 cm layer of rubble sand and debris for protection.

The Excavation of Rujum al-Manāra

During the excavation season the site of al-Manāra, located 12 km east from Umm Qays, was visited by members of the Ger-

man archaeological mission. Inhabitants of the village helped to identify the small ruin of the Rujum al-Manāra already reported by G. Schumacher in 1890.¹⁹ He described it as “a small square ruined tower on the Roman high road from Umm Keis to the Hauran, situated near Ibdar. Its elevated position, its extraordinary large and well-hewn building stones, with the columns and capitals, above which run a cornice and an architrave, would render it probable that we have here either the remains of a small temple or else a watch-tower at the frontier for the collection of toll”.

The Rujum al-Manāra presently lies some 30 m south of the asphalt road between Umm Qays and Irbid, and 50 east of a towered station of the military security police. The land is now privately owned by a local family. The Department of Antiquities at Umm Qays under the inspector Ibrahim Zu‘bi undertook clearance and a small-scale excavation with the endorsement of the owners. This fieldwork produced a small square building with east-west orientation (Fig. 9: a-b), the foundations of which consists of well-levelled bedrock. The structure is raised on a three-stepped podium and preserved a profiled base. In the interior a shaft tomb was found chiselled into the soft rock (Fig. 9: c), accessible by a short tunnel from the north. The pottery and reused limestone ashlar point to a use of this well-designed building as a tomb during the Byzantine period. In the environs various rounded blocks ornamented with palmette leaves and rosettes indicate the presence of an older building in the shape of a cylindrical tower. Due to the limited excavation area it was impossible to locate its foundations. The figural style of this frieze leads to the assumption that close to the uncovered building a tower-shaped monument marked the eastern border of the Gadarene chora in the Roman Imperial period.

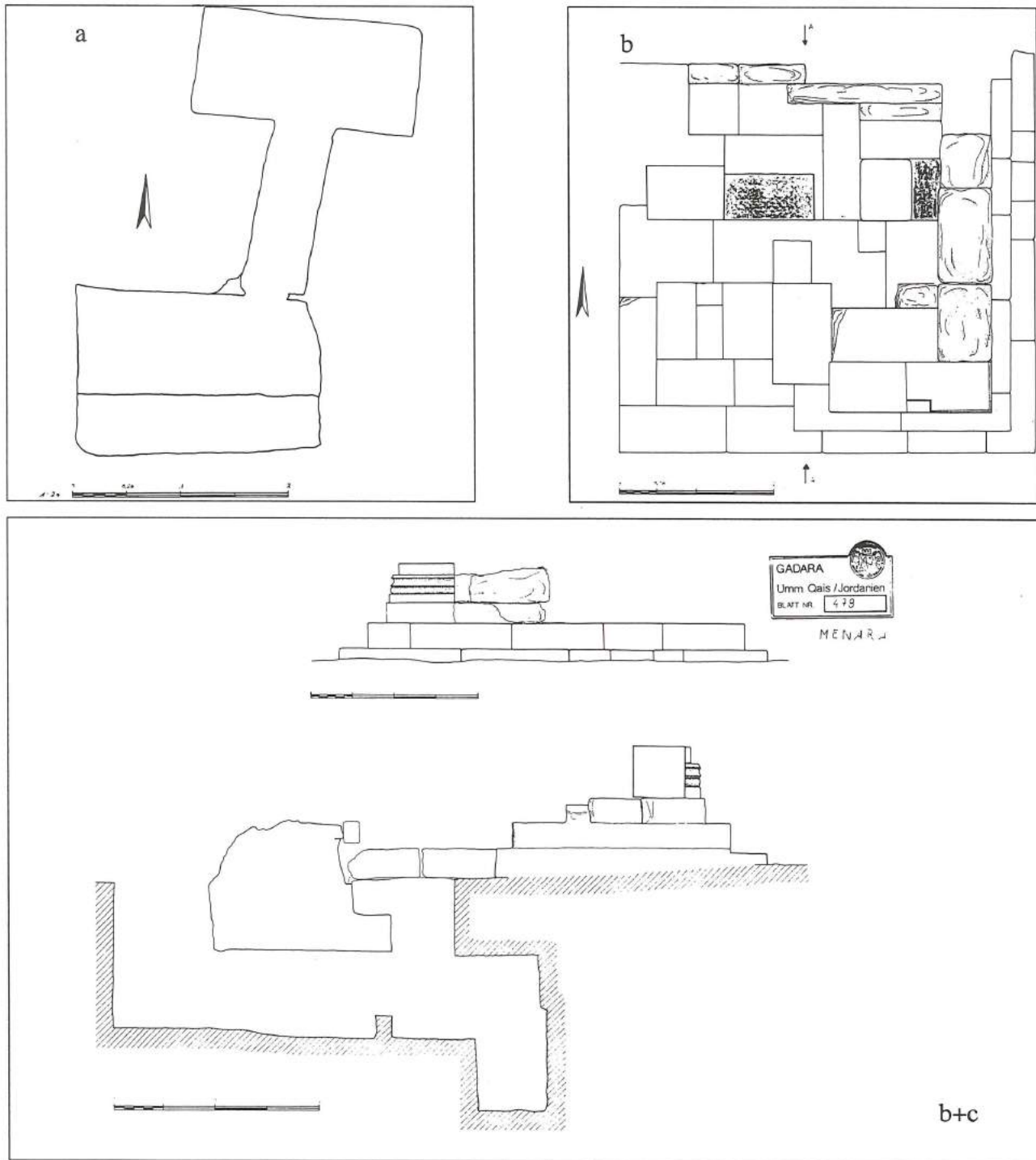
A Late-Hellenistic Fortress at Lahlūh (Ulrich Hübner)

Lahlūh is the Arabic name of a small promontory situated at a distance of about 400 m south-south-west of the fortified acropolis hill of Gadara. It is accessible south of the asphalted road winding through the Wādī ‘Ayn Umm Qays which connects the modern village to the perennial spring. The site is today planted with an olive grove and it is used for agriculture by its private owners.

At a first visit during the 1998 campaign traces of ancient quarrying on the protruding rocky outcrops at the site on the eastern top of the slope were noted together with visible remains of a fortress in its western parts. Close to the road a rock-cut Roman tomb was altered into a columbarium. These antiquities were reported to the responsible authorities at Umm Qays and briefly surveyed with the assistance of Thomas Weber and Sufyan al-Karaimah, the son of the owner of the land. The result of this visit is a sketchy ground map showing the layout of the fortress, which has not been previously reported by G. Schumacher or other visitors of the ancient territory of Gadara.

The fortress has an approximately square plan (Fig. 10) and was built on the highest elevation point of the slope and was founded solidly on the extant bedrock. It occupied an area of ca. 40 x 45 m. The interior consisted originally of two separate rectangular courtyards arranged adjacently to each other from east to west and connected to each other by a small rock-cut gate (Fig. 11 a). The fortified area was surrounded by walls and protected the eastern, southern and north-western part of the slope where the terrain is relatively steep. A main entrance should be searched at the eastern side because of the relatively flat elevation on this side of the hill. The south-western

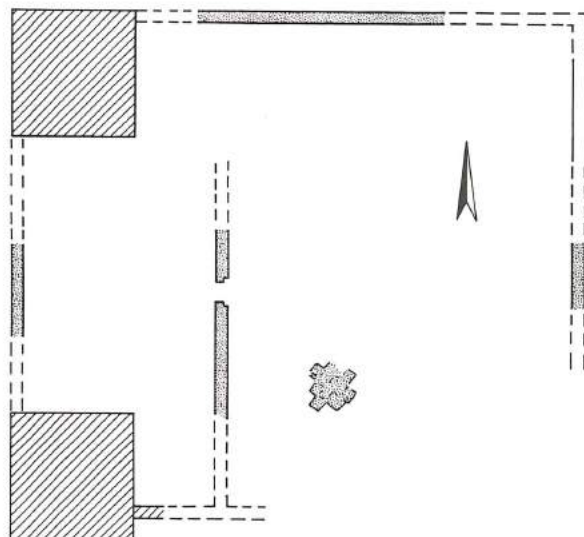
19. Schumacher 1890: 103f.



9a-c. Rujum al-Manāra, ground plan (a), elevation and section (b+c), plan of the rock-cut tomb (surveyed by Osama Hammouri, drawn by U. Denis).

and north-western corners of the fortification are flanked by a massive 10 x 10 m tower of square plan (Fig. 11 b). Their masonry consists of large (1.80 x 0.65 m) and carefully chiselled limestone ashlar laid in header-and-stretcher technique with precise horizontally and perpendicularly running

joints. The fortification wall connecting these two towers is only little preserved. It is obvious that the blocks for the construction of the fortress were produced in the quarries in the eastern part of the hill. Rough field walls have been built in recent times over both towers and other con-



10. Lahlüh, late-Hellenistic or Early Roman fortress. Sketch ground plan (surveyed by U. Hübner, and Th. Weber, drawn by U. Denis).

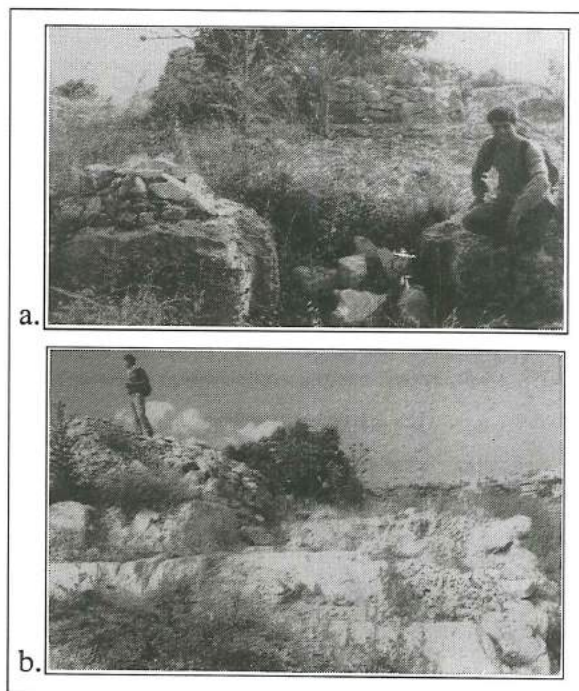
necting masonry, in order to make use of the enclosed area for the sake of agriculture. At the south-western tower remains of military shelters are preserved dating to the Arab-Israeli wars of the present century.

The ancient complex of Lahlüh was situated in a strategically well-chosen position. From here guarding military units had an excellent overview on the southern flank of the Gadarene city wall as well as on neighbouring sites such as into the Wādī al-‘Arab (close to Tall Zer‘a), on the promontory Angora, on the skyline of the ‘Ajlūn-massive until the plain of Baysān/Scythopolis. From Lahlüh, all natural southern entrances to the city and to its immediate vicinities could easily be controlled and the water supply from the spring ‘Ayn Umm Qays be guaranteed.

Due to the coherence of the building technique of the recently found fortress with the masonry of the city wall of Gadara, a preliminary date within the Late Hellenistic or Early Roman period seems appropriate. Pottery sherds scattered at the side, however, make it evident, that the side was still occupied in Byzantine times.

Acknowledgements

Funding was provided by the German



11. Lahlüh, late-Hellenistic or Early Roman fortress, a: Rock-cut gate of the interior, b: Remains of the south-western tower with masonry in solid header-and-stretcher-technique (Photo by Th. Weber).

Research Committee (DFG), generously supported by the Foreign Department of the German Protestant Church, Hannover, and the Franz und Eva Rutzen-Stiftung, Bonn.

This year's fieldwork was granted the Director-General of the Department of Antiquities, Dr Ghazi Bisheh. Organization was facilitated on all levels due to the tireless efforts and generosity of Dr Hans-Dieter Bienert, Acting Director of the German Protestant Institute, Amman. To all above persons and Institutions, and to the people of Umm Qays, I owe thanks for their cooperation, hospitality, and friendship.

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Bibliography

- Duval, S.
1988 *Auprès des saints corps. L'inhumation ad sanctos dans la Chrétienté d'Orient et d'Occident du III^e au VIII^e siècle.* Paris.
- Kerner, S. (ed.)
1991 *The Near East in Antiquity East II* (1991).
- Nielsen, S.H., Andersen, F. G. and Nielsen, I.
1993 *Die byzantinischen Thermen. Abhandlungen des Deutschen Palästina-Vereins XVIII = Gadara - Umm Qés III.*
- Piccirillo, M.
1993 *The Mosaics of Jordan.* Amman: ACOR.
- Schumacher, G.
1890 *Northern 'Ajlun - "within the Decapolis".*
- Tsaferis, V.
1983 *The Excavations of Kursi-Gergesa. 'Atiqot XVI.* Jerusalem.
- Weber, Th.
1995 *Gadara Decapolitana. Untersuchungen zur Topographie, Geschichte, Architektur und bildende Kunst einer Polis Hellenis" im Ostjordanland. Abhandlungen des Deutschen Palästina-Vereins XXV = Gadara - Umm Qés I.* (in press).
- 1998 Monumental Arches in the Near East. Monuments of Civic Representation or Custom Toll Post Stations? Paper submitted to the 7th Conference on the History Archaeology and of Jordan at Copenhagen (*SHAJ VII*).
- 1999 *Das Tiberiastor, das Hypogäum und die Memorialkirche. Abhandlungen des Deutschen Palästina-Vereins = Gadara - Umm Qés IV.*
- Weber, Th., Hoffmann, A., *et al.*
1990 Gadara of the Decapolis. Preliminary Report of the 1989 Season at Umm Qais. *ADAJ 34*: 321-342.

UNIVERSITY OF JORDAN EXCAVATIONS AT KHIRBAT YĀJŪZ

by
Lutfi Khalil

Introduction

The ruins of ancient Yājūz lie one km north of the aṣ-Ṣuwayliḥ-az-Zarqā' main road towards Shafa-Badrān, and are located about 8 km north-east of the Campus of the University of Jordan.

The site is also known as Tal'at Nimr (Tal'at=a small tall), named after the well-known Nimr Ibn al-'Adwān. It is there that his and his wife's grave are located, in the nearby modern Islamic cemetery.

Another name, formerly used for the site by the locals, was al-Madraj (terrace), which reflects the topography of the site.

The area must have been suitable for settlement due to the existence of a good water supply at 'Ayn Yājūz, which lies 500 m south-west of the archaeological site. During the Roman and Byzantine periods it was a wayfaring station 11 km out of Philadelphia, on the way to Gerasa.

The site measures approximately 530 x 400 m and occupies the entire southern side of the hill, sloping towards the south where Wādī Yājūz runs towards the az-Zarqā' area. (Figs. 1 and 2)

Two mile-stones were discovered by the Department of Antiquities in 1994 in the Shafa-Badrān area. They were rescued and are now displayed in the University of Jordan Archaeological Museum.

It is important to state that the site has been visited by explorers during the 19th and 20th centuries; Merrill,¹ Conder,⁴⁵⁸

McCown³ and Glueck⁴ all mentioned the site.

In 1972, a Roman tomb was excavated in the middle of Yājūz village and on the opposite side of the archaeological site. The tomb has been reused as an olive press in later a period.⁵

During the spring season of 1994, the Department of Antiquities excavated a large basilica church with mosaic floors. The church measured 28 x17 m and used Ionic-Corinthian capitals which were each adorned with a representation of a human head.⁶

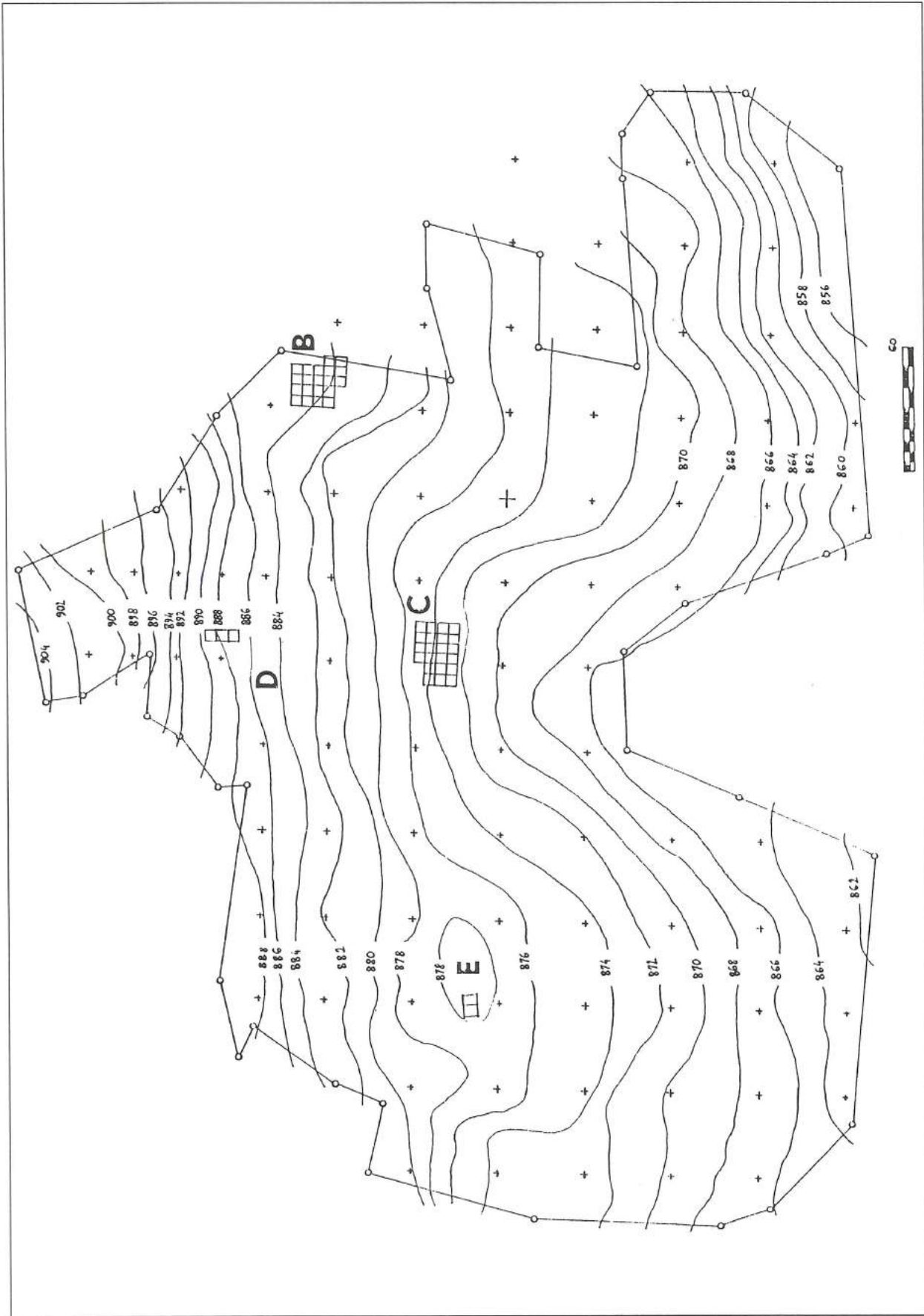
A team from the Department of Archaeology of the Jordan University, directed by the author, has excavated the site for three seasons:

- First season : 19 June - 18 August 1995
- Second season: 22 June - 18 August 1996
- Third season: 20 June - 20 August 1997.

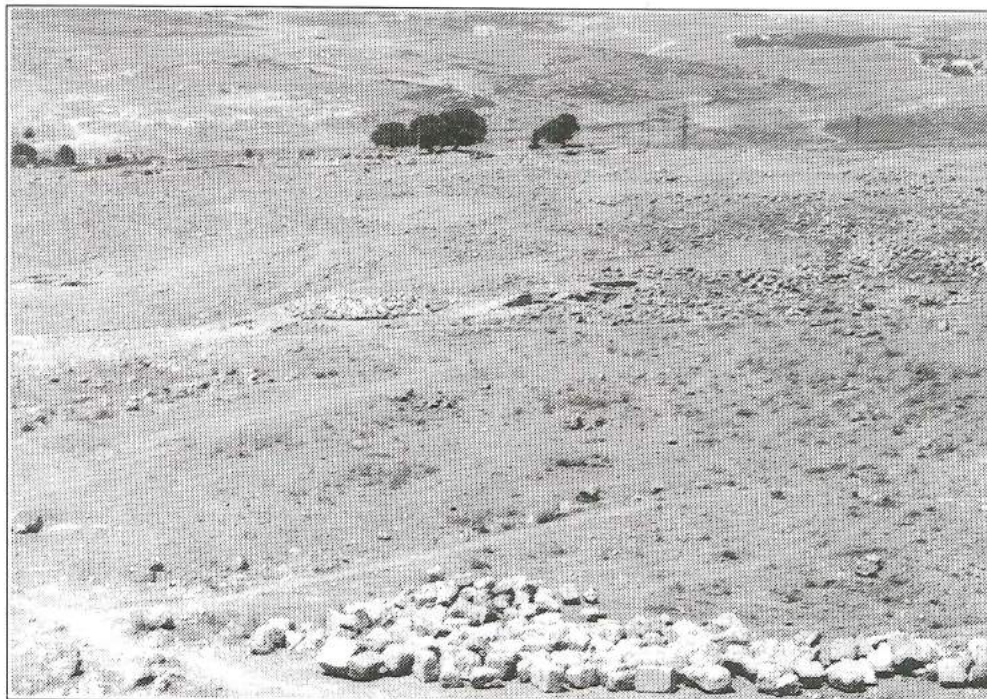
The excavations were sponsored and funded by the University in cooperation with the Department of Antiquities. The staff of the three seasons consisted of: Ayish Abu Hilal and Dhirar De Polsky from the University Archaeological Museum; Mahmoud Arienat from the Mādabā School of Mosaics who restored the mosaic floors; Mayyada Nammary and Widad Said who did all the architectural drawings of the excavations. As well, MA and BA students of the Department of Archaeology acted as

1. Merrill, S. (1883), *East of the Jordan*, NY: Charles Scribner's Sons: 272-277.
2. Conder, C.R. (1889), *The Survey of Eastern Palestine*, Vol. I, London (PEF: 15: 279).
3. McCown, C.C. (1930), Spring Field Trip, *BASOR* 39: 13-17.

4. Glueck, N. (1939), *Exploration in Eastern Palestine III*, *ASOR* xviii-xix: 177-178.
5. Thompson, H.O. (1972), A Tomb at Khirbat Yajuz. *ADAJ* 17: 37-47.
6. Suleiman, M. (1996), A Short Note on the Excavation of Yājūz. *ADAJ* 40: 457-463.



1. Contour map of Khirbat Yajuz, showing the location of excavations (Areas: B, C, D and E).



2. General view of the site looking west.

area and square supervisors.

The main objectives of the excavation were as follows:

- 1- To teach and provide on-site training for BA and MA students of the Department of Archaeology. Different processes and techniques of surveying and digging were taught and practised during excavation.
- 2- To determine the stratigraphy of the different areas (B-E) on the site.
- 3- To extend the excavation horizontally in order to uncover the architectural features, which are partially exposed on the surface.
- 4- To apply different geophysical methods, in order to explore the surface for underground archaeological information.

The excavation was carried out following the principles of the Wheeler-Kenyon method. Four areas, B-E were laid out. Area A is located in the S-W sector of the site, near the foot of the hill. Four squares (5x5 m each) were excavated during the first season. Work was stopped when modern Islamic graves were exposed.

The following account consists of: Stratigraphy and architecture of area B in-

cluding the chapel and the cemetery; the mill and wine press in area C; major remains in areas D and E, and the conclusion.

Area B

It lies in the N-E sector of the site, about 100 m to the north of the basilica church.

Architectural remains were obvious near the topsoil, encouraging us to lay out and excavate sixteen squares in the first season. During the second season, work was continued in the unfinished squares from the previous season, and seven new squares were excavated, in addition to the excavation inside the cemetery. During the third season, work was located north of the chapel where six additional squares were excavated.

The topsoil layer in the different squares was of a gray-brownish colour, dry and compact with roots of various plants and vegetation. The lines of the uppermost course of many stone walls were visible in many squares during cleaning of the top soil.

During the excavation of the 1995 season, the balks between the squares were removed and the architectural elements of a

chapel were exposed.

The Chapel

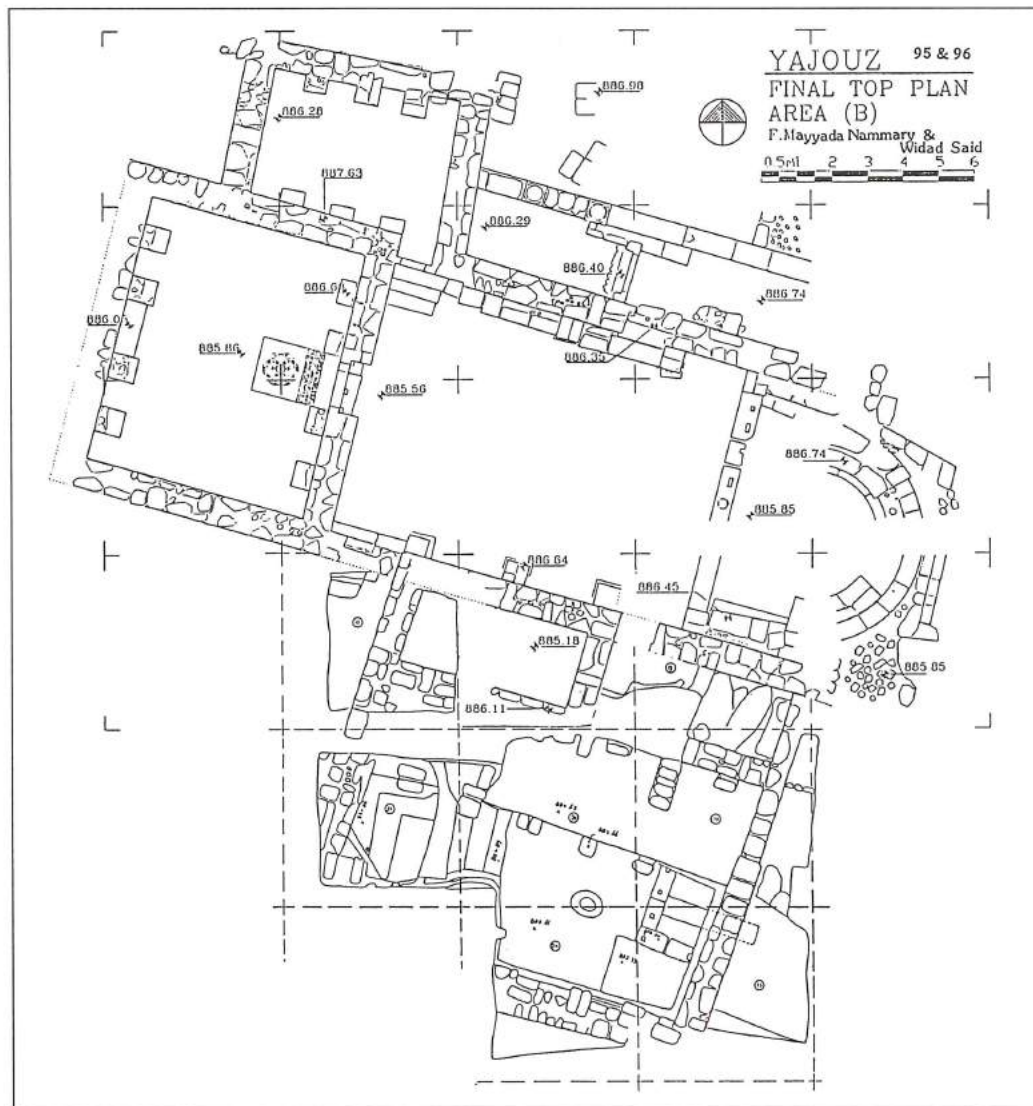
The chapel structure (Figs. 3. and 4) consists of the following:

- 1- The apse in the eastern side of the building: On both sides of the apse are adjacent rooms, made of well-dressed stones and covered with plaster.
- 2- The altar is located about the middle of the apse. It measures 1.37 m to the south wall of the apse and 1.29 m to the north wall of the apse. It is made of very well-dressed stone, and is 1.30 x 0.8 m x 0.42 m wide. Furthermore, there is a large rounded hollow, in the middle of the altar, with a cross carved in its bottom

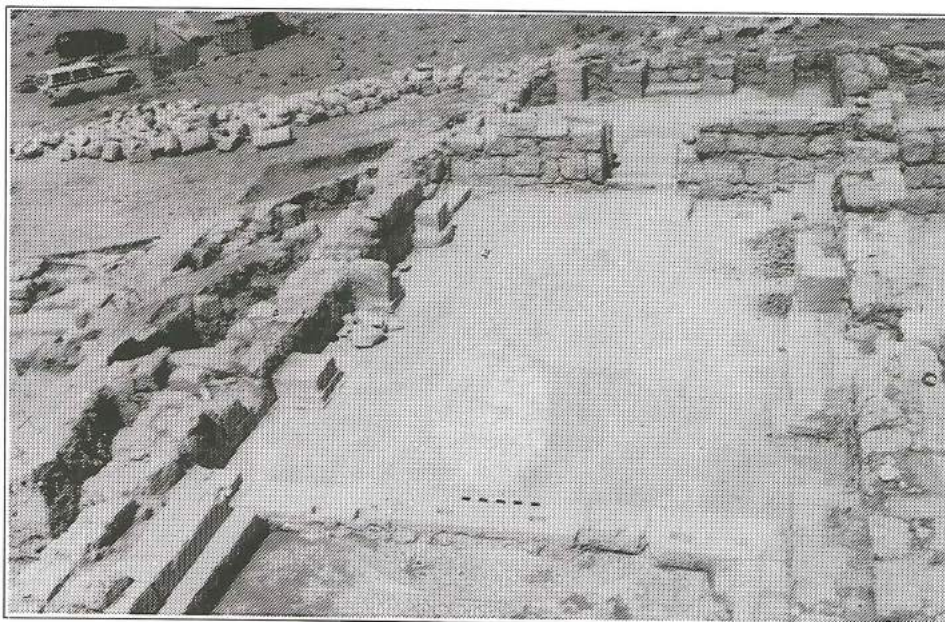
measuring 0.44 m in diameter and with a depth of 0.15 m (Fig. 5).

Four small square holes of 0.10 x 0.10 m diameter were carved at the corners of the altar to hold the marble columns, which were fixed inside the holes with lead, which can still be seen in one of the holes.

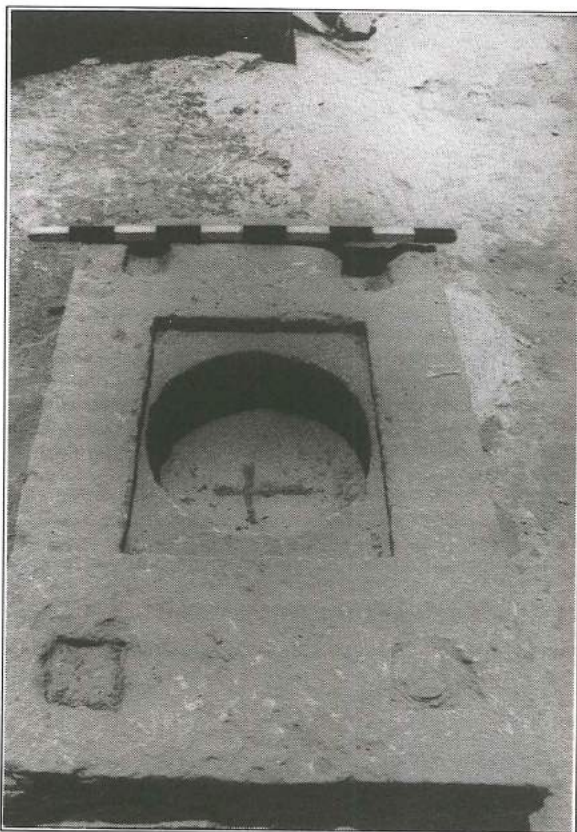
- 3- The chancel screen, which separates the apse from the main hall, is made of one row of well-dressed stones, with holes still in position to hold the screen.
- 4- The hall of the chapel—there are no aisles—measures 17.40 x 9.75 m. Three quasi-bases built of well-dressed stones were found on each side of the walls of the hall, probably placed there for a roof support. Many roof tile fragments were re-



3. Top plan of area B; the chapel and cemetery.



4. The architectural elements of the chapel, looking west.



5. Altar with marble base, looking north.

trieved during the excavation, in the chapel area. In square (13) south of the apse, at a depth of about 1.5 m a number of complete roof tiles were found, measuring approximately 45 x 36 m having fallen from the chapel room. A gabled

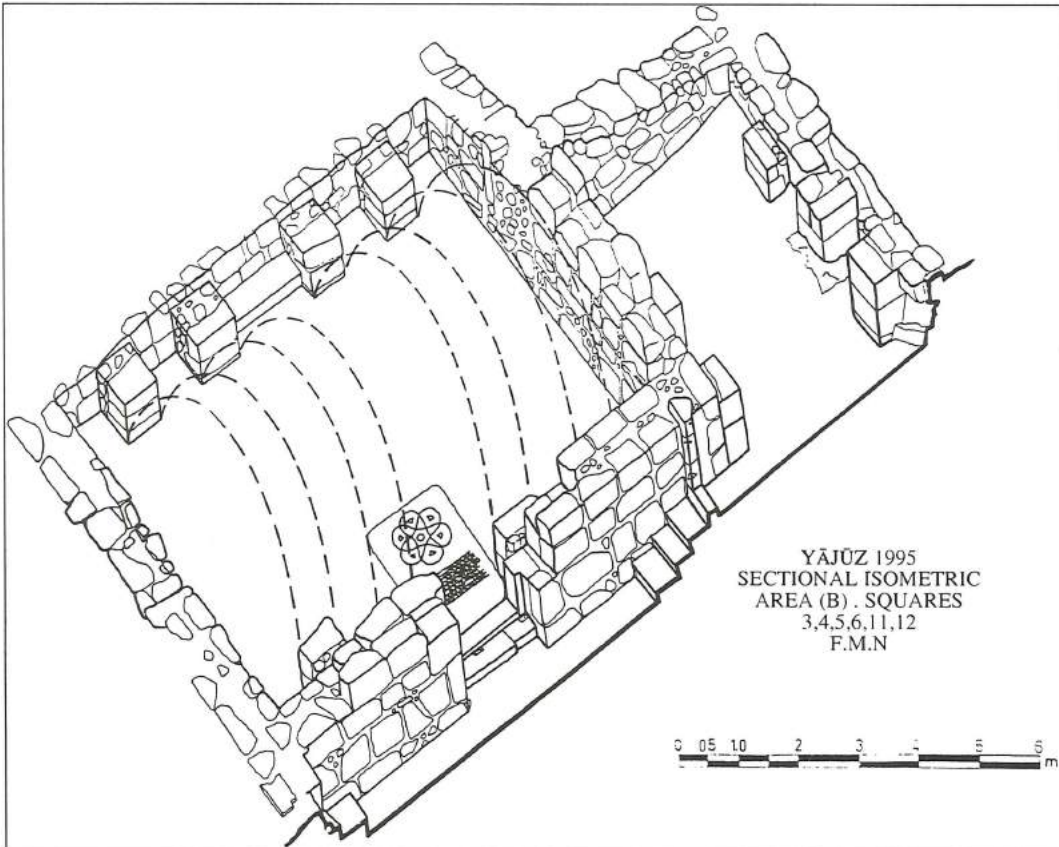
roof made of such tiles could have been supported on wooden posts fixed on the stone bases.

At the western end of the south wall of the hall, stairs lead to the main entrance of the chapel. Another entrance existed at about the middle of the northern wall of the hall whose door was blocked at a latter phase of occupation.

- 5- The adjacent building, has five rooms located on three sides of the main hall. The first room is located to the west and is the largest measuring 8.25 x 9.75 m, with the same width as the chapel. It had four arches; the arches and the vaulted roof, have collapsed and were excavated within a yellowish thick layer of *ḥawar*. It was possible to reconstruct the vaulting and ceiling system, using slabs in between every two arches (Fig. 6). A layer of clay (*ḥawar*) would be applied on top and made compact in order to prevent any leakage of rain water.

The second room is connected with the main hall by three steps above the level of the plaster floor in the hall with three arches of the same type. In the first room, near the staircase, an unfinished sculpture of an eagle, made of basalt, was found.

The third room is small and located near



6. A reconstruction drawing of the vaulting and ceiling system in the rooms adjacent to the chapel.

the main entrance of the hall. Finally, the fifth room is located south of the apse.

The chapel was built of well-dressed stones in two rows, reused dressed stones, and bases and drums of columns, from earlier periods. The interior of the walls were plastered, still *in situ* in many parts of the the chapel and the adjacent buildings.

It seems that mosaics covered the floors of the chapel and traces of mosaic flooring were found on the edges of the main hall. The rest of the floor in the hall is covered with mortar which is usually used as foundation for mosaic floors.

During the 1996 season a small sounding of 0.5 x 0.5 m was made at the western end of the hall (Locus 10), It was found that the mortar layer lies on two layers above bed-rock. Locus 12 is a light brown layer that contains small cobbles 12 cms thick, and Locus 13 is a light yellowish colour, *hawar*-like, which has a thickness of 3-5 cm.

At the entrance between the main hall of the chapel and the first room, a coloured mo-

saic floor with a geometric pattern was discovered. Towards the threshold, a Greek inscription (Fig. 7) was discovered. The inscription of eight lines was tentatively translated by Father M. Piccirillo as follows:

Greek Inscription

Εκτισθη των σων σοι και
ετελειοθη το αγια(ν) μα(ρ)τυριον του αγιου και
αθλοφορου μαρτυρου Θεοδωρου και
Κηρικου επι του θεοφιλεστατου και
ασιωτατου Θεοδοσιου επισκοπου κατα
σπουδη του θεοσεβεστατου Ηλιου
πρεσβυτερου και Ιωαννου επιστατου επι τη
ς δευτερας ινδικτιονος ετι

Translation

It was built from yours to You (God) and terminated the holy martyrion of the holy and victorious martir Theodore and Kiriakos at the time of the beloved of God and the most pious bishop Theodosius by care of the religious Elias



7. The mosaic with eight lines of Greek inscription in the room adjacent to the chapel, looking east.

the Priest and of John the curator at the time of the second indication year

It is a dedicatory inscription, with the name of Bishop Theodocius, who is a priest and a curator. A similar dedication was found at al-Yādūdāh, south of ‘Ammān, mentioning a Bishop Theodicius.⁷ It is known that Theodocius was bishop of Philadelphia /Amman in 502/503 AD (the year 565, 11th indication, month of Gorpaios). If Theodocius is the same bishop mentioned in the Yājūz chapel inscription, it means that the chapel was founded in 508 AD, which is the second indication year (Pompeian Era), mentioned in the last line of the inscription.

The coloured mosaics cover a limited area of the floor. Also, there are few small separated areas made of large size and coloured tesserae, whilst most of the floor is

covered with mortar showing the impression of the tesserae. In the same room, above the mosaic floors, were found a ca. 15cm thick layer of ash and collapsed arches of the room.

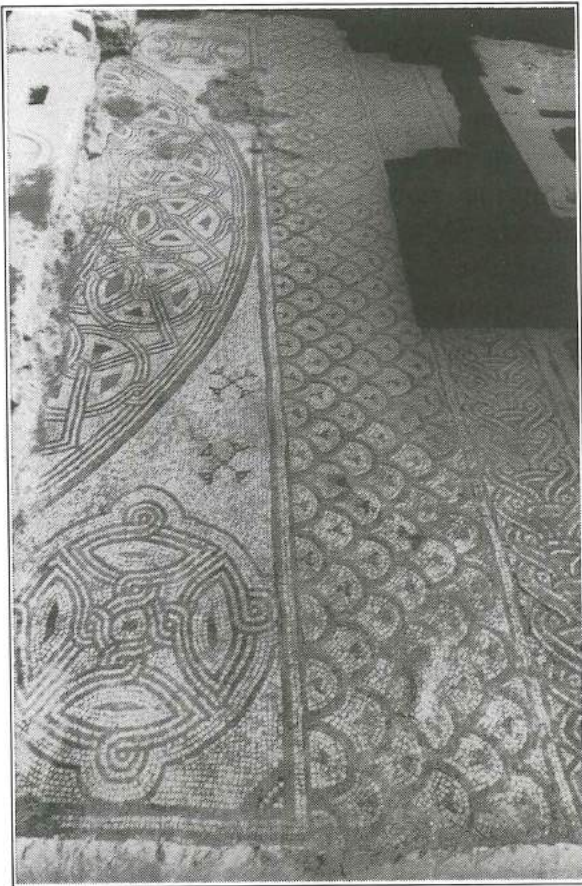
The preliminary study of the pottery sherds from this layer date to the Byzantine-Umayyad period, and perhaps the destruction of the chapel was caused by the 749 AD earthquake.

The chapel had two phases of occupation as evidenced by the architecture and mosaic floors: the door in the middle of the northern wall of the main hall was blocked during the second phase and stone benches were added along the interior side of the wall which had been plastered during the first phase.

There are two distinct levels of mosaics identified in the apse; the coloured mosaic floor, with an abstract motif pattern repre-

7. Pers. comm. Father M. Piccirillo.

senting the early phase of the chapel (Fig. 8). This floor was later covered with an ashy layer and earth 10 cm thick. Only the



8. Coloured mosaic floor in the apse, looking north.

mortar flooring, which is usually used beneath the mosaic floor, is left and few tesserae are still near the interior walls of the apse, indicating the upper level of the mosaic floor of the second phase.⁸

The Cemetery

Excavating to the south and near the chapel, an undisturbed cemetery was discovered during the 1996 season. During the excavation in square B20, an entrance of an intact cemetery was discovered; it opens towards the south and was blocked with dressed stones. When more soil layers were removed from the entrance, a courtyard was found cut in the bedrock. The courtyard measures 6.25 x 5.30 m, and there are three internal bases of arches built next to the bedrock near the entrance.

The opposite bases were built on top of the bedrock and the arches were part of the vaulted courtyard.

In the eastern side of the courtyard, a niche was cut into the bedrock. In front of the niche was found a small chancel-screen with cavities carved into well-dressed stone and into the bedrock as well. The floor of the chancel screen is paved with marble (Fig. 9).



9. Entrance of the cemetery with courtyard, looking north.

8. Further study of the inscription, architecture and finds from the chapel is in preparation.

About the middle of the courtyard, a pit was dug in the bedrock; this hole could have been made to gather the blood of the sacrificed animals, which might have been part of a religious practice during the burial services.

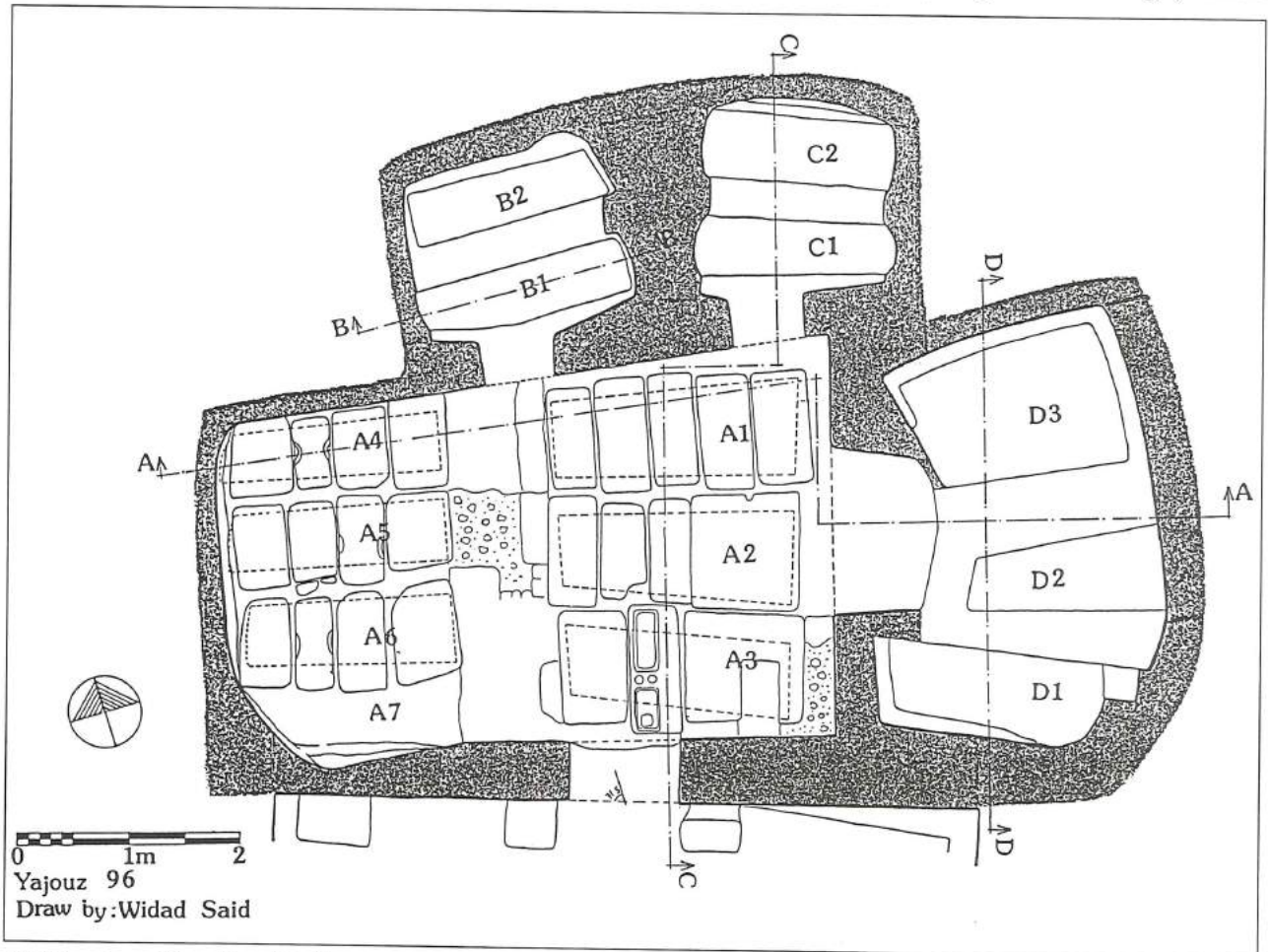
A staircase was cut in the bedrock, located at the western end of the courtyard leading towards the west, and then turning towards the southern entrance of the chapel.

The hypogean cemetery was cut into the soft limestone, its entrance measuring 1 x 0.85 m, its inside measuring, from the entrance towards the north, 6 m and from the east to the west 5.8 m.

Two types of burial systems were used; the first type consists of loculi which were carved into the rock (B1-B2, C1-C2 and

D1-D3). The second type of burial is constructed graves (A1-A6); they were built of dressed stones with stone slabs covering the graves (Figs. 10 and 11). A number of skeletal remains were found in the southwestern corner of the cemetery (A7), and about 132 skeletons were found in various loculi and graves. Most of the skeletons' heads were directed towards the west. The measurement of the various skulls may suggest that males, females, adults and babies were buried in the cemetery. However, osteological studies of the human skeletal remains are still to be carried out.

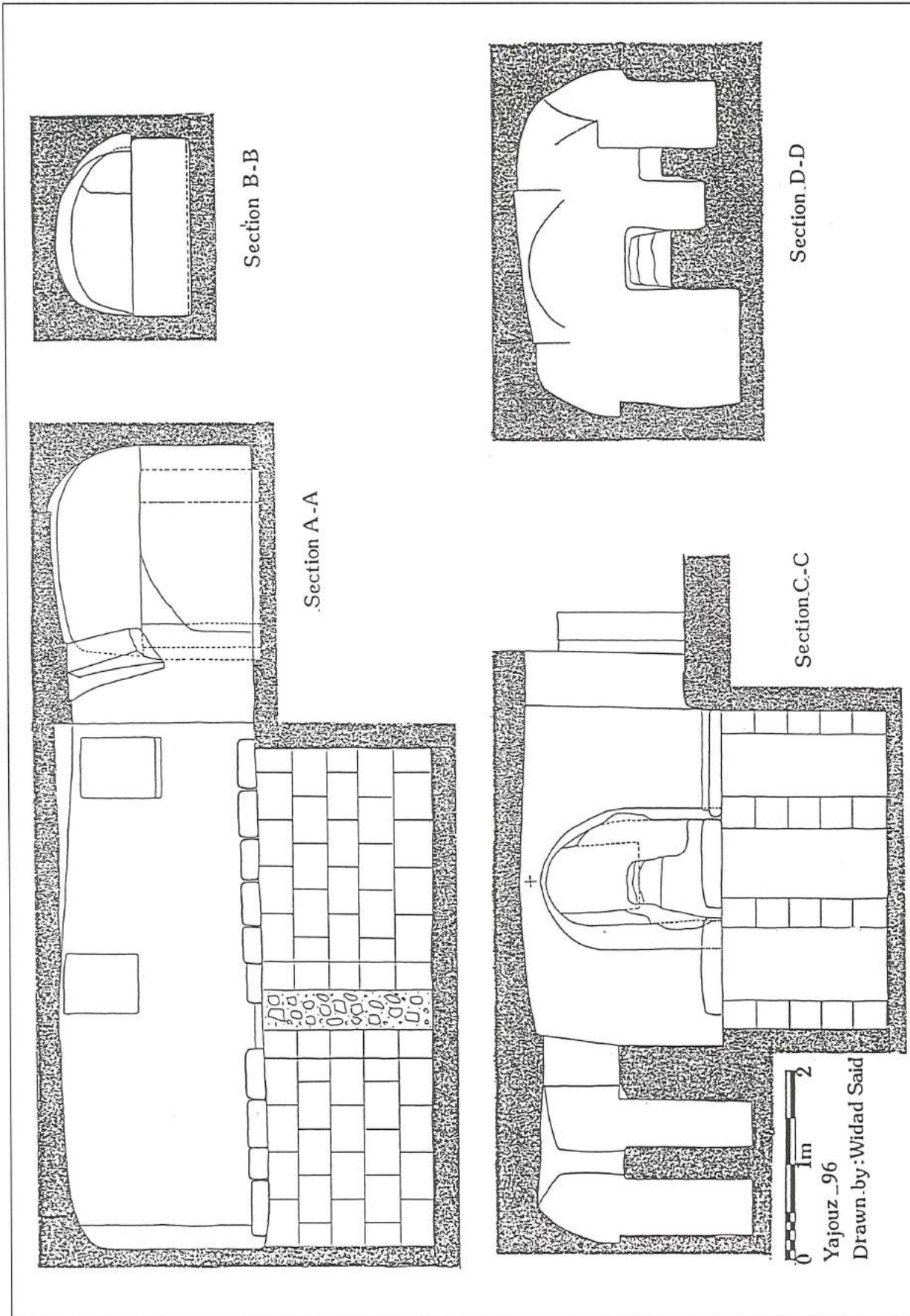
The cemetery is very rich in various types of artifacts such as pottery, candlesticks,⁹ oil lamps and glass vessels. Also, a number of bracelets, anklets, rings and earrings, made



10. Top plan of loculi and built graves.

9. L. Khalil, "Pottery Candlesticks from Byzantine Periods at Yājūz". Paper submitted to the 7th Con-

ference on the Archaeology and History of Jordan at Copenhagen, Denmark, 1998.



11. Sections of loculi and graves.

Table 1. Various complete artifacts and skeletal remains in the different graves and loculi.

Grave loculi	A1	A2	A3	A4	A5	A6	A7	B1	B2	C1	C2	D1	D2	D3	Total
Skeletal remains	-	39	20	4	8	3	10	4	1	10	25	5	3	-	132
Candle sticks	1	1	-	-	-	-	-	5	3	5	3	2	4	6	30
oil-lamps	5	-	-	3	-	-	1	3	-	1	1	-	3	1	18
glass vessels	-	-	-	-	-	-	-	2	4	-	-	1	-	-	7

of copper alloys, were retrieved. In addition iron nails, various coloured beads, needles and miscellaneous small finds were discovered, as well, as coins.

The following remarks can be made about the distribution of the various finds and skeletal remains in the different burials:

- 1- The number of the skeletons in the various burials is different.
- 2- There is no regularity in the occurrence of certain type of artifacts in the loculi or graves.
- 3- The loculi burials are richer in finds than those in the built graves.
- 4- Loculi B1 and B2 have less skeletal remains but they have more finds. Loculi B2, is unique in this aspect, with 1 skeleton, 4 glass vessels, 2 candlesticks, many copper rings, copper brooch, spatula and needle, and a number of beads.
- 5- No skeletal remains were found in A1 or D3, but they contained finds.
- 6- The occurrence of two types of burials could be explained either by the fact that the loculi type of burial was used during an early phase of the cemetery, and at a later phase the built graves were added. Or, the loculii were used for private and important persons, while, the built graves were used for common people, either at the same time or at a later stage.

The preliminary study of the two burial systems and the various finds from the cemetery suggest the date between the fifth

and eighth century AD, which is roughly contemporary with the date of the chapel.

Area C

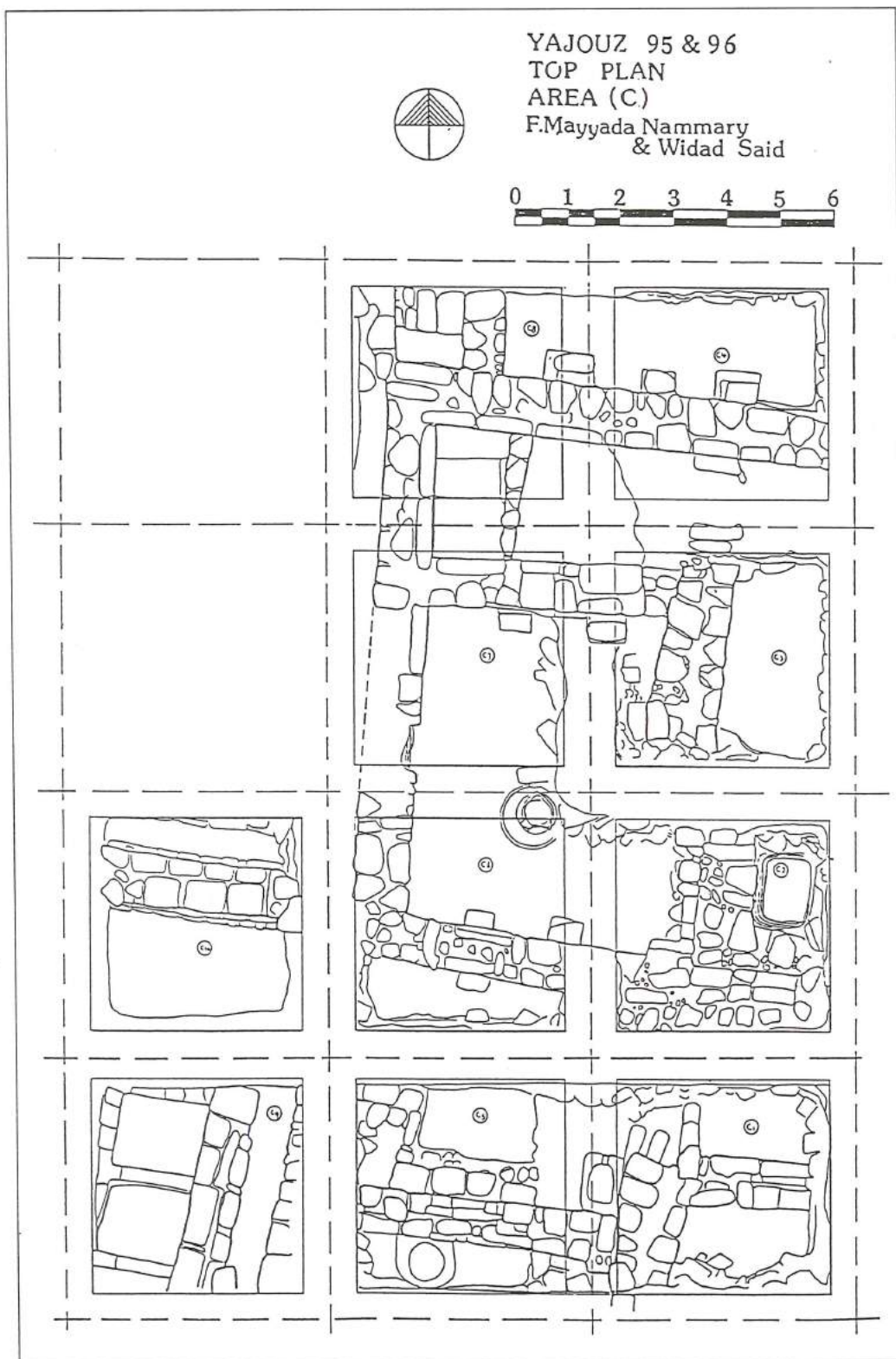
It lies in the N-W sector, almost in the middle of the site. The architectural remains were obvious near the surface, and speculation of the depth of occupation for stratigraphy decided the author to excavate the area. During the three seasons, 23 squares (5x5 m each) were excavated.

The topsoil in the different squares in the area is similar; it is grey-brownish in colour, dry, not yet compact and its thickness varies from 10-40 cm. The topsoil is rich in pottery sherds and tesserae, also roots and vegetation were excavated. Beneath this layer, a reddish layer was excavated, it is compact and contains pebbles. Further digging in the various squares exposed two types of walls:

The first type is constructed of dressed stones, with two rows of arches and vaults built against these walls.

The second type of walls contains of one row of undressed, rough stones. This type was used as internal dividing walls, as well as being used to block doors of the first walls (Fig.12)

When the balk between squares C6 and C7 was removed during the 1995 season, a complete flour mill as discovered *in situ* (Fig. 13). The mill consists of three elements; grinding stone, core and the basin.

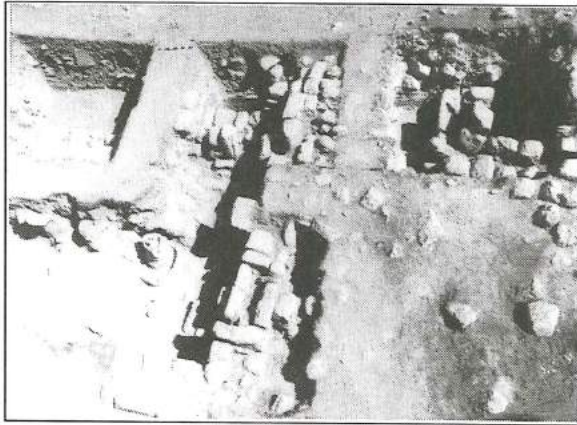


12. Top plan of Area C: the flour mill and wine press.

The grinding stone has an hour-glass shape, but it is open from both ends. It is fixed on the conical core; both parts are made of basalt. Abutting onto two sides of the grinding stone, there are two square holes located op-

posite each other. Those holes hold two wooden poles, to facilitate turning the grinding stone on the fixed and heavy core by man or animal power.

The third element of the mill is a large,



13. Flour mill in C6, looking north.

circular basin, made of limestone. It is located beneath the core to collect the ground flour. There is a hole in the side of the basin to pour the flour.

The mill is located in the middle of a building, its walls are constructed of dressed stones, with the main entrance from the southern side.

The Wine Press

During the last two seasons of excavations, a wine press was discovered. It is located about 7 m to the south-eastern side of the mill in square C9. The installation consists of three basins; two of them were completely recovered, the third one is still unexcavated, beneath the eastern balk of the square.

Each basin is surrounded with walls, made of well-dressed stones which separated them.

The length of the west wall of basin (I) is 1.60 m meanwhile, the eastern side wall, which is a dividing wall, measuring 1.44 m with a width of ca. 1.45 m. The height of the western walls of basin (I) is 1.60 m, the depth of the basin near the dividing wall is 0.20 m.

The measurement of the middle basin (II) is 1.50 x 1.42 m; it has almost the same depth as basin (I).

The floors of both basins (I and II) are made of white and large tesserae, each mosaic floor slopes slightly towards the south-

western corner, where there are plastered holes built up in the mosaic floors for the drainage of the pressed juice to a lower part of the wine press.

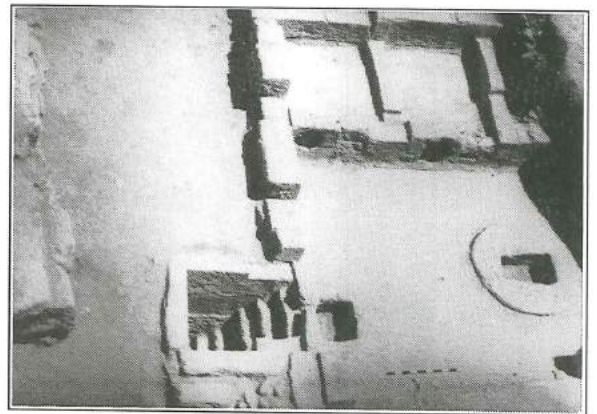
During the 1997 season, excavations were extended south of square C9 and C10, to expose more architectural elements of the wine press. When squares C13 and C14 were excavated, a yard and a reservoir were discovered (Fig. 14).

The yard is surrounded by retaining walls and furnished with a mosaic floor of the same type which was used in the above mentioned basins. It measures from N-S 3.30 m, and from W-E 4 m and it continues beneath the eastern balk of C13. At the eastern part of the yard, there is a large, circular stone fixed in the mosaic floor. Its diameter measures 1.50 m and it has a hole in the middle. This hole might be carved to hold a wooden post to drive another stone, which is a technique used for further pressing.

At the western end of the yard, there is a basin built with dressed stones, it measures 0.75 x 0.60 m and is 0.40 m deeper than the floor level of the yard.

The slope of the floor of the yard, and the location of the latter basin, indicate that the purpose of its construction is the last purification stage of the juice .

The reservoir is the place where the pure juice was collected, it is located to the west of the purification basin. It measures 1.5 x 1 m with a depth of 2 m. It was built of three



14. Wine press: press basins, yard and reservoir, looking north-east.

courses of well-dressed stones and its interior walls were plastered with mortar to prevent any leakage of the juice. It has a five-step staircase, built of stones and its bottom has a mosaic floor.

To the west and the south of the mill building there are two adjacent large rooms with internal arches - the southern room has eight arches - with plastered floors. The building might have been used as living quarters or for storage purposes. The arches collapsed above the plaster floor probably due to an earthquake (Fig. 15).

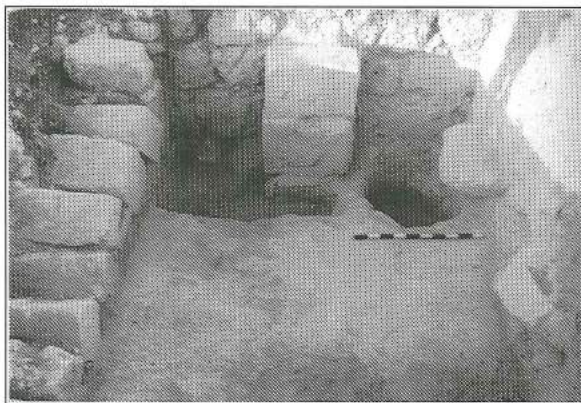
A number of copper coins, beside complete vessels and pottery sherds, were retrieved in the mill and the wine press constructions can be dated to the Byzantine and Umayyad periods.

Excavating in a lower strata in square C/O, a number of sigillata sherds of the second century AD were found. There are no architectural remains that can be related to this type of pottery.

Further excavation in Area C is required in order to expose more of the wine press and to determine the Roman phase of occupation.

Area D

It lies in the N-W sector, and is located about 100 m north of Area C towards the summit of the site. Seven squares (5x5 m) were excavated during the 1997 season (D3 - D6) from which no architectural remains were recovered.



15. Collapsed arch above plaster floor, looking south.

When the topsoil layer in the square D11 was excavated, a wall running E-W, with rows and two internal arches built south of the wall, was revealed. The wall is built with dressed stones, its width measures one meter and it runs under the west balk, with a height of 1.90 m. This wall is part of an uncovered building extending towards the south and the west.

To the north of the above mentioned wall, lies square D12. It was very easy to excavate and had a dark gray topsoil layer colour. When further soil layers were removed, a *tābūn* with a diameter of 1.75 m was discovered, built of clay and surrounded with medium size stones (Fig. 16).

At the same level of the *tābūn*, an entrance of a two-chambered cave, was discovered in the N-E corner of the square. The entrance is made of dressed stones built against the natural rock, and opens towards the north (Fig. 17). There are four steps leading into the cave a small basalt mill was found near the entrance, similar to what was found in Area C.

Excavations inside the cave are not finished yet, but a domestic use is suggested. Furthermore, the preliminary study of the pottery and other finds from the cave, suggest Late Roman-Byzantine periods.

Area E

It is located at the west edge of the S-W sector, with traces of few architectural remains near the ground surface.

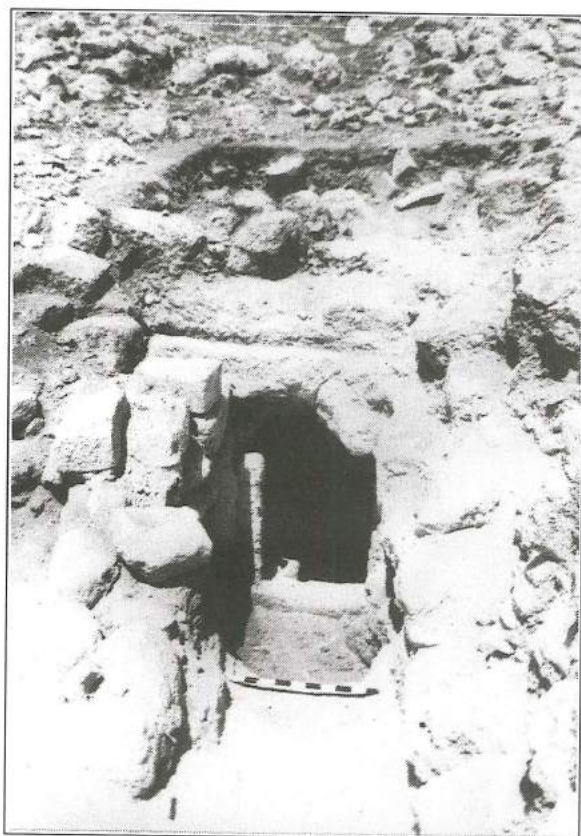
Three squares were laid out at the last week of the 1997 season and when the light grey ashy layers of the surface were removed, walls and vaulted arches, were revealed. The associated sherds of pottery with the architecture is very distinguishable, dating to the Umayyad-Mamluk periods.

Conclusion

The large number of the reused carved stones from the Roman period such as ro-



16. *Ṭābūn* at D12, looking west.



17. Entrance of the cave in D12, looking north.

settes, capitals and altars, that were used to built up the basilica church and the chapel, besides the discovered Roman pottery from

the excavations, confirm that Khirbat Yājūz was first founded in the Roman period, as an important town on the main road between 'Ammān and Jarash.

The site continued to be important during the Byzantine period, when the basilica church, the chapel and the cemetery were founded. The mill and the wine press belong to this period and those installations could have served for religious as well as common life purposes.

The types of pottery, which were discovered during the three seasons of excavations consist of flat-based bowls, carinated bowls, large kraters, frying pans, cooking pots with bevelled rim and short neck jugs, and water jars.

Most of these varied types are of the same ware and are locally produced.¹⁰

The pottery assemblage of Yājūz shares the characteristics common in the Byzantine period in Jordan.

Another wine press was revealed to the east of the above mentioned found by the Department of Antiquities during the 1997 excavations. It is built with dressed stones and plastered without mortar and is dated to

10. Pers. comm. Pamela Watson.

the Byzantine period.

The presence of two wine presses on the site at the same period shows that Yājūz was an important site for making wine during the Byzantine period, and was surrounded by large vineyards to supply the two wine presses.

Kom Yājūz, is another site which lies 1.5 m east of Khirbat Yājūz. It was mentioned as "Maioudos"; a main town located on the road between Amman and Jarash.¹¹ The site was visited by N.Glueck and dated to the Bronze -Iron Age.¹²

The capitals that were discovered in the basilica church in 1994, are important from a stylistic and chronological point of view. They are composed of Ionic-Corinthian elements of decoration, and the human faces were disfigured with a cross having been carved on one capital. This action must have occurred during the time of the Emperor Leo III ca. 728 AD, when the iconoclasm took place in the Umayyad period.

The third season of the University of Jor-

dan excavations brought to light evidence of the Umayyad-Mamluk periods of occupation on the west edge of the site. Further excavation in this area is essential to obtain more data of the Islamic periods.

Acknowledgements

I would like to express my gratitude to Prof. Dr Fawzi al-Gharebeh, President of the University of Jordan for his kind encouragement and support during the three seasons of excavations. Also, I wish to thank deeply the Director-General of the Department of Antiquities, Dr Ghazi Bishah, for his support and cooperation. Last, but not least, I sincerely thank the staff of the excavations and my students for their hard and dedicated work.

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11. F.-M. Abel (1967), *Histoire de la Palestins* (3rd ed.), Paris, Librairie le coffre: 185.

12. N.Glueck, *op cit*: 178-179.

PETRA PAPYRI

by

Traianos Gagos and Jaakko Frösén

The University of Michigan team in 1997, consisting of Ludwig Koenen, Robert W. Daniel, Donka Markus, Robert Caldwell, and Traianos Gagos, continued its work on the papyri by establishing a revised text for inv. 10 (Papyrus Petra Khaled and Suha Shoman), dealing with the historical and cultural implications of the information contained in that document, and producing transcripts for almost all of the other most important rolls.

Inv. 10

In addition to the main pieces of the papyrus that produce a more or less continuous text, there are 450 fragments, mostly the size of postage stamps, that provide snippets of information from various parts of the document, including its lost beginning. Several of the fragments come from the surviving part of the document. L. Koenen succeeded in placing a large number of these fragments onto the right side of the main text. This resulted not only in new information but also in confirmation of many restorations as well as the rejection of some. In several cases, the placement of fragments solved problems on which the team had spent much time. It also turned out that 95% of the team's supplements were confirmed by the newly placed fragments. This is an unusually high rate of success (30-50% is regarded as very good) which is mostly due to the formulaic character of the document.

As reported before, inv. 10 is a division of property among three brothers named Bassos, Epiphanius, and Sabinos. The property consists of houses in the metropolis of Petra and in the nearby village of Seril, as well as land in the surrounding countryside.

Study of the other documents in the archive suggests that inv. 10 is the oldest document in the archive, predating the earliest securely dated document of AD 528. Unfortunately, this cannot be proven since the dating formula that was at the beginning of the roll has been destroyed altogether.

The only link that connects inv. 10 with the rest of the archive is the name of one brother, Bassos, who does not come from the family of Theodoros son of Obodianos, the principal person of the archive. Rather, Bassos is the grandfather of Theodoros's wife Stephanos. This might explain why inv. 10 was found among the papers of Theodoros. Bassos' son, Patrophilos (father-in-law of Theodoros), appears as a party in pre- or post-nuptial agreements with Theodoros (e.g., inv. 63+65 and inv. 68) and possibly in other documents that Stephanos brought into the family.

Inv. 10 is an interesting document both on its own and within the larger context of the archive, because it provides unique information on property ownership and inheritance and because it sheds light on the nature of Petra's economy and its hinterland.

Above all inv. 10 is a monument in the history of the Arabic language. This is due to its wealth of Semitic (mostly Arabic) names for places, houses (e.g., line 85-86: Gr. Darath al-Ebad = Ar. Dārat al-'Ebād, "House of the Worshippers"), and parts of houses (e.g., line 86: Gr. Elliath Aphthonis = Ar. 'Alyyāt Afthonis, "Upper-story quarters of Aphthonios"). About 50 such names appear in roll 10, perhaps another 30 in the rest of the archive. Most of the names are in a form of pre-Islamic Arabic. The few unquestionably authentic remnants that we

have of pre-Islamic Arabic are written in other, non-vocalized Semitic scripts. In these papyri, however, the Greek vowels render the Arabic vowels.

The many Arabic toponyms that appear in inv. 10 are of particular interest because several of them are still in use in the greater Petra area. With the help of several linguists, archaeologists, and local residents it has been possible to identify several of them with still-existing modern places. A few examples may suffice here: al-Bassa and Xaphphath al-Ḥawāwer are names based on words meaning “moist place” and “pan (in the topographical sense) of white earth”. They were identified with two existing places in the town of Wādī Mūsā, next to Petra. Some five other places in the same town have names identical with or closely similar to place names in inv. 10. Some 5 km north of Wādī Mūsā, high in the hills overlooking Bayḍā, is an elevated area

called Umm al-Lawza (“Mother of Almond Trees”), and contiguous with it a part of the hillside is called al-Rafid. In Roll 10 are mentioned places called Math al-Lawza and al-Raphida, names that may be referring to the very same places. Clearly, the family of the archive owned much property in the prime farmland around what is now Wādī Mūsā, and they probably owned land to the north, around Umm al-Lawza, which is still an agricultural region today.

Other Rolls

The team also studied nearly all of the other priority rolls, some on the basis of existing partial transcriptions (1996: inv. nos. 8, 47, 60, 67 and 71; 1997: inv. nos. 63+65,¹ 64+66, 65, 67, and to a lesser degree 48). All those with inv. nos. over 60 come from field inv. 34, which was excavated as a group.² The overwhelming majority of the rolls in this group deal with

1. The two inventory numbers were originally considered to be two separate papyri. In the summer of 1997 and, as this report was being prepared, I managed to establish that in fact the two pieces are part of the same papyrus. Inv. 65 contains the left and inv. 63 the right portion of text. Suspicions arose when R. Caldwell was transcribing inv. 65 and the author was working on inv. 63. The identification was confirmed when it was established that several lines of the signatures at the foot of inv. 65 joined physically with lines in inv. 63. The document, as many others in the archive, is written *transversa charta*. The papyrus broke into two parts, either before or, much more likely, during the fire when it fell from the shelf where it was stored. The two pieces were found in very close proximity to each other as the archaeological locus shows. Similar is the case of inv. 64 and 66: the former contains the document proper and the latter contains the signatures. It is likely that we will establish more such connections in the future.

2. During the excavation of the papyri, each find was assigned a field inventory number. Several of the field inventory numbers consisted of one roll, but in some cases there were more. During conservation, the rolls were separated and each given a unique inventory number in the descriptive catalogue, using the Arabic number system. This latter inventory system is the one used for the sake of reference in publications. The inventory catalogue at its present (and final stage) numbers 103

items. When field inv. 34 was excavated, the rolls were placed in an old and deep desk drawer, the most secure container that could be found. The conservation by the team from Finland began in Sept. of 1994. Because this was one of the best preserved finds, it was decided to leave the group to be opened during the holiday season and thus it was dubbed the “Christmas Box.” Expectations were not proven wrong and inv. 34 yielded the majority of the best preserved rolls of the entire find. Because field inv. 34 consisted of many rolls, the individual items were renumbered with the letters of the Roman alphabet (a-r plus fragments) which yielded inv. nos. 60-77 in the descriptive catalogue. For the record, it should be noted that the division of the rolls for publication purposes between the Finnish and the University of Michigan team was done by lot on the basis of even and odd field numbers to secure an unbiased and fair distribution among the teams before they were opened. The Michigan team was allotted the odd numbers and the Finnish team the even numbers. However, in the agreement among all parties, field inv. 34 was held aside as a separate item. With the common agreement of J. Frösén, L. Koenen, and the American Center of Oriental Research (ACOR) the rolls from field inv. 34 were distributed between the two teams. In order to secure constant communication about progress not only on shared field inv. nos., such as 34, but also

property matters such as the transfer of property rights through cession, sale, or transfer of tax responsibilities. Three of the documents deal with the dowry and other property that Stephanous brought into the family. It is likely that field inv. 34 forms a separate set of documents that all concern Theodoros and that all pertain to his land holdings. Two of these texts can be briefly described here:

Inv. 60

This consists of 14 complete lines and four substantial fragments from the foot of that roll. The document deals with the registration of a vineyard called Malouda that is situated in a deserted hamlet called Baith Tall al-Keb. It records the transfer to Theodoros son of Obodianos, of the responsibility for paying taxes on that property to the local authorities. For reasons that are obscure, Theodoros and his father paid the taxes in the past to a municipal official, Flavios Leontios and his father, Valens. The text can be securely dated to January/February AD 540. The taxes for land that previously had been registered in the land register of Augustopolis are now being collected by the tax-office in the metropolis of Petra. The vineyard fell under the fiscal authority of the city (it is called "free" land, meaning free from the fiscal authority of the imperial administration; in other words, land that was under the control of the city). The rate of taxation is high, 47.5%, a rate corroborated by other documents in the archive that seem to record even higher rates.

Inv. 67

Papyrus Petra Selz Foundation II was reconstructed like a jigsaw puzzle – first by arranging the photographs and then arranging the original fragments – from more than 120 fragments of varying sizes. Seventeen lines of text were recovered. Only three or four of

them are not complete and the signature, probably that of the local official, is missing. The document is addressed by Flavios Dusarios son of Valens, who had been prefect of *Kastron Ammatha* (modern *al-Hammam*, a settlement SE of Petra and near the modern city of *Ma'ān*), to *Alpheios* son of Valens, the keeper of the public records, probably in Petra. Dusarios had held a post in *Ammatha*, as the document informs us, but was a citizen of Petra. In this document, he requests the keeper of the public records to transfer tax responsibility for a piece of land (part of which was a vineyard) to Theodoros son of Obodianos. The property was located near *Kastron Zadakathon* (modern *Sadaqa*, approximately 20 km SE of Petra) in an uninhabited hamlet. As in many of the other documents from Petra, the plot of land bears an Arabic name.

It is too early to draw general historical conclusions, but it is certain that in the sixth century Petra's agricultural economy was still functioning and that the city maintained economic and administrative ties with several other communities in the area, including *Augustopolis*, *Ammatha*, and *Zadakatha*. Furthermore, the documents inform us that at least the local administration (both in Petra and *Augustopolis*) was still fully functional in the middle of the sixth century.

T.Gagos

The team from the University of Helsinki continued its work on the Petra papyri during 1997 by reconstructing and transcribing some of the better preserved rolls. A large number of small fragments of various inv. numbers were placed onto the main texts. This resulted in new readings and a better understanding of the documents. Seminars were arranged every week for a discussion of the new transcripts. The work continued in Helsinki and seminars during

= on the entire archive, the two teams have set up electronic data files that are shared among the two

teams and other scholars that participate in the edition and historical study of this archive.

the fall term of 1997. In early 1998 the work continued at ACOR. Some of the documents will be presented at the XXII International Congress of Papyrologists (Florence, August 1998); some will be ready for prepublication by the end of 1998. At the same time work has been done for a prosopography of the Petra archive by Marjo Lehtinen and for a study on the officials and municipal administration by Mari Mikkola.

The 1997-98 University of Helsinki team consisted of senior fellows Jaakko Frösén, Antti Arjava, Maarit Kaimio and Jorma Kaimio; junior fellows Marjaana Vesterinen and Marjo Lehtinen; as well as students Mari Mikkola, Mari Mustonen, Tiina Ränkinen and Marja Vierros. Zbigniew T. Fiehma took part in the seminar discussions in Amman. In Helsinki, junior fellows Tiina Purola and Erja Salmenkivi participated in the seminars.

Inv. 4

Jaakko Frösén worked on Papyrus Petra P.E. MacAllister, a sworn settlement about a division of inherited property written in Gaza, May 10th, AD 538. More than 18 cm of the left part of the roll is preserved in irregularly broken pieces and some loose fragments. Tree roots (a species of *Populus*) had penetrated through and between the papyrus layers. That made the process of opening the roll very difficult and sometimes the layers were just inseparable, but work continues on separation. In early 1998, the fragments were rearranged and the beginning of the document reconstructed. The beginning of the document with the date is preserved in the core of the roll as it had been rerolled with the beginning inside. The text is written with a thin kalamos in *transversa charta*, across the fibers, in a very large, rounded and practiced hand without any clear parallels in our archive. The original width of the roll seems to have been slightly more than 20 cm. The outer part of the roll, that is the end of the document with

signatures, is not preserved. The remaining length of the opened roll is some 8.5 m. Three loose small bundles, together with some other loose fragments, were found separately without a Field Number. They were joined to inv. 4 as they have the same handwriting and the same content (same names). The document was written in Colonia Gaza. The fragmentary date can be reconstructed as May tenth, AD 538, the 12th regnal year of Justinian, the Eternal and Emperor, the consular year of Flavius Johannes, gloriosissimus (or illustris) and excellentissimus, the year 895 (!) of the era of Gaza [the year numerals of the era of Gaza are, as usual, rendered from units to hundreds (895 = 598)], the first year of the indiction. Other documents dated to the same year, AD 538, in the archive are inv. 13 (24 Aug.) and inv. 14 (9 Sept?). From the previous year, AD 537, there is only one document preserved with a date, inv. 68 (23 May), and that one is dated before Nov. 47 of Justinian (issued on 31 August, AD 537).

Inv. 6a

Jaakko Frösén also continued work on Papyrus Petra Daniel C. and Nancy E. Gamber, a donation or will by Obodianos, son of Obodianos. In 1997 most of the loose fragments were put on their right places. The roll was found with pieces of wood and a piece of textile string underneath. It consists of remnants of eight large columns with an original length of some 4.35 m. The text was written in a sloping cursive hand. There is a fragmentary date in the first column, most probably AD 528. The document was compiled in Petra, Metropolis of Palaestina Tertia Salutaris by a presbyteros (and superior?), Leontios son of Obodianos. After the date and place of issue, there are two very fragmentary lines written in Latin in a slightly larger rounded hand. In the body of the document there are six copies of a donation (last will?) by Obodianos son of Obodianos who is lying sick

and promises all his belongings to: the Monastery (Holy House) of the Saint High Priest Aaron, location not mentioned, and the Hospital/Hostel of the Saint Martyr Cyricus in the city of Petra. The receiving parties are represented by: Cyricus, son of Petros, presbyter and superior of the monastery, and Theodoros son of Obodianos, brother of Obodianos for the hospital or hostel. There is also a condition that from the donated belongings the mother of the donor, Thaaious, should be nourished and clothed as long as she lives. Three more people have gotten or will get amounts of money after the death of the donor (therefore there are six copies of the document).

Because all copies are still preserved in the same papyrus roll, the testator/donor recovered from the illness. There are some interesting points dealing with religion in Petra because, in addition to being the earliest mention of the Monastery of Aaron (probably that on Jabal Hārūn), some importance must be given to the rendering of the "Church of our Blessed and All-Holy Sovereign, the Glorious God-bearer and Ever-Virgin Mary."

Translation (partial: (ll. 5-16):

(ll. 5-16) "... I, Leontios son of Obodianos, priest and superior of the Church of ... and Valen(tino)s son of Samiabion, deacon, and Gesios son of Euthenios ... and Gesios son of Obodianos, priest of this Church of our Blessed and All-holy Sovereign, the Glorious God-bearer and Ever-Virgin Mary, and in our presence, he said as follows. "It is true that it has first to lead my hope in Lord and Benevolent God who has the power over living people and dead bodies, therefore, as one can see, because I am lying in bed, and no one among all can oppose the command of God, wherefore, having the human destiny in my mind, I wish and direct in your presence that, if indeed I do pass from this present life through the illness I

am suffering from, all my belongings whatsoever which I leave behind should be administrated by Cyricus son of Petros the Most Holy Presbyter and Superior of the Saint High Priest Aaron and by the aforementioned Theodoros son of Obodianos, the Most Beloved of God, Orthodox and Christ-loving, and that by them who are taking care, from those (belongings) my mother Thaaious should be nourished and clothed during the whole time of her life, and after her death from what will be left of my mentioned belongings whatsoever which I leave behind, one half passes to the mentioned Holy House of our Lord the Saint High Priest Aaron and the other half to the Most Holy Hospital of the Saint and Gloriously Triumphant Martyr Cyricus situated in this same city ..."

Inv. 9

Inv. 9 is (most likely) a written contract concerning sale of real property, including a right to pasture. It is being studied by Tiina Rankinen. The document is very fragmentary and only beginnings of the lines are preserved. Some fragment groups have been connected giving new information, but only a slight amount.

Invs. 13 and 17

Marja Vierros worked on invs. 13 and 17. The situation in inv. 13 (AD 538) is that Patrikios son of Difilos wants that his account and person should be burdened with the taxes of the land that Panolbios owns/has owned (but which Patrikios has rented?) The parcels of land in question are in Petra and Augustopolis. Inv. 14 deals with the same matter. In inv. 17 same Patrikios and Panolbios are the leading figures, also the land measures are the same. But inv. 17 is so fragmentary that no continuous text can be formed.

Invs. 14 and 15

Tiina Rankinen continued work on Pa-

papyrus Petra Zbigniew T. Fiema and Deborah Kooring (donated by Pierre and Patricia Bikai). Invs. 13 and 14 deal with the same issue; inv. 14 (AD 538) is a registration of an agreement concerning real estate. The document deals with tax payments by Panolbios and probably Patrikios son of Difilos, that is, who should pay which back taxes and who will pay the taxes in the future. The document was received by a tax official, Euthenios son of Dousarios. Most of the previously unplaced fragments have now been placed. Tiina Rankinen also began work on inv. 15. The results are few at the moment. The document probably concerns the sale of an inherited half of a house.

Inv. 20

In early 1998 Mari Mikkola worked on Papyrus Petra Selz Foundation I, which is some type of sales contract or settlement concerning family property. The document includes also a settlement of a debt. The roll is ca. 4 m long, partly well preserved. No actual date has been preserved, but the document can be dated on the grounds of the content to AD 556-92. The contracting parties are the key parties of the whole archive: Theodoros son of Obodianos and his father-in-law Patrophilos son of Bassos. Many fragments have been placed, but the reconstruction is still far from complete.

Inv. 22

In 1997 and 1998 Tiina Rankinen worked on 22, work begun in 1996 by Erja Salmenkivi and Tiina Purola. The document deals with buying/selling of a courtyard/house. It may be dealing with the same or similar matter as inv. 15.

Inv. 24

During 1997 and 1998 Mari Mikkola worked on inv. 24. In the inventory list, inv. 24 has been divided into two separate rolls (inv. 24.1 and 24.2). In inv. 24.2 there is the

beginning of document (the date), and in inv. 24.1, the middle and the end of the document (signatures). Because both of the rolls are written in same hand and same persons are mentioned, it can be suggested that these two parts belong to the same roll. The correct order of the fragments has not yet been established and placement of fragments is not complete. Inv. 24 is a contract of sale of real property dated to AD 540. The contract involves also involved taxes. The exact subject of the sale is unknown, but there are indications that it is some kind of a real property or estate. The document is signed by five different, more or less cursive signatures and the last of these is of Alfeios, son of Valens, who is probably the notary.

Invs. 68; 63 and 65

Papyrus Petra Thomas and Francesca Bennett was studied in 1997 and 1998 by Antti Arjava. It is a signed settlement between Patrophilos and Theodoros, drawn up in 537, presumably soon after the latter's marriage to the former's daughter, to clarify various financial aspects which for some reason had not been sufficiently dealt with in the marriage contract itself (the marriage contract is not among the preserved papyri of the archive).

The document (ca. 100 lines in length) was broken into three sections of almost equal size. It will be presented in the Papyrological Congress. Additionally, a working transcript of inv. 63+65 was prepared in early 1998, after T. Gagos was able to link the two documents. The transcript covers only the signatures but already reveals a number of important facts about the family of Patrophilos and Theodoros and the marriage which connected them.

Inv. 69

During the 1997 and 1998 seasons, Manna Vesterinen studied this group of several short documents. Five of them are tax re-

ceipts of Patrophilos son of Bassos and were written in transversa charta. One is a column text stating that Hierios (probably son of Patrophilos) has stolen some objects from Epiphanius. That text (inv. 69.6) is the only completely preserved document in the Petra archive. All these documents were rolled separately, piled together, and around them was a column-text, inv. 69. 8 in which Patrophilos is mentioned also and thus he would be the common factor in the documents under inv. 69.

Inv. 72

Marja Vierros worked on Papyrus Petra Gladys J. and Frank J. Vocci in early 1998 and the most important discovery was the fact that inv. 79 is part of the same document. Inv. 79 was originally classified as a text which did not offer much information in itself, but when it was combined with the fragments of inv. 72, there will perhaps be more information. Inv. 72 is a very long document, dated to AD 582-91, and a lot of it is missing. The document deals with various topics, a house and taxes are mentioned, something has been given away to Hierios, a dowry is mentioned, as are Augustopolis and a spring, Ain Tollat. Among the persons involved are Panolbios and Theodoros son of Obodianos.

Inv. 83

Papyrus Petra HM King Hussein bin Talal and HM Queen Noor al-Hussein was studied by Maarit Kaimio and Jorma Kaimio (see *ADAJ* XVI [1997]: 461-62). The roll contains a very long settlement of a dispute, made with the help of two arbitrators, between Theodoros son of Obodianos and Stephanos son of Leontios. The dispute concerns rights of drawing water from a spring and leading it through neighboring houses, the building of water channels and drains, and similar disagreements that have arisen between the owners of two neighboring houses in Zadakatha. During 1997-98 work

on inv. 83 concentrated on the reconstruction of the roll. Previously about 3/4 of the fragments had been placed, but there remained several series of fragments. In January 1998, we succeeded in identifying the place of more than hundred fragments, and in very many cases to link them together, so that continuous words could be read. On the basis of this work, the amount of the readable text in the document has been considerably increased. It has also become possible to form a more accurate picture of the physical form of the roll. Even in the upper layers of the roll, the fragments join together rather closely, so that there are not many lines missing between the fragments. This improved overall view of the layout of the document has made it possible to estimate much more accurately the placing of the fragments and the continuity of the lines of the text. A new, much enlarged version of the text is now under preparation, which will hopefully shed new light on the problems of the document, especially on the mystery of the koprodochion (dunghill? drain? toilet?), which is hotly debated by the litigants of the document. The new text will form the basis for the reappraisal of the document which will be presented in a preliminary form in the International Congress of Papyrologists August 1998.

Inv. 84

Marjo Lehtinen began reconstruction of this roll in January 1998. Many fragments contain supraposti that make the reconstruction somewhat cumbersome and this will require more work. This registration of a contract or agreement of as yet unknown kind (real property is involved) is written in transversa charta. The body of the document is written in a relatively small, upright and brushlike hand. Two other hands occur also, possibly as the subscriptions of the participants, but this remains to be seen as reconstruction proceeds. The approximate date of this document can

be likely established as the formula clearly indicates Justin, as well as the years of local era (463 or 473 depending on how much is missing between the fragments that contain the hundreds and fragmentary tens). Some points of interest in inv. 84: Toponym(s): Zadakathon (kastron), anonymous kome, likewise an anonymous polis (very likely Petra is meant); and persons: NN son of Valens, NN son of Obodianos (Theodoros no doubt), and Elafia (familiar from inv. 74).

Inv. 86

Papyrus Petra Patricia M. Bikai and Pierre M. Bikai (donated by the Joukowsky Family Foundation) is a roll written on both sides. In January 1997 the preliminary readings were done by Marjo Lehtinen for both of the documents. In January 1998 Marjo Lehtinen finished the photomontage of the two main texts, and also reconstructed the two minor documents (inv. 86 a and b) that were written on a separate piece of papyrus, also on both sides of it. The length of the existing roll, measured from the photomontage is ca. 2.5 m. Besides creating a more accurate reconstruction, the focus been to establish as accurate a decipherment as possible of the text now visible. The fragments will then be turned and those now not visible will be studied. The earliest text in recto is written in transversa charta in a large upright professional hand, similar to the hands in invs. 20 and 72 *et al.* It is a document dealing with an emphyteusis, "perpetual lease" of land. The lessor is Patrikios and the lessee Gessios. The beginning of the document has been cut away, so there is no preserved dating formula. However, in the beginning, "the present seventh year of indiction" is mentioned, very likely defining the beginning of the contract. The only additional information as to the date is the beginning of the name of the emperor in the oath-formula. Also the Trinity appears in the oath-formula, dating it to the Justinian's

reign or later. Unfortunately, the reading of the emperor's name is ambiguous (Fl. Ioustin-). The existing oath formula parallels need to be checked for more precise relative date (= seventh indiction during the reign of Justinian or Justinus).

Despite the fact that the document contains numerous standard long-winded legal formulae, details about the real property leased are unfortunately not preserved. The text ends abruptly, although the subscriptions are mentioned in the preserved end, they do not exist, and this may mean that the document was just a draft or had lost its validity as a legal document. Considering the nature of the lease, this is quite surprising. The fragmentary left side of the document is still under reconstruction and most of the roll is preserved except for a few centimetres of the right side. Only four of this type of lease contract are known from Egypt of this period (only one of them complete), but with the help of those parallels, most of the gaps in the text can be restored. Of interest, is that in all the existing parallels, the lessor is always an ecclesiastical institution, whereas here, it seems, the contract is made between two private citizens.

The text in the verso is still somewhat of a mystery and seems to begin with a prayer instead of the expected dating formula. The hand is generally relatively small although it varies in size and form; quite a few lines have corrections made by the writer. The text full of religious expressions that do not appear in papyri elsewhere; in addition the writer has problems with his vowels, hence the decipherment is somewhat difficult in places. The writer has, at some point, donated a hospital to a monastery, possibly in Zadakathon(?), or at least property situated there is mentioned. References are made to "therapy beneficial to the soul", "guardianship of the sacred vessels", a monastery and possibly monks. The name of this pious donator is not preserved, but his father's name

may be Simiabion. The end of the document becomes very obscure, money and possibly jewelry are mentioned several times. Since there is no indication of signatures, and considering the sloppy general characteristics of the document, it is reasonable to assume this may have been a draft also, perhaps made for private use only.

Under the roll was folded a separate papyrus piece written on both sides as well. A photomontage reconstruction has now been made of these two documents. Both of them appear to be somehow connected to the main verso-text, since a proestos of a monastery appears, and a reference is made to Aaron, so perhaps the monastery on Jabal Hārūn was meant. The other text, inv. 86a (small sloppy hand, thick stilus) has been canceled by criss-crossing diagonal lines. The other text, inv. 86 b, (largish cursive hand, fine stylus) mentions also Theodora (cf. the deceased Theodora in inv. 88), daughter of a female NN.

Inv. 88

Papyrus Petra Jaakko Frösén was studied by Mari Mustonen. The layers of the papyrus are partly unseparated. In 1998, Mari Mustonen tried to separate some of these layers, but it was not successful. The docu-

ment seems to be some kind of declaration concerning an inheritance in which several persons appear as testators or as heirs. Patrikios son of Diphilos seems to be one of the heirs. Other persons involved are: Alpheios son of Aphtaos, Akhzamos (a father's name?), Panolbios, Sabinos, Thekla?, Theodora (or Theodoros?). Skrinarios is mentioned in the beginning of the document, and occurs here most likely *ex officio* rather than as one of the contracting parties.

J.Frösén

Acknowledgements

The work of the Michigan team was supported by a generous grant from the National Endowment for the Humanities (NEH), an ACOR fellowship for Donka Marscus, and by the University of Michigan (R. Caldwell). The work of the Finnish team was funded by the Academy of Finland.

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THE FINNISH JABAL HĀRŪN PROJECT REPORT ON THE 1997 SEASON

by

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The first field season of the Finnish Jabal Hārūn Project (FJHP) in the area southwest of Petra was conducted in October 1997. The combined team of cartographers and archaeologists was led by Jaakko Frösén, University of Helsinki, the director of the FJHP. Henrik Haggrén, Katri Koistinen, Jussi Heikkinen, Saara Mattila, and Jyrki Mononen, all from the Institute of Photogrammetry and Remote Sensing at the Helsinki University of Technology, Finland, as well as Matti Rantanen, Espoo-Vantaa Institute of Technology. Juha Kanto, SITO Oy, prepared the geographical reference data to be used during the fieldwork, while Koistinen, Heikkinen, and Mononen also conducted the cartographic and photogrammetric survey of the site during the 1997 season. Mika Lavento, Jan Vihonen, Erko Mikkola, and Matti Mustonen, all from the University of Helsinki, conducted the archaeological reconnaissance of the mountain and its environs. Two American archaeologists, Zbigniew T. Fiema and Glen L. Peterman, assisted in the preparation of the project. Fiema also served as the chief archaeologist during the 1997 season. Muhammad Salameen was the representative of the Department of Antiquities of Jordan.

Previous Research and the FJHP Objectives

The focus of interest of this project is Jabal an-Nabī Hārūn (the mountain of the Prophet Aaron) located ca. 5 km to the southwest of Petra. According to Jewish, Christian and Muslim traditions, the moun-

tain is considered the place of burial of Moses' brother Aaron. Currently, the peak of the mountain is occupied by a Muslim shrine (*weli*)¹ which contains a sarcophagus (cenotaph) believed to contain Aaron's remains. Despite the significance of the site, marked by its proximity to Petra, and the existence of considerable ruins there, the Jabal Hārūn mountain has received relatively little attention among explorers and archaeologists. To date, the most important and comprehensive description was recently made by Russell, Peterman and Schick (Peterman and Schick 1996). This study also contains all ancient references to human habitation in the Jabal Hārūn region. Most of this information comes from the Byzantine period, and the relevant texts mention not only a monastery but also a church on the mountain. While the exact date of the abandonment of the mountain by the Christians cannot be determined, it must have happened not later than the mid-14th century when the Muslim *weli* was constructed on the peak (Peterman and Schick 1996: 477-78).

Of main interest for the Finnish Jabal Hārūn Project, however, is the extensive ruined architectural complex located ca. 70 m below and ca. 150 m to the west of the peak with the Muslim shrine, on a wide plateau of the mountain, at ca. 1270 m asl. Previous explorers admitted the possibility that the ruins represent a Byzantine monastery. However, it was the 1991 exploration by Russell, Peterman and Schick that resulted in a first sketch-plan of the site, its de-

1. Palestinian grid coordinates of the shrine: 188.64E x 969.667N; UTM coordinates 731200E x 3356470N.

scription, and the proposal that the extant ruins should most probably be identified with the monastery of Saint Aaron mentioned in Byzantine sources.

The origins of the Finnish Jabal Hārūn Project are to be found in the involvement of the Academy of Finland / University of Helsinki with the sixth century Petra Papyri discovered in a Byzantine church complex at Petra during the excavations of the site by the American Center of Oriental Research in December 1993 (Fiema, Schick and 'Amr 1995). The carbonized remains of 152 papyrus scrolls containing documents written in Byzantine Greek were subjected to a conservation process by a team of Finnish conservators. The studies of the papyrus documents conducted by two teams from the University of Helsinki and the University of Michigan, headed respectively by Jaakko Frösén and Ludwig Koenen, led to the assumption that this single largest collection of ancient documents from Jordan would clarify many poorly known or little understood aspects of society and economy in Byzantine Petra and southern Jordan (Frösén and Fiema 1994; Koenen 1996).

The legible texts, dated between AD 528 and 582, are mainly legal documents concerning transactions and registrations of property and settlements of disputes involving several families of Petra during at least two generations. They also mention local towns, churches and dwellings, as well as the agricultural hinterland of Petra. All of this prompted the scholars working on the texts to attempt to relate the revealed information to the archaeological remains and toponomastics in and around Petra. Papyrus Petra inv. 6 (Papyrus Petra Daniel C. and Nancy E. Gamber), which contains the earliest preserved date in the archive (15 June, 528), also mentions "the House of our Lord the Saint High-Priest Aaron" outside of the city of Petra. This institution is mentioned in the will of a sick person as one of the two beneficiaries in the event of his death (*do-*

natio propter mortem). Because of the terms *hagios oikos*, in Greek, and *domus*, in Latin, used in the Petra Papyrus, and because of the 'occurrence title' of the representative *hegoumenos* (= superior), the papyrus almost certainly refers to the monastery of Saint Aaron. The combination of this information with the aforementioned religious tradition associated with Jabal Hārūn and the architectural remains on the high plateau of the mountain strongly suggest that the latter, which had previously been thought to be the remains of a monastic complex, can indeed be identified as the Monastery of Saint Aaron. In that case, Papyrus Petra inv. 6 is the earliest historical source specifically referring to this monastery.

The historical ramifications of the proposed identification hold great promise in terms of the archaeological and historical data that can potentially be recovered through an intensive archaeological exploration of the area. Not only can a better understanding of the poorly known Byzantine monastic development in southern Jordan be achieved, but also a plethora of new information on Petra during the Byzantine and following periods should become available. The Finnish Jabal Hārūn Project, developed with these aims in mind, is designed to uncover, preserve and publish archaeological remains located on the Jabal Hārūn mountain, recognized as a monastery of St. Aaron. These tasks are to be fulfilled through a comprehensive five-year program of archaeological survey and excavation at the site, and through a geo-environmental exploration of the environs of the mountain. The project aims for a full understanding of the ruined monastic complex, the topography of the mountain, and the history of human settlements on the mountain and in its immediate surroundings, as well as their relations to the city of Petra.

The goal of the first season was twofold. Various cartographic methods, primarily

based upon a video-recording, were to be tested in order to create detailed maps and a 3-D model of the entire mountain needed for further archaeological exploration of the area, and to develop methods which could be used in archaeological recording during future excavation campaigns. This task was performed by the cartographers from the Helsinki University of Technology.

The archaeological goal of the 1997 season was to become thoroughly acquainted with the area and to verify archaeological observations made by previous explorers of the Jabal Hārūn area. For this purpose, an archaeological reconnaissance was conducted rather than a systematic survey. Also, the members of the archaeological team aided the cartographers in their work on the photogrammetric recording of the main site. The following description summarizes the cartographic and archaeological activities which were undertaken during that season.

The Cartographic Research and Fieldwork

One of the major problems in the preparation of a full-scale archaeological exploration of the Jabal Hārūn area was the lack of detailed maps. The only available means of geographical reference were a topographical map on a scale of 1 : 50 000 and an older set of aerial photographs on an approximate scale of 1:15,000. Taking into account both the actual requirements set for the first season of the FJHP and the future requirements of archaeological documentation, the contribution of the Institute of Photogrammetry and Remote Sensing of the Helsinki University of Technology, involved two tasks:

- 1) the production of a 3-D model of the Jabal Hārūn and the plotting of large scale 2-D maps thereof, and
- 2) the creation of a comprehensive on-site videographical record for the purpose of developing a prototype tool suitable for on-site archaeological documentation.

Pre-Survey-Research

The initial difficulty centered on the fact that the geographical datum for this project was not well defined, and thus a georeference system had to be created using the information available on existing maps and photos. However, once the 3-D model is fully developed, all data already collected and processed can be later transformed so as to conform to any other coordinate system. Meanwhile, the approximate datum could be defined using natural landmarks as control points. The grid reference (X- and Y-datum, or longitude and latitude, respectively) was defined by one point which was exactly identified and located on both the map and the aerial photo images, namely the Islamic shrine located at the southwestern peak of the NE summit. The azimuth was defined visually using distant landmarks. The level reference (Z-datum, or height) was defined by summits or hilltops selected throughout the area. The exact altitude datum was defined by the nearest high spot on the map just beside the ruins located on the plateau of the mountain. A block of images was selected for the aerial triangulation in order to produce local control points for stereo models. These will be used for combining the large scale maps and the 3-D model with the selected georeference system. The ground control point network was further densified through aerial triangulation.

A total set of 11 images from three strips was selected to form the block for the triangulation. About 10 to 15 tie-points were selected from each image in order to orient the images to each other and, through the ground control points, to the geographical reference system. Based on the aerial photographs a digital terrain model was created (Fig 1). Maps produced from this model were used during the 1997 campaign. This three-dimensional model will be further refined with the video-imagery produced during the campaign.



1. A topographic map of Jabal Hārūn mountain produced from aerial photographs. The map contains contours (5 m intervals), break lines and structures (created by the cartographic team under the direction of Henrik Haggren, Helsinki University of Technology).

The 1997 Cartographic Survey

During the 1997 field season, the image data were collected in order to construct a three-dimensional photorealistic model for the ruins tentatively recognized as the monastery of Saint Aaron. This model consists of a geometrical model and a texture model. Because the video digitizing techniques used for the creation of photorealistic models are still under research, an essential part of the field work was devoted to the testing of several strategies to collect the image data from an archaeological site. The work primarily concentrated on recording the remains of the monastery and its immediate surroundings (sites 1-12; see below). Having accomplished this task, the cartographic team began recording the agricultural-

hydraulic installations found during the archaeological reconnaissance in the environs of the mountain (sites A-S). In total, five basic image recording strategies were tested to record the remains of the monastery:

- 1- Circular sequences photographed with the video camera on a tripod were used to collect image data specifically for the 3-D modelling of the monastery. The video sequences will be digitized and the blocks of video images created will be used to create a 3-D model of the subject.
- 2- Free movement sequences photographed with a video camera were used to record visible structures or elements targeted according to archaeological preferences. Using this method, the remains of the monastery were video-recorded, con-

centrating on one recognized spatial element (room or cluster of rooms) within the remains of the monastery at a time.

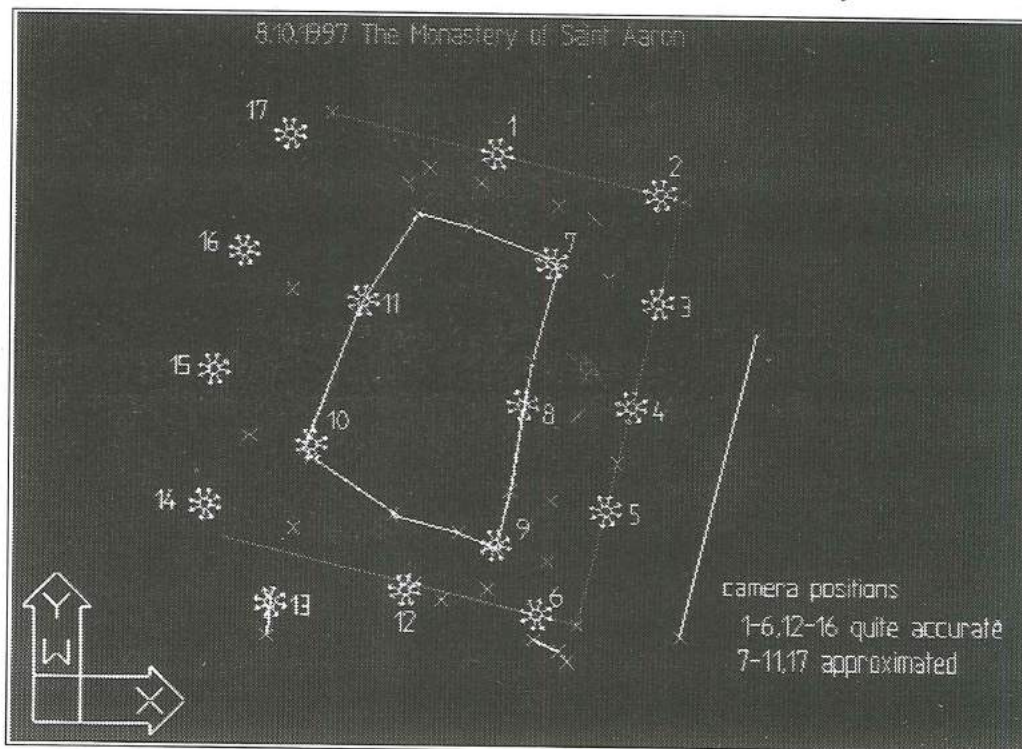
- 3- Circular sequences and free movement sequences photographed with a video camera were used to record the environs of the monastery, especially for the purpose of enhancing the texture and refining the model created from the aerial photographs. These sequences were taken from various places around the remains of the monastery.
- 4- A stereo recording system with two video cameras was tested in relation to small selected parts of the monastic complex.
- 5- Slide photos of the site using non-metric cameras were taken from most video camera stations and placements.

The preparation for the actual video-recording included the collecting of information related to the geometry and dimensions of the monastery, such as the main breaklines (the highest points of the walls and the lowest points marking the limits of the ruins). Furthermore, tests were performed to find the optimal opening angles of the video image. In all, 17 camera

stations were used (Fig 2). Two CCD video cameras (Sony Handycam camcorders) for 8 mm video format cassettes (Hi8) were the main recording devices used. One camera was equipped with a UV-filter. In addition to the video cameras, two non-metric cameras with slide film were used.

For various targeting purposes several signal types were utilized. The most suitable one proved to be white styrofoam balls mounted on small wooden sticks. Two basic types of paper board signals with black-and-white patterns were also tested. In most cases the signals were not used in the traditional sense, since it was decided to use natural targets as much as possible. On the other hand, the signals still served as common points for different images or as scale information for the modelling. In addition, the signals served as markers for particular features, such as ancient walls and installations, as specified and preliminarily interpreted by archeologists.

A test area (the southern part of the monastery) was video-recorded using a convergent stereo imagery, that is, a two-camera system mounted on a wooden



2. Video camera positions during one-day recording around the monastery of Saint Aaron.

frame. To determine the relative orientation, a calibration triangle was constructed from the styrofoam ball signals. The video tapes of the two-camera system were synchronized using flapping sticks. Generally, the image scale was relatively stable. However, possible variations in the scale also occurred, due to the fact that the system was heavy and therefore difficult to carry around while maintaining a constant height above the ground. At any rate, the wooden mounting was purely experimental, and a more convenient, better designed device will be needed in the future.

The remains of the monastery were also recorded from farther away. Imaging was done using both video and normal cameras from several positions. This image data can be further used in the modelling of the intermediate environment and for texture mapping. Some sequences were recorded especially for the definition of horizontal levels. A portable GPS-receiver was also used in the field. However, lacking differential correction, its accuracy was not fully satisfactory for the purpose of establishing the control points. The actual control points will be measured in the future, and the models created will be transferred to a new geo-reference system.

Basically, the same strategies, primarily the circular or half-circular sequences and the free-movement sequences, were used to record the environs of Jabal Hārūn. Sequences were taken from both sides of the wadi and also down in the wadi. In this case a tripod was not used, and all images and video sequences were taken in a mobile manner, and from longer distances, due to the large size of the archaeological sites noted in the environs of the mountain. Because of these factors, the resolution of the video images is quite low. Therefore, slide photography in combination with video sequences appeared to be of help.

The ground control points and the entire 3-D cartographic data can be linked to any

additional reference system selected later. For the height reference a local levelling would be preferred. The collected video data will be utilized to create full and comprehensive, photorealistic 3-D models of the monastery site, as well as of the agricultural-hydraulic installations located in the environs of the mountain.

The Archaeological Reconnaissance of the Monastery

The focus of the activities of the 1997 FJHP archaeological reconnaissance was the plateau in the higher part of the Jabal Hārūn mountain, which contains the ruins of the monastic complex and other archaeological remains. The plateau is dominated by two rocky summits - the NE one and the SW one - in excess of 1300 m asl. The northeastern summit consists of two peaks. The southwestern peak, which is the highest point of the mountain, culminates in a small flat area which is currently occupied by the Muslim shrine. At first, the work of the archaeological reconnaissance concentrated on the extensive ruins on the plateau, which had previously been identified as a Byzantine monastery (Fig 3). That site, roughly 60 m N-S x 50 m E-W, was preliminarily designated as Site 1. No surface material was collected during the 1997 season, except for one, accidentally found surface coin. To avoid unnecessary repetition, the following description of the monastery site will concentrate on the features which are new or which markedly differ from the description presented by Peterman and Schick (1996). The site was intensively explored and a particular effort was made to note the internal divisions, walls, corners and other features. For convenience, all spaces/compartments/rooms of the entire complex, as well as the main external walls of the complex, were designated by numbers or letters respectively. The walls are generally represented by ridges formed of rubble from collapsed upper courses, which occa-

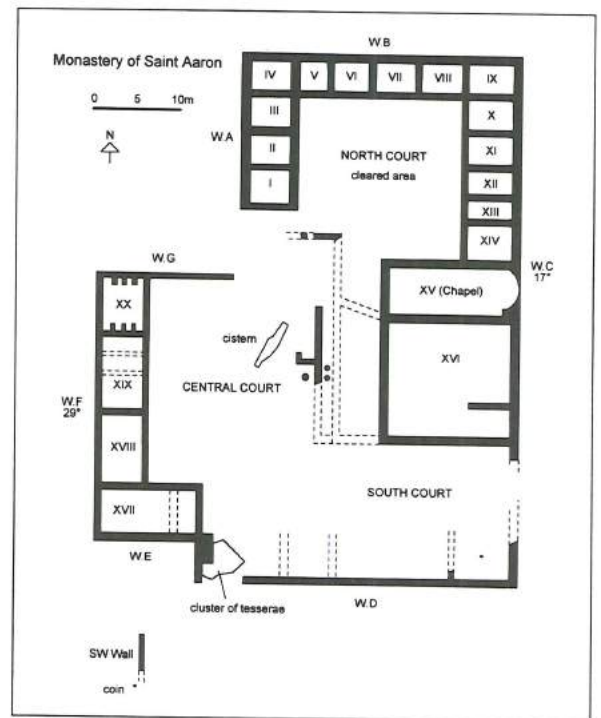


3. The monastery of Saint Aaron (Site 1). View from the east (photo by Jan Vihonen).

sionally display clear wall lines on the top.

Generally, the complex can be divided into three main components or wings, which in turn consist of rooms located around three courts (Fig 4). The North Court is surrounded by Rooms I through XIV on three sides, while being partially bounded on its southern side by Room XV (the chapel). This court appears to be the most self-contained and compact segment of the entire complex. The Central Court is bounded on its western side by Rooms XVII-XX. A rock-cut cistern is located in the center, and series of parallel walls, probably related to Rooms XV-XVI, bound this court on the eastern side. The South Court is located south of Rooms XV-XVI, which are the largest internal components in the complex. The southern half of this court may have been subdivided into a series of rooms along Wall D.

The actual plan of the site and the internal subdivisions generally correspond with the previously published plan. However, the latter represents an idealized symmetrical arrangement in which walls are strictly parallel or perpendicular to each other. In fact, there is a serious deviation from this picture. Wall F is not parallel to Wall C (17 degrees E from N), but rather follows the direction of 27 degrees. As such, all western



4. the monastery of Saint Aaron located on the plateau of the Jabal Hārūn mountain (as modified from Peterman and Schick, 1996)

rooms of the Central Court (XVII-XX) follow the same orientation. While this deviation is insignificant at the SW corner of the complex, it gradually increases to significant proportions farther north, causing a significant relocation of the northern part of the Central Court versus the previously published plan. Therefore, the entire complex, instead of being roughly rectangular, is

more trapezoidal in form. It is possible that this asymmetrical location of the western rooms of the Central Court versus the entire eastern part of the complex may indicate that the former was added to an already existing design. Significantly, the position of the cistern on the published plan is also incorrect (ca. 10 m too far to the ENE), although this error cannot be a result of the deviation mentioned above. The sketch plan published here does not correct these deviations but only serves to illustrate the approximate location of the architectural elements described below, and to note some significant additions to the original plan, as observed during the 1997 campaign.² A new top plan of the site will be created with the use of precise cartographic and surveying methods during the next season.

As opposed to the previously published description of the ruins (Peterman and Schick 1996: 473), the FJHP 97 was able to observe more ceramics on the surface, although the overall density of their presence inside the complex is low. This differential occurrence of sherds may be partially related to the continuous process of topsoil erosion inside and outside the site, a significant natural factor occurring in the area of the mountain. The ceramics observed inside the complex primarily include Nabataean (fine painted and plain) and Byzantine ware, although some possible Roman-period sherds were noted as well. Several lithics and fragments of roof tiles were also present inside the monastery.

Description of Some Rooms in the Complex

Detailed observations of the interiors of rooms in the complex were made during the reconnaissance, but only the most significant are presented here, in anticipation of the comprehensive survey and description to be conducted during the next season. Particular attention was directed to

Rooms XV and XVI. Room XV is the second-largest room in the entire complex. It appears to have been a narrow, single-apsed small church or chapel, oriented almost due east. The high ground of the interior is found along the south and north walls, with the depressed area in the center. The offset at the junction between the apse and the south wall is notable, but the curvature of the apse is clearly visible only in its central part. In general, the apse appears to be relatively shallow. The degree and the location of the central part of the curvature would suggest that there should be a parallel offset on the northern side, that is at the connection with the north wall. Further clearance will be required to prove this hypothesis. No traces of internal divisions were noted in Room XV, thus the chapel may perhaps have been of a single-nave type. Concentrations of small-sized sherds, including Nabataean fine painted ware, occur along the south wall, especially in the SW and SE corners. As for the adjacent Room XVI, it is definitely the largest room in the entire complex, even if internally subdivided. Two limestone ashlar and four column drums were noted on the surface. Surface material also includes fragments of roof tiles, fragments of bricks or hypocaust-type tiles, and marble fragments in the SW quadrant, one of which may be a fragment of a post which supported a marble screen of a chancel type. A slightly oval robbers' trench is located in the SE-central part of the room. Its interior displays a fragment of a stone wall or installation.

Room XIX is relatively long but appears to have been internally subdivided, judging from the traces of walls visible on the surface. One E-W wall is located ca. 4.9 m north of the south wall of Room XIX, while the other wall is located at a distance of ca. 6.2 m north from the south wall. The surface of the space between this second parti-

2. Thanks are offered to Glen L. Peterman for his permission to reproduce the original plan.

tioning wall and the north wall of Room XIX features a curious installation consisting of several tightly packed stones bonded by mortar. This obviously intentional cluster of stones is roughly rectangular. It appears to be a top of a pillar – perhaps a central supporting pillar of an internal staircase, an element well-known in Nabataean architecture (Negev 1973). Room XX represents the highest ground within Site 1, which holds promise for the room's preservation up to the upper floor. Outlines of three arches are visible at the surface level. Each is ca. 0.6 m wide and consist of several voussoir stones tightly set one beside the other. Since it appears that these arches are still standing *in situ* the ground floor of the room may be ca. 4 m (or more) below the surface.

The Courts

Several new elements were noted inside the South Court. Generally, the court features a deep E-W depression which runs south of Room XVI. Farther south toward Wall D the surface rises, which may indicate the presence of internal rooms set against Wall D. One subdividing wall which runs perpendicular to Wall D was detected ca. 5.7 m west of the corner of Walls C and D. Another wall appears to be ca. 22 m west of the SE corner, and still another one ca. 26 m west of that corner. Other subdividing walls may be in the area too. In the same area, traces of several stone circular/oval structures were observed on the top of the elevated surface along Wall D. These structures are no larger than 1.5 m in diameter. Some of the circles or ovals have a N-S stone partition. Some seem to occur in clusters of two or four. Possibly, these are top elements of buried installations, perhaps of storage function, but they may just as well represent installations which were dug in only after the accumulation of soil and stone deposit along Wall D. Another explanation of the circles as elements of small domes,

cannot be excluded at this point. The area of the SE corner of the court contains little pottery, but farther west small ceramic scatters are better evidenced, including roof tiles. One roof tile had a cross incised on its surface. Byzantine pottery is predominant, although some Nabataean pieces were noted as well. There seems to be a gap in Wall D by the SW corner of the court, and that wall appears to end at this point. The function of the main south wall of the complex is assumed by Wall E, which runs farther north. The gap itself, which is marked by a N-S depression in the ground, might have been a gate. This impression is enhanced by the east wall of Room XVII, which projects southward. This wall features a sort of a buttress—a rectangular, solid offset attached to the eastern face of the wall. The area of the buttress and especially immediately south of it was found to be strewn with stone mosaic floor tesserae. The most common sizes are 3 cm x 3 cm x 2.5 cm, and 2.5 cm x 2.5 cm x 2.5 cm. The tesserae are made of limestone, ranging from pale greenish-grey to light bluish-grey, with various shades of cream. Most of them have traces of mortar bedding of creamy white color. The most intensive concentration occupies an area of ca. 5.5 m (N-S) x 2 m (E-W). The concentration appears to be a dump of tesserae removed from somewhere else, rather than the place where they were originally set.

The main feature of the Central Court is a rock-dug cistern, the opening of which is ca. 6 m long and more than 1 m wide. No traces of internal plaster coat were noted, however the interior of the cistern is currently filled up with soil, rubble, and garbage. The cistern could have been roofed in antiquity. A water inlet was detected in the northern extremity inside the cistern; probably the water was internally channelled from the roof tops (?) of Rooms XIX-XX. A number of marble pieces (ca. 50 fragments) were found scattered on the ground to the north-east of the cistern. One piece is def-

initely a fragment of a Byzantine chancel screen. Some pavement fragments were also noted. East of the cistern a few roof tiles, marble fragments, sherds, and flints were observed. A few sherds, including some Nabataean and Byzantine, were found around the mouth of the cistern, as well as some small flints, including one point. The area between the cistern and Rooms XV-XVI is particularly unclear. There are at least two long N-S walls there, as well as column drums. One is located to the northwest of the northern end of the cistern and a second sits directly atop one of the long walls. Two drums are located beside this wall which should perhaps be interpreted as a portico's stylobate. The other wall, which is parallel to the "portico" wall, is marked on the plan with a broken line. Significantly, the south wall of Room XVI appears to continue westward (i.e., beyond its corner with the west wall of that room), where it apparently meets the broken-line wall and the "portico" wall. If this observation is correct, it means that Rooms XV (chapel) and XVI are located behind two parallel walls which remain in direct association with these rooms, perhaps forming a pseudo-narthex and/or portico entrance.

The area of the North Court is almost entirely surrounded by the north wing of Rooms I-XV, except for the southwestern corner where the court may or may not be connected with the Central Court. The central part of the court has been intentionally cleared of stones, probably relatively recently. Very little pottery was observed on the surface there.

Areas Outside Site 1

South of Site 1, there is a wall (the so-called SW Wall) which runs south from the area of the corner of the complex. The wall, which apparently stands directly upon the bedrock, is made of irregular and much weathered stones. A bronze coin was found near the determinable southern end of the

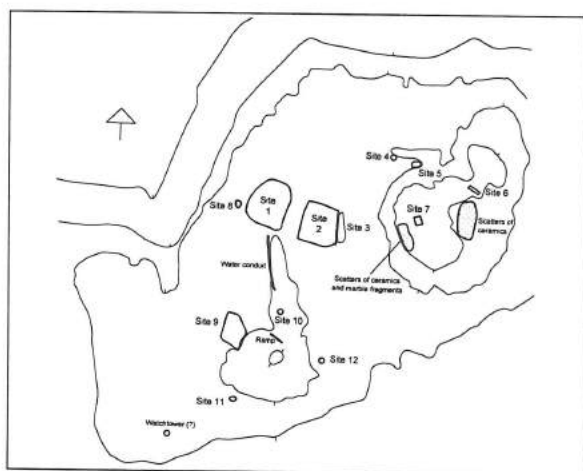
wall. Judging from its size, the coin is probably a fourth century issue. Two other bronze coins were found previously in this area by the guard of the Muslim shrine. One may be Nabataean, the other of fourth century date. Ceramics were also present in this area, most notably fragments of large storage jars. The roughly rectangular area east of Site 1 is characterized by a high frequency of ceramic occurrence, definitely higher than the deposits inside Site 1. The ceramics include Nabataean, Roman and Byzantine wares. Some pieces of light greenish-glazed ware (Early Islamic?) were also found. Roof tiles, marble fragments, and lithics were observed on the surface.

Remains of a water conduit are located on the western side of the elongated, north-projecting promontory of the SW summit. The conduit, which is carved in the slope of the rock formation, still preserves a rectangular trough section in some places, but in other places the western side is completely eroded. It appears that the channel directed water from south to north, probably fed by rainwater which descended in natural drainage lines down the slope of the summit. The water seems to have been discharged in several places along the route of the conduit. However, the main place of discharge is near the northernmost tip of the promontory, thus very close to Site 1.

Other Archaeological Sites on the Plateau

While the 1997 archaeological reconnaissance was neither intensive nor systematic, altogether 12 archaeological sites or locations of definite past human activity were easily identified on the plateau or in its vicinity (Fig 5). The following is a brief presentation of these sites, in anticipation of their full exploration and recording during the future seasons of the project.

Site 2, being a very large enclosure consisting of four stone walls, has been briefly described (Peterman and Schick 1996: 475). The west, south, and north walls feature ir-



5. The distribution of archaeological sites (Nos. 1-12) noted during the 1997 FJHP archaeological reconnaissance of the plateau of the Jabal Hārūn mountain.

regular courses made of relatively flat rocks. The width of these walls does not exceed 1.5 m. The east wall is very poorly preserved. Gaps exist in this wall at the NE and SE corners, perhaps because of the modern (?) path which runs in that area. The amount of surface ceramics found inside the installation is greater than inside Site 1 but fewer than in the area between Sites 1 and 2. Few Nabataean sherds were found there, but coarse (and much worn) wares which may be Roman or Byzantine were numerous. One piece of Red African Slip ware, as well as some Early Islamic sherds, were also observed. The enclosure appears to be a large corral or pen rather than a cultivation terrace, although the remains of some attempt at terracing inside the enclosure can be noted. Due to considerable erosion in this area, the bedrock is visible in many places. Another large stone enclosure (Site 9) is located at the northwestern side of the SW summit. Its form is basically quadrangular, but the walls, except for the northern wall, do not run straight. The walls are made of irregular stones and the coursing is barely recognizable. The maximum length of the enclosure is ca. 44 m (N-S) on the western side, and ca. 50 m on the eastern side. The maximum width is ca. 40 m. A "ramp" or a rock-cut trough running SE-NW is visible

along the eastern side of the enclosure. Perhaps the ramp originally channelled water down from the slopes of the SW summit into Site 9. As such, Site 9 might have been a water reservoir. The predominantly sandy deposition inside the enclosure appears to be water-borne.

Two potential cultic sites have been recorded. One of them (Site 4) is located at the NE end of the plateau, at the foot of the rocky slope of the NE summit. The bedrock directly adjacent to the foot of the slope had been chiselled out to form an incomplete band, ca. 0.3 -0.4 m wide and ca. 4.8 m in diameter, which follows the natural or enhanced curvature of the rock. It is possible that rectangular stones were fitted into the band to form a wall-like semi-rounded enclosure. Ca. 3 m up the slope and in front of the semicircle, are the much eroded remains of a rock-cut installation which looks like two seats, or niches without roofs. Two larger rock shelters and one small half-cave are located on the same level as the niches. Site 10 is located on the western side of the elongated, north-projecting promontory of the SW summit. The site is a natural rift or deep gully in the rock, probably human-enhanced, and ca. 7 m long. In a horizontal section, the rift appears as a trough which gradually widens toward its outlet on the western side. The interior surface of the trough is filled with reddish sand, but also with silt and clay. The outlet or "mouth" of the rift, ca. 1.2 m wide, is blocked by a pile of stones, perhaps originally an attempt at a dam. Both sides of the rift were originally mortared over. Traces of mortar, containing particles of crushed pottery, large-grain gravel, and very small pebbles, are still well visible. Both sides of the rift have niches carved out of the rocky surface: four on the southern side, and either three or five on the northern side. The interiors of the niches are badly weathered, but it appears that originally there were some carvings inside. Probably, the site was once a small water

reservoir (or drainage conduit) associated with some installations, probably of cultic nature. This association of a hydraulic installation with (cultic?) niches allows Site 10 to be tentatively dated to the Nabataean period.

Another water-related site (no. 8) was visited during the reconnaissance but not fully described. This site is located at the western foothill approach to the NE summit in a between-rock depression on the route to the southwestern peak which houses the Muslim shrine. The cistern is a masonry and rock-cut construction consisting of a large rectangular space with a roof supported by a series of arches. The rainwater was probably channelled inside from the surrounding high slopes. Future exploration should determine whether the cistern is Nabataean or Byzantine in date. Site 6, being a long flight of rock-cut steps, is located in roughly the same area between the northeastern and southwestern peaks of the NE summit. This route would presumably have been followed by anyone approaching the Jabal Hārūn mountain from the north or northeast.

Site 8 – a cluster of lithics – is located west of the SW wall described above in a flat area where numerous ceramics were also found. One suspects that erosion had a considerable impact on that area. The substantial concentration of lithics there included flint flakes and retouched flint tools. It is possible that the presence of lithics in this and other areas around the monastery site reflects early human habitation, the remains of which are perhaps still present underneath or close to the ruins of the monastery. Sites 11 and 12 appear to be the remains of very simple shelters or dwellings. The former is located on a long ledge on the southwestern side of the SW summit, while the latter is on the southeastern side of the same summit in a shallow but large rock-shelter. Both feature simple stone walls and small scatters of sherds nearby.

The existence of two other sites has been

duly recorded, but no further investigation of them will be carried out. One of these is a graveyard (Site 3) located directly east of Site 2 on low ground which is often used as an alternative route to the high plateau of the Jabal Hārūn mountain. The graves are marked by standing stones - stelae - that lack any signs or inscriptions. The pattern of grave distribution is irregular. Local informants claim that the graveyard has not been recently used. The earlier remains under the Muslim shrine located on the highest peak of the mountain have also been entered in the site list as Site 7. However, as it is a sacral site of current importance and use, this site was not explored, nor will it be in the future. It is apparent, however, that the *weli* had been built on top of an earlier structure characterized by masonry-built walls. The artifacts scattered all around include some sherds and a considerable number of marble fragments. All of these primarily occur on the slopes and ledges in the area west and southwest of the peak with the *weli*. Previous explorers have suggested that a Byzantine church existed under the Muslim shrine (Peterman and Schick 1996: 475-477), a hypothesis which may be correct but will remain untestable.

Despite an intensive search, no new inscriptions or graffiti were found during this reconnaissance. A general lack of epigraphic finds *in situ* cannot be fully explained by the properties of the sandstone formations at the site (fragility, peeling off) combined with the rapid changes in temperature and climate affecting the preservation of the outer skin of the rock. There are numerous epigraphic finds primarily located at the highest point of the alternative (southern) route to the plateau. These are Greek, Nabataean and Arabic graffiti, and foot "imprints." Some must certainly relate to the pilgrimages to the Mount of Aaron. These are not discussed here since all of them were previously recorded. At any rate, there might also be cultural-historical reasons for

the relative scarcity of the epigraphic material in the area.

The Reconnaissance of the Environs of Jabal Hārūn

As for the environs of the Jabal Hārūn mountain, the archaeological reconnaissance concentrated on western and southern environs of the mountain, i.e., its slopes and surrounding wadis. The northwestern, northern, and eastern approaches to the mountain are much steeper than the aforementioned and will be investigated during the next season. The wadis in the area are part of a large catchment area that centers on the Wādī al-Farāsha. This wadi is the main runoff drain between the Jabal Hārūn and the Jabal al-Farāsha. It generally runs E-W, but then appears to turn sharply north upstream, passing on the western side of the Jabal Hārūn mountain. Numerous small-scale natural drainages, such as gullies and deep washouts, on the slopes, also converge on the Wādī al-Farāsha. The most significant ecological factor affecting the current appearance of the area is erosion. Heavy rains of short duration, usage by animals, and the lack of vegetation have all substantially contributed to the rapid progress of topsoil erosion.

The reconnaissance noted that the entire area south and west of the mountain was once a large-scale irrigated farmland which used natural drainages and artificial means of water catchment. The irrigation and cultivation methods observed during the 1997 season and briefly described below are unique neither for the Jabal Hārūn area nor for the entire region. In fact, remains of extensive terracing and wadi farming installations have already been noted in the area between Şabra and Jabal Hārūn (Lindner 1986:137-138, 140, Fig 2). Furthermore, variations of these methods used both in ancient times and recently can be found in many areas of the semi-arid lands of the Near East and North Africa. However, the

Jabal Hārūn example is particularly interesting, in that it displays an exceptional concentration and intensity of irrigation installations in a relatively limited area, as well as a high level of technological concept, ingenuity in landscape utilization, and a considerable degree of interdependence among the elements of this irrigated farming system. The Jabal Hārūn environs undoubtedly present one of the best preserved examples of such systems in Jordan, if not in the entire region.

Two basic methods of farming evidenced in the Jabal Hārūn environs - slope terracing and wadi farming - have been extensively described before on the basis of examples elsewhere (e.g., Evenari and Koller 1956: 42-43; Hammond 1967: 38-39, Lawlor 1974: 81-85, Mayerson 1962). The terracing method utilizes retaining walls built on the slopes that support horizontal farming zones. The terraces are built in levels from the top to the bottom of the slope, converting the slope into a series of horizontal steps. The terrace walls retard the flow of rainwater and diminish the soil erosion from runoff. Particles of muddy soil floating in water are deposited on the horizontal levels, creating fertile ground for cultivation that is particularly suitable for orchards, groves, and vineyards.

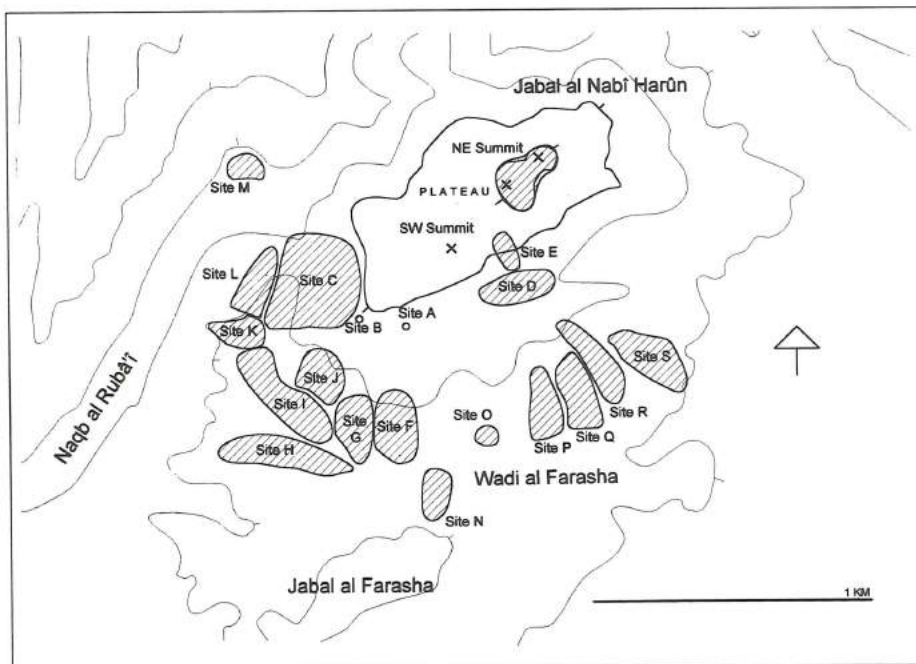
Wadi farming is sometimes combined with the slope terracing method, but it has its own specific dynamics. A particularly informative description of this method was presented with regard to Nabataean-Byzantine irrigation technique in the Negev, where it was conveniently divided into tributary wadi cultivation and main wadi cultivation (Mayerson 1962: 212, 231-246; Figs. 4-6). Tributary wadi cultivation is employed in smaller wadis, ravines, as well as in the larger slope gullies or deep washouts that are often naturally created by runoff water. As the wadis are the natural rainwater drainages, winter rains generate substantial amounts of fast running floodwater

which converges upon the wadis and follows their downstream orientation. The watercourse of a wadi is crossed by stone walls creating small plots of land at different descending levels, which are limited by the sides of the wadi. The walls serve to retard the velocity of rushing water at each level, while allowing for the deposition of fertile mud on the plots of land. Since the walls also raise the level of rushing water, its excess spills over laterally to higher areas along the sides of the wadi or is intentionally diverted there. Since hillslope terracing is not common in the Negev, the walls built across the wadis there were called "terrace walls." Technically, these walls are not dams (although they may look like them) and they often combine the function of terrace wall and check dam (Mayer-son 1962: 233, note 1). To avoid terminological confusion with the retaining walls used in slope terracing, the terms "wadi terrace wall" or "barrage" will be used here. The Negev examples also feature stone walls which run parallel to the course of the wadi, but at varying heights of the slopes. If these turn in, and their ends run down the slope and link up with the wadi terrace-walls, the entire irrigated area of the

wadi is enclosed.

Main wadi cultivation utilizes large wadis, usually being the centers of large catchment areas, and fed by several tributaries or slope gullies. The watercourse of such a wadi is an eroded, often stone-strewn channel which generally runs below the level of the soil-beds to its sides. In this case, rain-water is diverted from the watercourse and directed into terraced soil basins located along the banks of the wadi (Mayerson 1962: 241-246). Ancient barrages and diversion dams, which served to divert water higher up to the basins, are usually very poorly preserved in archaeological records, having been washed away and destroyed.

During the archaeological reconnaissance of the area west and south of the Jabal Hārūn mountain, well-preserved examples of the methods described above were observed. To avoid confusion, the sites described below are designated by alphabetic letters (Fig 6). Only Sites A (tool production station) and B (watch-tower?) represent different categories of archaeological sites in this list. All other sites (C-T) are variations in scale and combinations of slope terracing and tributary wadi cultivation. As such, these sites should be understood as relatively



6. The distribution of archaeological sites (A-T) noted during the 1997 FJHP archaeological reconnaissance of the western and southern environs of the Jabal Hārūn mountain.

large, intensive farming zones with hydraulic installations that border on each other and are often functionally interlocked, rather than as strictly delineated sites. It is less certain whether the main wadi cultivation method was practiced in the area. However, it is probable that Wādī al-Farāsha, the main drainage of the entire southern catchment area, once possessed installations characteristic of this method, especially in its main, southern section, which runs E-W.

In particular, Sites C-L reflect variations of tributary wadi cultivation, sometimes combined with slope terracing, based upon small tributary wadis of the Wādī al-Farāsha or upon deep gullies in the slope of the Jabal Hārūn mountain that also converge on that wadi. Considerable concentrations of fine alluvial deposits - silt, sand and mud - are much in evidence in the small, artificial fields created by the wadi terrace walls. In some cases these layers can reach a thickness of 5 m. Sites P-S are characterized by the predominance of slope terracing. The southern and southeastern gentle, lower slopes of the mountain would have provided a maximum of exposure to the sun, particularly conducive to the cultivation of spe-



7. The system of wadi terrace walls, as preserved at Site C (photo by Jan Vihonen).

cific crops there, even of horticulture or viticulture.

Site C appears as the most developed and best preserved example of tributary wadi cultivation. The area includes what appears to be the northernmost end of the main wadi itself. Two natural drainage gullies on the western slope of the mountain are cut by a series of barrages that are connected to the adjacent slope terraces. The main part of the system, which uses the bed of the Wādī al-Farāsha, includes at least 24 wadi terrace-walls³ that created wide farming plateaus across the wadi course (Fig 7). An oval area partially surrounded by poorly preserved low walls exists at the northern extremity of the wadi. This seems to be a main catchment area for the rainwater from the western slope of the Jabal Hārūn, which then was directed downstream in the wadi. The northwestern hills contain small tributaries of the Wādī al-Farāsha, one of which has at least 6 barrages. There are remains of stone structures on the tops and slopes of the hills and hillocks which flank the Wādī al-Farāsha. Some may be threshing floors, and others shelters. Concentrations of sherds (mainly Nabataean and Byzantine) and some lithics were noted in the area. The continuation of Site C in the SE direction of the Wādī al-Farāsha is Site I.

No clearly defined habitation sites, either isolated dwellings or small farmsteads, were observed during the reconnaissance. A great number of caves of various sizes exist in the area, but most of them are "half-caves", that is, shallow rockshelters not suitable for occupation because of their small size, poor accessibility, or for topographical reasons. The caves visited during the 1997 season did not possess soil layers which could contain any cultural material. However, there are still some larger caves in the area which were certainly used for habitation during various periods, but these were not explored

3. Together with the adjacent Site I.

during the reconnaissance.

Preliminary Conclusions

The earliest periods of human occupation in the area are difficult to discern, yet these left some tangible remains behind. The amount of lithic tools and refuse observed during the reconnaissance is considerable and points to human presence there during prehistoric periods. Prehistoric sites might have been located on the lower slopes of the Jabal Hārūn mountain, where numerous caves and rock-shelters exist, as well as in zones close to the banks of the Wādī al-Farāsha. Some of these find concentrations indicate only short-term human occupancy, but others may represent remains of more permanent habitation. However, no clearly defined dwelling site has been located, which may be due either to erosion and accumulation processes that either washed away or hid the site, or to the non-systematic character of the reconnaissance. The resources for tool production are easily available in the area. Flint and chert pebbles and nodules were sometimes visible in the bedrock but were even more often scattered on the soil surface. A variety of tools – scrapers, retouched blades, burins, points, “saws,” “knives,” borers and fragments of arrowheads—were noted. Some notched and denticulated implements, as well as micro-liths, were also found. On the basis of a rough evaluation of the flint and chert material, it seems probable that there was Middle Palaeolithic occupation in the area, exemplified by Levallois-technique tools, as well as Epipaleolithic occupation. Furthermore, fragments of some arrowheads and tools may indicate the presence of the Aceramic Neolithic and Neolithic industries, which are otherwise well-attested in the Petra area (e.g., Gebel 1986). On the plateau which contains the ruins of the monastery, only a thin layer of soil covers the sandstone bedrock. However, prominent concentrations of flint and chert tools and

flakes were encountered there. The most considerable flint and chert clusters were observed on the southern and eastern side of the monastery. Other lithic material, such as fragments of polished stone utensils or assemblages of ornaments, were found in comparatively small quantities.

More uncertain is the evidence for pre-Classical habitation in the area. Some of the sherds noted in the environs of Jabal Hārūn possibly date to the Bronze or Iron Ages. There is no doubt, however, that the Jabal Hārūn area was inhabited during the Nabataean period. The impressive array of rain-water catchment installations which were found in the area, such as barrages, terraces and dams, may easily date to that period. Close parallels for such installations can be found in the al-Bayḍā area, although not on such an extensive scale when compared with the size of the area under cultivation. Slope terracing is also well evidenced in the area of the Wādī al-Ḥasa. The extensive waterworks and cultivation installations known from the Negev and comparable to the examples from the Jabal Hārūn area are considered to have been built when the region was most intensively inhabited and exploited during the Nabataean and Byzantine periods (Mayerson 1962: 232).

The nature of the farming activities in the area is worth further investigation. The intensive farming zones discerned during the reconnaissance appear as one large-scale complex, probably interconnected to utilize the natural resources to the maximum. The size and the obvious relationships between the installations in the adjacent zones may suggest large project under common administration and management. The possibility of a large estate, possibly royal, should not be excluded. The Nabataean remains on top of the Jabal Hārūn do not appear to be extensive and are primarily represented by the ceramics. However, it is possible that Site 1 could have developed in some form already in Nabataean times, per-

haps as a residential and/or administrative structure. The origins of the structures at the top of the southwestern peak may date to the Nabataean period as well; and that location would be particularly suitable for a large watchtower. On the other hand, small-scale supportive installations, such as storage facilities, threshing floors, cisterns, watchtowers, etc., probably exist in the area around the mountain and on the lower ground.

At any rate, it is evident that the area of Jabal Hārūn should be understood as a significant part of the agricultural hinterland that supported the existence of a large urban population at Petra and caravans of traders. Equally important is the understanding of the significance of the Jabal Hārūn area within the local settlement pattern in the entire area south of Petra, in which not only the settlement in Şabra but also the major southern caravan trails would seem to have played prominent role (see Zayadine 1992 for discussion).

One expects that the intensive farming in the environs of the mountain continued throughout the Roman period. However, the Byzantine period was definitely another period of extensive use of the mountain and the environs. There is little doubt that Site 1 was either built as or later converted/modified to be used as a monastic establishment. The marble fragments found in association with Sites 1 and 7 indicate furniture usually associated with a Byzantine church. It is most plausible to think that in addition to a chapel or a small church which existed within the limits of the monastery located on the plateau, a church was also built on the top of the southwestern peak of the NE summit, as already postulated by earlier explorers. The monastery apparently continued the economic activities in the area already initiated during the previous periods. If the irrigation farming installations were not built in Nabataean times, they were certainly constructed during the By-

zantine period. More probably, they were continuously used and maintained from the Nabataean period on through the Byzantine period. This economic relationship between monastery and attendant farming installations located in a mountainous environment may find its best parallels in the Byzantine monasteries located in the high terrain of southern and eastern Sinai and in some areas of the Judaeen Desert (e.g., Finkelstein 1985; Hirschfeld 1992). The economic standing of the monastery would also have been enhanced by the pilgrimages and pious donations. The archaeological evidence for pilgrimages is not abundant, yet it is convincing and includes the already published short inscriptions, crosses and outlines of pilgrims' feet. While no new evidence for pilgrimages was found during the 1997 FJHP season, the already known examples were noted, especially in the area of the south-eastern approach to the mountain.

The written sources indicate that the monastery appears to have continued its existence at least up to the time of the Crusaders. Ceramics from the Islamic period were indeed found in the area. One may also assume that agricultural production also continued in the area, although perhaps not on the same scale. The time-period of the demise of permanent habitation of Jabal Hārūn will have to be established through archaeological excavations. Low-level farming activities in the area appear to have been continued in one form or another, and local informants possess a substantial knowledge of the agricultural exploitation of the area in the past 80 years. Comparative information from the Negev indicates that wadi farming methods continued to be used by the local Bedouin population there, as exemplified by the repair of the ancient installations, overlaying them with new ones, or constructing new installations fashioned after the ancient ones (Mayerson 1962: 232).

Future Research and Fieldwork of the FJHP

The archaeological reconnaissance has largely confirmed the historical interpretation of the area previously offered by scholars, but the results of the 1997 season allow more comprehensive statements concerning the past utilization of the area than before. The major new element in the interpretation concerns the evidence for the subsistence strategy pursued by the ancient inhabitants of the area. The ancient habitation of Jabal Hārūn should undoubtedly be understood in close connection with the extensive irrigation-enhanced farming in the western and southern environs of the mountain. The 1997 fieldwork of the FJHP has also substantially contributed to a better formulation of the research questions previously posed. At the present, the goals of the project may be fully defined in the following terms:

- 1- the nature of human occupation and its spatial and temporal variations in the area of Jabal Hārūn mountain throughout the ages, with special emphasis on the extent and nature of occupation at the site situated on the plateau of the mountain and recognized as a Byzantine monastery;
- 2- the patterns of human adaptation in the area, that is the techno-economic aspects of land utilization, including studies on ancient agriculture and resource exploitation;
- 3- the significance of the Jabal Hārūn area in a larger historical perspective, including especially the relationship of the site with Petra during the Nabataean through the Islamic periods.

These research goals will be addressed in a series of post-fieldwork seasonal reports to be submitted to the Department of Antiquities of Jordan and its annual publication. The final comprehensive publication of the project will be completed after the conclusion of the 5 years of fieldwork. Si-

multaneously, the non-research objectives of the project include the preservation of the monastery site, in terms of both its structural and artifactual remains, as well as the protection and presentation of the site for future researchers and visitors. To properly address all research questions and to fulfill all proposed objectives, the project will utilize the following multi-disciplinary means, understood in terms of methods, personnel, and equipment.

- Archaeological study and fieldwork* will include selective excavations of the monastery site, test excavations of other structures and installations on the top of the plateau and in the area around the mountain, a total survey of the environs of the area, the analysis of the recovered data, and the preparation of the cultural history-oriented synthesis of the project.
- Cartographic research and fieldwork* will be concerned with the preparation of visual locational tools needed in archaeological analysis (environs and site maps, 3-D computer-generated models), the creation of site ground-plans prior to and during the fieldwork, and the preparation of an operational computerized database for storing all archaeological data.
- Architectural and historical studies* will concentrate on the uncovered architectural entities at the monastery site. The studies will include the general layout, the construction methods, and the known structural and functional parallels. Architects will also study the issues related to the landscape architecture, that is, relationships between the terrain and human-made structures. The historical research will be continued in order to find further information concerning Jabal Hārūn derived from written sources, including the Petra Papyri. Additionally, it will include studies of any new epigraphic material to be found.
- *Ecological studies* will include research related to the natural environment of the area, that is geomorphology, soils, rainfall

patterns, natural water-catchment areas, fauna and flora of the area, and natural resources - all with reference to past and present natural conditions. Studies will also be undertaken to better understand the irrigation and cultivation installations in the wadis in terms of actual food production. To this end, the project will also pursue comparative studies of parallel ethnographic examples of village-level hydraulic agriculture and statistical studies on the average yield from fields of particular size will be among the ecological studies undertaken in connection with the project.

- *Conservation of the site* will be carried out to preserve and protect not only all artifacts and features that will need special attention during and after the fieldwork; also, comprehensive site protection and presentation plan will be undertaken after the end of the project.

Acknowledgements

The funding for the project was provided

by a grant from the Emil Aaltonen Foundation, Finland. The project is particularly grateful to Dr Ghazi Bisheh, Director-General of the Department of Antiquities of Jordan, for granting the permission to conduct the fieldwork, and for valuable advice and encouragement.

Among the many individuals who aided the project, Dr Pierre M. Bikai, Director of the American Center of Oriental Research in Jordan, is to be thanked for providing living quarters at ACOR during the the team's stay in Amman. Thanks and gratitude are also offered to Mr. Dakhilallah Qublan for his hospitality during the team's stay in Umm Şayhūn, and to the people of Umm Şayhūn for help and advice.

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Bibliography

- Evenari, M. and Koller, D.
1956 Ancient Masters of the Desert. *SA* 194(4): 39-45.
- Fiema, Z. T., Schick, R. and 'Amr, Kh.
1995 The Petra Church Project 1992-1994. Interim Report. Pp. 289-303 in J. Humphrey (ed.), *The Roman and Byzantine Near East: Some Recent Archaeological Research*. *JRA* Sup. Ser.14. Ann Arbor.
- Finkelstein, I.
1985 Byzantine Monastic Remains in Southern Sinai, with a Contribution by Asher Ovadia on Greek Inscriptions in Deir Rumhan, Sinai. *Dumbarton Oaks Papers* 39: 39-80.
- Frösén, J. and Fiema, Z. T.
1994 The Petra Papyri. *ACOR Newsletter* 6.2:1-3.
- Gebel, H. G.
1986 Die Jungsteinzeit im Petra-Gebiet. Pp. 273-308 in M. Lindner (ed.), *Petra. Neue Ausgrabungen und Entdeckungen*. München.
- Hammond, P.C.
1967 Desert Waterworks of the Ancient Nabataeans. *Natural History* 76(6): 37-43.
- Hirschfeld, Y.
1992 *The Judean Desert Monasteries in the Byzantine Period*. New Haven and London.

ADAJ XLII (1998)

- Negev, A.
1973 The Staircase-Tower in Nabatean Architecture. *RB* 80: 13-28.
- Koenen, L.
1996 The Carbonized Archive from Petra. *JRA* 9: 177-188.
- Lawlor, J.
1974 *The Nabataeans in Historical Perspective*. Grand Rapids.
- Lindner, M.
1986 Archäologische Erkundungen in der Petra-Region 1982-1984. Pp. 87-188 in M. Lindner (ed.), *Petra. Neue Ausgrabungen und Entdeckungen*. München.
- Mayerson, Ph.
1962 The Ancient Agricultural Regime of Nessana and the Central Negeb. Pp. 211-269 in *Excavations at Nessana*, Vol. 1. H. Dunscombe Colt. London.
- Peterman, G.L. and Schick, R.
1996 The Monastery of Saint Aaron. *ADAJ* 40: 473-480.
- Zayadine, F.
1992 L'espace urbain du Grand Pétra. Les routes et les stations caravanères. *ADAJ* 36: 217-39.

THE PETRA NATIONAL TRUST SITE PROJECTS
ARCHAEOLOGICAL SURVEY OF THE WĀDĪ MŪSĀ WATER
SUPPLY AND WASTEWATER PROJECT AREA

by

Khairieh 'Amr, Ahmed al-Momani, Suleiman Farajat and Hani Falahat

Introduction

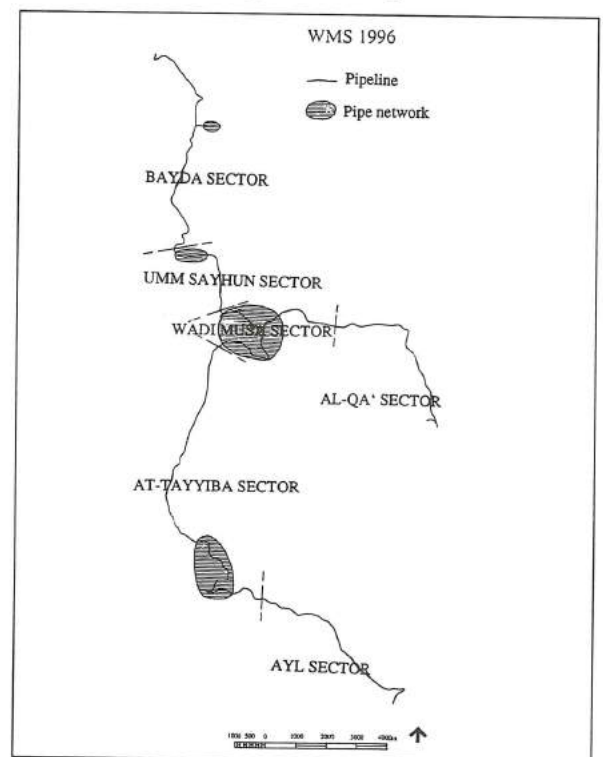
On 22 October 1996, the agreement for the "Archaeological Services for the Wadi Mousa Water Supply and Wastewater Project" was signed between Camp Dresser and McKee International Inc. (CDM) and the Petra National Trust (PNT)¹ as part of the environmental impact study of the region. Plans for the project were prepared by CDM in association with Associated Consulting Engineers (ACE), under contract from the Water Authority of Jordan with funding from USAID.

The field work was carried out on 23 October - 16 November 1996. The project site personnel were Khairieh 'Amr, Suleiman Farajat, Ahmed al-Momani and Hani Falahat of the Department of Antiquities of Jordan, along with Eng. Ma'an Al-Huneidi (Engineering Consultant) and Eng. Munther Kharouf (Project Engineer) of Middle East Consulting Engineers (MeeM).

Due to the extent of the area covered by the Wādī Mūsā Water Supply and Wastewater Project, and the relatively short time period assigned for the archaeological survey, it was decided to split the archaeological team into two groups working simultaneously at different sites whenever possible. This strategy implies that the sur-

vey could not use sequential numbers for the recorded archaeological sites. Thus it was decided to divide the area of the project into sectors, starting with Baydā in the north, then Umm Şayhūn, Wādī Mūsā, aṭ-Ṭayyiba, Ayl and al-Qā' (Fig. 1).

The archaeological survey was restricted



1. Archaeological Survey of the Wādī Mūsā Water Supply and Wastewater Project Area (WMS 1996): routes and sectors of the survey.

1. Tender named: *Wadi Mousa Water Supply and Wastewater Project, Stage II - Tender: CDM-002 Wadi Mousa Archaeological Studies*. The original report, dated 8 December 1996 ('Amr *et al.* 1996) was divided into three main sections: 1. The main stations (treatment plant, reservoirs and pump stations); 2. the routes between towns/ villages; and 3. inside towns/ villages. This division was dictated by the nature of engineering work to be carried out at the different locations and its consequences on existing archaeological remains. General recommendations and mitigation mea-

asures were given for each section, as well as specific recommendations for the vicinity of each archaeological site. Additionally, as the project covers varying terrain, it was found that different sectors within each section needed specific recommendations. These recommended mitigation measures are omitted from this paper. The original report also has much more extensive documentation of the sites in the form of photographs and drawings, many of which could not be included in this paper due to space constraints.

to the proposed route of pipelines and adjacent areas that may be affected by the movement of machinery, dumping or quarrying. Please note that where only one set of UTM coordinates are given for a site, they denote the approximate centre of that site. The Jordan Antiquities Database and Information System (JADIS, see Palumbo 1994a; Palumbo *et al.* 1995) was extensively consulted during the archaeological survey.

One outstanding result of the archaeological survey is the large number of flint sites discovered. The major Neolithic sites of Bayḍā, Ba'ja and Baṣṭa are in close proximity to the survey area (see for example Kirkbride 1966; Lindner 1986; Nissen *et al.* 1987; 1991; Byrd 1988; 1989; Gebel *et al.* 1988; Bienert and Gebel 1997), while several other Palaeolithic, Epipalaeolithic and Neolithic sites may be found in the area between the plateau and Wādī 'Arabah to the west (Gebel 1985; 1988; Schyle and Uerpmann 1988). Although we realise the difficulty in dating flint sites using only a few artifacts, it was decided to only do small flint collections from the discovered sites in order not to deflate them, thus indicating their presence for future research.

Another noticeable result is the absence of Bronze Age sites. This may be due to our failure to identify the local pottery production, as no sherds readily identifiable as "Bronze Age" were noted at any of the sites. Some of the sherds identified in this report as Late Islamic do have Early Bronze Age forms. Their assignment to the Late Islamic is based on the ware, as well as the proliferation of identifiable Late Islamic material at the sites. This assignment was further confirmed by the finds from the excavation at Khirbat an-Nawāfla in 1997 (site Wadi Musa 9, 'Amr and al-Momani 1998), where identical pottery forms were recovered from Late Islamic contexts.

A final note is on the seemingly rare occurrence of "Roman" identifications. This is

due to the fact that the Nabataean tradition of pottery production continued well after the Roman annexation of the Nabataean kingdom. Even the "Classical" Nabataean pottery was produced in the second century AD, and the coarser wares of third century southern Jordan were also of a pure Nabataean character (see 'Amr 1994; Schmid 1995). Thus the term "Nabataean" in this report is a cultural as well as a chronological identification.

LIST OF SITES

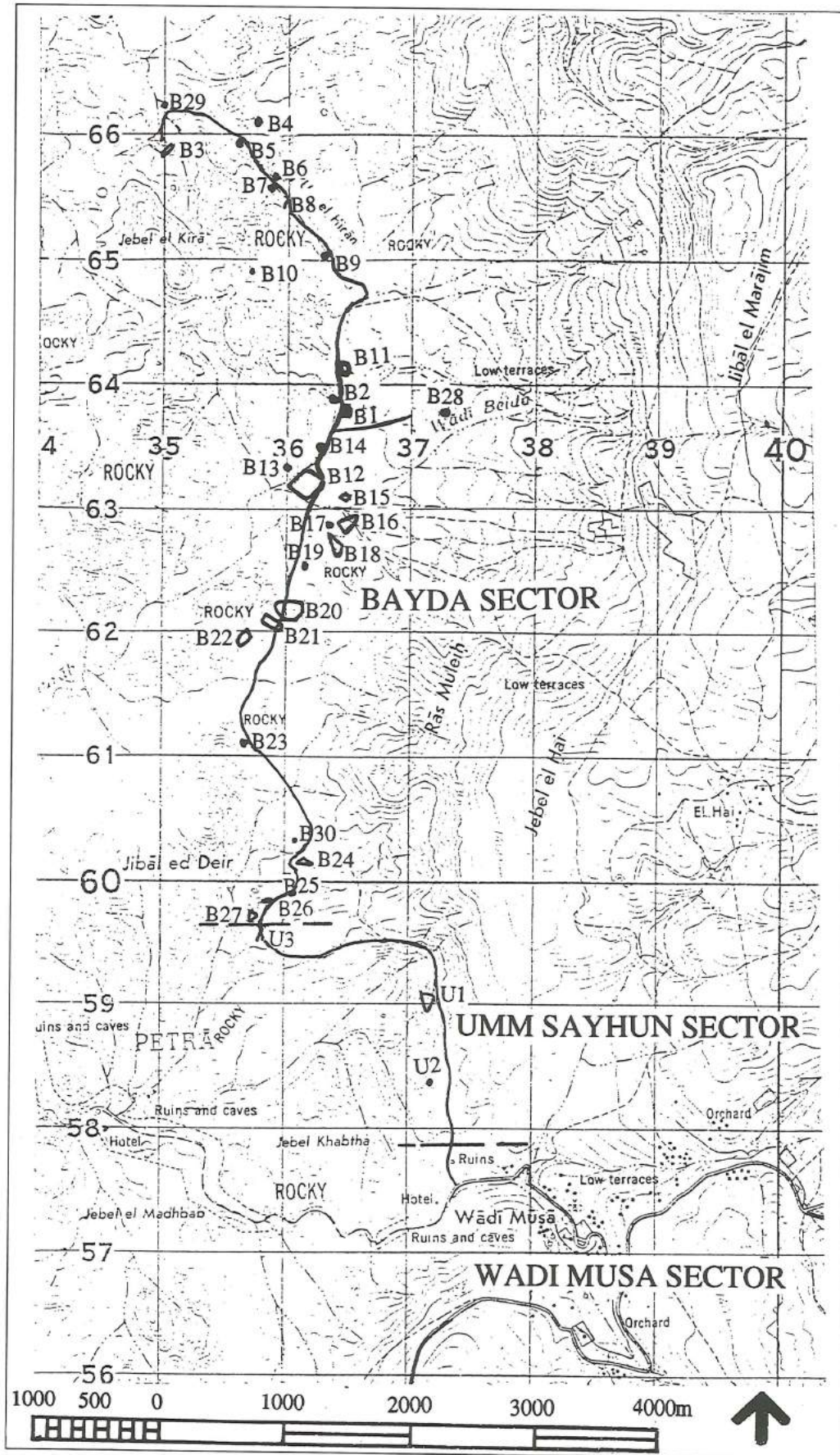
1. The Bayḍa Sector (Fig. 2)

The Bayḍa sector encompasses the whole area from Siq Umm al-Ḥirān (the proposed location for the wastewater treatment plant) to Umm Ṣayḥūn (through Bayḍa). This is dictated by the nature of the area, which is characterized by sandstone outcrops and intensive agricultural use (both modern and ancient). Much of this area – that to the west of the main road – is also within the boundaries of the Petra National Park. Additionally, there are numerous agricultural terraces along the route that were noted but not recorded in this survey. It is important to keep in mind that this area was a major agricultural suburb of Petra, and on a main caravan route, therefore the whole area is actually a large archaeological site. The recorded archaeological sites during this survey merely represent the main outstanding features along the proposed route for the pipelines.

Bayda 1

UTM coordinates: 736435E; 3363715N - 736497E; 3363721N-736440E; 3363754N.
Altitude: 1077.2 - 1087.9m.

A low hill of sandy soil and sandstone outcrops in the east. Characterized by the concentration of stones on the surface, including slopes. A dense scatter of flint tools and pottery sherds was noted at the surface, but no wall lines other than a few remnants



2. WMS 1996: Recorded archaeological sites in the Baydā and Umm Şayhūn sectors (ref. map Jordan 1:50,000 Petra 30501 K737).

of thin terrace walls at the west edge. One robbers pit in the northwestern section revealed stones that seem to form a wall. The site is also cut by the modern road at its western edge.

Dating: Neolithic; Nabataean, Roman, Late Roman/Early Byzantine (first to fourth centuries AD).

Bayda 2

UTM coordinates: 736388E; 3363867N - 736351E; 3363832N.

Altitude: 1075.6 - 1078.8m.

A complex area of rock-cut installations on the east face of sandstone outcrops. Including a wine press, staircases, several square cuts, niches and a facade with a partially buried entrance. No pottery sherds or flint tools were noted at the site.

Dating: Nabataean.

Bayda 3

UTM coordinates: 735084E; 3365798N - 735017E; 3365820N-734983E; 3365767N.

Altitude: 1042.5 - 1049.5m.

Agricultural terrace walls built of unhewn medium-sized field stones. Several terraces form series along side wadis. One terrace wall in the north had been added to (buttressed) during several phases, resulting in a substantially wide wall. Some sections of the walls are damaged by water courses. A few Nabataean pottery body sherds were noted at the site.

Dating: Nabataean (?), reused in modern times.

Bayda 4

UTM coordinates: 735731E; 3366064N.

Altitude: 1054.5m.

Dimensions:- Main press basin 3.70m E-W x 4m N-S; connection: 1m x 1m; sieve: 1.30m E-W x 1.10m N-S (actual orientation 60°).

A rock-cut wine press, with an almost

square main basin and smaller "sieve", with a square connection. There is also a round pole hole (for the pressing column) to the east of the main basin (for the different types of rock-cut wine presses see Melhem 1995). Located on a flat sandstone outcrop. Currently used as a water reservoir.

Dating: Nabataean. One Late Islamic sherd was also collected from the site.

Bayda 5

UTM coordinates: 735582E; 3365917N.

Altitude: 1050.6m.

Dimensions:- Opening~0.70m wide; channel: 11m long.

A rock-cut underground cistern, with small opening and horizontal rock-cut channel to the south of the opening. It is currently filled up with silt so internal configuration could not be determined. Located at the bottom of a large rock outcrop. No pottery was noted in the vicinity.

Dating: Nabataean.

Bayda 6

UTM coordinates: 735863E; 3365645N.

Altitude: 1066.1m.

Dimensions:- Rock: 22m N-S x 9m E-W; main basin 2.50m N-S x 2.70m E-W; inlet in the south: 0.50m wide; rounded sieve in the east: 1.10m N-S x 0.80m E-W (actual orientation 40°).

A rock-cut wine press on a small rock outcrop. Almost square basin with a "sieve" in the east. Inlet in the southeast corner of the basin. Remnants of rough hydraulic mortar on the interior. In the south edge of the rock outcrop, there is a rock-cut channel 50-70cm wide. The rock is in an area with several ancient terraces. There are also remnants of wadi barriers to the west. Scarce pottery sherd scatter was noted at the site.

Dating: Nabataean.

Bayda 7

UTM coordinates: 735864E; 3365551N.

Altitude: 1076.1m.

A rock-cut chamber at the top of a sandstone outcrop, with rock-cut steps leading up to the chamber. The steps and chamber are badly weathered. Scarce pottery sherd scatter at the site.

Dating: Nabataean.

Bayda 8

UTM coordinates: 735936E; 3365401N - 735961E; 3365466N.

Altitude: 1077.5 - 1079.9m.

Dimensions: Length ~30m.

A collection of well-preserved Nabataean inscriptions (16 were noted), most starting with the word "*salām*", indicating they are graffiti left by people passing by. Located on a protected part of a rock face, several metres above the current track level, one inscription being on the floor of the ledge.

Dating: Nabataean.

Bayda 9

UTM coordinates: 736294E; 3365043N.

Altitude: 1092.0m.

Rock carving on a steep rock face, representing two large obelisks in relief on a base. There is a carved inscription on the base and another inscription painted in red above the obelisks (Lindner 1986; Zayadine 1994: 497). There is also a carved niche with small idols in the lower left and a badly weathered carved idol in the upper right of the relief. The carvings are disfigured by modern graffiti.

Dating: Nabataean.

Bayda 10

UTM coordinates: 735683E; 3364883N.

Altitude: 1124.9m.

Dimensions: 7 x 7m (actual orientation 0°)

A small square structure of medium to large

unhewn stone blocks, probably a watch tower, with one to two courses showing above ground level. Located on a hill top, within a modern agricultural field and directly to the west of a branch dirt track. Pottery sherd scatter noted at the site.

Dating: Nabataean (first to second centuries AD), Late Islamic.

Bayda 11 (Khirbat an-Naq'a)

UTM coordinates: 736402E; 3364159N - 736447E; 3364167N-736387E; 3364101N - 736432E; 3364050N-736464E; 3364092N - 736428E; 3364115N.

Altitude: 1084.0 - 1099.6m.

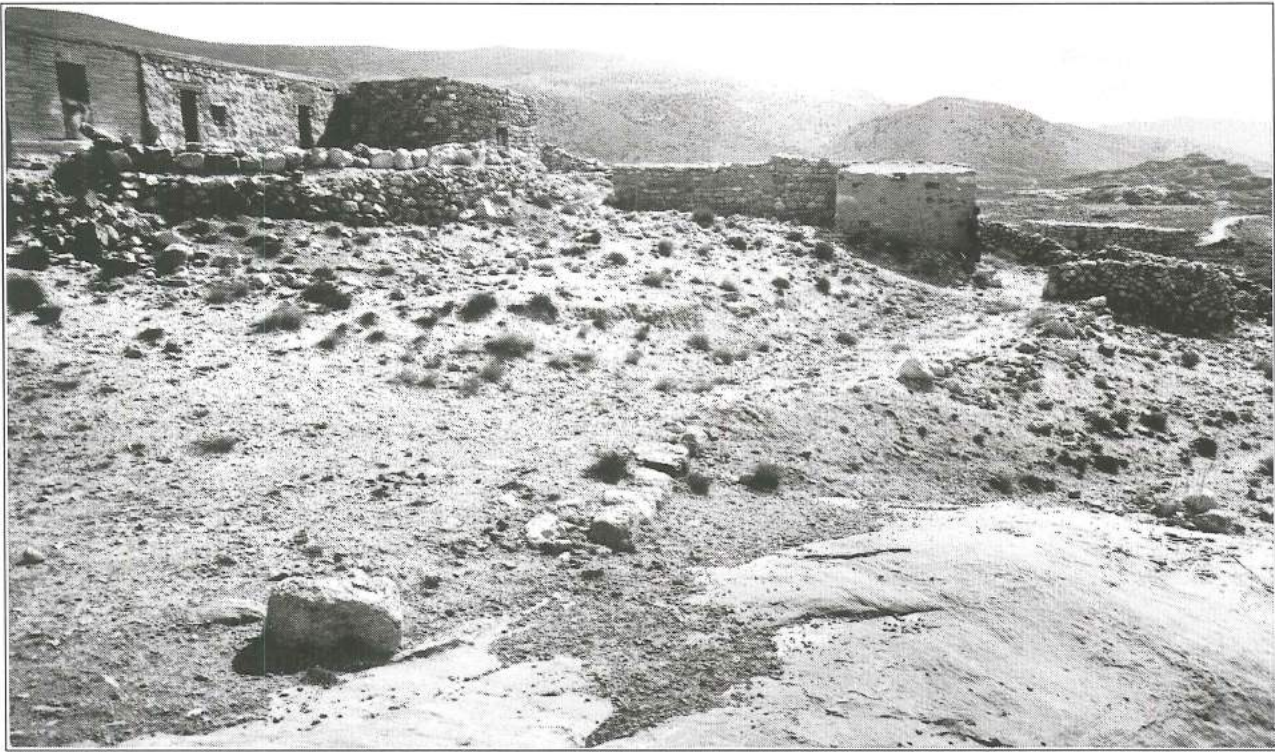
JADIS site 1997.011 (Musil 1908: 220; Glueck 1935: 87 Site 137). An ancient site, most of which is currently occupied by a modern (traditional) village. Ancient wall lines are apparent at the surface to the north and south of the modern village (Fig. 3). Located on a low hill to the east of the modern road. Directly to the north of the village, there is an elaborate rock-cut wine press on a sandstone outcrop. The press consists of a square basin in the north with three steps and a pole hole, a sieve in the south then a deep round collection tank (with five steps in the west), and another pole hole.

Dating:- Village: Nabataean (first and second centuries AD), Byzantine (fourth to sixth centuries AD), Late Islamic;-press: Nabataean.

[JADIS site 1997.046, an unfinished Nabataean facade between Khirbat an-Naq'a and Khirbat Bayḍa, was found to be located well to the west of the main road and protected by a deep intervening wadi. Therefore it was not recorded in this survey].

Bayda 12 (Khirbat Bayḍa/Umm Quṣṣa)

UTM coordinates: 736285E; 3363195N - 736161E; 3363037N-735998E; 3363163N-736186E; 3363302N.



3. WMS 1996 site Baydā 11 (Khirbat an-Naq'a): view from the north showing partially buried ancient walls and some of the traditional houses on the mound.

Altitude: 1047.6 - 1067.9m.

JADIS site 1997.037 (Banning and Köhler-Rollefson 1983: 381 Site 30; Zayadine and Farajat 1991: 281-282, pl. V). An extensive area of rock-cut installations, including quarries, several cisterns (both open and roofed), a large pool in the south, one large triclinium in the southeast, rock carvings representing animals and Nabataean graffiti, and numerous steps and channels. Located on several sandstone outcrops directly to the east of Siq al-Bārid. A modern cemetery is located in the southwest corner of the site. Abundant flint and pottery sherd scatter was noted at the site (Fig. 4).

Dating: Neolithic, Chalcolithic (?); Nabataean (predominant, date of most of the rock-cut installations), Roman, Early and Late Byzantine (first century BC to sixth AD); Late Islamic.

Bayda 13 (Bi'r al-'Arāyis)

UTM coordinates: 735999E; 3363331N.
Altitude: 1058.8m.

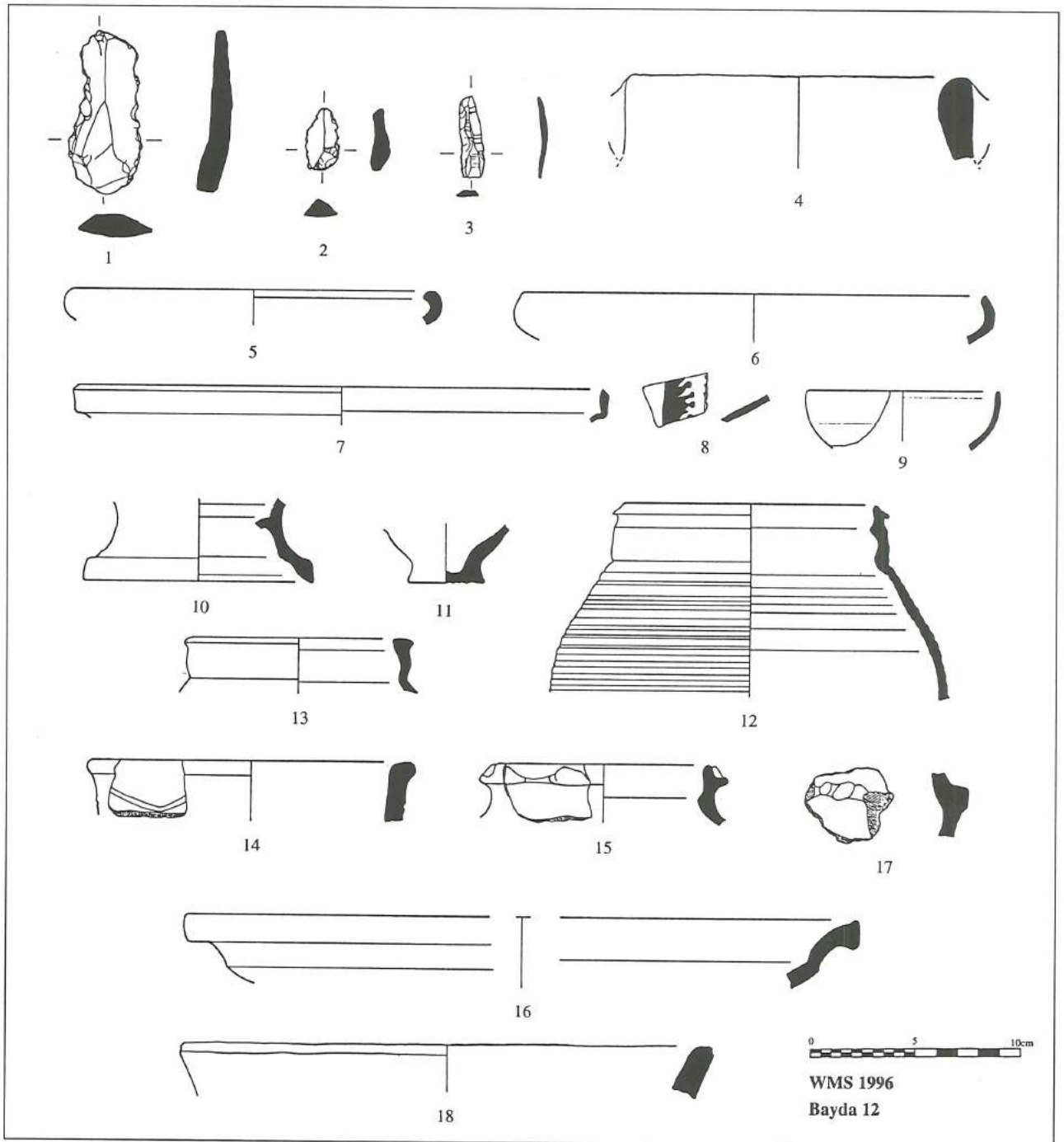
A large rock-cut cistern with three internal divisions. Remnants of a staircase leading from the opening to the bottom are currently reconstructed with concrete. The opening also has a concrete facade (cistern was dry when visited but it is usually used by local people, it was recently cleaned by the Department of Antiquities and detailed drawings for restoration were done by M. Sha'ar and Z. Aslan). There is also a large channel leading to the cistern from the top of the sandstone outcrop. Located on the southern cliff face of a large sandstone outcrop, directly to the east of Siq al-Bārid.

Dating: Nabataean.

Bayda 14

UTM coordinates: 736234E; 3363444N - 736285E; 3363423N-736302E; 3363489N.
Altitude: 1063.3 - 1065.2m.
Dimensions: Total preserved length 64.50m.

A large dam or wadi barrier, of two sections built against a small rock outcrop. The pre-



4. WMS 1996 site Bayda 12 (Khirbat Baydā/ Umm Quṣṣa) flint and pottery (drawn by A. al-Momani and L. Mo-hamadieh): 1. Blade fragment, grey; 2. borer, grey with extensive hydration; 3. sickle blade, light grey; 4. jar, red with wide grey core, abundant mineral and grog inclusions, very rough, Chalcolithic(?); 5. bowl, yellowish pink ware, Nabataean late 2nd-early 1st cent. BC; 6. bowl, fine light red ware, Nabataean 1st cent. BC- early 1st AD; 7. bowl, fine red ware, Nabataean 1st cent. AD; 8. bowl, fine red ware, red paint, Nabataean 1st cent. AD; 9. bowl, fine red ware with light grey ext. rim, Nabataean early 1st cent. AD; 10. base, fine red ware, Nabataean 1st-early 2nd cent. AD; 11. string-cut base, red ware with light grey core, thin cream slip ext., abundant sand inclusions, Nabataean 2nd cent. AD; 12. cooking pot, red ware. thin cream slip ext., many mineral inclusions, Nabataean 2nd cent. AD; 13. cooking pot, red ware, thin cream slip ext., sand inclusions, Late Nabataean 3rd-early 4th cent. AD; 14. jar, incised decoration, red ware with abundant sand inclusions, Byzantine 5th-6th cent. AD; 15. jar, thumb impressed decoration, red ware, light grey slip ext., Late Roman/ Early Byzantine 4th cent. AD; 16. "Late Roman Red" bowl, 4th cent. AD; 17. body sherd, impressed rope decoration, red ware with very wide grey core, abundant chaff impressions, Late Islamic; 18. jar, red ware with very wide grey core, burnished red slip, abundant chaff impressions, Late Islamic.

served part of the east section is 47m long (oriented at 100°), and 2.5m wide, with the anchorage cuts against the rock outcrop having remnants of mortar. This section is built with well cut sandstone blocks, some of which have oblique Nabataean trimming. The west section is 9.5m long (15m long if anchorage cuts on rock are considered, oriented at 55°), built of relatively small unhewn stone blocks. There is also a rock-cut channel to the south of the structure. Located across a flat area – currently an agricultural field directly to the west of the modern asphalt road – with high sandstone outcrop to the west, to the east of Siq al-Bārid. Badly eroded by several water courses and disturbed by agricultural field.

Dating: Nabataean.

Bayda 15

UTM coordinates: 736412E; 3363069N - 736461E; 3363010N-736450E; 3363099N - 736487E; 3363135N.

Altitude: 1067.3 - 1087.8m.

A complex system of rock-cut channels and cisterns. Located on several sandstone outcrops among agricultural fields, to the east of the main asphalt road. In the southern rock outcrops, natural depressions were used as water collecting areas, with channels leading into them. Rock-cut “steps” are anchorage areas for masonry walls, few remains of which can still be seen. The northern rock outcrops have remnants of five partially rock-cut cisterns that were roofed in antiquity, with the walls having niches for arch supports, one cistern has remains of an arch springer cut in the rock. Most cisterns still have remains of hydraulic mortar. There are also many wall lines in the surrounding fields. Abundant flint and pottery sherd scatter was noted at the site.

Dating: Neolithic (?), Chalcolithic (?), Nabataean (date for rock-cut hydraulic system, first and second centuries AD), Byzantine

(fifth and sixth centuries AD), Late Islamic.

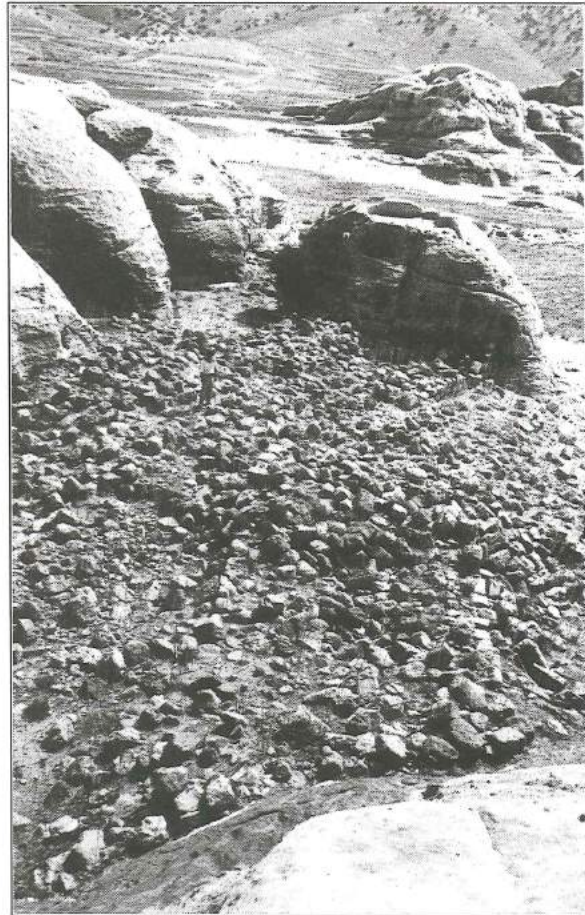
Bayda 16

UTM coordinates: 736546E; 3362943N - 736503E; 3362802N-736433E; 3362792N - 736381E; 3362873N.

Altitude: 1073.5 - 1088.5m.

A complex site with many structures built of medium sized stone blocks, some showing to a height of two to three courses above ground level. Located on a low hill with several sandstone outcrops. In the southern end, two sandstone outcrops have rock-cut installations (sacred high places ?); the rock outcrop in the southeast also has an area for water collection from a channel cut around the rock and several pot holes cut in a line along the side (Fig. 5).

Directly to the north of the built area, two sandstone outcrops also have rock-cut in-



5. WMS 1996 site Bayda 16: walls in the southern part of the site, and sandstone outcrop with rock-cut features.

stallations, the northern of which has two wine presses, several rectangular basins, and a cave below with an opening at the top (unlikely to be a collection tank as it has an entrance on the west side of the outcrop).

The main built site and rock outcrops are within an area of terraced agricultural fields. The "*khirba*" and the press are approximately 60m to the east of the main asphalt road. Ancient wall lines are abundant in the fields and some of them are showing in sections of water courses (wadi cuts).

Dating: Neolithic (?); Nabataean, Roman, Byzantine (second to fifth centuries AD).

Bayda 17

UTM coordinates: 736326E; 3362817N.

Altitude: 1062.3m.

Dimensions:- Height: 3.00m; width of base 0.90m.

An obelisk on a base, cut in relief on the west face of a sandstone outcrop. No apparent inscription. The obelisk is situated to the south of Bayda 16, approximately 25m to the east of the main road. There is a recent small robbers pit next to the face of the rock.

Dating: Nabataean.

Bayda 18

UTM coordinates: 736311E; 3362817N - 736428E; 3362634N-736428E; 3362669N - 736411E; 3362564N.

Altitude: 1058.3 - 1087.0m.

Dimensions:- Cistern: 30m E-W x 20m N-S. A hydraulic catchment area distributed among several sandstone outcrops. The area is accessed from the west through a small gorge, currently also leading into a small picnic area with concrete tables and benches. The site is to the east of the main road. The most outstanding feature is a natural depression between the rocks in the north adapted to form a large cistern, with a channel leading to it from the east. The southern (rock) wall of the cistern has steps and nich-

es cut into it (on the outer face). There are also two rock-cut chambers to the south of the cistern, one of which is currently blocked – except for a small opening – by a cement breeze block structure. There may also be another cistern to the west of the gorge entrance, the outline of which is currently obliterated by a modern agricultural field. A scarce sherd scatter was noted at the site.

Dating: Nabataean.

Bayda 19

UTM coordinates: 736129E; 3362406N.

Altitude: 1050.6m.

Rock-cut installations among sandstone outcrops, including a small triclinium with a round "wash basin" to the right of the entrance and a weathered cultic niche to the left. The triclinium is currently used for storing straw. The northern face of the outcrop has an unfinished façade and channel cut into it. Another rock outcrop directly to the north has rock-cut steps. A third outcrop further north has a long channel, which should lead into a cistern in the east (currently totally buried). Other rock outcrops to the south have cup holes cut into them. Basalt grinding stone fragments were found in the surrounding fields. A scarce pottery sherd scatter, predominantly Nabataean with a few Late Islamic sherds, was also noted at the site.

Dating: Nabataean, reused Late Islamic.

Bayda 20

UTM coordinates: 736082E; 3362219N - 736115E; 3362247N - 736145E; 3362147N - 735954E; 3362242N-735932E; 3362087N.

Altitude: 1055.4 - 1064.5m.

An extensive area of rock-cut installations and wall lines. The most prominent features include a rock-cut house in the northeast (oriented at ~70°) with a large hall measuring 5.75m N-S x 6.60m E-W. The south-

ern wall of the hall has rectangular niches (arch supports). The hall opens onto a smaller, almost square room (2.70 x 2.60m) in the northeast. To the northeast of the house, there is another rock-cut installation where the rock-cut eastern wall is continued with medium sized stone blocks to the south. The structure is too badly weathered and eroded for positive identification.

In the northwest edge of the site, there is an obelisk on a base, cut in relief on the rock face. There is a one-line Nabataean inscription below the base of this obelisk. Also in the northwest, there are several rock-cut channels leading into the weathered remains of rock-cut cisterns. The most noticeable feature from the road, however, is an almost cubical, semi-detached "Sehrij" block in the southwest.

Additionally, there are numerous scattered building blocks in the surrounding fields, including two large fragments of half columns. This indicates that there are (or were?) some masonry built structures at the site as well as the rock-cut installations. Abundant pottery sherd scatter was noted in the area.

The main road cuts this site. The road is also very close to the southeast corner of one less obvious rock-cut installation with one remaining course of ashlar blocks. Additionally, the road bedding here is less than 1m. This implies that bedrock is very close to the surface, but the possibility of archaeological remains preserved under the road cannot be ruled out.

Dating: Nabataean, Late Roman/ Early Byzantine (late first to fifth centuries AD), Late Islamic.

Bayda 21

UTM coordinates: 735823E; 3362120N - 735779E; 3362062N-735914E; 3361972N - 735952E; 3362043N.

Altitude: 1067.3 - 1074.2m.

An extensive site with many structures (wall lines), most of which are obscured by mod-

ern agricultural terraces. Located on an elevated stretch and surrounded by high sandstone outcrops in the east and west. A sandstone outcrop to the east has a rock-cut wine press with several basins, and a deep round "collection basin" with remnants of hydraulic mortar. Abundant pottery sherd scatter was noted at the site (Fig. 6).

The site is cut by the modern road, as well as two dirt tracks.

Dating: Iron II (Edomite), Nabataean (first century AD), Late Roman, Byzantine (fourth and fifth centuries AD), Late Islamic.

Bayda 22

UTM coordinates: 735701E; 3361941N - 735728E; 3361884N-735657E; 3361920N-735608E; 3361841N-735624E; 3361796N.

Altitude: 1048.8 - 1066.1m.

An area of rock-cut installations on several sandstone outcrops, with intervening agricultural fields having abundant wall lines and terraces. Located next to the east face of a large sandstone outcrop, to the west of the modern road. Prominent features are several rock-cut chambers in the northwest, including one small triclinium with a "wash basin" to the left of the entrance. Approximately at the centre of the site, there is a round rock-cut cistern with a channel and settling tank to the east. In the southwest, there is another rock-cut installation, probably a small open-air triclinium (?), and a channel cut in the same rock outcrop directly to the south of the "triclinium". Abundant pottery sherd scatter was noted at the site.

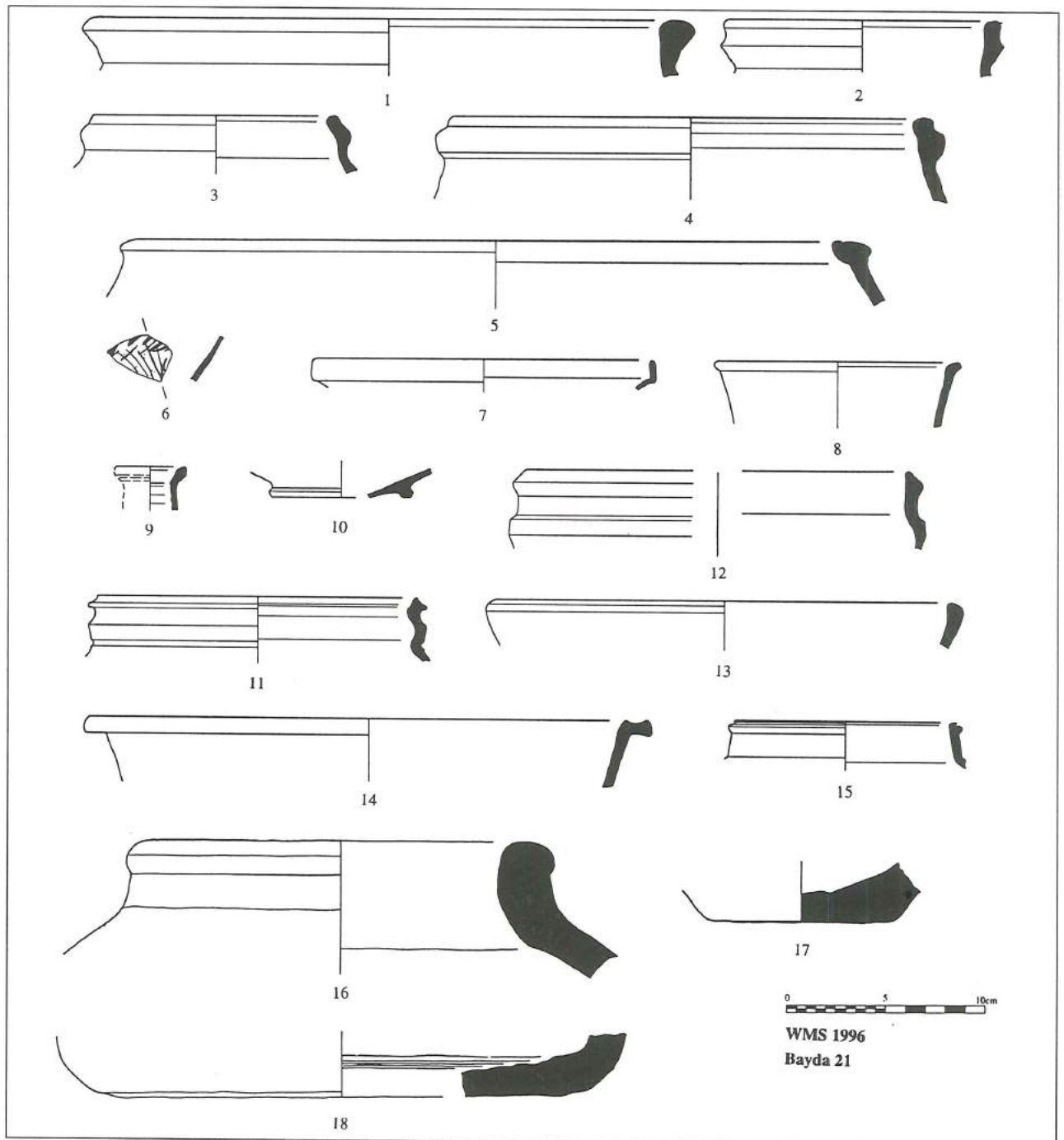
Dating: Nabataean, Roman/ Byzantine (first to fourth centuries AD), Late Islamic.

Bayda 23 (Sadd al-Kharrūba/Kharrū-bat al-Fajja)

UTM coordinates: 735680E; 3361021N.

Altitude: 1047.4m.

A small Nabataean dam located across a



6. WMS 1996 site Bayda 21 pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Large closed bowl, brown ware with grey core, Edomite Iron II; 2. cooking pot, red ware, dark grey slip, Edomite Iron II; 3. cooking pot/ jar, red ware with grey core, Edomite Iron II; 4. cooking pot/ jar, red ware with grey core and int., Edomite Iron II; 5. holemouth jar, red ware with grey core, grey slip ext., Edomite Iron II; 6. bowl, dark red paint, fine red ware, Nabataean mid-1st cent. AD; 7. bowl, fine red ware, Nabataean early 1st cent. AD; 8. cup, fine red ware, Nabataean 1st cent. AD; 9. jug, fine red ware, Nabataean 1st cent. AD; 10. base, fine red ware, Nabataean 1st cent. AD; 11. jar, red ware, Nabataean 1st cent. AD; 12. jar, red ware with grey core, sandy texture, Byzantine 5th cent. AD; 13. bowl, red ware, cream slip ext., Byzantine 5th cent. AD; 14. bowl, red ware, thin grey slip, Late Roman/ Early Byzantine 4th cent. AD; 15. cooking pot, red ware, dark grey slip ext., Late Roman/ Early Byzantine 4th cent. AD; 16. storage jar, handmade, red ware with wide light grey core, traces of cream slip ext., numerous mineral white, grey and grog inclusions, Late Islamic; 17. base, handmade, red ware, black slip ext. and reddish brown int., many grog inclusions and chaff impressions, Late Islamic (Ayyubid/ Mamluk ?); 18. base, handmade, brown with wide grey core, many mineral grey and grog inclusions, some chaff impressions, Late Islamic.

gorge in a high sandstone outcrop, to the west of the modern road. The three top courses of the medium sized masonry dam wall are missing (as indicated by their anchorage cuts in the rock). The wall is also mended with cement. The dam is named after a large carob tree growing inside it.

Dating: Nabataean, with later reuse.

Bayda 24

UTM coordinates: 736197E; 3360103N - 736159E; 3360146N - 736119E; 3360146N - 736085E; 3360112N.

Altitude: 1027.0 - 1035.9m.

A relatively small site with several structures built with medium sized stone blocks. Located on a hill slope with sandstone outcrops, to the south of the modern road. A rock outcrop on the east has remains of a rock-cut channel with pottery pipes and mortar (the ancient Nabataean line carrying water from 'Ayn Dibdiba to Petra). Below the channel, there is a rock-cut chamber currently used for storage (Fig. 7). Another

rock outcrop to the west has three rock-cut shaft tombs. Abundant pottery sherd scatter was noted at the site.

Dating: Nabataean (first to third centuries AD), Late Islamic.

Bayda 25

UTM coordinates: 735944E; 3359792N - 735972E; 3359765N.

Altitude: 995.1 - 999.6m.

A rock-cut channel and small wadi barrier directly opposite "Elephant Rock". The "Elephant Rock" also has a channel cut into it. The channel is already cut by the main road. Currently both the channel and the barrier are 1.70-3m above the road level.

Dating: Nabataean.

Bayda 26

UTM coordinates: 735918E; 3359709N.

Altitude: 1004.3m.

A sandstone outcrop with rectangular rock-cut shaft tomb at the top. There is also a



7. WMS 1996 site Bayda 24: view from the southwest showing the structures and rock outcrop with the channel and chamber.

Nabataean cistern at the northern face of the rock outcrop, with two sets of cut arch supports—one above the other—in the west wall, indicating that perhaps the cistern had a high roof originally, then the top of the walls collapsed and a lower roof was built to replace the original. Located on a steep mountain slope, to the west of the modern road. There are also remnants of a large dam/barrier across the deep wadi below, connecting the rock outcrop with the “Elephant Rock”.

Dating: Nabataean.

Bayda 27

UTM coordinates: 735794E; 3359663N - 735765E; 3359675N-735751E; 3359585N. Altitude: 992.6 - 1009.2m.

An extensive area of quarries at the (sandstone) mountain side. There is also a rock-cut cistern at the north side of the rock outcrop. In the east, there is a rock-cut chamber, currently faced with cement breeze blocks and used for storage. The chamber has a level area in front with rectangular cuts for arch supports in the western wall, indicating that it was a roofed hall originally.

The westernmost outcrop in this group has the remains of a water channel leading to a cistern, near the current police post at the service entrance to Petra. The modern road is at the southwestern edge of the site.

Dating: Nabataean.

Bayda 28 (Khirbat al-Qarn)

UTM coordinates: 737265E; 3363752N. Altitude: 1170.1m.

JADIS site 1997.075. This site is recorded in JADIS as being a Nabataean/ Roman fortress on a hill top (based on Palumbo 1994b). During this survey, it was noted that there are also other substantial structures down the slope, to the southwest of the hill top structure, being right next to the

edge of the modern village of Bayda (the modern village is built below the slope on which the site is located, resulting in the odd form of the east end of the village plan). The structures are built with small and medium stone blocks. There are also rock outcrops in between the hill top and slope structures, some of which have ancient cuts. A somewhat scarce pottery sherd scatter was noted at the site.

Dating: Nabataean (first to early second century AD).

Bayda 29

UTM coordinates: 734995E; 3366190N.

Altitude: 1036.8m.

Dimensions: 3.75m x 3.80m.

A small rock-cut cistern/ pool, found with water inside. Located on a slight flat rock outcrop above wadi. The area to the east is a ploughed field and there are no visible traces of channels in the vicinity. No pottery was found at the location.

Dating: Nabataean.

Bayda 30

UTM coordinates: 736091E; 3360259N.

Altitude: 1025.3m.

Dimensions: Length 11m; height 2m (actual orientation 110°).

A well-preserved wadi barrier/ dam between two rock outcrops. Built with large sandstone blocks. No pottery or flint scatter was noted at the site.

Dating: Nabataean.

2. The Umm Şayḥūn Sector (Fig. 2)

The Umm Şayḥūn sector is considered to start from the intersection of the roads connecting Umm Şayḥūn with Bayda and Petra in the north, through the village of Umm Şayḥūn, down to the intersection of the roads going into the az-Zurrāba district of Wādī Mūsā in the south. One site was re-

corded in the village (Umm Sayhun 3), and two sites along the road between Umm Şayhūn and Wādī Mūsā (Umm Sayhun 1 and 2). Additionally, there are some agricultural terraces and small wadi barriers, especially in the area above Umm Şayhūn, that were noted but not recorded in this survey.

Umm Sayhun 1

UTM coordinates: 737105E; 3359029N - 737162E; 3359005N - 737236E; 3359015N - 737195E; 3358974N.

Altitude: 1054.4 - 1068.3m.

An area of less steep soil deposits on rock outcrops. To the west, on a sandstone outcrop overlooking Petra, there is a small rock-cut triclinium, currently used for storage and the entrance is obscured by a facade of cement breeze blocks. Directly to the southwest of the triclinium on the same rock outcrop, there is a rock-cut shaft tomb partially excavated by robbers, showing that it has at least two internal tiers.

A side wadi of Wādī al-Wu'ayra, to the south of the triclinium, has a series of nine comparatively wide wadi barriers, the centres of which are currently eroded by water. Another sandstone outcrop directly south of the side wadi has a rock-cut niche.

Dating: Nabataean.

Umm Sayhun 2

UTM coordinates: 737184E; 3358363N - 737210E; 3358383N - 737195E; 3358414N.

Altitude: 1056.4 - 1057.4m.

Rectangular rock-cut chamber and niches with a large flat expanse in front. On a sandstone outcrop at the mountain slope. Directly to the east, and across Wādī al-Wu'ayra, from the Medieval fort. The round cave to the north of the chamber is a natural formation.

The nearby Medieval fort of al-Wu'ayra is not discussed in this report.

Dating: Nabataean.

Umm Sayhun 3

UTM coordinates: 735844E; 3359544N - 735888E; 3359599N.

Altitude: 1017.2 - 1023.7m.

A small "tunnel" in a sandstone outcrop, thought to have originally been a water collection tunnel/ channel. Close examination of the remains showed no signs of chiseling or hydraulic mortar. The tunnel is cut in the north and south (by levelling the ground to the west of the modern school) as well as by the modern main road through the village. The part to the south of the main road is currently modified into a storage area for a modern house. A somewhat scarce pottery sherd scatter was noted to the east of the site.

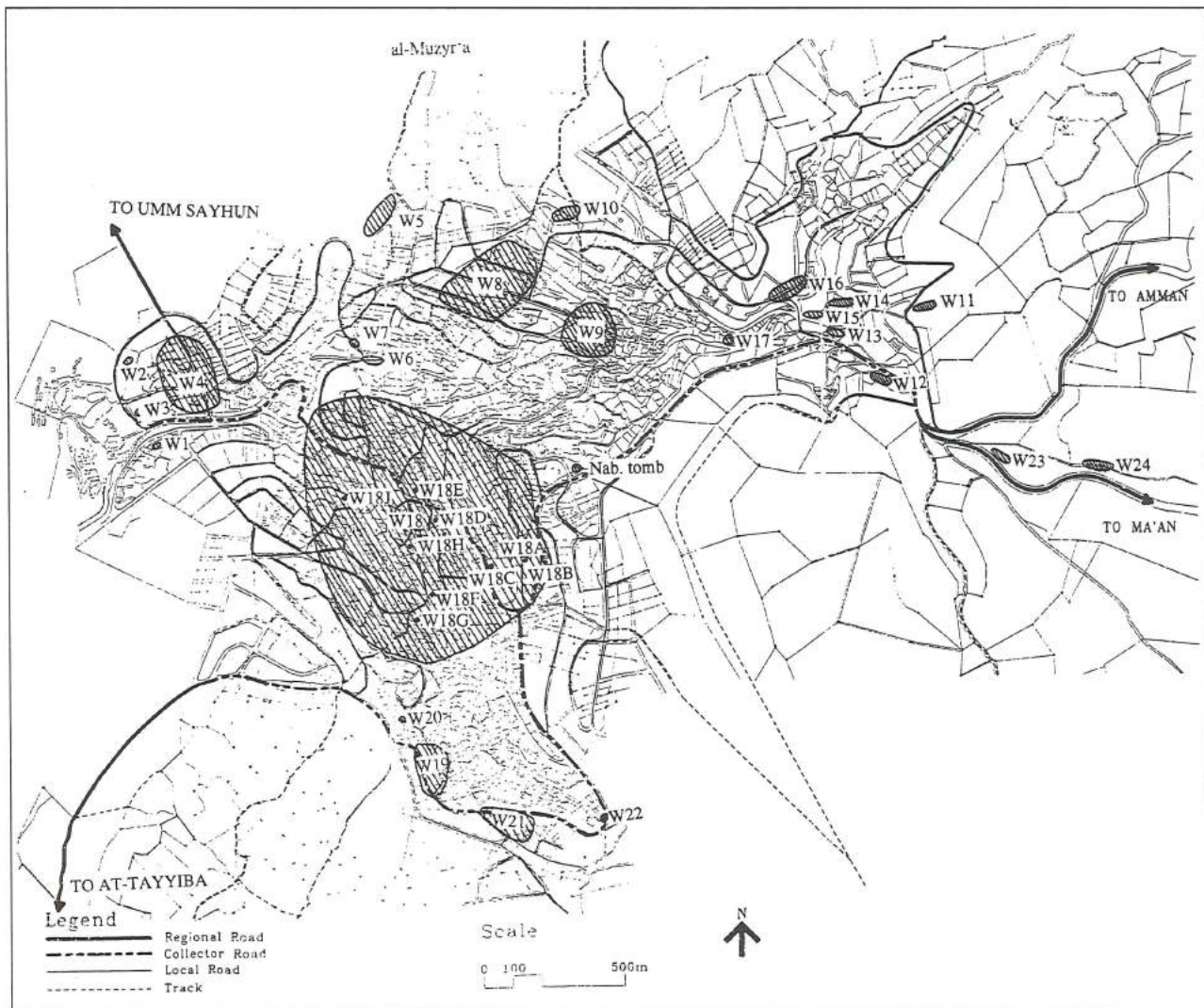
Dating: Nabataean (?).

3. The Wādī Mūsā Sector (Fig. 8)

The present town of Wādī Mūsā is built over an area with several water courses and rich agricultural land, add to this the fact that it was on ancient routes and the result is a rich archaeological heritage. Varying sites from almost all periods were discovered during the survey, three of which had been previously partially excavated (Wadi Musa 4, 10 and 18D), while two others were excavated in 1997 after the survey (Wadi Musa 8 and 9, see below). Additionally, there are many agricultural terraces and small wadi barriers within the town that were noted but not recorded in this survey. The discovery of ancient architectural fragments and decorations is an on-going event at the town (see for example Zayadine 1981: 250), and several such fragments were recorded out of context during the survey. Unfortunately, the fast rate of development over the past few years at Wādī Mūsā made it very difficult to conserve much of its rich archaeological heritage.

Wadi Musa 1

UTM coordinates: 737408E; 3357493N - 737434E; 3357474N - 737425E; 3357441N



8. WMS 1996: recorded archaeological sites in the Wādī Mūsā sector (base map supplied by the Petra Region Planning Council).

- 737385E; 3357456N.

Altitude: 1022.5 - 1026.1m.

Low agricultural terraces on the southern bank of Wādī Mūsā. Reused (and much disturbed) by small agricultural fields. Abundant Nabataean pottery sherds were noted but no wall lines other than the agricultural terrace walls. The site is on the lowest of a series of low terraces on the mountain slope adjoining the Wādī Mūsā ravine near the modern entrance gate to Petra. Sherd scatters indicate that these terraces are an archaeological site. A cultural resources impact assessment of this terrace area recommended that they be kept green, and "an archaeological park for the illustration

of agricultural terracing in Nabataean times" be developed (Palumbo 1994b).

Floods during the winter of 1996/1997 revealed the existence of two substantial walls in the wadi cut, approximately 200m to the north of site Wadi Musa 1.

Dating: Nabataean, Roman, Late Roman/Early Byzantine (first to fourth centuries AD).

Wadi Musa 2 (Birkat az-Zurrāba)

UTM coordinates: 737370E; 3357735N-737382E; 3357747N-737345E; 3357786N-737333E; 3357775N.

Altitude: 1055.9 - 1056.5m.

A double cistern, partially rock-cut and continued with masonry walls. The southern section has a staircase in its west wall. A channel leads to the cistern from the east (uphill, probably originating at 'Ayn Mūsā for the transfer of water into Petra). The channel joins the cistern at a square stone built inlet, then water goes down into a "cave" with small niches at the facade, in the northern section. The cistern walls are partly collapsed, especially at the northern section. The interior of the cistern is currently used as an agricultural field.

Dating: Nabataean, with later reuses.

Wadi Musa 3 (al-Quff)

UTM coordinates: 737387E; 3357575N-737360E; 3357623N-737382E; 3357688N-737418E; 3357624N.

Altitude: 1030.9 - 1047.7m.

Several rock-cut features, on the slope of the same sandstone outcrop as site Wadi Musa 2. A rock-cut chamber in the north is currently full of modern dump. In the centre, there is a rock-cut shaft tomb with top and side (west) openings and three interior chambers. In the south, a circular hydraulic structure built with unhewn stones over a rock-cut vertical channel (perhaps would have been the entrance into a now destroyed cistern, although there are no apparent remains of a channel). This structure can now be seen in section in the Mövenpick Hotel parking lot, and a small palm tree is planted inside it. A few pottery sherds in the mortar are not diagnostic.

Dating: Nabataean rock-cut features, hydraulic stone structure in the south may be later.

Wadi Musa 4 (az-Zurrāba)

UTM coordinates: 737611E; 3357730N.

Altitude: 1058.7m.

Dimensions: ~200m E-W x ~250m N-S.

JADIS site 1997.012. An ancient industrial

area. Seven pottery kilns and parts of a pottery workshop were excavated by the Department of Antiquities in 1980, 1981, 1991 and 1997 (Zayadine 1981: 350-351; 1982: 380-393; 1986; 'Amr 1991; Mason and 'Amr 1995: 629-631; 'Amr and al-Momani 1998a). The excavation area, which is currently fenced, is only the central part of the site, which is characterized by layers of ash and red soil very rich in pottery. The site is now much disturbed by modern buildings, including several hotels. Additionally, there are several weight and pressing stones that were reused in terraces in the area, indicating that there were also olive presses at the site (Zayadine 1982: 384; Mason and 'Amr 1995: 623-633).

Dating: Nabataean-Byzantine (first to sixth century AD).

Wadi Musa 5 ('Ayn at-Ṭinah)

UTM coordinates: 737911E; 3357730N.

Altitude: 1058.7m.

Dimensions: - mine: 80m N-s x 45m E-W x 15m deep (actual orientation 160°).

An ancient clay mine on the slope of Jabal a-Ṭinah. There are also structures showing in the wadi section opposite the mine that may be related to pottery production ('Amr 1987: 42-43; 1997; Mason and 'Amr 1995: 635). All archaeological remains in the wadi itself had been eroded down to the natural rock.

Dating: Nabataean, with Neolithic below the structures in the wadi section.

Wadi Musa 6 (al-'Udmal)

UTM coordinates: 738209E; 3357775N.

Altitude: 1090.1m.

Dimensions: ~100m E-W.

In the wadi cut (Wādī al-Madar), up to 6m of archaeological deposits can be seen. A thick layer of ash at the bottom has much burnt bone, some charcoal, some hematite, some flint tools and numerous cobbles. Layers above that have finely crushed pot-

tery sherds. There are no apparent structures in the section. All archaeological remains in the centre of the wadi had been eroded down to the natural rock.

There is a small water spring to the west. Locals say that the famous 'Ayn al-'Udmal (mentioned by al-Nuwayri in 1276 as a stop along the route of the voyage of Sultan Baybars from Cairo to al-Karak, Zayadine 1985: 168-170) was directly upstream but had dried up, and this present spring (now called 'Ayn as-Sayl) evolved after the drying up of 'Ayn al-'Udmal. The crushed pottery may be the result of people and animals trampling the route to the spring. There are modern agricultural terraces above the site with again much finely crushed pottery.

An Early Islamic lamp fragment was found at the site by 'Amr during a visit earlier this year, but no Early Islamic pottery was recovered during the present survey.

Dating: Epipalaeolithic/ Neolithic, Nabataean (first - third centuries AD), Byzantine, Early Islamic, Late Islamic.

Wadi Musa 7

UTM coordinates: 738163E; 3357841N.

Altitude: 1104.2m.

Walls of somewhat large limestone blocks showing in a road cut. The depth of archaeological deposits is between 1-1.5m above bedrock in the cut. Scarce small sherds noted at the site, none diagnostic.

Dating: Uncertain.

Wadi Musa 8 (al-Basit)

UTM coordinates: 738413E; 3358021N - 738632E; 3357932N - 738766E; 3358166N - 738793E; 3357954N.

Altitude: 1195.5 - 1235.5m.

Dimensions: ~250 x 250m.

An area of somewhat ashy soil with abundant flint tool scatter, and some pottery. A few houses are built there while much of the area is terraced agricultural fields. The cut

for one house in the north shows a burnt layer with much burnt bone and cobbles. The site is also cut by several roads.

Some wall lines could be seen in the south, built with cobbles, being very similar to the Bayda/ Sayl 'Aqlat Neolithic village structures (this section was destroyed by a road cut soon after the survey). Fragments of grinding stones and querns were also found in the agricultural fields. An olive press stone was found among a pile of cleared stones in the south.

A small scale excavation was carried out by the Department of Antiquities in the north-eastern part of the site in August-December 1997 (Fino 1997; 1998). Remnants of structures with red-painted plaster floors were discovered. The structures were dated to the LPPNB.

Dating: Neolithic (predominant), Iron II, Nabataean, Byzantine.

[The substantial site of al-Muzayr'a, overlooking Wadi al-Yasala, is to the northwest of al-Basit. It is not included in this survey due to its distance from the proposed pipe network].

Wadi Musa 9 (Khirbat an-Nawāfla)

UTM coordinates: 739081E; 3357818N - 739291E; 3357788N-739243E; 3357822N.

Altitude: 1198.8 - 1218.2m.

JADIS site 1997.071. An ancient site currently occupied by a modern (traditional, abandoned) village and olive groves. Located on a flat area in the mountain side, above Wadi Khalil. The most outstanding archaeological feature at the time of the survey was a square, masonry built cistern in the west. Many ancient decorated stone blocks (cornices, Nabataean oblique-trimmed masonry, marble fragments, olive press stones and at least one Nabataean inscription) are reused in the building of the houses. Directly to the southeast of the village, there are the remains of a substantial

bridge crossing Wādī Khalīl. The southern springer of the bridge is still preserved to a height of 2.5m, and remains of a base can still be seen in the wadi bed.

The traditional village had been purchased for conversion into a tourist resort, similar to "Taibet Zaman". Archaeological excavations by the Department of Antiquities were carried out at the site from April to December 1997 ('Amr and al-Momani 1998b). The site is basically a series of superimposed and overlapping agricultural villages starting from the first century BC, while earlier material was recovered from the northern part of the site.

Dating: Probable Middle Bronze Age, Iron II (Edomite), Hellenistic, Nabataean (first century BC onwards), Early Byzantine, Late Byzantine, Early Islamic, Ayyubid/Mamluk, Late Islamic.

Wadi Musa 10 (Ṭawilān)

UTM coordinates: 738912E; 3358203N.

Altitude: 1233.9m.

JADIS site 1997.002. A major Iron Age site, with other period remains, including cemeteries and towers. The site was excavated over several seasons by the British Institute in Amman for Archaeology and History (Bennett and Bienkowski 1995).

Dating: Chalcolithic, Iron I, Iron II (predominant), Iron III, Late Roman, Umayyad, Mamluk, Ottoman.

Wadi Musa 11

UTM coordinates: 740304E; 3357975N - 740240E; 3357922N.

Altitude: 1341.2 - 1343.7m.

An area of ashy soil, with a few wall lines of small stone blocks much obscured by collapse and dump. Located on a mountain slope above a wadi, with a spring—now collected in a modern pool—to the north. The east edge of the site may be cut by the modern road, a section in an olive orchard

to the east of the road shows less than 0.5m of ashy deposits but no wall lines there. Some pottery, iron lumps, a corroded bronze coin and fragment of a green glass bracelet were found at the site.

Dating: Late Islamic (probably Mamluk).

Wadi Musa 12 (Ṭāḥūnat 'Ayn Mūsā)

UTM coordinates: 740067E; 3357619N.

Altitude: 1293.2m.

A water mill, built with medium and large stone blocks. Located on the mountain slope opposite and above 'Ayn Mūsā. Revealed in a cut to the south of the main road from 'Ayn Mūsā to the town centre. Conduit wall (in the south) is used as a boundary wall separating two modern (traditional) houses, indicating that the water mill is earlier. There are other traditional structures, now partially collapsed, directly to the north of the mill and may be associated with it. No pottery was found at the site. Such mills are most probably Late Islamic, but are very difficult to date precisely (see for example Greene 1995; McQuitty 1995). Only two water mills in Wādī Mūsā were mentioned in the Ottoman records dating between 1864 and 1918: Ṭāḥūnat Banī 'Aṭā wa ash-Shurūr (probably site Wadi Musa 22) and Ṭāḥūnat al-'Alāyā (site Wadi Musa 13, see also site Wadi Musa 17) (Tarawneh 1992: 168, 171). Due to the proximity of this mill to Ṭāḥūnat al-'Alāyā, its state of exposure as well as its location, it is probable that it went out of use before 1864 and was replaced by the lower Ṭāḥūnat al-'Alāyā.

Dating: Late Islamic (probably Ottoman).

Wadi Musa 13 (Ṭāḥūnat al-'Alāyā)

UTM coordinates: 739911E; 3357806N.

Altitude: 1285.8m.

Dimensions: Length ~10m (actual orientation 15°).

A water mill, built with medium and large stone blocks, partly collapsed, mill stones

missing. Located above the main Wādī Mūsā. Conduit wall carrying channel preserved from the north. Scarce Late Islamic pottery scatter was found at the site. Ṭāhūnat al-‘Alāyā was mentioned in the Ottoman records dating to 1864-1918 (Tarawneh 1992: 171), although the probability that the name in the records referred to the mills of site Wadi Musa 17 cannot be ruled out. Judging by the state of exposure and location, this mill seems later than Ṭāhūnat ‘Ayn Mūsā (Wadi Musa 12).

Dating: Late Islamic (Late Ottoman).

Wadi Musa 14 (Khirbat al-Muḥaylla)

UTM coordinates: 740013E; 3357850N.

Altitude: 1302.3m.

JADIS site 1997.014. An area with modern and traditional houses. Many oblique-trimmed Nabataean blocks are reused in the houses and terraces, but no clear ancient walls could be seen. The site is much obliterated, and may be destroyed, by the modern houses and terraces (Glueck 1935: 74, Site 97 was hoping to find an Edomite fort at this location but only found modern pottery fragments; see also Musil 1908: 11). A scarce Nabataean pottery scatter was also noted at the site during this survey.

Dating: Nabataean, Late Islamic.

Wadi Musa 15

UTM coordinates: 739796E; 3357830N.

Altitude: 1263.3m.

Dimensions: Length of wall ~8m (actual orientation 115°).

A wall, 1.20m wide with very solid mortar between the facing stones, much destroyed. Located at the north edge of a side wadi off Wādī al-Muḥaylla, next to a modern channel. Most probably a conduit. Scarce pottery scatter (including a Nabataean ceramic water pipe fragment) and two microliths were found directly next to the wall. There is a cave directly to the east of the wall, current-

ly used for storing dung.

Dating: Natufian (?) in the vicinity, Nabataean (?) for the conduit wall.

Wadi Musa 16

UTM coordinates: 739776E; 3357951N.

Altitude: 1267.9m.

Dimensions: ~100m E-W x ~50m N-S.

Several structures of medium sized stone blocks, showing in section in the road cut. There is also an ash layer in the cut to the east. Site very difficult to define exactly due to extensive modern deposits at the surface, it is also badly disturbed by the modern road. Located at the mountain slope, well above Wādī al-Muḥaylla. Pottery sherds were noted at the surface and in the section.

Dating: Nabataean/ Roman (first - third centuries AD), Ayyubid/ Mamluk, Ottoman.

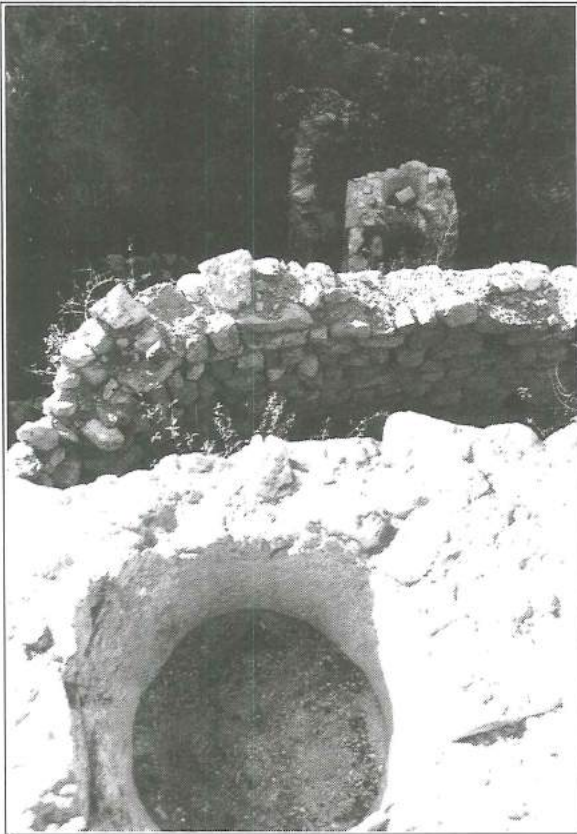
Wadi Musa 17

UTM coordinates: 739569E; 3357780N.

Altitude: 1246.0m.

Two water mills, one situated above the other on a mountain slope overlooking Wādī al-Muḥaylla, within terraced orchards. Built with medium and large stone blocks. The conduit of each mill leads into a circular structure, while the top structure is situated directly above the lower mill's conduit (Fig. 9). There are remnants of hydraulic mortar in the conduit channels. It is difficult to determine whether the upper mill was earlier and replaced by the lower when the water level dropped, or whether the two mills were used concurrently. Such mills are most probably Late Islamic, but are very difficult to date precisely. These mills may be the Ṭāhūnat al-‘Alāyā mentioned in the Ottoman records dating to 1864-1918 (Tarawneh 1992: 171; see also site Wadi Musa 13). A few washed sherds were noted at the site.

Dating: Late Islamic (probably Late Otto-



9. WMS 1996 site Wadi Musa 17: View from the conduit of the upper mill, with the lower mill and its associated semi-circular structure directly below the upper semi-circular structure.

man).

Wadi Musa 18

UTM coordinates:- Upper: 738033E; 3357588N - lower: 738471E; 3357467N.

Altitude: 1104.6 - 1159.3m.

Dimensions: ~750m E-W x 1000m N-S.

This is a very extensive site, currently the Wādī Mūsā town centre. It is thought that this area is the site of the ancient city of Gaia, with plentiful water and on the trade routes. Wādī Mūsā is JADIS site 1997.003 (see also Zayadine 1985: 168-170).

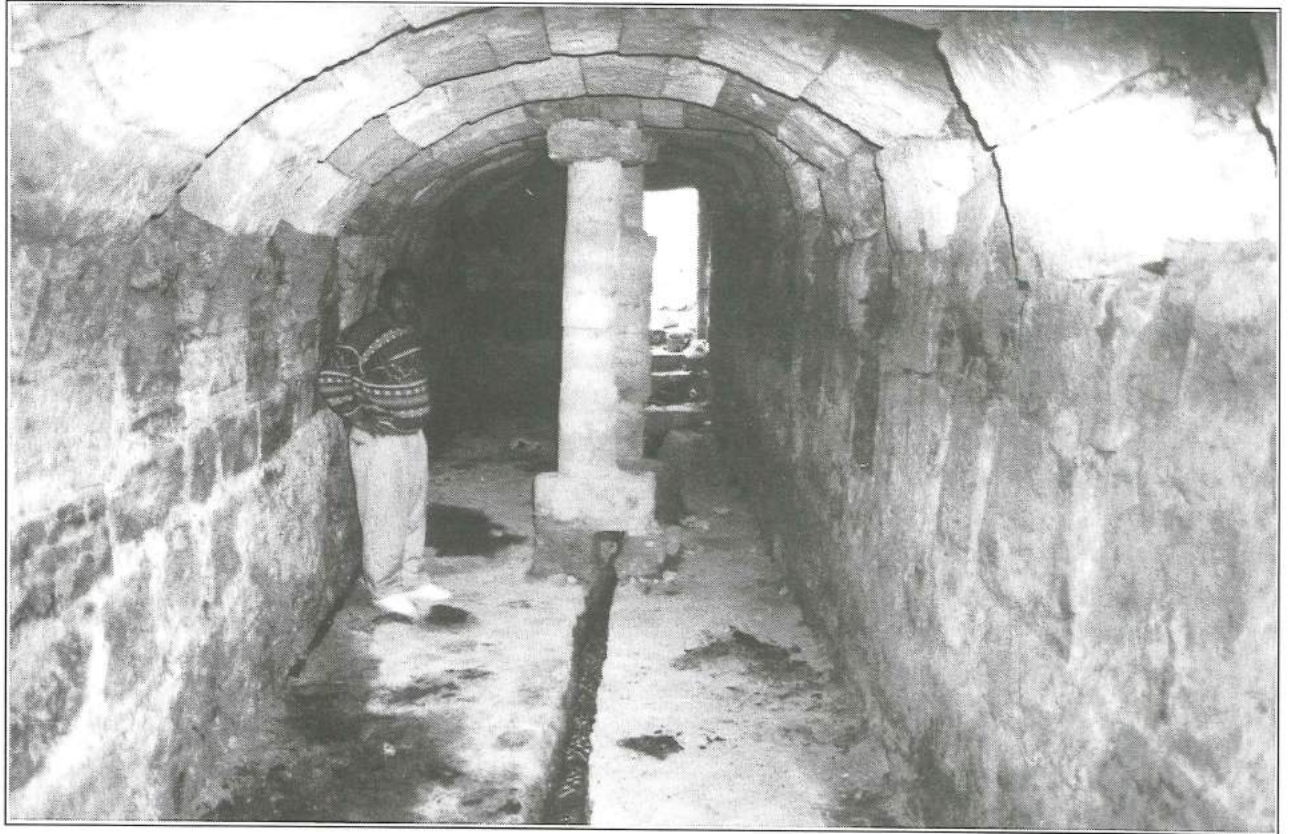
Wadi Musa 18 is by far the largest (and most dense) recorded site in this survey, being an ancient city. It is also the most densely built up area in modern times, a trend that will be very difficult to stop at the time being. Due to the expanse of this site, and the extensive disturbance due to the modern town, the exact boundaries could not be de-

termined and only highlights could be recorded:

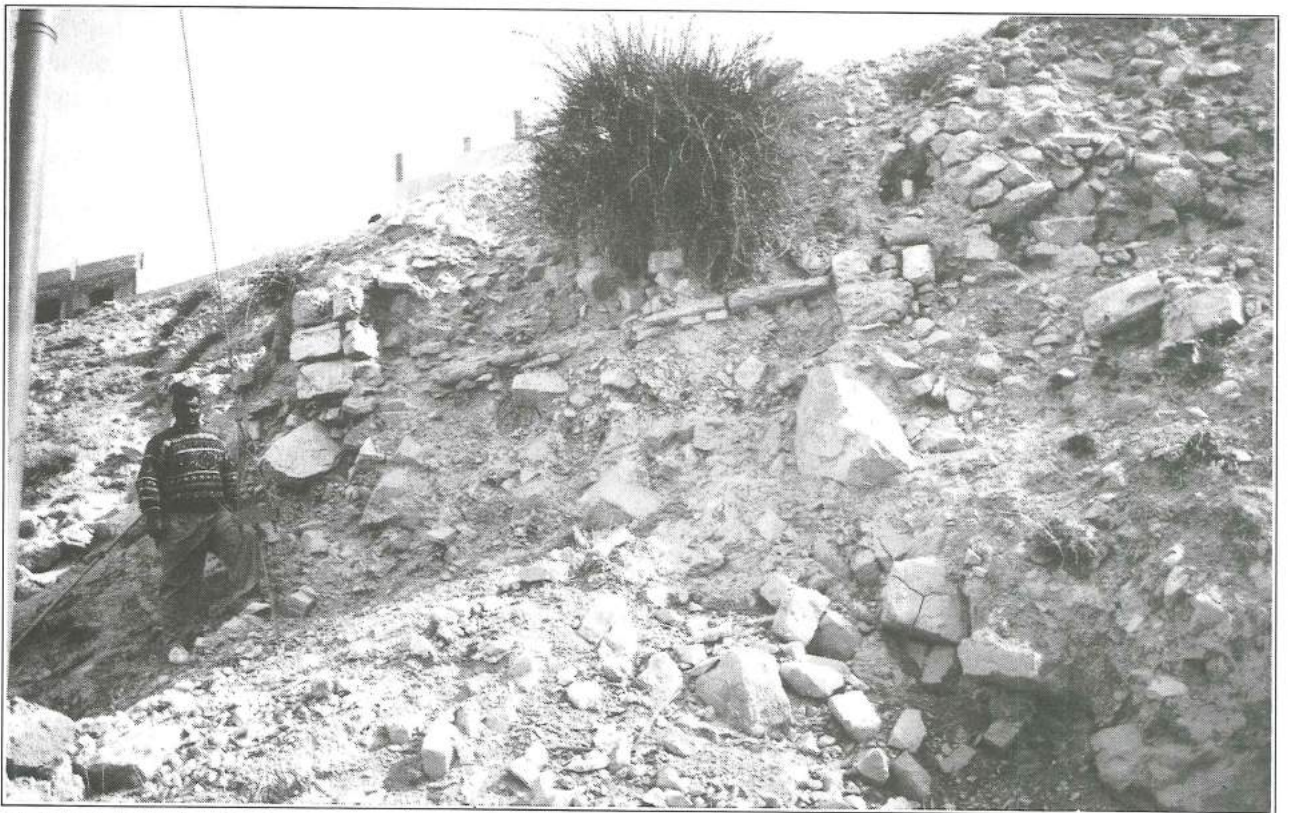
Wadi Musa 18A (Dār al-Birka): (UTM coordinates: 738733E, 3347069N; altitude: 1181.6m). In the east part of the site, on a mountain slope. The main feature (the *dār*) is a chamber built at a water spring still flowing from the east (uphill) side of the chamber. The chamber is roofed with ten arches, there are also three columns that seem to be a later addition for supporting the central arches (Fig. 10). The north wall, opposite the entrance, is cut in the limestone rock, with a niche in it. The rock-cut floor has channels cut into it, the main channel crosses under the modern street and leads to an open cistern in the terraced orchards to the west. The upper courses of the cistern walls have several reused blocks, including a fine cornice. To the north of the *dār*, there is a substantial wall against which a traditional, now deserted, house was built. An abundant pottery sherd scatter was noted at the site, which seems to have originally been Nabataean but reused in later periods. The *dār* was cleared and restored by the Department of Antiquities in 1993.

Wadi Musa 18B: (UTM coordinates: 738792E, 3356935N; altitude: 1186.9m). JADIS site 1996.025 (Palumbo 1994b, where it is named al-Brayka but see site Wadi Musa 18C below). At the east edge of the site, on a mountain slope, a "row" of substantial and well-built structures is cut by the main road and a side track. Many of the walls are plastered. The road-cut also shows that several rooms have flagstone pavements (Fig. 11). A built drain covered with slabs can also be seen at the northern edge of the row of structures. Abundant pottery sherd scatter at the location, dating to the Nabataean period (first through to the third century AD).

Wadi Musa 18C (Al-Brayka): (UTM co-



10. WMS 1996 site Wadi Musa 18A (Dār al-Birka): interior of the underground chamber.



11. WMS 1996 site Wadi Musa 18B: room with a flagstone pavement showing in the road cut. This section was covered by a modern retaining wall in early 1998.

ordinates: 738604E, 3357056N; altitude: 1149.3m). In the east section of the site, on a mountain slope. Substantial and well-built structures cut by the main road, and remnants of a ceramic water pipe as well as a drain. In 1994, the collapse of a section in front of which now a new building stands, revealed a large wall and drain (only the northward continuation of the upper walls is now evident). Still further north and close to the main circle in Wādī Mūsā town centre (the Martyr Circle), a retaining wall can be seen based on a substantial earlier wall. Abundant Nabataean pottery sherd scatter was noted at the location (of the first centuries BC/ AD).

Wadi Musa 18D: (UTM coordinates: 738430E, 3357222N; altitude: 1126.9m). Inside the triangle that forms the centre of the Wādī Mūsā main market place. The location was excavated in February to June 1996 by a team from the Department of Antiquities ('Amr *et al.* 1997a, b). The excavations uncovered a Nabataean roofed cistern, around which were structures dating from the first century AD through to the Late Byzantine, topped by Ayyubid/ Mamluk and Ottoman. To the north, there was a first century AD villa with the only known Nabataean mosaic floor up till now. The excavated part of the villa is now destroyed (the mosaic was transferred to the Petra Nabataean Museum), but parts remain under a traditional building to the east, while the cistern and the other structures were back-filled. In between, there are walls showing behind "Al-Anbat II Hotel". The "Yākhūr" building to the east, the largest central traditional building in Wādī Mūsā, is now destroyed. Much of its stones were of the typical oblique-trimmed Nabataean masonry and were sold off for inclusion in new buildings in various areas of the modern town.

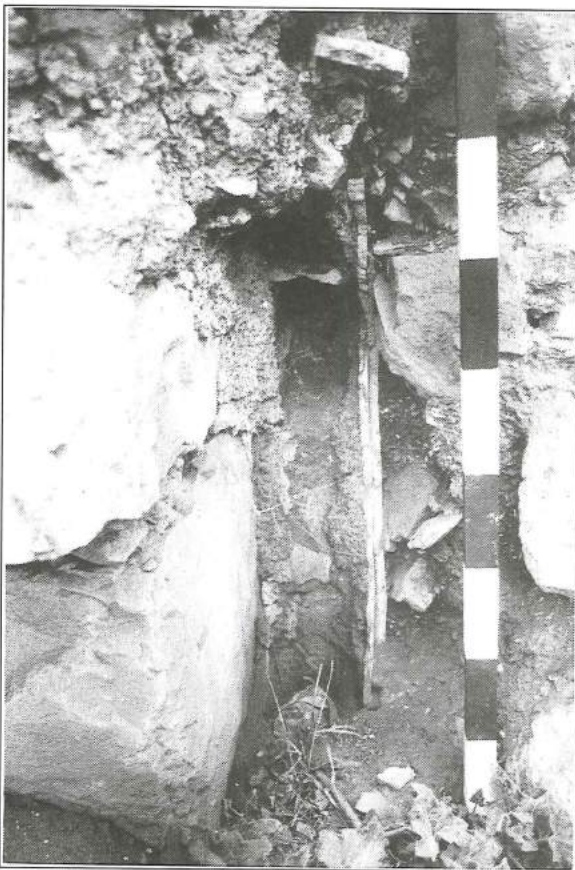
Wadi Musa 18E (Maqbarat Wādī Mūsā): (UTM coordinates: 738390E, 3357312N; altitude: 1124.5m). To the north of location

18D, in the modern town cemetery. A column drum was noted in the east edge (*in situ?*), and a column base on the roof of a traditional room next to it. Inside the room, it is evident that the north wall was built on earlier arches, next to them there is a large robbers pit revealing ashlar blocks. Abundant Nabataean pottery sherd scatter was noted (first to third centuries AD), and people report that pottery, coins and decorated architectural fragments are found when graves are excavated.

Wadi Musa 18F: (UTM coordinates: 738451E, 3356889N; altitude: 1127.0m). Along the road from the old mosque to the southern bridge (Jisr al-Falaḥāt) and in side wadis off Wādī al-Juḥaysha, an area of obviously monumental buildings is exposed by the road cut and the water course from the town slaughter house. Part of a substantial wall now forms the back wall of a multi-storey building (Fig. 12). To the south, the side wadi has uncovered part of a building with arches (only the springers are now preserved, but people say at least one arch was standing intact around twenty years ago). Opposite the arches, a horizontal clay pipe attached to a wall and covered with two layers of plaster is showing in section, however, it does not look like a flue pipe for a bath (Fig. 13). During a visit last summer, 'Amr noted a fragment of crimson red painted plaster at the site, but none could be seen during the survey. More wall lines can be seen in section in the main wadi below. A modern building to the northwest (to the south of location Wadi Musa 18H) had lost all soil under one of its supporting pillars, leaving it and its foundation hanging in midair several metres above the wadi slope and indicating that the whole area is loose fill. The old mosque, between locations Wadi Musa 18D and 18F, is called "Al-Masjid al-'Umari" and people say that it was built on the remains of an archaeological mosque. The Ayyubid/ Mam-



12. WMS 1996 site Wadi Musa 18F: ancient monumental walls in the road cut.



13. WMS 1996 site Wadi Musa 18F: ceramic channel and plaster against a wall face in a side wadi cut off Wādī al-Juhaysha.

luk structures of Wadi Musa 18D are only across the modern road and shops to the north of the mosque, but only Nabataean pottery sherds (of the first to early second century AD) were noted at Wadi Musa 18F.

Wadi Musa 18G ('Ayn al-Baṣṣa): (UTM coordinates:- channel 738344E, 3356796N; spring: 738415E, 3356672N; altitude:- channel: 1128.7m, spring: 1137.4m). In the southern part of the site. A ceramic water channel with hydraulic mortar and probable side branches, as well as a stone drain with slab cover (Fig. 14). Found while dismantling a modern agricultural terrace wall, being in the cut behind the terrace wall. Abundant Nabataean pottery sherd scatter was noted at the location. This channel started at the 'Ayn al-Baṣṣa spring. Al-Baṣṣa was mentioned in the Petra Church papyri discovered in December 1993 (Kaimio and Koenen 1997: 460).

Wadi Musa 18H: (UTM coordinates: 738330E, 3357116N; altitude: 1114.5m). In the centre of the site. The remains of the



14. WMS 1996 site Wadi Musa 18G ('Ayn al-Baṣṣa): ceramic water channel and stone drain to the right.

early twentieth century village of "Eljî". The extent of loss of the village houses can be seen by the intervening new structures between the houses at this location and the "Yākhūr" of Wadi Musa 18D. Many reused architectural blocks (Nabataean oblique-trimmed masonry and doorjambs, column drums and aqueduct blocks) were found incorporated in the walls. Scarce Nabataean and Late Islamic pottery scatter was noted at the location.

Wadi Musa 18J: (UTM coordinates: 738101E, 3357268N; altitude: 1094.9m). Near the western edge of the site. A substantial wall of well-cut ashlar blocks (Fig. 15). Several new houses are built against this wall, which local people say "stretches for a long way". Only a small portion of the wall is currently exposed—in a yard between two houses above Wādī al-Juḥaysha, to the west of Khirbat al-Falaḥāt—making it very difficult to determine the function of the wall which may have been a city boundary wall at some stage of the site's history. The exposed stretch shows that a gate may

have existed at the location, later blocked by a rough wall. No pottery sherds were found in the immediate vicinity due to modern clearance of the area.

[In November 1997, workers on one of the Petra Region Planning Council projects hit the top of a Nabataean family tomb while excavating shallow foundations for a wall opposite the Wādī Mūsā health centre. The tomb is in a cave and only rock was showing at the surface at the time of the survey. Excavation of the tomb by the Petra Antiquities Office showed it dates to the first century AD (Marahleh 1998), and it seems to be part of a cemetery associated with site Wadi Musa 18].

Wadi Musa 19 (Khirbat Banī 'Atā)

UTM coordinates: 738351E; 3356289N.

Altitude: 1188.1m.

Dimensions: ~150m N-S x 100m E-W.

A modern (traditional) village built on an ancient site. Many reused stone blocks are evident in the walls of the houses, the most frequent are oblique-trimmed Nabataean



15. WMS 1996 site Wadi Musa 18J: ancient wall preserved at the back of a modern courtyard.

blocks, but there are also column drums, a doorway built with a well-cut array of door jambs, and an Arabic inscription (dotted Kufic, perhaps a tomb stone) reused sideways above a door in one house (Fig. 16). No wall lines are showing at the surface, but local people say that the mosque in the *khirba* was built on the foundations of an ancient mosque. Some pottery sherds were noted at the site.

Dating: Iron II (Edomite), Nabataean, Late Byzantine, Early Islamic, Late Islamic.

Wadi Musa 20 ('Ayn Ridān)

UTM coordinates: 738239E; 3356403N.

Altitude: 1183.4m.

Dimensions: 8.5 x 9.0m.

A cistern, built with cut stone blocks. Steps of slabs protrude from the east wall internally, and there are remnants of hydraulic plaster on the interiors of the walls. Located approximately 60m below the spring of 'Ayn Ridān, above the present wadi. The

walls of the cistern had been reused as foundations for modern (traditional) houses, now deserted and collapsed. A new house is built against the north wall and the cistern is used as a yard within the surrounding terraced agricultural field. A scarce Nabataean and Late Islamic pottery sherd scatter was noted at the site.

Dating: Nabataean (?), with later reuses (Musil 1908: 234 and Glueck 1935: 77 Site 109 "Ain Ghidan" date the cistern as Islamic).

Wadi Musa 21 (Khirbat Şubḥiyya)

UTM coordinates: 738652E; 3356027N.

Altitude: 1213.0m.

Dimensions: ~150m E-W x 120m N-S.

JADIS site 1996.009. N. Glueck (1935: 77, Site 110) described the site as a pile of collapsed stones with nothing to date them. Since the mid-thirties, a modern (traditional) village, and some new houses, were built over the ancient site which is located



16. WMS 1996 site Wadi Musa 19 (Khirbat Banī 'Aṭā): tombstone with dotted Kufic inscription reused sideways above the doorway of a traditional house.

on a mountain slope, approximately 200m to the west of 'Ayn aṣ-Ṣadr. Wall lines can be seen among the houses and in the cuts for the new houses. Many reused stone blocks (Nabataean oblique-trimmed masonry and column drums) can be seen in the walls of the traditional houses. Scarce pottery sherd scatter, and some steatite vessel (body) fragments, were noted at the site.

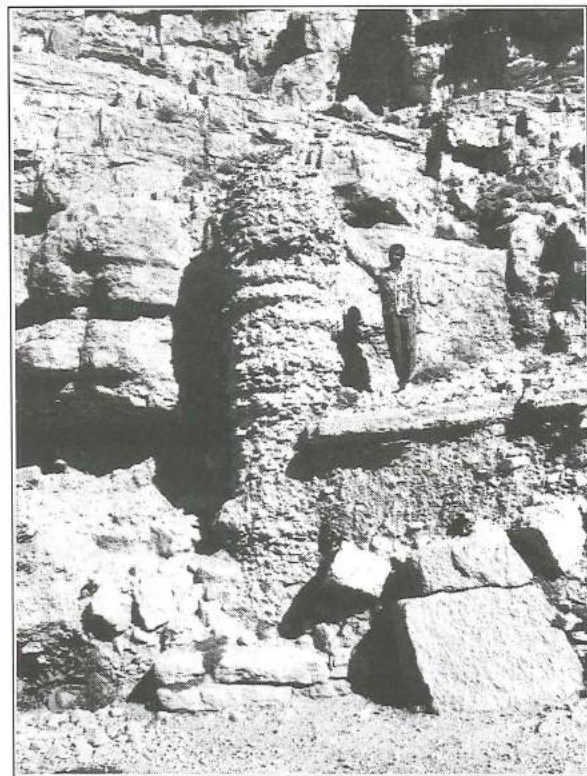
Dating: Nabataean (first-early second century AD), Early Islamic (?), Ayyubid/ Mamluk, Late Islamic.

Wadi Musa 22 ('Ayn aṣ-Ṣadr)

UTM coordinates: 739015E; 3356078N.

Altitude: 1185.2m.

Remnants of a water mill above 'Ayn aṣ-Ṣadr. The core is standing around 5m high (Fig. 17). Most stones are either robbed or eroded away. A stone channel can be seen cut by the wadi, directly under a modern concrete channel to the west of the mill.



17. WMS 1996 site Wadi Musa 22 ('Ayn aṣ-Ṣadr): the water mill core. Note the remaining stone blocks at the base.

Water for running this mill would have come from 'Ayn Suwākha (JADIS site 1996.013).

Judging by the proximity of this mill to Khirbat Banī 'Aṭā (site Wadi Musa 19), this is most probably Ṭāḥūnat Banī 'Aṭā wa ash-Shurūr mentioned in the Ottoman records between 1864 and 1918 (Tarawneh 1992: 168).

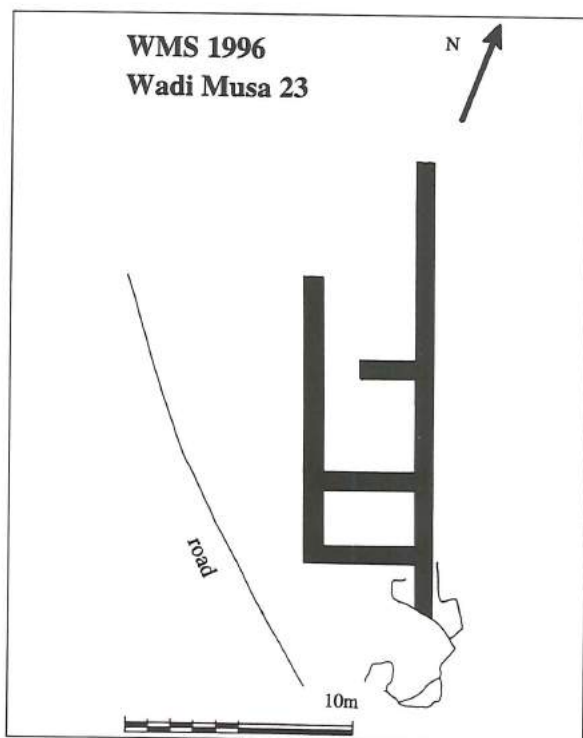
Dating: Probably Late Ottoman.

Wadi Musa 23

UTM coordinates: 740414E; 3357314N.

Altitude: 1335.3m.

A structure built of large rough flint blocks, with internal divisions, only one to two courses preserved above rock outcrop (Fig. 18). A cave at the southern edge of the structure has walls built in front and may have been incorporated in the building. Located at the tip of a flat knoll above a wadi to the southwest. The modern road connecting Wādī Mūsā and Baṣṭa runs above this wadi and has cut the edge of the site.



18. WMS 1996 site Wadi Musa 23: sketch plan of the structure (drawn by A. al-Momani).

Additionally there is much dumping at the side of the wadi opposite the structure. The structure may be associated with roads site Wadi Musa 24 directly to the east (between the town of Wādī Mūsā and Wādī Mūsā existing water reservoir). Scarce pottery sherd scatter was noted at the site (ignoring what may have come from the dumps).

Dating: Hellenistic/ Early Nabataean, Nabataean (second century BC - second century AD).

Wadi Musa 24

UTM coordinates: 740726E; 3357240N - 740598E; 3357208N - 740595E; 3357270N - 740654E; 3357242N.

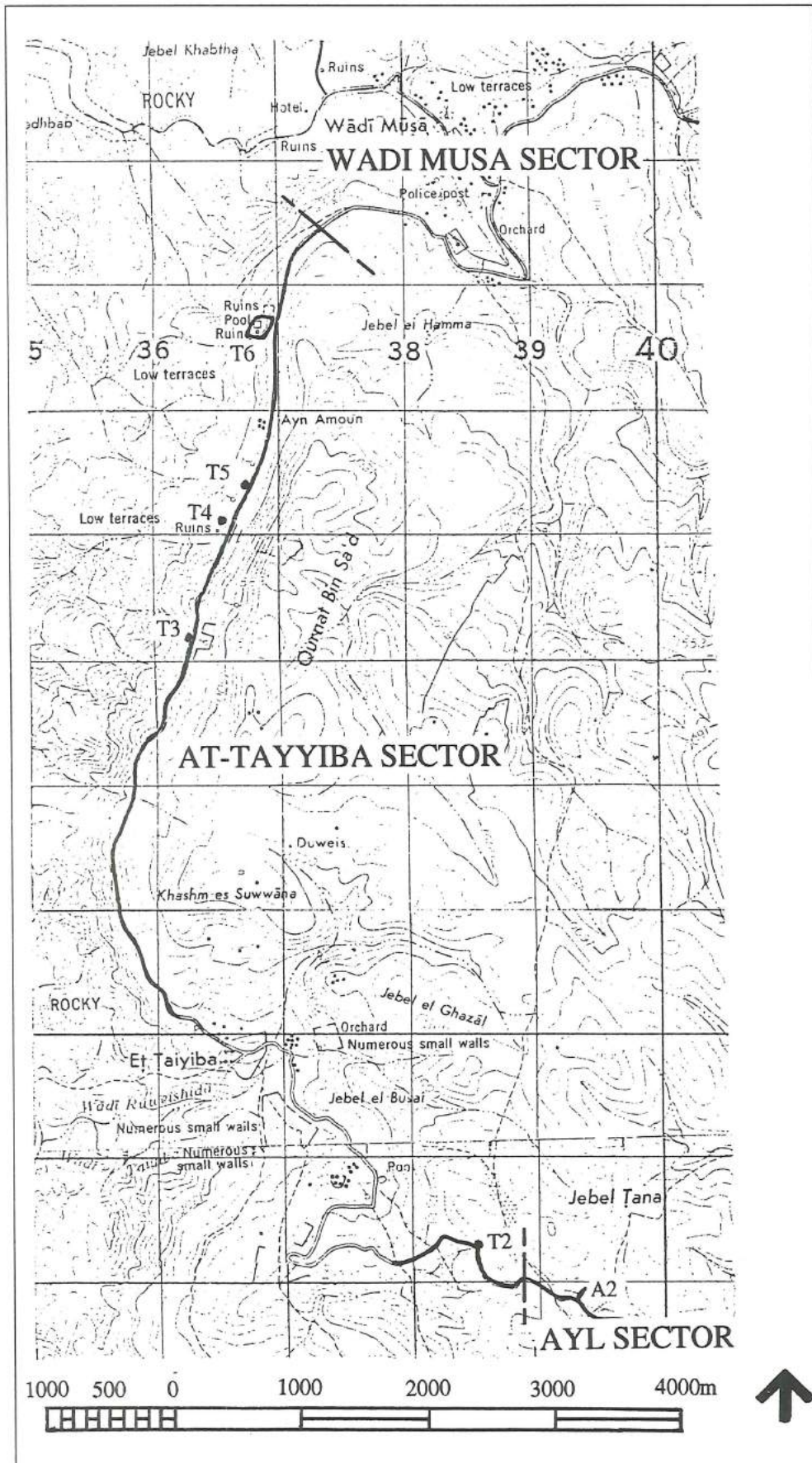
Altitude: 1361.9 - 1374.5m.

Two ancient roads, the edges of which are defined by layouts of chert stones. Located along the ridge of a long knoll, to the south of site Wadi Musa 23. The higher road could only be traced for a short stretch to the west of the better preserved road, which is defined by smaller stones. The lower road is still cut by the main road and several side tracks, it is also lost around an area where a modern water hole was excavated. The road may join with ar-Raṣīf (site Qa' 10, see below). A modern bedouin cemetery is also located to the west of the northern part of the road. Scarce Nabataean pottery sherd scatter was noted near the site.

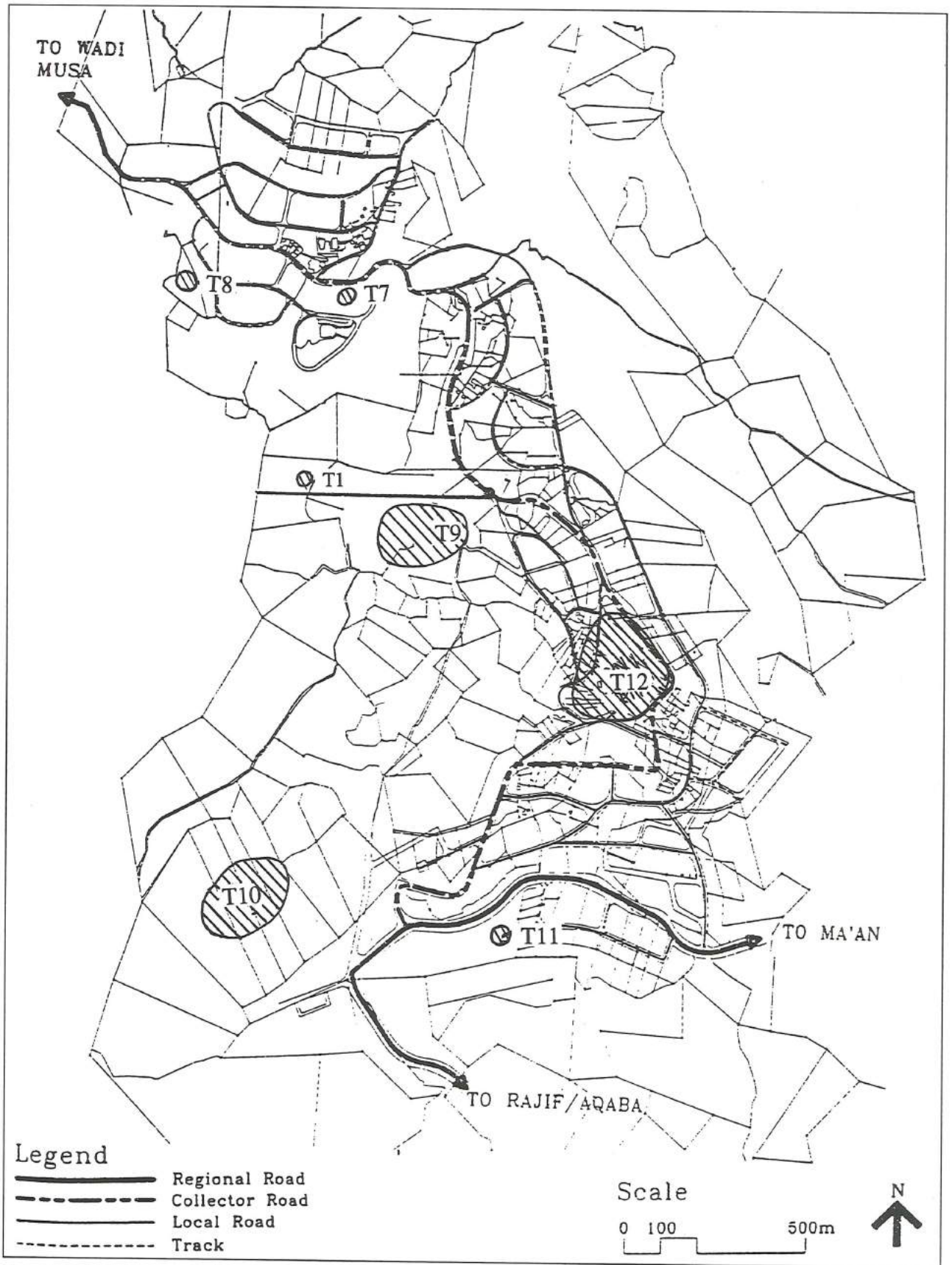
Dating: Nabataean, probably with earlier as well as later use.

4. The aṭ-Ṭayyiba Sector (Fig. 19a, b)

The aṭ-Ṭayyiba sector is comprised of the area extending in the north from the beginning of the road connecting the towns of aṭ-Ṭayyiba and Wādī Mūsā, the town of aṭ-Ṭayyiba itself, all the way south to the road connecting the towns of aṭ-Ṭayyiba and Ayl, the division being at the new water reservoir installed by the Water Authority (Fig. 19a). Sites Tayyiba 1 and 7-12 lie within the



19a. WMS 1996: recorded archaeological sites in the at-Ṭayyiba sector along the routes connecting at-Ṭayyiba with Wādī Mūsā, and at-Ṭayyiba with Ayl (ref. maps Jordan 1:50,000 Petra 3050I K737 and Rās an-Naqab 3050II K737).



19b. WMS 1996: recorded archaeological sites in the town of at-Tayyiba (base map supplied by the Petra Region Planning Council).

boundaries of the town of aṭ-Ṭayyiba (Fig. 19b), Tayyiba 2 is along the road between Ayl and aṭ-Ṭayyiba, while Tayyiba 3-7 are along the connecting road between aṭ-Ṭayyiba and Wādī Mūsā. The plotting of JADIS sites showed that 'Ayn Dubayl (JADIS site 1996.026) and 'Ayn Āmūn (JADIS site 1996.021) are also close to the road connecting aṭ-Ṭayyiba and Wādī Mūsā, but during the field survey it was found that 'Ayn Dubayl is far enough above the route not to be affected, and the archaeological site at 'Ayn Āmūn is well below the route and protected by the intervening modern buildings of the village. Therefore it was decided not to include these two known archaeological sites in this survey.

The water sources in this sector made it ideal for small agricultural villages, as indicated by the types of sites recorded. In addition to the recorded sites, there are numerous agricultural terraces and wadi barriers in the aṭ-Ṭayyiba area that were noted but not recorded in this survey. Most noteworthy are the terraces to the northwest of the modern town, which are also characterized by a "background" of flint implements (the only concentration noted being at site Tayyiba 1). There are several known Palaeolithic, Epipalaeolithic and Neolithic sites to the north and west of aṭ-Ṭayyiba (see for example Gebel 1985; Schyle and Uerpmann 1988). It is possible that the mountain slopes next to aṭ-Ṭayyiba were favoured hunting grounds during these periods.

Tayyiba 1

UTM coordinates: 736698E; 3349386N.

Altitude: 1272.7 - ~1280m.

Wadi barriers of unhewn medium sized stone blocks and deeply buried terrace walls revealed by the wadi cut. Additionally, there is an abundant flint scatter on the slopes of the wadi. The area is a flat ridge below limestone cliffs, with wadis in the north and south. It is currently an agricultural field, and there are several (mod-

ern) agricultural terraces and rock shelters in the vicinity.

Dating: Uncertain for the walls; Natufian (?) for the slope.

Tayyiba 2

UTM coordinates: 738508E; 3348310N.

Altitude: 1652.0m.

Dimensions: 60m N-S x 20m E-W; actual orientation 340°.

Wall lines, of somewhat large stones. Possibly the remnants of an ancient road. On an elevated area (midway down a mountain slope) surrounded by obvious ancient terraced agricultural fields. The site is disturbed by modern agricultural fields and cut by the modern road connecting aṭ-Ṭayyiba with Ayl. The modern road cut shows several terrace walls, all the way down to bedrock. Pottery sherd scatter was noted at the site.

Dating: Nabataean, Early Byzantine.

Tayyiba 3 (Khirbat Dubayl)

UTM coordinates: 736258E; 3353211N.

Altitude: 1398.1m.

JADIS site 1996.016 (Musil 1908: 128, 283; Glueck 1935: 79 Site 122). Several structures on a ledge along the mountain slope, directly to the west of the road connecting aṭ-Ṭayyiba with Wādī Mūsā. The site is characterized by a concentration of large stones. Abundant pottery sherd scatter was noted at the site.

Dating: Iron II (Edomite), Late Islamic.

Tayyiba 4 (Khirbat al-Mu'allaq)

UTM coordinates: 736553E; 3354146N.

Altitude: 1367.0m.

JADIS site 1996.011 (Glueck 1935: 79 Site 121). Several structures within a walled agricultural village, located on a flat area in the mountain slope. The site was partially excavated in 1994 by a team from the Natu-

ral History Museum of Nürnberg (Lindner and Knauf 1994; Lindner *et al.* 1996), therefore no samples were collected from the site during this survey.

Dating: Iron II (Edomite), Late Islamic.

Tayyiba 5

UTM coordinates: 736769E; 3354389N.

Altitude: 1348.8m.

Dimensions:- Structure: 12.5m N-S x 5m E-W (actual orientation 20°).

A small rectangular structure, of medium and large stone blocks, currently covered with small stones from field clearance. Located in a flat terraced area on the mountain slope, below the road connecting aṭ-Ṭayyiba with Wādī Mūsā. Abundant flint and pottery sherd scatter was noted at the site, indicating that the terrace area is an archaeological site as well as the structure (Fig. 20).

Dating: Unidentified flint, Nabataean (second century AD), Late Roman/ Early Byzantine (fourth century AD), Abbasid (late eighth century AD).

Tayyiba 6 (Khirbat Brāq)

UTM coordinates: 736991E; 3355734N - 736929E; 3355571N - 736918E; 3355774N - 736849E; 3355600N.

Altitude: 1299.6 - 1318.4m.

JADIS site 1996.005 (with adjoining pool being JADIS site 1996.017). (Musil 1908:

78, 98, 102, 108; Glueck 1935: 79 Site 119; 1939: 44-46; Parr 1960: 134-136; Tholbecq 1996: Shara Survey Site 13). An extensive village site with ancient terraces, several structures, a water cistern and a temple, situated on a relatively flat area on the mountain slope. The east edge of the site is currently covered with the bedding of the road connecting aṭ-Ṭayyiba with Wādī Mūsā. A large building and its surrounding area was excavated by a team from the Department of Antiquities in 1995 (Farajat *et al.* in press), therefore no samples were collected from the site.

Dating: Nabataean, Roman, Byzantine, Early Islamic, Ayyubid/Mamluk.

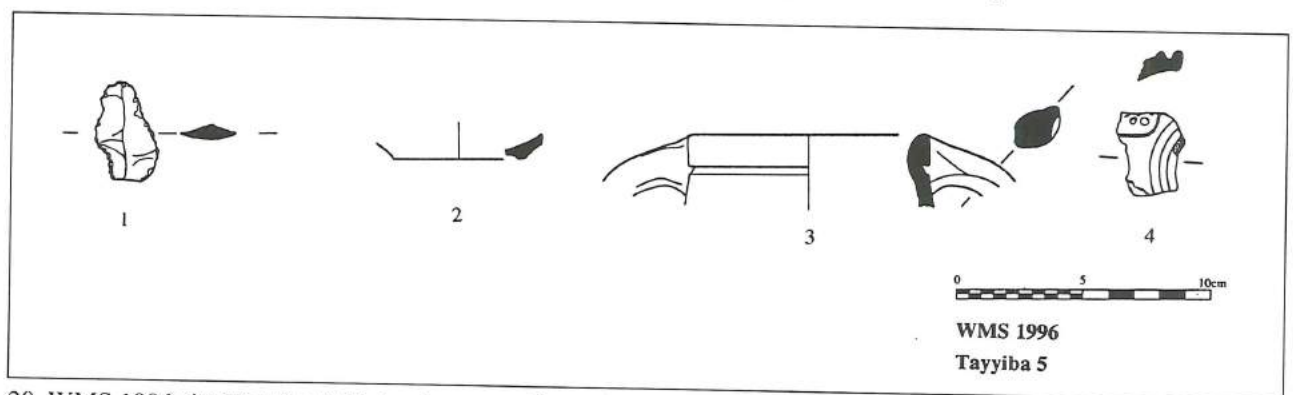
Tayyiba 7

UTM coordinates: 736720E; 3349835N - 736640E; 3349851N-736765E; 3349881N.

Altitude: 1331.8 - 1337.4m.

The modern (1915-1950) site of aṭ-Ṭayyiba is JADIS site 1996.020 (Glueck 1935: 79). Among the traditional houses to the north of Taibet Zaman Hotel, earlier wall lines and a scant sherd scatter was noted. The earlier remains are much obscured by the modern houses and it is difficult to determine the extent of the modern deposits at the site. These houses are located on the mountain slope.

Dating: Nabataean, Byzantine.



20. WMS 1996 site Tayyiba 5 flint and pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Burin, light grey; 2. base, red ware with grey core, Nabataean 2nd cent. AD; 3. jar, red ware, cream slip ext., Late Roman/ Early Byzantine 4th cent. AD; 4. moulded lamp, grey ware, Abbasid.

Tayyiba 8

UTM coordinates: 736305E; 3349844N - 736255E; 3349869N-736257E; 3349874N.

Altitude: 1326.0 -1327.1m.

Probable wall lines in the cut for a dirt road, some flints and pottery sherds were also noted in the vicinity. Located on the mountain slope among agricultural terraces. The area is intensely farmed and disturbed by recent houses, making it difficult to define the limits of the site.

Dating: Neolithic (?), Iron II, Nabataean.

Tayyiba 9 (Khirbat al-Hāma)

UTM coordinates: 737062E; 3349164N - 737109E; 3349091N-737033E; 3349000N - 736903E; 3348994N-736861E; 3349048N - 736889E; 3349191N.

Altitude: 1353.2 - 1380.0m.

A very extensive site with many structures. Located on two hills and wadi in between (walls showing in the wadi cut therefore structures are continuous on hill slopes as well as hill tops, the southern slope is currently cleared for agricultural terraces). The northern part is better preserved than the southern. Pavements of several threshing floors at the site may be, at least in part, cleared ancient pavements. There is a water spring at the northern slope of the southern hill, currently in the middle of a modern agricultural fields. One structure on the southern hill may be a roofed cistern with a square opening, however this identification is difficult to determine without further clearance. Abundant flint and pottery sherd scatter was noted at the site.

Dating: Neolithic (?), Nabataean (first to third centuries AD), Byzantine (fifth to sixth centuries AD), Late Islamic.

Tayyiba 10 (Khirbat al-Hubays)

UTM coordinates: 736924E; 3347495N.

Altitude: 1427.7m.

JADIS site 1995.025. A large complex site

with many structures built using medium sized stone blocks (an agricultural village?), with the main site being on a hill along the mountain slope, and a smaller concentration of structures on a small hill across the wadi to the south (Fig. 21). Both are among terraced agricultural fields. Some walls in the north are still showing several courses above ground level. Two robbers pits were noted at the site, one of which shows walls preserved at least 1.50m high. A Byzantine tomb stone with a cross but no inscription was noted in the field to the northwest, however there are no apparent signs of a cemetery. The area surrounding the concentrations of structures is much disturbed by ploughing and threshing floors that may have disturbed the cemetery. Abundant pottery scatter was noted at the site (Fig. 22).

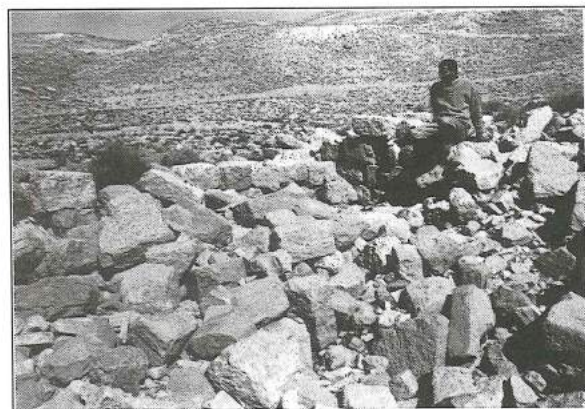
Dating: Nabataean, Roman, Byzantine (late first - sixth centuries AD).

Tayyiba 11 (Khirbat ar-Ruways)

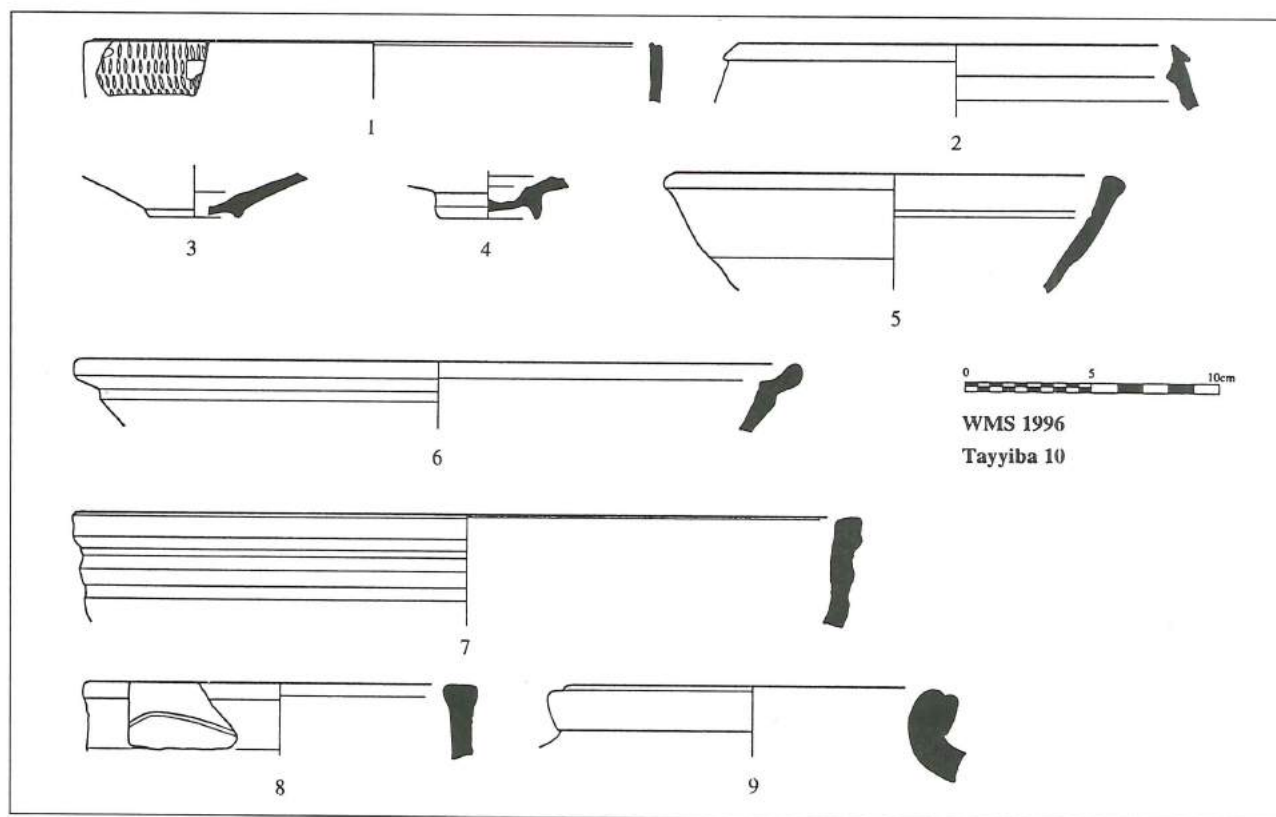
UTM coordinates: 737314E; 3348099N.

Altitude: 1569.9m.

Structures on a hill top and slopes dominating above the town, built of medium and large stone blocks. Extensive concentration of collapsed stones make it difficult to discern wall line, but this is an ideal location for watch towers. There is one robbers pit near the top of the hill.



21. WMS 1996 site Tayyiba 10 (Khirbat al-Hubays): structure in the southern concentration with the main mound across the wadi in the background.



22. WMS 1996 site Tayyiba 10 (Khirbat al-Ḥubays) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Bowl, red with grey core, fine ware, rouletted decoration, Nabataean late 1st-early 2nd cent. AD; 2. cooking pot, red with cream slip, Nabataean 2nd cent. AD; 3. base, dark red with wide grey core, somewhat coarse ware, Late Nabataean late 2nd-3rd cent. AD; 4. base, greyish red, grey int., Late Nabataean late 2nd-3rd cent. AD; 5. bowl, light orange, sandy texture, Byzantine 5th-early 6th cent. AD; 6. bowl, grey, Early Byzantine 4th cent. AD; 7. large bowl, red, cream slip ext., Byzantine late 4th-5th cent. AD; 8. jar, orange with red core, sandy texture, Late Byzantine 6th cent. AD; 9. storage jar, red with grey int., sandy texture, Late Byzantine 6th cent. AD.

Abundant sherd scatter was noted at the site (Fig. 23).

Dating: Iron II (predominant), Nabataean (second and third centuries AD), Late Islamic.

Tayyiba 12 (Khirbat Dhbā')

UTM coordinates: 737615E; 3348852N.

Altitude: 1459.0m.

JADIS site 1996.015 (Musil 1908: 282; Glueck 1935: 79 Site 125). An extensive site located across two slight rises, currently occupied by modern (traditional) houses, agricultural terraces and cut by the main road through the town of aṭ-Ṭayyiba. People still dwell in the houses on the site. A few wall lines can be seen in the area of traditional houses, and structures can be seen in the modern road cut (which apparently has

gone below floor levels; Fig. 24). A scarce pottery sherd scatter was noted at the site.

Dating: Late Nabataean, Late Byzantine, Late Islamic.

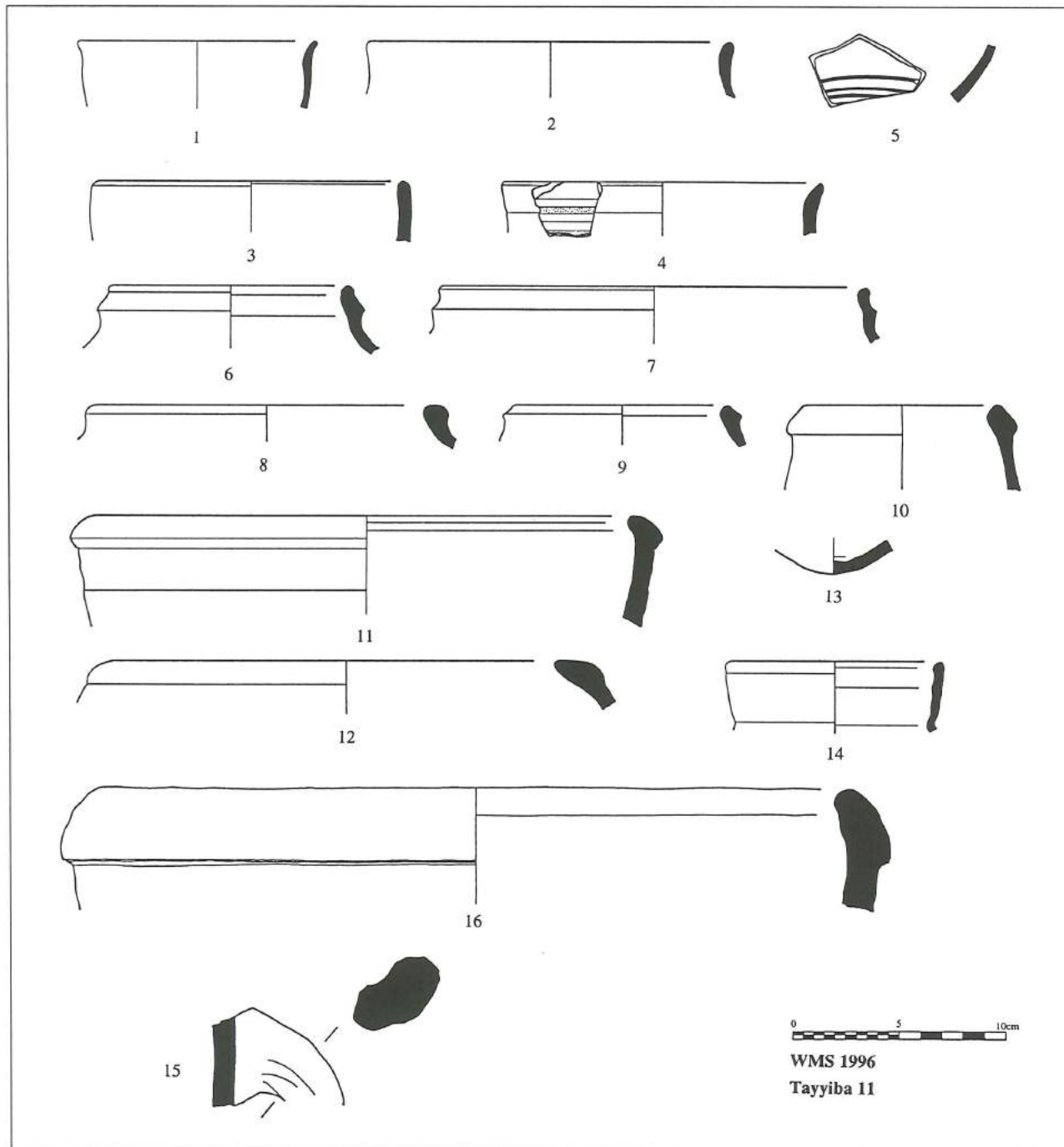
5. The Ayl Sector (Fig. 25)

The Ayl sector starts at the road connecting aṭ-Ṭayyiba with Ayl, and includes the village of Ayl. There are numerous agricultural terraces along this route that were noted but not recorded in this survey.

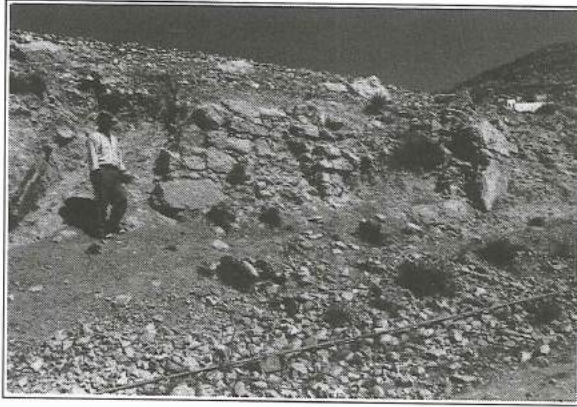
The impression in this sector is that of mainly agricultural farmsteads and villages. The area around Ayl was also obviously of special military importance.

Ayl 1 (Nabāt 'Ayn al-'Ashra)

UTM coordinates: 743152E; 3344553N.



23. WMS 1996 site Tayyiba 11 (Khirbat ar-Ruways) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Small bowl, red ware fired with patch of cream ext., thin grey core, Edomite Iron II; 2. closed bowl, brownish red ware with dark grey core, Edomite Iron II; 3. bowl, red ware fired with patch of grey ext., dark grey core, Edomite Iron II; 4. bowl, red ware with grey core, grey slip and black paint ext., Edomite Iron II; 5. bowl, red ware, black paint int., Edomite Iron II; 6. cooking pot, red ware, Edomite Iron II; 7. cooking pot, red ware, dark grey slip, Edomite Iron II; 8. holemouth jar, red ware with wide grey core and int., dark grey slip ext., Edomite Iron II; 9. holemouth jar, greyish brown ware with wide grey core, Edomite Iron II; 10. holemouth jar, red gritty ware, Edomite Iron II; 11. large bowl, red gritty ware, Edomite Iron II; 12. holemouth jar, reddish grey ware with wide grey core, cream slip ext., Edomite Iron II; 13. base, red ware with grey core, Nabataean 2nd cent. AD; 14. jar, red ware, Late Nabataean 3rd cent. AD; 15. storage jar handle, handmade, red ware with very wide grey core, thick cream slip ext., many calcite and grog inclusions, abundant chaff impressions, Late Islamic; 16. basin, handmade, greyish brown ware with very wide dark grey core, many calcite, grog and mineral grey inclusions, many chaff impressions, Late Islamic.



24. WMS 1996 site Tayyiba 12 (Khirbat Dhba'): ancient walls in the cut for the main road through the town.

Altitude: 1530.0m.

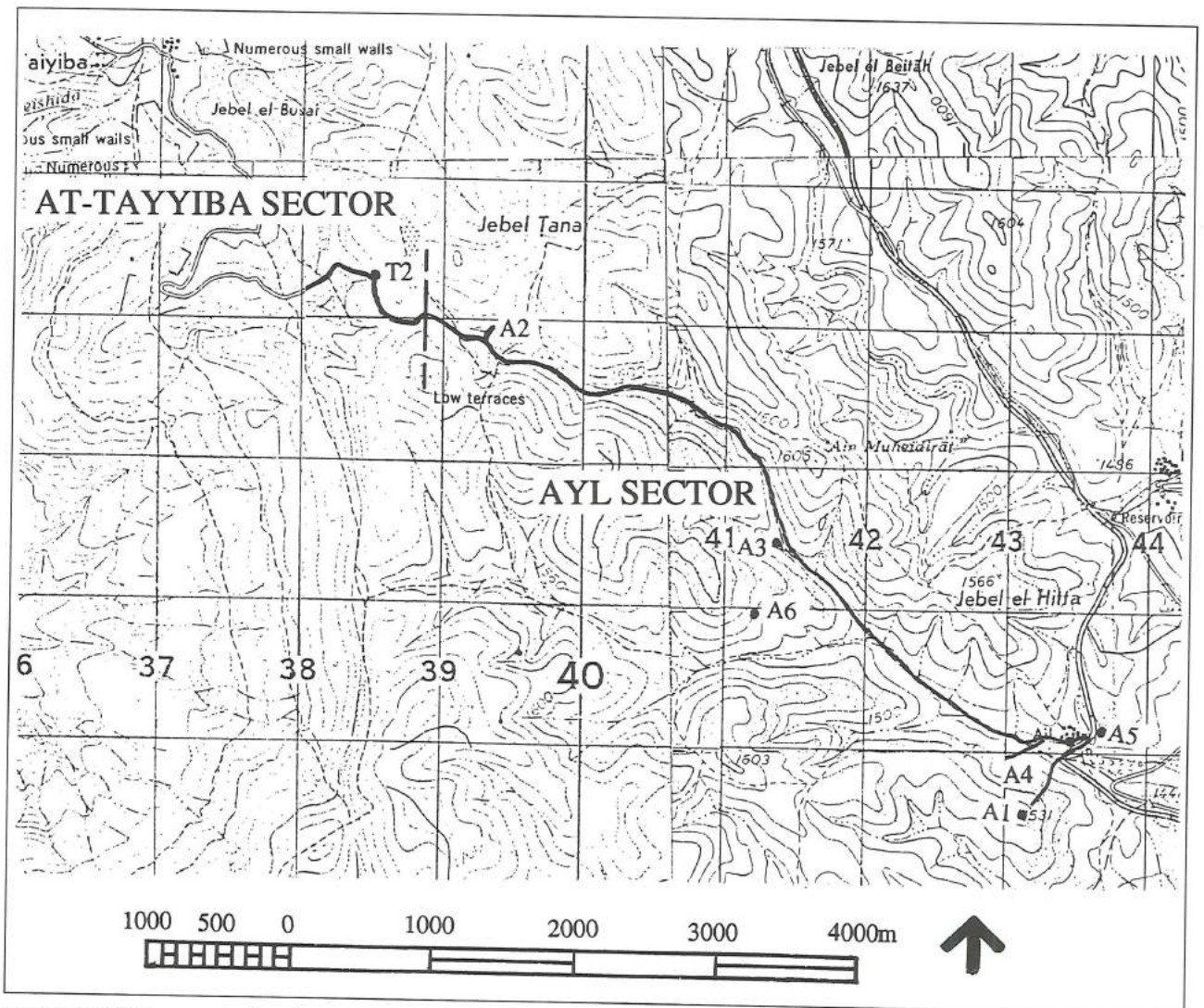
Two square structures (watch towers) at the

summit of the mountain. Built of medium and large stone blocks, with one and sometimes two courses visible above ground. Abundant sherd and some flint scatters were noted in the area. This site is to the south of Khirbat Ayl (site Ayl 5), on a high mountain top and slope. The area is strategically located with a superb view all the way to Ma'an and beyond, and there is (relatively) abundant water in the area.

Dating: Uncertain flint, Iron II (Edomite), Byzantine.

Ayl 2 (Khirbat al-Mabrak)

UTM coordinates: 739311E; 3347912N -



25. WMS 1996: recorded archaeological sites in the Ayl sector (ref. maps Jordan 1:50,000 Ras en-Naqb 3050II K737 and Ma'an 3150III K737).

739286E; 3347826N.

Altitude: 1641.5 - 1654.51m.

Extensive site with several structures built with medium and large stone blocks. On top and slopes of a high hill, above 'Ayn al-Mabrak. A dense scatter of pottery sherds was noted at the surface. Two robbers pits in the northern section—across the modern road from the hill top location—revealed wall lines with grey mortar above a rock cut, indicating that the site extends onto the flat area and is cut by the modern road connecting aṭ-Ṭayyiba with Ayl. The road has cut through the site down to bedrock in the southern part.

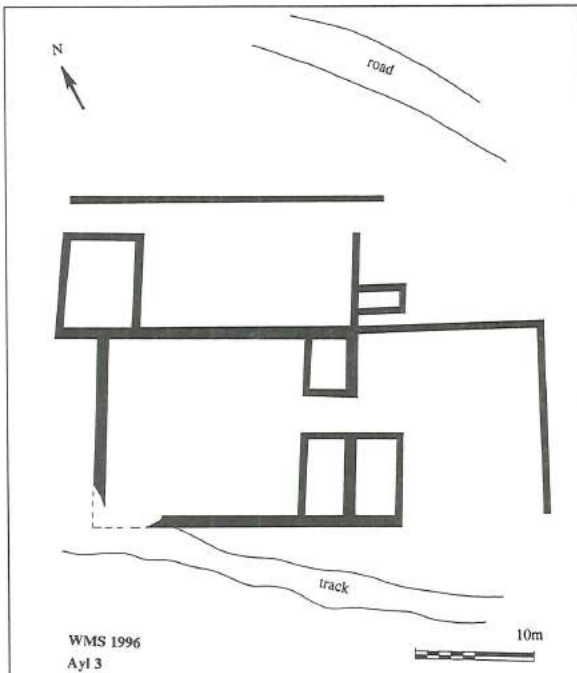
Dating: Nabataean, Byzantine, Late Islamic.

Ayl 3

UTM coordinates: 741371E; 3346484N.

Altitude: 1510.3m.

A complex structure, of medium sized stones. Up to two courses can be seen at the surface. The structure has an entrance in the east, accessed through a courtyard in a typical Oriental fashion (probably a farmstead; Fig. 26). There are also elaborate



26. WMS 1996 site Ayl 3: sketch plan of the structure (drawn by A. al-Momani).

wadi barriers to the north of the structure (across the modern road). The main structure is situated at the bottom of an east facing hill slope. The structure is situated directly south of the main road connecting aṭ-Ṭayyiba with Ayl, and is cut by a track in the south and east. Abundant sherd scatter was noted at the site.

Dating: Nabataean (first to early second century AD).

Ayl 4

UTM coordinates: 743330E; 3344939N - 742994E; 3345105N.

Altitude: 1433.6 - 1443.2m.

A water channel, of small sized cut stones and stone slabs with grey ashy mortar. The interior of the channel is covered with thick hydraulic plaster and calcite deposits. Located on a natural ledge, the eastern section is directly opposite Khirbat Ayl (site Ayl 5), approximately 200m west of 'Ayn Ayl. This eastern section is exposed by the road cut for a length of 22m (internal width of channel is 25cm). Another section of the channel is exposed approximately 300m to the west, along the modern road connecting aṭ-Ṭayyiba with Ayl. The western exposed section is 10m long. The recent road cut has seriously damaged the channel and due to the sheer cut, the level of the channel is currently approximately 2.5m above the present road surface.

Dating: Nabataean/ Roman.

Ayl 5 (Khirbat Ayl)

UTM coordinates: 743462E; 3345086N.

Altitude: 1446.6m.

This is JADIS Site 2095.001, a complex site of various structures (Brünnow and von Domszewski 1904: 467; Musil 1908: 275; Glueck 1935: 74-75 Site 101; Parker 1976: 24; Fiema 1995: 266; Graf 1995: 418). Much of the ancient site is currently built on by a modern (traditional) village. The site is

on a low hill to the north of the main road.

Dating: Iron II, Nabataean, Roman, Byzantine.

Ayl 6

UTM coordinates: 741230E; 3345973N.

Altitude: 1524.1m.

Dimensions: -Cistern: 12.80m E-W x 12.10m N-S (actual orientation 60°); channel: exposed to a length of 2.50m.

A water cistern at the bottom of a hill, with a channel leading to it from the west (up-hill). The cistern walls are 1.40m wide, built of medium and large stone blocks with remnants of mortar on the east wall. The site is approximately 25m to the west of the main road. No pottery sherds or flint tools

were noted at the site.

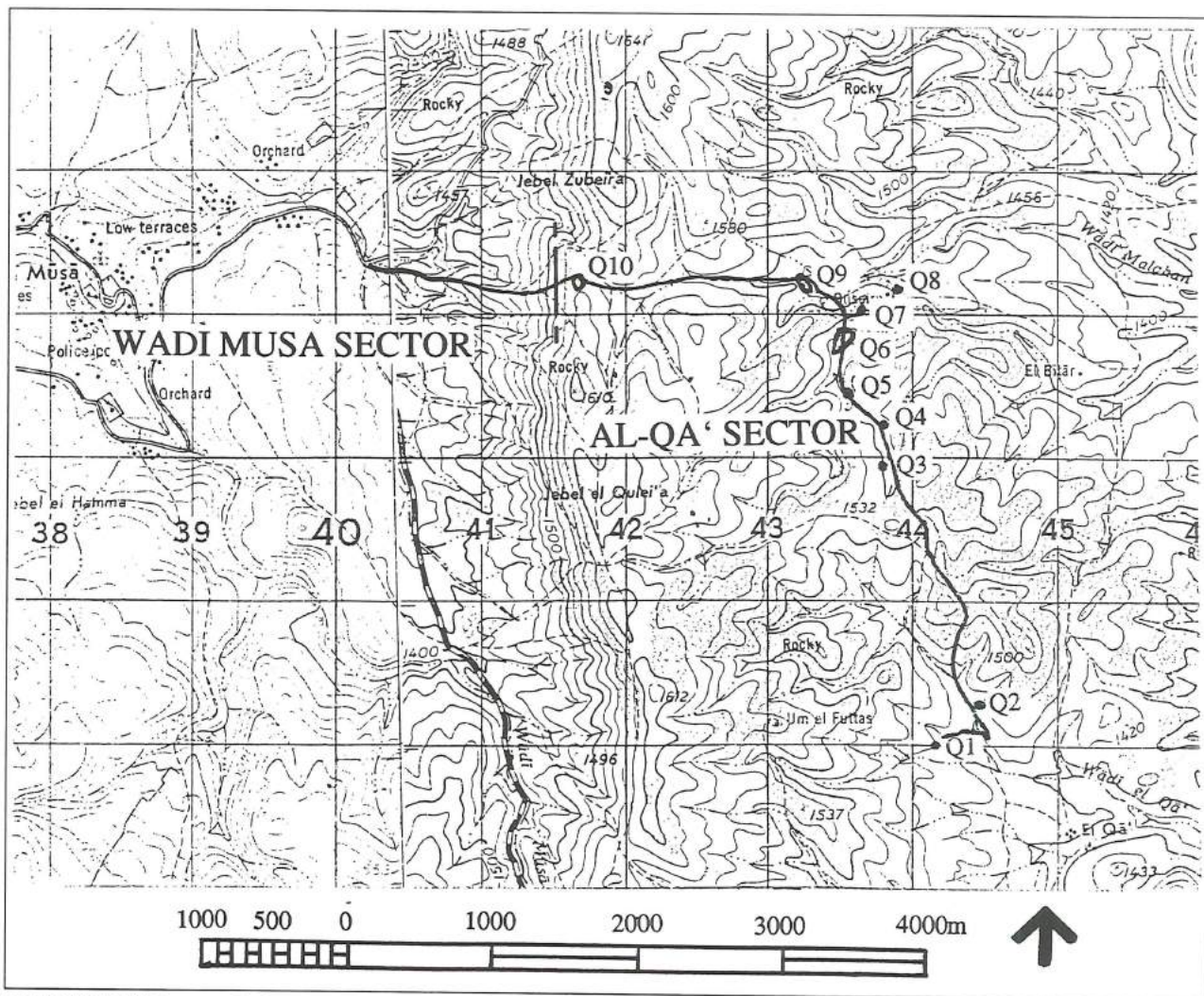
Dating: Nabataean/ Roman (?).

6. The Al-Qā' Sector (Fig. 27)

Along the pipeline route connecting al-Qā' and Wādī Mūsā, the division is at the present Wādī Mūsā reservoir. Ten sites were recorded in the al-Qā' sector. Additionally, there are numerous agricultural terraces along the route that were noted but not recorded in this survey.

Most of the surveyed route in the al-Qā' sector is along dirt tracks, away from the main road.

The general impression at the al-Qā' sector is of an ancient agricultural area, with farm-



27. WMS 1996: recorded archaeological sites in the al-Qā' sector (ref. maps Jordan 1:50,000 Petra 3050I K737 and Bir Khadd 3150IV K737).

steads and hamlets dotted over the sector. This implies that many of terraces are ancient sites in themselves.

Qa'1

UTM coordinates: 744148E; 3354004N.

Altitude: 1436.8m.

A round, rock-cut water well with steps internally (one step at a depth of ~1m, cleared depth above fill 1.30m). One course of stones preserved above rock-cut. Remnants of hydraulic plaster on the inside. The well is connected to a square settling tank directly to the northwest (uphill). There is a also a channel leading from the well to the south-east (directly opposing the settling tank). The well is located on the flat top of a low hill, surrounded by remnants of ancient terraces. Some pottery was noted at the site.

Dating: Nabataean (first century AD).

Qa'2

UTM coordinates: 744451E; 3354303N.

Altitude: 1419.4m.

Complex rectangular structure with internal divisions, built of unhewn stone blocks (mostly flint). Branching wall lines also apparent at the surface. Located on a flat area between several hills, surrounded by agricultural fields. The structure is cut by a water course in the south.

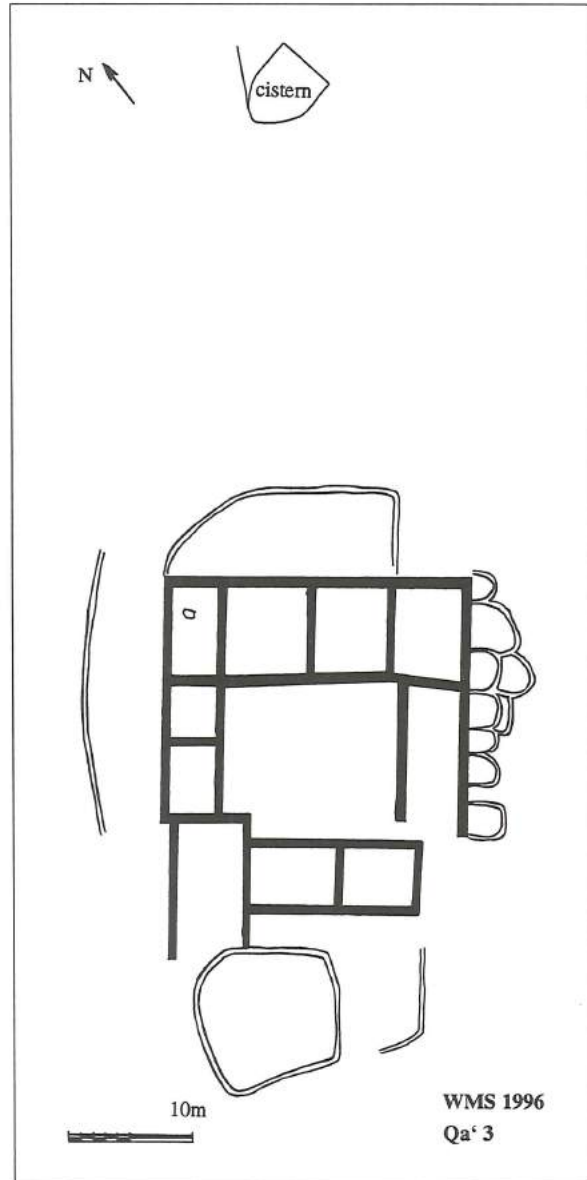
Dating: Nabataean (first/ second century AD).

Qa'3

UTM coordinates: 743779E; 3355974N.

Altitude: 1510.7m.

A large rectangular complex with internal divisions and a well in the northwest corner, built mostly of large flint blocks (Fig. 28). Located on the upper slope of a hill. Original outline of the structure partially obstructed due to recent corrals and shelters built in and around it. Approximately 40m to the northeast of the structure further



28. WMS 1996 site Qa'3: sketch plan of the structure (drawn by A. al-Momani).

down the slope, there is a rectangular rock-cut cistern with remnants of hydraulic plaster, located partially within a natural cave, part of the roof of which is still preserved. The east wall of the cistern, which would have been stone-built, is currently destroyed. Abundant pottery sherd scatter was noted at the site.

Dating:- Structure: Nabataean (first/ second century AD), Late Roman/ Early Byzantine (fourth century AD), Late Islamic; cistern: Nabataean, Early Byzantine.

Qa'4

UTM coordinates: 743787E; 3356224N.

Altitude: 1496.1m.

A rectangular building with internal divisions, built of large flint stone blocks. Located on the lower slope of a hill among agricultural fields. A dirt track may have cut part of the site. Abundant sherd scatter was noted at the site.

Dating: Nabataean (first to second century AD).

Qa'5

UTM coordinates: 743516E; 3356446N.

Altitude: 1480.5m.

Dimensions: 27.5m E-W x 11m N-S (actual orientation 45°).

A rectangular structure located at the bottom of a hill. Very difficult to discern the outline as it is obstructed by the piling of small stones from the clearance of the surrounding agricultural fields, however the northeast and southwest corners are clearly

visible. Scarce sherd scatter (Classical Nabataean body sherds) was noted at the site.

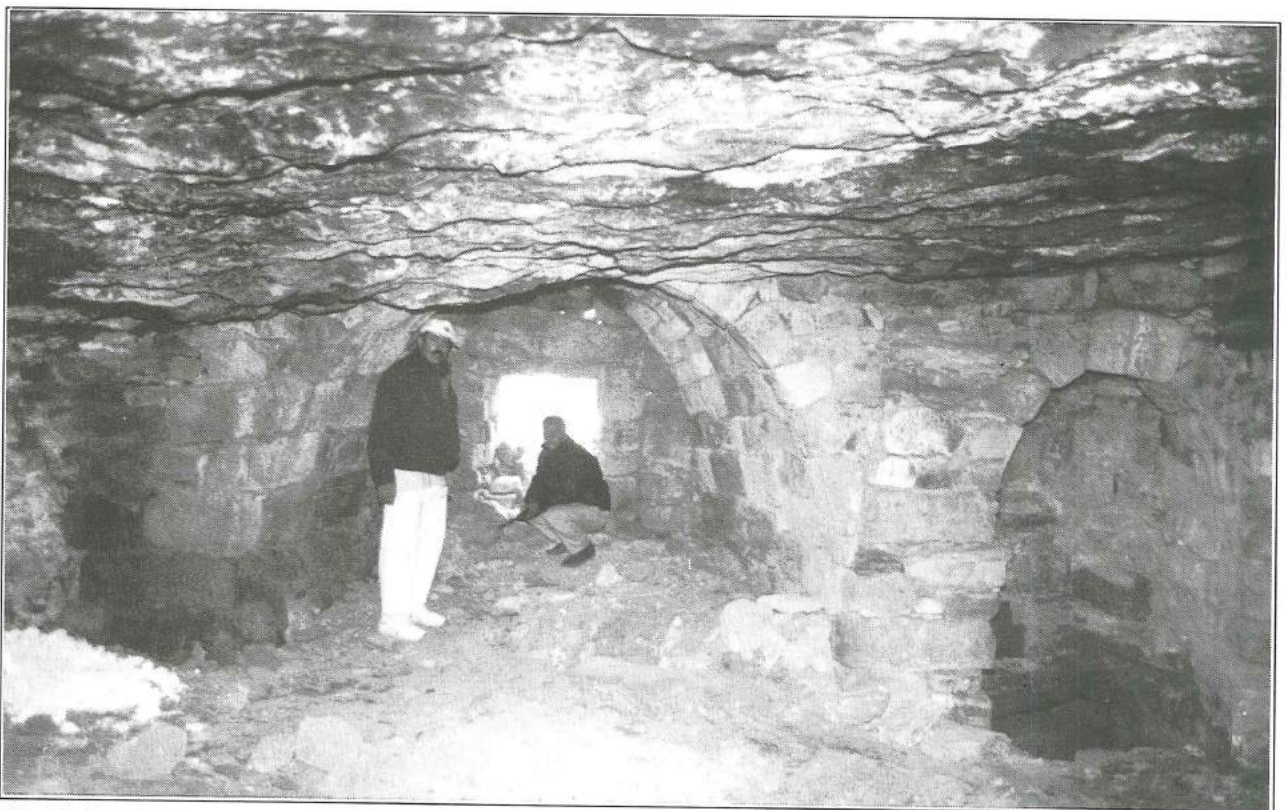
Dating: Nabataean (?).

Qa' 6 (Umm at-Ṭirān)

UTM coordinates: 743511E; 3356871N - 743675E; 3356861N-743416E; 3356736N.

Altitude: 1486.0 - 1494.1m.

An extensive site with many structures built with medium and large stone blocks. There are three main concentrations of structures showing at the surface, located on three close-lying low hills (continuity of structures may have been disturbed by intervening agricultural fields). The largest concentration (in the northeast) has one cave with an arched entrance, rock-cut niches and a cistern inside, also built walls within the cave are showing in robbers pits (Fig. 29). The roof of another cave in this main concentration, to the south, had collapsed. A round water well, to the east of the second cave, has a ceramic water pipe leading



29. WMS 1996 site Qa' 6 (Umm at-Ṭirān): interior of the first cave. The cistern is below the arch to the right.

into it from the west (uphill). The present water pipe line, laid in 1974, cuts this part of the site. It has already destroyed the edge of a structure at the southern end of the main concentration. The vehicular dirt track also cuts the main concentration of structures at its east end.

There are also two smaller concentrations of similar structures to the south and east of the main concentration, the eastern of which has several recent threshing floors and many corrals. Abundant sherd scatter was noted at the site (Fig. 30).

Dating: Nabataean to Byzantine (first to fifth centuries AD), Late Islamic.

Qa'7

UTM coordinates: 743674E; 3357052N.

Altitude: 1500.8m.

A complex structure with several internal

divisions, built of medium and large stone blocks, located at a hill top within a mountain slope and surrounded by agricultural fields. Abundant flint scatter was noted in the field surrounding the structure indicating that the area around the structure is a prehistoric archaeological site.

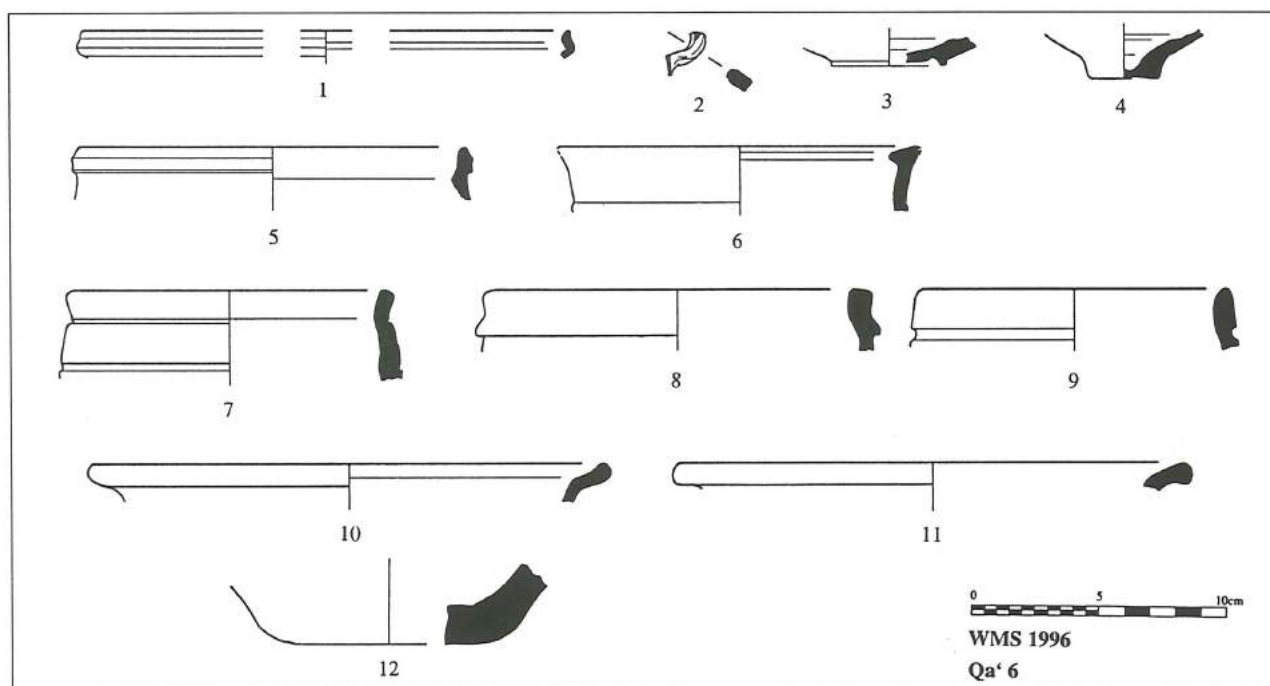
Dating: Neolithic for the field; Nabataean and Late Roman/Early Byzantine for the structure.

Qa' 8

UTM coordinates: 743866E; 3357120N.

Altitude: 1486.2m.

Structures located on a hill at the mountain slope. The site is currently dominated by the remnants of a modern (traditional) structure which had partially collapsed. There are also several modern corrals. A cave in the northwest edge of the site has rec-



30. WMS 1996 site Qa' 6 (Umm at-Ṭirān) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Bowl, fine red ware, cream ext. rim, Nabataean 1st cent. AD; 2. small juglet handle, fine red ware, Nabataean late 1st-early 2nd cent. AD; 3. base, fine red ware, Nabataean 1st cent. AD; 4. string-cut base, buff ware with red core, Late Nabataean 3rd cent. AD; 5. cooking pot, red ware, cream slip ext., Nabataean 2nd cent. AD; 6. jar, sandy red ware, cream slip ext., Late Nabataean late 2nd-3rd cent. AD; 7. jar, sandy red ware with grey core, cream slip ext., Nabataean 2nd cent. AD; 8. jar, sandy red ware, traces of grey slip ext., Byzantine 5th cent. AD; 9. jar, brownish red ware with grey core, Byzantine 5th cent. AD; 10. bowl, buff ware, traces of cream slip ext., Byzantine 5th cent. AD; 11. bowl, red ware, grey slip, Early Byzantine 4th cent. AD; 12. base, handmade, red ware with wide dark grey core and int., abundant calcite, grog and mineral grey inclusions, abundant chaff impressions, Late Islamic.

tangular niches cut into its walls. Abundant pottery sherd scatter was noted at the site.

Dating: Nabataean to Late Roman/ Early Byzantine (second to fourth centuries AD), Late Islamic.

Qa' 9 (Bi'r al-Biṭār)

UTM coordinates: 743220E; 3357218N-743293E; 3357184N-743205E; 3357278N.

Altitude: 1484.5 - 1502.1m.

Site with several structures located on a hill top, now occupied by modern (traditional) houses and a school. Some of the houses in the east had collapsed and ancient wall lines are apparent in the vicinity. Modern pits behind the school revealed well-preserved ancient walls (Fig. 31). Abundant pottery sherd scatter was noted at the site (Fig. 32).

Dating: Iron II (Edomite), Nabataean (first and second centuries AD), Late Byzantine to Early Islamic (sixth and seventh centuries AD), Late Islamic.

Qa' 10 (ar-Raṣīf)

UTM coordinates: 741683E; 3357298N-741668E; 3357239N-741673E; 3357205N-

741744E; 3357228N.

Altitude: 1549.5 - 1552.9m.

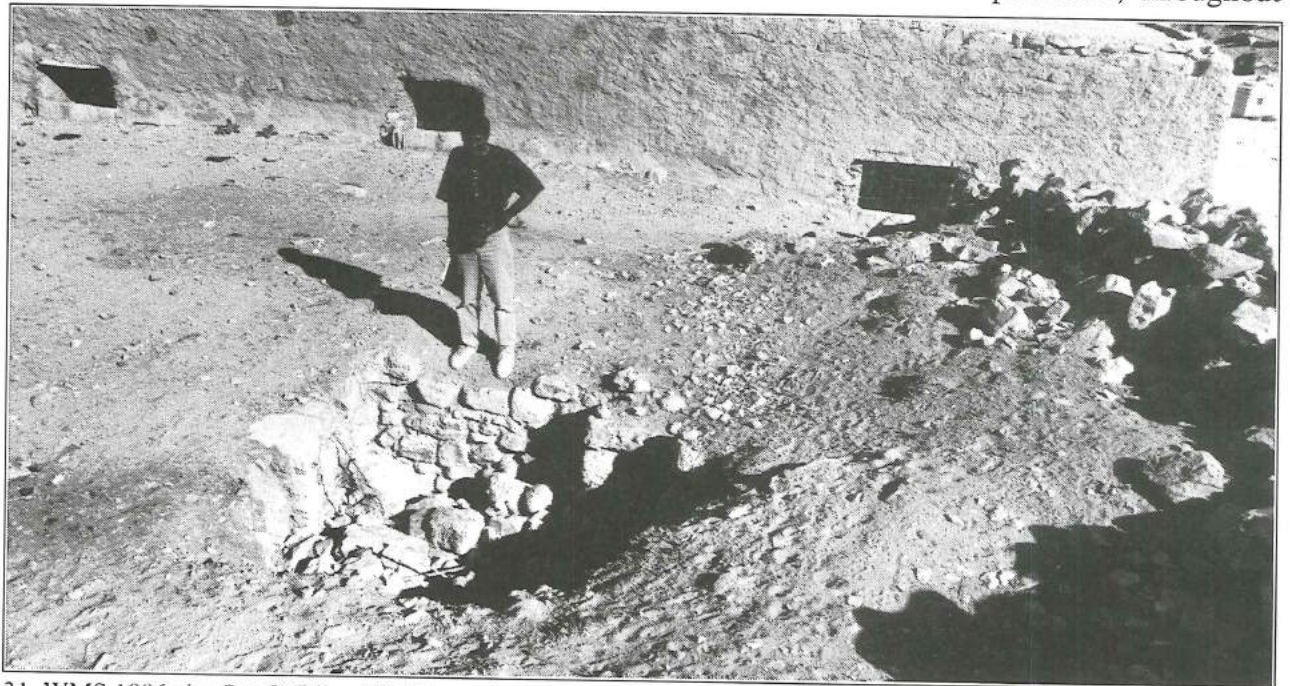
What may be the junction of three ancient roads, one from Udhrūḥ (Fig. 33), the second from aṭ-Ṭayyiba, and the third from Wādī Mūsā (Site Wadi Musa 24; see also Graf 1992: 256). The "aṭ-Ṭayyiba road" is the best preserved, being several kilometres long. The stretch concerned is directly to the south of the present Wādī Mūsā reservoir, and is already disturbed by its enclosure. A cave to the west of the "aṭ-Ṭayyiba road" was used as a cistern, with stone-built walls around it. Robbers pits directly to the south of the cistern unearthed much pottery and an ash layer, including restorable pots. There are also several wall lines to the west of the cistern.

Terrace walls to the east of the road seem to be based on older structures.

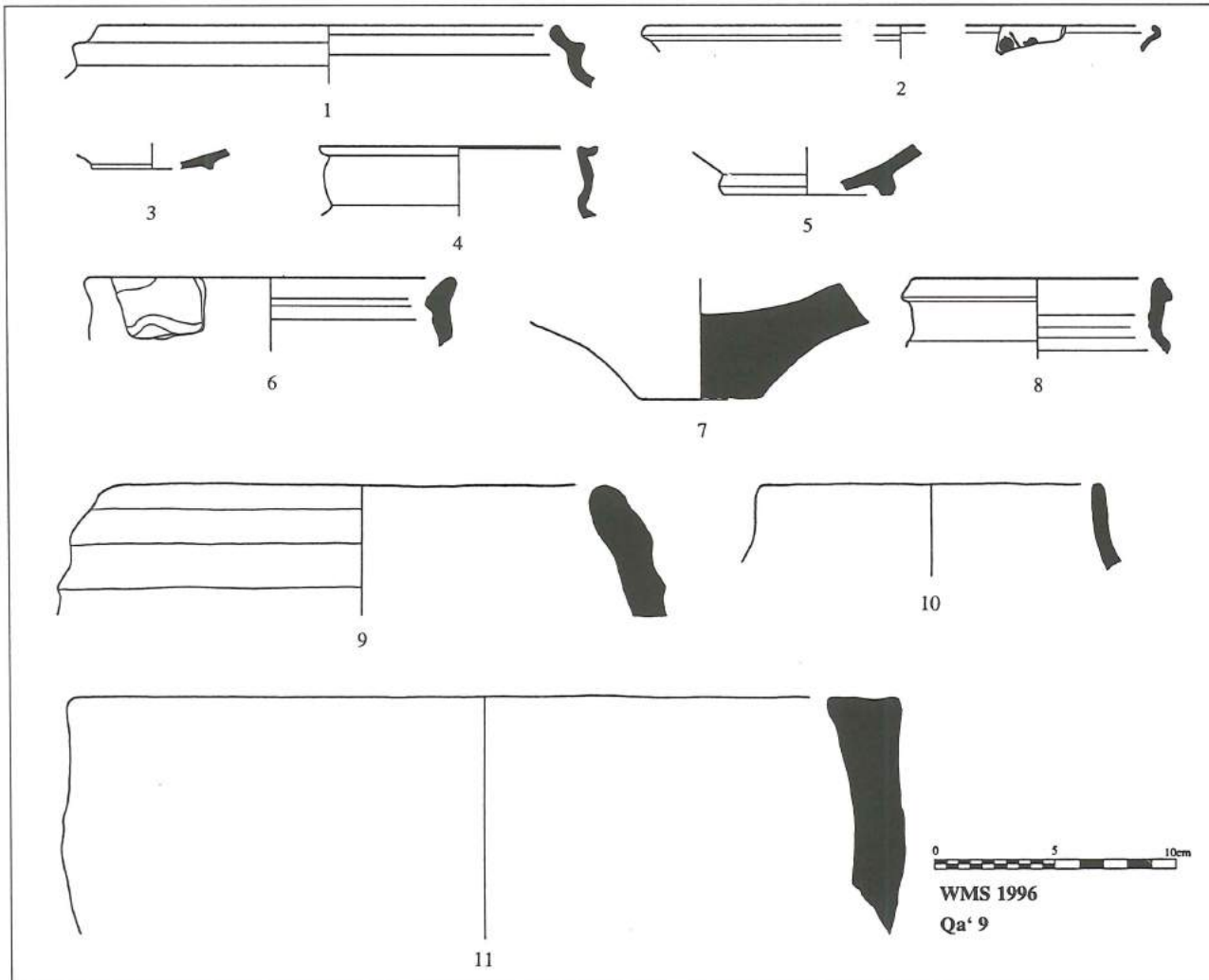
Dating: Nabataean, Roman, Late Roman/ Early Byzantine.

Acknowledgement

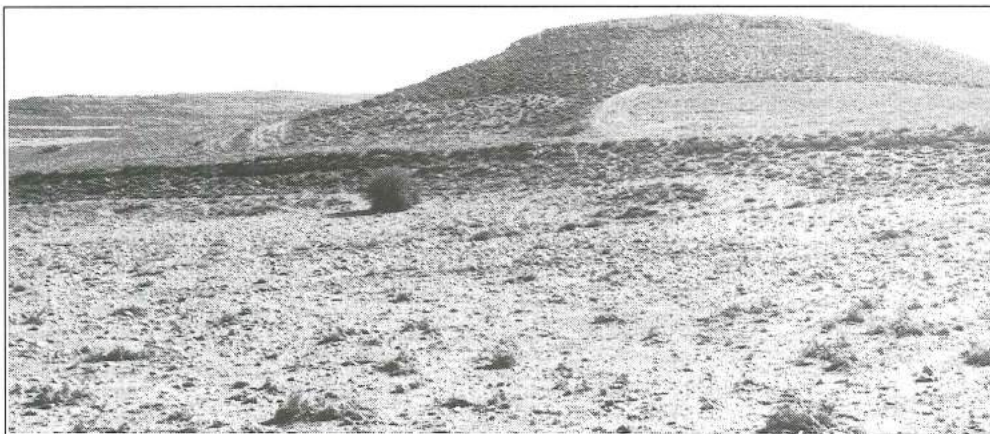
We wish to express our gratitude for the support received from CDM in general, and Mr Fred McNeill in particular, throughout



31. WMS 1996 site Qa' 9 (Bi'r al-Biṭār): ancient walls showing in a pit behind the school house.



32. WMS 1996 site Qa' 9 (Bi'r al-Biṭār) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Cooking pot, sandy brownish red ware, Edomite Iron II; 2. bowl, fine red ware, brown paint, Nabataean 1st cent. AD; 3. base, sandy red ware, Nabataean 2nd cent. AD; 4. jar, red ware, thick cream slip ext., Nabataean 2nd cent. AD; 5. base, fine red ware, Nabataean 1st-early 2nd cent. AD; 6. jar, incised decoration, sandy red ware, orange slip ext., Late Byzantine 6th cent. AD; 7. storage jar base, handmade, red ware with grey core, Late Byzantine - Early Islamic late 6th-7th cent. AD; 8. cooking pot, sandy reddish brown ware, Early Islamic 7th cent. AD; 9. storage jar, handmade reddish buff ware with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic; 10. small jar, unevenly fired red, brown and grey with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic; 11. basin, handmade, greyish buff ware with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic.



33. WMS 1996 site Qa' 10 (ar-Raṣīf): view from the north. The level at which the plants are growing is the surface of the ancient road from Udhrūḡ.

the period of the project. Thanks are also extended to land surveyor Mr F. Khalil, the Directorate of Lands and Surveys in Wādī Mūsā; the Petra Region Planning Council for the supply of base maps; and the Department of Antiquities personnel at the Registration Centre and Photography Section in Amman for the use of JADIS and the supply of base maps and photographs used in this report. We also thank Luay Mohamadieh for his help with the drawing of the archaeological artifacts, and Laurent

Tholbecq and Gaetano Palumbo for allowing us access to unpublished material on work they did in the area.

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Bibliography

- 'Amr, K.
1987 *The Pottery from Petra: A Neutron Activation Analysis Study*. BAR International Series 324. Oxford: British Archaeological Reports.
1991 The Petra National Trust Site Projects: Preliminary Report on the 1991 Season at Zurrabah. *ADAJ* 35: 313-323.
1994 La poterie nabatéenne. *Le Monde de la Bible* 88: 33.
1997 The Changing Landscape of the Clay Deposits at 'Ayn aṭ-Ṭinah, Wādī Mūsā. Pp. 121-126 in *SHAJ* VI. Amman: Department of Antiquities.
- 'Amr, K., Farajat, S., al-Momani, A. and Falahat, H.
1996 *Archaeological Studies Final Report for Wadi Mousa Water Supply and Wastewater Project, Stage II - CDM - 002 Tender*. Unpublished report on file at the Department of Antiquities Registration Centre and the Water Authority of Jordan, Amman.
- 'Amr, K. and al-Momani, A.
1998a *The Excavation of Two Additional Pottery Kilns at Zurraba*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
1998b *Khirbat an-Nawafila Excavation 1997*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
- 'Amr, K., Al-Nawafleh, S. and Qrarhi, H.
1997a A Preliminary Note on the Wādī Mūsā Salvage Excavation 1996. *ADAJ* 41: 469-473.
1997b Wadi Musa Salvage Excavation. In P. M. Bikai and V. Egan, (eds), *AJA* 101: 515-516.
- Banning, E. B. and Köhler-Rollefson, I.
1983 Ethnoarchaeological Survey in the Beidha Area, Southern Jordan. *ADAJ* 27: 375-383.
- Bennett, C.-M. and Bienkowski, P.
1995 *Excavations at Tawilan in Southern Jordan*. British Academy Monographs in Archaeology No. 8. Oxford: Oxford University Press.
- Bienert, H.-D. and Gebel, H. G.
1997 Ba'ja—Early Neolithic Settlers in the Petra Mountains. *Occident & Orient* 2/2: 2-4.
- Brünnow, R. and von Domaszewski, A.
1904 *Die Provincia Arabia I*. Strassburg: Trubner.

- Byrd, B. F.
 1988 The Natufian of Beidha: Report on Renewed Field Research. Pp. 175-197 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.
 1989 *Excavations at Beidha I. The Natufian Encampment*. Jutland Archaeological Society Publications XXIII:I. Copenhagen: Arhus.
- Farajat, S., Marahleh, M. and Falahat, H.
 In press The Excavations at Khirbat Braq. *Studies in Honour of Manfred Lindner*.
- Fiema, Z. T.
 1995 Military Architecture and the Defense "System" of Roman - Byzantine Jordan — A Critical Appraisal of Current Interpretations. Pp. 261-269 in *SHAJ V*. Amman: Department of Antiquities.
- Fino, N.
 1997 Al Baseet, a New LPPNB Site Found in Wadi Musa, Southern Jordan. *Neo-Lithics* 3/97: 13-14.
 1998 Al-Basit Neolithic Site in Southern Jordan. *ADAJ* (this volume).
- Gebel, H. G.
 1985 *TAVO Palaeoenvironmental Investigations in the Greater Petra Area, Field Research in 1984*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
 1988 Late Epipalaeolithic - Aceramic Neolithic Sites in the Petra Area. Pp. 67-100 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.
- Gebel, H. G., Muheisen, M. and Nissen, H. J.
 1988 Preliminary Report on the First Season of Excavations at Basta. Pp. 101-134 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.
- Glueck, N.
 1935 Explorations in Eastern Palestine, II. *AASOR* 35.
 1939 Explorations in Eastern Palestine, III. *AASOR* 38-39.
- Graf, D. F.
 1992 Nabataean Settlements and Roman Occupation in Arabia Petraea. Pp. 253-260 in *SHAJ IV*. Amman: Department of Antiquities.
 1995 Milestones with Uninscribed Painted Latin Texts. Pp. 417-425 in *SHAJ V*. Amman: Department of Antiquities.
- Greene, J. A.
 1995 The Water Mills of the 'Ajlun-Kufranja Valley: The Relationship of Technology, Society and Settlement. Pp. 757-765 in *SHAJ V*. Amman: Department of Antiquities.
- Kaimio, M. and Koenen, L.
 1997 Reports on Decipherment of Petra Papyri (1996/97). *ADAJ* 41: 459-462.
- Kirkbride, D.
 1966 Five Seasons at the Pre-Pottery Neolithic Village of Beidha in Jordan. *PEQ* 98: 8-72.
- Lindner, M.
 1986 *Archaeological Explorations and Surveys in the Petra-Region of the Nat*

- urhistorische Gesellschaft Nürnberg 1986*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
- Lindner, M. and Knauf, E. A.
 1994 *Khirbet el Mu'allaq: An Edomite Fortress and a Late Islamic Village*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman.
- Lindner, M., Knauf, E. A. and Zeitler, J. P.
 1996 An Edomite Fortress and a Late Islamic Village near Petra (Jordan): Khirbat al-Mu'allaq. *ADAJ* 40: 111-135.
- McQuitty, A.
 1995 Water-Mills in Jordan: Technology, Typology, Dating and Development. Pp. 745-751 in *SHAJ* V. Amman: Department of Antiquities.
- Marahleh, M.
 1998 *The Excavation of a Nabataean Tomb at Wadi Musa*. Unpublished report on file at the Department of Antiquities Registration Centre, Amman (Arabic).
- Mason, J. R. B. and 'Amr, K.
 1995 An Investigation into the Firing of Nabataean Pottery. Pp. 629-636 in *SHAJ* V. Amman: Department of Antiquities.
- Melhem, I.
 1995 The Technology of Wine Presses in Jordan and Palestine During the Roman and Byzantine Periods. Pp. 29-35 in *SHAJ* V. Amman: Department of Antiquities (Arabic).
- Musil, A.
 1908 *Arabia Petraea. II: Edom. Topographischer Reisebericht*. Wien.
- Nissen, H. J., Muheisen, M. and Gebel, H. G.
 1987 Report on the First Two Seasons of Excavations at Basta (1986-87). *ADAJ* 31: 79-119.
 1991 Report on the Excavations at Basta 1988. *ADAJ* 35: 13-40.
- Palumbo, G.
 1994a *JADIS, The Jordan Antiquities Database and Information System. A Summary of the Data*. Amman: The Department of Antiquities of Jordan and the American Center of Oriental Research.
 1994b Unpublished report on the cultural resources impact assessment for the UNESCO Petra National Park Management Plan.
- Palumbo, G., Abu Dayyeh, A. S., Qussous, K. and Waheeb, M.
 1995 Cultural Resources Management and National Inventory of Archaeological and Historic Sites: The Jordanian Experience. Pp. 83-90 in *SHAJ* V. Amman: Department of Antiquities.
- Parker, S. T.
 1976 Archaeological Survey of the *Limes Arabicus*: A Preliminary Report. *ADAJ* 21: 19-31.
- Parr, P. J.
 1960 Nabataean Sculpture from Khirbet Brak. *ADAJ* 4 and 5: 134-136.
- Schmid, S.
 1995 Nabataean Fine Ware from Petra. Pp. 637-647 in *SHAJ* V. Amman: Department of Antiquities.
- Schyle, D. and Uerpmann, H.-P.
 1988 Palaeolithic Sites in the Petra Area. Pp. 39-65 in A. N. Garrard and H. G. Gebel

(eds), *The Prehistory of Jordan, The State of Research in 1986*. BAR International Series 396 (i). Oxford: British Archaeological Reports.

Tarawneh, M. S.

1992 *The History of the Region of al-Balqa, Ma'an and al-Karak 1281-1337 Hijri / 1864-1918 A.D.* Amman: Ministry of Culture (Arabic).

Tholbecq, L.

1996 *Première campagne de prospection archéologique du Gebel Shara (mai 96); rapport préliminaire*. Unpublished report.

Zayadine, F.

1981 Recent Excavations and Restorations of the Department of Antiquities (1979-80). *ADAJ* 25: 341-355.

1982 Recent Excavations at Petra (1979-81). *ADAJ* 26: 365-393.

1986 The Pottery Kilns of Petra. Pp. 185-189 in D. Homès-Fredericq and H. J. Franken (eds), *Pottery and Potters - Past and Present*. Tübingen: Attempto.

1985 Caravan Routes Between Egypt and Nabataea and the Voyage of Sultan Baibars to Petra in 1276. Pp. 159-174 in *SHAJ* II. Amman: Department of Antiquities.

1994 Ayla-'Aqaba in the Light of Recent Excavations. *ADAJ* 37: 485-505.

Zayadine, F. and Farajat, S.

1991 The Petra National Trust Site Projects: Excavation and Clearance at Petra and Beida. *ADAJ* 35: 275-311.

PRELIMINARY REPORT ON THE SURVEY OF THE DHĪBĀN PLATEAU, 1997

by

Chang-Ho C. Ji and Jong-Keun Lee

The second season of the Dhibān Plateau Project took place between July 20 and August 24, 1997. The authors directed the survey on behalf of La Sierra University and Korean Sam Yook University. Ahmad al-Shami was the representative from the Department of Antiquities, and Jae-Hyuk Kwak, Matthew Schlitz, and Byung-Suh Yoo participated in the survey as core field staff.

Research Purpose and Methodology

The primary goal of the Dhibān Plateau Project is to understand the occupational history and settlement pattern of the Dhibān Plateau. The significance and specific objectives of the project were dealt with in detail in the preliminary report of the first field season (Ji 1997; Ji and 'Attiyat 1997).

In particular, the purpose of the 1997 field season was threefold: (1) to locate new archaeological sites in the regions of ar-Rāmah-as-Sāliya and 'Aliyyān-'Ammūriya; (2) to revisit Glueck's sites to re-examine his dating of each site in these regions; (3) to compare the occupational history and settlement pattern of the two regions. To these ends, in 1997, a major effort was centered on the collection of pottery and artifacts at each site. In addition, the survey team recorded various features of each site and made sketch maps for all the visited sites. Off-site features were located and documented as well. *The Madaba Plains Project Survey Manual* designed by Larry Herr and Gary Christopherson (1996) was the main guide for data collection.

The Dhibān Plateau Project surveys the area located between the Wādī al-Mūjib in the south and the Wādī al-Wāla in the north.

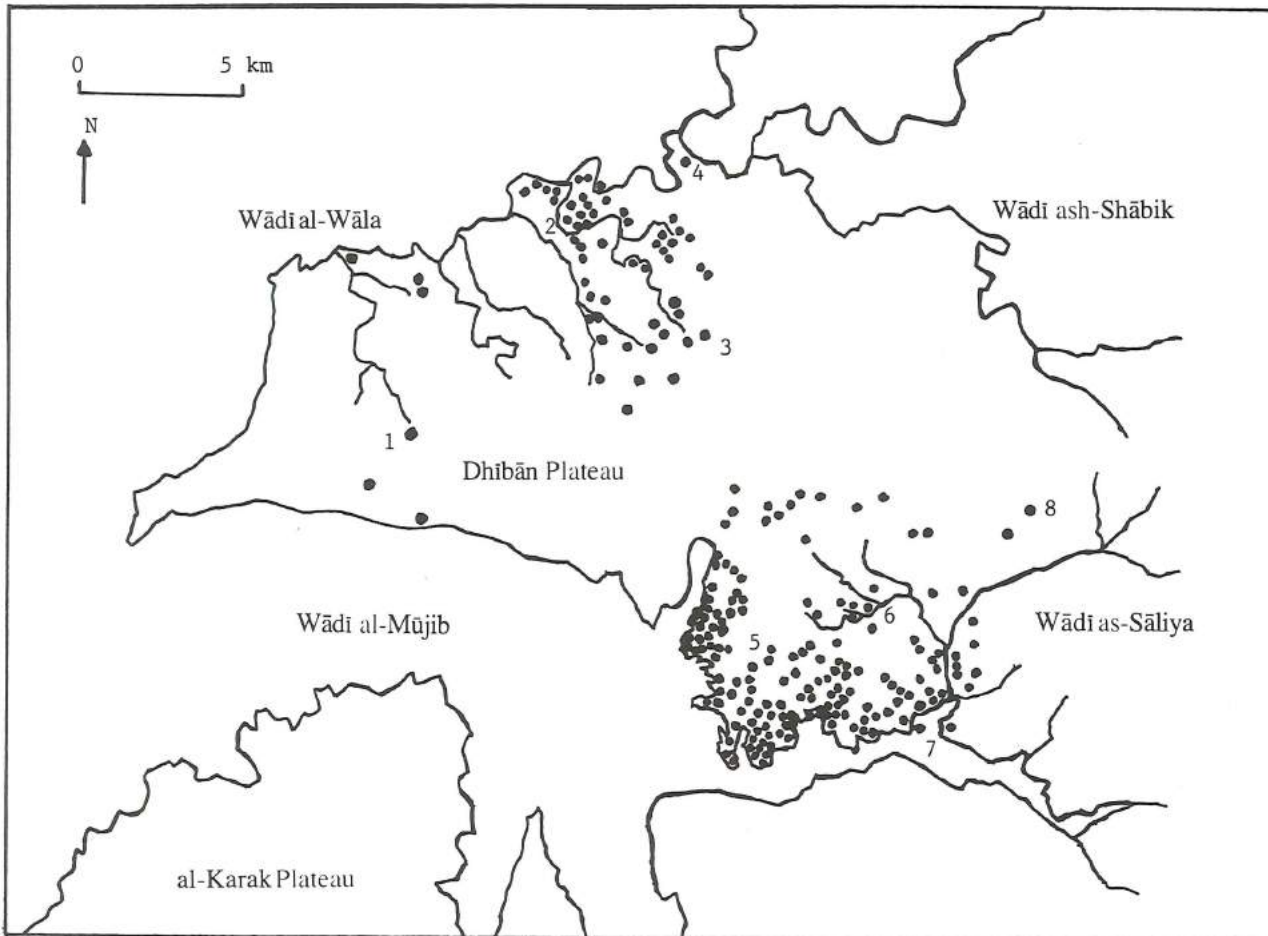
The survey area extends about 25 km east from Dhibān to the Wādī ash-Shābik. Although excursions may be conducted into the eastern desert fringe and the canyons of the Wādī al-Mūjib and the Wādī al-Wāla, systematic surveying will be limited to the plateau proper, an area of approximately 250 km².

The survey area is divided into about 250 parcels of 1 km x 1 km. The 1 sq. km grid of a 1:50,000 scale Universal Transverse Mercator map is used to identify these 250 parcels, and each of these squares is assigned a sequence number. To take advantage of the larger 1:25,000 scale, the actual positions of the survey parcels are established on older Palestine regional topographic maps produced in 1958.

The Global Positioning System is used to increase the precision with which selected parcels are located. For each square, the survey is conducted in an essentially east-west and south-north direction. Each 1 x 1 km² is surveyed in a systematic way, employing a series of 200 m spaced traverses. In other words, each square is divided into five 0.2 x 1.0 km sectors, and the survey team walks or drives systematically. In this way, no part of the area is either under- or over-represented in the survey. Exceptions to this approach are the squares which contain previously known or conspicuous archaeological sites. In this case, the sites are examined first, and then their vicinity is explored.

Survey Results

In 1997, a total of 204 archaeological sites were visited. These sites, when added to the 11 sites visited in 1996 (Fig.1), bring



1. Archaeological Survey of the Dhibān Plateau, 1996 and 1997. 1. Dhibān; 2. Khirbat 'Ammūriya; 3. Khirbat 'Aliyyān; 4. Khirbat ar-Rumayl; 5. Khirbat ar-Rāmah; 6. Khirbat as-Sāliya; 7. Khirbat al-Mdayyneh as-Sāliya; 8. Khirbat al-Musayṭiba.

the Dhibān Plateau Survey Site total to 215. One-hundred-ninety-four of the 204 sites surveyed in 1997 are new archaeological sites. Eight sites were previously visited by Glueck: Khirbat al-Musayṭiba, Khirbat al-Mdayyneh as-Sāliya, Khirbat ar-Rāmah, Khirbat 'Ammūriya, Khirbat al-Kaum, Umm ash-Shujayrāt ash-Shiyāb, Umm ash-Shujayra al-Gharbiyya, Khirbat al-Qahqaha, and Hashāsh.

Of the 215 sites recorded during the 1996 and 1997 seasons, 25 sites (11.63%) contained pottery sherds dated to the Chalcolithic and Early Bronze periods (Fig.2). Late Bronze sherds came from six sites (2.79%), whereas Iron I, Iron II, and Persian sherds were found at 13 sites (6.05%), 27 sites (12.56%), and eight sites (3.72%) respectively. Thirty sites (13.95%) pro-

duced Hellenistic sherds; 55 sites (25.59%) had Roman sherds. Byzantine sherds came from 75 sites (34.88%). Early Islamic and Middle Islamic sherds were found at 22 sites (10.23%) and 17 sites (7.91%) respectively.

Six of the 215 sites (2.79%) were situated at the bottom of a wadi, whereas 38 sites (17.67%) were located in the central plain of the Dhibān Plateau. It is interesting to notice that 171 sites (79.53%) were found in the band about 2 km wide along the edge of the plateau, suggesting fairly high concentrations of sites along the plateau rim (see Table 1 for the regions of ar-Rāmah-as-Sāliya and 'Aliyyān-'Ammūriya).

On the other hand, watch-tower sites accounted for 60.93% of the total (131 of 215 sites), while city or village sites made up

No.	Provenance	Date/Type	Descriptions
1	Site 14	Roman bowl	wheel-made, light red clay (2.5YR 6/8) yellowish red slip (5YR 5/8) (E*, I*), no core, no inclusions, diameter 22.5 cm
2	Site 20	Iron II bowl	wheel-made, pink clay (7.5YR 7/3), light gray core (5YR 7/1), many small to large white inclusions, diameter 9 cm
3	Site 20	Iron II storage jar	wheel-made, light reddish brown clay (2.5YR 7/4), light red slip (E) (2.5YR 6/6), reddish gray paint (E) (2.5YR 5/1), no core, many small to medium white and gray inclusions, diameter 28 cm
4	Site 20	Hell-Early Rom bowl	wheel-made, very pale brown clay (10YR 7/3), light gray core (10YR 7/1), no inclusions, diameter 11.5 cm
5	Site 20	Hell-Early Rom bowl	wheel-made, yellowish red clay (5YR 5/8), gray core (5YR 6/1), few small inclusions, diameter 14 cm
6	Site 20	Hellenistic storage jar	wheel-made, pink gray clay (7.5YR 7/4), no core, some very small white and gray inclusions, diameter 9.5 cm
7	Site 20	Hellenistic storage jar	wheel-made, light red clay (2.5YR 7/6), pink slip (7.5YR 7/3) (E, I), light gray core (7.5YR 7/1), many small white inclusions, diameter 7.5 cm
8	Site 20	Nabataean bowl	wheel-made, light red clay (10R 6/6), red paint (10R 5/6) (I), no core, no inclusion, width 2.5 cm
9	Site 20	Nabataean bowl	wheel-made, light red clay (10R 6/6), red paint (10R 5/6) (I), no core, no inclusion, width 2 cm
10	Site 153	Iron I storage jar	wheel-made, light reddish brown clay (5YR 6/4), gray core (7.5YR 5/1), many small to medium white and gray inclusions, diameter 21 cm
11	Site 152	Mid Islamic Jar	hand-made, very pale brown clay (10YR 8/2) pink slip (7.5YR 7/2) (E), light reddish gray core (2.5YR 7/1), dark gray paint (5YR 4/1) (E), no inclusions, diameter 9 cm
12	Site 152	Hellenistic cooking pot	wheel-made, weak red clay (10YR 5/3), greenish gray core (10Y 5/1), no inclusions, diameter 10 cm
13	Site 152	Nabataean bowl	wheel-made, light red clay (2.5YR 6/6), red paint (10R 5/6) (I), reddish gray core (2.5YR 5/1), no inclusions, diameter 13.5 cm

*E: Exterior; I: Interior.

2. Selected Pottery from the Dhibān Plateau.

Table 1. Frequency Table and Pie Chart by Site Location in the Regions of ar-Rāmah-as-Sāliya and 'Aliyyān - 'Ammūriya (N=209).

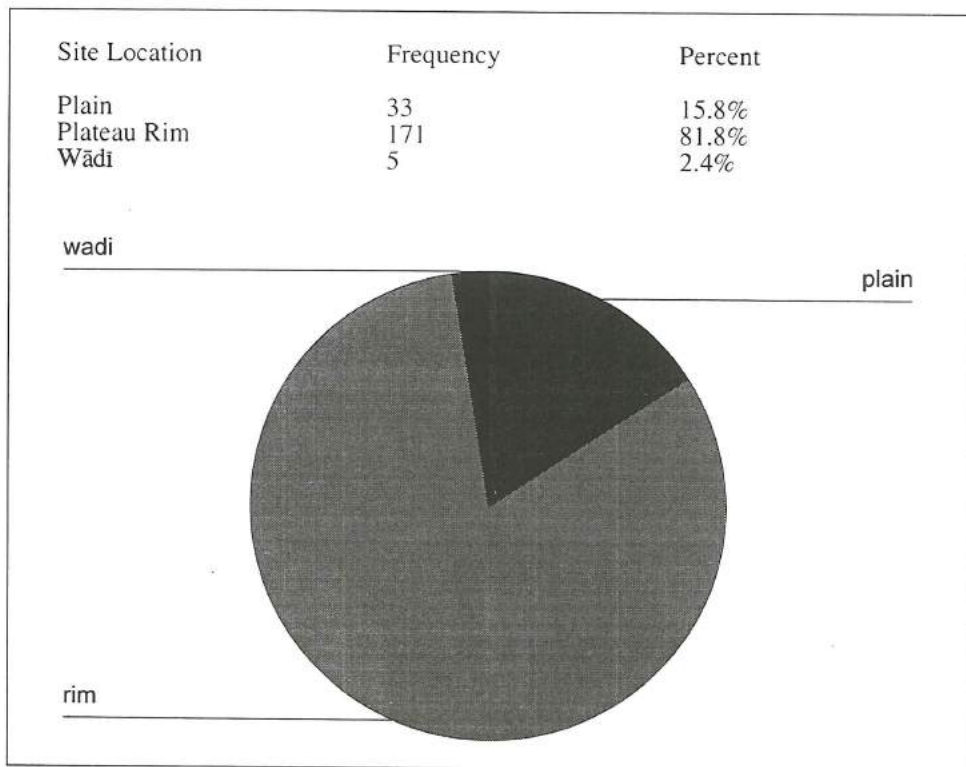
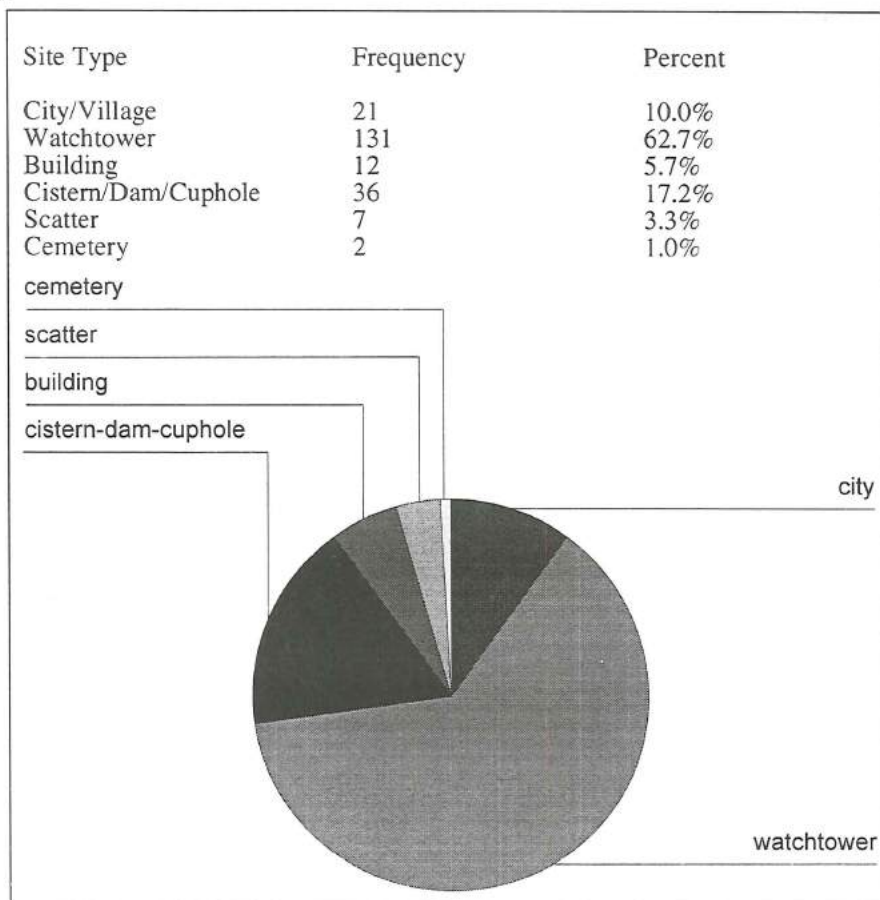


Table 2. Frequency Table and Pie Chart by Site Type in the Regions of ar-Rāmah-as-Sāliya and ‘Aliyyān- ‘Ammūriya (N=209).



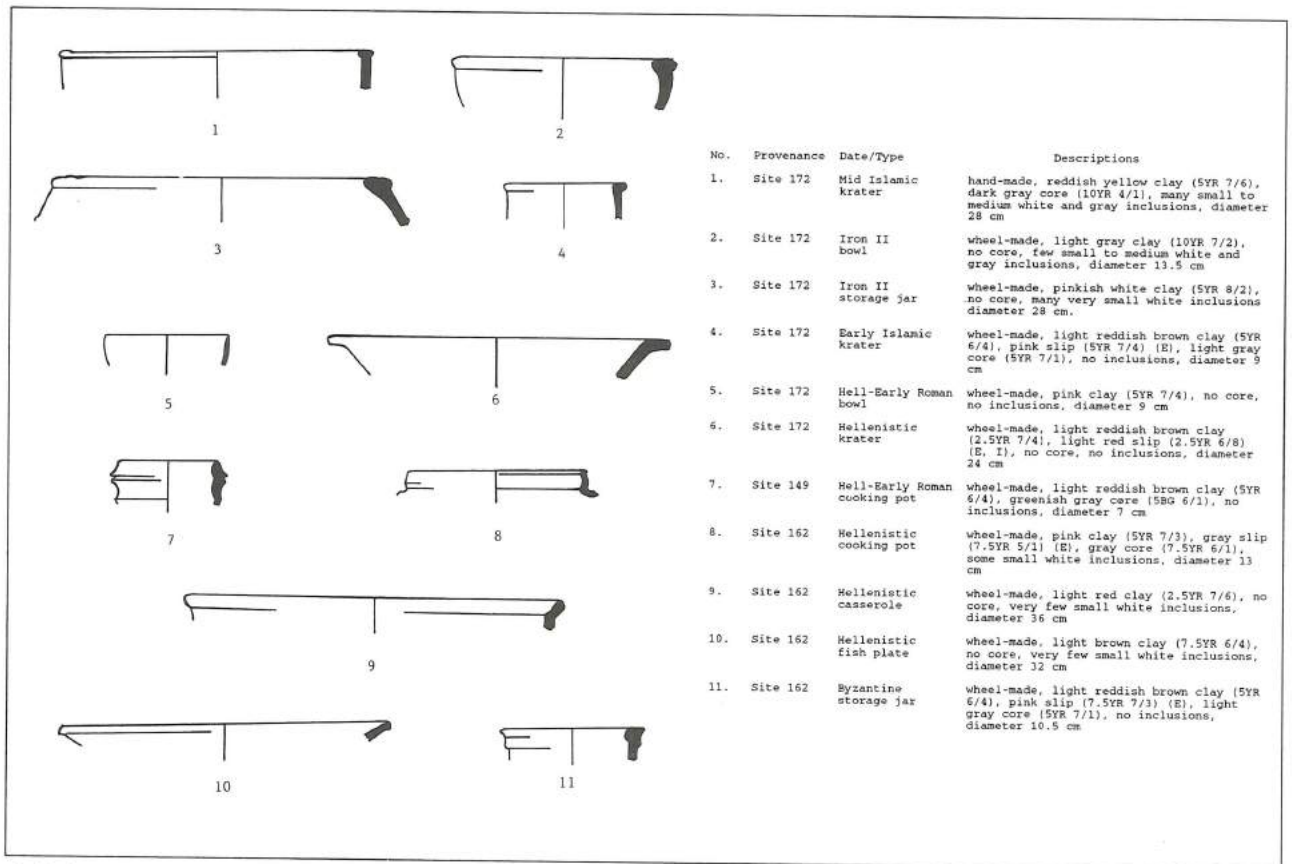
11.16% (24 sites). Thirty-seven sites (17.21%) were identified as agricultural dams or water cisterns. The remaining sites consisted primarily of farmstead buildings (12 sites; 5.58%), road features (two sites; 0.93%), and cemeteries (two sites; 0.93%). Seven sites (3.26%) merely produced pottery sherds or lithic tools without any architectural evidence (see Table 2 for the regions of ar-Rāmah-as-Sāliya and ‘Aliyyān-‘Ammūriya).

To put it more precisely, in the ar-Rāmah-as-Sāliya region, pottery of the Chalcolithic and Early Bronze periods was collected at 18 sites, that is, 11.84% of the sites explored in the region (see Table 3). Pottery of the Middle Bronze period was completely absent. Late Bronze and Iron I pottery was found at five sites (3.29%) and 10 sites (6.58%) respectively. Iron II and Persian pottery came from 19 sites

(12.50%) and four sites (2.63%) respectively, and Hellenistic pottery was collected at 20 sites (13.16%). The Roman and Byzantine periods witnessed a flourishing population with at least 38 sites (25.00%) and 61 sites (40.13%) occupied respectively (Table 3 and Fig. 3). This region experienced a substantial decline in population during the Early and Middle Islamic periods when 16 sites (10.53%) and ten sites (6.58%) were occupied. This cyclic settlement pattern over the periods seems to be distinctive along the plateau rim and in the plain region except for the wadi region. Likewise, in the Aliyyān-‘Ammūriya region the Roman and Byzantine periods had substantial population, with 13 (22.81%) and 12 (21.05%) of 57 sites yielding Roman and Byzantine pottery (see Table 4). This region experienced a somewhat reduced occupation in the Chalcolithic and Early Bronze (six sites, 10.53%),

Table 3. Cross-Tabulation by Site Location, Site Type, and Chronology in the ar-Rāmah-as-Sāliya Region. (N=152).

Location	Site Type	Chronology											Total
		CEB	MB	LB	II	I2	Per	Hel	Rom	Byz	EIs	MIIs	
Plain (n=27)	City	2	0	2	2	2	0	3	3	2	2	3	3
	Watch-tower	0	0	0	0	0	0	0	0	0	0	0	0
	Building	0	0	0	0	1	0	0	1	1	1	0	1
	Cistern-Dam	3	0	0	1	1	1	4	3	12	5	3	23
	Scatter	0	0	0	0	0	0	0	0	0	0	0	0
	Cemetery	0	0	0	0	0	0	0	0	0	0	0	0
	Total	5	0	2	3	4	1	7	7	15	8	6	
Plateau Rim (n=122)	City	5	0	1	1	2	2	4	4	5	3	1	9
	Watch-tower	6	0	2	5	11	0	4	17	32	3	2	92
	Building	1	0	0	0	0	0	0	1	2	0	0	7
	Cistern-Dam	0	0	0	0	0	0	2	4	1	1	1	7
	Scatter	0	0	0	0	1	0	2	4	4	1	0	7
	Cemetery	0	0	0	0	0	0	0	0	0	0	0	0
	Total	12	0	3	6	14	2	12	30	44	8	4	
Wādi (n=3)	City	0	0	0	1	1	1	1	1	1	0	0	1
	Watch-tower	0	0	0	0	0	0	0	0	0	0	0	1
	Building	1	0	0	0	0	0	0	0	1	0	0	1
	Cistern-Dam	0	0	0	0	0	0	0	0	0	0	0	0
	Scatter	0	0	0	0	0	0	0	0	0	0	0	0
	Cemetery	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	0	0	1	1	1	1	1	2	0	0	
Total	18	0	5	10	19	4	20	38	61	16	10		



3. Selected Pottery from the Dhibān Plateau.

Table 4. Cross-Tabulation by Site Location, Site Type, and Chronology in the Aliyyān-Ammūriya Region (N=57).

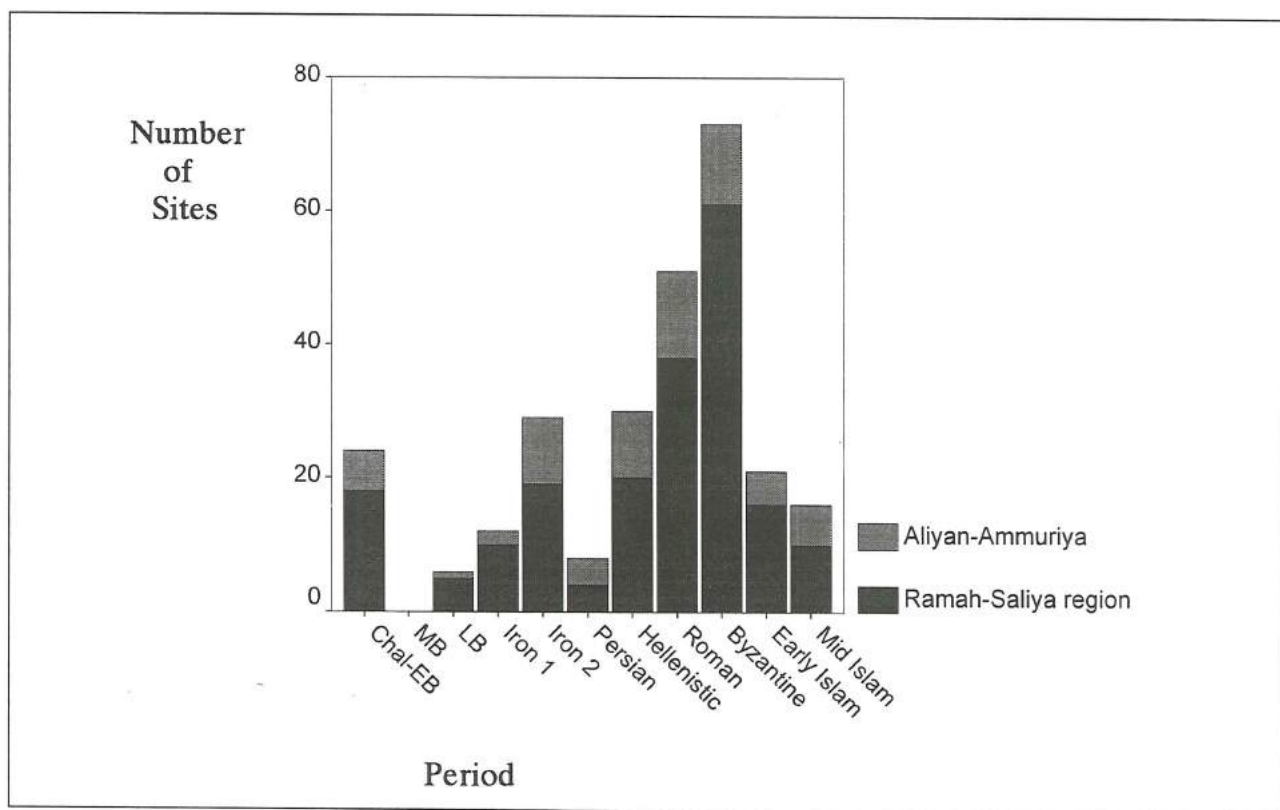
Location	Site Type	Chronology											Total
		CEB	MB	LB	I1	I2	Per	Hel	Rom	Byz	Els	MI5	
Plain (n=6)	City	1	0	1	1	1	0	1	2	1	1	2	2
	Watchtower	0	0	0	0	0	0	0	0	0	0	0	2
	Building	0	0	0	0	0	0	0	0	0	0	0	0
	Cistern-Dam	0	0	0	0	0	0	0	0	0	0	0	2
	Scatter	0	0	0	0	0	0	0	0	0	0	0	0
	Cemetery	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	0	1	1	1	0	1	2	1	1	2	
Rim (n=49)	City	3	0	0	1	4	2	4	4	4	4	3	6
	Watchtower	2	0	0	0	3	2	4	5	3	0	1	36
	Building	0	0	0	0	0	0	1	1	1	0	0	2
	Cistern-Dam	0	0	0	0	0	0	0	0	2	0	0	4
	Scatter	0	0	0	0	0	0	0	0	0	0	0	0
	Cemetery	0	0	0	0	0	0	0	0	0	0	0	1
	Total	5	0	0	1	7	4	9	10	10	4	4	
Wādi (n=2)	City	0	0	0	0	0	0	0	0	0	0	0	0
	Watchtower	0	0	0	0	0	0	0	0	0	0	0	0
	Building	0	0	0	0	1	0	0	0	1	0	0	1
	Cistern-Dam	0	0	0	0	0	0	0	0	0	0	0	0
	Scatter	0	0	0	0	0	0	0	0	0	0	0	0
	Cemetery	0	0	0	0	1	0	0	1	0	0	0	1
	Total	0	0	0	0	2	0	0	1	1	0	0	
Total	6	0	1	2	10	4	10	13	12	5	6		

Iron II (10 sites, 17.54%), Persian (four sites, 7.02%), Hellenistic (10 sites, 17.54%), Early Islamic (five sites, 8.77%), and Middle Islamic periods (six sites, 10.53%). The period from the Middle Bronze period to Iron I seems to have had a substantial decline in settled population. The basic uniformity between the two regions in regard to the settlement pattern over the periods leads to the potential presence of a broad settlement cycle in the Dhibān Plateau. This view is supported by Table 5 which presents the results of the survey by plotting number of sites according to chronological period. In this case, the Aliyyān-‘Ammūriya and the ar-Rāmah-as-Sāliya regions are plotted simultaneously. When Tables 1-5 are taken into account, marked similarity between the ar-Rāmah-as-Sāliya region and the Aliyyān-‘Ammūriya region becomes apparent. In both regions, settlement sites are distributed fairly unevenly from period to period with high representations in the of Roman and

Byzantine periods. An interesting point is that the data point to a gradual and continuous increase of settlement from Iron I to the Byzantine period, although the Persian period shows short-term decrease. This result posits that the settlement abatement in the Hellenistic period was not substantial in comparison to Iron II. We also note that the number of settlements for the ‘Aliyyān-‘Ammūriya region are lower than those for the ar-Rāmah-as-Sāliya region. This fact shows that the ar-Rāmah-as-Sāliyah region was more heavily utilized over time than the ‘Ammūriya-‘Aliyyān region. In general, however, the preceding observation is indicative of the existence of one settlement cycle through the ages in the Dhibān Plateau.

On the other hand, Figure 1 and Table 3 demonstrate that in the region of ar-Rāmah and as-Sāliya sites are strongly concentrated along the plateau rim which accounts for 122 of 152 sites (80.26%). This pattern sug-

Table 5. Stacked Bar Graph by Chronology in the Regions of ar-Rāmah-as-Sāliya and ‘Aliyyān-‘Ammūriya (N=209).



gests evidence for settlement locational preferences of the plateau rim to the central plain area. In conjunction with this suggestion, note that in the plateau rim region, 92 of 122 (75.41%) were small watch-tower sites overlooking the wadi. A comparison of site type for the plain region indicates a somewhat different occupational pattern: 23 of the 27 sites (85.19%) contain agricultural dams, water cisterns, or rock-cut features (e.g., cupholes and basins) without any adjacent architectural evidence. The ‘Aliyyān-‘Ammūriya region exhibits a similar pattern overall in regard to settlement distribution (see Table 4). The narrow band along the plateau rim contain 85.97% of the sites (49 of 57) occupied in antiquity, and 73.47% of these sites (36 of 49) are watch-tower sites. A unique feature of the ‘Aliyyān-‘Ammūriya region is the sparsity of agricultural dams and water cisterns in its neighboring plain area: only two water cistern sites were found in this area. This scarcity seems to be related with virtual absence of such major

wadi tributaries suitable to dry farming in the ‘Aliyyān-‘Ammūriya region as the Wādī al-Mamlah, the Wādī al-Manshala, and the Wādī Hinu Sāliya in the region of ar-Rāmah and as-Sāliya. At the same time, it should also be noted that watch-tower sites are conspicuously absent in the plain region.

Taken together, in the Dhibān Plateau, settlement sites are heavily concentrated along the plateau rim, and approximately 75% of these sites are associated with watch-tower-like structures. This sub-regional variability in site location should be considered an important variable for future field work and studies since it may be indicative of patterned subsistence strategies and settlement systems within the Dhibān Plateau.

Major Sites in the ar-Rāmah-as-Sāliya Region

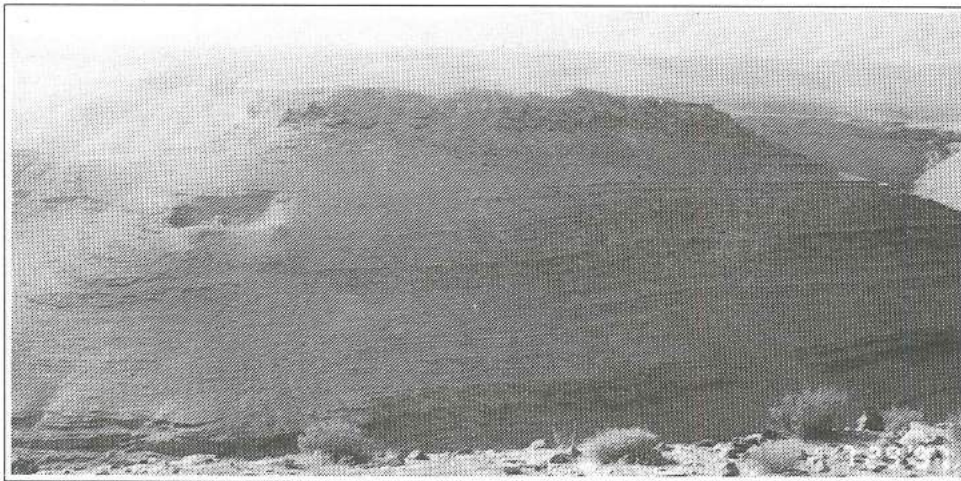
The ar-Rāmah-as-Sāliya region is situated on the southeastern edge of the Dhibān Plateau. It extends about 7 km from the

Wādī al-Mūjib to Umm ar-Raṣāṣ. This region includes many archaeological sites like Khirbat as-Sāliya (Site 3), Khirbat al-Mdayyneh as-Sāliya (Site 20), Khirbat ar-Rāmāh (Site 23), Khirbat al-Musayṭiba (Site 153), and Khirbat al-Jumayil (Site 4). The survey team visited Khirbat as-Sāliya in 1996 and collected many sherds dated to the Iron Age and the Nabataean period (Ji and 'Attiyat 1997). In 1997, the survey team revisited this site and collected more than 350 sherds including a large number of Iron II, Roman-Byzantine, and Islamic sherds. Several Nabataean painted sherds were also collected. The survey team revisited Khirbat al-Jumayil in 1997 as well and collected a large number of sherds. An important aim of the 1997 sherding was to look for Iron Age sherds, since the survey team failed to collect Iron Age sherds in 1996. The 1997 survey shows that at Khirbat al-Jumayil, Iron Age pottery is concentrated on the southern edge near the Wādī Hinu Sāliya, which is currently covered by modern roads, buildings, and olive groves. A suggestion is that during the Iron Age, Khirbat al-Jumayil was a small village located on the eastern bank of the Wādī Hinu Sāliya.

Since space limitations do not allow us to illustrate all the sites in detail, we present the results of our investigation of some important sites. Survey Site 18 (PG: 241.0/094.3) is a building ruin at the end of a promontory near the head of the Wādī as-

Sāliya, ca. 2.5 km southeast of Khirbat as-Sāliya. Although the building is filled with tumbled stones, wall lines indicate a single-room broad-house (ca. 4.0 x 8.0 m) of fine stone construction. The entrance is found on the east side of this building which is approached possibly by several steps. Noticeable is the oval shaped configuration of field walls on the south side of the building. The walls are barely visible at ground level, yet a careful investigation suggests that the building is possibly bounded by these walls, and its southeastern corner is connected to them. Like the building, the walls are constructed of fine stones of medium size and are two to three courses wide (ca. 1.0 m thick). A suggestion is that the building and the boundary walls were built according to an overall plan which resembles the Early Bronze temples at et-Tell and Yarmouth in Palestine (cf. Callaway 1972; Miroschedji 1988). This being the case, it is not improbable that Site 18 is an Early Bronze cultic site, and a few wall lines with small stones two to three courses high, found on the east edge of the promontory, may represent a boundary of a holy area. This site yielded one possible Early Bronze body sherd along with two flints.

Khirbat al-Mdayyneh as-Sāliya (PG: 240.3/092.2) is Survey Site 20 corresponding to Glueck's Survey Site 93 (Fig.4). This site is located on a conspicuous promontory at the junction of the Wādī



4. Khirbat al-Mdayyneh as-Sāliya (looking southeast).

as-Sāliya and the Wādī as-Sa'ādah, ca. 5.0 km southeast of Khirbat as-Sāliya. This site is one of six ruins in the region east of the Dead Sea, called locally by the name of Khirbat al-Mdayyneh (Miller 1989). At Khirbat al-Mdayyneh as-Sāliya, the remains of ancient buildings spread over the promontory, ca. 50 m (north-south) by 150 m (east-west), which is almost completely cut off from the mainland plateau, with steep sides all around except for a narrow land bridge on the eastern side.

Although at the first glance, ruins of buildings seemingly cover the entire site (Glueck 1934: 36), a careful investigation of the surface remains indicates most of the houses are oriented parallel to the edge of this site, while architectural evidence is absent at the center. There are no examples of four-room houses discernible on the surface such as have often been found at Khirbat al-Mdayyneh al-'Āliyya (Routledge 1995) and Khirbat al-Mdayyneh al-Mu'arrajah (Olávarri 1983).

Situated on the northeastern side of this site is the stone tumble of a large building complex comprised of several small to large buildings, yet it is difficult to distinguish the exact plan of the buildings. One of the buildings appears to be rectangular in shape and measure 3.0 x 15.0 m. Immediately west of

this building is the remnant of another rectangular building which is smaller than the first one. To the west of this building complex are the ruins of a large building measuring 11 x 20 m. One interior wall which appears to bisect the building into two rooms is visible on the ground. Approximately midway between this building and the acropolis is a ruin which represents a single structure (ca. 4.3 x 4.7 m) built with medium- to large-sized dressed stones on three sides. The evidence of wall lines is absent on the south side of this structure. The structure could have been approached from the south side, possibly by a couple of steps.

On the highest point of Khirbat al-Mdayyneh as-Sāliya is a raised platform of masonry constructed of roughly cut, rectangular blocks of stone (Fig. 5). The inside seems to be filled up to the top with stones, and no doorway is evident. This structure provides a commanding view of the entire site and the surrounding region. Associated with this platform are two large rectangular cisterns or reservoirs. About 10.0 m southeast of the platform a first one is noted which measures 10.2 m by 18.0 m and about 6.0 m deep. Immediately west of the platform is another large, rectangular cistern which had already been badly disturbed when the survey team investigated. To the



5. Stone Platform at Khirbat al-Mdayyneh as-Sāliya (looking northwest).

south of the platform are two completely ruined rectangular-shaped structures with possible stairways leading down to the western cistern.

The southern side of Khirbat al-Mdayyneh as-Sāliya consists of a series of vague wall lines, probably remnants of a building complex, and a rectilinear enclosure wall covering an area of ca. 17.7 x 18.0 m. To the east of this site, occasional wall lines can be traced amid the rubble of field stones spread over an area ca. 10 x 15 m, which seems to represent a large, completely ruined structure.

We were unable to distinguish any surface evidence of fortification around the city. This observation stands in sharp contrast with Glueck's description (1934: 36); "El-Medeiyineh was a large Nabataean acropolis, surrounded by a wall which was further strengthened by towers." Segments of the potential wall lines which may have been used for defence purpose are found in two areas. One of the two walls, found on the steep hillside immediately south of the rectilinear enclosed structure, is built of semi-hewn stone blocks possibly built along the southern rim of Khirbat al-Mdayyneh as-Sāliya, and up to some 1.0 m of the wall has survived. The other segment which is now eroded in many places is found on the western slope of this site, ca. 25.0 m west of the platform at the acropolis. Both wall lines seem to be contemporaneous and associated with each other in terms of their building blocks and construction technique. Noteworthy is the fact that both wall lines are situated below the ground level, and most of the Iron I and Iron II sherds which the survey team collected came from the western slope near the possible defence wall rather than in connection with the above-described buildings on the surface. This explains why the possible defence fortification wall may be dated to Iron I and Iron II, whereas Khirbat al-Mdayyneh as-Sāliya was an unfortified city in the Nabataean-Roman pe-

riod.

There are a number of large plastered cisterns on the eastern slope of Khirbat al-Mdayyneh as-Sāliya. The cisterns are rectangular in shape, measuring up to 7.0 m wide, 8.0 m high, and 28.0 m long. Quite a few number of caves are also associated with these cisterns.

At Khirbat al-Mdayyneh as-Sāliya, Glueck (1934: 36) found a large quantity of Nabataean and Roman pottery. We collected 497 sherds, including diagnostic Iron I, Iron II, Persian, Hellenistic, Nabataean, Roman, and Byzantine sherds. Hence, on the basis of the analysis of the pottery, Khirbat al-Mdayyneh as-Sāliya appears to date to the Iron I and Iron II, Hellenistic and Roman, and possibly Persian and Byzantine periods.

Khirbat ar-Rāmah (Survey Site 23; Glueck's Site 96; PG: 236.0/094.7) is situated about 4.5 km southeast of Khirbat al-Jumayil and about 3.5 km southwest of Khirbat as-Sāliya. It is on a natural hill spreading over an area approximately 150 x 150 m. A cluster of caves and cisterns on the eastern slope are enclosed by Ottoman and modern stone animal pens and field-walls. A high school is immediately at the foot of the eastern slope, and several modern graves are also noted on the western and northern slopes. Despite these modern structures and graves, however, considerable evidence of architecture remains visible on the site, especially on the summit and the northern slope. The summit, though destroyed by a modern animal pen, contains a rectangular tower or altar which measures about 3.6 x 4.3 m and still stands about 1.4 m high. Roughly centered on the northern part of this site are some impressive wall lines and corners of a large building complex, although its overall plan is difficult to determine. Walls indicate a cluster of buildings which covers an area of about 50 x 50 m (Fig.6).

At Khirbat ar-Rāmah, Glueck (1934: 38) collected a large number of Nabataean pot-



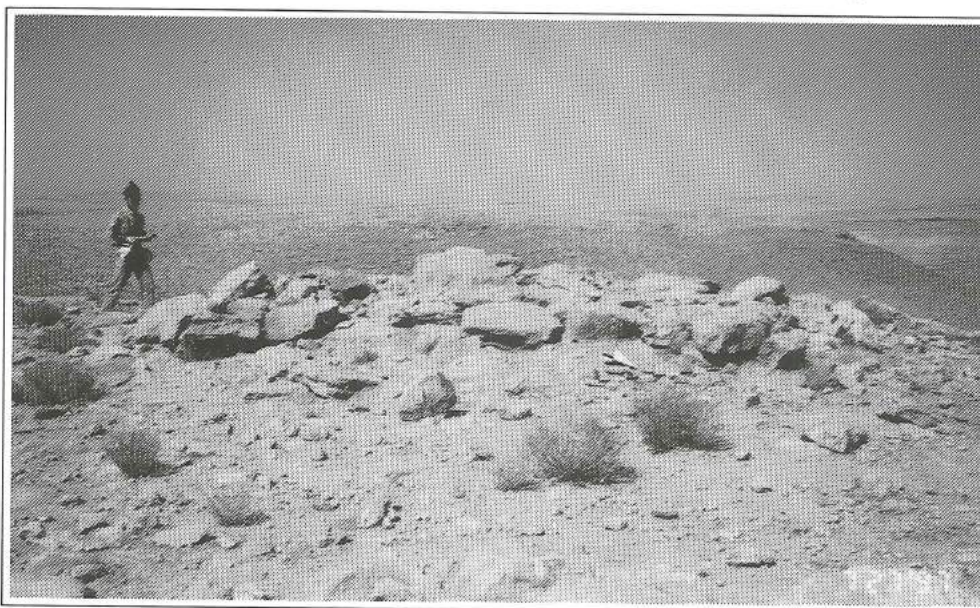
6. Potential Nabataean Buildings at Khirbat ar-Rāmah (looking north).

tery along with some pieces of sigillata ware; Parker (1986: 170) found Nabataean, Roman, and Byzantine sherds. The survey team collected about 410 sherds which included Hellenistic, Nabataean, Roman, Byzantine, Early Islamic, and mid-Islamic pottery along with five Iron II sherds.

Situated on the edge of a flat-topped promontory, Rujum Shu'ayb Oda'a (Survey Site 45; PG: 237.6/093.3) stretches over an area of 50 x 200 m. This site may represent the remains of a small village or a watch-tower spot. Rujum Shu'ayb Oda'a provides a clear view toward the Wādī al-Mūjib. Es-

pecially notable among the ruins are the remains of about 12 round or oval solidly built structures (Fig.7). Their diameters range from 2.6 to 6.2 m, and they are about 5 to 10 m apart. A rectilinear structure, measuring 10 x 100 m, is situated at the eastern extremity of this site and appears to have been recently used as an animal pen. This site has yielded only seven undiagnostic sherds along with five flints. The sherds are dated to the Roman and Byzantine periods.

Rujm Hilayla (Survey Site 56; PG: 237.7/092.3) is situated at the rim of a



7. A Watch-tower-like Structure at Rujum Shu'ayb Oda'a.

promontory which overlooks the Wādi al-Mūjib. Occupational remains are still evident over an area of 40 x 60 m. Five round watch tower-like structures stand out. They range from 4.0 to 5.3 m in diameter and presently stand up to 70 cm above the ground. They are all solidly made of small to medium rough stones. The distance between the structures varies, ranging from 3 m to 30 m. Some of these round structures have been disturbed and robbed for use in the modern Bedouin graves that dot this site. An impressive rectangular structure is located in the middle of this site (Fig.8). It measures 9.7 x 13.0 m and is preserved up to two to three courses high. It is solidly made up of medium to large stone blocks (ca. 0.3 x 0.6 x 1.1 m), and its external walls measure 1.5 m thick. Connected to this rectangular building are wall lines which may represent a recent small water reservoir measuring 10 x 40 m. No pottery was collected at this site.

Rujum Jama Maiat (Survey Site 90; PG: 235.4/092.3) is located near the end of a stretch of ground that protrudes to the southwest, providing a good view over the Wādi al-Mūjib. The area is rocky and unsuitable for farming and plowing. This site is represented by a round structure (ca. 3.5 m in diameter) surrounded by a rectilinear building

measuring 13.0 m (north-south) by 17.5 m (east-west). The circular structure is only one to two rows wide and is built of medium to large stones. The rectilinear structure is preserved up to 1.5 m above the ground, and its external walls are 1.0 m thick. The walls of this structure are constructed from medium to large limestone blocks. On the southeast side of this structure is an inner room which is possibly oval or rectilinear in shape. Seven sherds were collected including one potential Iron I and one Byzantine sherds.

Khirbat az-Zuqayba Umm Rakhm (Survey Site 100; PG: 235.7/091.9) is comprised of a number of architectural remains scattered over an area ca. 150 x 200 m. Located on the edge of a very pronounced promontory, most of the structures provide a clear view south toward the Wādi al-Mūjib and an overview of approaches from the wadi to the plateau. A first characteristic feature of this site is a cluster of three round structures exposed 1.2 m above the ground and solidly constructed of medium to large field stones (ca. 0.3 x 0.4 x 1.3 m). They measure 3.6 m, 4.1 m, and 5.2 m in diameter respectively. Some 40 m east of these structures is a line of architectural remains oriented in the roughly north-south direction along the eastern rim of the pro-



8. A Stone Structure at Rujum Hilayla (looking north).

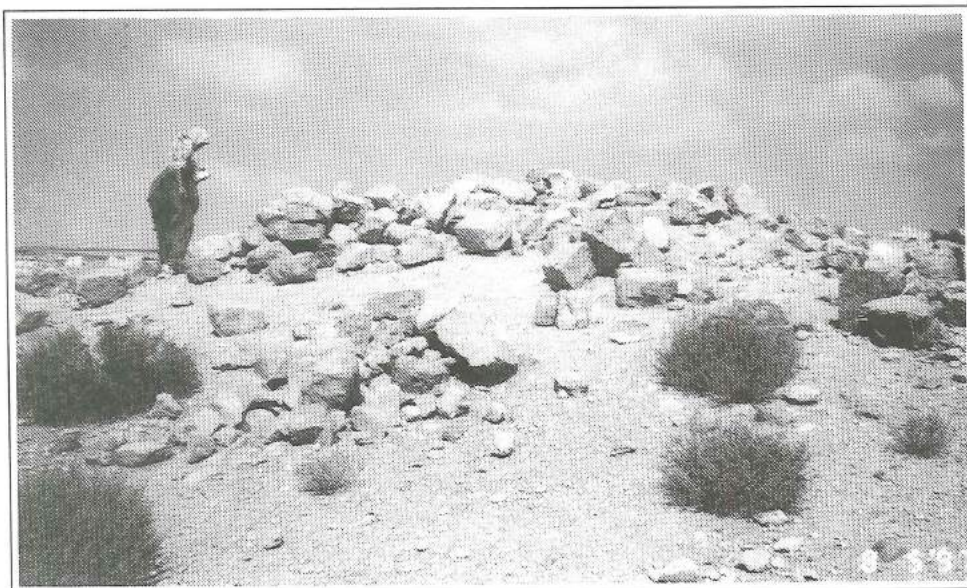
montory. The northernmost structure is a round watch tower measuring 4.6 m in diameter. Between this structure and the first three round structures is a wall line 6.0 m long and 1.0 m thick. It is oriented in the east-west direction. To the south of the preceding round structure are four buildings, two of which are rectangular in shape and the other two circular. The distance between the structures is not uniform, and they still stand up to 1.0 m high. The rectangular structures measure 6.1 x 7.3 m and 5.4 x 7.6 m; the two round ones are 4.5 m in diameter. All these structures are built of limestone blocks in medium to large sizes. At the center of this site is a water cistern which is not currently in use. To the east of this cistern are five building remains, four of which are circular in shape. The diameter of the four round structures, apparently watch-towers, ranges from 3.5 m to 6.0 m. A roughly square building (ca. 5.3 x 5.5 m) is noted associated with these round watch towers. On the west side of this site are four circular structures built along the rim of the promontory. These western watch towers measure 3.9 m to 6.7 m in diameter and stand up to 1.7 m above the ground. Like other structures at this site, they are made of medium to large limestone blocks and command an excellent view over the Wādī al-Mūjib. In comparison to the abundant architectural remains, pottery is quite sparse. This site yielded only 12 body sherds, most of which appear dated to the Roman and Byzantine periods.

It is possible that Qaṣr Almanqada'a (Survey Site 101; PG: 235.7/091.7) is an early Iron I fortress strategically situated on the edge of promontory overlooking the Wādī al-Mūjib. The ruin consists of foundation walls indicative of a single rectangular building measuring 11.4 x 20.0 m. The external walls, well preserved up to 2.5 m high, are neatly laid using medium and large limestone blocks. The external walls are 1.0 m thick. There are interior walls at the

northwest corner of the building, yet it is difficult to distinguish whether they compose an interior room or a stairway leading up to the second floor since collapsed stones cover the wall lines. The entrance appears to be located on the northeast side of this building, and the external walls are equipped with windows (about 40 x 65 cm). The survey team collected 135 sherds at this site including early Iron I and Roman pottery.

Situated on a knoll at the head of the Wādī as-Sāliya, Rujm ar-Rayna (Survey Site 121; PG: 240.6/096.5) overlooks the wadi to the south and Khirbat as-Sāliya to the southwest. Wall lines visible at ground level suggest a solidly-built, rectangular structure which measures 4.1 x 6.4 m (Fig.9). Since the center of the building is filled with tumbled stones, we were unable to identify a complete plan of the building. Yet, a small square chamber attached on the northern wall of this building can be made out. There is a small cairn measuring about 0.3 x 1.8 m to the south of this site, which seems to be a Bedouin grave. Approximately midway between the building and the potential grave is a cistern currently out of use. The survey team collected 214 sherds including Iron II, Roman, and Byzantine pottery. The majority of the nondescript sherds may be dated to either the Iron II or Roman-Byzantine periods.

Situated on the high point of a northwest-southeast ridge with valleys on either side, Khirbat aḍ-Ḍā'an (Survey Site 143; PG: 235.2/097.0) is a medium sized ruin (ca. 90 x 120 m) with numerous wall lines and a couple of caves. Khirbat ar-Rāmah is visible to the southeast. Clear outlines of structures are discernible in several places. At the acropolis of this site is an almost completely disturbed structure measuring approximately 5.3 x 8.0 m. East of the acropolis is a rectangular building with one partition wall, which measures 5.0 x 10.5 m. Both structures are still exposed about 70 cm above

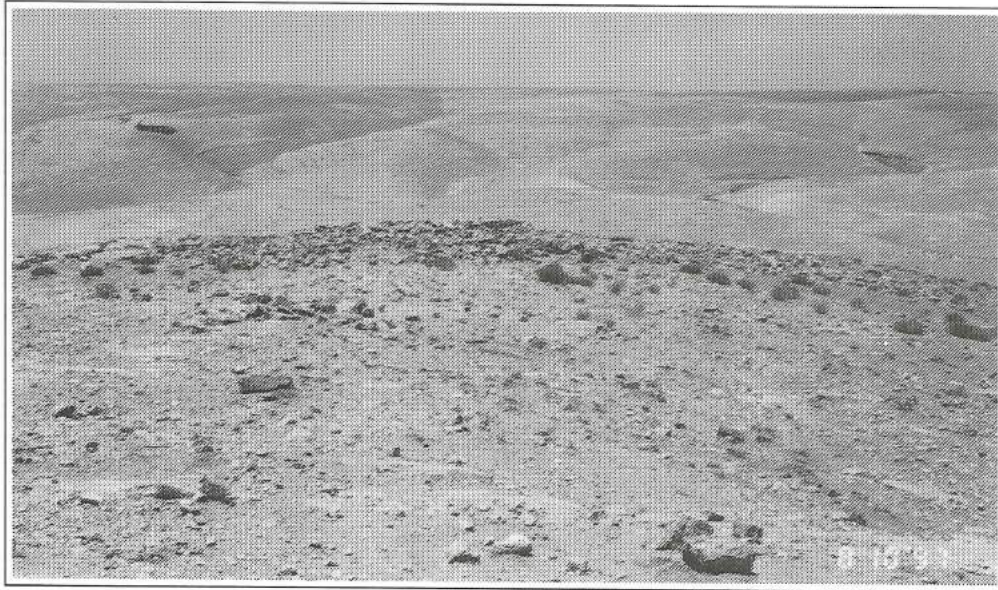


9. Rujum ar-Rayna (looking west).

the ground and made of medium to large rough stones. At the east end of this site is a massive tumble of stones which seems to be the remains of a potential, rectangular building (ca. 10.5 x 18.3 m). Immediately outside the western wall of this building is a wall line extending 3.3 m in the roughly east-west direction. At the center of this site, we note another massive rectilinear building complex divided into two major sections. The eastern section appears to consist of a couple of rectangular rooms and to cover an area of 17.0 x 17.0 m. The western section, characterized by a large courtyard-like room (ca. 11.4 x 14.0 m), covers an area ca. 22.0 x 24.0 m and still stands up to 1.5 m high. It is likely that the central building complex is a public building of some sort. There is a round structure, measuring 1.5 m in diameter, inside the western section of the central complex. Approximately 300 m northeast of Khirbat aḍ-Ḍā'an are a large, rectilinear enclosure and three massive terrace dams, presently in use as sheepfolds. Khirbat aḍ-Ḍā'an yielded 261 sherds, including Late Bronze II, early Iron I, Iron II, Iron II-Persian, Hellenistic, Roman, Byzantine, and Early Islamic sherds.

Khirbat al-Qrayya (Survey Site 149; PG: 234.8/096.4) is an unoccupied village site

on a ridge overlooking the head of the Wādi al-Mūjib and the Wādi al-Qaṭṭār, about 800 m west of the modern paved road from Khirbat ar-Rāmāh to Khirbat al-Jumayil (Fig.10). This site consists of a large building complex, a watch-tower, and at least six dwelling caves. The building complex is spread over an area of 50 x 50 m, and a large number of external and internal wall lines can be traced with confidence. The south quadrant of this complex is comprised of at least six rectilinear rooms; the north quadrant consists of six to seven rectilinear rooms as well. Immediately east of the northern quadrant is a large oval animal pen (ca. 13 x 15 m) built adjacent to a rectangular structure (ca. 5.6 x 8.3 m). Roughly centered on the west quadrant of this complex, foundation walls indicate two circular structures which measure about 3.0 m in diameter each. About 20 m east of this building complex is a rectangular building, probably a watch-tower, which measures 8.5 x 10.5 m. At Khirbat al-Qrayya all the structures are constructed from undressed stone blocks. Several caves are found in the west side of this site, which appear to have been used as dwellings. There are two cisterns in the vicinity of this site, one of which is still in use. The survey team collected 533 sherds, including Persian, Hel-

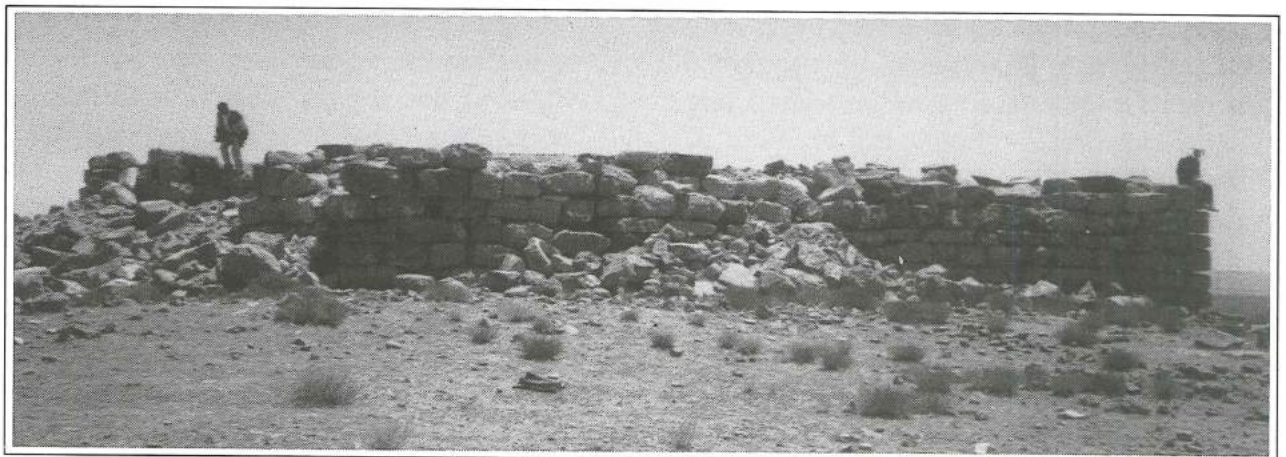


10. Khirbat al-Qrayya (looking northwest).

lenistic, Nabataean, Roman, Byzantine, and Early Islamic sherds.

Khirbat al-Musayṭiba (Survey Site 153; Glueck's Site 87; PG: 243.3/099.7) is a large settlement site ca. 6.5 km southeast of Umm ar-Raṣāṣ and immediately north of the modern road from Umm ar-Raṣāṣ to the Desert Highway. The most characteristic feature of this site is a roughly square structure which measures 20.0 x 21.3 m (Fig.11). The external walls are solidly constructed of roughly cut blocks of stones and still stands 3.3 m high. Glueck (1934: 40) described it as "a raised platform of masonry" with "two flights of broad steps, one each on the northern and southern sides, leading to the top of the platform". The stairs which Glueck des-

cribed appear to have been largely obliterated by the modern settlers, yet the stone tumbles on the northern and southern sides of this structure still bear some evidence of stairs. Glueck closely investigated this structure and discovered inner vaulted chambers, which led to the suggestion that this structure was a Nabataean cultic platform. Adjacent to this square structure is a large building complex comprised of a large number of wall lines and chambers. In the middle of this building complex is a large possible courtyard measuring some 30.0 x 35.0 m. This building complex seems to have been used for public and military purposes in antiquity, since it is solidly built according to an overall plan. Not much can be



11. The Main Structure at Khirbat al-Musayṭiba (looking southeast).

made of the details of this complex because parts of this structure have been badly disturbed and removed for use in the modern village nearby. In addition, we see some possible wall lines along the east side of the main square structure.

Approximately 70 m northeast of this square building is a large rectangular water reservoir with steps inside leading down from its northwest corner. This reservoir measures 13.0 x 24.0 m and was dug into bedrock 6.3 m deep. The inner walls and steps of this reservoir are plastered with clay cement and contain large numbers of ancient pottery sherds. We note the immediate surrounding terrain of this reservoir essentially as Glueck (1934: 42) described it: the reservoir is "surrounded on the outside by mounds of earth...which deflect the rain-water into it." At the southeast corner of this reservoir is a water channel leading to an opening in the wall through which the water runs into it. To the west and east of this reservoir are three water cisterns presently in use. There is another water reservoir about 150 m east of the first reservoir. This second reservoir is currently in use, and its inner walls are cemented using modern cement. Two additional water cisterns are recognized in the immediate vicinity of the second reservoir.

Located about 130 m east of the main square structure is a single structure (ca. 3.0 x 4.0 m) with roughly hewn limestone blocks. It is presently preserved up to only one course high. In this area, we also note a couple of additional foundation walls along with a stone heap. Some 100 m south of this small building is another completely ruined building with wall lines representing a rectangular building with a cluster of inner chambers. The overall dimensions of this building are ca. 4.0 x 17.0 m, including at least four rooms. Additional wall lines are easily discernible on the west and south sides of this building.

Glueck (1934: 41) collected a considerable

number of Nabataean sherds and pieces of sigillata at Khirbat al-Musayṭiba. Parker (1986: 170) also visited this site and found Iron I, Nabataean, Roman, Byzantine, and Early Islamic pottery sherds. The Dhibān Plateau survey team collected 386 sherds, including Late Bronze II, Iron I, Hellenistic, Nabataean, Roman, Byzantine, Early Islamic, and mid-Islamic pottery. Hence, the earliest occupation of Khirbat al-Musayṭiba seems to go back to Late Bronze II and Iron I, and it was reused at least three times after a potential long occupation gap in the Iron II and Persian periods.

Major Sites in the 'Aliyyān-'Ammūriya Region

During the second half of the 1997 season, the survey team visited 'Aliyyān-'Ammūriya region which is marked by the Wādī al-Wāla in the north, the Wādī 'Ammūriya and the Wādī Umm az-Zabayia in the west, and the modern road from Nitil to Umm ar-Raṣāṣ in the east. This region includes Khirbat 'Aliyyān (Site 6) and Khirbat ar-Rumayl (Site 11), both of which were visited by the survey team in 1996 (Ji and 'Attiyat 1997). As stated above, in this region, the survey team has so far discovered 53 new archaeological sites. Most of these new sites are small watch-tower-like remains located along the Wādī al-Wāla, the Wādī 'Ammūriya, the Wādī al-Kaum, and the Wādī al-Buṭum, and in the flat lands between these wadis. Yet, not a small number of ancient cities are also located in this region, which shows that this region was more or less densely settled in ancient times. Examples are Umm ash-Shujayrāt ash-Shiyāb (Site 162), Khirbat al-Qahqaha (Site 166), Khirbat al-Kaum (Site 172), Khirbat 'Ammūriya (Site 186), and Umm ash-Shujayra al-Gharbiyya (Site 214).

Located on a high flat-topped spur overlooking the Wādī al-Buṭum, Khirbat Umm ash-Shujayrāt ash-Shiyāb (Survey Site 162; Glueck's Site 154; PG: 232.9/100.1) com-

mands a good view over the surrounding terrain and provides excellent visibility of Khirbat 'Aliyyān. This ruin is located some 1.0 km northwest of Khirbat 'Aliyyān and stretches over an area ca. 40 x 50 m. The ancient wall lines can be traced only partially today since local inhabitants have been robbing stones from the ancient buildings to the extent that only traces of possible wall lines survive. A characteristic feature of this site is a partitioned rectangular structure which covers over the area of ca. 5.8 x 19.4 m. Its external walls average about 60 cm thick and solidly built using roughly dressed limestone blocks. Portions of the external walls have survived up to 1.5 m high. This building is oriented in the northwest-southeast direction and occupies the highest point of this site. In the middle of this building is a Buṭum tree that Glueck (1939: 115) mentioned as "a landmark for a distance of many kilometers." Ruin of another building complex (ca. 13 x 15 m) are visible immediately west of the northwest corner of the first one. This structure rests on bedrock and includes at least three to four rooms. Also notable are possible remains of wall lines on the southern side of this site where the hill begins to drop precipitously into the Wādī al-Buṭum. There is a large collapsed cave or cistern (ca. 4.0 x 5.0 x 8.0

m) near the wall lines. Ancient remains are virtually non-existent on the east and west side of this site, and they appear to have been completely obscured by the modern structures. At Umm ash-Shujayrāt ash-Shiyāb, Glueck (1939: 115) picked up a few Nabataean sherds along with Islamic sherds. Although the ruins were scanty, the survey team collected 263 sherds at this site, including diagnostic Iron II, Nabataean, Roman, Byzantine, and early Islamic sherds.

Khirbat al-Qahqaha (Survey Site 166; Glueck's Site 161; PG: 232.3/104.2) is situated near the head of the Wādī al-Qahqah that feeds into the Wādī al-Buṭum, ca. 2.0 km southwest of Khirbat 'Aliyan and some 2.2 km northeast of Khirbat Umm ash-Shujayra al-Gharbiyya. The Wādī al-Qahqaha cuts around most of the spur where the ruin is situated, leaving the west side connected to the plateau. This site covers an area some 120 m by 140 m.

Glueck (1939: 116) visited Khirbat al-Qahqaha and reported it as "a fairly extensive ruin" without providing any details on the architectural remains. Yet, we observed numerous building remains, several caves, and water cisterns that constitute Khirbat al-Qahqaha (Fig.12). Situated on a high point in the center of this site are two structures solidly made of small to medium



12. Ancient Remains at Khirbat al-Qahqaha (looking southwest).

limestone blocks. One measures 4.4 x 6.0 m and the other 2.5 x 3.0 m. The external walls of both structures measure 80 cm thick and still stand 60 cm high. Approximately 50 m northeast of these two structures are three cisterns cut into bedrock, two of which are currently in use. The cisterns are large and well-cut each other with an opening ca. 57 cm in diameter.

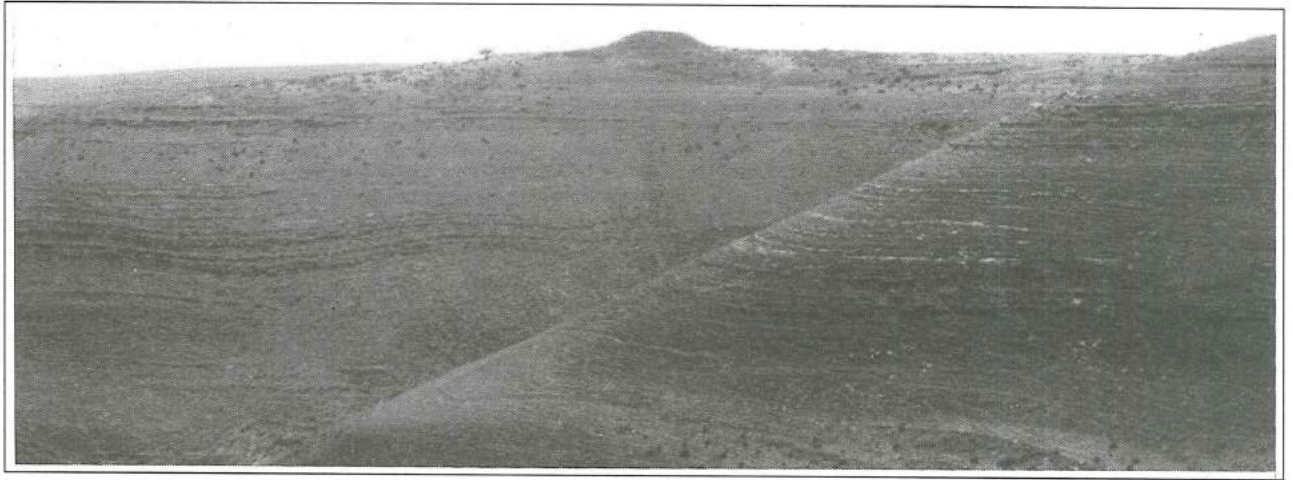
Along the slopes on the eastern side of Khirbat al-Qahqaha are the wall remains of solidly built structures, probably a residential area, which cover an area ca. 50 x 50 m. In this area at least three building complexes were noted. Situated about 20 m south of the three cisterns is a large building which measures some 10.0 x 10.0 m overall and is divided into three to four chambers. Another building complex is observed some 20 m southeast from the first one. The vague outlines of several houses and chambers are discernible in this complex. The external walls measure 0.8 m to 1.2 m thick, and parts of the buildings have survived up to 90 cm above ground level. Approximately midway between the first and second building complexes are three natural caves which may have been used for dwellings and storage in antiquity. There are potential man-made terraces on the eastern slope of this site, ca. 10 m east of the second building complex. The heaviest concentration of building ruins are noted on the southeastern side of Khirbat al-Qahqaha. Although the whole complex covers an area ca. 40 x 50 m, only part of wall lines can be traced with any degree of certainty. We identify more than 10 chambers and numerous foundation walls. In this area the buildings are constructed of large dressed stone blocks, which stands in contrast to the two structures in the center of this site. Also notable are water cisterns and caves dotted inside and outside of this building complex: the survey team recorded five water cisterns all currently out of use plus three natural caves. The cisterns were cut into deep bedrock,

each with openings ca. 1.0 m in diameter.

The building ruin approximately 20 m west of the third building complex deserves our attention, since it is the best preserved and well-built structure at Khirbat al-Qahqaha. The whole building measures ca. 3.3 x 5.0 m with external walls about 1.3 m thick. It is built of medium boulders using head-stretcher building technique and still remains standing up to six courses high in some places. A possible entrance was noted on the north side of this building. The overall plan of this building shows that a rectangular room runs across the front and three long rooms stem forward from it. The main entrance leads into the front rectangular room.

Glueck (1939: 116) collected some Nabataean sherds along with several pieces of sigillata and Middle Islamic painted sherds at this site. We collected 663 sherds including diagnostic Hellenistic, Nabataean, Roman, Byzantine, Early Islamic, and mid-Islamic sherds. The predominant pottery was Middle Islamic. Hence, Khirbat al-Qahqaha appears to have been a place of importance during the period from the Hellenistic to Middle Islamic periods, particularly during the Middle Islamic period.

Khirbat al-Kaum (Survey Site 172; Glueck's Site 174; PG: 230.6/107.0) is situated on a spur surrounded almost completely by a loop in the Wādī al-Kaum except for the south where the spur joins a plateau (Fig.13). The site provides broad visibility: for example, al-Ḥashāsh (Site 215) is visible about 1.2 km directly to the north and Khirbat 'Ammūriya some 2.0 km to the northwest. On this large site, the debris spreads over an area of ca. 100 x 200 m. The main feature of this site is a rectangular structure, probably a fortress, which occupies the acropolis of this site. It measures 18.9 x 21.5 m and is oriented north and south. The structure presently remains standing up to 3.5 m, and its external walls are 1.0 m thick. The building itself is relatively well pre-



13. Khirbat al-Kaum (looking east).

served, although its southern wall has been disturbed. Immediately northeast of this building are the collapsed remains of a building which measures some 15.0 x 17.0 m. It consists of one large inner chamber (ca. 10.0 x 15.0 m) and two smaller inner chambers (ca. 2.8 x 7.5 m and 7.5 x 12.0 m). This building still stands up to 2.5 m, and its external walls are 1.4 m thick. It appears to have been used for residence. This large building appears to have been connected to the fortress by a rectangular structure measuring 9.0 x 12.0 m. Some 30 m west of the fortress are numerous foundation walls which indicate a solidly built building complex composed of at least eight to 10 chambers, although its overall plan cannot be traced completely. There are two cisterns and a cave in the midst of this building complex. The north and east terraces of this site contain numerous wall lines, foundations of ancient buildings, cisterns, and caves. In these areas, it is almost impossible to differentiate ancient structures from modern ones, since the stones of ancient remains have been taken for the construction of modern animal pens and houses, and the ancient ruins thus have practically disappeared. In this area, the survey team identified at least seven cisterns and caves, each associated with the buildings and wall lines.

Glueck (1939: 123) noted that the pottery

found on the east and north slopes below the fortress were dated predominantly to the Iron Age. Glueck's observation appears to be accurate. According to our survey, there is an exceptionally high concentration of Iron Age and Hellenistic sherds collected on the eastern slope of Khirbat al-Kaum. In contrast, Roman, Byzantine, and Islamic sherds are predominant on the western slope and northern terrace. Glueck suggested that in the Iron Age the fortress was possibly built and strengthened, and a glacis was built against its sides. According to his report, parts of this glacis was visible when he visited Khirbat al-Kaum. Yet, in 1997, we were unable to distinguish clear evidence of ancient glacis. In addition, Glueck collected a large quantity of Nabataean and Roman pottery. We also collected a large number of Nabataean, Roman, and Islamic sherds at this site, particularly on the western slope and northern terrace. In summary, at Khirbat al-Kaum the survey team found 525 sherds including Early Bronze, Iron II, Iron II-Persian, Hellenistic, Roman, Byzantine, Early Islamic, and Middle Islamic pottery.

Khirbat 'Ammūriya (Survey Site 186; Glueck's Site 173; PG: 228.4/107.7) provides a good vantage point from which to view almost the entire length of the Wādī 'Ammūriya. To the southeast Khirbat al-Kaum is clearly visible from this site. Khirbat 'Ammūriya is marked by many ruined

block-houses and enclosure walls, some of which are currently in use for animals. As Glueck (1939: 123-24) noted, however, there is a large number of wall lines spread over the area of ca. 100 x 100 m in addition to a couple of cisterns and caves. The flint block foundation wall lines on the flat top of this site indicates a large building complex including a relatively well-preserved building measured at 6.0 x 6.0 m. The external walls of this building are 1.0 m thick and are preserved up to 1.2 m above the ground. The main building appears to be a watch tower connected with at least three to four structures. There are other building remains west of the acropolis, one of which extends over an area of 15.0 x 18.3 m and the other one 10.0 x 14.8 m. The ruin of a building comprised of arches, possibly remains of a church, has been found almost completely covered by soil on the western terrace. There are a couple of cisterns and caves scattered in the vicinity of this ancient ruin. Glueck found a large number of Nabataean sherds along with some sigillata fragments. The survey team collected 286 sherds including Early Bronze, Hellenistic, Nabataean, Roman, Byzantine, Early Islamic, and Middle Islamic sherds.

Site 194 (PG: 227.9/108.3), a large watch-tower site, consists of at least seven circular structures on top of a high hill situated about 800 m east of the confluence of the Wādī 'Ammūriya with the Wādī al-Wāla. This site provides a strategic vantage point from which to view the surrounding area, and Mulayḥ is visible to the north. This site covers an area of 100 x 200 m. A first structure, about 3.0 m in diameter, is situated at the southeast end of the hilltop. Immediately northwest of this structure is another round structure measuring about 3.3 m in diameter. Both structures are solidly built with walls about 1.2 m thick. They presently stand about 80 cm above the ground and include a rectangular inner room (ca. 0.8 x 1.2 m). About 30 m northwest from

the two structures is a third tower 2.5 m in diameter, which is now partly destroyed. The next two structures are located some 30 m northwest from the third one, and they are 2.5 m and 6.0 m in diameter respectively. Their walls are 60 to 80 cm thick and remain standing about 70 cm high. Another ruin is noted some 10 m northwest of these structures, which measures about 3.5 m in diameter. This structure presently stands 50 cm above the ground. To the east of these six structures and clearly visible from the last three towers is a round structure built on the edge of the hilltop overlooking the bend of the Wādī al-Wāla. It is 4.7 m in diameter and is still preserved up to 70 cm high. Sherds were extremely sparse at this site; only two possible Roman or Byzantine body sherds were collected.

Tor al-Hashāsh (Site 203; PG: 230.7/108.6) is located close to the bottom of the Wādī al-Wāla, immediately across the wadi from the village of al-Ḥashāsh (Site 215). It is almost completely surrounded by a loop in the Wādī al-Wāla, where a group of cliffs jutting up from the wadi. The ruin consists of a large building complex which appears to have been a villa or a way station. The complex measures some 14.0 x 17.5 m, and is partitioned by several cross walls into five chambers and a rectangular courtyard (ca. 19.0 x 22.0 m). An oval circle of stones attached to the courtyard could be interpreted as used for animals. This seems also to be the case for another oval circle of stones noted on south side of the main building. The main building complex remains standing two to three courses high (ca. 1.0 m). Near the southeast corner of this building is a circular structure measuring 4.4 m in diameter. Fifty-one undiagnostic sherds were collected, including one potential Early Islamic sherd. The predominant sherds at this site appears to belong to the Byzantine or Early Islamic periods.

Khirbat Umm ash-Shujayra al-Gharbiyya

(Survey Site 214; Glueck's Site 159; PG: 230.3/103.2) is situated in an intensively cultivated plateau, approximately midway between Qaryat Flāḥa and Khirbat al-Qahqaha. The most characteristic feature of this site are abandoned Ottoman period houses built on top of earlier remains. Glueck (1939: 116) described this site as "a small modern settlement...consisting of a dozen houses, built partly out of the stones of the ruined site they supplanted." Ancient building ruins and foundation walls, however, are still clearly visible under the Ottoman building ruins, over an area of some 50 x 60 m. The ancient settlement is surrounded on the east, south, and west by modern paved roads and buildings.

Although the plan is not entirely clear, there seems to have been a large building complex (ca. 35 x 35 m), comprised of numerous partition walls and small chambers, on the north side of this site. On the south side of Khirbat Umm ash-Shujayra al-Gharbiyya is another building complex made of finely dressed blocks, spreading over an area of some 12 x 25 m. This building seems to have been composed of five to six rectangular rooms. Immediately west of this second complex are additional large building remains and foundation walls which covers an area ca. 20 x 45 m. This building complex is almost completely covered up by the later Ottoman building, yet part of earlier wall lines are still clearly discernable. It is very likely that these three building complexes were originally connected to each other and formed a huge villa or building complex. We are unable to distinguish any fortification walls. Approximately 50 m west of this building complex is another evidence of ancient settlement which is scattered over an area of 20 x 30 m. In this area, we note one cave, a rectangular enclosure animal pen (ca. 2.0 x 8.0 m), and the ruin of a stone-made structure. There are also two water cisterns at the western end of this area.

At Khirbat Umm ash-Shujayra al-Gharbiyya, Glueck (1939: 117) collected a few Nabataean-Roman sherds along with some glazed mid-Islamic sherds. Our investigation produced 404 sherds including Roman, Byzantine, Early Islamic, and mid-Islamic sherds.

Conclusion

According to the 1997 survey, the ar-Rāmah-as-Sāliya region appears to have been densely settled in the Hellenistic, Nabataean, Roman, and Byzantine periods. There is evidence of settlement continuity throughout these periods. Of the other periods, the Early Bronze, Iron I and II, and Islamic periods seem to have more than a token representation, whereas the Middle Bronze, Late Bronze, and Persian periods are virtually unrepresented. In general, we observe a chronological correlation between the results of the survey in the ar-Rāmah-as-Sāliya region and those in the 'Aliyyān-'Ammūriya region. In the 'Aliyyān-'Ammūriya region, the majority of the 57 sites surveyed so far are attributed to the Iron II, Hellenistic, Roman, Byzantine, and Islamic periods. Yet, although well attested to at Khirbat 'Aliyyān and Khirbat ar-Rumayl (Ji and 'Attiyat 1997), Iron I appears to have witnessed a more or less low settlement intensification in the 'Aliyyān-'Ammūriya region in comparison to the ar-Rāmah-as-Sāliya region. The evidence of Early Bronze is also sparser in the 'Aliyyān-'Ammūriya region than in the ar-Rāmah-as-Sāliya region. Middle Bronze and Late Bronze pottery is almost completely absent in this region.

The geographical distribution of ancient sites also deserves some attention. Most of watch-tower sites and villages are situated along the southern and northern edge of the plateau, and they are often located in close proximity to each other. In contrast, they are surprisingly sparse in the central plateau bounded by Khirbat as-Sāliya and Khirbat

ar-Rāmāh in the south, Khirbat al-Musayṭiba in the east, and Khirbat 'Aliyyān and Khirbat al-Qahqaha in the north. Therefore, what is apparent is that in the ancient times, especially in the Iron Age and the Hellenistic-Byzantine periods, the Dhibān Plateau was encircled by a chain of watch-tower like settlements found in groups along the plateau rim. It is doubtful that these watch-tower settlements should be referred to as military and wayside stations since there are too many of them within a short distance of each other. On the other hand, urban centers are spread over the entire region and seem to have been built along ancient roads. It would appear, therefore, that road systems played a significant role in shaping the urban settlement pattern in the Dhibān Plateau. A suggestion is that the preceding settlement pattern of the Dhibān Plateau was related to a variety of factors, rather than military defence alone, including nomadic economy, unequal social structure, climate, water, tribal system, and transportation.

Taken together, the 1997 season of the Dhibān plateau project appears to have been successful and productive. The results of the 1997 survey show that in the Dhibān Plateau, there are still a large number of archaeological sites which await further field-work and careful follow-up analysis. In addition, the Dhibān Plateau seems to have a unique settlement pattern and occupational history, one somewhat different from the Mādabā plains in the north and the al-Karak

Plateau in the south. At least a couple of seasons of full-blown archaeological field-works appear to be necessary to complete the survey in the Dhibān Plateau.

Acknowledgement

The authors are most grateful for the permission and encouragement granted by the Director-General, Dr Ghazi Bisheh, and his staff at the Department of Antiquities to survey and investigate the Dhibān Plateau. Nuha Karadsheh and her friends at Mādabā also played an important role in the 1997 project by providing comfortable lodging and good food for the survey team. We are particularly grateful for their hospitality and friendship. The Dhibān Plateau Project is also deeply indebted to Dr Lawrence T. Geraty at La Sierra University and Dr Kye-Hoon Shin at Korean Sam Yook University for their encouragement and financial support. In addition, needless to say, without the generous financial support from a number of individual donors, the project would have been impossible. The authors wish to thank the donors for their help.

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Bibliography

- Callaway, J. A.
1972 *The Early Bronze Age Sanctuary at Ai (et-Tell)*. London: Quartich.
- Glueck, N.
1934 *Explorations in Eastern Palestine I*. AASOR 14. New Haven: ASOR.
1939 *Explorations in Eastern Palestine III*. AASOR 18-19. New Haven: ASOR.
- Herr, L. G. and Christopherson, G.
1996 *The Madaba Plains Project Survey Manual*. Berrien Springs: Andrews University.
- Ji, C. C.
1996 Archaeological Survey of the Dhibān Plateau. *AJA* 101: 499-500.
- Ji, C. C. and 'Attiyat, T.
1997 The Reconnaissance Survey of the Dhibān Plateau, 1996. *ADAJ* 41:115-28.
- Miller, J. M.
1989 Six Khirbet el-Medeinehs in the Region east of the Dead Sea. *BASOR* 276: 25-28.
- de Miroschedji, P.
1988 *Yarmouth I*. Paris: Editions Recherche sur les Civilisations.
- Olávarri, E.
1983 La campagne de fouilles 1982 à Khirbet Medeinet al-Mu'arradjeh près de Smakieh (Kerak). *ADAJ* 27: 165-78.
- Parker, S. T.
1986 *Romans and Saracens: A History of the Arabian Frontier*. Winona Lake: Eisenbrauns.
- Routledge, P.
1995 Pillared Buildings in Iron Age Moab. *BA* 58:236.



GHARANDAL SURVEY 1997: AIR PHOTO INTERPRETATION AND GROUND VERIFICATION

by

David Kennedy¹

with the assistance of Julie Kennedy

No formal field survey has yet been carried out in the vicinity of the village of Gharandal. Sites have been noted there, not least by Nelson Glueck, but a formal and systematic survey of the region is planned for a future season. In anticipation of that, the author was invited by the Director, Alan Walmsley, to examine and interpret air photographs of the intended survey area. The objective for Walmsley was as a preparation for field survey; for the author it offered the opportunity to evaluate the photographs for a region being examined as part of an existing project.² Happily the author was then able to join the excavation and two days (4 - 5 May 1997) were devoted to verifying on the ground some of the "sites" identified on the air photographs.³ It is hoped that further sites may be followed up in 1998 but the results are already significant and merit a preliminary report here.

The Survey Area

The intended survey will extend over an irregular area, about 12 km E-W by 7 N-S, some 50 sq km (Fig. 1). The landform is hilly but consists of a high plateau overlooking often spectacular views on the west, not least the Dānā National Park on the SW.

In the SE the land is over 1600 m high, falling by more than 500 m as one travels NW. All along the W, however, the land

then falls away very steeply leaving a number of tongues of land on which villages lie. Best known of these is Buṣayra in the NW. Gharandal itself lies just E of the centre of this area. Other modern settlements are recorded on the 1:50,000 map (K737 "ash-Shawbak" 3151 III) at "Umm Dāyifa" (sic) and "ar-Rashādiyya". Other notable features recorded there are four springs recorded by name, all along the W and NW where the land begins to drop westwards very steeply.

Previously Recorded Archaeological Evidence

The most convenient source of information is now the immensely useful JADIS volume (Palumbo 1994). Table 1 sets out the list of 12, perhaps 13, sites, the names there being variants on the spelling on the map.

Of these, the Iron Age site of Buṣayra is certainly the best-known, not least from the excavations of Crystal Bennett (1973; 1974; 1975; 1977) while Gharandal itself, largely Roman to Early Islamic is reported on elsewhere (Walmsley, this volume; cf. Walmsley 1989 and Walmsley and Ricklefs 1997).

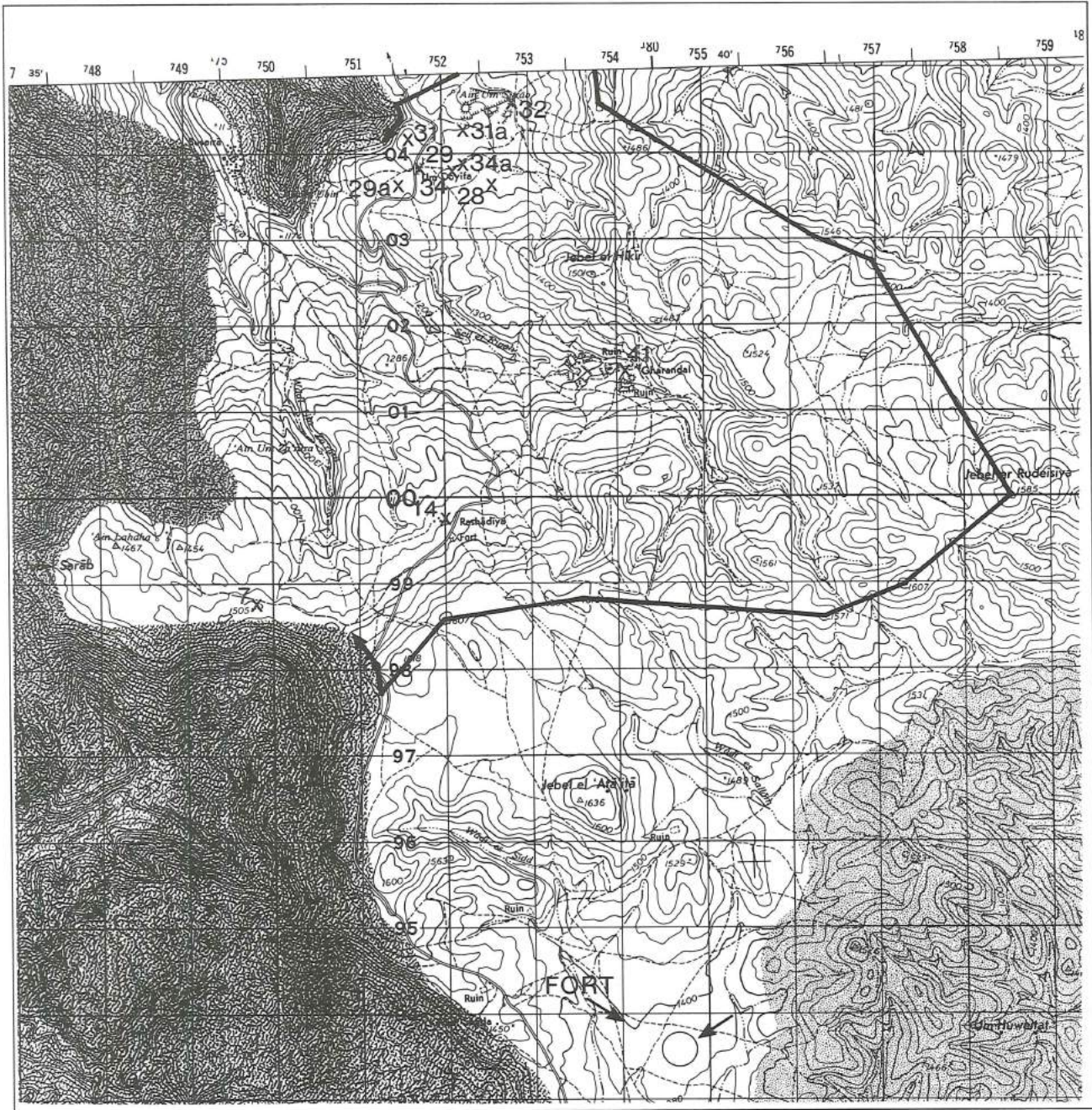
Khirbat Sarāb was visited by Glueck (1935: 98, Site 187) but he found no pottery and described a "small, completely ruined

1. I am grateful to Alan Walmsley for his kind invitation to work with him and for his comments on an earlier draft of this article.

2. Since 1992, the Australian Research Council has funded a project, Remote Sensing for Archaeology in the Middle East, the core of which has been the systematic analysis of some 4000 vertical air photographs of Jordan. To date over 25,000

sites have been identified. Preliminary analysis arising from parts of this project can be seen in Kennedy 1996, 1997b, 1998a; cf. 1995, 1997a, 1998b, *forthc. a*, *forthc. b*, Kennedy and Freeman 1995.

3. Ground verification was carried out by the author, Walmsley and Jihad Darwish of the Department of Antiquities.



1. The Gharandal Survey area showing the location of sites discussed in the text. N.B. the very dark toning on the left is where very steep slopes are rendered by close contours.

site, with building stones similar to those of Khirbat Nusraniyah” (below).

At Umm Dāyifa Hart and Falkner (1985: 270, Site 113) report a village with dating evidence extending from the second century B C to the Ottoman period.

At Rās al-Hala, Glueck (1935: 95-95, Site 184; 179, pl. 17) reports an Edomite border fortress and Nabataean and Islamic sherds

(cf. Hart and Falkner 1985: 270, Site 112).

For Rushdiyeh no publications are recorded in JADIS but Glueck (1934: 78) was there and reported an extensive site of the Nabataean, Roman and Ottoman period and there has been unpublished excavation on the church in recent years (below).

- Khirbat an-Nuṣrāniyya was also seen by Glueck who describes a large Byzantine

Table 1. Sites in the Gharandal Survey area recorded in JADIS (Palumbo 1994)

JADIS No.	COMMENT
2001.001	Umm Dayiea
2001.004	Kh. Sarab
2001.010	Buṣayrā
2001.012	Kh. el-Nasraniya. No information; unspecified structure
2001.013	Modern Buṣayrā
2101.001	Kh. Gharandal
2101.002	Ras el-Hala
2101.010	Rushdiyeh. No information published
2101.011	Kh. Nusraniyeh
2101.012	No information; unspecified structure
2101.013	No information; unspecified structure
2101.014	No information; unspecified castle
2101.019	Qal'at er-Rashadiyah. No information; unspecified palace
2101.021= 2001.001	Dari Sahabi Hareth bin Umeir el-Azdari. No information; unspecified "Wadi Darīh". Error in grid reference?

and Medieval Arab site (1935: 98).⁴

- Qal'at ar-Rashādiyya provides no information but the code identifies a "pa-lace". The location is very close to that of Rushdiyeh (above) and one may suspect it is the same site here being recorded in JADIS from the entry on the 1:50,000 map. The "palace" may be an error for the "fort" marked there.

Sites Recorded on the Air Photographs

Every part of the survey area was covered by one or more of a total of 15 frames, all at a scale of c. 1:25,000. They were taken in 1953 in four sorties on four days at different times of the day. Most were taken around midday when shadows were smallest, glare highest and the landscape would seem very "flat".

Table 2. Frames in the sorties covering the Gharandal Survey area.

Sortie nos	Frames	Date	Time
15.032-035	4	10 July 1953	c. 12.45
25.034-037	4	17 July 1953	c. 09.45
43.023-025	3	11 September 1953	c. 11.30
47.116-119	4	16 September 1953	c. 12.45

4. There is a problem here as the grid references in JADIS place this site about 4 km due E of Buṣayra rather than 4 km SSE as Glueck contends. Moreover, Glueck then locates Khirbat Sarāb 3 km SW of an-Nuṣrāniyya. Khirbat. Sarāb is presumably correctly located beside Jabal Sarāb marked on the 1:50,000 map. That is only possible if an-Nuṣrāniyya does indeed lie SSE of Buṣayra as Glueck says and the location given by JADIS is corrected as shown in parenthesis on Fig. 1 to place it beside what the modern map calls 'Ayn Umm Za'rūra, 2 km W of ar-Rashādiyya (Glueck mentions a spring just W of Nusraniyah). The problem is compounded by the Archaeological Map (Karak

Sheet) of Jordan which places "Kh. en-Nasraniyeh" about 4 km W of ar-Rashādiyya, on the scarp where the air photographs show some faint traces of what might be rectilinear buildings. Worse still, there is an 'Ayn Umm Sarāb on the 1:50,000 map (Map 3151.3: YV524045) and a Khirbat en-Nusraniyeh to its NNE (Map 3151.4: YV569143) - the latter, however, is 11, not 3 km away and cannot be the same site.

The archaeological map records a "Kh. Beitun". The site is not in JADIS or Glueck. Its location on the map is approximately where I have identified Site 26.

The general strengths and limitations of these photographs have been described elsewhere (Kennedy 1998a: 42-46; 51-55). In interpreting the photographs, "site" was defined as an apparent man-made intrusion in the landscape which there is reason to believe is pre-1919 in date (cf. Kennedy 1998a: 50-51).

A total of 50 sites was recorded (App. 1), more than trebling the number known to JADIS. The site types recorded range from a few which may be "modern" (1919-1953) but deserve checking, to several which have every appearance of much greater antiquity. Gharandal (Site 41) is the most important in terms of this survey, the present village having not yet developed to obscure parts of the ruins. Buṣayra (Site 30) is disappointing but in contrast, Site 31 nearby would be well-worth closer examination. Also worth investigation are the many small dark spots noted on several frames. Elsewhere these have often proved to be cairns or, in a few instances, collapsed towers. Most sites appear on more than one frame. Especially interesting from the point of methodology is Site 42 which is visible on only a single frame although the area is covered by four frames. Significantly the frame on which it does appear was taken relatively early in the morning implying a low wall visible only early in the morning when there was a sufficient shadow.

Not recorded individually is the evidence for agriculture. Many fields are plainly in current use but others may be the remnants of an older disused system. A selection of field walls in various areas would repay investigation to see if the walls themselves appear recent, old, or recent overlying old.

Comments on Individual Sites (Additional to Brief Remarks in Appendix 1)

The purpose of the ground work was to verify the existence of sites identified on the air photographs, to explain their appearance there in terms of what was visible on

the ground and to evaluate the contribution made by the aerial view. No artifacts were collected and no attempt was made to record the site. That will be the task of the subsequent field survey. Numbers are those in Appendix 1; the addition of a letter to a number (e.g. 29A) indicates a site found on the ground in the course of verification but which had not been identified as a site during the photo interpretation.

The first group of sites checked on the ground lie in the SW of the survey area on a tongue of the plateau just above the Wādī Ḍānā:

Sites 1-6: None of these could be traced on the ground as the area is being extensively quarried to a great depth. However, some may still survive on higher ground beyond the quarry. George Findlater (pers. comm.) subsequently described having seen well-preserved sites in this area which may well include these. It is in this area that Glueck apparently saw the site he called Khirbat Sarāb.

Site 7: The only site actually seen on this tongue was preserved as a partly bulldozed island of rubble on the edge of a large quarried area. The nature of the site is unclear but its location offered wide vistas to the S across the Wādī Ḍānā and the valley and probably W, N and E across the plateau of this peninsula. Masonry and numerous sherds were noted across an area of c. 1 ha.

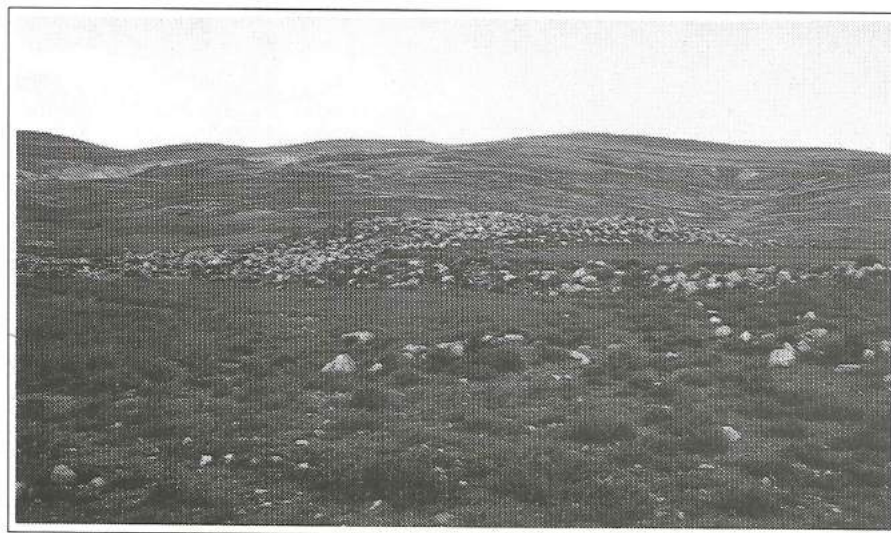
The Second Group Lies in the NW:

Site 28: Plainly visible on the ground as a large rubble heap on the skyline (Figs. 2 and 3). Proved to be on a raised platform of the slope with extensive views to N, W and E. Well-built walls forming a large rectangle within which lies a square/ rectangular structure. There is a smaller, detached, square structure on the NW.

Site 29: A shrine to a Muslim saint of the early seventh century AD, al-Harith ibn 'Umayr al-Azdi, which has recently been rebuilt and walled in. Seemingly popular



2. Air photograph of the area north-west of Gharandal showing several sites as they appeared on 16 September 1953. The photo shows clear traces of structures and enclosures and a possible street winding through Site 31. At ground level the foundations of numerous buildings are clear (cf. Fig. 5) (HAS 47.120).



3. Site 28 from the west (May 1997).

and ancient. This this presumably the Dari Sahabi Hareth bin Umeir el-Azdari recorded in JADIS.

Site 29A: Visible on the photo but interpreted as probably natural (Figs. 2 and 4). A rubble heap on hilltop SW of 29. Inspection revealed it similar to but smaller than 28 – a

well-built, rectangular structure on raised ground surrounded now by ploughed land.

Site 31: On a hilltop overlooking a steep drop into a valley below. Easily located, substantial and well-preserved remains in a lozenge shape, c. 250 x 250 m (Figs 2. and 5). An important site. From the photo it



4. Site 29A from south-east (May 1997).



5. View of Site 31 from the east (May 1997).

should be possible to identify the main areas of structures as opposed to the southern part where the walls are seemingly more crudely built and intended as terrace walls only on the steep slope.

Site 31A: Not noted in the photo interpretation (Fig. 2). On a tongue-like promontory E of 31. A few sherds on the plateau. The modern house at S end may overlie a hint of a small square structure which appears as light toning on the photo.

Site 32: Significant spring with a few houses nearby (Fig. 2). The region around the spring has been bulldozed. Spring water is channeled westwards to irrigate land to S of that channel. It would be worth investigating this irrigated area on the ground.

Site 34: The trace on the photo seemed

on inspection to be no more than a rock outcrop (Fig. 2). The land around has been extensively ploughed, however, and in the field nearby lies half of a very large stone basin.

Site 34A: Possibly visible on the photo but not noted. The site was discovered on the ground beside the road just N of 34. Small square, well-built structure under rubble (Figs. 2 and 6).

Finally, two extensive sites:

Site 14: ar-Rashādiyya deserves close inspection. Along with Glueck's brief comments (1934: 78) the site was surveyed as part of the Dānā Archaeological Survey (Finlayson and Baird 1995; Findlater pers. comm). We may add the visible evidence



6. Site 34A. Small square rectangular structure partly damaged by roadworks.

on the ground of several massive columns, a stone basin - part, perhaps, of an olive press, architectural pieces and fragments of a Roman milestone from the *Via Nova Traiana* which runs nearby. Individual structures may be identified on the ground but the general form, size and distribution of these show well on the air photograph (Fig. 7). Especially important is the very large building at C (Fig. 8). Recent excavation by a team from Mu'ta University has revealed a church close to the road (Fig. 7, point D).

Site 41: The ancient village/ town of Gharandal shows clearly on the air photograph as an extensive area of ruins (Fig. 9). The site today is closely hemmed in by houses and been subject to over 50 years pressure from the human population. The photograph provides a useful guide to the former extent of the ruinfield and permits a few individual structures to be identified.

The opportunity was taken to investigate a problematic site identified on air photos of the region just S of the Gharandal Survey area. In the course of doing so another important site was noted. Both may be reported on here and included in the overall summary of results.

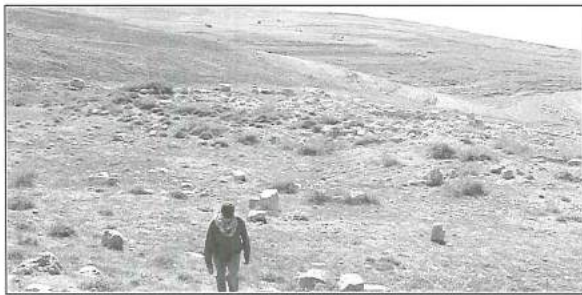
Circle: Examination of an air photo of the region just E of the new but large village of Khirbat Shada on the ridge of the King's Highway 6 km S of ar-Rashādiyya, revealed

a large circle some 800 m in diameter (Fig. 10). Although it appears on the 1:50,000 map (Sheet 3151.3: YU546936) as a perfect circle, the air photograph reveals several slight "wobbles". The site was easily located on the ground as it had been built from the basalt boulders which characterize this region and contrast with the bright red/orange soils and green vegetation (Fig. 11). It lies on a slight rise and was readily visible from a distance on the ground. On inspection it proved to consist of basalt boulders, 3-4 m wide and heaped about 50 cm high. They had a uniform patina of surface lichen and seemed long undisturbed. The circuit was traceable almost the entire length except on the E where a modern road has cut through it and beyond which the boulders have been removed for a short distance for land clearance. A few sherds were observed in several places and provisionally identified (by Walmsley) as "Late Antique". Although the sherds may well be no more than the outcome of field manuring, the circle itself looks old - certainly pre-1919. Another, almost identical in diameter and appearance was located on the air photos further n (Sheet 3151.1: YV806186).

Fortified site: the site was discovered by chance, not having been noted on the interpretation of the relevant air photograph. It was identified when examination of what



7. Site 14: Ar-Rashādiyya. The most prominent buildings are those of the late Ottoman period, well-preserved but lacking their roofs (A). The ancient remains extend under and to the S towards the modern police post (B). Several buildings can be identified, especially a very large one at C (cf. Fig. 8). The church is at D. Passing out to the NE is the trace of an old road, perhaps the original line of the Roman road. It appears again on the same alignment (Site 15) at a point where the modern road takes a different route.



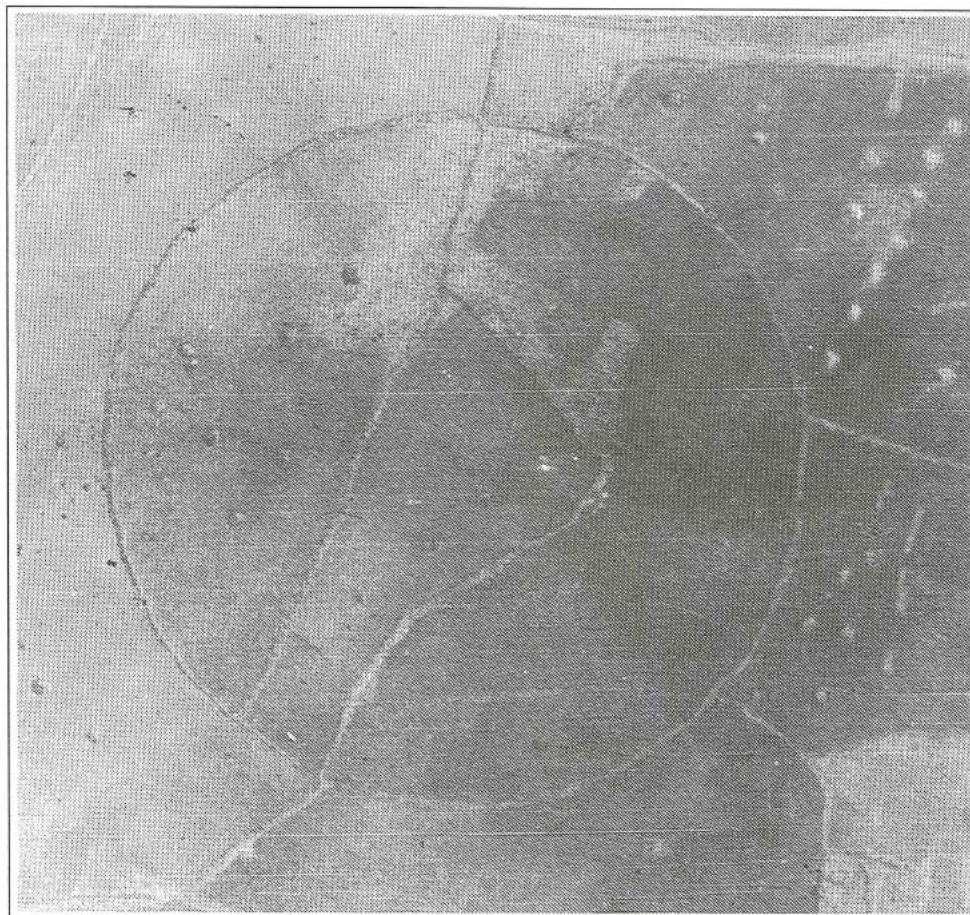
8. Site 14: Ar-Rashādiyya - the major building (C on Fig. 7) from the north-east seen (May 1997).

was taken to be a very high wall of basalt boulders on one side of a field track, proved to be the circuit wall of a large site (Sheet 3153.1: YU538941) (Fig. 12). The wall was some 2 m high and 2-3 m wide. The upper surfaces of the boulders were covered in a heavy patina. Two sides of an area of some 200 (E-W) and 150 m (N-S) were noted. The failure to note such a massive structure on the air photographs was probably due to

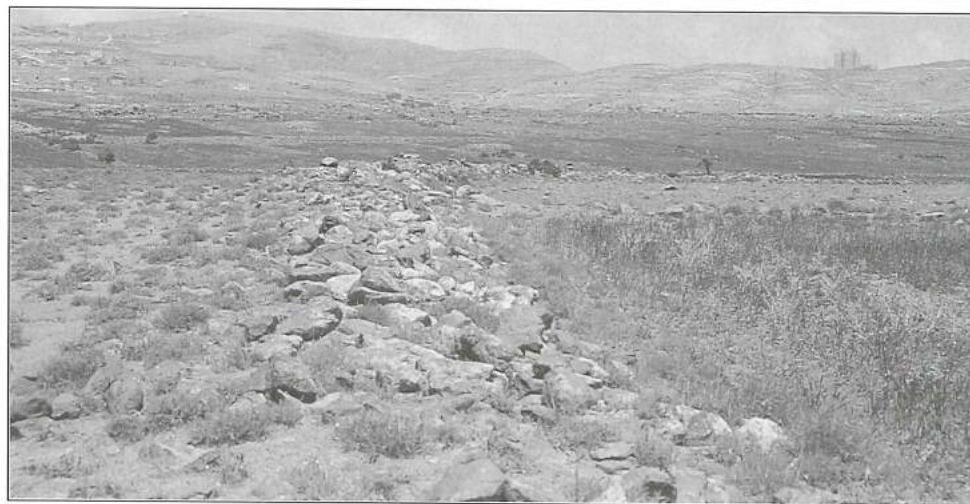


9. Site 41 - Gharandal from the air on 17 July 1953 (HAS 25.035).

the slight shadows on the air photograph and their direction – almost due west at 09.15 for a structure whose principal wall runs E-W. It was found that up-ending the



10. Air photograph of 17 September 1953 of the circle east of Khirbat Shada (HAS 25.039).



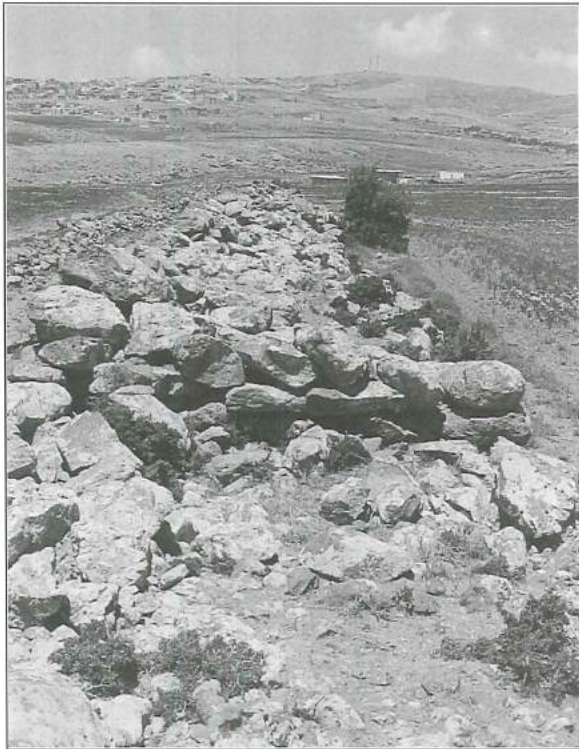
11. The circle east of Khirbat Shada as seen from the east (May 1997).

photograph, and placing the shadows in the “correct” visual relationship to the viewer, brought at least the S wall of the site into focus (Fig. 13).

Comment

As was to be expected with photographs taken for other purposes, at a relatively

small scale and at unsuitable times of the day, the results are mixed. The positive features are that the number of “sites” identified is three or four times the number previously known. Second, they show the extent and something of the nature of individual sites, for example Site 31. Site 14 (see Fig. 2) is a good example of where spe-



12. View looking west along the south wall of the fortified site between Khirbat Shada and the Circle. Immediately in front is an apparent gate. The south wall stands out more clearly if the book is turned end-for-end and viewed with north nearest the viewer (May 1997).

cific buildings can be distinguished and the photo may be used like a simple sketch plan. An obvious limitation is that some sites encountered by chance on the ground were not taken as such during air photo interpretation: Site 34A was overlooked entirely and Site 29A was noted but thought to be a natural feature. These instances suggest that interpretation might be less self-denying than has been the practice in deciding what to include. More serious is the failure to spot the fortified site discussed at the end. On the ground it appears as a clear and massive structure. Only after discovery was it "seen" on the photograph. A salutary warning that interpretation must be alert for the ways in which shadows are likely to reveal features (cf. comments on Site 42 above).

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13. Air photograph of 17 September 1953 of the fortified site between Khirbat Shada and the Circle (HAS 25.039).

Bibliography

Bennett, C.-M.

- 1973 Excavations at Buseirah, Southern Jordan, 1971: A Preliminary Report. *Levant* 5: 1-11.
- 1974 Excavations at Buseirah, Southern Jordan 1972: Preliminary Report. *Levant* 6: 1-24.
- 1975 Excavations at Buseirah, Southern Jordan, 1973: Third Preliminary Report. *Levant* 7: 1-19.
- 1977 Excavations at Buseirah, Southern Jordan, 1974: Fourth Preliminary Report. *Levant* 9: 1-10.

Finlayson, B. and Baird, D.

- 1995 Dana Archaeological Survey, Phase 1 Report, Jordan. *Centre for Field Archaeology, Report No. 204*. University of Edinburgh.

Glueck, N.

- 1935 *Explorations in Eastern Palestine, II. BASOR* 15 (1934-1935). New Haven

Hart, S. and Falkner, R. K.

- 1985 Preliminary Report on a Survey in Edom, 1984. *ADAJ* 29: 255-277.

Kennedy, D. L.

- 1995 Water supply and use in the Southern Hauran, Jordan. *JFA* 22.3: 75-90.
- 1996 Aerial archaeology in the Middle East. *AARGNews. The Newsletter of the Aerial Archaeology Research Group* 12: 11-15.
- 1997a Roman roads and routes in north-east Jordan. *Levant* 29: 71-93.
- 1997b Aerial Archaeology in Jordan: Air photography and the Jordanian Hauran. Pp 77-86 *SHAJ* VI. Amman: Departement of Antiquities.
- 1998a The area of Umm el-Jimal: maps, air photographs, and surface survey. Pp. 39-90 in B. de Vries *et al.*, *Umm el-Jimal. A Frontier Town and its Landscape in Northern Jordan*. RI (*JRA*), Supp. Vol. 26). Portsmouth.
- 1998b Aerial archaeology in Jordan. *Levant* 30: 91-96.
- Forth-coming Declassified satellite photographs and archaeology in the Middle East: case studies from Turkey. *Antiquity*: in press.
- Forth-coming *Remote sensing for archaeology in the Middle East*. In preparation.

Kennedy, D. L and Freeman, P. W. M

- 1995 Southern Hauran Survey 1993. *Levant* 27: 39-73.

Palumbo, G.

- 1994 *The Jordan Archaeological Database and Information System (JADIS)*. Amman: Department of Antiquities/ American Center for Oriental Research.

Walmsley, A.G.

- 1989 Gharandal (Khirbat), in D. Homès-Fredericq and J.B. Hennessy (eds), *Archaeology of Jordan III. Field Reports*. Leuven.
- 1998 Gharandal in Jibal: first season report *ADAJ*: 42.

Walmsley, A.G. and Ricklefs, N.

- 1997 The Church at Arindela (Gharandal) of Palaestina Tertia'. *LA* 47 (forthcoming).

Appendix 1: Sites recorded on air photographs of the Gharandal Survey area.

N.B. Sites have been "starred" to give some guide to their relative importance *as they appear in the air photograph.*

	Stars	Name and description	Photo nos
0001		Cairns? Scatter of dark spots amongst scrub	43.023; 024; 025
0002		Square enclosure. Possible modern stock pen	
0003		Area of disturbed ground	
0004		Area of disturbed ground	
0005		Small circular enclosure	
0006	***	Large destroyed structure? Hilltop site, discolouration. Defensive wall beyond	
0007	*	Disturbed area on hillock with slopes marked by terracing	47.116
0008		Long wall	
0009		Terraces/ field strips - possibly modern	
0010		Small circular enclosure	
0011		Cairn (dark spot)? and cistern (dark rectangle)?	
0012		Disturbed ground near modern field enclosure	
0013		Disturbed ground - pale soil marks	
0014	**	RASHADIYA: Abandoned modern fort, long rect. structures (school?), traces of older (?) structures (?)	
0015	*	Disturbed ground around which road is deflected	47.117
0016		Faint long rectilinear field enclosure.	
0017		Spring/ reservoir	
0018		Dark disturbed area	
0019		Disturbed/ textured ground	
0020		Dark disturbed ground	
0021	*	Small square outline, beduin tents, fields	
0022		Dark disturbed area	
0023		Rectilinear features, perhaps natural	
0024		Square, unroofed structure	47.118
0025	**	UM DAYIEA: spring and/ or wadi deflection system	
0026	*	Cellular structure	
0027		Cistern? Beside track	47.119
0028	**	Faint rectilinear structure on hilltop	
0029		Small square unroofed structure at roadside	
0030	***	BUSEIRA: Modern village with extensive traces of disturbed ground (mainly to S) and enclosures all around	
0031	**	Settlement? Fields, enclosures set into lea of curving hillside. Irrigation by deflection?	
0032	*	AIN UM SIKAB: spring	

0033		Spring and channel	25.034
0034	*	Disturbed ground - hint of ruin?	
0035		Cairn? Dark spot	
0036	**	Hilltop ruins - faint trace, disturbed surface	
0037	**	Disturbed surface on hilltop, traces of outlying walls	
0038		Possible small rectilinear structure	
0039	**	Hummocks on hilltop	
0040	*	Discolouration, unevenness on hilltop	25.035
0041	*****	GHARANDAL: A few modern houses around an area of garden fields. Extensive area of ruins of ancient village to SE measuring c. 500 x 200 m.	
0042	*	Large, irregular circle, c. 120 m diameter. Only visible on one frame!	25.035
0043		Cairn/ tower. Tiny cellular enclosure	
0044		Waterhole? Pale area with black spot at centre	
0045		Walls - two straight, long stretches along hill edges - channels?	25.036
0046	*	Cairns/ Scatter of dark spots on high ground	
0047	**	Circular enclosure of hill-top. Beduin tents nearby	25.036
0048	**	Old road alignment between Rāshadiya and Gharandal (= <i>Via Nova Trainana</i> ?)	
0049	*	Ancient road? Running eastwards from Gharandal	15.034
0050	*	Faint traces of possible rectilinear structures on scarp with steep drop to W.	43.024



**ARCHAEOLOGICAL SURVEY AND SETTLEMENT PATTERNS
IN THE REGION OF 'IRĀQ AL-'AMĪR, 1996
A PRELIMINARY REPORT**

by

Chang-Ho C. Ji

'Irāq al-'Amīr is situated on the west bank of the Wādī as-Sīr, about 17 km west of Amman and 29 km east of Jericho. This region includes a megalithic Hellenistic monumental building (Qaṣr al-'Abd), an ancient village, scattered ancient structures, and a large number of man-made and natural caves on a steep cliff. 'Irāq al-'Amīr is situated about 4 km upstream from the confluence of the Wādī as-Sīr with the Wādī al-Kafrayn (Wādī Bahhath). The Wādī as-Sīr descends from the high Transjordan plateau, which is located about 6 km upstream from 'Irāq al-'Amīr. Under the auspices of the Mādabā Plains Project, the first season of a new archaeological survey took place in the region of 'Irāq al-'Amīr and the Wādī as-Sīr between July 20 and August 31, 1996 (for the first survey, see Villeneuve 1988; 1989 and Will 1989). The survey was directed by the author on behalf of La Sierra University. Taysir 'Attiyat was the representative from the Department of Antiquities.

Research Background

A large number of surveys have taken place along the wadis in central and northern Jordan. For example, in the al-Maqārīn reservoir area on the Yarmuk river, a Jordanian team found 31 ancient sites (Kerestes *et al.* 1978), and along the Wādī Kufranja the 'Ajlun-Kufranja Valley survey team identified more than 200 archaeological sites (Greene 1995). The surveys and excavations in the Wādī al-Yābis recorded a large number of archaeological sites, especially Chalcolithic and Early Bronze (EB) I settlements (Palumbo 1992; Palumbo, Mabry and Kuijt 1990). Most of the sherds collected from Tall adh-Dhahab belong to

either the Iron Age or the Hellenistic period (Gordon and Villiers 1983). The survey along the Nā'ūr-Dead Sea Highway discovered a couple of dolmen fields and some sporadic ancient remains along the highway and near Tall al-Hammām (Coughenour 1986). During the three seasons of the Ḥisbān regional survey, the team located 152 sites within the Wādī Ḥisbān and the plateau area (Ibach 1987). These surveys have provided valuable data to help trace the settlement history in the wadi region in central Jordan.

On the other hand, 'Irāq al-'Amīr and its environs were visited by early travellers and scholars beginning with C. L. Irby and J. Mangles (1823) in 1817. E. M. de Vogüé (1864) explored and described this area in 1864, followed by F. de Saulcy (1870) in 1868 and C. R. Conder (1882; 1889) in 1881. H. C. Butler (1910) conducted archaeological soundings at Qaṣr al-'Abd and its surrounding constructions during six days. Glueck (1939: 153-56) also explored and described 'Irāq al-'Amīr. In 1961 and 1962, P. W. Lapp (1962a; 1962b; 1963; 1975; 1993; N. Lapp 1989) directed archaeological excavations at the village of 'Irāq al-'Amīr, the Qaṣr al-'Abd, and the Square Building. R. Brown (1979) excavated inside and outside of the Qaṣr al-'Abd during one month in 1976, and the Department of Antiquities in Jordan carried out subsequent excavations and restoration of the Qaṣr al-'Abd (Sauer 1979). Excavations were resumed in 1976-1982 by Will, Larché, Villeneuve, and Zayadine (Villeneuve *et al.* 1981; 1982 and Will 1989), and this French-Jordanian team excavated at the village, the Qaṣr al-'Abd, and their sur-

rounding areas.

The preceding survey shows that in the 'Irāq al-'Amīr region archaeological expeditions have been centered on the Qaṣr al-'Abd and the village of 'Irāq al-'Amīr. As far archaeological surveys are concerned, the vicinity of 'Irāq al-'Amīr, especially the area of the Wādī al-Kafrayn and the Wādī Shu'ayb, appears to have been neglected. An exception to this generalization is the survey of François Villeneuve (Larché, Villeneuve and Zayadine 1981; 1982; Villeneuve 1988;1989) who explored 10 km from the village of the Wādī as-Sīr to the al-Ghawr. This survey took place in the narrow band along the Wādī as-Sīr and the Wādī al-Kafrayn, and recorded a total of 147 sites. On the other hand, Raikes (1965) explored part of the Wādī Shu'ayb and the Wādī al-Kafrayn, but his examination was limited to only four ancient ruins. Also noteworthy are the surveys of the Wādī Shu'ayb and the as-Salt region, which produced settlement data of 20 and 44 sites respectively (de Vaux 1938; Wright, Schick and Brown 1989).

In general, the French survey may provide information on settlement histories along the Wādī as-Sīr and the Wādī al-Kafrayn. Yet, this survey took place in the period between 1981 and 1984, and thereafter modern settlements have rapidly encroached upon ancient remains in the 'Irāq al-'Amīr region. In recognition that this modern development will continue in the region, we are compelled to systematically document and provide a detailed record of the rich archaeological heritage in the vicinity of Irāq al-'Amīr. This urgency is particularly the case for prehistoric sites and remains which were not incorporated into the French survey (cf. Ji 1997a; pers. comm. with Villeneuve). Furthermore, no survey work has ever focused on the settlements in the hilly area and wadis (e.g., the Wādī al-'Amīr and the Wādī an-Nār) between the Wādī as-Sīr and the Wādī

Shu'ayb, which should have been closely associated with those at Irāq al-'Amīr.

Hence, any inferences about settlement history in the region of Irāq al-'Amīr and the Wādī al-Kafrayn would be premature without archaeological data on this region which lies to the west and north of Irāq al-'Amīr and the Wādī al-Kafrayn. Recent technological and methodological advances in Jordanian archaeology also lead us to undertake a follow-up study to the French expedition's survey along the Wādī as-Sīr and the Wādī al-Kafrayn. As Mattingly (1997: 216) points out in his reports for the al-Karak Resources Project, archaeologists can now establish precise coordinates for sites by means of the Global Positioning System (GPS). In addition, *the Madaba Plains Project Survey Manual* (Herr and Christopherson 1996) is now available for practically all archaeological surveyors, and it has been widely adopted as the main guide for collecting survey data by many ongoing project groups in central Jordan, for example, the Dhibān Plateau Project (Ji and 'Attiyat 1997), the al-Karak Resources Project (Mattingly 1997), the Mādabā Plains Hinterlands Survey Project (Boling 1989; Christopherson 1997a; 1997b; Cole 1989; Younker 1991), and the Wādī ath-Thamad Project (Daviau 1997). The use of this manual is quite advisable not only because of its usefulness for data collection on a wide range of archaeological and environmental features, but for its convenience as a means of coordinating the various survey records (Mattingly 1997: 216).

Research Methodology

The archaeological survey of 1996 was designed to: (1) document the occupational history and settlement pattern of the vicinity of Irāq al-'Amīr and the region between the Wādī as-Sīr and the Wādī Shu'ayb from the prehistoric period to the present; (2) accurately establish the location of each site

by plotting it on a map; (3) examine each site in order to describe, photograph, and when feasible, sketch its visible archaeological features and significant characteristics; (4) collect artifacts, especially representative sherds, from each site; (5) trace the development of the Wādī as-Sīr, the Wādī al-Kafrayn, and the Wādī al-'Amīr as routes of trade between the Jordan Valley and the Transjordan plateau; and (6) compare settlement patterns of the 'Irāq al-'Amīr region with those of the Mādabā Plains.

In 1996 two different field strategies were implemented within a 5 km radius of 'Irāq al-'Amīr. They were random square survey and site survey. The random square survey adopted the random square survey method that has been developed by the Mādabā Plains Project (Cole 1989: 51-52). It obtained representative characteristics of the region surrounding 'Irāq al-'Amīr in a thorough examination of randomly chosen 200 x 200 m parcels within a 5 km radius of the site. The 1 square km grid of a 1:50,000 scale Universal Transverse Mercator map was used to identify 1,962 basic sampling areas which have the major fraction of their 40,000 square meters contained within the 5 km radius of 'Irāq al-'Amīr. Each of the 1,962 squares was assigned a sequence number and 50 randomly selected sequence numbers composed the list of random squares to be visited. To take advantage of the larger 1:25,000 scale, the actual positions of the random squares were established on older Palestine regional topographic maps produced in 1958. Global Positioning System was used to increase the precision with which selected parcels were located.

The site survey was designed specifically to search for new archaeological sites in the survey area. The survey team recorded various features of each site and made sketch maps for some selected sites. Off-site features (e.g., agricultural installations, cisterns, tombs, quarries, terraces, water chan-

nels, caves) were also located and documented. At the same time, surface soil was collected at some selected sites for geological studies. A major effort, however, centered on the collection of pottery sherds and artifacts at each site. As noted above, the *Madaba Plains Project Survey Manual* was the main guide for these efforts, although it was supplemented by other survey procedures offered by Bintliff and Snodgrass (1985), Shaw and Jameson (1993), and Portugali (1982).

SURVEY RESULTS

1. Random Square Survey

According to the random square survey, the 'Irāq al-'Amīr region was densely settled during the Byzantine and Early Islamic (Umayyad-Abbasid) periods, and there is evidence of continuity between these two periods. Of the other periods, the Chalcolithic-Early Bronze, Iron II-Hellenistic, Roman and mid-Islamic (Ayyubid-Mamluk) periods appear to have more than token representation, but the Middle Bronze (MB), Late Bronze (LB), and Iron I periods are virtually unrepresented.

In detail, diagnostic Chalcolithic and EB pottery sherds came from five squares (10%), and possible Chalcolithic and EB body sherds were found at 10 squares (20%). Diagnostic MB, LB, and Iron I pottery appeared in only one random square each (2%). Although possible Iron Age body sherds were collected at 10 random squares (20%), diagnostic Iron II sherds were found at two squares (4%) and Iron II/Persian pottery came from four squares (8%). Three random squares (6%) appear to have distinctive Hellenistic pottery sherds, and another three (6%) contained possible Hellenistic body sherds. Diagnostic Roman pottery was found in three squares (6%), and possible Roman body sherds were attested to at 11 squares (22%). Seven squares (14%) contained diagnostic Byzan-

tine pottery; 10 squares (20%), Early Islamic pottery. Twenty-five squares (50%) had possible Byzantine body sherds and 16 squares (32%) possible Early Islamic body sherds. Twenty-one sites included both Byzantine and Early Islamic pottery, which shows a continuous settlement history in the survey area. Diagnostic mid-Islamic pottery came from three squares (6%).

Of special interest is the comparison of the preceding data with the Tall al-'Umayrī hinterlands survey data (Cole 1989; Christopherson 1997a). According to the data from this survey, Iron Age and Byzantine pottery come from about 80% of the 100 random squares, with Roman from about 75%. The difference between the 'Irāq al-'Amīr region and Tall al-'Umayrī region is striking when we observe that in the 'Irāq al-'Amīr region only three random squares contain diagnostic Roman pottery. Although both areas were most densely occupied in the Byzantine period, the distribution of Byzantine pottery appears broader and denser in the Tall al-'Umayrī region than in the 'Irāq al-'Amīr region. Another marked difference between the two survey regions is the sparsity of Iron I pottery in the 'Irāq al-'Amīr region: Iron I pottery was attested to in only one square of the 50 random squares (2%) in the 'Irāq al-'Amīr region, while it came from nine squares of the 38 random squares (24%) visited by the 'Umayrī survey team in 1984 (Boling 1989; Cole 1989). Yet, the 'Umayrī data may be misleading since no Iron I pottery was collected from 40 random squares recorded in 1989 (Christopherson 1997a). Overall, it seems apparent that ancient settlement in the 'Irāq al-'Amīr region is less dense than the Tall al-'Umayrī region.

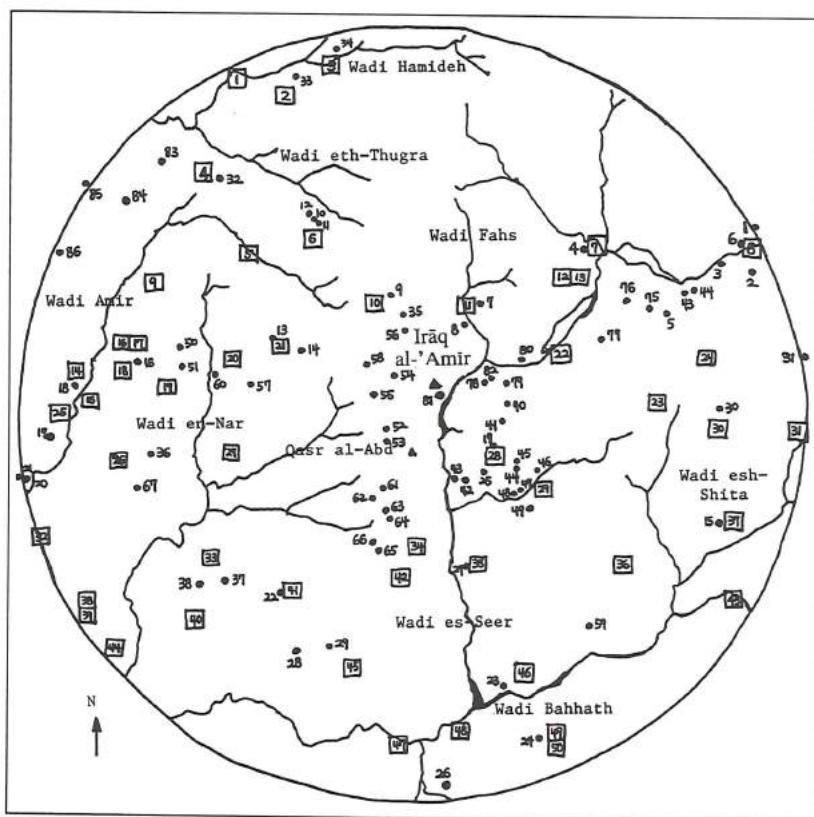
In terms of modern landuse, some 53% of the area surveyed remains as pasture and uncultivated land, which may indicate approximately half of the survey wadi sites are unsuitable for agricultural settlements. Grain fields, vegetable crops, and orchards

and vineyards account for some 39% of the land use in the visited random squares. The remaining 8% of the area surveyed is currently in use for roads and buildings. This leaves less than 1% of the total area for archaeological sites. In the Tall al-'Umayrī region, pasture and uncultivated lands accounted for about 35% of the area surveyed, and some 50% is utilized for cultivation (Cole 1989; Christopherson 1997a). Thus, a summary of landuse by percentage of the visited random squares gives the impression that the 'Irāq al-'Amīr region is primarily a pastoral and horticulture zone. Given this landuse pattern of the region, it is hardly surprising to note that ancient settlement in the 'Irāq al-'Amīr was less dense and less extensive than in the region of Tall al-'Umayrī.

2. Site Survey

As we survey the settlement patterns of the 'Irāq al-'Amīr region, it is convenient to think of the survey area in terms of the seven regions (Fig. 1). Five of the seven regions follow more or less north-south orientation along the Wādī as-Sīr (upper and lower), the Wādī ash-Shita, the Wādī an-Nār, and the Wādī al-'Amīr (Wādī al-Jeriah). The other two regions lie mostly east-west along the Wādī al-Kafrayn and the Wādī Ḥamidah (Wādī al-Buqei). The hills and ridges are dissected by these wadis. The regions along the Wādī al-'Amīr, the Wādī Ḥamidah, and the Wādī an-Nār are often rocky with difficult to work soils. They cover a much less promising region than the regions of the Wādī as-Sīr and the Wādī al-Kafrayn with their fertile soils and perennial water sources. The following presentation will proceed for the most part with reference to this regional division.

In 1996, the surveyed area included the west part of the 5 km radius of 'Irāq al-'Amīr, bordered on the north by the Wādī ath-Thughra, on the south by the Wādī al-Kafrayn, and on the east by the Wādī Faḥṣ



1. Survey of the 5 km Radius of 'Irāq al-'Amir. Random Squares and Archaeological Sites.

and the Wādī as-Sir. The surveyed area also extended some 500 m beyond the east side of the Wādī as-Sir bed and 500 m south of the Wādī al-Kafrayn bed, and included the region within 3 km upstream from the Wādī ath-Thughra along the Wādī Ḥamidah. Eighty-six new archaeological sites were recorded in the survey area that has been investigated so far. Seventy of the 86 sites contained ancient pottery.

The sites include 13 tells and village ruins, 10 cave settlements, three ancient campsites, 16 cemeteries, 10 farmsteads, 11 watch-towers, seven watermills, and two potential religious hermitages. Most of these settlement sites are spread over relatively narrow areas on hilly ranges along

the wadis. The survey team also examined many cisterns, wine- and oil-press complexes, reservoirs, dams, quarries, and cultivation terraces.

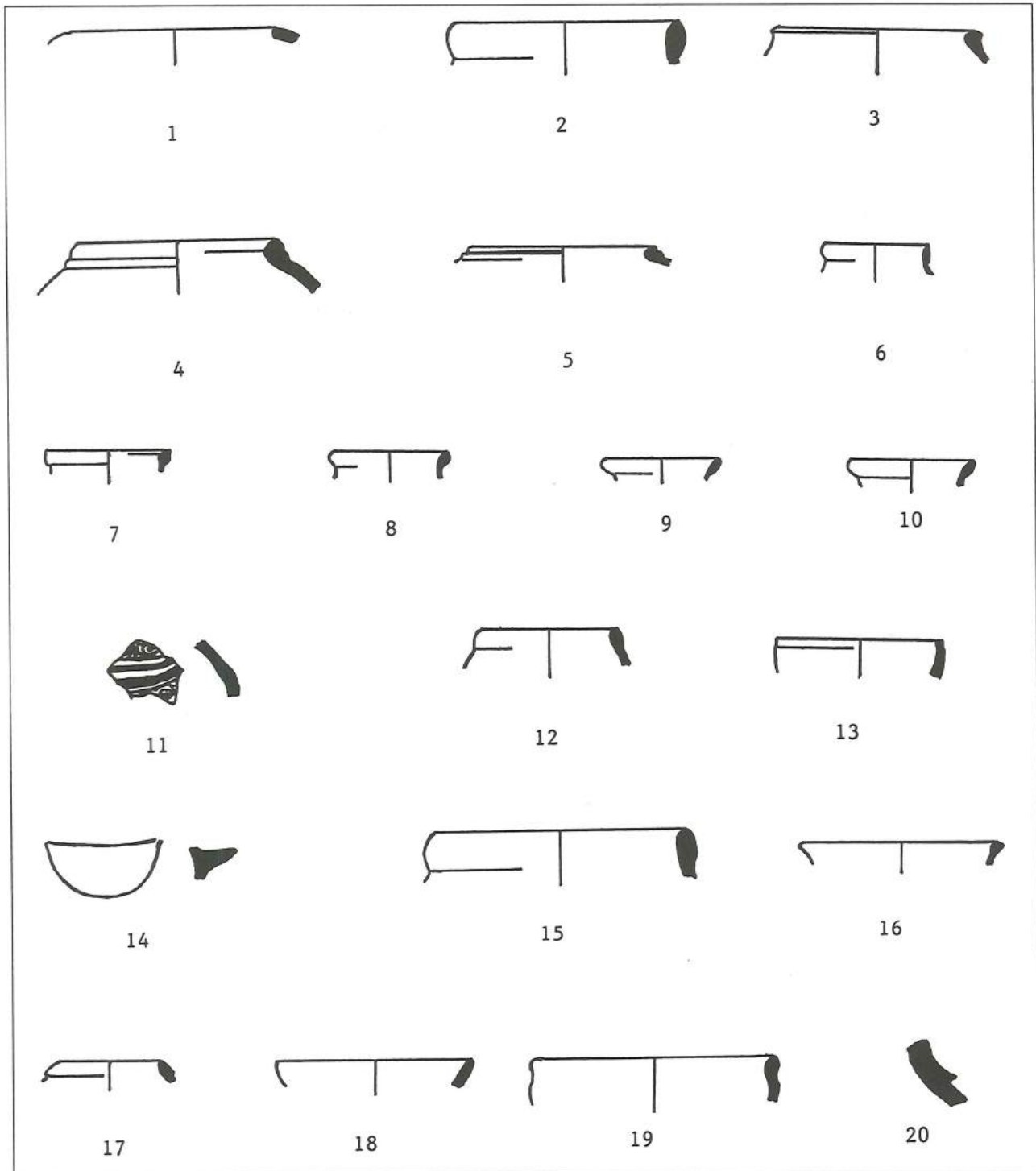
Figure 2 summarizes the number of ancient sites with diagnostic pottery according to their regional distribution. In general, we observe a strong chronological correlation between the results of the site survey and those of the random square survey. Of the 86 sites surveyed, 17 sites are attributed to the Chalcolithic or EB periods, the earliest periods represented in the surveyed area. So far, the MB and LB periods are represented in the survey by two and three sites each, and Iron I by four sites. Fifteen sites are attributed to Iron II, and in many cases,

Region	C/EB	MB	LB	Iron 1	Iron 2/Per	Hell	Rom	Byz	EIs	MIs	Site Total
as-Sir	3	1	1	0	2	1	2	6	1	1	16
as-Sir	8	0	0	2	3	7	0	11	6	3	33
al-Kafrayn	3	1	1	1	4	3	4	6	3	2	6
ash-Shita	1	0	0	0	0	1	0	1	1	2	3
an-Nār	0	0	0	0	1	2	1	2	3	1	11
'Amir/Thughra	2	0	1	1	5	0	1	3	7	3	15
Ḥamidah	0	0	0	0	0	0	0	1	1	1	2
Site Total	17	2	3	4	15	14	8	30	22	13	

2. Distribution of Diagnostic Pottery by Region.

occupation seems to have continued into the Persian period. The settlement in the Hellenistic period is relatively widespread as it is represented by 14 sites. Roman remains were recorded at eight sites, but the survey team collected possible Roman body sherds at 22 sites. Evidence of occupation in the

Byzantine and Early Islamic periods is extensive: Byzantine and Early Islamic pottery is found at 30 and 22 sites respectively. In many cases, occupation at these Byzantine sites appears to have spanned all of the Early Islamic periods. Mid-Islamic pottery was collected at 13 sites (Fig.3).



3. Some Selected Examples of Pottery.

No.	Provenance	Date/Type	Descriptions
1	Abū'Unayz	EB storage jar	hand-made, light reddish brown (2.5YR5/4) (E, I*), light reddish brown (2.5YR5/4) core, many large and small white inclusions, diameter 10.5 cm
2.	Abū'Unayz	Iron I storage jar	wheel-made, pale red (2.5YR6/2) (E, I), gray core (5YR6/1), numerous white small inclusions, diameter 11.5 cm
3.	Abū'Unayz	Iron II krater	wheel-made, reddish yellow (5YR6/6) (E, I), reddish yellow core (5YR6/6), some white and gray small inclusions, diameter 10 cm
4	Abū'Unayz	Iron II cooking pot	wheel made, pinkish gray (5YR6/2) (E, I), dark gray core (2.5YR4/0), numerous small to medium white and gray inclusions, diameter 10 cm
5	Abū'Unayz	Iron II cooking pot	wheel made, pinkish gray (5YR6/2) (E, I), gray core (5YR6/2), many small to medium white and gray inclusions, diameter 9 cm
6	Abū'Unayz	Hellenistic jar	wheel-made, pale brown (10YR6/3) (E, I), pale brown core (10YR6/3), few small white inclusions, diameter 5 cm
7	Abū'Unayz	Hellenistic jar	wheel-made, pale brown (10YR6/3) (E, I), pale brown core (10YR6/3), many small white and gray inclusions, diameter 6 cm
8	Abū'Unayz	Hellenistic jar	wheel-made, light reddish brown (2.5YR6/4) (E, I), light reddish brown core (2.5YR6/4), few small gray inclusions, diameter 6 cm
9	Abū'Unayz	Hellenistic jar	wheel-made, light red (2.5YR6/6) (E, I) (E, I), gray core (2.5YR5/0), very few medium gray inclusions, diameter 5.5 cm
10	Abū'Unayz	Hellenistic jar	wheel-made, light red (2.5YR6/6) (E, I) (E, I), light red core (2.5YR6/6), very few small gray inclusions, diameter 6 cm
11	As-Sa'āda	mid Islamic body	hand-made, pale red (2.5YR6/2) (E, I), pale red core (2.5YR6/2), light reddish brown decoration, light reddish slip, no inclusions, width 4 cm
12	As-Sa'āda	mid Islamic jar	wheel-made, pink (7.5YR7/2) (E, I), pink (7.5YR7/2), some small gray inclusions, diameter 6.5 cm
13	As-Sa'āda	mid Islamic bowl	hand-made, pale red (2.5YR6/2) (E, I), pale red core (2.5YR6/2), light reddish brown decoration, light reddish slip, no inclusions, diameter 8.5 cm
14	Al-Muwayna	EB ledge handle	hand-made, pale red (2.5YR6/2) (E, I), gray core (5YR5/1), no inclusions, width 6 cm
15	Al-Muwayna	Iron I storage jar	wheel-made, very pale brown (10YR7/3) (E, I), very pale brown core (10YR7/3), many small white and gray inclusions, diameter 12.5 cm
16	Al-Muwayna	Iron II bowl	wheel-made, very pale brown (10YR7/3) (E, I), dark gray core (2.5YR4/0), many small white inclusions, diameter 10 cm
17	Al-Muwayna	Iron I cooking pot	wheel-made, light reddish brown (2.5YR 6/4) (E, I), dark gray core (2.5YR4/0), few small white inclusions, diameter 5 cm
18	Al-Muwayna	Iron I bowl	wheel-made, light reddish brown (2.5YR 6/4) (E, I), gray core (5YR5/1), many small white inclusions, diameter 10 cm
19	Al-Muwayna	Iron I bowl	wheel-made, very pale brown (10YR7/3) (E, I), gray core (5YR5/1), many small white and gray inclusions, diameter 12 cm
20	Al-Muwayna	Iron I collared-rim jar	wheel-made, very pale brown (10YR7/3) (E, I), very pale brown core (10YR7/3), few small gray inclusions, length 3.3 cm

*E:exterior; I:interior.

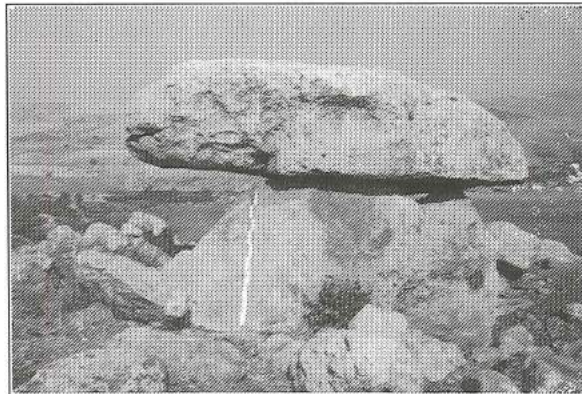
3. Pottery Descriptions.

From the geographical point of view, in the regions of the Wādī as-Sir and the Wādī al-Kafrayn, there was substantial population in the Byzantine period. The Chalcolithic-Early Bronze, Iron II-Persian, Hellenistic, and Early Islamic periods are attested to at about 10 sites each, and thus appear to have witnessed a decline in settled population when compared with the Byzantine period. The settlement abatement is also apparent during the Roman and mid-Islamic periods. On the other hand, it seems necessary to suggest that through the ages, the settlements in the regions of the Wādī al-'Amīr, the Wādī an-Nār, and the Wādī Ḥamīdah appear to have been less dense and less extensive than in the regions of the Wādī as-Sir and the Wādī al-Kafrayn. The only possible exception is the Islamic period. If one judges from the data on hand, Iron II was marked by the appearance of some new settlements throughout the regions of the Wādī Amir, the Wādī an-Nār, and the Wādī Ḥamīdah. These regions seem to have been reused intensively during the Byzantine and Islamic periods. The Hellenistic and Roman periods may have had a slight decline in population. In short, settlement sites appear to cluster mainly in the regions of the Wādī as-Sir and the Wādī al-Kafrayn. In these regions settlement evidence is noticeably strong during the Chalcolithic, EB I, Iron II, Persian, Hellenistic, Byzantine periods. The regions of the Wādī al-'Amīr and the Wādī Ḥamīdah seem to have had relatively dense population in the Iron II, Persian, and Islamic periods.

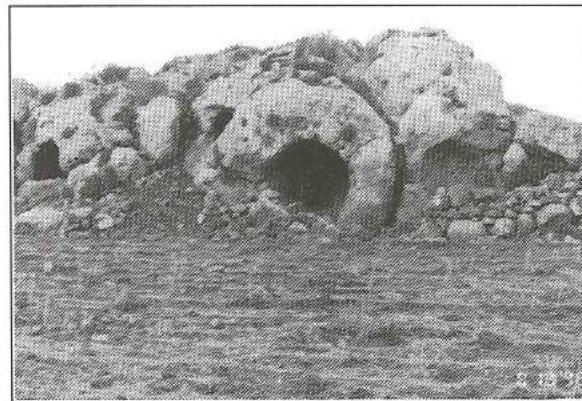
3. Major Chalcolithic and Early Bronze Sites

The survey data on the Chalcolithic and Early Bronze periods were dealt with in detail elsewhere (Ji 1997a; 1997b). Since space limitation do not allow us to repeat such data, we include a brief summary of important finds. Among many fortunate finds resulting from the survey are two

Chalcolithic/Early Bronze cemeteries which contain a large number of rock-cut chamber tombs and no less than 15 dolmens (Sites 40, 41, 44, 45, 46, 48, 53, 61, and 66). Many dolmen fields have been found in the Jordan Valley, the Wādī Ḥisbān, Amman, and the Transjordan plateau. Yet, the discovery of dolmen fields in the Wādī as-Sir area fills in the geographical gap between the Jordan Valley and the Amman region. A characteristic feature of the Wādī as-Sir dolmen fields is their association with many Late Chalcolithic and Early Bronze I rock-cut chamber tombs (Ji 1997a; Figs.4 and 5). Conder (1889: 125-33, 164-65, 196, 221-27) already observed a parallel phenomenon in the Wādī Ḥisbān and the southern Mādabā Plains a century ago. Yet, the intensive cultivation and growing population in the Wādī Ḥisbān region have probably destroyed these dolmens. Hence, our dolmen fields seem to be one of rare ar-



4. A Dolmen at Site 44 (looking northeast).



5. Rock-cut Chamber Tombs at Site 41 (looking southwest).

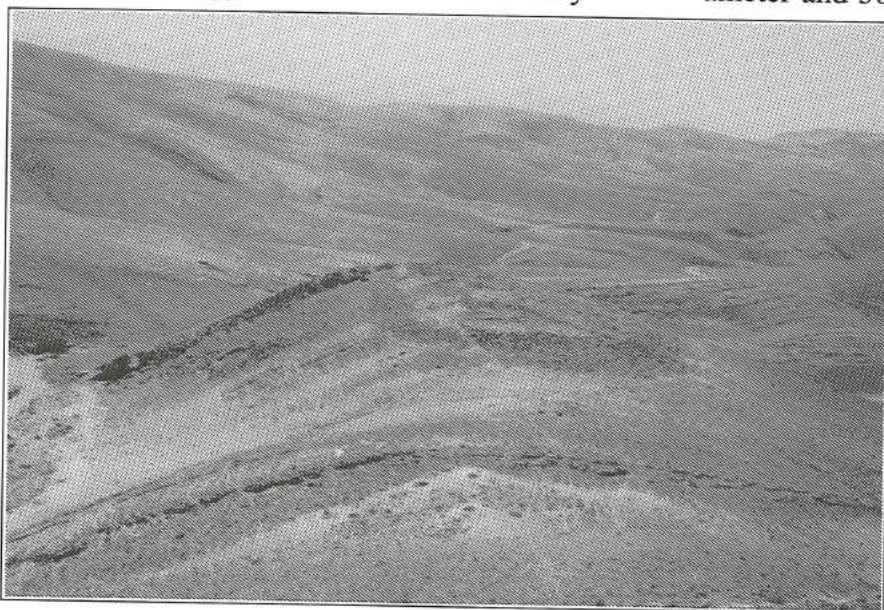
chaeological sites still containing both dolmens and rock-cut chamber tombs *in situ* in central Jordan.

4. Major Iron Age, Persian and Hellenistic Sites

Khirbat al-Ḥassān (Site 20; PG: 216.1/146.1; Fig. 6) is a fortified Iron II, Roman, Byzantine and Early Islamic settlement site, and the debris on a promontory spreads over an area of about 60 x 80 m overlooking the Wādī al-'Amir. The slope rises steeply on all sides except for the north where the hill joins a ridge. Ruins of a substantial building complex at the highest point of this mound gives the impression of a small acropolis. The ruins at the acropolis indicate a single building which measured about 15.5 m (east-west) by 15.6 m (north-south). Constructed with large boulders (40-75 cm), some sections of this central building stand 1.2 m high. The defensive walls are built of large, rudely shaped stones, and are still about 1 m high on average and 1.2 m thick. Inside the walls of the enclosure are the ruins of numerous wall lines built against its sides. A couple of individual structures are discernable, yet most of them are filled with tumbled stones. Parallel interior wall lines on the west side of this site suggest that this section may

have been used for animal pens in ancient times. A city gate is still visible on the north side of the ruin.

Khirbat ath-Thughra (Site 32; PG: 218.4/150.1) is a fortified LB II-Iron I, Iron II, Byzantine-Islamic, and possibly Hellenistic settlement site situated on a saddle on a north-west-southeast oriented ridge dividing the Wādī al-'Amir and the Wādī ath-Thughra. The precise dimensions and outline of this site are difficult to determine because a late Ottoman village and modern settlement at this site have badly disturbed ancient remains. Yet, ancient settlement appears to have encompassed an area which measures no smaller than 60 x 100 m. Along the northern part of this site are the remains of massive ancient fortification walls and a possible city gate, still standing about 1.5 m high. Inside the city wall are several courses of exterior building walls with a large number of associated inner walls. A wine-press carved in bedrock on the north-west side of this site consists of a main vat and an attached small basin. There are several caves with entrances enclosed by stone walls. At least two cisterns have been cut into limestone bedrock: one on the north side of this site and the other on the south side. At the eastern side is a large circular depression about 3 m in diameter and 50 cm deep, which may suggest



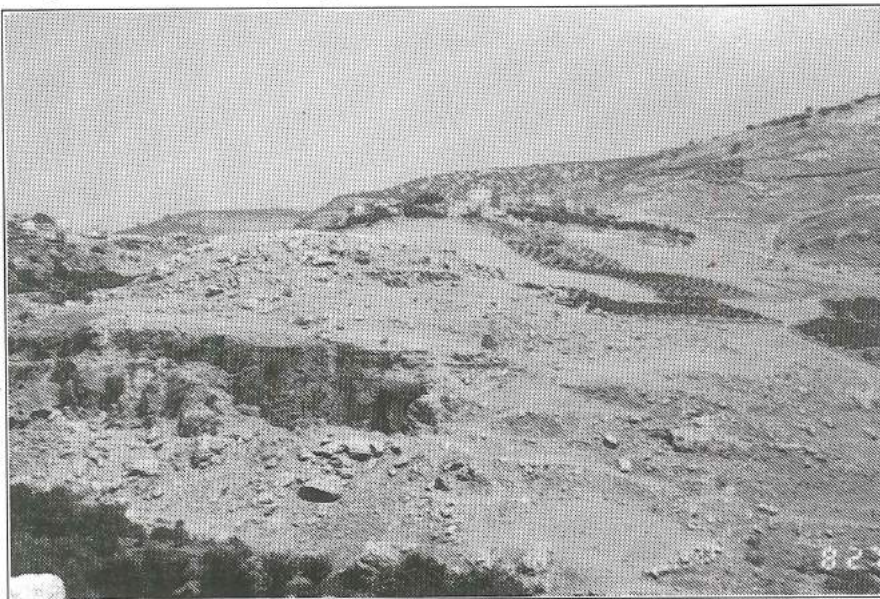
6. Khirbat al-Ḥassān (Site 20; looking south).

the existence of a water system or a large cave. Although the matter is open to further study, there is reason to believe that Khirbat ath-Thughra was a fortified agricultural settlement associated with a trade route which leads from the Wādī al-Kafrayn to the region of Māḥiṣ and Amman via Khirbat al-Ḥassān and the Wādī al-'Amīr.

Khirbat al-Farāwīt (Site 28; PG: 219.6/143.9) is an unoccupied settlement site on the summit of a gentle hill near 'Ayn al-Farāwīt. It appears to have prospered during the Iron II, Hellenistic-Early Roman, and Byzantine-Early Islamic periods. The mound on which this ruin is situated provides a clear overview of approaches along the Wādī al-Kafrayn from the Jordan Valley to 'Irāq al-'Amīr and Nā'ūr. The probable latest phase of ruins at this site is fairly well preserved, with relatively thick defense walls standing several courses high. Inside the defense walls are compartment walls dividing the ruin into six large separate sections. A central building appears to be located on the west side of this site. Its dimensions are about 15 x 25 m, and it appears to have been subdivided into three rooms. Near the northwest corner of this site is a potential gate. Possibly there is an ancient road along the northern part of the city wall leading down the perennial water spring.

Tall Abū-'Unayz (Site 26; PG: 221.5/142.3; cf. Raikes 1965) is a medium-sized ancient ruin atop a natural hill. The top is extremely rocky, which makes it difficult to distinguish the ephemeral remains of walls. Yet, city walls are visible around the site, and many inner walls are clearly discernable as well. It is not improbable that a casemate defense system protected this site. A city gate appears to be located in the northeast side of the ruin, and a possible road ascends its northeastern slope. A winepress carved in bedrock is found on the northwest side of this site. A large number of Iron II and Hellenistic sherds were collected on the northeast side of the ruin. Byzantine sherds are scattered mainly inside the city walls and in a rectangular structure built outside of the city wall on the southeast slope of this site. This site overlooks the Wādī as-Sīr and the Wādī al-Kafrayn, providing a commanding view of the route from the Jordan Valley to 'Irāq al-'Amīr and Nā'ūr. Khirbat al-Farāwīt is visible to the northwest and Rujum al-Musattarah and 'Irāq al-'Amīr to the north. The combination of a strong fortification system and a command over the ancient trade roads seems to define the nature of this site.

Al-Muwayna (Site 79; PG: 222.2/147.5; Fig. 7) is an Ottoman and modern village on



7. Khirbat al-Muwayna (Site 79; looking northeast).

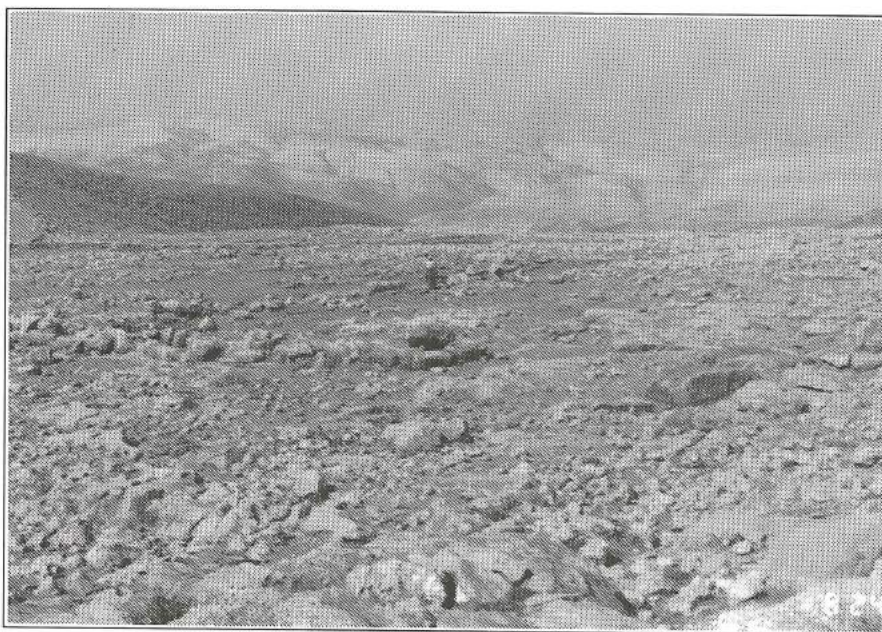
a steep-sided promontory immediately east of 'Irāq al-'Amīr, covering an area of about 200 x 300 m. It is located along a track which leads north from the Wādī al-Kafrayn along the east bank of the Wādī as-Sīr. Al-Muwayna has a commanding view to the east, south, and north, but visibility to the west is obstructed by a ridge about 100 m higher. The late Ottoman and modern settlements have completely obscured all indications of ancient occupation except for pottery sherds. Numerous sherds are scattered in the vicinity of the present-day settlement, particularly on the east and south terraces, where they have been carried by erosion and recent building activities. Although it is a provisional view, the site location, topography, and associated pottery combine to suggest that Muwayna represents one of the rare EB settlements which remained in continuous use from early Iron I to the Hellenistic period without an occupational gap. Some of these sherds appear to belong to early Iron I that has not yet been attested to in the survey area except at Khirbat ath-Thughra and Tall abū-'Unayz.

Site 81 (PG: 221.6/147.3) is a building complex located about 100 m east of the village of 'Irāq al-'Amīr and includes a large number of rock-cut installations. This site

contains a variety of pottery from the EB, Iron II, Hellenistic, and Byzantine periods. Although the relation of this site to Qaṣr al-'Abd and 'Irāq al-'Amīr awaits further research, its location about 50 m east of the village of 'Irāq al-'Amīr suggests Site 81 may be treated as part of the settlement at 'Irāq al-'Amīr.

5. Major Roman, Byzantine and Islamic Sites

Khirbat as-Sūr (Site 67; PG: 217.5/145.9) is a massive Hellenistic-Byzantine fort on the flat top of a ridge west of 'Irāq al-'Amīr (Fig. 8). It shows evidence of continuous occupation during the Early Islamic period. Although Conder (1889: 66, 156) and later the French survey team (Ville-neuve 1988:280-82; 1989:58) mentioned this site especially in conjunction with the origin of the name of the Wādī as-Sīr, no systematic survey and excavation have ever been conducted at this site. Khirbat as-Sūr is a well fortified site with heaps of rudely-cut stone and numerous foundations covering about 200 x 400 sq. m. A massive defense wall which measures more than 2 m thick and remains standing up to 2.5 m surrounds the site. The acropolis includes a large rectangular building with many small



8. Khirbat as-Sūr (Site 67; looking southwest).

inner walls. Remains of another large building complex is also visible south of this acropolis, and several large cisterns located in the middle of this site seem to have been the main water source for this site. It is apparent that Khirbat as-Sūr was a very important site during the Hellenistic, Roman, and Byzantine periods and thus deserves further investigation and study.

Al-Bardūn (Site 76; PG: 223.3/148.1) is a modern village on an ancient site situated on the east bank of the Wādī as-Sir, about 2.5 km north of 'Irāq al-'Amīr and about 300 m east of al-Baṣṣa (cf. Larché, Ville-neuve and Zayadine 1981: 342). A large number of Roman and Byzantine pottery sherds, as well as with some Early Islamic sherds, have come from the surface of this site. The ruins at this site have been largely obliterated by construction of late Ottoman and modern facilities. There is much evidence showing that residents of the Ottoman village have removed most of the ancient walls from their original places while building their houses. Ancient occupational remains, however, are still evident inside the modern village. Some wall lines, constructed with ancient large well-dressed stones, are preserved up to 10 courses high. There is a rectangular oil and wine-press carved into bedrock, now destroyed and filled with debris. The survey team noted two circular-shaped rock installations of large well-dressed stone which gave the impression that they were used for grinding grain or pressing wine and oil. The Byzantine and Islamic sherds are collected mainly from inside the modern village, which indicates the wall remains and rock-cut installations were built during the Byzantine and Islamic periods. The concentration of EB and Iron II sherds, however, is found in mass on the slope south of the hill on which the Byzantine village was probably located.

About 100 m west of al-Bardūn is a Byzantine cemetery (Site 75; PG: 224.0/148.5) in which about 20 robbed-out tombs are lo-

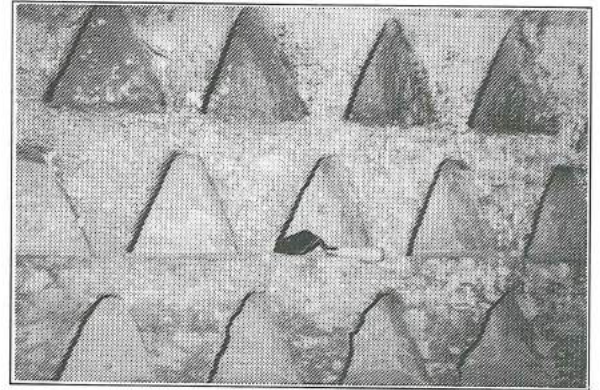
cated. Each tomb has a rectangular shaft cut into bedrock with two ledges to bear covering slabs above the burial vault. Each also has two side chambers at the bottom of the shaft. It should be noted that the same type of Byzantine tomb with Byzantine pottery (Site 3; PG: 224.9/149.2) is also found near al-Baṣṣa in the survey area. A recent salvage excavation on the south side of Site 3 also revealed an EB IV cemetery of shaft tombs with a Byzantine cave-church and several rock-cut Byzantine tombs (Waheeb and Palumbo 1994: 57).

In conjunction with these finds are two possible Byzantine monasteries or hermitages (Sites 2 and 77; PG: 225.3/149.0 and 223.3/148.1) carved through steep cliffs on the southern slope of the Wādī as-Sir. Local residents call Site 2 "Mu'llaqat ad-Dayr" which means "the hanging place of the monastery." Site 77 is composed of two man-made caves with several rock-cut installations and a plastered cistern inside them.

Conder (1889: 94-96; Larché, Ville-neuve, and Zayadine 1981: 342; Villeneuve 1988; 1989) visited Mu'llaqat ad-Dayr and provided a detailed and precise description, and the survey team saw it essentially as Conder described except for a couple of detailed features. This site is an impressive rock-cut three-story hermitage consisting of two parallel chambers with windows and doors all cut in the rock of the cliff. The first floor was 2 m high; the second floor, 2.6 m high; and the third floor, 2 m. The first floor is entered by a door 0.7m x 1.55 m wide and consists of two parallel rooms without any windows. Each room of the three floors is 2.9 m x 7m, and the rock wall between is about 90 cm thick with two doorways through it. The survey team could find possible traces of a vertical ladder hewn into the wall at the northwest corner of each floor. About 800 equal lateral triangular niches were carved into the inside walls of this hermitage: on the first floor,

niches are arranged in six tiers; on the second floor in seven tiers; and on the third floor in eight tiers (Fig. 9). Each niche is 22 cm high, 25 cm wide at the base, and 22 cm deep. They are about 36 cm apart from center to center. The function of these niches is not known for certain, but they may have cradled skulls of monks, lamp lights, or pigeons. In front of the hermitage is a rock-cut courtyard about 6 m wide and 3.5 m deep, and there are traces of rock-cut stairs leading up to the hermitage from the valley. On the east and west of Mu'llaqat ad-Dayr are caves which appear to have formed similar hermitages or dwelling caves.

Dūr al-Hadlūli (Site 16; PG: 217.5/147.6) is an unoccupied settlement site about 2 km northeast of Khirbat al-Ḥassān, on a small hilltop on the east bank of the Wādī al-'Amīr. It enjoys a commanding view of the Wādī al-'Amīr and of Dūr Jarī'ah to the southeast. Byzantine and Early Islamic sherds dominate the pottery assemblage from this site. Late Ottoman building ruins measuring about 60 x 60 m spread over the site. Many ancient wall lines, however, can be traced with confidence. Most of the remaining ancient stones are unworked, but some have been roughly squared. There is a



9. Triangular niches inside Mu'llaqat ad-Dayr (Site 2).

cistern in the middle of the settlement, which seems to have been reused at least once, probably during the late Ottoman period.

At Dūr al-Hadlūli, there are at least four caves used for habitation. A first cave is located about 30 m southeast of the cistern and oriented toward the south (Fig. 10). It measures 6.6 m long, 6.4 m wide, and 1.8 m high. Remains of side walls and a front with a doorway at the entrance of this cave suggest earlier use as a dwelling. The construction style seems earlier than those late Ottoman houses at this site, which may indicate this cave was used for habitation during the Islamic period. Around the cave is a 15 x 17 m stone enclosure still standing 1 m



10. A Cave at Dūr al-Hadlūli (Site 16; looking north).

high with a 3.7 m wide gate. Three additional caves are found with well-built entrance structures similar to those of the first cave in appearance. It is thus evident that in the survey area, caves have been commonly used as dwellings. A related discovery is that caves were also attractive living facilities in the region of Tall al-'Umayri and Tall Ḥisbān (James 1976; LaBianca 1991; Mitchel 1994: 99). In ancient central Jordan, local residents appear to have settled in such caves during the winter when growing grain and migrated with their flocks to more distant pastures during the summer months (LaBianca 1991). Likewise, at Dūr al-Hadlūli the surrounding area does not provide good farm land, although there are some modern terrace walls on the eastern slope of this site. A plausible suggestion, then, is that Dūr al-Hadlūli is a Late Byzantine and Early Islamic cave settlement associated with some scattered houses, and the settlers engaged in animal herding rather than farming.

Dūr Jāri'ah (Site 17; PG: 216.4/146.5) is situated on a steep ridge, overlooking the Wādī al-'Amir and a track from Khirbat al-Ḥassān to Khirbat ath-Thughra. On the basis of pottery, Dūr Jāri'ah appears to have been occupied during the Early Bronze, Roman, Byzantine and Early Islamic periods. Foundation remains indicate a 15.5 x 17.0 m rectangular building situated on a prominent hill with good visibility in all directions. Visible to the northeast are the ruins of Khirbat ath-Thughra and Dūr al-Hadlūli, and to the southeast, Khirbat as-Sūr. The walls of the building are constructed of three parallel rows of unhewn limestones filled with smaller fieldstones. No inner partitions are visible. A late Ottoman house of two rooms is built on top of this building and covers most of the southern half of the earlier structure. During the Byzantine and Early Islamic periods, the building at Dūr Jāri'ah may have served as an outpost fortress for the settlements at Dūr al-Hadlūli

and Khirbat ath-Thughra.

Khirbat 'Ayn-Qrāda (Site 57; PG: 218.9/147.4) is located in what is now horticultural land. It contains a heavy sherd scatter, many buried or at least partially buried walls, and rectangular structures. The entire site has been disturbed by field clearance and by the robbing of stones from the ancient limestone block structures. There is a large ancient cistern just to the south corner of this site, and about 11 cupholes and basins are cut into the bedrock around the cistern. A large inhabitable cave was found at the northeastern part of the site as well. Although identifiable sherds collected at this site date to the Persian-Hellenistic, Byzantine, Early Islamic, and mid-Islamic, Khirbat 'Ayn-Qrāda seems to be a predominantly Islamic site which began to prosper in the Byzantine period. This site should be referred to in connection with the Wādī an-Nār as it is located on the plateau immediately east of this wadi. What seems to be an Islamic building composed of a 5 x 12 m rectangular room and a 4 x 4 m square room is located on the east side of this site. There is no evidence of defence walls at this site.

Khirbat as-Sa'āda (Site 31; PG: 225.9/147.9) is an impressive Islamic site on the ridge above the western slope of the Wādī ash-Shita. It lies in the path of rapid urban development, and bulldozers have already threatened this site. Numerous features are visible on the surface. These include rectilinear buildings, city gates, defense walls, and various wall lines. The largest and best preserved of the structures presents a central building complex, possibly a residence of the governor. Various size rooms make up this building, and its walls are constructed of two to five rows of large stone blocks. Adjacent to this central building is a large settlement cave that has been completely filled and obscured by boulder tumble. It is not improbable, however, that this is not a cave but part of a reservoir that was the

main water source for the settlement. About 10 m to the north are the remains of another small rectilinear building complex characterized by quoin and pier walls. At the northwest corner of this site are ruins of a watch-tower measuring about 3 m x 17 m. The northern defense wall lines are very faint, barely exposed above the surface of the ground. A city gate is noticeable, however, in the middle of this wall line. Another gate located on the western wall appears to lead toward the central building. On the southern side of this site are the partially standing remains of another large building complex that measures about 12 x 35 m. It is similar in construction style to the central building complex. While several additional walls can be traced in this site, the overall plan of other buildings cannot be determined without further investigation.

Al-Baqi' al-Gharbi (Site 34; PG: 220.0/151.5), located on the gentle slopes immediately north of the Wādi Ḥamīdah, appears to be a large Islamic building complex. This site overlooks the Wādi Ḥamīdah to the west and is still in a good state of preservation. This site is divided into two segments by a ca. 45 m long stone-lined wall. Many wall foundations and a large room measuring ca. 2 x 5 m are noted in the northern segment of this site. It is probable that this section of the site was used for habitation. In contrast, the southern segment lacks any building remains, is relatively flat, and appears to have been used for animals. The most characteristic feature of this site is a large building comprised of three to four rectangular rooms. This central building is located in the eastern part of the southern section and measures about 21m x 25 m. A gateway measuring 2.8 m wide was noted on the east side of the site. Further to the east, a round structure about 6 to 7 m in diameter, commands a good view of the entire building complex. Although the ruins themselves are scanty and obscured by the modern farming activity, this structure seems to

have been a watch-tower associated with this site. Parts of the foundation walls still stand about 30 to 50 cm high, and the walls are one to two courses thick. Early and mid-Islamic pottery is predominant at this site with some sporadic Roman and Byzantine body sherds.

The survey team recorded seven water-mills along the Wādi as-Sir (Sites 3, 6, 68, 70, 71, 72, and 73). A growing consensus among the scholars is that most of the water-mills in Transjordan were originally built during the Mamluk period, and they were reused during the late Ottoman period (Gardiner and McQuitty 1987; Greene 1995; McQuitty 1995; Rogan 1995). The survey team collected Byzantine sherds scattered around some of these watermills, but failed to find any mid Islamic pottery.

Settlement Patterns: A Preliminary View

In regard to the Chalcolithic and EB periods, it appears that there was both sedentary and pastoral occupation of the area during the late Chalcolithic and EB periods, especially during the EB I period (cf. Ji 1997a). Chalcolithic and EB sherds collected at Tall abū-'Unayz, Khirbat as-Sa'āda, al-Muwayna, and Sites 24, 47, and 59 may provide some evidence for this sedentary life-style. The small, camp-like sites and caves, particularly Dūr Jārī'ah, Site 1, and Site 63, are probably remnants of temporary, pastoral settlements. Sherds of the late Chalcolithic and EB IA periods seem evenly scattered over these sites, but the EB II-III periods are poorly represented in the survey area except for Site 47. There is also a large number of rock-cut chamber tombs and dolmens probably dated to the late Chalcolithic and EB I period. All these sites, except for Dūr Jārī'ah and Site 18, are located in the regions of the Wādi as-Sir and the Wādi al-Kafrayn. Hence, the survey area appears to have been substantially occupied during the period from the late Chalcolithic to the EB IA periods, and a sharp decline in

population occurred in the EB II-III periods. This suggestion certainly corresponds to the facts that 'Irāq al-'Amīr and Qaşr al-'Abd include only EB IA and IV pottery, and a recently-excavated tomb at al-Başşa is dated to the EB IV period (Lapp 1962a; 1963; Waheeb and Palumbo 1994).

Turning to the Iron Age, we tentatively propose that there was a sharp drop in the level of settled occupation in the survey region in the MB and LB periods. There is no definite MB period pottery collected in the survey area. The exceptions are the two sherds found at Khirbat al-Farāwīt and Site 59, both located near the Wādī al-Kafrayn. LB sherds were collected at Khirbat ath-Thughra, Tall abū-'Unayz, and al-Badrūn.

A characteristic feature of the 'Irāq al-'Amīr region is the scarcity of Iron I settlements. (cf. also Villeneuve 1988: 272-74) Given that sedentarization reached its apex during LB II and early Iron I in the Transjordan plateau and the Jordan Valley (Ji 1995; 1996; 1997c; 1997d), the sparsity of Iron I pottery and of settlement in the survey area is somewhat surprising. Provisionally, this fact may point to the absence of early Iron I settlement intensification similar to that in the Transjordan plateau in the 'Irāq al-'Amīr region. In the survey area, it is not improbable that Iron Age sedentarization took place in early Iron II, a process which continued to the Hellenistic period. The exceptions to this generalization are al-Muwayna and Khirbat ath-Thughra which contain a large amount of early Iron I pottery.

Iron II and Persian settlements appear almost certainly located on the high hills along the Wādī as-Sīr, the Wādī al-Kafrayn, and the Wādī al-'Amīr. For example, 'Irāq al-'Amīr, al-Muwayna, Tall abū-'Unayz and Khirbat al-Farāwīt are situated at high points lined up along the Wādī as-Sīr and the Wādī al-Kafrayn. They are all fortified settlements and visible to each other. The Iron Age inhabitants appear to have ex-

perienced tremendous labor on the city walls and towers, which implies security was one of their major concerns. This is also true in the Wādī al-'Amīr region where Khirbat al-Ḥassān and Khirbat ath-Thughra are located. The Wādī as-Sīr and 'Irāq al-'Amīr are, of course, currently the best agricultural land in the area and were most likely so in the Iron II and Persian periods. However, Iron II and Persian sites in the regions of the Wādī al-'Amīr and the Wādī al-Kafrayn (e.g. al-Ḥassān, ath-Thughra, abū-'Unayz, al-Farāwīt, and Sites 22, 83, and 86) are strategically located for defense, yet do not provide a very good situation for agriculturally based settlements.

Therefore, one may take this Iron II settlement pattern and suggest the existence of road systems of the period connecting the Jordan Valley with 'Irāq al-'Amīr and the Transjordan plateau, particularly along the Wādī al-Kafrayn and the Wādī as-Sīr (cf. Larché, Villeneuve and Zayadine 1981). This suggestion seems plausible, since to the south of 'Irāq al-'Amīr, there is a line of sites at which Iron II-Persian pottery were collected. This line stretches in a south-north direction from the confluence of the Wādī as-Sīr and the Wādī al-Kafrayn to 'Irāq al-'Amīr and al-Muwayna. This proposed trade route and defense system may be related to "the plateau fort" at the mouth of the Wādī al-Kafrayn (Prag and Barnes 1996). According to Prag and Barnes, this fort is dated to Iron II and seems to have been built for some strategic reasons. This being the case, our findings and the plateau fortress indicate the strategic importance of the Wādī al-Kafrayn and the Wādī as-Sīr in Iron II, and the survey team may find further traces of Iron Age settlements along the Wādī al-Kafrayn in the future survey seasons. This route appears to have been intensively reused in the Hellenistic, Roman, Byzantine, and Early Islamic periods.

The Hellenistic period was apparently one of increased population and prolife-

ration of settlements in our survey area, although this period witnessed light occupation in central Jordan (Ibach 1987: 168-70). Yet, considering the extensive settlement of 'Irāq al-'Amīr during the Hellenistic period, it is hardly surprising that three of our 50 random squares produced Hellenistic pottery, and 13 sites were associated with the Hellenistic period. A general impression, however, is that most of these Hellenistic settlements (e.g. Tall abū-'Unayz, Khirbat al-Farāwit, al-Muwayna, Rujum al-Musattarah and Site 81) are noticeably centered in the narrow areas located along the Wādī as-Sīr and the Wādī al-Kafrayn, and in the immediate vicinity of 'Irāq al-'Amīr. There seems to have been continuous occupation in this area from Iron II to the Hellenistic period. During the Hellenistic period, a couple of new fortresses and public buildings (e.g. Rujum al-Musattarah and Site 25) were incorporated into the already existing Iron II and Persian trade route and defense system. If the number of sherds collected from this time frame is any indication, then many of the cities in the area of the Wādī ath-Thughra and the Wādī al-'Amīr were abandoned during this period, and the population was small. It is not improbable that urban habitation did not extend beyond the hilly ranges west and north of the Wādī as-Sīr and the Wādī al-Kafrayn. There are no urban sites from the Hellenistic period of any significance in the regions of the Wādī al-'Amīr and the Wādī an-Nār, although Khirbat as-Sūr and Khirbat ath-Thughra would be an exception to this generalization. Accordingly, to see the full picture of the urban settlement history in 'Irāq al-'Amīr and its vicinity, we note that during the Hellenistic period, when 'Irāq al-'Amīr prospered, most of its vicinity remained sparsely occupied. This fact leads to a suggestion that in the Hellenistic period, the Tobiades settlement in this region was probably restricted to a narrow valley along the Wādī as-Sīr and the Wādī al-

Kafrayn, and the immediate vicinity of 'Irāq al-'Amīr, more or less isolated from its neighbors.

The Roman sites are rather evenly scattered over the survey area. Yet, the overall impression is that settled population levels were relatively low in the Roman period, as shown by pottery evidence. In contrast to the Roman period, there must have been a substantial settled population in the Byzantine period. A glance at the settlement pattern for this period shows that many Roman sites remained in use, and Byzantine sites spread throughout the survey area. The pattern may show a concentration of Byzantine sites in the Wādī as-Sīr area, but this does not appear to be significant, since many of the sites in the western part of the survey area (e.g., as-Sūr, ath-Thughra, 'Ayn Qrāda, Sites 22, 51 and 85) have visible, impressive architecture that might be dated to the Roman and Byzantine periods. The most architecturally significant of these sites is Khirbat as-Sūr, a substantial fortress site that was originally built in the Hellenistic period (Villeneuve 1988). Now, however, most of the stones from the ancient structures at this site have been used for the terrace walls. In addition, the settlement pattern shows the concentration of many small cave settlements and rock-cut installations (e.g., Sites 1, 2, 9, 49, 53, 62, 63, 77 and 78) in the Wādī as-Sīr area. Two possible hermitages were also found in the survey in addition to two cemeteries used in conjunction with al-Badrūn. A puzzling feature of the survey area is the absence of Byzantine churches except for the one found at al-Baṣṣa. The Christian population settled and built churches in virtually all areas of Transjordan during this period. Further surveys in the region may shed some light on this question.

Although there are very few Early Islamic remains at 'Irāq al-'Amīr and its immediate vicinity, there is, nevertheless, abundant evidence for both sedentary and pastoral ac-

tivity in the survey area during this period. In the area of 'Irāq al-'Amīr and its immediate vicinity, most of the impressive Byzantine sites were abandoned during the early Islamic period and remained unoccupied continuously in the mid-Islamic period. Some Early Islamic sherds are collected at al-Badrūn, Rujum al-Musattara, and Site 49, but they are very few in number. The most significant Byzantine sites (e.g., 'Irāq al-'Amīr, Qaṣr al-'Abd, al-Muwayna, Khirbat as-Sūr) lack any substantial ceramic and architectural evidence of the Early Islamic period. Thus, it may be stated that in the Wādī as-Sīr area, the Early Islamic settlement pattern cannot be treated in conjunction with the Byzantine period. In contrast, many impressive Early Islamic sites are situated along the Wādī al-'Amīr, the Wādī an-Nār, the Wādī Ḥamīdah, and the Wādī al-Kafrayn. For example, a large number of Early Islamic sherds are found with architectural remains at Dūr al-Hadlūla, Dūr Jarī'ah, Khirbat al-Farāwit, Khirbat ath-Thughra, al-Baqī' al-Gharbī, Khirbat 'Ayn Qrāda, Site 59 and Site 84. In many cases, Early Islamic pottery is found in association with camp sites and cave settlements like Sites 9, 24, 51, and 63.

There was a continuous decline of settled population in the mid-Islamic period, with 13 sites bearing evidence of occupation. The settlement pattern for this period is similar to that of the Early Islamic period except that the regions of the Wādī al-'Amīr and the Wādī an-Nār were no longer densely occupied. A first cluster of mid-Islamic sites is located in the region of the Wādī Ḥamīdah and the Wādī ath-Thughra; a second cluster is in the region of the Wādī al-Kafrayn and the Wādī ash-Shita. Impressive mid-Islamic sites are Khirbat as-Sa'āda on the east edge of the plateau west of the Wādī ash-Shita, al-Baqī' al-Gharbī on a flat-topped hill overlooking the Wādī Ḥamīdah, Khirbat 'Ayn Qrāda and Site 84 in close proximity to the Wādī an-Nār and the Wādī

al-'Amīr respectively, Site 59 and Site 24 overlooking the confluence of the Wādī as-Sīr into the Wādī al-Kafrayn. No distinctive mid-Islamic structures and sites are noted along the Wādī as-Sīr. To recapitulate, mid-Islamic sites appear more frequently in the regions of the Wādī Ḥamīdah, the Wādī ath-Thughra, and the Wādī al-Kafrayn than the regions of the Wādī as-Sīr and the Wādī al-'Amīr. The population may have been confined mainly to the ridges and hills of the Wādī al-Kafrayn and the northern extremity of the survey area.

Conclusion

If we were to summarize the evidence documented above it would be in terms of the coherence between the results of the random square survey and that of the site survey. A provisional suggestion is that the Byzantine and Early Islamic periods showed a substantial population in the region of 'Irāq al-'Amīr and the Wādī as-Sīr. Chalcolithic-Early Bronze, Iron II-Persian, Hellenistic, and mid-Islamic pottery were collected at more than 10 different sites and some random squares. Thus, the survey area may have witnessed high settlement intensification during the Byzantine and Early Islamic periods and low settlement intensification in the Chalcolithic-Early Bronze, Iron II-Hellenistic, mid-Islamic, and possibly Roman periods. Settlement abatement followed each of these settlement peaks.

It would appear from the foregoing investigation that the population in the survey region was concentrated in different regions in different periods. There are a number of settlement sites which appear to have been associated with the region along the Wādī as-Sīr and the Wādī al-Kafrayn during the Chalcolithic-Early Bronze I, Iron II-Persian, Hellenistic, and Byzantine periods. The concentration of settlements appears to have been gradually shifted from the Wādī as-Sīr to the regions of the Wādī Ḥamīdah, the

Wādī ash-Shita, and the Wādī al-Kafrayn during the Islamic period. The Wādī al-'Amīr region has remained rather sparsely occupied through the ages except for the Iron II, Byzantine and Early Islamic periods.

The results of one season of fieldwork are not specific enough to identify the settlement patterns and occupational history of the 'Irāq al-'Amīr region. Therefore, until more detailed studies of our pottery are conducted and further finds are made in the region, the foregoing suggestions which rely on one season of field work needs to remain tentative. More extensive data collection and hypothesis testing will be undertaken in the future as our research and expedition

continue in the region of 'Irāq al-'Amīr, the Wādī as-Sīr, the Wādī al-Kafrayn, and the Wādī Shu'ayb.

Acknowledgements

The survey team would like to thank its sponsors: Riverside Korean Church of the Seventh-day Adventist, Photo Image Ltd., and other private donors. Thanks are also due to the Department of Antiquities of Jordan, and in particular to its Director-General, Dr Ghazi Bisheh.

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Bibliography

- Bintliff, J. L. and Snodgrass, A. M.
1985 The Cambridge/Bradford Boeotian Expedition: The first Four Years. *JFA* 12: 123-61.
- Boling, R. G.
1989 Site Survey in the el-'Umayri Region. Pp. 98-188 in L. T. Geraty *et al.* (eds), *Madaba Plains Project 1*. Berrien Springs: Andrews University.
- Brown, R. M.
1979 Excavations at 'Iraq el-Emir. *ADAJ* 23: 17-30.
- Butler, H. C.
1910 Trajan's Road from Bosra to the Red Sea: The Section between Bosra and Amman. *Syria* 3: 12-16.
- Christopherson, G. L.
1997a The 1989 Random Square Survey in the Tell el-'Umayri Region. Pp. 250-90 in L. G. Herr *et al.* (eds), *Madaba Plains Project 3*. Berrien Springs: Andrews University.
1997b Madaba Plains Project: Regional Survey Sites, 1989. Pp. 291-302 in L. G. Herr *et al.* (eds), *Madaba Plains Project 3*. Berrien Springs: Andrews University.
- Cole, J. A.
1989 Random Square Survey in the el-'Umayri Region. Pp. 51-97 in L. T. Geraty *et al.* (eds), *Madaba Plain Project 1*. Berrien Springs: Andrews University.
- Conder, C. R.
1882 Tour of Their Royal Highnesses Princes Albert Victor and George of Wales in Palestine. *PEFQS* 14: 214-34.
1889 *The Survey of Eastern Palestine*. London: The Palestine Exploration Fund.

- Coughenour, R. A.
 1986 The Amman-Naur-Dead Sea Road Archaeological Survey Report'. An unpublished manuscript submitted to the Department of Antiquities in Jordan.
- Daviau, P. M. M.
 1997 Moab's northern Border. *BA* 60: 222-28.
- Gardiner, M. and McQuitty, A.
 1987 A Water Mill in Wadi el-Arab, northern Jordan and Water Mill Development. *PEQ* 119: 24-32.
- Glueck, N.
 1939 *Explorations in Eastern Palestine III*. AASOR 18-19. New Haven: The American Schools of Oriental Research.
- Gordon, R. L. and Villiers, L. E.
 1983 Telul edh Dhahab and its Environs: Surveys of 1980 and 1982, A Preliminary Report. *ADAJ* 27: 245-74.
- Greene, J. A.
 1995 The Watermills of the 'Ajlun-Kufranja Valley: The Relationship of Technology, Society and Settlement. Pp. 757-65 in *SHAJ* V. Amman: Department of Antiquities.
- Herr, L. G. and Christopherson, G. L.
 1996 *Madaba Plains Project Survey Manual*. Berrien Springs: Andrews University.
- Ibach, R. D.
 1987 *Archaeological Survey of the Hisban Region*. Berrien Springs: Andrews University.
- Irby, C. L. and Mangles, J.
 1823 *Travels in Egypt and Nubia, Syria and the Holy Land during the Years 1817 and 1818*. London: The Times.
- James, H. E.
 1976 Geological Study at Tell Hisban, 1974. *AUSS* 14: 165-69.
- Ji, C. C.
 1995 Iron Age I in central and northern Transjordan: An interim Summary of archaeological Data. *PEQ* 127: 122-40.
 1996 The Israelite Settlement in Transjordan: The Relation between the biblical and archaeological Evidence. *Near Eastern Archaeological Society Bulletin* 41: 61-70.
 1997a The Chalcolithic and Early Bronze Cemeteries near 'Irāq al-'Amīr and the Preliminary Report on Salvage Excavations. *ADAJ* 41: 49-68.
 1997b New Dolmen Field near 'Iraq al-Amir, Jordan. *BA* 60: 251-52.
 1997c The east Jordan Valley during Iron Age I. *PEQ* 129: 19-37.
 1997d A Note on the Iron Age Four-room House in Palestine. *Orientalia* 66: 387-413.
- Ji, C. C. and 'Attiyat, T.
 1997 Archaeological Survey of the Dhibān Plateau, 1996: A Preliminary Report. *ADAJ* 41: 115-128.
- Kerestes, T. M. *et al.*
 1978 An Archaeological Survey of Three Reservoir Areas in Northern Jordan, 1978. *ADAJ* 22: 108-35.
- LaBianca, O. S.
 1990 *Sedentarization and Nomadization*. Berrien Springs: Andrews University.
 1991 A Note on seasonally occupied Cave Villages. Pp. 351-55 in L. G. Herr *et al.*

- (eds), *Madaba Plain Project 2*. Berrien Springs: Andrews University.
- Lapp, N. L.
 1989 'Iraq el Amir. Pp. 280-88 in D. Homès-Fredericq and J. B. Hennessy (eds), *Archaeology of Jordan*. *Akkadica* Suppl. III. Leuven: Peters.
- Lapp, P. W.
 1962a Soundings at 'Araq el-Emir (Jordan). *BASOR* 165: 16-34.
 1962b The 1961 Excavations at 'Araq el-Emir. *ADAJ* 6-7: 80-89.
 1963 The Second and Third Campaigns at Araq el-Emir. *BASOR* 171: 8-39.
 1975 The Excavations at 'Araq el-Emir. Pp. 59-119 in N. L. Lapp (ed), *The Tale of the Tell*. Pittsburgh: The Pickwick Press.
 1993 'Iraq el-Emir. Pp. 646-48 in E. Stern (ed), *The New Encyclopedia of the Archaeological Excavations in Holy Land*. Jerusalem: Israel Exploration Society.
- Larché, F., Villeneuve, F. and Zayadine, F.
 1981 Recherches archéologiques à Iraq al-Amir. *LA* 31: 333-42.
 1982 Recherches archéologiques à Irâq al-Amir. *LA* 32: 495-98.
- Mattingly, G. L.
 1997 A new Agenda for Research on ancient Moab. *BA* 60: 214-21.
- McQuitty, A.
 1995 Water-mills in Jordan: Technology, Typology, Dating and Development. Pp. 745-52 in *SHAJ* V. Amman: Department of Antiquities.
- Mitchel, L. A.
 1994 Caves, Storage Facilities, and Life at Hellenistic and early Roman Ḥisbān. Pp. 97-107 in P. D. Merling and L. T. Geraty (eds), *Hisban after 25 Years*. Berrien Springs: Andrews University.
- Palumbo, G.
 1992 The 1990 Wadi el-Yabis Survey Project and Soundings at Khirbet Um el-Hedamus. *ADAJ* 36: 25-37.
- Palumbo, G., Mabry, J. and Kuijt, I.
 1990 Survey in the Wadi el-Yabis (Irbid District, Jordan), 1989. *Syria* 67: 479-81.
- Portugali, Y.
 1982 A Field Methodology for regional Archaeology (The Jezreel Valley Sūrvey, 1981). *Tel Aviv* 9: 170-88.
- Prag, K. and Barnes, H.
 1996 Three Fortresses on the Wadi Kafraïn, Jordan. *Levant* 28: 41-61.
- Raikes, R.
 1965 Sites in Wādī Shu`eib and Kufrein, Jordan. *PEQ* 97: 161-68.
- Rogan, E. L.
 1995 Reconstructing Water Mills in Late Ottoman Transjordan. Pp. 753-57 in *SHAJ* V. Amman: Department of Antiquities.
- de Saulcy, L.F.
 1870 Mémoires sur les monuments d'Aâraq el-Emyr. *Mémoires de l'Académie des Inscriptions et Belles-Lettres* 26: 83-115.
- Sauer, J. A.
 1979 New French Work at 'Araq el-Emir. *BA* 42: 135.
- Shaw, I. and Jameson, R.
 1993 Amethyst Mining in the Eastern Desert: A Preliminary Survey at Wadi el-Hudi. *Journal of Egyptian Archaeology* 70: 81-97.

de Vaux, R.

1938 Exploration de la région de Salt. *RB* 47: 398-425.

Villeneuve, F.

1988 Prospection archéologique et géographie historique: la région d'Iraq al-Amir (Jordanie). Pp. 257-88 in *Géographie Historique au Proche-Orient*, Gatier, P. et al., (eds.) Paris: CNRS.

1989 *Contribution française à l'archéologie jordanienne*. Amman: IFAPO.

de Vogüé, C. J. M.

1864 Ruines d'Araq el-Emir. *RA* 10: 52-62.

Waheeb, M. and Palumbo, G.

1994 An Early Bronze Age IV Cemetery at al-Bassah near 'Iraq al-Amir. *ADAJ* 38: 57-62.

Will, E.

1989 'Iraq el Amir. Pp. 288-97 in D. Homs-Fredericq and J. B. Hennessy (eds), *Archaeology of Jordan . Akkadica*, Suppl. III. Leuven: Peters.

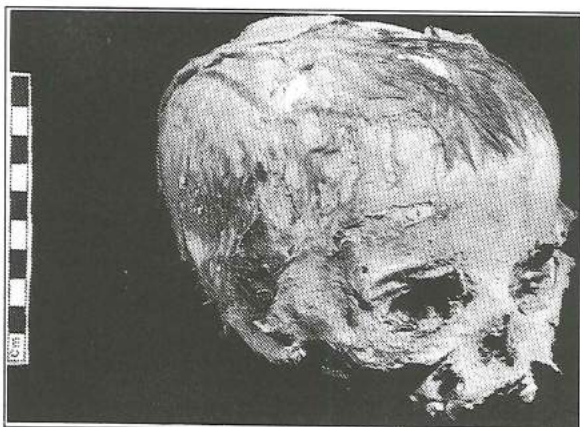
Wright, K., Schick, R. and Brown, R.

1989 Report on a preliminary survey of the Wadi Shu'eib. *ADAJ* 33: 345-50.

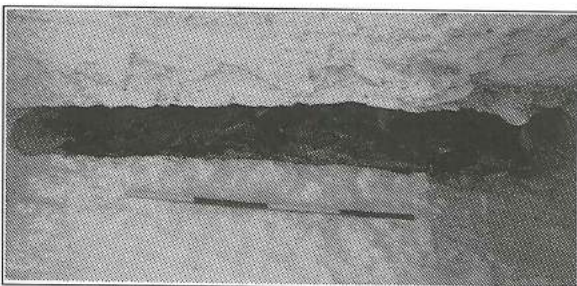
Yunker, R. W.

1991 Judgment Survey. Pp. 269-334 in L. G. Herr et al. (eds), *Madaba Plains Project 2*. Berrien Springs: Andrews University.

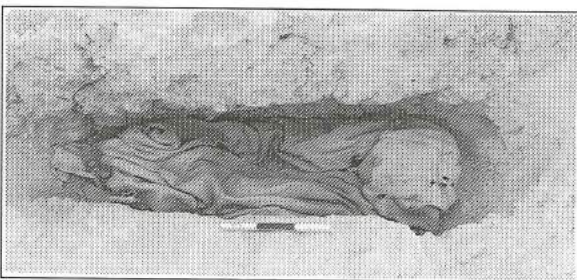
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5. Well-preserved head of Nabataean boy (photo: T. Springett).



6. Burial H2 with body encased within decorated and stitched leather shroud (photo: T. Springett).



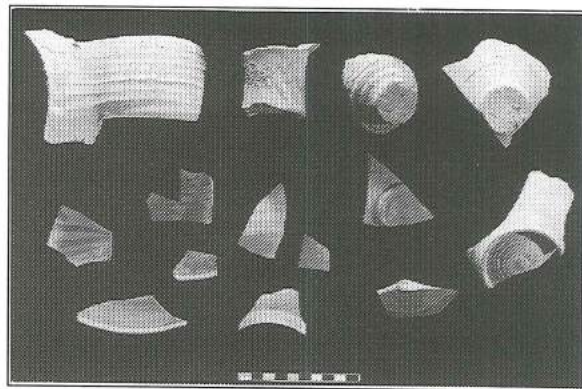
7. Burial A1 with textile wrapped around body (photo: T. Springett).

rel wreath.

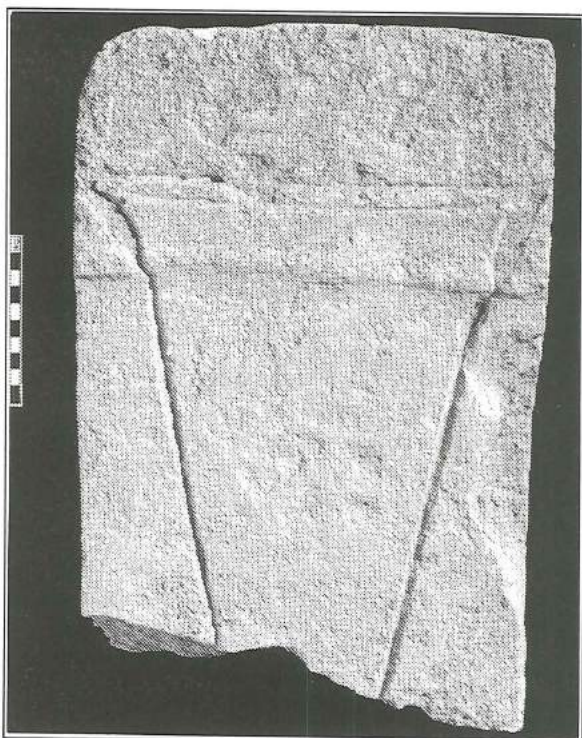
From surface collections more metal work was recovered, as well as pottery and glass fragments belonging to the first and second century AD (Fig. 8). Five funerary stelae were also discovered from robbed-out tombs, four of which had engraved rectangular signs (*betyles* or "Dusares blocks") (Figs. 9 and 10) and one which was inscribed in Greek, ΑΥΧΕΝΗ Η ΚΑΛΗ (= Afseni the pretty one) (Fig. 11).

Conclusions

Regional surveys revealed first to second

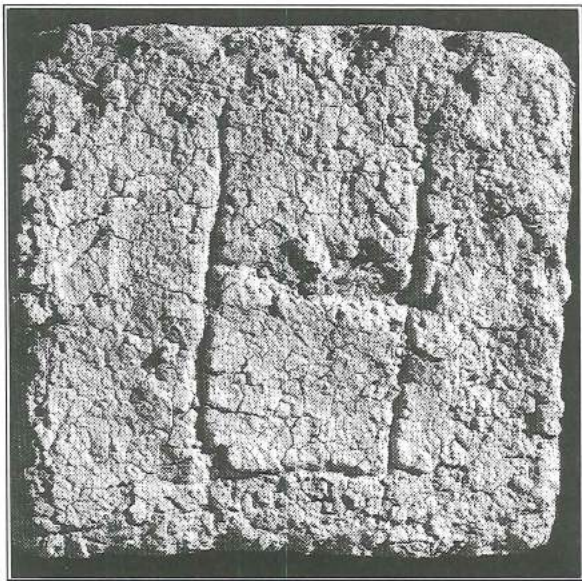


8. First to Second century AD Nabataean pottery fragments (photo: T. Springett).



9. Funerary stela KQ 2 with rectangular sign (*betyle* or "Dusares block") (photo: T. Springett).

century AD pottery sherds to the north in the ashy deposits of the Medieval/Islamic sugar factory in al-Mazra'a near the Wādī al-Karak which could have also been the location of the settlement site related to the Khirbat Qazone cemetery. Further investigations indicated the possibility of similar period cemeteries and settlements situated at Khirbat Sekine and al-Ḥaditha. These may all have been part of the Nabataean community living near the Dead Sea which was described by the ancient historians Di-



10. Adobe brick slab KQ 6 engraved with rectangular sign (betyle or "Dusares block") (photo: T. Springett).

odorus, Strabo and Josephus.

The Staff

The excavation team consisted of Khalil Hamdan, Department of Antiquities representative; Kathy Gruspier, human osteologist; Clare Pickersgill, archaeologist; W. Eddie Moth, surveyor; Pippa Cruickshank and Denise Ling, field conservators; Trevor Springett, photographer; Yannis Meimaris, epigraphist; and excavations were assisted by Ghassan Nasser, Isabelle Ruben and Samer Mouasher. A preliminary identification and analysis of the textiles was done by Hero Granger-Taylor and initial laboratory conservation was conducted by Karen Horton who also compiled a catalogue on the textiles. The project was directed by the author of this report.

Bibliography

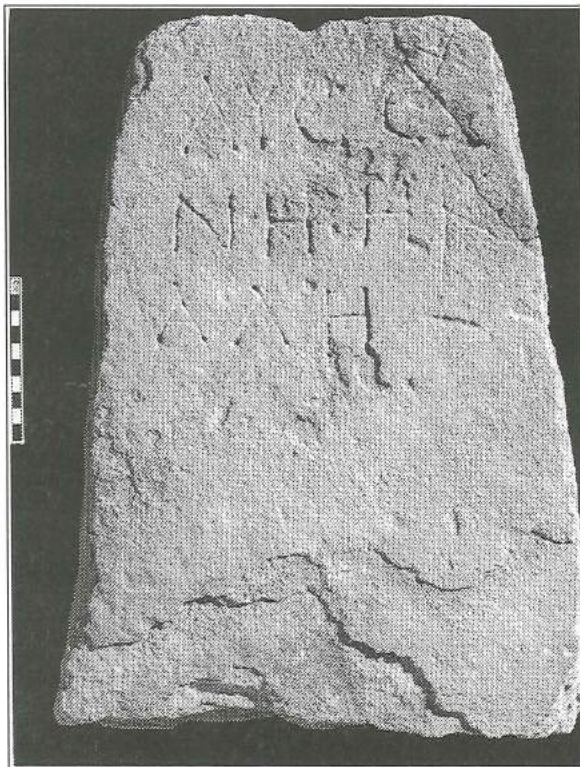
Gruspier, K. and Pickersgill, C.

1996-97 *Khirbat Qazone Excavation Notebook 1996-97*. Unpublished MS.

Politis, K. D.

1997 Newsletter from Jordan. *Minerva* 8.6 (November/December 1997): 35-37.

1998 *Khirbat Qazone. AJA* . 102/3: 596-97.



11. Funerary stelai KQ 5 inscribed in Greek, (photo: T. Springett).

Acknowledgements

The excavations were sponsored by the British Museum in London and the Department of Antiquities of Jordan. Accommodation was provided by the Jordan Valley Authority in their al-Mazra'a-Sekine complex. Logistic support was provided by ARAMEX International Couriers.

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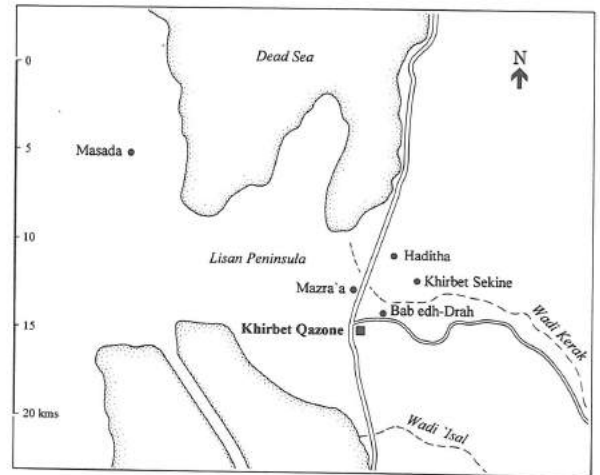
RESCUE EXCAVATIONS IN THE NABATAEAN CEMETERY AT KHIRBAT QAZONE 1996-1997

by

Konstantinos D. Politis

Introduction and Objective

During April and May 1997 rescue excavations were conducted at a Nabataean cemetery locally referred to as Khirbat Qazone (an area just south-west of Bāb adh-Dhrā') (Fig. 1). The objective was to continue the urgent measures taken in May 1996 to investigate this unusual site. The site had originally been identified in 1994 by staff of Dayr 'Ayn 'Abātā excavations while the al-Mazra'a aṣ-Ṣāfi highway was being widened (Fig.2). Unfortunately, nothing was done to protect it from ruthless and systematic pillaging.



1. Location map of Khirbat Qazone (J. M. Farrant).



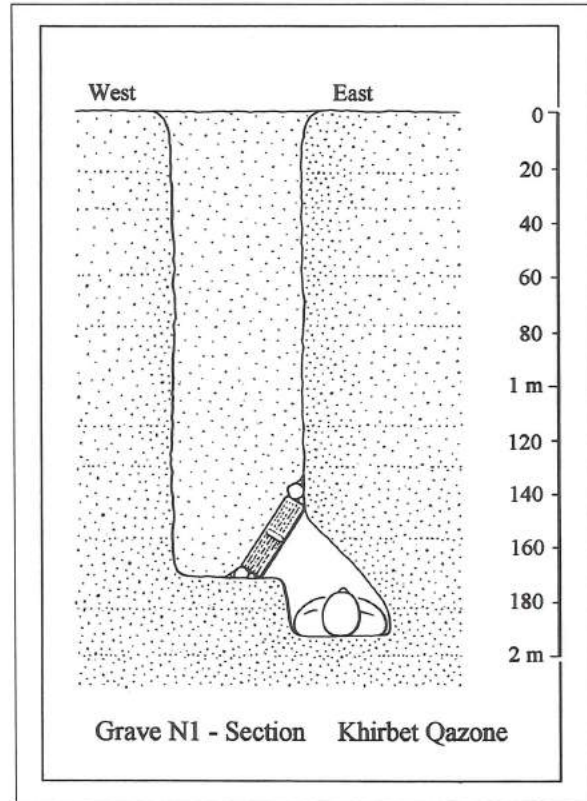
2. Aerial view of Khirbat Qazone at al-Mazra'a on 22-09-1992 (courtesy of The Royal Jordanian - Geographic Center, 'Amman).

Survey and Excavations Results

Initially, surface collections and a survey were conducted to define the extent of the cemetery. Over 3,500 robbed-out shaft graves were counted which were orientated north-south (Fig. 3). Local tomb robbers were interviewed for additional information.

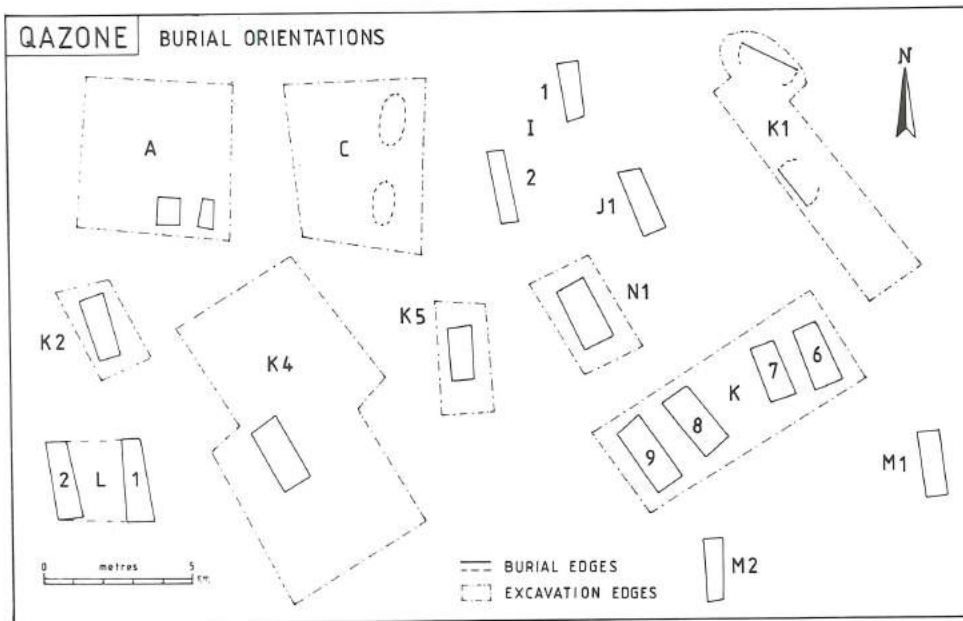
In total, twenty-four shaft graves were investigated in detail, twenty of which were excavated. Each of the graves had a single burial and there was no evidence of re-interment. Most of the graves were dug into the natural al-Lisān marls, undercut to the east and covered by adobe brick slabs (Fig. 4). A few were constructed of stone cists. Men, women and children were laid out with their heads on the south side of the grave. The dry conditions of the soil in which they were buried allowed many of the corpses to be so well preserved that hair, skin and even internal organs survived (Fig. 5).

Some of the bodies were encased within decorated and stitched leather shrouds (Fig. 6). Others had reused textiles still wrapped around them (Fig. 7). From robbers' spoil and excavations thirty-five complete and partial tunics, mantels and scarves representing the most intact textiles (mostly made of wool) ever found in the Levant were retrieved.



4. Section of grave which was characteristically undercut to the east and covered by adobe brick slabs (J. M. Farrant after C. Pickersgill).

Only a few of the burials which were excavated contained any grave goods. They included iron, copper, silver and gold earrings and bracelets, beads, a scarab, a wooden staff, a pair of leather sandals and a lau-



3. Orientation of graves (W.E. Moth).

THE 1996 EXCAVATION SEASON AT KHIRBAT AS-SAMRĀ' THE BYZANTINE CEMETERY SITE B

by

Abdalla J. Nabulsi, Jean-Baptiste Humbert and Aktham A. Abbadi

The systematic excavation of the still accessible areas within the ancient Byzantine cemetery was resumed in the 11th campaign at Khirbat as-Samrā' (1996)¹ aiming at concluding work at site B already started in the summer of 1995. Site B covers an area of 35x30 m and was divided into 5x5 m squares with 60 cm balks on the southern and eastern sides. In the 1996 season 20 squares were excavated. Tombs were located after clearing down to 50 cm of the top soil, whereby relevant stone structures were uncovered. A total of 66 tombs were excavated, of which only three were undisturbed (Fig.1). In both campaigns, 130 burials were excavated and 4 more were only localised in a 1000 m² area of the site (i.e., 1.34 tombs per 10m²).

In this season the excavated area is complementary to that of the previous one but the extent of damage by pillage was much less (Nabulsi and Humbert 1996). Human bones were missing in three burials only (there were 17 of 64 tombs in the 1995 season). No differences in the cemetery organisation, as indicated by the primitive wall structures dividing the cemetery into different sectors, and tomb architecture were observed. A relatively large number of fragmented ceramic oil lamps were salvaged in the process of top surface clearance. These were homogeneous and datable to the seventh century AD (late Byzantine - early Umayyad), suggesting that site B belongs to the same period.

Analysis of Human Skeletal Remains

The majority of burials excavated were

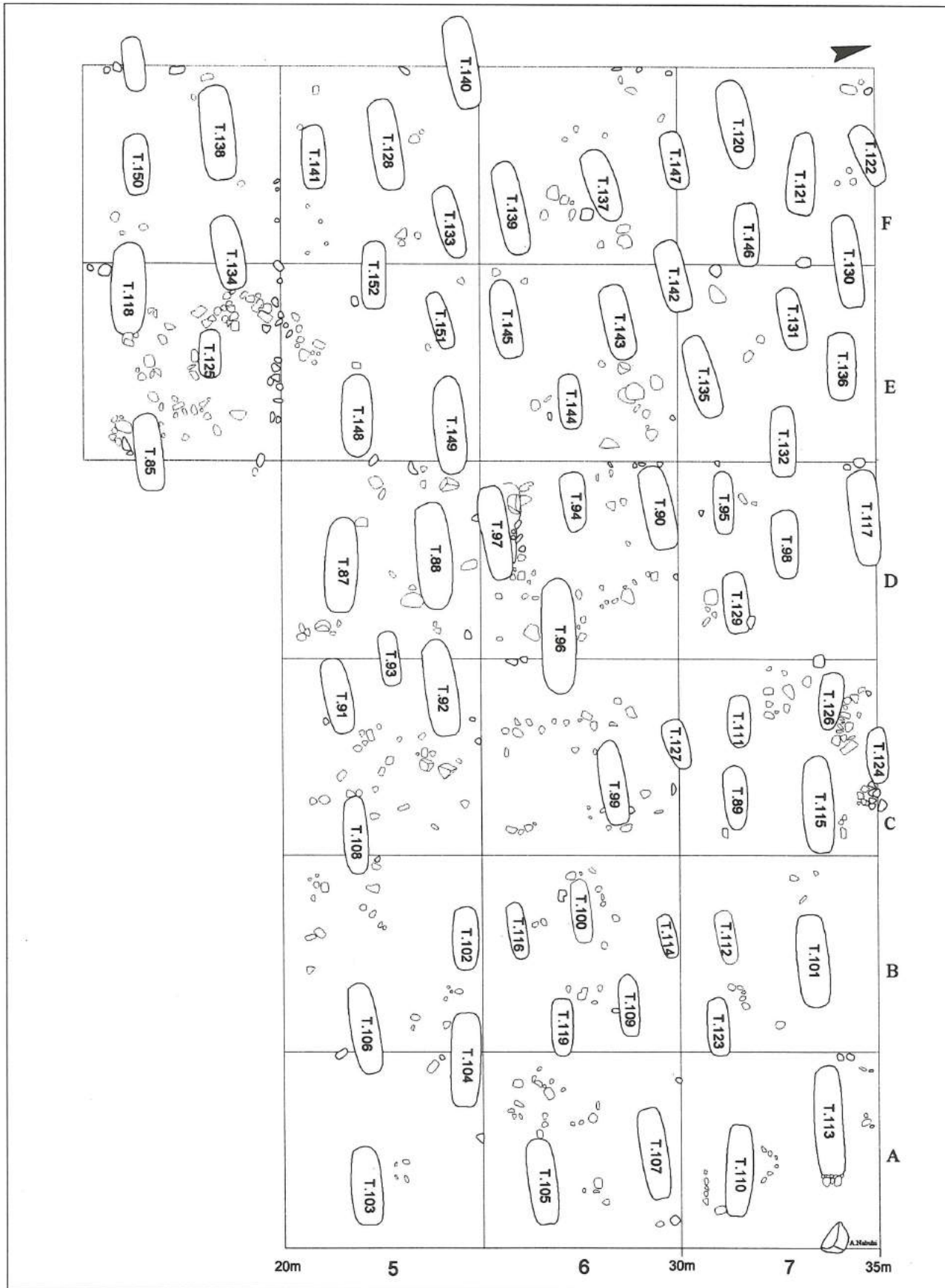
disturbed and the human skeletal remains found varied from near complete to few fragments. Yet, the osteological material was more abundant and less fragile than in previous excavations allowing, in a few cases, *in situ* analysis. In a previous report, the preliminary results of anthropometric, paleopathological and epigenetic analysis were presented (Nabulsi 1996). For more reliable inferences, we prefer to postpone further reporting on these points until excavation is completed. Presently, only the demographic analysis of human bone material excavated from site B are considered.

Age and sex distribution in the skeletal material are presented in Table 1. The obtained data in the 1996 excavation revealed no significant differences towards those of the 1995 season so that site B can be approached as a whole unit. Age distribution in the sample reflects high child mortality of that population: more than 65% of the examined remains belong to non-adults and 44% were less than 5 years old. It is evident that those who reached adulthood seldom survived to the age of 50 years. Accordingly, the estimated mean mortality age ($h=11.55$ years) is very low while the average mortality rate ($m=0.086$) is very high (see methods in Drenhaus 1992). These parameters indicate a population size of ca. 140 individuals.

It is very improbable that a population of this size can maintain itself over a period of 300 years under such a high mortality rate. Besides, the size of the ancient settlement (Humbert 1990) contradicts these estimates. It is most probable that site B represents

1. With the participation of P. Schönrock-Nabulsi, A. Rosendahl, B. Filipic, Restorer: H.-G. Bungler

(Höxter-FRG), Students: K. Drinhausen (Univ. München), F.-W. Schleif (Univ. Hamburg).



1. Khirbat as-Samrā' Byzantine Cemetery Site B 1996.

Table 1. Age groups and sex distribution in the human skeletal material of site B.

Age group	Site B 1996			Site B 95-96 ^(a)			Total	Anthrop. & Objects. ^(b)		
	F	M	U	F	M	U		F	M	U
0-2 y.	-	-	20	-	-	28	28	-	-	28
2-5 y.	-	-	7	-	-	20	20	-	-	20
5-10 y.	1	-	7	1	-	11	12	4	2	6
10-15 y.	3	1	3	4	1	7	12	5	4	3
Σ non adult	4	1	37	5	1	66	72	9	6	57
15-20 y.	1	2	4	3	3	4	10	5	4	1
20-25 y.	2	2	-	3	5	1	9	3	5	1
25-35 y.	-	2	1	3	4	1	8	3	5	-
35-45 y.	-	3	1	-	3	1	4	1	3	-
>45 y.	-	1	-	1	1	-	2	1	1	-
Adult ^(c)	-	-	2	-	-	5	5	2	-	3
Σ adult	3	10	8	10	16	12	38	15	18	5
no bone ^(d)	-	-	3	-	-	20	20	-	-	20
Σ	7	11	48	15	17	98	130	24	24	78

F: female, M: male, U: sex presently indeterminable.
^(a): in all site B.
^(b): sex determined in association with objects found (see text).
^(c): adult material (>20 y.) allowing no further age estimation.
^(d): burial missing human remains.

mainly a child cemetery within the larger graveyard as previously hinted at (Nabulsi and Humbert 1996). This is substantiated by the fact that most of the 20 tombs with missing human bones and thus excluded from the statistics are too small in size to involve adult burials. Also, there is no evidence to relate the high child mortality to

epidemics since indications of ceremonial burials were noticed in all excavated tombs.

The condition of the human bones did not allow anthropological sex determination for a large number of individuals. Though identifiable sex distribution reflects balanced sex ratio, females appear to display lower life expectancy than males. These data remain

limited by the small size of the sample.

Tomb Objects

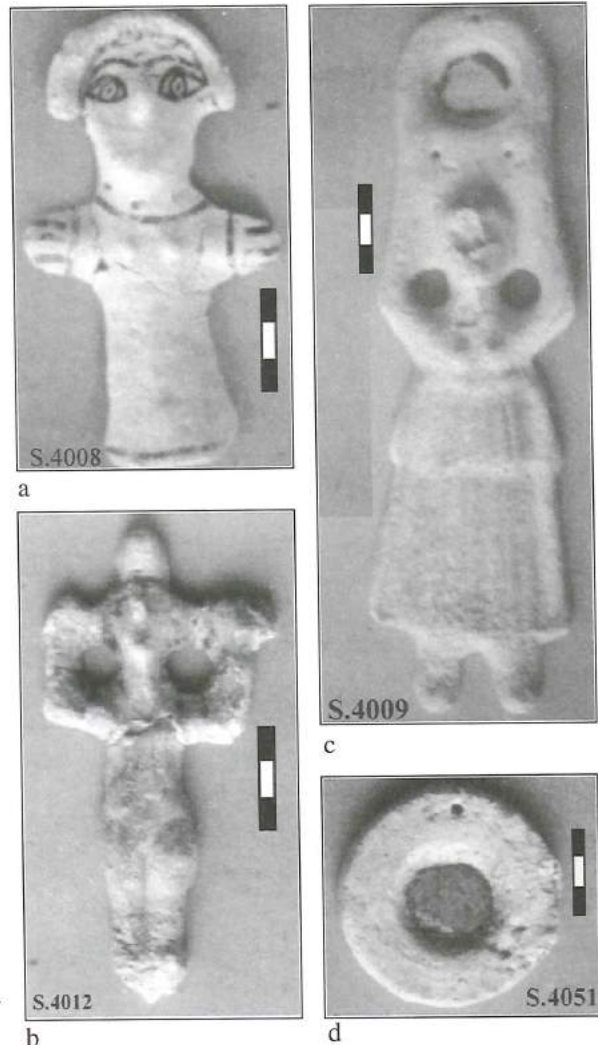
Diverse tomb offerings were salvaged during the last excavation at site B, including iron, bronze, stone, glass, plaster, ceramic and gold objects. They were in relatively acceptable condition and can be categorised as either jewellery (and anklets, bracelets amulets, rings, earrings, bells, pins and pins) or utensils (vases, cups, mirrors, chains, strap buckles and daggers). Necklaces were very common tomb offerings and included a variety of glass, stone, animal bone and bronze beads, together with different amulet types (crosses, “bells”, bronze coins and others), metal rings and spindle stones. A number of Palaeolithic and Mesolithic pebbles were found on the surface. and in tomb fillings, whereby a nicely chipped flint (S.5315) was part of the tomb’s 118 objects.

Painted plaster figurines (gypsum) of variable shape, form and size were the most interesting objects so far obtained from the cemetery in Khirbat as-Samrā'. They were restricted to non-adult burials and included figurines of geometric form (half spherical, rounded or oval disks, star-shaped and quadratic) or painted figurines of crude “female” or animal design. Most of these objects were broken and incomplete but we were able to restore some that are presented in this report.

Object S.4008 (Fig. 2a) represents a female wearing a long dress. This black-on-white painted, 12 cm long figurine was found *in situ* in tomb 99 placed in the right hand of a 12-15 year old female child. At least two more identical but less intact figurines were found in other child burials. They are believed to have served as dolls. In the same burial (T.99) was found a round framed mirror, 7 cm in diameter, (Fig. 2d). Brashler (1995) reported a similar find in the Byzantine cemetery at Umm al-Jimāl (sixth century AD). The fragments of object

S.4009 (Fig. 2c) were found in the filling of tomb 128 (Fig. 2b). The slightly worn, 22.5 cm long figurine represents a female wearing an elaborate dress. The two arms were stretched above the head to form a circle around a mirror. The two circular spaces between the arms were probably filled with small mirrors. Painted figurine, S.4012, 13.5 cm long, was found in tomb 126 (Fig. 2b) . It represents a woman “dancer” wearing a long transparent dress revealing detailed body contours. This figurine is incomplete but probably missing an attached mirror above the head, similar to that of figurine S.4009 .

Female plaster figurines are suggested to



2. Plaster figurines of Khirbat as-Samrā', site B (photo: A.J. Nabulsi, restoration: H.G.Bunger, courtesy of the DAJ).

have a long regional history. Besides the one reported by Smith (1969) in Pella, we were able to trace similar objects dated to the fifth century BC in Greece (Amiet *et al.* 1994). Yet, the quantity and diversity of such finds in the limited area of Khirbat as-Samrā's cemetery appears to be particular. Furthermore, these objects are datable to a period about 150 years later than the one suggested for similar finds in Jordan (Smith 1969, Bashler 1995). We hope in the near future and after the completion of restoration work to provide a detailed study covering the wide range of the plaster figurines obtained from this site.

The distribution of tomb offerings over the whole excavated area of site B was observed to be variable. This was manifest not only in their presence or absence in burials but also in the occurrence of clusters of specific objects at different parts of the site. For example, bronze cross amulets were concentrated in tombs in the southern part of site B while plaster figurines were almost restricted to the north-eastern parts, with similar objects often being found in adjacent burials. These variations tend to be associated with the simple 'walls' separating the different familial graveyards as suggested above. Tomb density was observed to decrease as distance from the walls increases. Also, child burials, in which most objects were found, were concentrated around these enclosures. Hence, the distribution of object types may reflect different periods of a few decades, each with different types of tomb offerings, and showing socio-economic differences be-

tween the various contemporary families. These objects may also be useful when investigating regional and local trade contacts of that time.

The tomb objects also helped to overcome problems caused by the bad condition of bone material that prevented osteological sex determination: Statistical analyses were based on the distribution of objects in burials which contained skeletal remains of anthropologically determinable sex. The obtained data showed that the presence and quantity of specific grave goods strongly correlates with the sex of the deceased, that is earrings, beads, bronze bracelets and plaster mirror frames were found with females, daggers and worn bronze rings with males. The age and sex distributions, in the last three columns of Table 1, indicate a more balanced total sex ratio. However, one has to caution that the absence of objects in many male burials may lead to a bias in these estimates.

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Bibliography

- Amiet, P., Baratte, F. Noblecount, C. D. Metzger, C. and Pasquier, A.
1994 *Antike Formen und Stile*. Köln: Benedikt Taschen Verlag.
- Brashler, J.
1995 The 1994 Umm al- Jimal cemetery excavations: Area S and Z. *ADAJ* 39:457-468.
- Drehnhaus, U.
1992 Methoden der Paläodemography. Pp 605-616 in R. Knußmann (ed.), *Anthropologie*, BdI/2. Stuttgart: Gustav Fischer Verlag.
- Humbert, J.-B.
1990 Khirbat Es-Samra du Diocese de Bosra. In G.C. Bottini, L. Di Segni and E. Alliata (eds), *Christian Archaeology in the Holy Land*. Jerusalem: Franciscan Printing Press.
- Nabulsi, A.
1996 The Byzantine Cemetery at Khirbat as-Samra: Preliminary human osteological analysis. *ADAJ* 40: 315-321.
- Nabulsi, A. and Humbert, J.-B.
1996 Excavations in the Byzantine Cemetery at Khirbat as-Samra: Site B- 1995. *ADAJ* 40: 491-493.
- Smith, R.
1969 The 1967 Excavations at Pella of the Decapolis. *ADAJ* 14:5-10.

AMMAN RING ROAD ARCHAEOLOGICAL PROJECT PHASE I (SURVEY)

by

Mohammad Waheeb

Introduction

The archaeological heritage constitutes the basic record of past human activities. Its protection and proper management is therefore essential to enable archaeologists and other scholars to study and interpret it for the benefit of present and future generations.

The protection of archaeological heritage must be based upon effective collaboration between professionals from many disciplines. It also requires the cooperation of government authorities, academic researchers, private or public enterprise and the general public.

The Department of Antiquities of Jordan has been promoting a Cultural Resource Management (CRM) program in its own organization in order to develop such a technique in Jordan. The program has been active in finding ways of cooperation between governmental development departments and the Department of Antiquities. Governmental agencies are now aware of the importance of preserving our national heritage, and of the need for coordination at the earliest stage of a construction project. We are in the process of having Cultural Resources Impact Assessment (CRIA) included in the Environmental Impact Reports of major public construction projects, and these assessments are now routinely prepared by the CRM Office each time a new construction project enters the design and feasibility phases.

General Assessment

Here it suffices to say that each time we are informed of a public project being in the design or prefeasibility study phase, we conduct a preliminary inspection of the project

area, after having completed library research on the presence of archaeological sites (being much facilitated by JADIS, a computerized database of sites within the limits of given coordinates). After a visit to the proposed "Amman Ring Road", a preliminary Cultural Resources Impact Assessment was issued, which informed the development agency, Ministry of Public Works and Housing (MPWH) and the consultant about the presence of archaeological sites within or in the vicinity of the area to be developed.

The assessment also includes an evaluation of impact on sites and suggestions for their protection (such as possible road realignments) or for their rescue excavation before construction begins at the site.

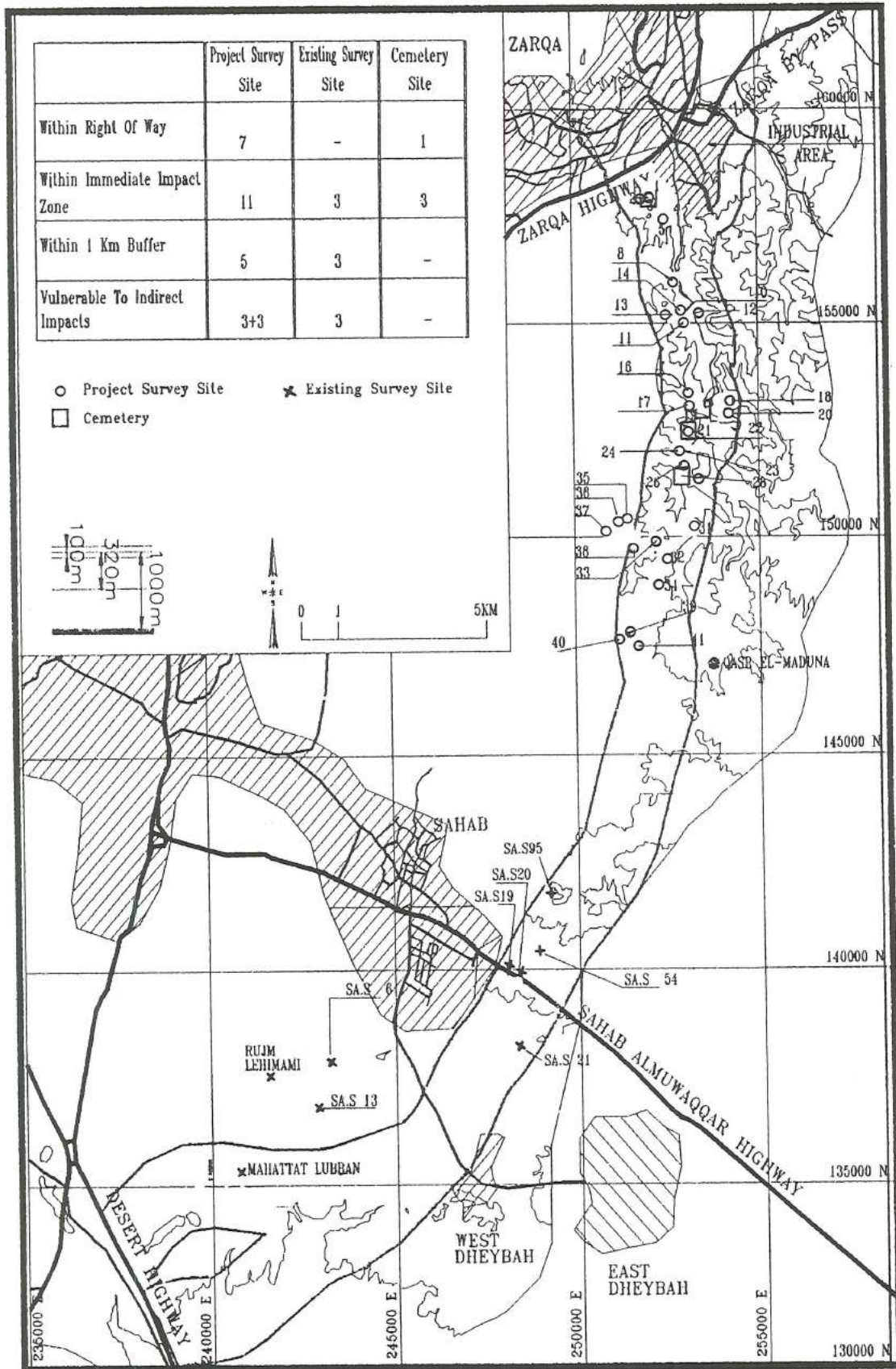
Definition and Scope of Work

Our approach to the study of the region consists of 5 steps:

1. Analysis of the aerial photographs and identification of visible sites.
2. Intensive archaeological survey and identification of periods of occupation (sherd, flint scatter, burial sites, etc).
3. Soundings at selected sites for the establishment of a stratigraphic record.
4. Limited excavations in different areas (selected sites) followed by comprehensive excavations to salvage all threatened sites.
5. Processing the data for publication.

Methodology

A team composed of eight Department of Antiquities staff members surveyed the road alignment from November 1997 to January 15, 1998.



1. Map showing the discovered sites during the survey.

The team surveyed, registered and mapped all the sites located within a radius of 250m to the right and left of the road alignment. Available maps were of the scale 1:25,000.

The survey was conducted on foot, with survey members walking at distances between 15-40m from each other. Sample collections were taken at all sites, and the features were recorded.

The principal aims of the survey were to locate archaeological sites along the road alignment, so as to enable the Department of Antiquities to propose different solutions for their protection in cooperation with MPWH and the consultant.

There have been many changes in eastern Amman in the twentieth century. The biggest initial change was the building of the al-Hijaz rail road, but in the last 30 years the pace of modern development has accelerated at an alarming pace.

Now the region is crossed by networks of paved roads, towns and workshops have been put up everywhere; local people have started removing ancient monuments to construct new buildings. Quarries are still destroying the mountainous terrain and the modern garbage dumps spoil once scenic views.

The purpose of the survey was not only to find sites, but to gain knowledge of land use resources, travel routes and general aspects of the frontier region.

A complete listing of all sites found by the survey follows, with the identification of the main period for each site. The sites are located by the number assigned to them in the field. The reference given following the site number is the Jordan 1: 50,000 series map sheets, by sheet number and grid coordinate, together with height asl in metres.

If known, the modern Arabic site name is also given. Appended to each description is a summary of the number and period of the artifacts recovered from the site. Both lithics and sherds are presented in chronological

order, from earliest to latest.

The dating of artifacts from a site to a specific period does not necessarily imply that architectural or other features of a site are to be so dated.

Paleolithic and Neolithic occupation is well attested in the area, Roman Byzantine and Islamic sites are known to have existed. Finally, the discovered sites included sherds and lithic scatters, structures, watch-towers, enclosures, camps, water installations, and so on (Fig.1).

Damage to the discovered sites had already occurred and has continued over the last years at the same rate:

- Alluvial debris resulted from running water through the area partly covering and cutting through cultural layers. The extent of the disturbed cultural layers cut by the water is difficult to determine.
- A bulldozer cut resulted in separating the archaeological deposits into two parts and exposing cultural layers in section up to 1 m high.
- Modern agricultural activities revealed well-cut stones.
- Pits dug by robbers all over the sites: these pits were dug by local people disturbing several walls and deposits.

Sites Assessment

The archaeological surveys made in the area of the road (Road Alignment) and its vicinity revealed several types of archaeological sites: Paleolithic (Middle-Lower) 500,000-200,000 BC (site No. 1)
- Pre-Pottery Neolithic Age (PPNA) 9000-5500 BC (site No. 6)
- Chalcolithic 4500-3000 BC (site No. 4)
- Iron Age I 1200-900 BC (site No. 15)
- Iron Age II 900-322 BC (site No. 7)
- Roman/Byzantine 1-600 AD (site No. 27)
- Islamic (Umayyad) 650-750 AD (site No. 42) Khirbat al-Manakher.

Endangered Sites

The survey has shown that there are 23

sites directly threatened by the project.

These are :

Site Nos. (1) (2) (3) (4) (5) (6) (7) (8) (9)
(15) (16) (17) (19) (23) (25) (26) (27)
(28) (29) (32) (34) (42) (43)

sites not directly threatened by the project .

These are:

Site Nos. 10/11/12/13/14/18/20/21/22/24/
30/31/33/35/36/37/38/39/40/41.

Sites not in Immediate Danger of Destruction

The survey has shown that there are 20

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Appendix: Survey List

Site No.	Site Name	P.G.E	P.G.N	Periods of Occupation and Type of Site
1	W.Ush 1	252.1	158.1	Paleolithic plus u.d flints (scatter)
2	W.Ush 2	252.1	157.9	Modern (cemetery)
3	W.Ush 3	252.4	157.7	UD (small structure)
4	W.Ush 4	252.6	157.6	Chalcolithic (small structure)
5	W.Ush 5	252.7	157.3	Chalcolithic ? (wall foundation)
6	W.Ush 6	252.6	156.3	Pre-Pottery Neolithic (scatter)
7	W.Ush 7	252.6	156.2	Pre-Pottery Neolithic plus u.d (structure)
8	W.Ush 8	252.7	156.0	Pre-Pottery Neolithic? (wall foundation)
9	W.Ush 9	252.7	155.9	Byzantine (building plus enclousers)
10	W.Ush 10	253.1	155.3	u.d. (structure)
11	W.Ush 11	253.0	155.0	Roman? Byzantine (settlement)
12	W.Ush 12	252.9	155.1	Byzantine (small structure)
13	W.Ush 13	252.8	155.2	Byzantine (wall foundation)
14	W.Ush 14	252.9	155.3	u.d. (cairn)
15	W.Ush 15	253.2	153.5	Iron II+u.d (enclosure)
16	W.Ush 16	253.3	153.3	u.d. (structure)
17	W.Ush 17	253.4	153.2	Byzantine (watch-tower?)
18	W.Ush 18	254.1	153.2	u.d. watch-tower
19	W.Ush 19	253.5	153.0	Modern (cemetery)
20	W.Ush 20	254.1	152.9	u.d. (small structure)
21	W.Ush 21	253.1	152.4	Modern (cemetery)
22	W.Ush 22	252.9	152.3	Roman? Byzantine (watch-tower)
23	W.Ush 23	253.0	152.0	u.d. (small structure)
24	W.Ush 24	252.8	152.0	Byzantine?(enclosure)
25	W.Ush 25	252.9	151.9	Roman? Byzantine-u.d (settlement)
26	W.Ush 26	252.9	151.7	Roman Byzantine (small structure)
27	W.Ush.27	252.9	151.6	Roman Byzantine u.d (settlement)
28	W.Ush.28	252.9	151.4	Modern (cemetery)
29	W.Ush.29	252.7	151.1	Byzantine (wall foundations)
30	W.Ush 30	253.1	150.2	Roman ? Byzantine (watch-tower)
31	W.Ush.31	253.1	150.2	Byzantine (enclosures)
32	W.Ush.32	252.4	149.6	u.d. (small structure)
33	W.Ush.33	252.2	14.9	Byzantine ? (small structure)
34	W.Ush.34	252.2	148.9	Roman ? Byzantine ? (watch-tower)

Site No.	Site Name	P.G.E	P.G.N	Periods of Occupation and Type of Site
35	Rujum al-Abyad	251.4	150.1	Roman Byzantine (watch-tower)
36	Rujum al-Abyad	251.2	150.3	u.d. (watch - tower)
37	Rujum al-Abyad	251.0	150.0	Iron II+u.d. sherds (cairn)
38	Rujum al-Abyad	251.6	149.9	Byzantine ? u.d. (small structure)
39	Rujum al-Abyad	251.4	147.8	Iron II. Byzantine ? (building)
40	Rujum al-Abyad	251.4	147.7	Iron II ?(settlement)
41	Rujum al-Abyad	251.5	147.5	Iron II. Byzantine (small structure)
42	Kh.al-Manakhir	251.8	144.8	Iron? Byzantine, Islamic. u.d. (settlement)
43	Kh. al-Manakhir			Byzantine -Umayyad (wall foundations)



SURVEY AND RESCUE COLLECTIONS IN THE GHAWR AŞ-ŞĀFĪ

by

Konstantinos D. Politis

Introduction and Objectives

In 1996 an urgent rescue project was mounted to save the antiquities of the Ghawr aş-Şāfi which were being ruthlessly pillaged in spite of the efforts of the Department of Antiquities to protect them and a public awareness campaign about the looting (Politis 1994: 12-15). The aim was to record as much information about the ancient sites and objects which came from them and to collect as many objects as possible.

Survey

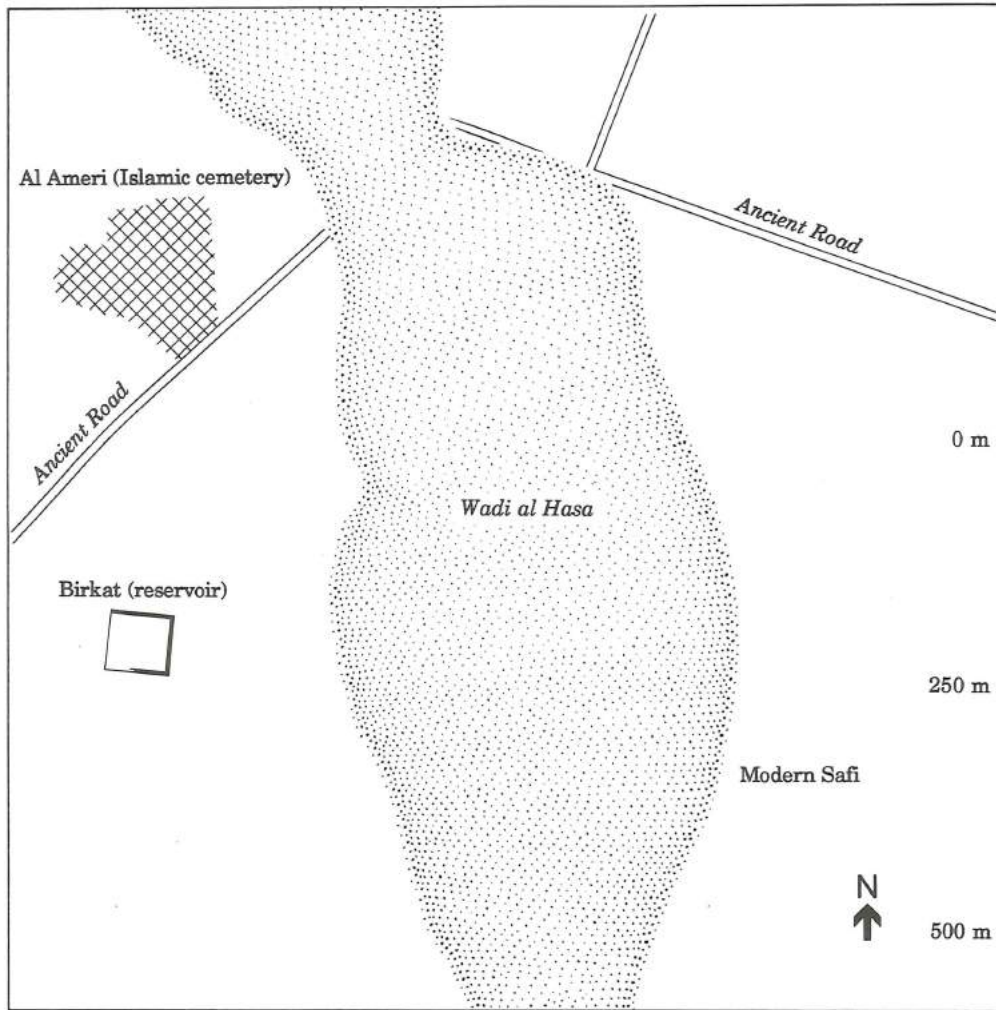
From 1992 and especially by 1994, it became apparent to a number of staff on the Dayr 'Ayn 'Abāṭā excavation project that illicit excavations in the Ghawr aş-Şāfi were reaching alarming proportions. The increase of arable land, thanks to improved water irrigation techniques, meant that more private land in the Ghawr aş-Şāfi was acquired for agriculture. This expansion encroached on to the archaeological grounds of the modern town, particularly in the neighbourhoods of Khirbat ash-Shaykh 'Isa, an-Naqa', Ṭawāḥin as-Sukkar and 'Unayz. Consequently, in the early 1970's the village of aş-Şāfi was relocated from these areas to its present location north of the Wādī al-Ḥasa. The Byzantine hermitage at the mouth of the Wādī al-Ḥasa and the Nabataean fortress at Umm aṭ-Ṭawābin which had been damaged by tomb robbers were less threatened.

Initially a number of informal ground surveys and interviews with the local inhabitants of aş-Şāfi were conducted in order to identify specific archaeological features and finds coming from them. It was established early in these investigations that a

great deal could be learned from the local people who had been finding ancient remains for decades during their routine agricultural activities. This source of information had not been tapped by scholars visiting the southern end of the Dead Sea before and we found it very useful in identifying areas of ancient occupation from different periods.

The area of 'Unayz is between the Wādī al-Ḥasa and the modern 'Aqaba-Dead Sea Highway. Today it primarily consists of relatively small agricultural plots which were allocated to Safites. Two areas of 'Unayz have been identified as belonging to the Medieval Islamic settlement: Al-Ameri and al-Birkah (Figs. 1 and 2).

Birkat is what its modern Arabic name implies: a water reservoir. It was constructed from local river stones and plastered with white lime mortar. A substantial part of the reservoir still exists today, though it is in the middle of an agricultural field (Fig. 3). Some of it was recently destroyed as is evidenced by a pile of stones just to the north. Al-Ameri has been recognised and partially claimed by the Department of Antiquities, but since there are Islamic burials on the site, the Ministry of Awqāf also has protective rights. Ayyubid-Mamluk pottery and glass can be found on the surface. A group of plain ceramic tiles were also found after recent tomb robbing which were apparently arranged in a star formation. These probably belonged to a tiled floor. After a closer examination of Al-Ameri using aerial photographs taken in 1992, the actual occupation area was observed to extend farther westward into private agricultural plots (Fig. 2). Traces of an-



1. Medieval Islamic settlement in the Ghawr as-Şāfi: Al- Ameri and al-Birkah at 'Unayz (map based on 1992 aerial photographs and 1996 investigations by J. M. Farrant) .

cient roads are also visible which lead north-east to a ford at the narrowest point across the Wādi al-Ḥasa.

An-Naqa', or al-Mustanq', is the neighbourhood of as-Şāfi immediately south-east of Wādi al-Ḥasa (Fig. 4). It is here on the southern banks of the wadi that Early Bronze Age I and Byzantine period cemeteries have been found by tomb robbers. The Bronze Age tombs are in such close proximity that they often overlap at different levels. Recent rescue excavations by the Department of Antiquities and Mu'ta University revealed the wealth and density of these burials (Waheeb 1995: 553-555). Judging from this limited work and our survey, it can be estimated that there were tens of thousands of burials at an-Naq' representing one of the largest Early Bronze Age I cemeteries ever found in the Levant. Fur-

thermore, the type of grave goods found may indicate an Egyptian presence or influence. The settlement site for this period has yet to be located but may lie immediately to the west under alluvial deposits and modern agricultural fields. Byzantine tombs have been found further down the slope near and under the modern roads (Fig.5). Although far less numerous than the Bronze Age I ones, the burials belonged to one of the most interesting communities of the fourth to seventh centuries AD (see below).

Ṭawāḥin as-Sukkar is a sugar factory dating from the 12th to 15th centuries AD which has been mentioned in a number of surveys (Albright 1924: 4; Frank 1934; Glueck 1935: 7; Rast and Schaub 1974; King 1985: 446; MacDonald 1992: 114-117) but has never been systematically studied or excavated. During our investigation



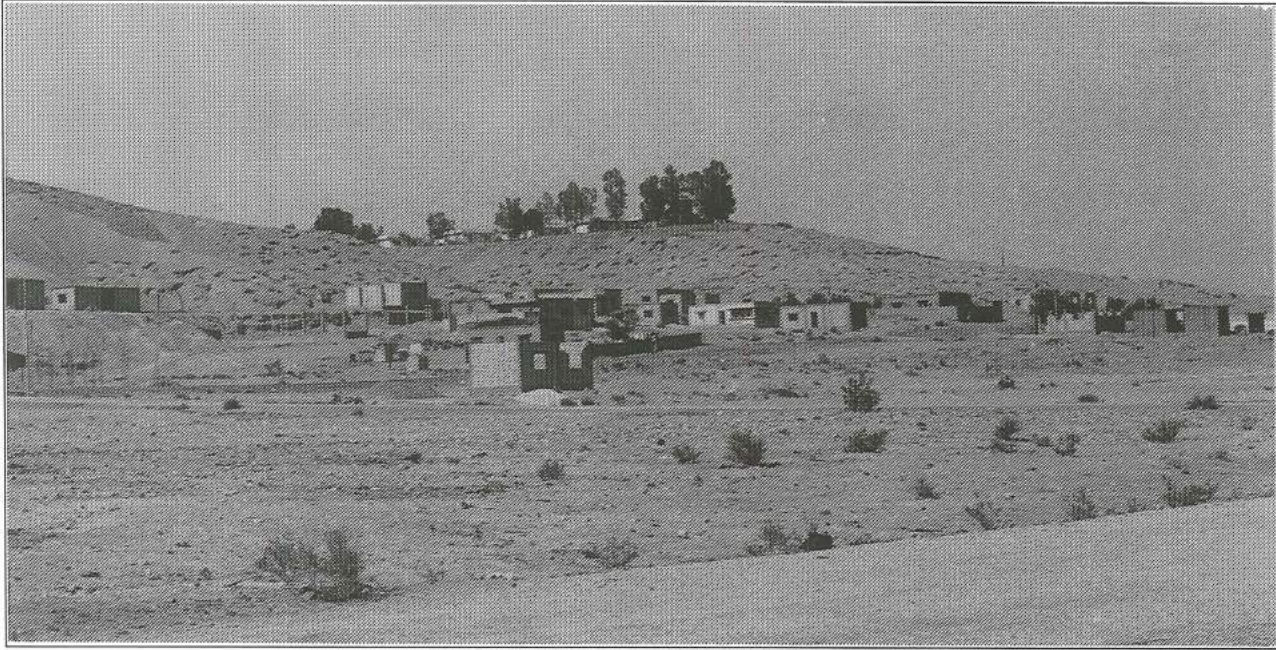
2. Aerial photograph of Wādi al-Ḥasa ford, al-Ameri and al-Birkah on 9-9-1992 (courtesy of Royal Jordanian Geographic Centre, 'Amman).



3. Al-Birkah, the reservoir, from the south (photo: T. Springett).

it was possible to distinguish a mill fed by two water channels and a refinery all enclosed by an adobe brick wall. In the process of robbing Byzantine and Bronze Age I tombs below the factory, intact underground tunnels and stone-paved surfaces were revealed. Although there are other similar sugar factories in the Jordan Valley this one in the Ghawr aṣ-Ṣāfi is the best pre-

served and it may also have been the largest one in the Valley. The sugar industry, which was very important during the Ay-yubid-Mamluk period, was based in the Jordan Valley, accounting for much of its wealth (Hamarnah 1977-78: 19). Medieval Zughar, which is known to have been a major commercial centre (Le Strange 1890: 286-292), may have been the centre for sug-



4. Unregistered cemetery area at an-Naq' from north-east (photo: T. Springett).

ar production and to have given its name to the product.

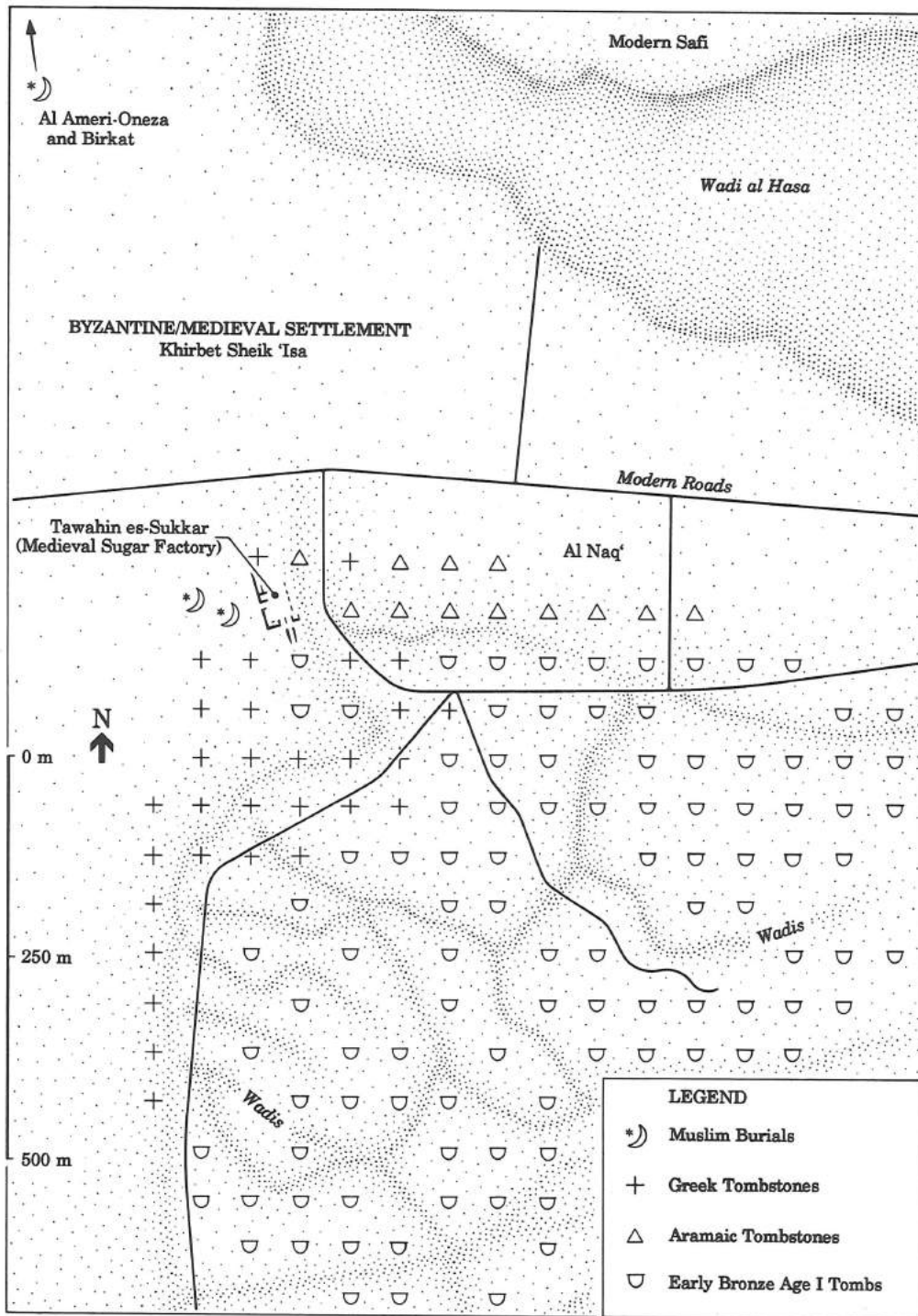
The agricultural field of Khirbat ash-Shaykh 'Isa is located immediately north-west of Ṭawāḥin as-Sukkar and together they constitute part of the same Medieval and Byzantine period site (Fig. 6). It has been referred to as the best possible candidate for the ancient city of Zughar/Zoara (Albright 1924: 4; Frank 1934: 204-205; Gleuck 1935: 8-9; Rast and Schaub 1974; King 1985: 448, 456; MacDonald 1992: 115; Politis 1998) Although no official archaeological excavations have been conducted at this site, numerous finely worked architectural stones on the surface indicate that a substantial settlement once existed there. Recent bulldozing has exposed what seems to be a portion of a city wall made of well-hewn ashlar blocks. During the early 1980s when underground irrigation pipes were being installed by the Italian Impresit Company and the Jordan Valley Authority, columns, capitals and even mosaic floors were uncovered several metres below the current road. One bulldozer driver cut through what may have been an *in situ* church entrance (Fig. 7).

Rescue Collections

The antiquities from the Ghawr aṣ-Ṣāfi, which have been made available by the depredations of the tomb robbers, span several thousand years and all materials. They include Early Bronze Age I pottery, ostrich eggs, alabaster vessels, beads and mace heads; Middle Bronze Age II pottery, metal work and beads; Byzantine funerary stelae, pottery, glass, coins, copper situlas, kohl sticks, amulettes, plaster mirror plaques, gold earrings and beads, and Islamic pottery. Sadly, even human bones were offered for sale.

Careful observations were made and when possible a selection of these objects were collected. Unfortunately, the rate at which tombs were being robbed and the sheer quantity of objects coming from them made it impossible to record and/or rescue all of them. The objective, therefore, became to focus on the most representative and unusual discoveries. Several hundreds of these objects have been registered with the Department of Antiquities to date.

The most important finds were undoubtedly the 300-plus funerary stelae dating from the to fourth to seventh centuries



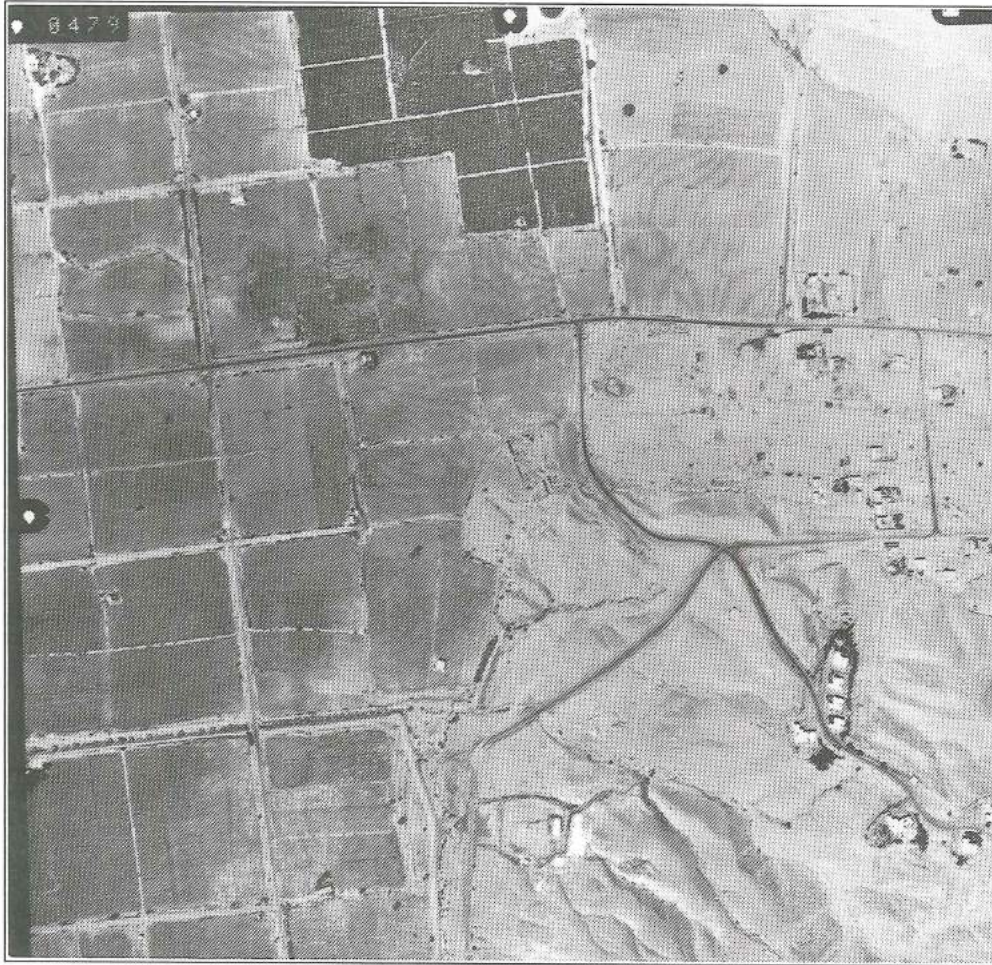
5. Byzantine and Medieval settlement and cemetery at Khirbat ash-Shaykh 'Isa and an-Naqa' (map based on 1992 aerial photographs and 1996 investigations J. M. Farrant).

AD. Approximately 90% were inscribed in Greek, the remainder being in Aramaic. These are currently being studied and a catalogue will soon be published (Meimaris and Politis, forthcoming). From interviews with the local people, the areas where they were found could be identified at an-Naqa' and Ṭawāḥin as-Sukkar (see Fig. 5). Unfortunately a large portion of an-Naqa' has

not been claimed as antiquity land and has consequently been allocated for new housing (see Fig. 4). Inevitably, the inhabitants have been discovering tombs while building foundations for their own homes.

Conclusions and Recommendations

The antiquities of the Ghawr aṣ-Ṣāfi represent some of the most important ar-



6. 2. Aerial photograph of Khirbat ash-Shaykh 'Isa, Ṭawāḥin as-Sukkar and an-Naqa' on 9-9-1992 (courtesy of Royal Jordanian Geographic Centre, 'Amman).

chaeological finds in Jordan and the southern Levant. Unfortunately very few of them have come from legal archaeological excavations. From the objects recorded so far it is apparent that the substantial wealth of these areas was founded on international trade during the Early Bronze Age I, Byzantine and Islamic periods.

Considering the significant discoveries that have been made from surveys and tomb robbing, a great deal of knowledge could be gained from extensive archaeological excavations. It is imperative that these investigations should be carried out so that the rescued objects now with the Department of Antiquities can be understood within their original contexts.

The Byzantine cemetery at an-Naqa' is most under threat and urgently needs to be fully registered as an antiquity site and excavated as soon as possible. More Early

Bronze Age I burials at an-Naqa' should also be excavated. The full extent of ancient Zughar/Zoara at Khirbat ash-Shaykh 'Isa and Ṭawāḥin as-Sukkar needs to be further investigated even though they are registered sites and should be planned and excavated as a single integral site. The relatively well-preserved buildings, offer an excellent potential for their restoration for tourism purposes. Al-Birkah and Al-Ameri also need to be excavated to understand the extent of the Medieval Islamic occupation. The Wādī al-Ḥasa hermitage and the Umm aṭ-Ṭawabīn fortress also need more documentation.

All the sites need to be fenced in and well-guarded.

A local museum encompassing the archaeology, environment and modern history of the Ghawr aṣ-Ṣāfi is being proposed which would contribute towards the awareness of the rich local heritage as well as



7. *In situ* capital of door from Byzantine church (?) discovered during placement of underground water channels at Khirbat ash-Shaykh 'Isa (photo: M. Piccerillo).

benefit the tourism industry.

Acknowledgements

The author would like to thank Dr Ghazi

Bisheh, Director-General of the Department of Antiquities, for understanding the urgency of this project and for giving it his full support. Thanks are also due to the British Museum which supported most of the activities via the Dayr 'Ayn 'Abātā excavation project. W. Eddie Moth and Jim Farrant were responsible for making the maps of the sites and Trevor Springett for the photography. Khalil Hamdan, Inspector of Antiquities for the Southern al-Aghwār, served as a constant vigilante in this troubled area. Mario Dradi deserves special mention for sympathizing with the work and helping with the funding of the collections as well as the proposed local museum. Additional financial support also came from Anis and Samer Mouasher, Iannis Lewis and Hazem Malhas. Finally the author extends his great appreciation to the local people of the Ghawr aş-Sāfi who came forward to help protect the antiquities of their home town, in particular Yacoub Ahmed Turkey Aleshebat.

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Bibliography

- Albright, W. F.
1924 The Archaeological Results of an Expedition to Moab and the Dead Sea. *BASOR* 14: 1-12.
- Frank, F.
1934 *Aus der 'Araba I Reiseberichte*. ZDPV 57.
- Glueck, N.
1935 *Explorations in Eastern Palestine, II*, AASOR vol. XV for 1934-35: 7-9.
- Hamarneh, S.
1977-78 Sugar Cultivation and Refining under the Muslims during the Middle Ages. *ADAJ* 22: 12-19.
- King, G.
1985 A Survey of the Southern Ghawr, the Wadi 'Araba and Western Trans-Jordan, 1981-82. Pp. 41-47 in *Proceedings of the Seminar for Arabian Studies*, vol. 15-1985, Institute of Archaeology. London.
- MacDonald, B.
1992 *The Southern Ghors and Northeast 'Araba Archaeological Survey*. Sheffield: J.R. Collis.
- Meimaris, Y. and Politis, K.D.
forth-coming *The Early Byzantine Funerary Stelae from Zoara in the Ghor es-Safi, Jordan*. Athens: National Hellenic Research Foundation.
- Politis, K.D.
1994 Biblical Zoar: The Looting of an Ancient Site. *Minerva* 5.6 (November-December): 12-15.
1998 The Sanctuary of Agios Lot, the City of Zoara and the River Zared. Proceedings of the International Colloquium on The Madaba Map Centenary 1897-1997, 'Amman, 7-9 April, 1997.
- Rast, W.E. and Schaub, R.T.
1974 Survey of the Southeastern Plain of the Dead Sea, 1973. *ADAJ* 19: 5-53.
- Waheeb, M.
1995 The First season of the an-Naq' Project, Ghawr aş-Sāfi. *ADAJ* 39: 553-555.
- Le Strange, G.
1890 *Palestine Under the Moslems, PEF*. London.

WĀDĪ AL-KHARRĀR ARCHAEOLOGICAL PROJECT (AL-MAGHTAS)

by

Mohammad Waheeb

Introduction

The ministry of Tourism in cooperation with the Ministry of Water and Irrigation are preparing a master plan for the tourist development of the baptism site Al-Maghtas on the Jordan River. In fact, field operations, of Wādī al-Kharrār and the adjacent area have already started in January 1997 as part of the cultural impact assessment of the site. The Department of Antiquities of Jordan (DAJ) has chosen the Wādī al-Kharrār area in particular, so as to protect the archaeological sites from threats of destruction by initiating an emergency archaeological survey, followed by test soundings and comprehensive excavations.

The work plan was divided into the following three sections:

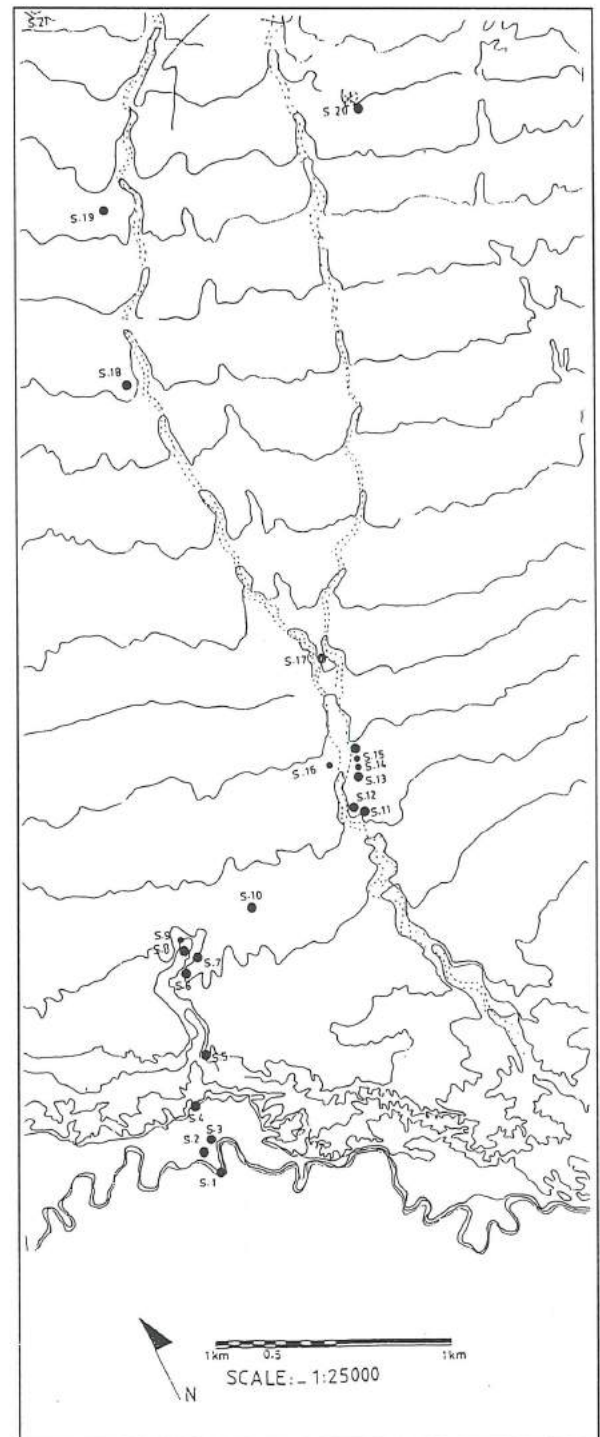
- Survey
- Excavations
- Restoration

The Survey

The survey, conducted by the DAJ team, has located 21 sites, (Fig.1) some of which were identified for the first time. Since much of the area is covered by accumulation of deposits from alluvial and cultivation activities, in addition to numerous mine fields, the limits of the discovered archaeological sites are still being investigated

The discovered sites belong mainly to the following archaeological periods:

1. Chalcolithic-Early Bronze Age Periods:
site No.17
P.G.coordinates 206.2,137.4.
2. Iron Age I-II: site No.18 P.G coordinates
203,7,138,4.
3. Early to Late Roman periods: site No 7



1. Archaeological sites discovered during the survey of 1997.

P.G coordinates 203,7,138,4.

4. Early to Late Byzantine periods: site No.3

P.G coordinates 202,2,138,4.

5. Islamic period (Umayyad): site No. 12

P.G coordinates 205,1,137.1.

The Roman and Byzantine periods, combined, are represented at the two sites on the basis of this survey alone. One way say that Wādī al-Kharrār has shown a record of continuous occupation. However, it is important to stress an almost total absence of pre-historic sites and materials, while the periods between the first century BC and the seventh century AD mark the high point of human occupation and intensive exploitation of the limited resources in the area.

The sites fall under five main categories:

- Agricultural sites
- Religious sites
- Habitation sites
- Water installation
- Sherd scatter
- Unspecified sites

The important result of the survey is the discovery of several archaeological sites in an area, which today looks totally inhospitable: As can now be seen, man was able to adapt to the harsh environment. In fact, adaptation was only possible through a number of factors one of which was the territorial link with the plateaus in Ghawr al-Kafrayn, ar-Rāmeḥ and the Jordan River. It seems that these 'links' were explored during the Roman and Byzantine periods.

The Excavations

Several factors were considered in the work plan for the excavation of the discovered sites. Some of these were the examination of the size and nature of the area, the depth of the archaeological deposits and the fact that the sites may be very important for the early history of Christianity.

The ongoing excavations by a DAJ team along the Wādī al-Kharrār, east of the Jordan River have identified the remains of several architectural features such as churches,

water installations and other buildings.

The most important discovery is the remains of a church, immediately adjacent to the east of the Jordan River, with fine coloured mosaic floors Corinthian capitals and pottery sherds, all dating back to the Late Roman, Byzantine and Late Islamic periods. The second important site comprises structures on and around Tall al-Kharrār, located two kilometers east of the Jordan River and adjacent to the spring and small oasis at the head of the wadi.

The site continued to be used from the Roman up to the Late Byzantine period. Excavations of this settlement have revealed three plaster-lined pools, and a system of water pipes and channels to carry water to and from the site. In addition, several mosaic floors and associated buildings were discovered: one of these floors has an inscription consisting of five lines mentioning ROTORUIS as the Head of the monastery, translated as follows (see Fig. 2): "By the help of the grace of Christ our God. The whole monastery was constructed in the time of Rhetorios, the most God-beloved presbyter and Abbot. May God the Saviour give him mercy".

Furthermore, the DAJ team has identified two natural caves, which had been transformed into hermit grottas and monk cells. Other caves certainly remain to be identified. Excavations are still continuing on five sites located near the eastern side of the Jordan River and along the southern bank of



2. Tall al-Kharrār: Mosaic floor with inscription.

Wādī al-Kharrār.

The discovery of Roman and Byzantine remains at Wādī al-Kharrār, confirms stories told in the Gospel and that these sites were an integral part of the local history.

The discovered buildings at al-Kharrār (Fig.3) and its related outposts, further down the northern coast of the Dead Sea, had played a vital part in the recorded events. What supports the association of the site with biblical history is that the area of al-Kharrār was at a point near the River to which old roads came down. The road which concerns us most is, about four and one half miles down-stream, where the monastery of St. John stood, on a low hill, seven hundred yards west of the River. And on other side the eastern side the road comes in from the east. Both the circumstances of John's work and the archaeological discoveries emphasize that John's activities were accomplished on the eastern side of the river as well. There is a clear reference to John's work, in (John 1:28 and 10:40) where it is stated that he carried out baptisms in Bethany beyond the Jordan River.

In addition to that, pilgrims from Bordeaux (333 AD) and Theodosius (530 AD) have stated that the place of the baptism had some connection with Tall al-Kharrār from which Elijah was taken up to heaven and

they located this place on the eastern side of the Jordan River. Moreover, in Jhon Moschas' writings in the seventh century, he mentions 'Sapsaphas' near Wādī al-Kharrār, and he also says that the patriarch Elias of Jerusalem (464-518 AD) had built a church and monastery there.

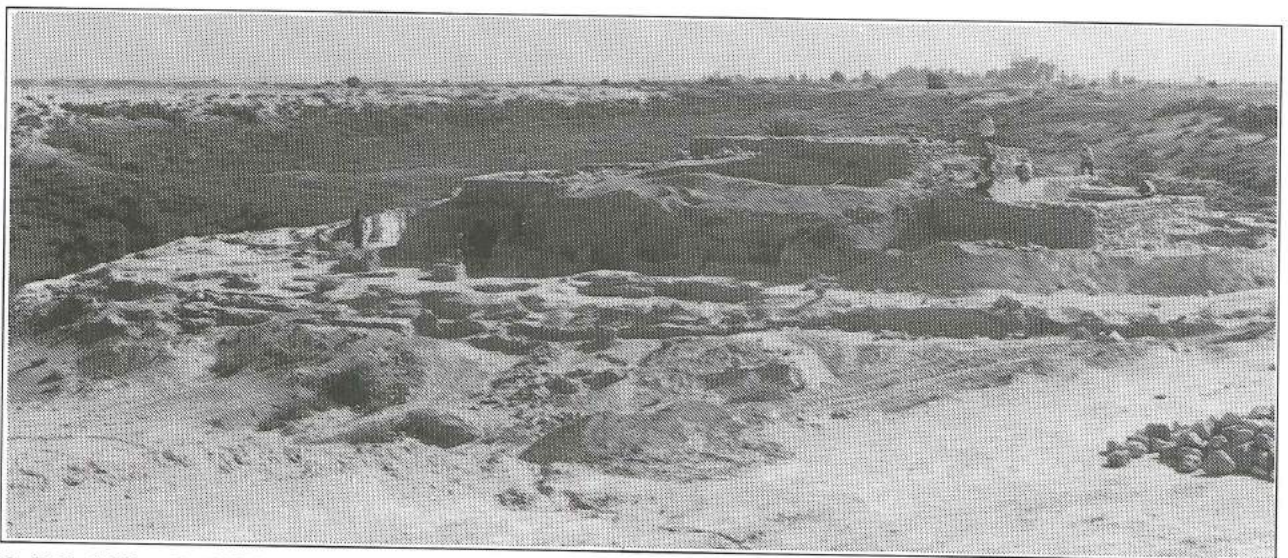
Recent excavations in the southern al-Ghawr at Nimrīn, Iktanū, al-Hammām, Wādī al-Kafrayn, as-Suwaymah, az-Zāra, Dayr al-Qaṭṭār al-Byzantī and Dayr 'Ayn-Abāṭā help in studying the importance of sites related to our area.

Wādī al-Kharrār deserves not only excavation and preservation, but also some degree of aesthetic and archaeological development in order to become, once again, a focal point of attraction in the whole area of the Jordan Valley.

Restoration

Given the unique spiritual and environmental character of the area, a long term strategy for the protection of the discovered archaeological sites were adopted by the engineers and archaeologist of the DAJ team.

Particular emphasis was given to conservation work at Tall al-Kharrār during the 1997-98 excavation season. The first job was to repair the damage done by erosion and earthquakes. Some field stones were re-



3. Tall al-Kharrār. 1997 excavations.

placed including the strengthening frames of other stones. Original blocks were joined back together so as to put them in their original position.

Acknowledgement

This work could not have been done without the total commitment of the entire field team to which I owe gratitude. As well, I would like to thank HE Akel Biltaji, the Min-

ister of Tourism and Antiquities, and Dr Ghazi Bisheh, Director-General of the Department of Antiquities, for their constant support and encouragement for the project. Thanks go also to Sa'ad Hadidi, inspector of the as-Salt office.

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FURTHER INVESTIGATION OF THE HUMAN SKELETAL REMAINS FROM THE HIPPODROME AT JARASH

by

Karen B. Hendrix

Introduction

During the spring 1997 the author undertook further analysis of the human skeletal remains excavated from the Hippodrome, Jarash.¹ This report deals with a portion of material from Chamber W2⁶⁴⁰ (Fig 1).

Results

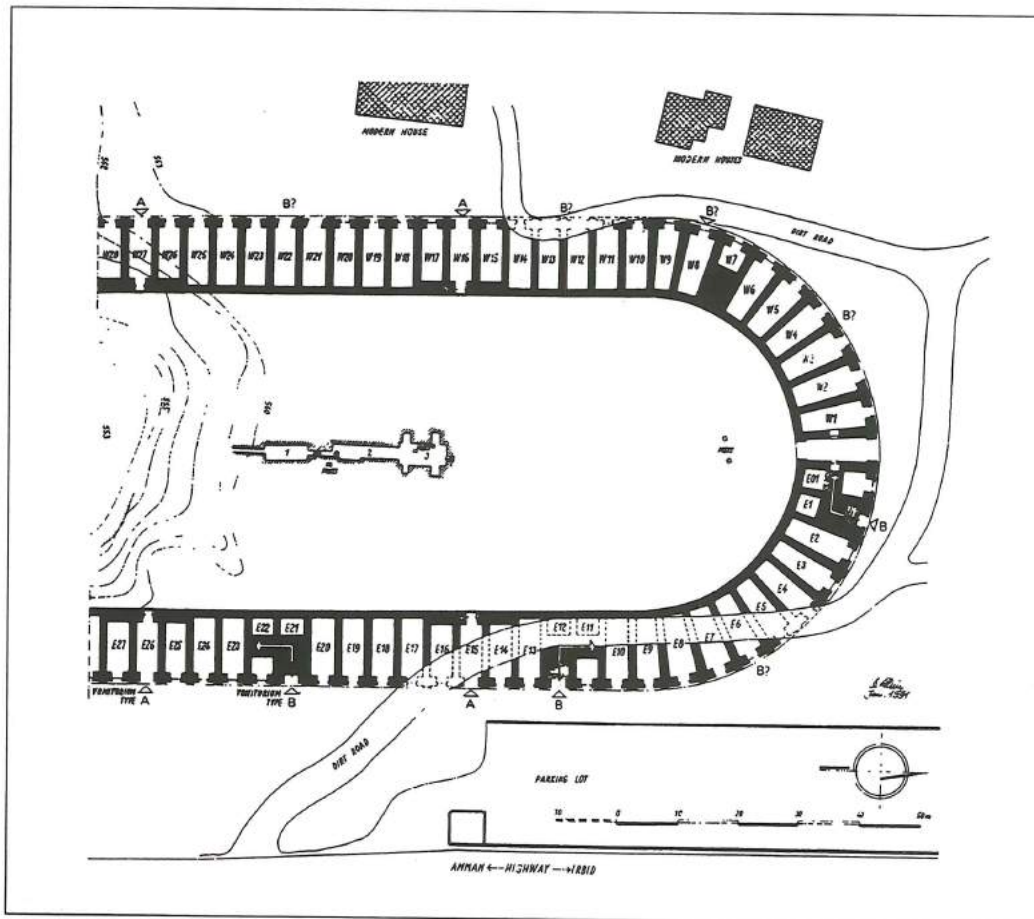
Minimum Number of Individuals (MNI)

Table 1 indicates an MNI for adults of 47

based on the highest incidence of a sided bone (clavicle). Approximately 30 immature individuals were identified.

Demography

In relation to the demographic profile, similar results were observed in this chamber to those of W3, with a slight bias towards older males.³ As was the case in chamber W3, there were several examples of very ro-



1. Hippodrome. Plan of north part (A.A. Ostrasz).

1. The first preliminary report appeared in *ADAJ* 1995 in which information regarding the excavations and the methodology employed in this investigation can be found. I would like to thank the Department of Antiquities of Jordan, Abdul Majeed Mjelli and Ina Kehrberg for their support

during this second investigation.
2. Chamber W2 contains approximately twice as much material as W3. Due to constraints of time, only half of the material was analyzed. Further study of the material is planned for 1999.

Table 1. Adults only.

Box	Patellae		Clavicle		Femora		Axial Vert
	L	R	L	R	L	R	
100	1	2	6	5			2
101					1		
102	1				1		
103			1	1			
104	2	2					
105		1					
106/7			1	2	3	3	
108/9	2	2	1	2			
110		4	3	2			4
111	2			2	1	1	3
112			1	1			2
113	2		2	2			1
114		1	1	1			
115			5	3	1		3
116	2	1	2	1	2	1	3
117	1	2	1		2		2
118	2		5	5			
119	1	2					
120	2		2	1	2		
121	3	4	4	4	3	4	
122		1	7	6			4
123	1						
124	1						
125			1	2	1	1	6
126							7
127	4	2	2	2	4	4	2
128	3	2			2	2	
129	6	4	3	3	3	3	
130	5	8			5	5	1
131	2	2	1	2	2	1	1
132	3	5	1		2	2	1
Total	46	45	50	47	35	28	42

bust males. All ages of classes were present for adults with an observable imbalance in relation to immature individuals.

Pathologies

A number of pathologies were recog-

Bibliography

Hendrix, K. B.

1995 Preliminary Investigations of the Human Skeletal Remains from the Hippodrome at Jarash, *ADAJ* 39: 560-562.

Ostrasz, A.A.

1991 The Excavation and Restoration of the Hippodrome at Jarash: A Synopsis. *ADAJ* 35: 237-250 esp.241f.

1994 Ostrasz, A.A. and Kehrberg, I. Jerash/Gerasa: Hippodrome. *AJA* 98/3:545-547.

3. This information was collected from fragmented crania and femoral head measurements.

4. This discrepancy can be explained by the fact that the collapse of the *cavea* was less severe above chamber W3, keeping several stepped arches in-

nized including joint disease (osteoarthritis), infectious disease (tuberculosis), metabolic disease (porotic hyperostosis) and several fractures. Dental analysis evidenced many examples of severe attrition and resorption, as well as several examples of enamel hypoplasia and possible periodontal disease.

General Observations

Chamber W3 yielded more intact bone than W2, with several examples from the axial skeleton, including sacrum, sternum and vertebrae.⁴ A rare example of a complete articulated right arm was recorded, providing (so far) the only example of articulated bones. The majority of intact bone lay in the bottom levels of the chamber, indicating that they were less disturbed by the falling *cavea* stones, further supporting the theory that the *cavea* collapsed some time after the bodies were placed in the chambers.⁵

Summary

The results from chamber W2 are similar to those observed in the investigation of W3. No evidence was observed that identified a cause of death. Further investigations on the pathologies from both chambers and DNA analysis is projected for the future.

Karen Hendrix

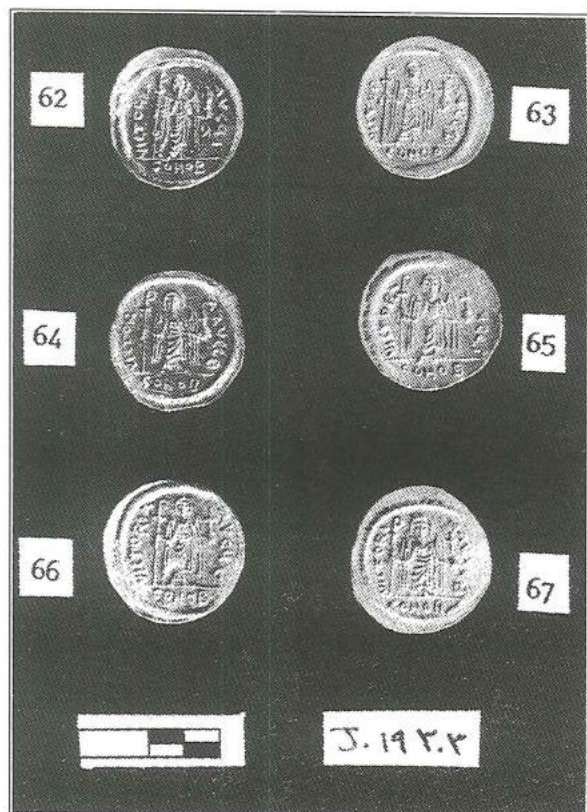
tact at the podium end of the chamber (pers. comm. I. Kehrberg).

5. See Hendrix 1995:561 for an explanation of the time-lapse between death of the individuals and the collapse of the chamber.





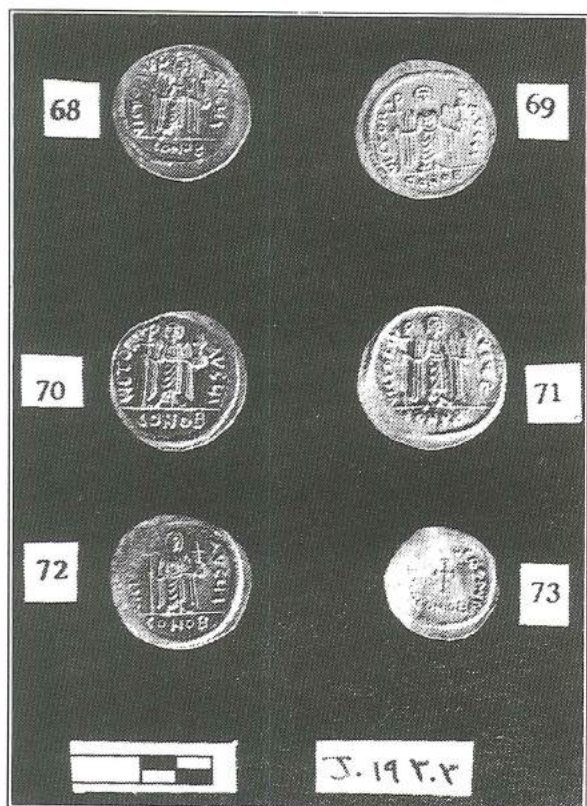
Arabic Section



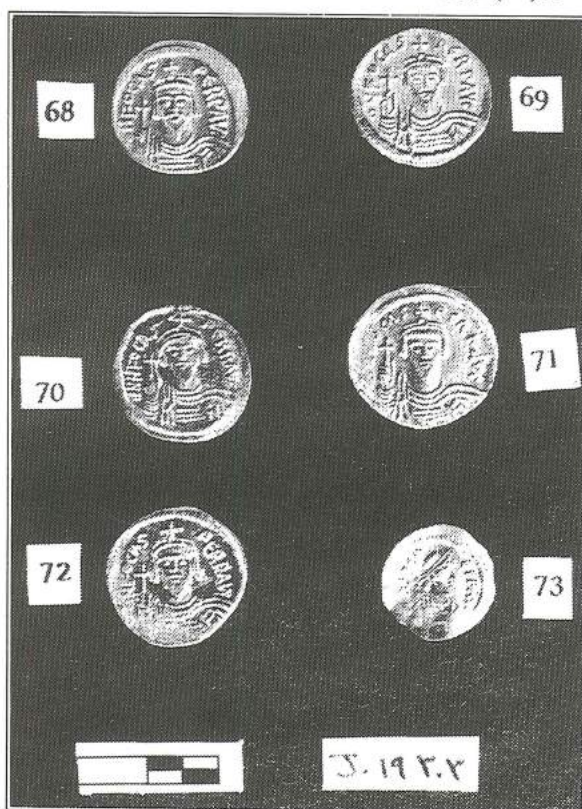
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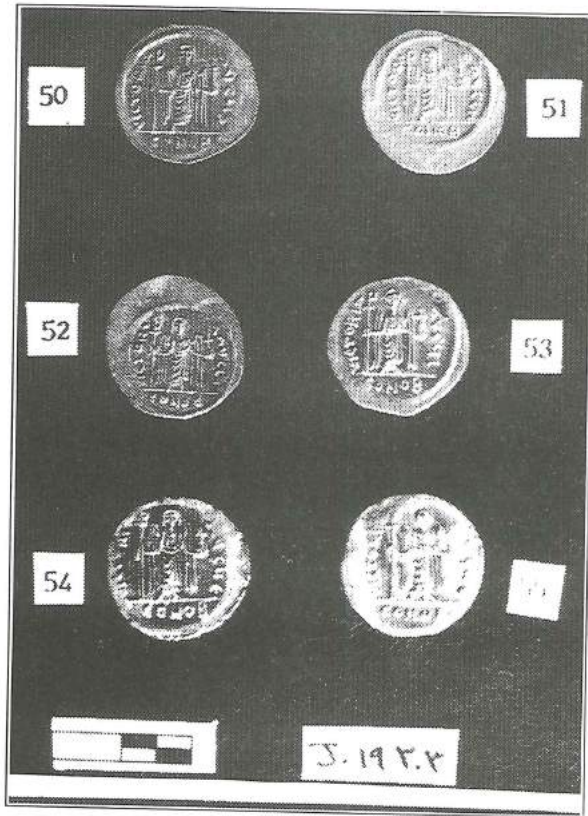
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شكل (١٢) ظهر.



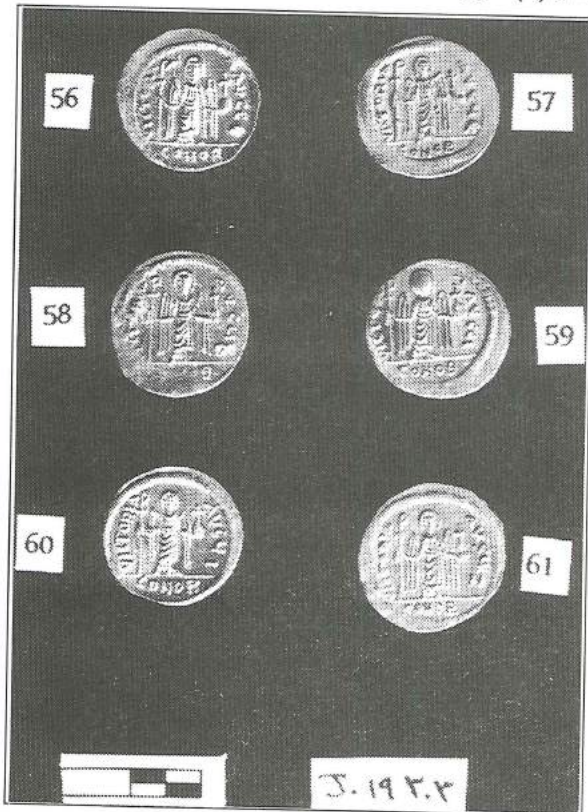
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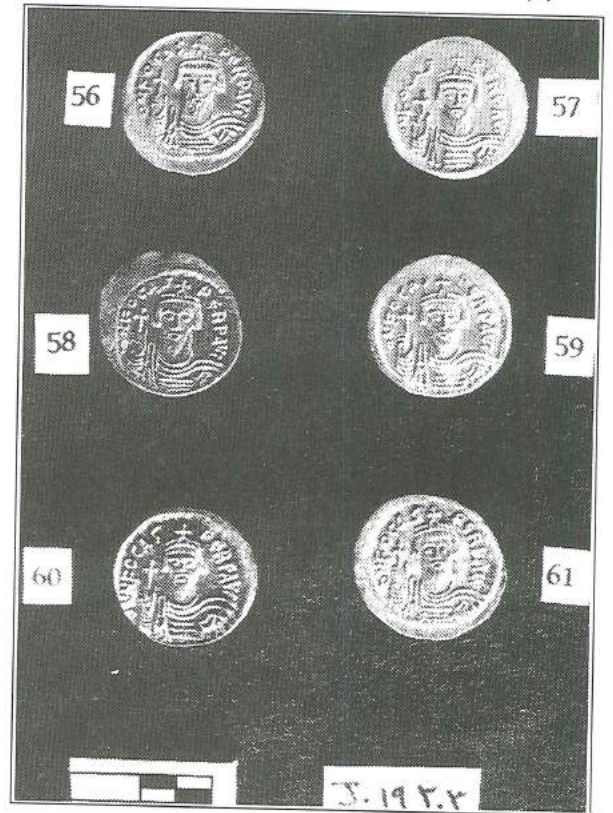
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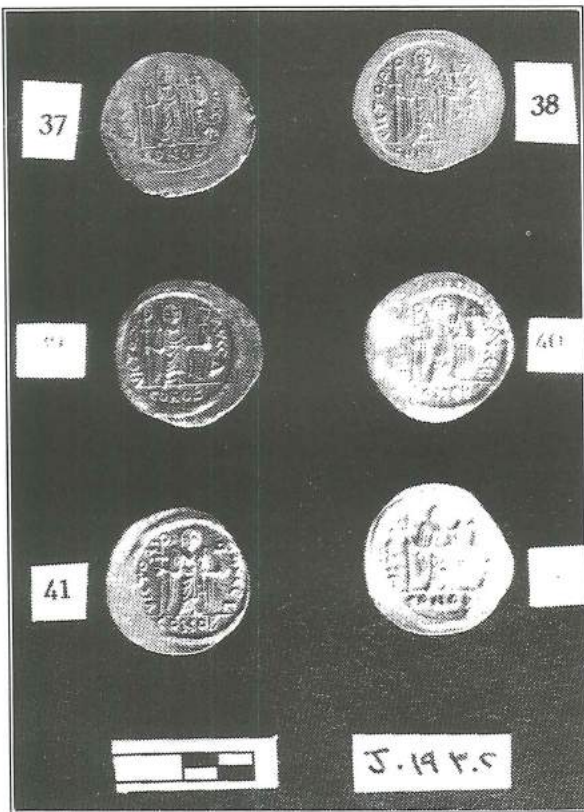
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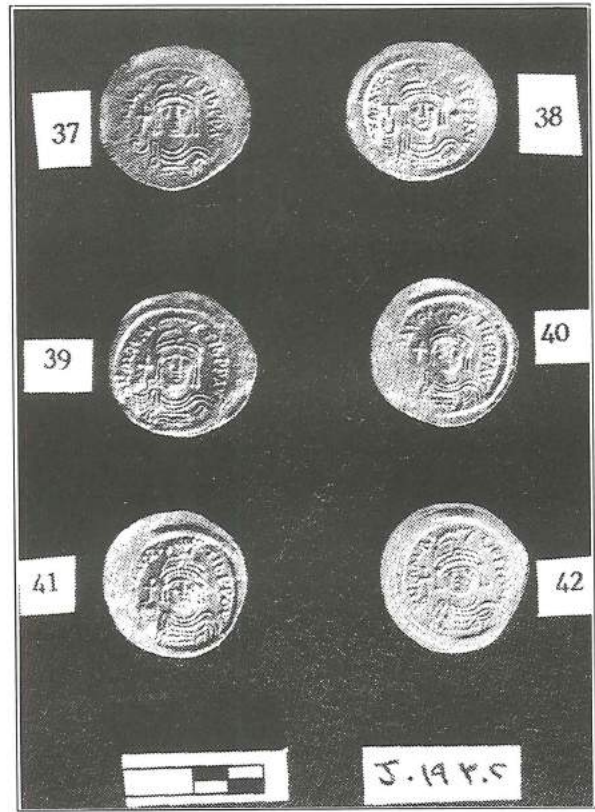
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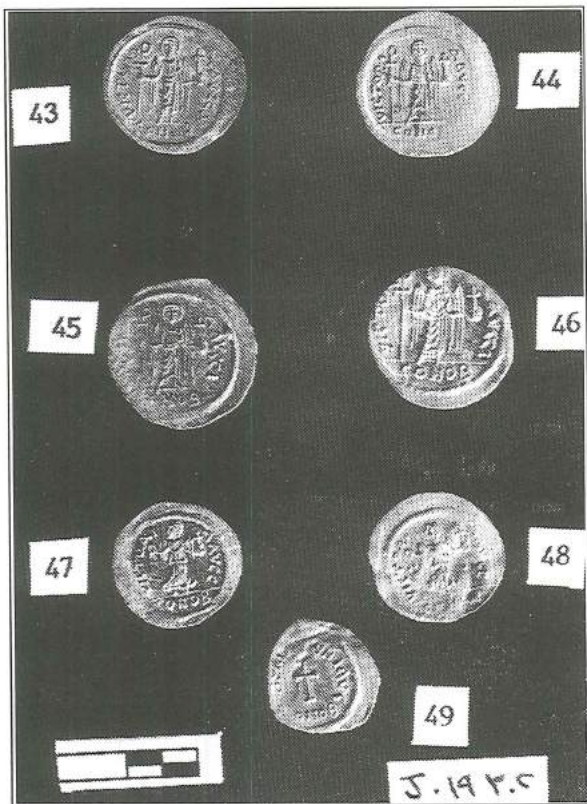
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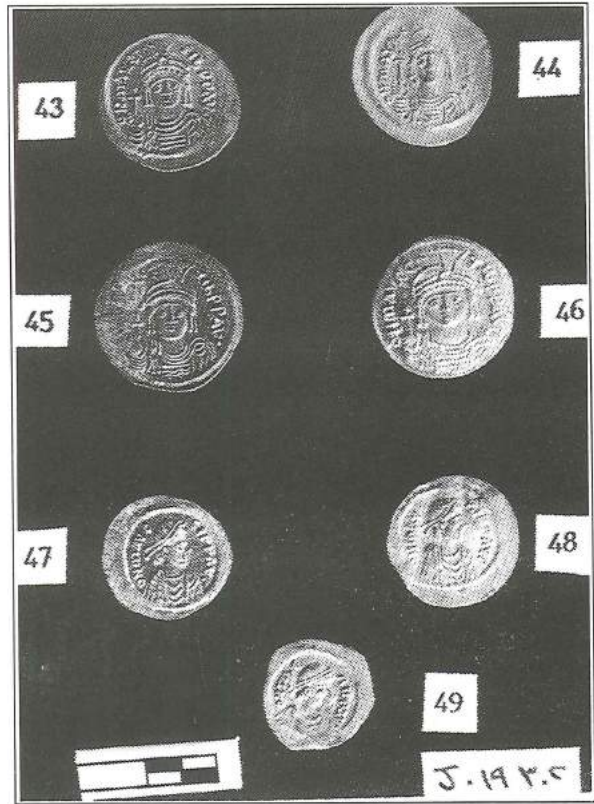
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شكل (٧) وجهة.



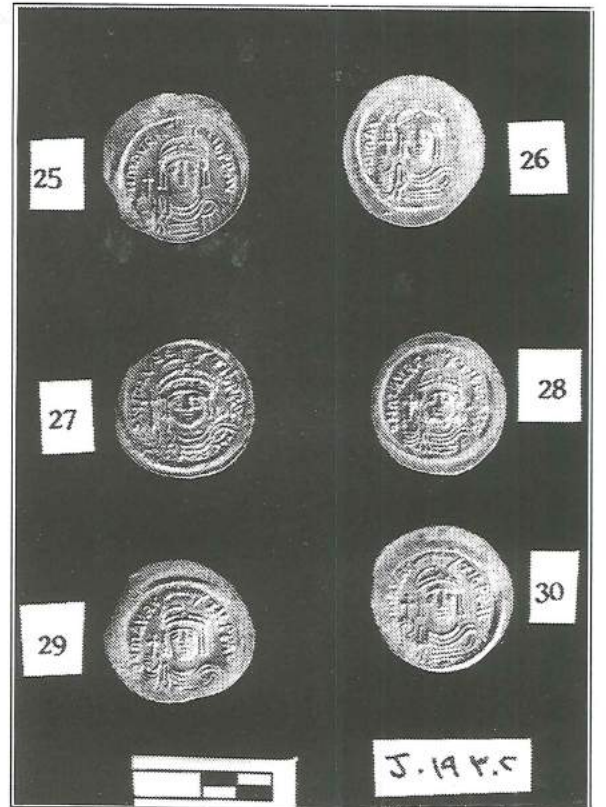
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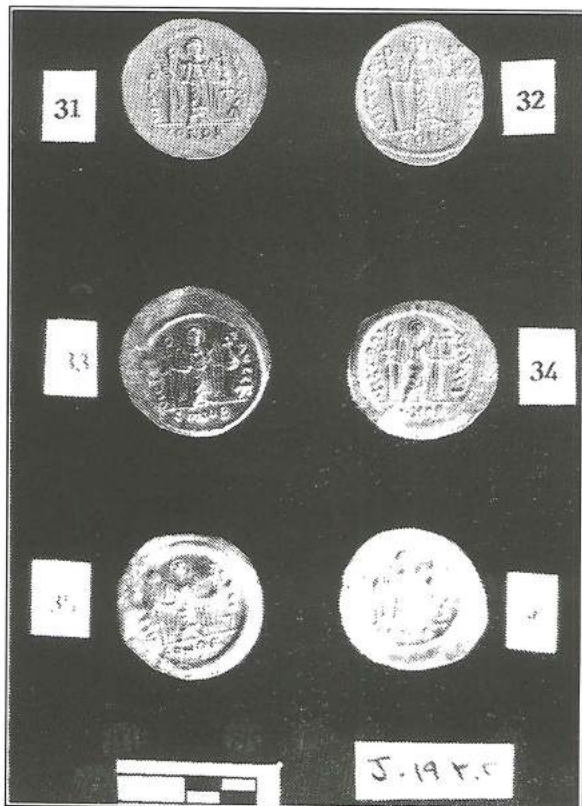
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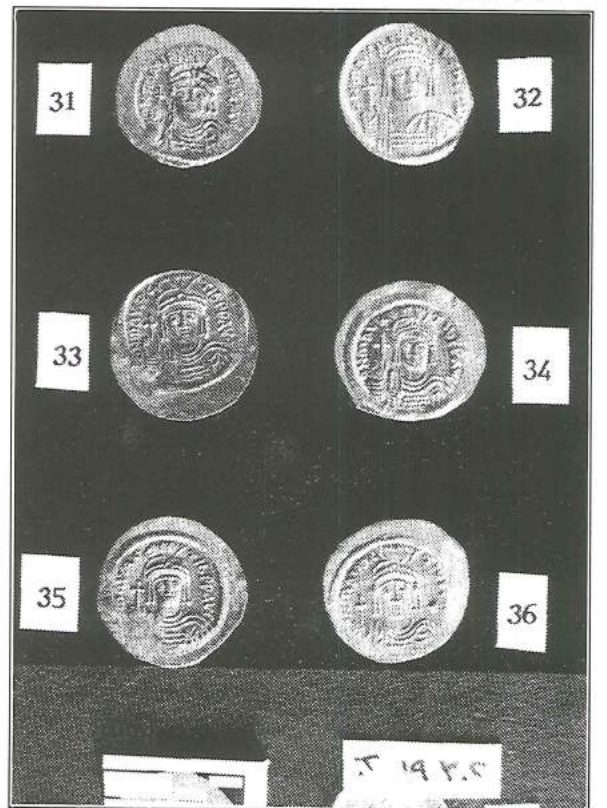
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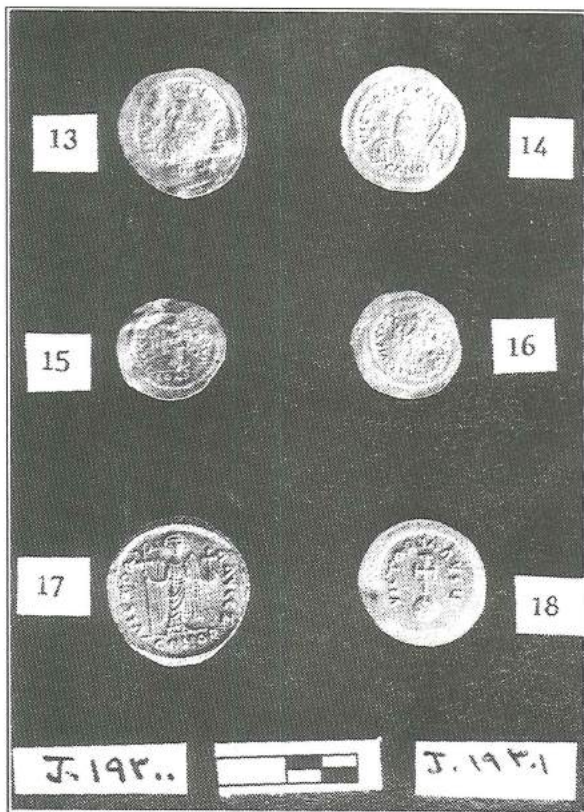
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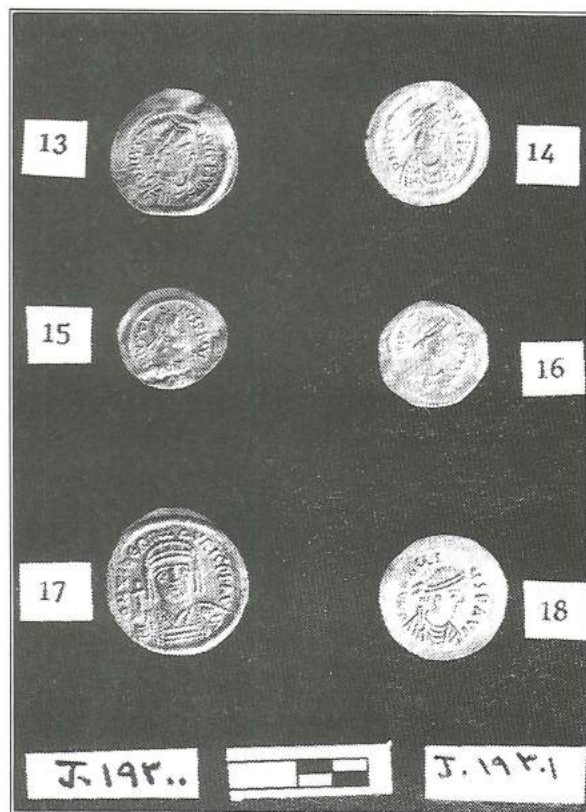
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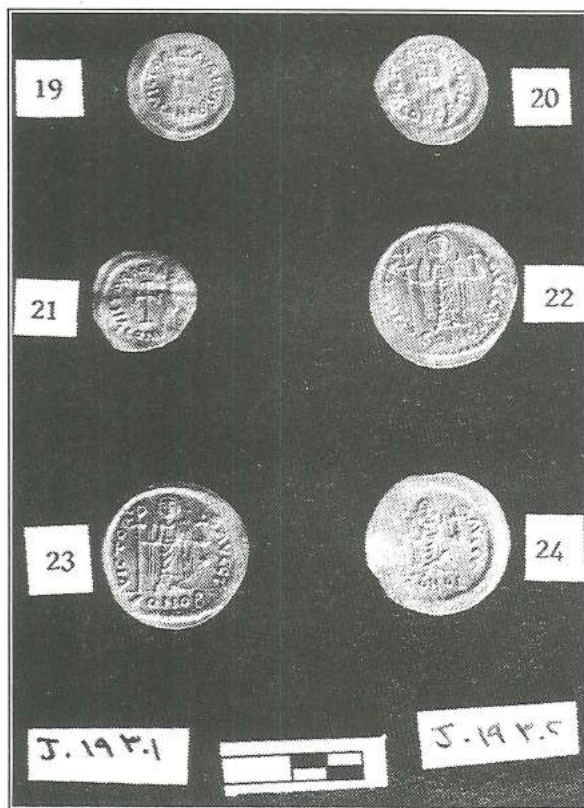
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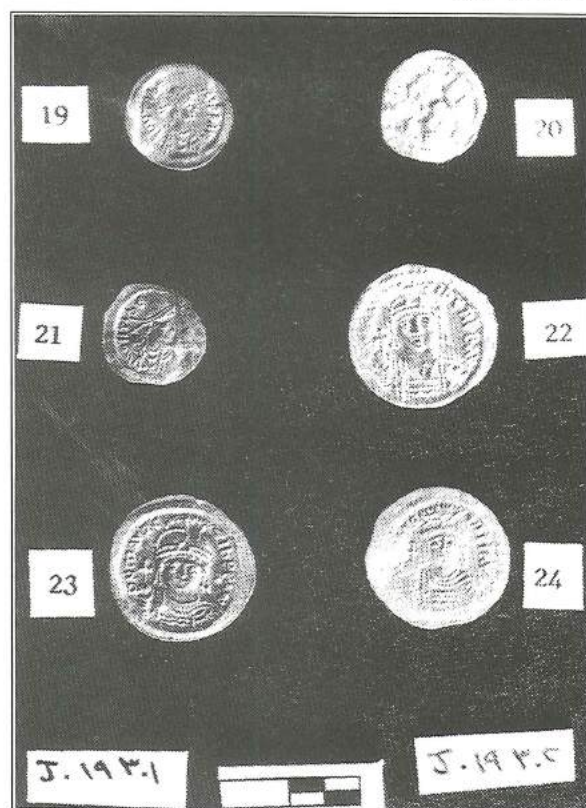
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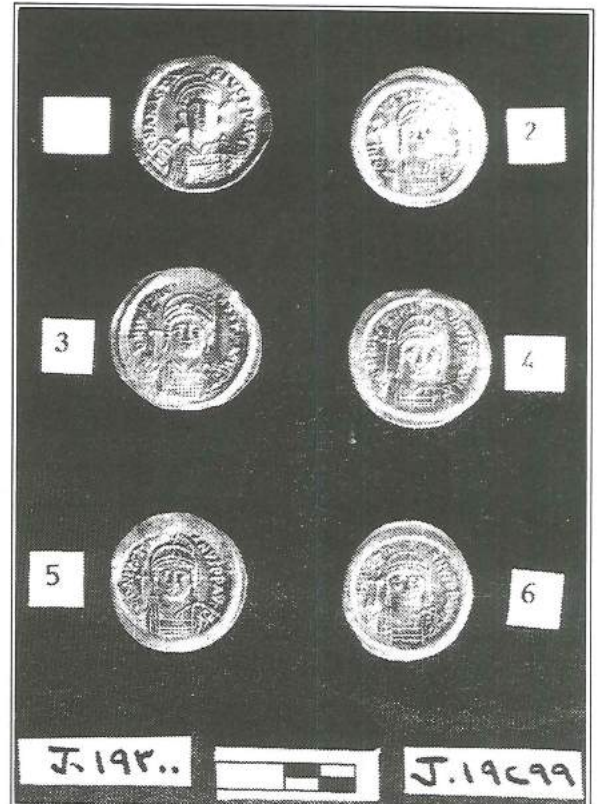
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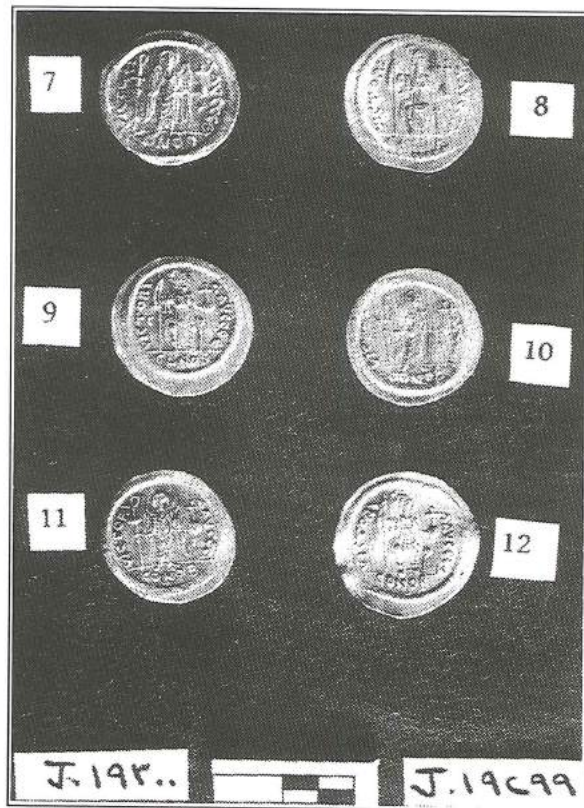
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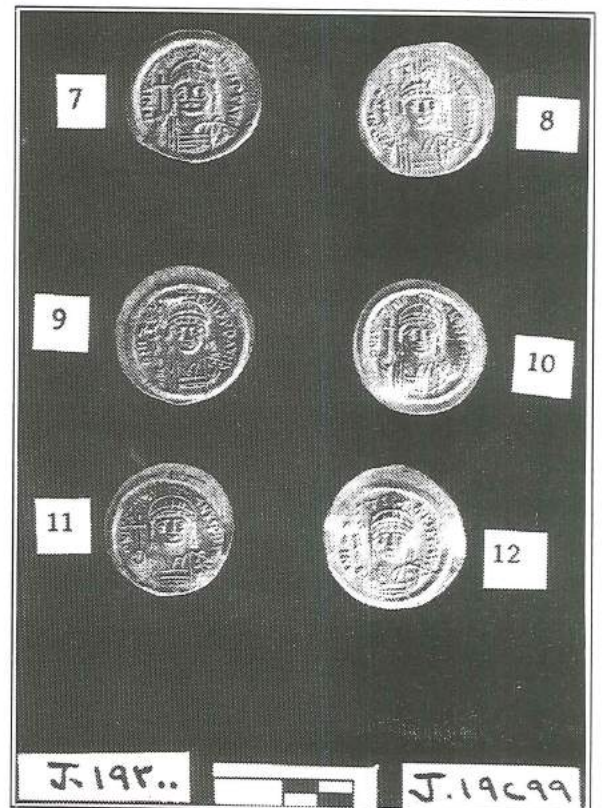
شكل (١) ظهر.



شكل (١) وجهة.



شكل (٢) ظهر.



شكل (٢) وجهة.

تتمة جدول رقم (٥)

مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣	دينار ذهب	٢,١٥	٤,٣٥	J١٩٣٠٢/٤٢
مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣	دينار ذهب	٢,٠٦	٤,٤٧	J١٩٣٠٢/٤٣
مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣	دينار ذهب	٢,٠٧	٤,٤٩	J١٩٣٠٢/٤٤
مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣	دينار ذهب	٢,١١	٤,٣٦	J١٩٣٠٢/٤٥
مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣	دينار ذهب	٢,٠٧	٤,٤٩	J١٩٣٠٢/٤٦
الانتصار الممنح واقفاً يرتدي الثوب ينظر إلى اليسار يحمل بيده اليسرى الكرة يعلوها الصليب ويده اليمنى الاكليل مماثلة للقطعة ٤٧	مماثلة للقطعة ٢٣	نصف دينار ذهب المنتصف العلوي للامبراطور يرتدي التاج ويلبس الثوب الملكي وينظر إلى اليمين	١,٨٢	٢,٢٢	J١٩٣٠٢/٤٧
الصليب منفرداً يتوسط القطعة	مماثلة للقطعة ٤٧	نصف دينار ذهب	١,٨٤	٢,١٦	J١٩٣٠٢/٤٨
	المنتصف العلوي للامبراطور يرتدي التاج ويلبس الثوب الملكي ينظر إلى اليمين	ثلث دينار ذهب	١,٧١	١,٣٥	J١٩٣٠٢/٤٩

جدول رقم (٦) الامبراطور فوكاس ٦٠٢-٦١٠ م

الظهر	الوجه	الفئة والنوع	القطر	الوزن	الرقم الأردني
الملك الممنح واقفاً يرتدي الثوب ينظر إلى الأمام بيده اليمنى الصليب الطويل واليسرى يحمل الكرة وفوقها الصليب	المنتصف العلوي للامبراطور ينظر إلى الأمام وهو ملتحي الوجه يرتدي التاج يعلوه الصليب يلبس الدرع ويحمل بيده اليمنى الصليب	دينار ذهب	٢,١٤	٤,٢٧	J١٩٣٠٣/٥٠
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٥	٤,٥٢	J١٩٣٠٣/٥١
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٤٦	J١٩٣٠٣/٥٢
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٣٤	J١٩٣٠٣/٥٣
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٥٠	J١٩٣٠٣/٥٤
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٢٠	J١٩٣٠٣/٥٥
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٤٢	J١٩٣٠٣/٥٦
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٦	٤,٤٨	J١٩٣٠٣/٥٧
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٢٠	٤,٤١	J١٩٣٠٣/٥٨
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٨	٤,٤٨	J١٩٣٠٣/٥٩
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٣	٤,٤٤	J١٩٣٠٣/٦٠
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٢٥	٤,٤٣	J١٩٣٠٣/٦١
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٢	٤,٤٧	J١٩٣٠٣/٦٢
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٥	٤,٣١	J١٩٣٠٣/٦٣
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٨	٤,١٨	J١٩٣٠٣/٦٤
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٤	٤,٣٧	J١٩٣٠٣/٦٥
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٤٣	J١٩٣٠٣/٦٦
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠٦	٤,٤٨	J١٩٣٠٣/٦٧
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,٠١	٤,٣١	J١٩٣٠٣/٦٨
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	١,٩٥	٤,٤٩	J١٩٣٠٣/٦٩
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	١,٩٢	٤,٥٠	J١٩٣٠٣/٧٠
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	٢,١٠	٤,٤٨	J١٩٣٠٣/٧١
مماثلة للقطعة ٥٠	مماثلة للقطعة ٥٠	دينار ذهب	١,٩٦	٤,٤٩	J١٩٣٠٣/٧٢
صورة الصليب منفرداً	المنتصف العلوي للامبراطور ينظر إلى اليمين يرتدي التاج ويلبس الدرع الملكي	ثلث دينار ذهب	١,٥٧	١,٤٢	J١٩٣٠٣/٧٣

الرقم الأردني	الوزن	القطر	الفئة والنوع	الوجه	الظهر
J1٩٣٠١/١٧	٤,٤٨	٤,١٧	دينار ذهب	النصف العلوي للامبراطور يرتدي الخوذة ويلبس الدرع الملكي يحمل بيده اليمنى الصليب	الملاك المجنح رمز الانتصار يقف مواجهاً ويرتدي الثوب الملكي ويمسك بيده الصليب الطويل ويحمل بيده اليسرى كرة يعولها الصليب.
J1٩٣٠١/١٨	٢,٢٢	١,٨٥	نصف ذهب	النصف العلوي للامبراطور ينظر إلى اليمين يرتدي التاج ويلبس الثوب الملكي	كرة يعولها الصليب
J1٩٣٠١/١٩	١,٤٢	١,٥٦	ثلث ذهب	النصف العلوي للامبراطور يرتدي التاج وينظر إلى اليمين ويلبس الثوب الملكي	الصليب في الوسط منفرداً
J1٩٣٠١/٢٠	١,٤٤	١,٦٢	ثلث ذهب	مماثلة للقطعة ١٩	مماثلة للقطعة ١٩
J1٩٣٠١/٢١	١,٣٩	١,٦١	ثلث ذهب	مماثلة للقطعة ١٩	مماثلة للقطعة ١٩

الرقم الأردني	الوزن	القطر	الفئة والنوع	الوجه	الظهر
J1٩٣٠٢/٢٢	٤,٢٩	٢,١٣	دينار ذهب	النصف العلوي للامبراطور ينظر إلى الأمام ويرتدي التاج المجوهر ويلبس الدرع يحمل بيده اليمنى الصليب	الملاك المجنح ينظر إلى الأمام ويرتدي الثوب ويحمل بيده اليمنى الصليب الطويل وبيده اليسرى كرة يعولها الصليب
J1٩٣٠٢/٢٣	٤,٢٨	٢,١٠	دينار ذهب	النصف العلوي للامبراطور ينظر إلى الأمام يرتدي الخوذة وعليها الريش يلبس الدرع الملكي ويحمل بيده اليمنى الصليب	الملاك المجنح ينظر إلى الأمام يرتدي الثوب يحمل بيده اليمنى الصليب الطويل وبيده اليسرى الكره يعولها الصليب
J1٩٣٠٢/٢٤	٤,٤٣	٢,١١	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٢٥	٤,٤٦	٢,١٦	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٢٦	٤,٤٧	٢,١٦	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٢٧	٤,٣١	٢,١١	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٢٨	٤,٠٨	٢,١٠	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٢٩	٤,٤٨	٢,١٧	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٠	٤,٤٨	٢,١٣	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣١	٤,٥٠	٢,١٤	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٢	٤,٠٦	٢,٠٨	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٣	٤,٤٧	٢,١٦	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٤	٤,٤٨	٢,١٩	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٥	٤,٤٢	٢,١٥	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٦	٤,٢٨	٢,١١	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٧	٤,٤٩	٢,٠٨	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٨	٤,٣٠	٢,١١	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٣٩	٤,٥٢	٢,٠٨	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٤٠	٤,٣٦	٢,٠٨	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣
J1٩٣٠٢/٤١	٤,٤٩	٢,٠٥	دينار ذهب	مماثلة للقطعة ٢٣	مماثلة للقطعة ٢٣

جدول رقم (١) الامبراطور انستازيوس ٤٩١-٥١٨م

الرقم الأردني	الوزن	القطر	الفئة والنوع	الوجه	الظهر
١٩٢٩٩/١	٤,٤٨	٢,١٣	دينار ذهب	النصف العلوي للامبراطور ثلاثة أرباع الوجه يرتدي الخوذة وعليها الريش ويلبس الدرع. يمسك بيده الرمح الذي يمتد خلف رأسه.	رمز الانتصار تبدو واقفة تنظر إلى اليسار. بيدها اليمنى تحمل الصليب الطويل وترتدي الثوب الملكي.

جدول رقم (٢) الامبراطور جستينان الأول ٥٢٧-٥٦٥م

الرقم الأردني	الوزن	القطر	الفئة والنوع	الوجه	الظهر
J١٩٣٠٠/٣	٤,٤٩	٢,٢٥	دينار ذهب	النصف العلوي للامبراطور وجهه إلى الأمام يحمل بيده اليمنى الصليب يلبس الدرع ويرتدي الخوذة.	الملاك المجنح يرتدي الثوب ينظر إلى الأمام بيده اليمنى يحمل الصليب الطويل وبيده اليسرى يحمل الصليب المجوهر.
J١٩٣٠٠/٤	٤,٣٨	٢,١٢	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/٥	٤,٤٩	٢,٠٥	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/٦	٤,٤٩	٢,٠٠	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/٧	٤,٣٣	٢,١٠	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/١٠	٤,٥١	٢,١٠	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/١١	٤,٤٧	٢,٠٠	دينار ذهب	مماثلة للقطعة ٣	مماثلة للقطعة ٣
J١٩٣٠٠/١٣	٢,١٣	١,٩٠	نصف ذهب	النصف العلوي للامبراطور ينظر إلى اليمين يرتدي التاج ويلبس الثوب الملكي	رمز الانتصار تجلس متكئة إلى الدرع وعليها العباءة وتحمل بيدها الترس. يغطي نصفها السفلي الثوب الملكي وأمامها الصليب مماثلة للقطعة ١٣
J١٩٣٠٠/١٤	٢,١٨	١,٨٠	نصف ذهب	مماثلة للقطعة ١٣	مماثلة للقطعة ١٣

جدول رقم (٣) الامبراطور جستين الثاني ٥٦٥-٥٧٨م

الرقم الأردني	الوزن	القطر	الفئة والنوع	الوجه	الظهر
J١٩٣٠٠/٢	٤,٥٠	٢,٠٢	دينار ذهب	النصف العلوي للامبراطور وجهة إلى الأمام يرتدي الخوذة يعولها الريش ويلبس الدرع يمسك بيده اليمنى كره يعولها رمز الانتصار	رمز الانتصار تبدو جالسة على العرش بيدها اليمنى الرمح وبيدها اليسرى كرة يعولها الصليب. ويكشف ثوبها الملكي عن ساقها اليمنى
J١٩٣٠٠/٨	٤,٣٧	٢,١٠	دينار ذهب	مماثلة للقطعة ٢	مماثلة للقطعة ٢
J١٩٣٠٠/٩	٤,٣٧	٢,١٠	دينار ذهب	مماثلة للقطعة ٢	مماثلة للقطعة ٢
J١٩٣٠٠/١٢	٤,٤٧	٢,٢٠	دينار ذهب	مماثلة للقطعة ٢	مماثلة للقطعة ٢
J١٩٣٠٠/١٥	١,٤٢	١,٦٣	ثلث دينار ذهب	النصف العلوي للامبراطور يرتدي التاج ويلبس الثوب الملكي ينظر إلى اليمين	رمز الانتصار ترتدي الثوب وتحمل بيدها اليمنى الاكليل وبيدها اليسرى الكرة يعولها الصليب.
J١٩٣٠٠/١٦	١,٣٤	١,٧٥	ثلث دينار ذهب	مماثلة للقطعة ١٥	مماثلة للقطعة ١٥

المراجع

- القسوس، نايف والطراونة، خلف
١٩٩١ مسكوكات العالمين القديم والأسلامي، عمان، البنك العربي.
العريني، السيد الباز
١٩٨٢ الدولة البيزنطية ٣٢٣-١٠٨١، بيروت، دار النهضة العربية.

Bibliography

Price, M. J. (ed.)

1980 *Coins; an illustrated Survey 650 BC to the Present day.* London: the Hamlyn Publishing group.

Sear, D. R.

1974 *Byzantine Coins,* London.

Worth, W.

1908 *Catalogue of the Imperial Byzantine Coins in the British Museum.* Vol. 1, London.

فلا يمكن أن تكون هذه المسكوكات بعددها الكبير وشبه الدينانير الذهبية فيها إلا أنها تمثل ثروة طائلة في ذلك الزمن. ولا شك أن صاحبها كان يمتلك اقطاعية زراعية مزدهرة من تلك الاقطاعيات التي انتشرت في ظل الاضطراب السياسي والديني الذي ساد بداية العصر البيزنطي.

ولعل الاقطاعية قد بلغت أوج ازدهارها في العقد الأخير من القرن السادس والعقد الأول من القرن السابع أي في نهاية فترة حكم موريس تيبيريوس الذي حكم بين عام ٥٨٢-٦٠٢م وبداية عهد فوكاس ٦٠٢-٦١٠م. والدليل على ذلك هو زيادة عدد قطع العملة نسبة إلى عدد سنوات حكم كل امبراطور كلما اتجهنا نحو نهاية عهد فوكاس. فنسبة ادخار أو تجميع القطع الذهبية التي عثر عليها في عبدون إلى عدد سنوات حكم كل امبراطور كانت على النحو التالي:

في عهد أول حكام الفترة الانتقالية وهو انستازيوس بلغت حوالي ٠,٣٧ وفي عهد جستين الأول لم تسجل شيئاً وفي عهد جستينان بلغت ٠,٢٤ وفي عهد جستين الثاني ١,٥ وفي عهد تيبيريوس ١,٢٥ وفي عهد موريس تيبيريوس ١,٤ وفي عهد فوكاس بلغت النسبة ٣ قطع لكل سنة. وسبب ارتفاع هذه النسبة في عهد فوكاس بهذا الشكل الكبير له تفسير واضح هو أن أوج ازدهار هذه الاقطاعية كان في فترة حكم هذا الامبراطور فكان من الطبيعي أن تتجمع أعداد وفيرة من الذهب الذي سك في عهده رغم وجود تداول لمسكوكات الأباطرة الذين سبقوه.

ولا نستبعد احتمالية تخلص صاحب الاقطاعية من المسكوكات الأقدم عهداً واستبدالها بمسكوكات فوكاس وموريس تيبيريوس الأحدث. ولكن على جميع الأحوال هذا لا يلغي الاستنتاج الأقوى بأن الاقطاعية ازدهرت في العقدين الأخيرين السابقين للاحتلال الفارسي للمنطقة.

فالانقطاع المفاجيء إذاً في تجميع المسكوكات وعدم وجود أية قطعة للامبراطور هرقل الذي حكم في ٦١٠م يؤكد فترة هجران الاقطاعية نتيجة الأحداث السياسية والعسكرية التي اجتاحت الأطراف الشرقية من الدولة البيزنطية وتمثلت بسقوط بلاد الشام وفلسطين واستباحة المقدسات المسيحية في القدس سنة ٦١٢م.

يزيد عليان

دائرة الآثار العامة

وعليها الريش أو مرتدياً التاج وعلى ظهر الدينار رسم الملاك المجنح واقفاً وهو يحمل بيديه الصليب الطويل والقصير. في حين رسمت صورة الامبراطور على وجه النصف دينار وعلى وجه الثلث وهو ينظر إلى اليمين ويرتدي التاج والثوب الملكي وعلى الظهر رسم الصليب منفرداً. (جدول ٥، وشكل ٤ قطعة رقم ٢٢-٢٤، والأشكال ٥-٨ القطع رقم ٢٥-٤٩).

أما آخر عهد الفترة المتقدمة من العصر البيزنطي فقد كانت تتمثل في فترة حكم الامبراطور فوكاس الذي حكم بين ٦٠٢-٦١٠م. وقد امتازت فترة حكمه بالاضطراب البالغ وساد الارهاب والرعب وأخذت الدولة بالتفكك والانحيار. وانتشر الفساد حتى بلغ الجهد بالناس أن قبلوا بتمرد هرقل حاكم مصر ونصبوه امبراطوراً عليهم عام ٦١٠م (العريني، ١٩٨٢: ص ١١٢). ومع ذلك فقد استطاع فوكاس أن يترك بصماته على اصدارات العملة منذ توليه الحكم، وسك أنواعاً كثيرة من النقد من دور السك المختلفة مثل كارتاج ونيكوميديا وسيزكوس وثياسالونيك والاسكندرية، ورافينا وكثيراً ما كانت الامبراطورة زوجته تظهر إلى جانبه على وجه العملة. وقد تميزت صورته دائماً بوجهه الملتحي وعلى رأسه التاج يعلوه علامة الصليب (Worth 1908).

وعثر في مجموعة عبدون على أربع وعشرين قطعة ذهبية منها ثلاث وعشرون قطعة من فئة الدينار وواحدة فقط من فئة الثلث. وقد تشابهت الدينانير جميعها في صورة الوجه والظهر حيث ظهر على الوجه النصف الأعلى للامبراطور يرتدي التاج المرصع يعلوه الصليب ويرتدي أيضاً الدرع وقد بدت اللحية واضحة على وجهه بينما برزت صورة الملاك المجنح بمواصفاته المعهودة وهو ينظر إلى الأمام ويحمل بيده اليمنى الصليب الطويل وباليسرى الصليب فوق الكرة. أما على الثلث فقد ظهر على الوجه الامبراطور فوكاس ينظر جانباً بينما رسم على الظهر الصليب منفرداً في الوسط. (جدول ٦ والأشكال ٩-١٢ القطع من ٥٠-٧٣).

الخلاصة

نلاحظ من خلال دراسة المسكوكات الذهبية التي عثر عليها في عبدون أنها تمثل بوضوح تلك الفترة الحساسة من تاريخ العصر البيزنطي المتقدم أو الفترة الانتقالية من الدولة الرومانية إلى الدولة البيزنطية.

على الظهر رمز الانتصار يقف حاملاً الإكليل والصليب. (جدول ٤، شكل ٣، قطعة رقم ١٥، ١٦).
وخامس أباطرة العصر المبكر للامبراطورية البيزنطية هو تيبيريوس الذي حكم بين ٥٧٨-٥٨٢م وهي فترة حكم قصيرة نسبياً، وقد عثر في عبدون على خمس قطع تمثل طرز مسكوكاته في المجموعة، دينار ذهبي واحد وقطعة من فئة النصف وثلاث قطع من فئة الثلث. ومن أهم الصفات التي تميزت بها مسكوكات تيبيريوس هو رسم الصليب منفرداً أو على أدراج ثلاث أو فوق كرة وذلك على ظهر القطع. (Sear, 1974: 12) وجميع القطع ضرب القسطنطينية وقد ظهرت صور الامبراطور تيبيريوس على وجه المسكوكات الخمس بذات المواصفات المعهودة للأباطرة الأربعة السابقين الذكر بينما تميز ظهر المسكوكات برسم الملاك المجنح رمز الانتصار ينظر إلى الأمام ويحمل بيده اليمنى الصليب الطويل المعقوف أعلاه ويحمل باليسرى الصليب فوق الكرة وهذا يمثل على قطعة الدينار. أما على النصف فقد ظهر الصليب منفرداً فوق الكرة على ظهر القطعة في حين رسم الصليب منفرداً على ظهر الأثلاث الثلاثة. (جدول رقم ٤، شكل ٣، قطعة رقم ١٧-١٨، وشكل ٤ قطعة رقم ١٩-٢١).

ومن دور السك في عهد تيبيريوس هي ثياسلونيك ونيكوميديا وسيزكوس وانيوخ والاسكندرية وكارتاج ورافينا.

أما موريس تيبيريوس الذي حكم بين ٥٨٢-٦٠٢م فقد سك جميع أنواع العملة وفئاتها المعهودة. ورغم طول فترة حكمه نسبياً إلا أن الدولة البيزنطية ظلت تراوح في نهجها القديم بالتعامل مع أعدائها وظروفها الاقتصادية والسياسية. وقد انتشرت الاقطاعات الزراعية وساد الفساد المالي والإداري وتعاضم تهديد الفرس والبربر واللومبارديين ومع ذلك فقد صدرت المسكوكات من عدة دور للضرب مثل القسطنطينية ونيوسالونيك ونيكوميديا وانيوخ والاسكندرية وكارتاج وتيرسون ورافينا (العريني، ١٩٨٢: ص ١٠٢-١٠٦).

وقد عثر في مجموعة عبدون على ثمان وعشرين قطعة ذهبية تحمل اسم موريس تيبيريوس وهو أكبر رقم يحمل اسم امبراطور من أباطرة العصر المتقدم للدولة البيزنطية من مجموعة عبدون. وجميعها ضرب القسطنطينية وقد بلغ عدد الدنانير الذهبية خمسة وعشرين ديناراً بينما بلغ عدد القطع من فئة النصف دينار قطعتين ومن فئة الثلث قطعة واحدة.

وقد تشابهت أوجه الدنانير الخمسة والعشرون في طرزها حيث يظهر موريس تيبيريوس مرتدياً الخوذة

متشابهتان تماماً حيث ظهر الامبراطور على وجه القطعة وهو يرتدي الثوب الملكي والتاج وينظر إلى اليمين، وأما على ظهر القطعة فظهر الملاك المجنح رمز الانتصار يجلس متكئاً إلى الدرع يحمل بيده الترس وقد غطى نصفه السفلي الثوب. وظهر أمامه الصليب (جدول ٣، شكل ٣، قطعة رقم ١٣، ١٤).

أما في عهد جستين الثاني ٥٦٥-٥٧٨ رابع أباطرة الفترة المتقدمة من العصر البيزنطي فقد طرأ تغيير على مساحة الامبراطورية البيزنطية حيث ورث هو والأباطرة الذين من بعده دولة مترامية الأطراف تزح تحت مشاكل اجتماعية واقتصادية عديدة وقد ازدادت سيطرة أصحاب النفوذ المالي والاقتصادي على مقدرات الدولة مما سهل من نجاح الأعداء في الغرب من اللومبارديين ومكنهم من إسقاط هذا الجزء من الدولة ومع ذلك فقد ظل الامبراطور في الشرق يعتبر الحاكم الشرعي للامبراطورية والأب الحامي للمظاهر المسيحية. وفي عهد جستين الثاني تجددت الحروب مع الفرس لرفضه دفع الجزية المستحقة التي أقرها جستينان وفي عهده أيضاً تقلصت دور السك مرة أخرى وأصبحت أهم الاصدارات تسك في القسطنطينية ونياسلونيك ونيكوميديا وانيوخ وكارتاج (Sear, 1974: 82).

وأكثر علامة كانت تميز مسكوكات جستين الثاني هو إدخاله مشهد الجلوس على العرش على ظهر العملة حيث استبعدت رموز الملاك المجنح التي كانت سائدة في عهد جستينان وأعيد تصوير رمز الانتصار الانثوي وذلك من أجل تخليد اسم القسطنطينية وكذلك من أجل تمجيد الصليب (Sear, 1974: 13).
والميزة الثانية لمسكوكات جستين الثاني أنها ضمت صورة صوفيا زوجة الامبراطور جنباً إلى جنب مع صورته على وجه العملة. (Wroth 1908).

ولقد شملت مجموعة عبدون ست قطع من عهد جستين الثاني أربعة منها دنانير ذهبية واثنين من فئة الثلث وجميعها من ضرب القسطنطينية.

وقد تميزت دنانير جستين الثاني في مجموعة عبدون بأنها تظهر على وجه القطعة صورة جستين وهو يرتدي الخوذة والدرع ويحمل الصليب في حين رسمت صورة رمز الانتصار الانثوي على ظهر القطعة وهي تجلس إلى العرش وتحمل بيدها اليمنى الرمح وبيدها اليسرى الكرة يعلوها الصليب بينما كشف ثوبها عن ساقها اليمنى. (جدول ٤، شكل ١ قطعة رقم ٢ وشكل ٢ قطعة رقم ٨، ٩، ١٢)

أما القطعتان من فئة الثلث فيظهر جستين ناظراً إلى اليمين ومرتدياً التاج والثوب الملكي بينما رسم

أن عظمة انجازاته التي انعكست على نواحي الحياة جميعها لم تنعكس بنفس الدرجة على سك النقود.

وقد اهتم جستنيان بأظهار رمز الانتصارات الباهرة التي حققها في النقوش والمباني والفسيفساء والمنحوتات. وكذلك ظهر على العملة هذا التوجه حيث برزت رموز الانتصار جلية على ظهر القطع النقدية وترسخ رسم الملاك المجنح ورمز الانتصار على ظهر العملة استمراراً للنهج السابق في عهد جستين.

وأكثر ما يلفت النظر أن زوجة الامبراطور ثيودورا التي كانت تتمتع بتأثيرها السياسي والتي ظهرت في النقوش الحجرية ورسوم الفريسكو والفسيفساء والتماثيل جنباً إلى جنب مع الامبراطور لم تظهر صورتها على القطع النقدية أو ما يشير إليها (Wroth 1908).

إن أهم ما يميز عصر جستنيان في موضوع سك النقود أنه أعاد افتتاح الكثير من دور السك التي كانت قد اختفت مع سقوط الجانب الغربي من الامبراطورية. وأنه قد تم سك واصدار كل أنواع النقد في زمنه ولم يطرأ تغيير كبير على اصدار العملة الذهبية في فئاتها الثلاث: الدينار، والنصف، والثلث. ولكن أصبح هناك تنوع في دور السك التي تصدرها فبالإضافة إلى القسطنطينية وثياسلونيك صدرت النقود الذهبية والفضية من كارثاج وروما ورافينا وقرطاجنه وربما صدرت من انتيوخ أيضاً. وصدرت العملة النحاسية من أربع عشرة داراً للسك توزعت على مساحة الامبراطورية الشاسعة (Sear, 1974: 18).

إن أكثر ما يسجل لجستنيان في موضوع النقد أنه اهتم بتنظيم اصدار المسكوكات وخاصة البرونزية منها حيث اعتمد بعد ١٢ سنة من حكمه على وضع رموز على قطع العملة تشير إلى سنة الضرب وبهذا أمكن تتبع الاصدارات النقدية في عهده سنة بسنة (Worth 1908) وقد تم العثور على تسع قطع ذهبية في مجموعة عبدون تعود لفترة حكم جستنيان، سبعة منها من فئة الدينار واثنين من فئة النصف دينار وجميع القطع ضرب القسطنطينية. وقد تشابهت الدنانير السبعة في الشكل تماماً مع بعضها البعض حيث ظهر على وجهها صور جستنيان يرتدي الخوذة وينظر إلى الأمام ويحمل بيده اليمنى الصليب ويلبس الدرع بينما نقش الملاك المجنح رمز الانتصار على ظهر القطعة وهو يرتدي الثوب ويحمل بيده اليمنى الصليب الطويل وباليسرى يحمل الصليب فوق الكرة. (جدول ٢، شكل ١، قطعة رقم ٢-٦ وشكل ٢ قطعة رقم ٧، ١٠، ١١).

أما القطعتان من فئة النصف دينار فهما

اليسار مرتدية الثوب الملكي (جدول ١، شكل ١). أما جستين الأول ثاني أباطرة الفترة المتقدمة من العصر البيزنطي فقد استمر سك العملة في زمنه على نهج سلفه ولكن مع فروقات بسيطة في سك الدينار الذهبي حيث ظهر الملاك المجنح على ظهر الدينار بشكل أساسي بدلاً من رمز الانتصار الانثوي الذي كان شائعاً.

وقد حدث كذلك في عهده أن تم تصوير وجه اثنين من الأباطرة على وجه العملة حيث ظهرت صورته إلى جانب صورة خلفه جستنيان (Sear, 1974: 48)

أما في عهد جستين الأول فقد أعيد افتتاح دور السك في سيزكوس والاسكندرية وقد تم في عهده أيضاً لأول مرة ضرب ثياسلونيك العملة النحاسية. وللأسف فإن مجموعتنا المكتشفة في عبدون لا تضم أية قطعة من عهد هذا الامبراطور.

أما في عهد جستنيان الأول ٥٢٧-٥٦٥ ثالث أباطرة الفترة المتقدمة من العصر البيزنطي فقد وقعت أعمال بالغة الأهمية في الدولة البيزنطية. فجستنيان قائد فذ وضع نصب عينيه إعادة أمجاد الامبراطورية الرومانية وإعادة ضم الجناح الغربي وعاصمته روما إلى جسم الدولة. فخاض من أجل ذلك حروباً مريعة وأنفق أموالاً طائلة على الجيوش والعساكر، وفرض ضرائب كثيرة حتى أجهد الدولة وجعلها ترزح تحت أعباء مالية خطيرة (المريني، ١٩٨٢: ص ٦٥) وقد اضطر إلى عقد معاهدات مع عدو الدولة البيزنطية الأكبر وهم الفرس فعهد إلى توقيع هدنة يدفع بموجبها إلى كسرى أنو شروان ملك الفرس أموالاً طائلة وذلك ليتفرغ لأعمال الحرب ضد أعدائه في الغرب حتى تمكن أخيراً من فرض سيطرته على كامل الامبراطورية. وحرر روما والأجزاء الغربية برمتها من يد القوط والمتبريرين ودانت له أجزاء كبيرة من شمال افريقيا أيضاً وأصر جستنيان رغم اتساع أراضي الامبراطورية على جعل الحكم مركزياً في قبضته وصار البحر الأبيض المتوسط في عهده بحيرة بيزنطية (Sear, 1974: 52) وبهذا يكون جستنيان قد ترك لخلفه عبئاً سياسياً واقتصادياً لم يتسنى معالجته فعادت الامبراطورية تخسر أجزاءها الغربية من جديد وبعض أجزائها في شمال افريقيا في عهد جستين وتيبريوس.

وقد ترك جستنيان بصمات واضحة على جميع نواحي الحياة في الامبراطورية البيزنطية فبنى الكنائس والقلاع والحصون واهتم بنواحي الحياة الفنية والثقافية والدينية. ولكن الشيء الملفت للانتباه

ففي سنة ٤٩٨م أمر باتخاذ النقد النحاسي المعروف بالفلس Folis بعد أن ثبتت قيمته بربطه بالنقد الذهبي وظل هذا النظام معمولاً به لقرون تالية (العريني، ١٩٨٢: ص ٦٠) وقد اتبع انستازيوس سياسة مالية رشيدة إلى جانب الاصلاحات الاقتصادية وترك في خزينة الدولة حوالي ٢٢٠ الف قطعة ذهبية وهي ثروة كبيرة نسبياً في ذلك الزمن الذي تميز بوراثة مشاكل الاضطراب والانتقسام وتراجع الاقتصاد في العهود السابقة.

وفي عصر انستازيوس أيضاً تم تصنيف المسكوكات تصنيفاً دقيقاً فهناك الدينار الذهبي وهناك نصف الدينار وكذلك ثلث الدينار وتم ضرب الفضة أيضاً ولكن بكميات قليلة (القسوس والطراونة ١٩٩١: ص ٤٢) المليارن وتساوي جزءاً من اثني عشر جزءاً من الدينار الذهبي وهناك السيلكوا وهي تساوي نصف المليارن.

أما العملة النحاسية فقد ضربت بوفرة بالغة وتم تقسيمها كما ذكرنا وربطها بالعملة الذهبية. فمثلاً الفلس المميز بالعلامة M كان يساوي جزءاً من مائة وثمانين جزءاً من الدينار الذهبي (١٨٠/١) وهو يساوي أيضاً ٤٠ نمية. ونصف الفلس K يساوي ٢٠ نمية والربع I كان يساوي ١٠ نميات وأما ثمن الفلس فقد كان يساوي ٥ نميات (Price, 1980: 120).

وقد أفاد هذا التقسيم التحسينات المالية للقرون البيزنطية التالية إلى حد بعيد مع أن اصدارات كثيرة للنقد كانت تخالف هذا النظام، قد شاعت في شمال افريقيا أحياناً حيث صدرت مجموعات نادرة بعضها يساوي ١٢ نمية وبعضها يساوي ٢٢ نمية و ٦ نميات و ٢ نميات (Sear, 1974: 23)

أما عن دور السك الرومانية زمن انستازيوس فقد تعطلت وخاصة تلك التي كانت تعمل في القرن الثاني والثالث والرابع. واعتمد انستازيوس أول حكمه في ضرب العملة على دار السك في ثيوسالونيك والقسطنطينية ثم أدخل للخدمة دارين للسك هما انتيوخ و نيكوميديا وبذلك ينتهي عصر انستازيوس مخلفاً أربعة دور للسك (Sear, 1974: 18).

وقد عثر في مجموعة عبدون الذهبية على قطعة واحدة لانستازيوس من فئة الدينار وتمثل المدرسة التقليدية للسك الخاصة بالنمط الامبراطوري لدار السك في القسطنطينية. حيث ظهر على الوجه صورة انستازيوس وهو يمسك بالرمح الذي يمتد خلف رأسه ويرتدي الخوذة والدرع. في حين نقش على ظهر العملة رمز الانتصار الانثوي تحمل بيدها الرمح وتنظر إلى

حساسة بالنسبة للامبراطورية المسيحية البيزنطية وهي الفترة التي اختلف عليها الكثير من علماء التاريخ حيث سماها البعض بالفترة الرومانية المتأخرة أو العصر البيزنطي المتقدم. وقد اختلفوا أيضاً بتأريخ بداية هذه الفترة فبعضهم من يعتبرها بداية العصر البيزنطي المتقدم مع بداية اعتماد الديانة المسيحية وإنشاء القسطنطينية على أنقاض بيزنطة واعتمادها عاصمة الدولة في عصر قسطنطين ٣٢٠م. ومن المؤرخين من يعتبرها زمن الامبراطور انستازيوس الذي حكم بين ٤٩١ و ٥١٨م والذي قام بالاصلاح النقدي وترتيب الحياة الاقتصادية بداية الفترة المتقدمة للامبراطورية البيزنطية (Worth 1908). في حين رأى آخرون أن انقسام الدولة الرومانية هو تاريخ بداية الفترة الانتقالية أو فترة العصر البيزنطي المتقدم.

وأمام هذا الاختلاف في تحديد بداية العصر المتقدم للدولة البيزنطية فإن الدارسين يكادون يجمعون على نهاية هذه الفترة معتبرين تاريخ استلام هرقل للحكم سنة ٦١٠ هو بداية تشكل ملامح وصيغة الامبراطورية البيزنطية العظيمة التي استمرت تهل من هذه الملامح حتى القرون الوسطى.

ولقد تعرضت الدولة البيزنطية لاضطرابات بالغة وخاصة بعد انقسامها في عام ٤٧٦م ولكن لم يلبث الجزء الشرقي من الامبراطورية الذي اتخذ القسطنطينية عاصمة له أن تغلب على مشاكله الاقتصادية والسياسية والاجتماعية وكون دولة مميزة وقوية حتى صار الحاكم في الشرق يعتبر نفسه امبراطوراً عاماً وزعيماً للعالم المسيحي بأسره. وقد ظل الشغل الشاغل للأباطرة في الشرق هو كيفية إعادة كامل سيطرتهم على جميع أجزاء الامبراطورية الرومانية في الغرب والدفاع عن حدود الدولة.

وقد توافرت في الشطر الشرقي من الامبراطورية عناصر القوة التي مكنتها في النهاية من صيغ الامبراطورية الرومانية بالصيغة البيزنطية (العريني، ١٩٨٢: ص ٥٦) وتعتبر المسكوكات البيزنطية استمراراً للمسكوكات الرومانية إلا أنها تطورت عنها بسرعة وتعتبر أقل جمالاً من المسكوكات الرومانية واليونانية فهي مهمة الصناعة وريثة النقش (القسوس والطراونة ١٩٩١: ص ٤٢).

تغطي المجموعة الذهبية المكتشفة في عبدون الفترة الأولى من العصر البيزنطي منذ عهد انستازيوس ٤٩١م وحتى نهاية عصر فوكاس ٦١٠م. وكما هو معلوم أن انستازيوس Anastasius قد أحدث تغييرات مهمة في موضوع الادارة والاصلاحات المالية.

دراسة موجزة لمسكوكات عبدون الذهبية

اعداد : يزيد عليان

مقدمة

تم اكتشاف موقع أثري بالغ الأهمية في منطقة عبدون - غربي مدينة عمّان - وذلك على أثر أعمال شق إحدى الطرق الرئيسية. حيث تعرض هذا الموقع الأثري لأضرار بالغة أمكن لدائرة الآثار العامة انقاذ جزء كبير منه خلال الموسمين ١٩٩٥ - ١٩٩٦ م.

يمكن اعتبار منطقة عبدون مقراً لمستوطنات زراعية تاريخية عديدة حيث تنتشر آثار العصور المختلفة على جميع التلال والوديان المتاخمة للموقع. وتتسلسل فتراتها من العصر الحديدي حتى العصر الأيوبي المملوكي مروراً بالفترات الرومانية والبيزنطية والأموية.

تميز الموقع الذي تم التنقيب فيه في الموسمين ١٩٩٥-١٩٩٦م بغنى مكتشافته العمرانية وكذلك اللقى الأثرية. وتبين أنه كان عبارة عن مستوطنة زراعية تعود للحقبتين البيزنطية المتأخرة والأموية المبكرة.

ازدهر الموقع بشكله المتميز بوجود معصرة الزيتون ومعاصر العنب المتكاملة في الفترة الأموية في نهاية القرن السابع عندما أعيد إعمار الموقع بعد فترة من الهجران فألغيت بعض المرافق المتواضعة التي كانت تستخدم في عمليات صناعة عصير العنب والزيتون في نهاية الحقبة البيزنطية وأعيد توسيعها وبناء مرافق أكثر تطوراً وسعة.

لقد أمكن تحديد فترة هجران الموقع بوضوح من خلال تتبع المظاهر المعمارية وما طرأ عليها من تغييرات ووظائفية وكذلك من خلال التباين الواضح في اللقى الأثرية وخاصة قطع العملة المتوافقة مع الفترات العمرانية وتغيراتها. ويبدو أن فترة هجران الموقع لم تكن بالفترة الطويلة فهي تبدأ مع بداية التهديد الفارسي الخطير لبلاد الشام وفلسطين في العقد الأول من القرن السابع وتنتهي مع الفتح الإسلامي في العقدين الرابع والخامس من القرن نفسه.

ومن الطريف أنه تم دفن بعض الأجزاء المهمة في فترة إعادة الأعمار دون الالتفات إلى أهمية ما تحويه هذه الأجزاء من لقى وعناصر معمارية. وكان من بين المرافق التي تم إعادة إعمارها المصلى البيزنطي الثاني الذي تم تحويله لغرفة تفيد عمليات التصنيع الغذائي، وتم كذلك ردم خزان الماء تحت أرضيته وتحويل محرابه إلى حوض صغير مبلط بالفخار لتخزين السوائل أو تصفيتها بعد العصر. وقد كان من الغريب

أن يتم العثور على هذه المجموعة الذهبية الكبيرة في الحوض الصغير المردوم تحت أرضية هذا المصلى. ومن خلال النظر في هذه المسكوكات يمكن ملاحظة ما يلي:

أولاً: أن المجموعة كاملة هي من الذهب الخالص (ثلاث وسبعون قطعة) منها إحدى وستون قطعة من فئة الدينار وأربع قطع من فئة النصف دينار وثمانية قطع من فئة الثلث دينار.

ثانياً: تم العثور على المجموعة كاملة في محيط لا يتجاوز النصف متر وفي خزان للمياه تحت أرضية المصلى الغربي للموقع أو الكنيسة الثانية وضمن طبقة عميقة من الطين والحصى والحجارة وأن الخزان الذي وجدت فيه لا يحوي أية قطع نقدية أخرى.

ثالثاً: جميع قطع المسكوكات ترجع لفترات حكم الأباطرة الذين يمثلون الفترة المبكرة أو المتقدمة من العصر البيزنطي والذين حكموا بين عامي ٤٩١-٦١٠م.

رابعاً: يوجد فروقات واضحة في عدد القطع التي تمثل عصر كل امبراطور فقد تم العثور على قطعة واحدة من المجموعة ترجع إلى فترة حكم انستازيوس الذي حكم بين ٤٩١-٥١٨م أما جوستين الأول فلم يعثر على قطع تمثل فترة حكمه في حين عثر على تسع قطع تمثل فترة جستينيان الأول الذي حكم بين ٥٢٧-٥٦٥م وست قطع تمثل فترة جستين الثاني ٥٦٥ - ٥٧٨م وخمس قطع لتيبيريوس ٥٧٨-٥٨٢م وثمان وعشرين قطعة لموريس تيبيريوس ٥٨٢-٦٠٢م وأربع وعشرين قطعة لفوكاس ٦٠٢-٦١٠م.

خامساً: جميع القطع مضروبة في دار السك بالعاصمة البيزنطية القسطنطينية وتكاد تتشابه في أسلوب الرسم والنقش وخاصة وجه العملة التي حملت جميعها صورة النصف الأعلى من الامبراطور يرتدي الخوذة والدرع أو التاج والثوب الملكي.

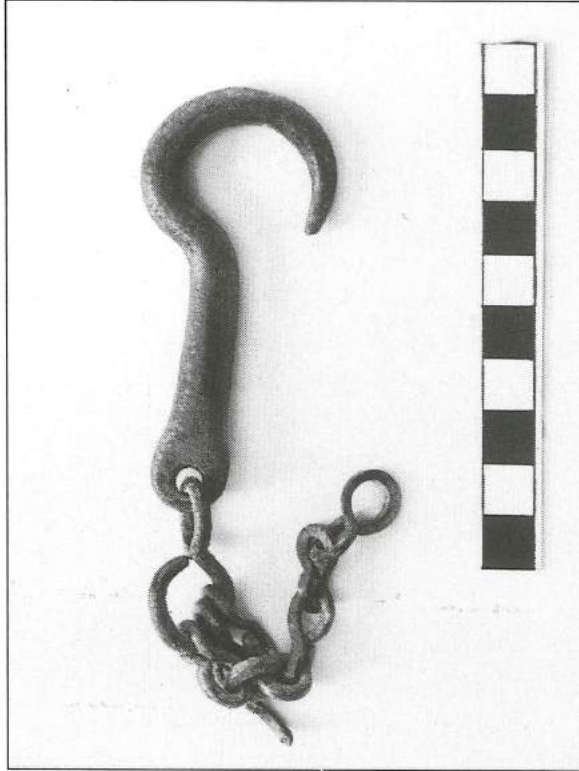
إن أهمية هذه المجموعة الذهبية من النقد البيزنطي تغطي كما ذكرنا سابقاً أكثر الفترات

المراجع العربية

- إبن منظور، أبو الفضل جمال الدين محمد بن مكرم. ١٩٩٠ لسان العرب. المجلد الرابع. دار صادر. بيروت.
- أبو دلو، ربي ١٩٩٤ التقرير النهائي حفزية حوفا الوسطية ١٩٩٢م. حولة دائرة الآثار العامة، المجلد الثامن والثلاثون. ص: ١٩-٥.
- الخصاونة، ناصر ١٩٩٤ تقرير نهائي عن حفزية خربة البرز - سما الروسان ١٩٩٣م. حولية دائرة الآثار العامة، المجلد الثامن والثلاثون. ص: ٢٩-٢١.
- القسوس، نايف والطراونة، خلف. ١٩٩١ مسكوكات العالمين القديم والإسلامي. البنك العربي، عمان.
- كراسنة، وجيه ١٩٩٧ حفزية كنيسة خربة داريا لعام ١٩٩٥م، الزعترة - صمد. حولية دائرة الآثار العامة، المجلد الحادي والأربعون. ص: ٣٦-٢١.

Bibliography

- Al-Muheisen, Z.
1991 Yasileh: A New Site in Northern Jordan. *ADAJ* 35: 341-346.
- Gawlikowski, M. and Musa, A.
1986 The Church of Bishop Marianos. Pp. 137-162 in F. Zayadine (ed.) *Jerash Archaeological Project 1981-1983*, Vol. I. Amman: Department of Antiquities.
- Mittmman, S.
1970 *Beiträge Zur Siedlungs-und Territorialgeschichte des Nördlichen Ostjordanlandes*. Wiesbaden: Otto Harrasswitz.
- Walker, J. et.al
1958 *A Catalogue of the Arab-Byzantine and Post-Reform Umayyad Coins*. The Trustees of the British Museum. London.



شكل (٢٤) خطاف من البرونز لتعليق قطعة معدنية.

وعادل حداد من قسم التصوير في دائرة الآثار العامة، والرسام موفق بطاينة والمصور حسين ديباجة من جامعة اليرموك، والدكتور زيدان كفاقي المدير السابق لمعهد الآثار والأنثروبولوجيا، والدكتورة دومنيك المحيسن لقراءتها النقوش، والسائق خلف الحموري.

اسماعيل ملحم
مكتب آثار لواء الكورة
دائرة الآثار العامة

حوفا الوسطية (أبو دلو ١٩٩٤: ٩-١٩).
٧- بناء على مساحة هذه الكنيسة وأروققتها يمكن تقدير سعتها من المصلين حوالي ١٠٠ شخص على الأقل، وإذا ما ربطنا هذا العدد بعائلاتهم، فهذا يعني أن عدد سكان القرية يتجاوز هذا العدد خمسة إلى ستة أضعاف، مما يشير على أن هؤلاء السكان كان لهم بيوت ومنشآت قريبة، وهذا يعزز ضرورة الاهتمام بهذه المنطقة أثرياً.

تأريخ الكنيسة:

إن الدمار الذي لحق بمبنى الكنيسة ووجود العديد من حجارة البناء ساقطة مباشرة على الأرضية الفسيفسائية ووجود الكسر الفخارية والإبريق الفخاري الكامل الذي عثر عليه في أروقة الكنيسة، إضافة إلى قطعة العملة المؤرخة إلى حوالي ٧٣/٦٩٣م والنقوش الكتابية الثلاثة تشير إلى أن موقع الكنيسة قد هُجر في أعقاب دمار واسع تعرضت له المنطقة والذي يغلب أنه نتيجة زلزال قوي مدمر، وعلى الأرجح زلزال سنة ٧٤٧م في العصر الأموي. وبالتالي يمكن القول أن تأريخ هذه الكنيسة يعود لأواخر العصر البيزنطي وللعصر الأموي أي في أواخر القرن السابع الميلادي وحتى أواسط القرن الثامن الميلادي، وبذلك فهي من الكنائس القليلة في الأردن التي عاصرت العصر الأموي، وفي هذا إشارة إلى التسامح الديني الذي ساد المنطقة في العصر الأموي بين سكانها العرب.

شكر وتقدير

أتوجه بالشكر والتقدير للسادة إبراهيم الحاج حسن الذي أشرف على صيانة وترميم القطع الأثرية المكتشفة، سالم الدعجة، محمد فايز، أسامة جبر،

أن فسيفساء الكنيسة قد رصفت في فترة لاحقة لاستخدام الكنيسة بشكل تجديدات على يد القسيس (كرياكوس) في زمن الكاهن (بيشوب بولص) وهذا يُعطي مؤشراً أن الكنيسة كانت قائمة في مرحلة أولى بأرضية فسيفساء أقدم، وأن التجديدات جاءت تحسیناً في وضع الكنيسة وعمارتها.

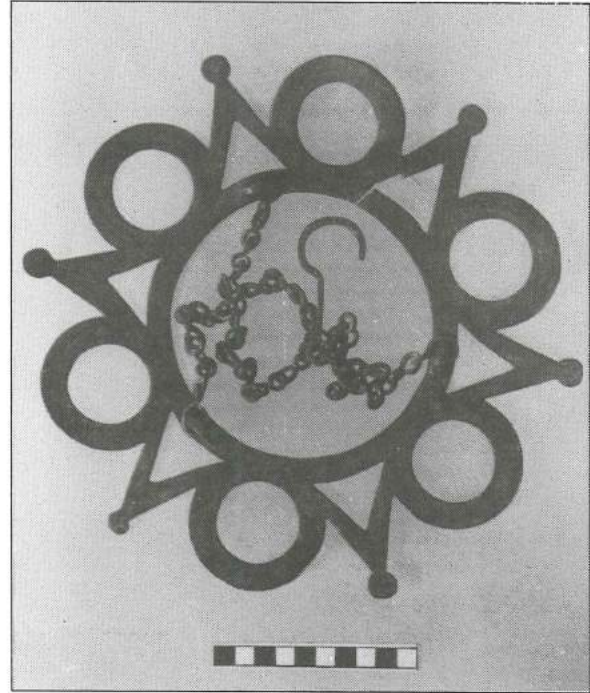
٢- تشير عمليات الترقيع المتعددة في الأرضية الفسيفسائية داخل الأروقة الى طول فترة استخدام الكنيسة بعد رصفها، والى ضعف الحالة الفنية والاقتصادية لمعاصري الفترة اللاحقة التي عملت في عصرهم الترقيعات العشوائية والتي لم يراع فيها أي إبداع، وكانت فقط مجرد ملء فراغات.

٣- إن تركيز موضوع الزخرفة على العناصر الهندسية المختلفة يُعطي دلالة قوية على أن مذهب مستخدم هذه الكنيسة كان من المذاهب الدينية المعارضة لوضع صور روحانية في أرضيات الكنائس حيث لم يُعثر على أي شكل ذي روح.

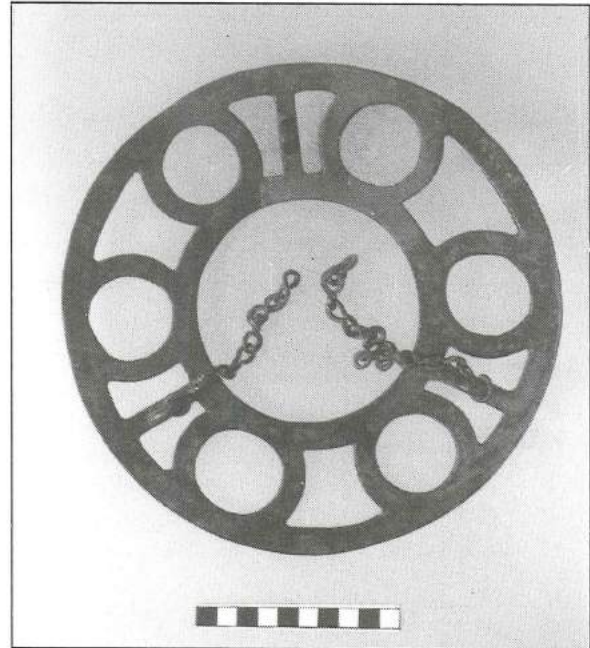
٤- إن دقة الزخارف الهندسية وتنوع أشكالها وألوانها تشير الى الاهتمام البالغ من قبل مستخدم هذه الكنيسة بزخرفتها والى المبالغ المالية التي صُرفت على هذا الإنجاز كثمان مواد وأجور عمال وفنانين، وهذا بالتالي يدل على الوضع المادي الجيد لسكان المنطقة.

٥- إن العثور على كم كبير من حجارة البناء المشذبة منهارة فوق أرضيات الأروقة والهيكل تشير الى أن المبنى كان ذو نمط معماري رفيع وأن القواعد التي تفصل بين الأروقة وعلى الجوانب كانت ترفع أقواس والتي بدورها ترفع السقف. وعثر على بقايا القصاراة البيضاء التي كانت تغطي حجارة الجدران والقواعد وبقايا قصاراة عليها ألوان وبقايا رسومات، مما يشير الى احتمال وجود رسوم مائية (فرسيكو) كانت قائمة على الجدران.

٦- إن إلحاق مدفن في مقدمة البهو الأمامي للكنيسة ووجود ناووس حجري في الجهة الشمالية الشرقية من الكنيسة يشيران الى العناية الدينية ببعض الأشخاص المتوفين والذين ربما كانوا من رجال الدين، حيث ذكر اسم أحدهم في نقوش الهيكل وهو القسيس (سوزيم)، الذي عملت الفسيفساء تخليداً له. أما ظاهرة إلحاق مدافن بالكنائس فقد وجدت في كنائس مختلفة من العصر البيزنطي مثل: كنيسة خربة البرز في سما الروسان (الخصاونة ١٩٩٤: ٢١-٢٦). وكنيسة



شكل (٢٢) حمالة سراج إضاءة (ثريا) من البرونز.



شكل (٢٣) حمالة سراج إضاءة (ثريا) من البرونز.

أن مواقعها أصلية حيث بقيت على حالها منذ تاريخ هجر الكنيسة إثر زلزال عام ٧٤٧م.

الاستنتاجات

في ضوء المكتشفات الأثرية يمكن أن نخرج بعدد من الاستنتاجات:

١- يشير النقشان الواقعان في منطقة الهيكل الى أن



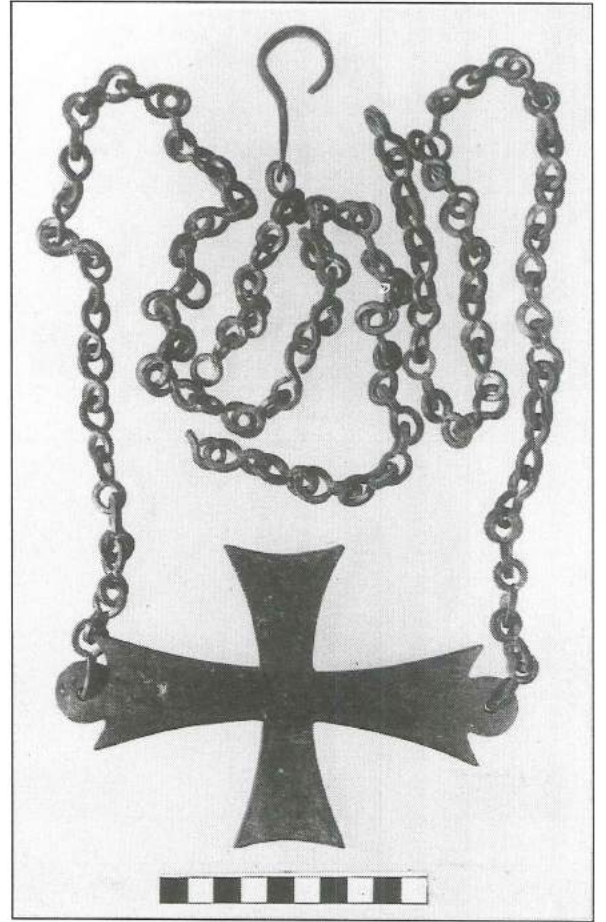
شكل (٢١) صليب ضمن حلقة دائرة برونزية متصل بسلسلة، كان يعلق على الجدران.

قرية الزعتر جنوب مدينة اربد وتؤرخ للقرن السادس الميلادي (كراسنة ١٩٩٧ : ٣٤). وفي كنيسة ماريانوس في جرش وتؤرخ أيضاً للقرن السادس الميلادي (Gawlikowski, M. and Musa, A. 1986: 1962) (شكل ٢٢).

٦- حمالة لسراج إضاءة (ثريا)

عبارة عن قطعة من البرونز دائرية الشكل تمثل حمالة لسراج إضاءة، قطرها ٢٤سم، سمك معدنها ٣سم، مكونة من ستة دوائر صغيرة مفرغة، بين كل دائرة وأخرى تجويف، قطر كل دائرة ٤سم، يتوسط الدوائر الصغيرة والتجاويف دائرة كبيرة مفرغة بقطر ١١سم. يوجد بين الدوائر الصغيرة ثلاث حلقات موزعة في ثلاثة أماكن لتثبيت الجنازير، اثنين منها مفقودان، كما أن خطاف التعليق مفقود. (شكل ٢٣). هذه الحمالة والحمالة السابقة كانتا تعلقان في سقف الكنيسة للإضاءة.

وجدت جميع المكتشفات الأنفة الذكر في أروقة الكنيسة وقريبة من سطح الفسيفساء، مما يشير الى



شكل (٢٠) صليب برونزي ذو سلسلة، كان يعلق بواسطة خطاف على جدران الكنيسة.

في طرفيها ثقبين يتصل بهما جنزير برونزي ذو حلقات صغيرة، طول الجنزير في كل جهة ٥١سم، قطر الحلقة ٩٧سم سمك معدنها ٣سم، يوجد في وسط الجنزير خطاف من المعدن يستعمل للتعليق. وجد مثل هذه القطعة التي يتوسطها الصليب قطعة مشابهة في كنيسة حوفا الوسطية التي تعود الى أواخر القرن الخامس الميلادي والقرن السادس الميلادي (أبو دلو ١٩٩٤ : ١٥) (شكل ٢١).

٥- حمالة لسراج إضاءة (ثريا)

عبارة عن قطعة من معدن البرونز تمثل حمالة لسراج إضاءة، سمك معدنها ٣سم، قطر كل دائرة منها ٤سم، وبين كل دائرة وأخرى مثلث مفرغ برأس دائري صغير عدد المثلثات ستة. يتوسط الدوائر والمثلثات دائرة كبيرة مفرغة بقطر ١٣سم، وعليها ثلاثة حلقات صغيرة لتثبيت ثلاثة جنازير، طول كل جنزير حوالي ١٧سم، تلتقي بخطاف من المعدن للتعليق طوله ٧سم.

وجد مثل هذه القطعة في كنيسة خربة داريا في

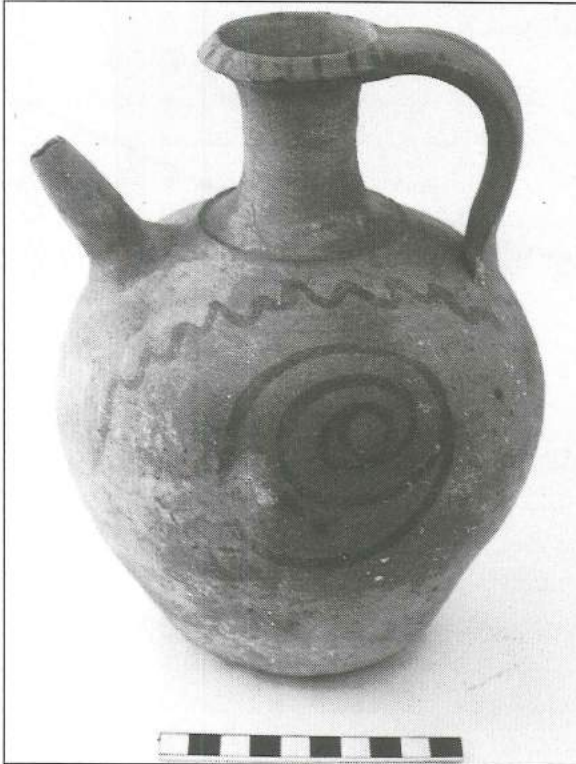


أ. وجه العملة



ب. ظهر العملة

شكل (١٨) قطعة عملة برونزية من عهد الخليفة الأموي عبد الملك بن مروان قبل تعريب العملة.



شكل (١٩) إبريق فخاري من القرن الثامن الميلادي (أموي).

البهو الأموي الخارجي للكنيسة. لوحظ أن طبقة الفسيفساء قد وضعت على طبقة ملاط رقيقة أسفلها طبقة رقيقة أيضاً من الرمل الأبيض ثم طبقة من الصخر الطبيعي أو التراب. وقد أدت هذه التركيبة إلى هبوط الأرضيات في بعض المناطق بسبب أساسها الترابي.

المكتشفات الأثرية الأخرى

تم الكشف أثناء التنقيب عن عدة لقي أثرية من مخلفات الكنيسة وتعود لتاريخ انهدامها إثر تعرضها لزلزال عام ٧٤٧م في العصر الأموي، وفيما يلي وصفاً لهذه القطع:

١- قطعة عملة برونزية

قطر هذه القطعة ٢,٢ سم. يمثل الوجه صورة الامبراطور البيزنطي وعلى جانبه ولديه. والظهر عليه حرف M يعلوه صليب محور. كتب على نطاق القطعة اسم دار الضرب باللغة العربية وهي (طبرية)، وباللغة اليونانية وهي (THBEPHIA ΔO). تؤرخ هذه العملة لعهد الخليفة الأموي عبد الملك بن مروان في فترة ما قبل التعريب حوالي ٧٣هـ. (القسوس والطراونة ١٩٩١: ٥٤، ٥٥)، (Walker 1958: xevi) شكل (١٨).

٢- إبريق فخاري

وهو كامل الشكل ذو لون بني فاتح، الجسم منتفخ له فوهة دائرية أسفلها خط دائري غائر، وله صنوبر بارز، وقاعدة حلقيه مجوفة، على شفة فوهته خطوط طولية قصيرة، وعلى جسمه الخارجي من الجهتين زخرفة لخط متموج وخط حلزوني متداخل، ارتفاع الإبريق ٢٣ سم، ويؤرخ للقرن الثامن الميلادي، العصر الأموي (شكل ١٩).

٣- صليب برونزي

صليب ذو أربعة أطراف، سمك المعدن ٤ سم، طول الصليب في طرفيه الطويلين ١٧ سم، طول الصليب في طرفيه القصيرين ١٥، ١١ سم، يوجد في طرفين من أطرافه ثقبين دائريين، يتصل بكل ثقب منهما طرف جنزير برونزي تتصل حلقاته ببعضها البعض وهي من الحجم الصغير، طول الجنزير في كل طرف على حدة ٧٥ سم بتوسطه خطاف من المعدن للتعليق، وعلى الأغلب يُعلق هذا الصليب على جدران الكنيسة (شكل ٢٠).

٤- صليب برونزي

عبارة عن صليب يتوسط حلقة دائرية من البرونز

بمستطيل كبير ٣٦٠سم × ٨٧٠سم تتوزع فيه أشكال معينة يتوسطها مربعات صغيرة. أما ألوان المكعبات التي استخدمت في الرواق الأوسط فهي الأحمر، الأصفر، البرتقالي، الرمادي، إضافة إلى اللون الأبيض.

٤- فسيفساء الحجرات الملحقة بالكنيسة

عُثر على بقايا فسيفساء بيضاء اللون في الحجرة الشرقية / الجنوبية المجاورة للكنيسة، كما عُثر على رقعة مماثلة في الناحية الشرقية / الشمالية المجاورة للكنيسة. وعُثر أيضاً على رقعة متناثرة من الفسيفساء ذي المكعبات الصغيرة الحجم ٨، ٨ × ٨، ٥ سم وهي أصغر حجماً من المكعبات الفسيفسائية المستخدمة داخل الأروقة، ورغم تعرض الجزء الموجود فيها للتدمير، وهو الجزء الجنوبي من الكنيسة، إلا أنها ولحسن الحظ احتفظت بزخرفة لشجيرة ذات ثمر ربما كانت شجيرة تفاح، يجاورها مثلثات ملونة أحدها فيها خطوط متكسرة بشكل أمواج، استخدمت الألوان الأحمر، البرتقالي، الأصفر، الرمادي. ويجاور هذه الزخرفة نقش كتابي تعرضت بعض أجزائه للتدمير مما حال دون قراءة واضحة له، غير أنه يُفهم مما تبقى من كلماته أنه نقش تذكاري يُمجد الرب، ويعود لنهاية القرن السابع الميلادي، وهذا النقش لا يزال قيد الدراسة^٢ (شكل ٨، ٩).

وربما أن هذا النقش والفسيفساء المكتشفة قريباً منه في الجزء الجنوبي خارج الرواق الجنوبي للكنيسة مثلت كنيسة أقدم من العصر البيزنطي في أواخر القرن السابع الميلادي، يُعزز ذلك الاحتمال نص النقش الموجود في هيكل الكنيسة التي يتحدث عن تجديدات في بناء الكنيسة.

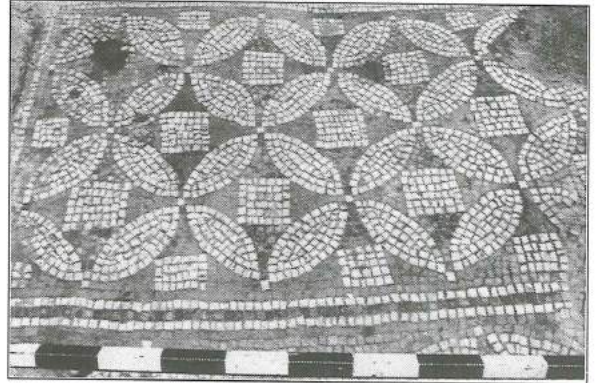
تقنية عمل الفسيفساء في هذه الكنيسة

يبدو أن المكعبات الملونة للفسيفساء قد جرى استقدامها إما من مناطق محلية مشهورة بالفسيفساء كمأدبا أو من خارج البلاد نظراً لندرة بعض الألوان في الطبيعة كاللون البنفسجي مثلاً. كما أنه قد استخدمت ثلاثة أحجام للمكعبات، الأول قياس ١سم × ١سم واستخدم في رصف أرضيات الأروقة والحنية، والثاني قياس ٨، ٨ × ٨، ٥ سم واستخدم في رصف الجزء الجنوبي من الكنيسة في الحجرات الملحقة، والحجم الثالث قياس ٢سم × ٢سم واستخدم في عمليات الترميم اللاحقة، إضافة إلى استخدامه في رصف

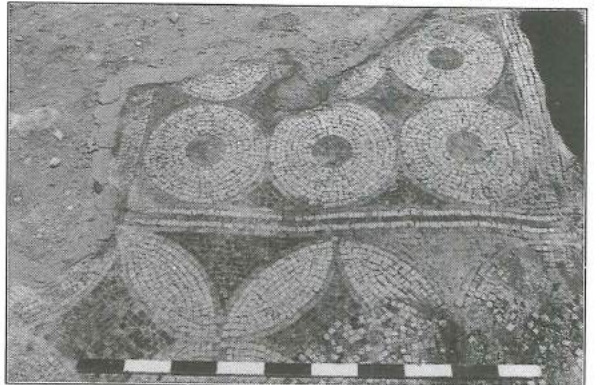
(الاشكال ١٥، ١٦، ١٧)، كما يلاحظ وجود رقعة من الفسيفساء مرممة في فترة لاحقة من مكعبات فسيفسائية ملونة رصفت بشكل عشوائي كان الهدف منها ملء الفراغ من غير عناية بالتشكيل الفني الزخرفي (شكل ١٥). وتتشابه زخرفة المساحات بين القواعد الفاصلة بين الرواق الجنوبي والرواق الأوسط. وقد استخدم في زخرفة الرواق الأوسط إطار بعرض ٥٠سم من دوائر متجاورة متكررة، يتوسط كل دائرة شكل شبه معيني، ويحيط هذا الإطار



شكل (١٥) زخرفة لأشكال هندسية بين الأروقة، ويُلاحظ عمليات ترميم وترقيع لاحقة.



شكل (١٦) زخرفة دوائر متداخلة بين الأروقة.



شكل (١٧) زخرفة دوائر متجاورة وبتلات زهور بين الأروقة.

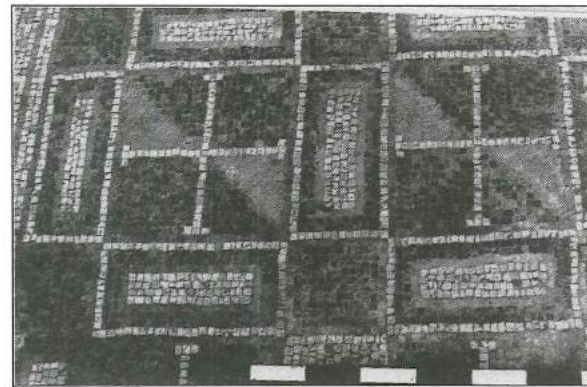
٢- سيتم نشر دراسة هذا النقش مع النقشيين الآخرين المكتشفين في هذه الكنيسة في بحث مشترك بين كاتب هذا التقرير ود. دومنيك محيسن.

خارج الإطار الذي يشمل شبكة المربعات الهندسية، شكل معين باللون الأحمر والبرتقالي موزع بشكل متكرر ضمن الأرضية ذات اللون الأبيض (شكل ١٢، ١٣).

لوحظ وجود أعمال ترميم في أرضية الرواق الشمالي في الجهة الغربية استخدم فيها المكعبات البيضاء ذات الحجم الكبير إضافة الى الملاط، كما لوحظ وجود عمليات ترفيع وترميم بين قواعد الأعمدة استخدمت فيها مكعبات فسيفسائية أكبر حجماً من المكعبات الأصلية. يوجد في الجهة الشرقية من الرواق الجنوبي زخرفة مميزة لم يُعمل مثلها في الرواق الشمالي وهي عبارة عن استخدام مربعات متجاورة بينها مستطيلات صغيرة روعي فيها التدرج اللوني والتركيز خاصة على الألوان البنفسجي والأحمر والأصفر والبرتقالي وركز على اظهار صليب باللون الأبيض يتوسط المربعات (شكل ١٤).

وجدت زخارف فسيفسائية مشابهة للعناصر التي وجدت في أروقة كنيسة خربة الدوير في كنيسة تعود الى القرنين الخامس والسادس الميلاديين في موقع اليبيلة شمال شرق مدينة اربد بـ٨كم.
(Al-Muheisen 1991: 341-346, Pl. II,2)

٣- فسيفساء الرواق الأوسط (صحن الكنيسة)
تتوزع على جانبي الرواق الأوسط من كل جانب ستة قواعد كانت ترفع أعمدة أو حجارة بناء لترفع بدورها السقف. زخرفت المساحات بين قواعد الأعمدة الفاصلة بين الرواق الشمالي والرواق الأوسط بزخارف هندسية مميزة في كل مساحة وتختلف عن الزخارف المجاورة لها، مثل استخدام الدوائر وداخلها مربعات مُلئت بخطوط مكررة بشكل درجات، ودوائر متداخلة يُشكل تداخلها ما يشبه الزهور المتفتحة، وأيضاً دوائر كاملة متجاورة ومربعات متجاورة



شكل (١٤) زخرفة لأشكال هندسية تعتمد في مركزها الصليب، توجد في الجهة الشرقية من الرواق الجنوبي.

للقسيس سوزيم» (أنظر الشكل ٥).

٢- فسيفساء الرواقين الشمالي والجنوبي

رصفت أرضيات الرواقين الشمالي والجنوبي للكنيسة بمكعبات الفسيفساء الملونة ذات الألوان الأبيض، الرمادي، البنفسجي، الأحمر، البرتقالي والأصفر. معظم مساحة الرواقين محتفظة بالأرضية الفسيفسائية باستثناء جزء من الجهة الغربية من الرواق الشمالي المعرض للتدمير، وبعض الأجزاء في الرواق الجنوبي. استخدم في زخرفة هذه الأرضيات الأشكال الهندسية المتميزة بتناسقها اللوني ودقة توزيع المساحات بينها بشكل يدل على المقدرة الفنية والرياضية للفنان الذي صمّم ونفذ مثل هذا العمل.

صممت الأشكال الهندسية داخل شبكة مربعات متجاورة يتوزع بينها وبشكل متكرر مربع صغير فيه شكل صليب مروحي (شكل ١٢، ١٣).

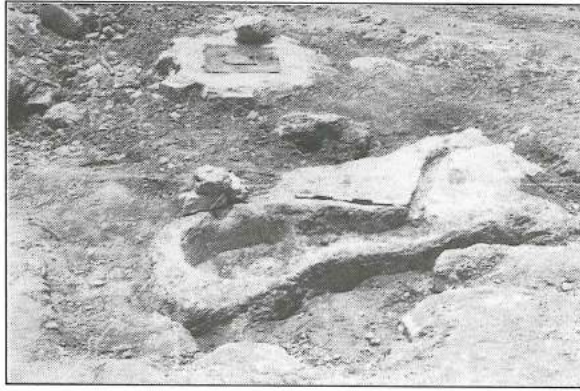
استخدم اللون الرمادي الغامق كإطار لمعظم المربعات. أهم الأشكال الهندسية المتواجدة شكل معين بداخله شكل معين صغير، وصليب صغير مع ما يشبه الجرس، ومربعات عددها أربعة تتلاقى رؤوسها من إحدى زواياها، وخطوط بشكل درجات متكررة، وخطوط بشكل أمواج، وخطوط بشكل شعاع. كما يتوزع



شكل (١٢) أشكال هندسية في فسيفساء الرواق الشمالي.



شكل (١٣) أشكال هندسية في فسيفساء الرواق الشمالي.



شكل (١١) بئر الماء يجاوره حوض الترسيب الملحق بالكنيسة.

من عدة عناصر زخرفية ملونة ذات أشكال هندسية متنوعة تخلو من العناصر ذات الروح، وتغطي الأرضيات الفسيفسائية الأروقة الثلاثة والحنية والهيكل والبهو الأمامي لمدخل الكنيسة، كما عُثر على بقايا رقع فسيفسائية خارج الجدار الجنوبي للكنيسة في أرضيات الحجرات الملحقة، ورقعة صغيرة شرقي الرواق الشمالي. استخدمت المكعبات الفسيفسائية ذات الألوان الأحمر، البرتقالي، البني، الأصفر، الأزرق، الأسود، الرمادي، إضافة إلى اللون الأبيض. وفيما يلي وصفاً للزخارف على الأرضيات الفسيفسائية:

١- فسيفساء الحنية والهيكل

الأرضية سليمة في معظمها تقريباً، وتشمل زخرفة تيجان زهرة متكررة مكونة شكل معيني يتوسطه معين صفير في وسطه صليب، وقد استخدم في هذه الأشكال اللون الأحمر واللون الرمادي إضافة إلى اللون الأبيض. كما يوجد في منتصف الأرضية الفسيفسائية لحنية الكنيسة مربعين بمساحة ٧٠سم × ٧٠سم لكل منهما إطار باللون الأحمر، وبداخلهما نقشين كتابيين باللغة اليونانية، ويقعان على جانبي قاعدة المائدة المقدسة، استخدم في إظهار الحروف اللون الرمادي الغامق. ترجمة النقش الأول على الجهة اليمنى باللغة العربية:

«في زمان الكاهن بيشوب بولص المحبوب من الله ورومانوس عملت التجديديات في هذه الكنيسة.»
ترجمة النقش الثاني على الجهة اليسرى باللغة العربية:

«الشكر للقسيس كريكوس الذي يطلب من الله تقبل الأرضية الفسيفسائية التي عملها تخليداً

٦- ناووس حجري

وُجد هذا الناووس الحجري في الجهة الشمالية / الشرقية من الكنيسة وعلى بعد ٢٠ سم عن الجدار الشمالي للكنيسة، وهو مشغول من الحجر الكلسي متوسط الصلابة، تعرض للكسر بفعل أعمال التجريف الحديثة مما أضر بتركيبته. أطواله ٢٢٠ سم × ٨٠ سم، وقد وجد للأسف مفرغاً من محتوياته، عثر بجانب هذا الناووس في المساحة بينه وبين الجدار الشمالي للكنيسة على كمية كبيرة من الكسر الفخارية والزجاجية جُلبها يؤرخ للقرن الثامن الميلادي وتمثل كسر لأواني طبخ وكسر لأباريق وأسرجة وجرار، أضيف إلى كسر زجاجية لأواني صغيرة وقوارير، مما يُعطي مؤشراً على طقوس كانت تؤدي احتراماً للمتوفى بوضع هذه المشغولات الفخارية والزجاجية بالقرب منه (شكل ١٠).

٧- رصيف للمشاة

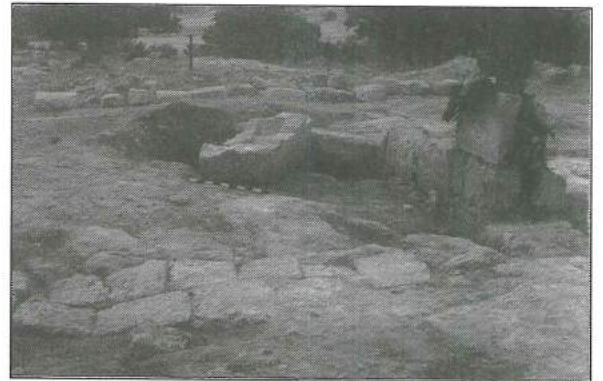
وجد هذا الرصيف في الجهة الشمالية من الكنيسة مبني من حجارة مرصوفة بشكل مسطح بعرض ٢م × طول ٤م، مما يشير إلى احتمال وجود مدخل شمالي للكنيسة كان هذا الرصيف يتقدمه (شكل ١٠).

٨- بئر ماء

بُني هذا البئر في الجهة الغربية من الكنيسة، وهو منحوت في الصخر الطبيعي، يصل عمقه ٨-٩ متر، ويجاوره جرن منحوت في الصخر الطبيعي موصول بقناة ربما لترسيب الشوائب قبل دخول ماء المطر إلى البئر شكل (١١).

فسيفساء الكنيسة

تتكوّن الأرضية الفسيفسائية لكنيسة خربة الدوير



شكل (١٠) الجهة الشمالية للكنيسة، فيها الجدار الشمالي وناووس حجري ورصيف للمشاة.

١ - قامت بقراءة النقشين وترجمتهما د. دومنيك محسن، الأستاذة سابقاً في علم النقوش الكلاسيكية في معهد الآثار والأنثروبولوجيا - جامعة اليرموك.

يوصلها بالرواق الجنوبي بعرض حوالي ٨٠سم. لكن للأسف تعرضت للتدمير وانزلاق الحجارة في الجهات الشرقية والشمالية والجنوبية. كانت أرضيتها مرصوفة أصلاً بالفسيفساء، حيث وجد جزء منه من النوع الأبيض غير الملون، إلا أن الجزء الأكبر وجد مدمراً (انظر شكل ٢).

ب- ألحق بالكنيسة أيضاً في الجهة الجنوبية ما يغلب أنه حجرتين إحداهما أكبر مساحة من الأخرى، وتتضح بقايا حجارة بناء الحجارة الأولى وهي الصغرى قياس ٢م × ٤م تقريباً، الحجارة مشدبة، ومنزلة عن أماكنها في الجهة الغربية. أما الحجارة الثانية فعرضها تقريباً ٤م × ٥,٥٠م، وقد دُمرت هذه الحجارة ولم يُعثر على جدرانها في الجهتين الجنوبية والشرقية. وجدت في أرضية الحجارة الأخيرة رقع صغيرة من الفسيفساء ذي المكعبات الملونة الصغيرة الحجم ٨,٠ × ٨,٠ × ٥,٠سم عليها صورة لشجيرة تفاح صغيرة، وبقايا نقش عليه كتابة يونانية في إطار دائري، وعدد من الأشكال الهندسية كالمثلثات، وسنفضل لاحقاً قراءة النقص (الشكل ٨, ٩).

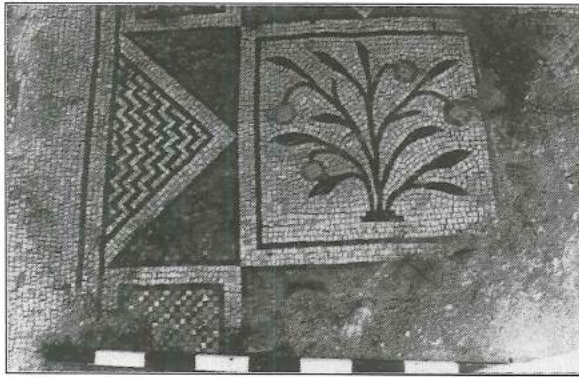


شكل (٥) نقشان باللغة اليونانية في حنية الكنيسة يتوسطهما قاعدة المائدة المقدسة.

الفسيفسائية، وقد وجدت أثناء التنقيب عدة قطع من هذه الأعمدة التي كانت تزين منطقة الهيكل، ووجد أيضاً جُرن حجري مربع الشكل تقريباً ٥٤سم × ٤١سم × ارتفاع ٤٠سم، ربما كان يُستخدم كجُرن للمعمودية (شكل ٦, ٧).

٥- الحجرات الملحقة بالكنيسة

أ- ألحق بالكنيسة في الجهة الشرقية حجرة مربعة الشكل تقريباً ٣٠٠سم × ٢٥٠سم، لها مدخل



شكل (٨) زخرفة شجيرة تفاح يجاورها أشكال هندسية في الحجرات الجنوبية للكنيسة.



شكل (٦) أحد الأعمدة التي كانت تزين منطقة الهيكل، وجد خارج الرواق الجنوبي.



شكل (٩) بقايا نقش باللغة اليونانية في الحجرات الجنوبية للكنيسة.



شكل (٧) جُرن المعمودية، وجد في منطقة الهيكل بشكل عشوائي.

٤- حنيّة وهيكل الكنيسة

بُنيت حنيّة الكنيسة على شكل قوسي، نصف قطره ١٧٥ سم شرق - غرب، والآخر حوالي ٢٥٠ سم شمال - جنوب، ويمتاز بناءها بسماكة الجدار حيث يصل عرض جدار الحنيّة حوالي ٢٢٠ سم، استخدمت فيه في الواجهة الداخلية حجارة مشذبة ربما استخدمت على ارتفاع مناسب لاستعمالها كمقاعد لجلوس الجوقة الموسيقية المرافقة للكاهن. يضم جدار الحنيّة في معظمه حجارة غير مشذبة في أكثرها. الجزء الشمالي من الحنيّة متعرض للتدمير بسبب أعمال التجريف الحديثة ويلاحظ تواجد بقايا قصارة بيضاء على الجدار الداخلي للحنيّة (شكل ٤).

يوجد في المنطقة الأمامية من الحنيّة ما يُطلق عليه (الهيكل) وهو المكان الذي تتم فيه الطقوس الدينية من قبل الكاهن ومرافقيه. طول هذه المنطقة ٦م بعرض ٣م٢٠ ابتداءً من الحاجز الأيقوني الذي يقع في الجهة الغربية من الهيكل، وفيه عتبات مغازز حجرية للحاجز الذي كان يزدان بالصور والرموز الدينية، وبالعادة يكون الحاجز مصنوعاً من الخشب. يتوسط العتبات الحجرية أقنية وفجوات لتثبيت الحاجز الخشبي (الدرابزين) (شكل ٤).

كما يتوسط منطقة الهيكل حجر قاعدة المائدة المقدسة التي كانت توضع عليها الأنجيل والشمعدان، وهذا الحجر كلسي عليه نحت لخطوط نافرة، أطواله ٣٠ سم × ٦٠ سم. وجد في أرضية الهيكل وعلى جانبي قاعدة المائدة المقدسة نقشين كتابيين باللغة اليونانية، سنفصل في دراستهما لاحقاً (شكل ٥). كما وجدت بقايا أعمدة صغيرة كانت مغروزة بالأرضية

حجارة بناء أو أعمدة ترفع أقواس متناظرة، ترفع بدورها سقف الكنيسة الذي كان يغطيه القرميد المحروق، والذي وجدت قطع عديدة منه. أطوال هذه الأروقة كالتالي:

الرواق الشمالي: طول ١٢م × ٢٦٠ سم.

الرواق الأوسط: طول ١٠م × ٤٧٠ سم.

الرواق الجنوبي: طول ١٢م × ٢١٠ سم.

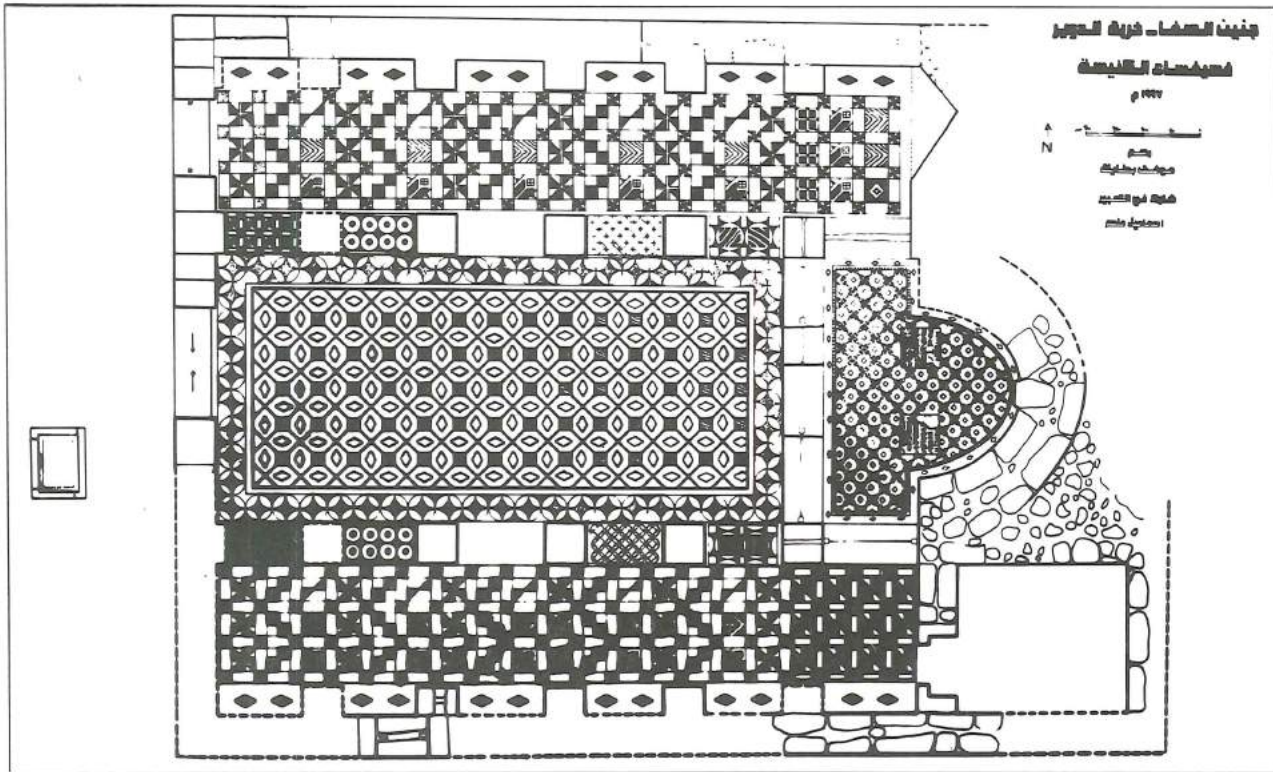
هيكل الكنيسة: طول ٥م شرق - غرب × عرض ٦م شمال - جنوب (شكل ١، ٢).

لوحظ أن بعض قواعد الأعمدة قد بُنيت من قطعة حجرية واحدة وبعضها الآخر من قطعتين حجريتين متجاورتين، كما لوحظ وجود آثار قصارة بيضاء عليها. وأن بعض القواعد مفقودة إما نتيجة أعمال التجريف أو بسبب نقل الحجارة حديثاً من قبل المواطنين. رصفت أرضيات الأروقة الثلاثة بالمكعبات الفسيفسائية الصغيرة الحجم والملونة والتي شكلت زخارف متنوعة. احتفظ الجدار الشمالي للرواق الشمالي بجزء واضح من تركيبته، حيث استخدم فيه حجارة مشذبة متوسطة وكبيرة الحجم، وقد احتفظ الجدار بثلاثة مداميك، ومن طريف الأمور أن حفظ الجدار من الدمار كان نتيجة نمو شجرة بلوط فوقه بشكل مباشر، مما أبعد عنه خطر التجريف. بالنسبة الى مستوى الأرضيات الفسيفسائية فهو غير متوازن نظراً لهبوط الأرضيات في بعض الأجزاء، حيث تتواجد طبقة أساس ترابية، وأيضاً لسقوط حجارة البناء عليها وتعرضها للإنشاء.

نسرّد لاحقاً وبالتفصيل وصفاً للأرضيات الفسيفسائية.



شكل (٤) منظر عام لهيكل الكنيسة والحنيّة.



شكل (٢) المخطط العام للكنيسة مع إعادة تصور لفسيفسائها المفقودة.

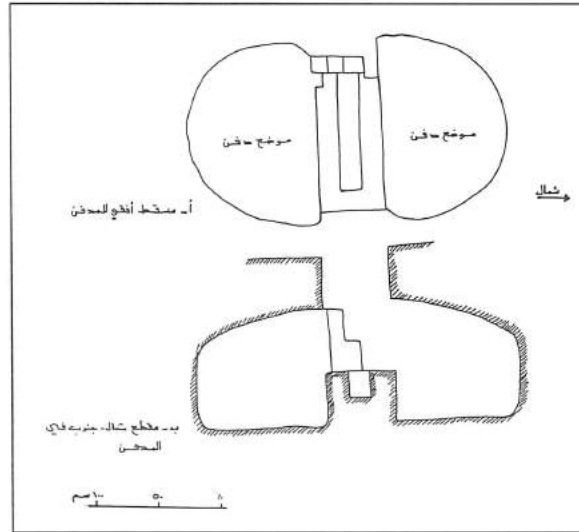
الجماعي بسبب اتساعهما. يتوسط المساحة بين القبرين الشمالي والجنوبي تجويف مستطيل الشكل منتظم بقياس ٢٠سم×٩٠سم، يُحتمل أنه كان يستعمل كممر صغير بين القبرين. غير أن المدفن بكامله وجد منبوشاً، حيث لم يُعثَر إلا على كسر قليلة جداً من العظام الأدمية وجزء من عظام جمجمة وكسر فخارية، ومكعبات فسيفسائية من الحجم الكبير والمتوسط بيضاء اللون. غير أن المثير للاستفهام أن المدفن وجد مطموراً بكامله بالأتربة والحجارة بطريقة متعمدة، مما يشير إلى محاولة لإلغائه في فترة لاحقة (شكل ٢،١).

٢- مدخل الكنيسة الرئيسي

يقع مدخل الكنيسة الرئيسي ضمن الجدار الغربي للكنيسة، وهو مكوّن من بوابتين رئيسيتين لدخول المصلين إلى أروقة الكنيسة كانتا مثبتتين على عتبتين حجريتين بهما مفرزين لأعمدة البوابتين، إحدى العتبتين بطول ٣٠سم والأخرى ١٨٠سم (انظر شكل ١).

٣- أروقة الكنيسة الداخلية

تتكوّن الكنيسة من ثلاثة أروقة: الرواق الشمالي، والرواق الأوسط، والرواق الجنوبي. وتتوزع بين الأروقة وعلى أطرافها قواعد حجرية مثبتة كانت تقوم عليها



شكل (٣) مسقط ومقطع للمدفن الموجود في أرضية البهو الأمامي.

أنه كان له غطاء، أطوال فتحة مدخل المدفن ٦٥سم×٤٠سم، وتتسع عند الدخول لأسفل المدفن بعرض حوالي ٥٤سم، يتم الدخول إلى المدفن بشكل عمودي للأسفل بواسطة درجتين.

نحت المدفن في الصخر الطبيعي، فيه قبرين جانبيين متساويين تقريباً في الجهتين الشمالية والجنوبية أبعادهما ٤٠سم×١٠٠سم×ارتفاع أقصاه ٢٠سم، يبدو أن هذين القبرين كانا يستعملان للدفن

الأرضيات، نظراً لصعوبة الاجراءات المتبعة في قطع الأشجار الحرجية (شكل ١).

مخطط الكنيسة

بعد انتهاء أعمال الحفر والتنظيف وإزالة الحجارة المتراكمة اتضح مخطط الكنيسة وتقسيماته، غير أن أجزاء من أرضية الكنيسة قد دُمّرت إما نتيجة سقوط حجارة البناء في أعقاب الزلزال المدّمّر الذي يغلب أنه زلزال عام ٧٤٧م، وإما نتيجة أعمال التجريف الحديثة. غير أن ما تبقى من أرضية الكنيسة إضافة الى أساسات جدرانها يُعطي تصوراً واضحاً تقريباً عن وضع هذه الكنيسة.

تم بناء الكنيسة على نظام البناء البازليكي، فالمبنى مستطيل الشكل يتكوّن من رواقين جانبيين ورواق أوسط (صحن الكنيسة)، ويتقدم المبنى في الجهة الشرقية الهيكل وحنية الكنيسة. تبلغ أبعاد هذه الكنيسة حوالي ١٩ر٣٠م شرق - غرب بما في ذلك الحنية والبهو الأمامي للمدخل الرئيسي. كما يبلغ عرض الكنيسة حوالي ١٣م بدون بقايا الحجرات الملحقة في الجهة الجنوبية (شكل ٢، ٣).

وفيما يلي وصفاً لأقسام الكنيسة وملحقاتها:

١- البهو الخارجي لمدخل الكنيسة

يقع هذا البهو في الجهة الغربية من مبنى الكنيسة، يبلغ عرضه ٢٥٠سم، وطوله ١٢م وهو موازي لطول الجدار الغربي للكنيسة. رصفت أرضيته بالفسيفساء البيضاء اللون المتوسطة الحجم. وجد في أرضية البهو وعلى يمين مدخل الكنيسة مدفن منحوت في الصخر الطبيعي له مدخل رأسي مركب من عدة حجارة، ويبدو

التخريب وتكشفت رقعة الفسيفساء. بلغ مجموع المربعات مع انتهاء اعمال الحفر ٣٦ مربعا بمساحة اجمالية ٢٤م×٢٤م. تراوحت سماكة التربة فوق الارضية الفسيفسائية المكتشفة بين ٢٠سم - ٧٠سم، وهي تربة بنية اللون متوسطة الصلابة، وتفتقر لتسلسل طبقي واضح بسبب تعرض الموقع لأعمال التجريف من قبل مُلاك الأرض بقصد استصلاحها، وتعرضها لأعمال النباش من قبل مجهولين بحثاً عن لقي أثرية، أضف الى أن المنطقة كانت معسكراً سابقاً للجيش الأردني.

تبين خلال أعمال الحفر في المربعات وجود أنقاض لمبنى الكنيسة ممثلة بتراكمات لحجارة المبنى بقياسات مختلفة أغلبها ساقطة فوق بعضها أو على الأرضية مباشرة أو يفصلها عن الأرضية طبقة تراب صفراء اللون بسمك ٥-٦سم أو بلون بني فاتح بسماكة ١٠-٢٠سم. تركزت حجارة البناء الساقطة بشكل خاص في المربعات: O, J, F, A. ولوحظ أن لون التربة بين الحجارة في مربع A ممزوج بآثار حريق، كما وجد في ذات المربع وتحت إحدى هذه الحجارة إبريق فخاري كامل الشكل بطول ٢٣سم له يد وصنوبر وقاعدة حلقيّة، ويؤرخ للقرن الثامن الميلادي من العصر الأموي.

من ناحية أخرى فإنه من الجدير ذكره أن نمو العديد من الأشجار الحرجية (البلوط) فوق الأرضيات الفسيفسائية والجدران قد أضر كثيراً بالموقع، إذ أن تمدد الجذور داخل الموقع سبب ضعف البنية العمائرية وتماسك عناصرها. وللأسف فقد حالت عدة أشجار بسبب وجودها فوق الأرضية الفسيفسائية وفوق الجدران مباشرة دون الكشف الكامل عن



شكل (١) منظر عام للكنيسة، يلاحظ في المقدمة مدخل المدفن الأرضي.

حفرة كنيسة خربة الدوير / جنين الصفا ١٩٩٧م

اعداد: اسماعيل أحمد ملحم

الفسيفساء اضافة الى حجارة بناء مشذبة مبعثرة في الموقع.

ويتفقد الموقع على نطاق أوسع لوحظ وجود العديد من الكهوف والمدافن الفردية والجماعية، ومعاصر العنب، وجميعها مقطوعة في الصخر الطبيعي الكلسي الذي يميز تضاريس المنطقة، كما لوحظ وجود عدة مقاطع في الصخر تشير الى قطع الحجارة المشذبة من نفس الموقع.

في ضوء ذلك تقرر إجراء حفرة عرضية بهدف استكشاف الموقع ومعرفة ماهيته، ولتحقيق الغايات من تدميره، حيث بوشرت أعمال التنقيب على الفور ابتداءً من تاريخ ١ نيسان ولغاية ٥ حزيران ١٩٩٧م. وقد كشفت النتائج الأولية للتنقيب عن كنيسة بيزنطية - أموية.

أعمال التنقيب

تكوّن فريق التنقيب من اسماعيل ملحم مشرفاً، وحرّاس الآثار التابعين لمكتب آثار الكورة كمراقبين للورشة بالتناوب وهم حسين بني يونس، زايد السلامة، ياسر عبدالنبي، بسام بني يونس، ومحمد بني حمد، اضافة الى حارسين دائمين للمواقع وستة عمال. لغايات الحفر المنظم استخدمت الطريقة الشبكية في عمل المربعات، قياس كل مربع ٤م × ٤م، وبين كل مربع وآخر فاصل بعرض ٥٠سم. ابتدأت أعمال الحفر في المربع A (جدول رقم ١) الذي وجد فيه آثار

X6	Y	Z	A1	A2	A3
X5	L	K	J	A4	A5
X4	C	B	A	O	A6
X3	D	E	F	N	Q
X2	G	H	I	M	P
X1	R	S	T	V	W

جدول (١) المخطط الشبكي للمربعات.

الموقع

تقع خربة الدوير غرب بلدة جنين الصفا / لواء الكورة في محافظة اربد، وتحديداً تقع شمال / شرق بلدة دير أبي سعيد مركز اللواء حوالي ٧كم. ولغويًا فإن كلمة الدوير هي تصغير لكلمة دير، والدير هو خان النصرى، وجمعه أديار، وصاحبه الذي يسكنه ديار وديراني (ابن منظور ١٩٩٠: ٢٩٦، ٢٩٧).

تشتهر جنين الصفا بتربية الأبقار ويوجد فيها حوالي (٢٠٠٠) رأس بقر، كما تشتهر بسهولها الخصبة وخصوصاً في خربة إرخيم التي تنتج معظم المحاصيل الشتوية والصيفية وخاصة البصل واليامية. كما يقوم المواطنون باستصلاح الأراضي ذات الطبيعة الصخرية وزرعها بأشجار الزيتون. وتتواجد الأشجار الحرجية في عدة مناطق مجاورة للبلدة.

ترتفع بلدة جنين الصفا عن سطح البحر حوالي ٢٦٢م، كما يبلغ معدل سقوط الأمطار السنوية فيها ما لا يقل عن ٣٠٠ملم، ويبلغ عدد سكان البلدة حوالي أربعة آلاف نسمة.

المسوحات الأثرية

أشارت المسوحات الأثرية السابقة الى بلدة جنين الصفا، إذ يذكر سيففرد متمان فترات الاستيطان التي شهدتها البلدة: العصر الحديدي الثاني، العصر الهلنستي، العصر الروماني، العصر البيزنطي، العصر الاسلامي (Mittmann 1970: 258). كما أشار كل من بانغ وفاوكت ضمن مسحهما لوادي زقلاب الى وجود دلائل تشير الى وجود كنائس واستيطان مزدهر من العصر البيزنطي (Banning and Fawcett 1983: 302-305).

الكشف عن الموقع

تم الكشف عن الموقع بتاريخ ١/٤/١٩٩٧م، أثناء جولة تفتيشية على المواقع الأثرية قام بها مفتش آثار الكورة يرافقة حارس الآثار حسين بني يونس والسائق خلف حموري، حيث تبين وجود تخريب وحفريات غير شرعية من قبل مجهولين في قطعة الأرض رقم ٨ حوض رقم ٧ المسمى حوض كرم الحمام، المملوكة لعدد من مواطني سكان بلدة جنين الصفا. وقد تم ضبط أدوات الحفر ومصادرتها، كما لوحظ تكشف رقعة من

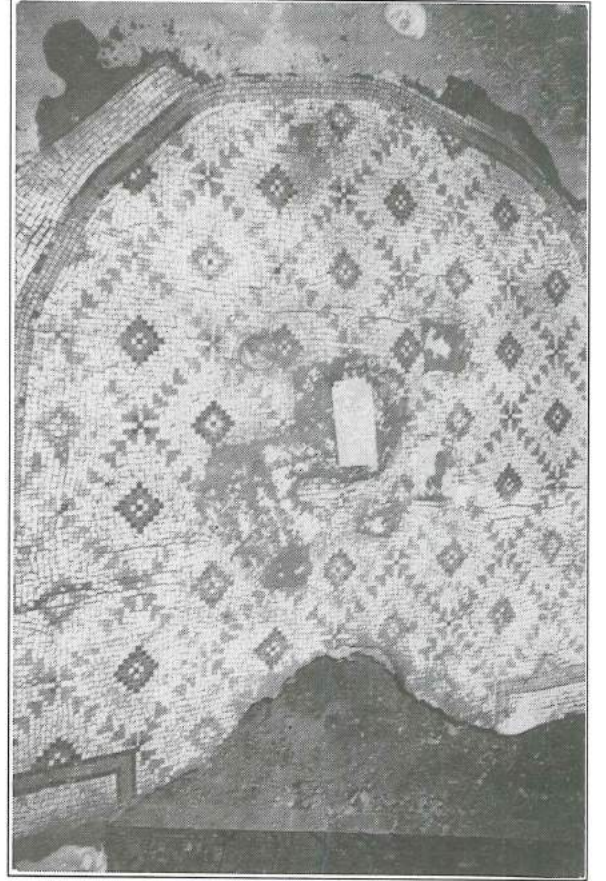
(راجع Piccirillo, 1993)

- ١ . مأدبا، ص: 111, 113 125 .
- ٢ . ماعين، Church of the Acropolis ص: 198 .
- ٣ . أم الرصاص، ص: 210 242 .
- ٤ . حسيان، ص: 249 .
- ٥ . خربة الكرسي، ص: 265 .
- ٦ . جرش، ص: 298 .
- ٧ . كنيسة، Saint Mary ص: 311 .
- ٨ . قرية رحاب، كنيسة Saint Menas ص: 313 .
- ٩ . الشونة الجنوبية، Beth Namaris ص: 322 .
- ١٠ . طبقة فجل، Esbus ص: 331 .
- ١٢ . قبة الصخرة في فلسطين، ص: 340 .
- ١٣ . قصر الحلابات، ص: 351 .

المكتشفات الأثرية

بعد الانتهاء من أعمال الحفر والتنقيب وتنظيف الموقع لم يعثر في هذا الموقع على أية من المخلفات الأثرية باستثناء ما وجد من كسر فخارية تعود للفترتين الأموية والبيزنطية. نستنتج مما تقدم أن تأريخ بناء هذه الكنيسة وبعد الدراسة الأولية للكسر الفخارية وللأرضيات الفسيفسائية وبالمقارنة مع أرضيات فسيفسائية في المواقع الأخرى نجد أن تأريخ بناء هذه الكنيسة يعود إلى القرن السادس الميلادي.

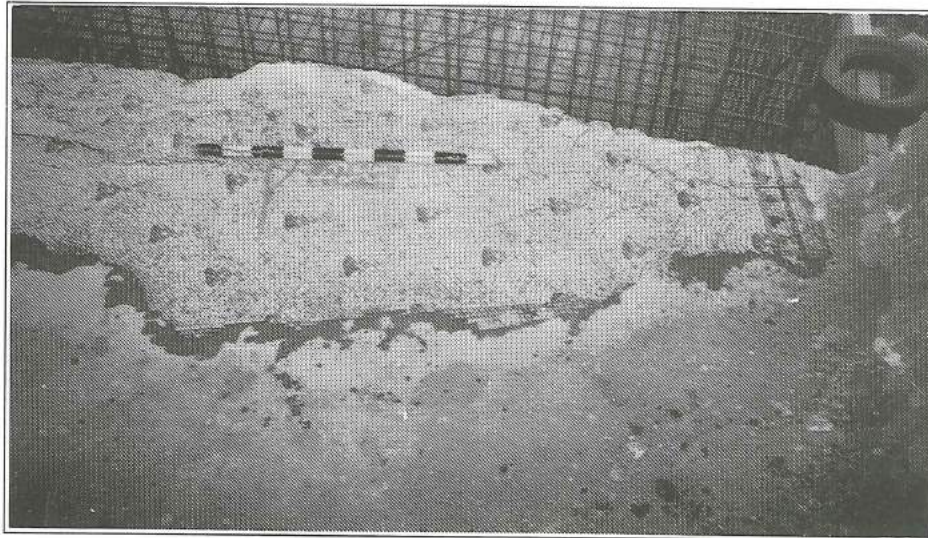
وجيه كراسنه
أسماء الزيدة
مكتب آثار إربد
دائرة الآثار العامة



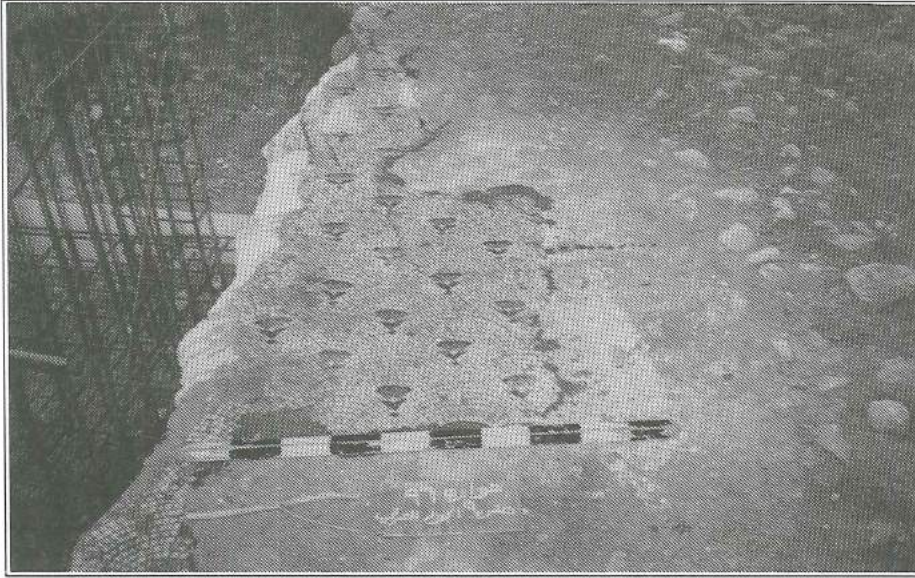
شكل (٩) الزخرفة في منطقة الحنية.

- ٣ . الشونة الجنوبية، ص: 351, 321 .
- ٤ . طبقة فجل، ص: 331 .

أما إطار الرواق الشمالي والجنوبي فهو مزخرف بمثلثات مدببة (▲) وتوجد مثل هذه الزخرفة في:



شكل (١٠) زخرفة الرواق الشمالي.



شكل (٧) الرواق الجانبي الجنوبي.



شكل (٨) تظهر حنية الكنيسة.

The Theotokos Chapel, P. 151. . ٩

The New Baptistry Chapel, P. 150. . ١٠

The Church of the Holy Martyrs Lot and Procopius, P.165 . ١١

. ١٢ . كنيسة Saint George ص: 178 .

The Church of the Deacon . ١٣ . جبل نيبو، ص: 188 .

Kaianus: The Upper Church, . ١٤ . جبل نيبو، ص: 191 .

وعشر أيضاً على مثل زخرفة الوردية خارج منطقة مادبا: (راجع Piccirillo, 1993).

. ١ . أم الرصاص، The Church of the Lions ص: 211 .

. ٢ . حسيان، كنيسة Esbus ص: 249-351 .

٤ . قصر القسطل الأموي، ص: 352 .

ويوجد مثل زخرفة الوردية في عدة كنائس في منطقة مادبا : (راجع Piccirillo, 1993).

The Church of the Virgin Mary, P.66. . ١

The Burnt Palace of Madaba, P. 79. . ٢

The Church of the Apostles, P.106. . ٣

The Baptistry Chapel, P.113. . ٤

The Chapel of the Martyr Theodore, . ٥ P.117.

The Chapel of the Twal Family, P. 128. . ٦

The Church of al-Khadir, P. 132. . ٧

The old Diakonikon Baptistry, P. 145, . ٨ 146, 147.

كل معين كبير يوجد معين صغير مدبب الحواف (شكل ٩). ويوجد مثل هذه الزخرفة في عدة كنائس في الأردن تعود إلى القرن السادس الميلادي وهي: (راجع Piccirillo, 1993) ٢ .

- ١ . كنيسة نيبو، ص: 80 .
- ٢ . كنيسة ماعين، ص: 198 .
- ٣ . كنيسة القويسمة، ص: 267 .
- ٤ . Bishop Marianus Chapel في جرش، ص: 298 .
- ٥ . كنيسة Saint Peter في خربة السامراء، ص: 307-308 .
- ٦ . كنيسة Saint Basil في قرية رحاب، ص: 311 .
- ٧ . كنيسة الشونة الجنوبية ، ص: 320 .
- ٨ . كنيسة اليصيلة، ص: 341 .

وقد عثر أيضاً على مثل أشكال المعينات في القصور الأموية التالية: (راجع Piccirillo, 1993).

- ١ . قصر الحلّبات، ص: 351 .
- ٢ . قصير عمرة، ص: 353 .

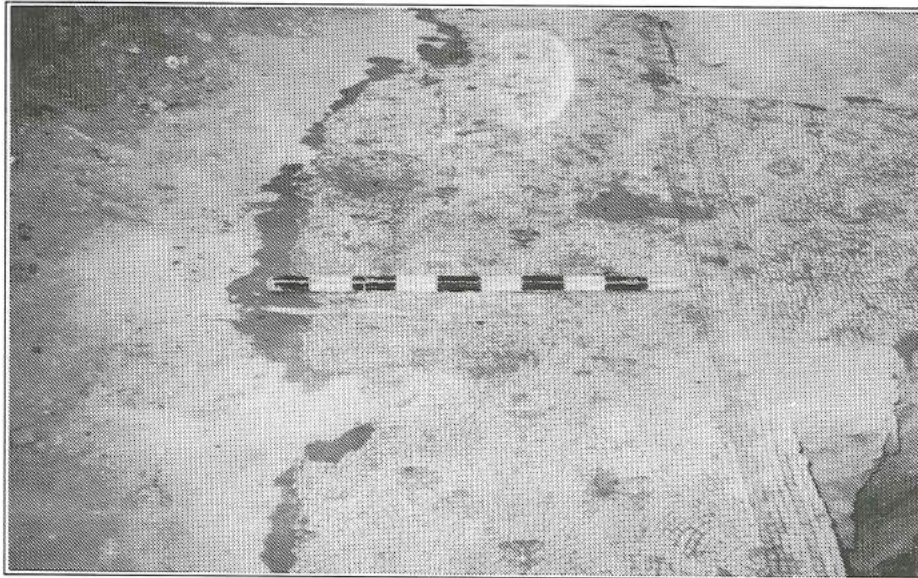
أما منطقة الرواق الشمالي والجنوبي فأرضيتها الفسيفسائية مزخرفة بأشكال وردة مفتوحة Open flower (شكل ١٠) موضوعة داخل أرباع الدائرة، وتوجد مثل هذه الزخرفة في عدة مباني أموية: (راجع Piccirillo, 1993).

- ١ . قبة الصخرة، ص: 340 .
- ٢ . قصر المشتي، ص: 344 .
- ٣ . قصر الحلّبات، ص: 351 .



شكل (٥) جزء من الرواق الأوسط ويظهر مدمراً كلياً.

الرسومات الفسيفسائية المنفذة في منطقة الحنية (Apse) تحاط منطقة الحنية بشريط ملون، قسمت داخل الشريط إلى معينات حدود هذه المعينات مزخرفة على شكل وردة صغيرة ذات ثلاثة رؤوس (♥)، وبداخل



شكل (٦) الرواق الجانبي الشمالي.

2. See M. Piccirillo, 1993. *The Mosaics of Jordan*. American Center of Oriental Reserach, (ACOR) Amman.

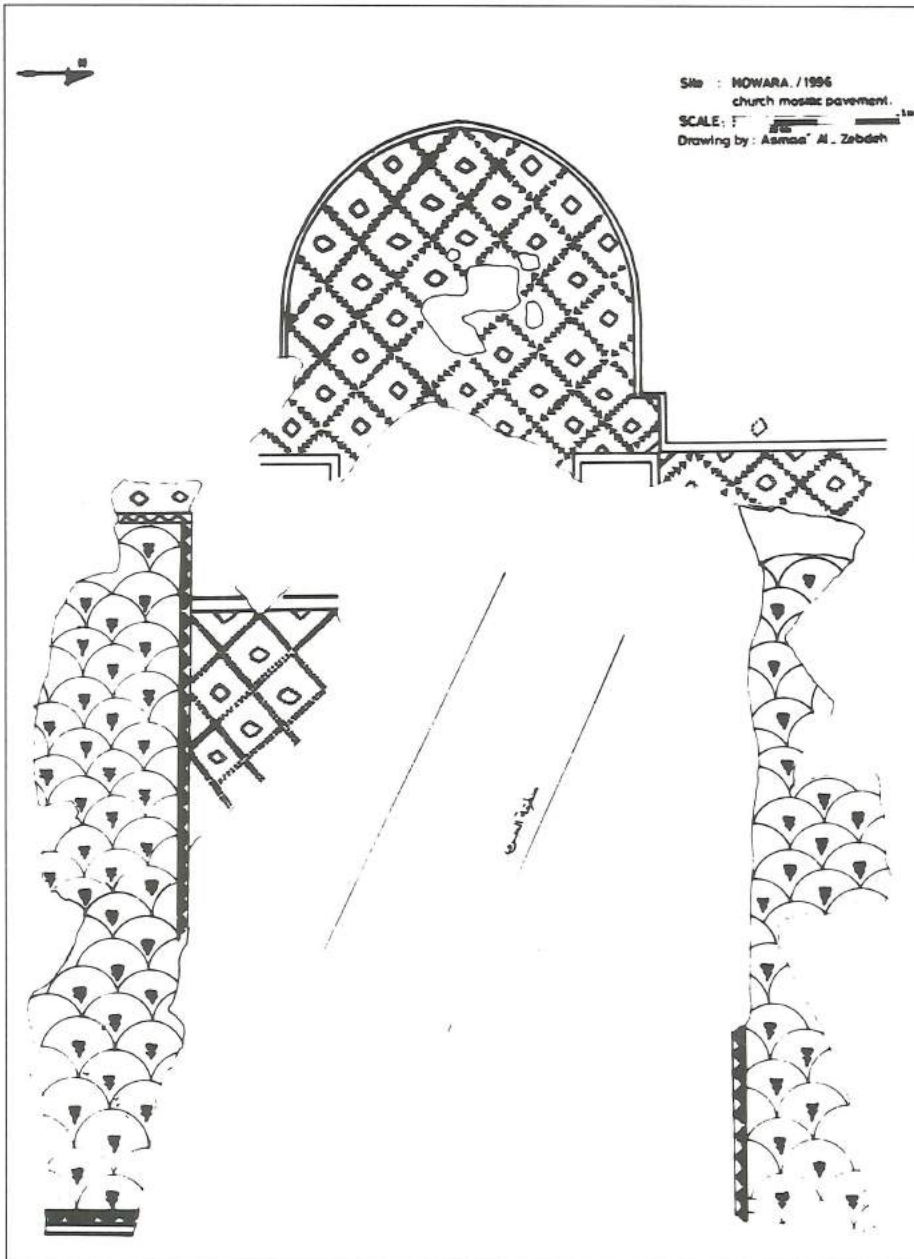
(٣,٥×٥م)، وقد وجد الصحن مدمراً كلياً بسبب أعمال التجريف ولم يبقى منه سوى جزء بسيط جداً في الناحية الشمالية من الأعلى (شكل ٥)، أما الرواقان الشمالي والجنوبي (Aisles) فيبلغ طولهما ٥م، وأما عرضهما فهو غير محدد لعدم امتداد الأرضية وذلك بفعل التدمير (شكل ٦، ٧) أما في النهاية الشرقية فتوجد الحنية (Apse) ويبلغ مساحتها (٢,١٠ × ٢,١٠م) ويوجد في مركز الحنية المذبح حيث تظهر القواعد الحجرية الأربعة وقاعدة المذبح، وقد دمر جزء بسيط جداً في وسط الحنية وفي المنطقة الشرقية للحنية (شكل ٨).

ومزخرفة بزخارف نباتية وهندسية.

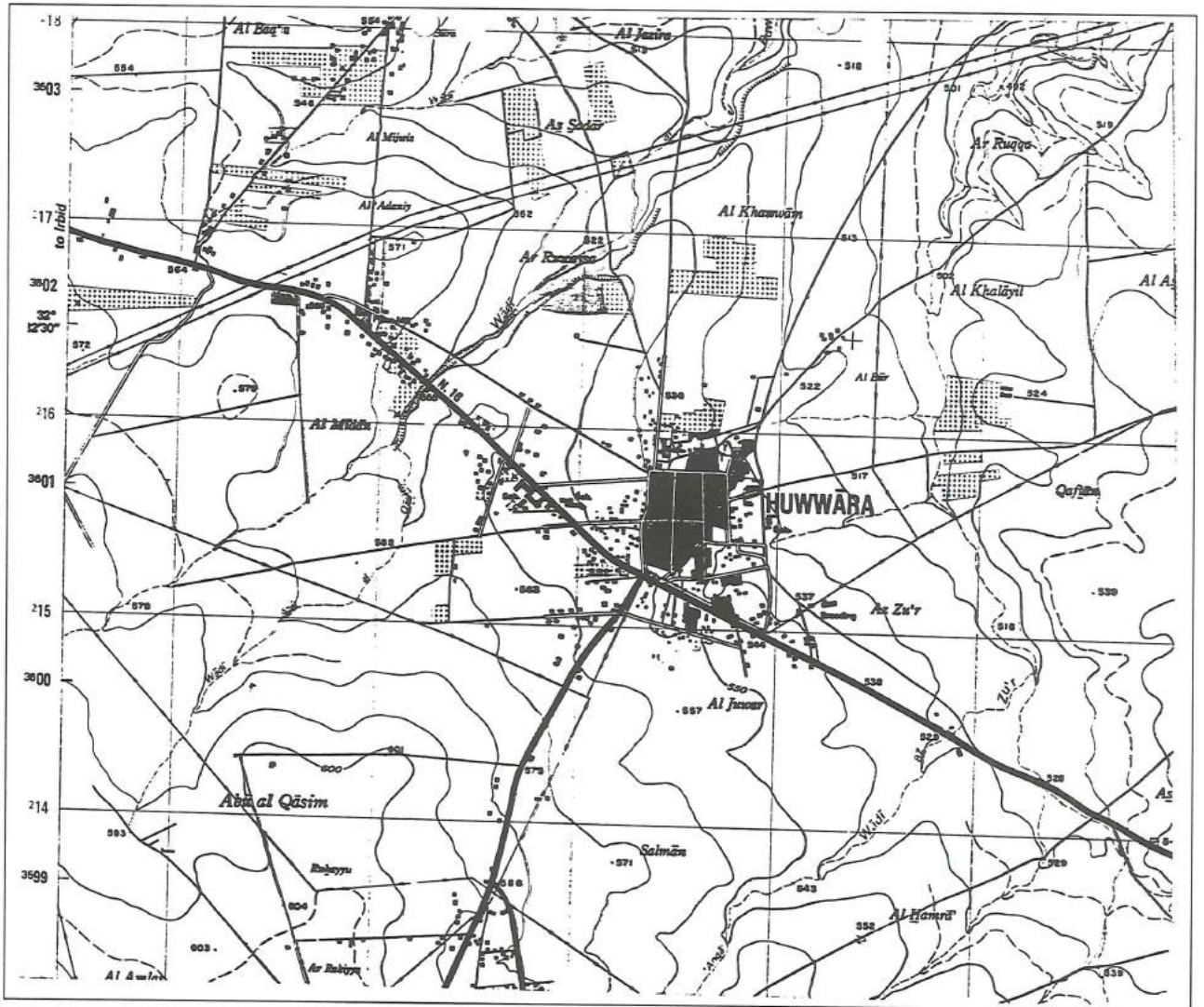
المخطط المعماري للكنيسة

بعد الانتهاء من أعمال التنقيب، لم تظهر أية بقايا لجدران، أو أساسات لمبنى الكنيسة أو أعمدة، فقد تم التعرف على هذه الأرضية على أنها أرضية كنيسة من خلال المخطط المعماري للكنيسة والأرضية الفسيفسائية التي تم العثور عليها (شكل ٤).

نظام المخطط المعماري لهذه الكنيسة هو نظام البازيلكا حيث تتكون من قاعة تنقسم إلى ثلاثة أجزاء: الرواق الأوسط (Nave) ويبلغ طوله



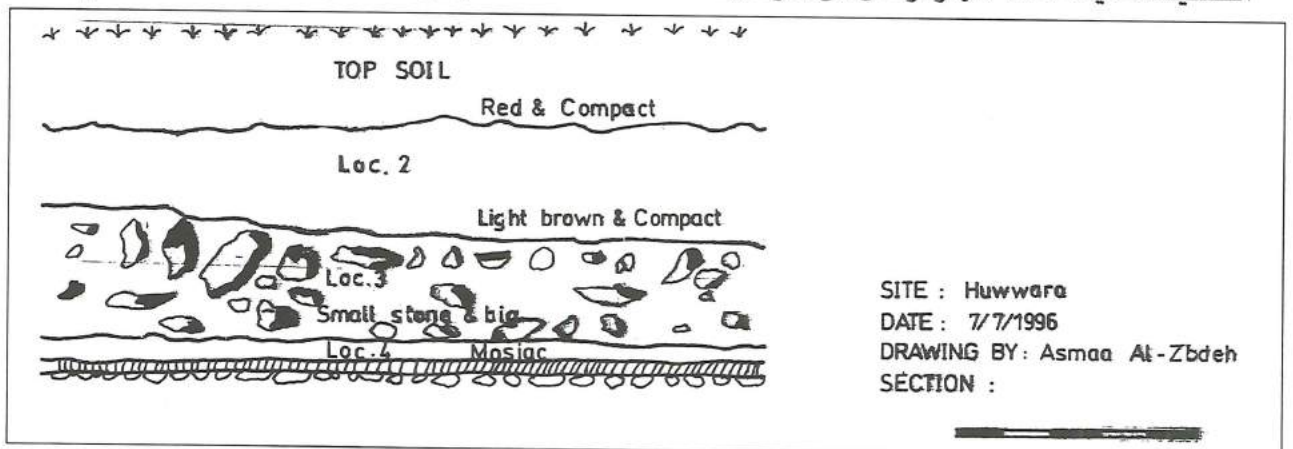
شكل (٤) مخطط يوضح الأرضية الفسيفسائية في كنيسة حوارة.



شكل (٢) خريطة كنتورية لموقع حوارة.

الفسيفسائية الأولى: أرضية صغيرة الحجم
مرصوفة بالقطع الفسيفسائية الكبيرة الحجم غير
الملونة في الجهة الشمالية الشرقية.
أما الأرضية الفسيفسائية الثانية فهي ملونه

الكسر الفخارية القليلة وحولها طبقة من الرماد
في وسط المربع.
٤. الطبقة الرابعة (Loculus 4): وهي الأرضية
الفسيفسائية، فقد ظهر نوعان من الأرضية



شكل (٣) مقطع للطبقات الأربع المكتشفة.

حفرة كنيسة حوارة/ إربد ١٩٩٦

إعداد: وجيه كراسنه وأسماء الزيدة

تجري فيه ولأول مرة حفرة أثرية منظمة، إضافة إلى وجود الأرضية الفسيفسائية المكتشفة في الموقع.

طريقة الكشف

على أثر إخبارية وردت بتاريخ ١٩٩٦/٧/٦ م إلى مكتب آثار إربد تفيد بأنه وأثناء أعمال التجريف لإقامة بناء من قبل صاحب الأرض في منطقة الجور الشرقي/ حوارة تم العثور على أرضية فسيفسائية. وعلى الفور توجه فريق عمل من مكتب آثار إربد للكشف عن هذه الأرضية الفسيفسائية التي وجدت محطمة في المنطقة الوسطى إثر جرفها بواسطة الجرافة.

بدأ العمل للكشف عن باقي الأرضية الفسيفسائية بتاريخ ١٩٩٦/٧/٦ م واستمر حتى نهاية ١٩٩٦/٧/٣١ م.

المنطقة الأثرية

تم تقسيم المنطقة المحاذية لمنطقة الجرف من الجهة الجنوبية والشرقية والشمالية إلى ستة مربعات تبين خلال أعمال الحفر استمرار الأرضية الفسيفسائية ولكن بشكل متقطع، فقد تم الحفر على عمق ٥,٠ م من الجهة الجنوبية، وحوالي ٥,٠ م من الجهة الشرقية، و٥,٠ م من الجهة الشمالية، ولكن وجدت أجزاءها في معظم المناطق محطمة. بعد الانتهاء من أعمال الكشف تبين أن جميع المربعات تحتوي على نفس الطبقات (شكل ٣):

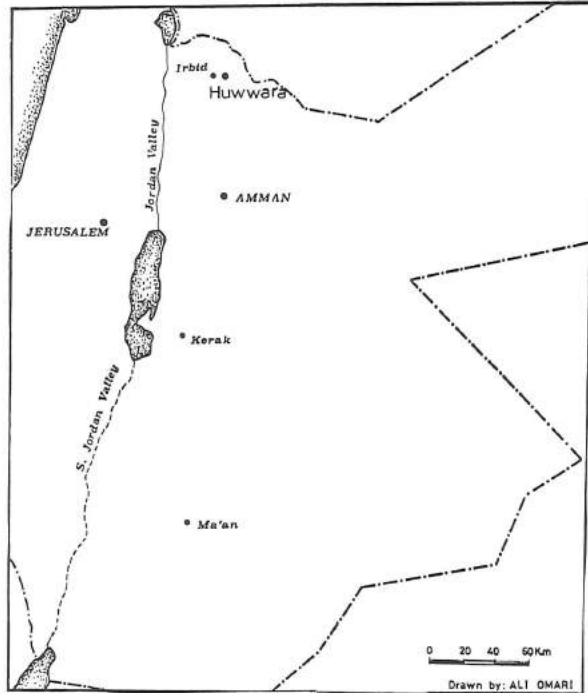
١. الطبقة الأولى (Loculus 1): وهي عبارة عن طبقة الطمم التي أضيفت من قبل صاحب الأرض من أجل الزراعة، عمق هذه الطبقة ٤٠ سم وهي ذي تربة حمراء اللون رطبة وتحتوي على القش وبعض الحجارة الصغيرة والقليل من الكسر الفخارية.
٢. الطبقة الثانية (Loculus 2): وهي عبارة عن تربة صلبة بنية اللون ولا تحتوي على كسر فخارية.
٣. الطبقة الثالثة (Loculus 3): وهي عبارة عن طبقة تحتوي على الحجارة الصغيرة والمتوسطة والكبيرة الحجم، وهي صلبة جداً لأنها تعلو طبقة الفسيفساء حيث عثر في هذه الطبقة وفي المربع الأول على ما يعتقد بأنه الموقد، وعثر أيضاً على

الموقع

تقع بلدة حوارة على بعد ٦ كم شرق مدينة إربد وعلى بعد ٥ كم إلى الغرب من مدينة الرمثا على حدود حوران. تأتي أهمية الموقع قديماً إلى وقوعه بالقرب من تقاطع الطرق التجارية التي تربط مدن الديكابولس الرومانية، وتقع على طريق تجاري هام يصل إلى سوريا في الشمال، وفلسطين في الغرب، ويدل ذلك على وجود الجسر الروماني في وادي الشلالة بالقرب من البصيلة (شكل ١، ٢) وقد ورد ذكر بلدة حوارة في المسح الأثري الذي قام به متمان Mittmann لهذه المنطقة حيث عثر على كسر فخارية تعود للفترات الرومانية والبيزنطية والإسلامية، إضافة إلى بعض التوابيت البازلتية غير الكاملة، وبعض الأعمدة التي لم يبقى منها أي شيء، وعثر أيضاً على بعض شواهد القبور وعليها نقوش يونانية، هذا بالإضافة إلى قطع أثرية رخامية وبازلتية. (Mittmann, 1970: 127).

أهمية الموقع

تأتي أهمية موقع حوارة من الناحية الأثرية كونه



شكل (١) موقع حوارة على خريطة المملكة الأردنية الهاشمية.

1. S. Mittmann, 1970 *Beiträge zur siedlungs-und Territorialgeschichte des Nördlichen Ostjordan-*

landes. Wiesbaden: Otto Harrassowitz.

الزيتون في الأردن وأن انتاجها يتجاوز حاجة القاطنين بالقرب من الموقع إلى غايات تجارية، أما المعاصر ذات الانتاج المتوسط فقد كانت تخدم قرية أو تجمع سكاني محدود مثل معصرة زقريط في جرش والتي تؤرخ للقرنين الخامس والسادس الميلاديين (الصمادي وملحم ١٩٩٧ : ٥-١٢).

سعد الحديدي
إسماعيل ملحم
دائرة الآثار العامة

حجرات التخزين الأربعة عشرة ووحدتي عصر، فإن ذلك يُعتبر مؤشراً على أن انتاج هذه المعصرة كان وفيراً ويرقى إلى وصفه بالتجاري، مما يعني وجود كثافة شجرية للزيتون في المنطقة في العصرين الروماني والبيزنطي. وقد وجدت أنظمة لمعصر الزيتون متشابهة إلى حد ما مع نظام معصرة جلعد في معصرة خربة السوق في وادي شعيب (الحديدي ١٩٧٩ : ٧-٩). وفي معصرتي زيادي وكاركارا في الجليل الغربي (Frankel 1992: 39-71). يمكن اعتبار معصرة جلعد واحدة من أكبر معاصر

المراجع

- الحديدي، عدنان
١٩٧٩ قبر روماني في السلط. حولية دائرة الآثار العامة ، المجلد ٢٣ : ٧-٩.
الصمادي، موسى وملحم، إسماعيل
١٩٩٧ معصرة زيتون "زقريط" جرش. حولية دائرة الآثار العامة ، المجلد ٤١ : ٥-٨.

Bibliography

- Drachman, A.G.
1993 *The Mechanical Technology of Greek and Roman Antiquity* . Copenhagen.
Frankel, R.
1992 Some Oil Presses from Western Galilee. *ASOR*, 286: 39-71.



شكل (٧) منظر لحجرات التخزين.

أبعاده ٢٠سم × ٢٠سم وهو بمثابة مغرز لعمود نهايته ملولبة كان يتحرك عليه ذراع عرضي يضغط للأسفل على صفيحة خشبية دائرية يوجد في أسفلها السلال المسطحة المحتوية على الزيتون المهروس، وبالضغط اللولبي يسيل الزيت للأسفل، وقد عمل لذلك مجرى دائري يصب في حوضين منفصلين، الأول يستقبل الزيت ويرسب الشوائب، والثاني يصله الزيت صافياً، أطوال هذين الحوضين الحجريين الأول ٢٤سم × ٨٠سم × عمق ٢٢سم، والثاني ٤٤سم × ٨٠سم × عمق ٥سم. (أنظر شكل ٦).

يُلاحظ في هذه المعصرة أن حوض هرس الزيتون الذي يُهرس عليه الزيتون قبل عصره مفقود، ولم يُعثر عليه أثناء أعمال الحفر. يُفترض أن موقع حوض الهرس كان في الجهة الشمالية من الصالة، ويتكون بالإضافة إلى حوض الهرس الدائري من حجر رحي عمودي يدور على مجرى الحوض بشكل دائري لهرس الزيتون.

الاستنتاج

نظراً لاتساع مساحة معصرة جلعد ووجود



شكل (٨) منظر تفصيلي لقاعدة الزيتون المستقلة، التي تعمل باللولب الضاغظ



شكل (٥) منظر عام لوحدة العصر A، وتتضح حجرات التخزين.

يُربط إليها حجارة أثقال (ثقالات وزن) كل حجر منها مثقوب من جهتين ليكون بالإمكان ربطها بحبل إلى طرف العارضة الخشبية (شكل ٦). ويذكر (هيرون) أن وزن الحجارة المربوطة بطرف العارضة يصل إلى حوالي ٥٥٤ كغم. (Drachman 1965: 110-111).

بعد مضي ساعات يبدأ الزيت بالسيلان حتى يصل إلى بئر تجميع الزيت، وكلما زاد وزن الحجارة على سلال الزيتون كلما ازداد سيلان الزيت. بعد انتهاء عمليات العصر يتم إبعاد السلال وإنزال العارضة بواسطة حركة البكرة والعتلات، ثم يبدأ بإضافة نسبة من الماء إلى بئر تجميع الزيت لكي يرتفع الزيت للأعلى وترسب التفل والشوائب للأسفل، وبعدها يُنقل الزيت إلى جرار التخزين ليوضع في حجرات التخزين الأربعة عشرة المرفقة بالمعصرة (شكل ٧).

أما بالنسبة للزيتون المهروس الذي تم عصره لأول مرة وحتى لا تضيق أية قطرة منه فقد كان يُعاد عصره بعد إضافة ماء ساخن على السلال في وحدة عصر مستقلة تم العثور عليها في هذه المعصرة، وهي عبارة عن قاعدة حجرية يبلغ طولها حوالي ١٥٠سم (شكل ٨) خصصت للعصر وعمل في وسطها ثقب مربع الشكل

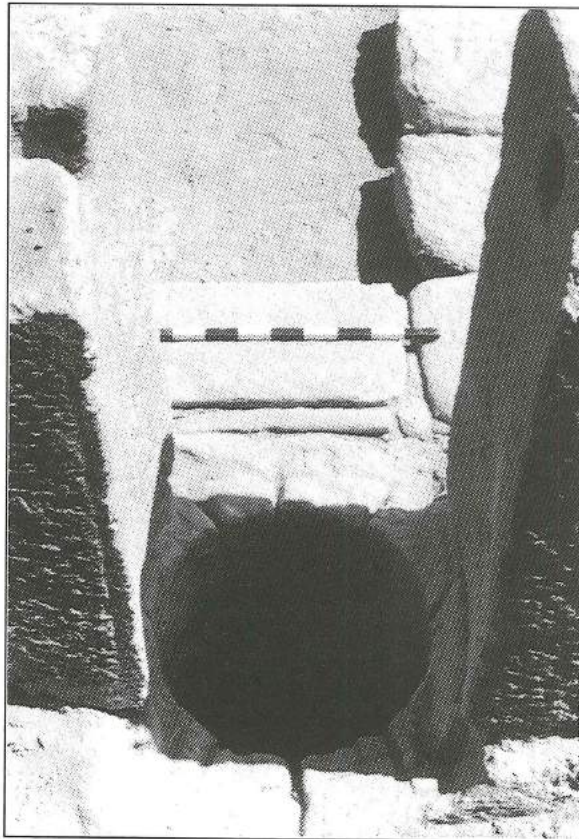


شكل (٦) حجارة ثقالات الوزن، وحوضين للزيت، وقاعدة لعصر الزيتون.

١٨٠سم، كما روعي أيضاً ألا تنزلق العارضة الخشبية للأعلى فعمل تجويف في كل حجر لوضع عمود خشبي بشكل عرضي، وبضغط العارضة على كومة الزيتون المهروس في السلال يسيل الزيت للأسفل إلى بئر تجميع الزيت، وقد روعي عمل أخاديد جانبية على فوهة البئر لإسالة الزيت (شكل ٤).

يوجد على بُعد ٤,٥٠م من موضع العصر هذا حجران مربعان كقاعدتين متقابلتين، أطولهما ٦٥سم×٨٠سم والآخر ٧٠سم×٧٠سم، عمل في وسط كل منهما ثقب مربع، ويبدو أنهما كانا مغرزين لعمودين خشبيين قائمين، كان الهدف من وجود هذين العمودين هو حمل الطرف الطليق من العارضة الخشبية بواسطة حبل ملتف على بكرة محمولة على اسطوانة خشبية في أعلى العمودين القائمين، الطرف السفلي من الحبل مربوط باسطوانة خشبية مثبتة في أسفل العمودين القائمين بشكل عرضي، وهي اسطوانة متحركة بواسطة عتلتين، ويمكن بواسطتها رفع العارضة الخشبية الضاغطة للأعلى، ويخصص لذلك عاملان يقومان بتحريك عتلي الاسطوانة (شكل ٣، ٥).

أما بالنسبة لطرف العارضة الخشبية فقد كان



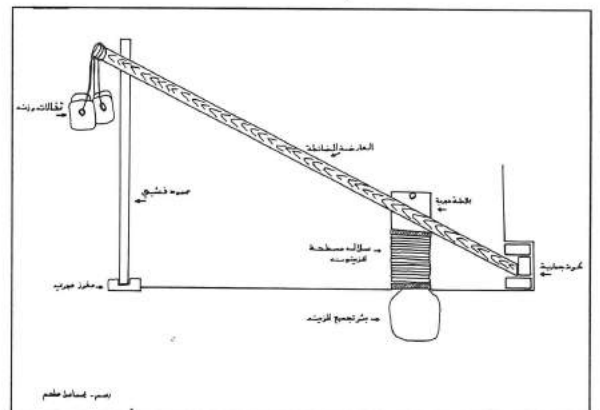
شكل (٤) موضع العصر في وحدة العصر A مكون من حجرين واقفين وبئر تجميع الزيت



شكل (٢) منظر عام للمعصرة.

المعصرة وتعمل بطريقة العارضة الخشبية الضاغطة حيث يثبت أحد طرفيها في كوة جدارية بينما يربط الطرف الآخر بثقل. بنيت الكوة الجدارية في جدار مبني من حجارة مشذبة في الجهة الجنوبية، أبعادها ١٢٠سم×٦٥سم×٦٠سم عمق (شكل ٣)، يثبت فيها طرف العارضة الخشبية بحيث يتم ضغط العارضة بحجارة أو أخشاب لمنع انزلاقها، وبالعادة يصل طول العارضة الخشبية في مثل هذه المعصرة الكبيرة حوالي ١١,٥٦م حسب ما ذكر (هيرون) (Drachman 1965: 110-111).

يقابل الكوة الجدارية موضع العصر، وهو عبارة عن بئر لتجميع الزيت بعمق حوالي (٤٠سم) كانت توضع فوق فوهته -على الأغلب- صفيحة خشبية بشكل دائري وفوقها توضع سلال مسطحة مرتبة فوق بعضها البعض تعمل خصيصاً لوضع الزيتون المهروس، وفي أعلاها صفيحة خشبية دائرية أخرى بحيث تضغط العارضة الخشبية على الصفيحة، وبالتالي على السلال المسطحة (شكل ٣). ومراعاة لوضع السلال التي يصل ارتفاعها أكثر من متر واحد، وحتى لا تنزلق، تم تثبيت حجرين مشذبين على جانبي بئر تجميع الزيت بشكل طولي يصل طول كل منهما



شكل (٣) إعادة تصور لآلية عمل وحدة العصر A - جلد.

معصرة زيتون في جلعاد / السلط

إعداد: سعد الحديدي وإسماعيل ملحم

وجدت المعصرة مدمرة في بعض أجزائها علاوةً على فقدان بعض مرافقها الرئيسية كحوض الهرس. تؤرخ الكسر الفخارية والعملات التي عُثِرَ عليها إلى العصر الروماني المتأخر والعصر البيزنطي.

وصف مفصل لمعصرة الزيتون

تبلغ المساحة الإجمالية لمعصرة زيتون جلعاد حوالي ٢٠م × ٢٠م وتتكون من صالة مكشوفة، ليس لها سقف بنائي على ما يبدو. يوجد فيها وحدتا عصر، وعلى جانبيها أربعة عشرة حجرة تخزين صغيرة، أبعاد كل حجرة حوالي ١٣٠سم × ١٧٥سم. أبعاد الصالة ١٣,٥م × ٦,٨٠م. توجد في الصالة وحدتي عصر A و B، كلاهما تعملان بالتقنية نفسها. (شكل ١، ٢).

وحدة العصر A

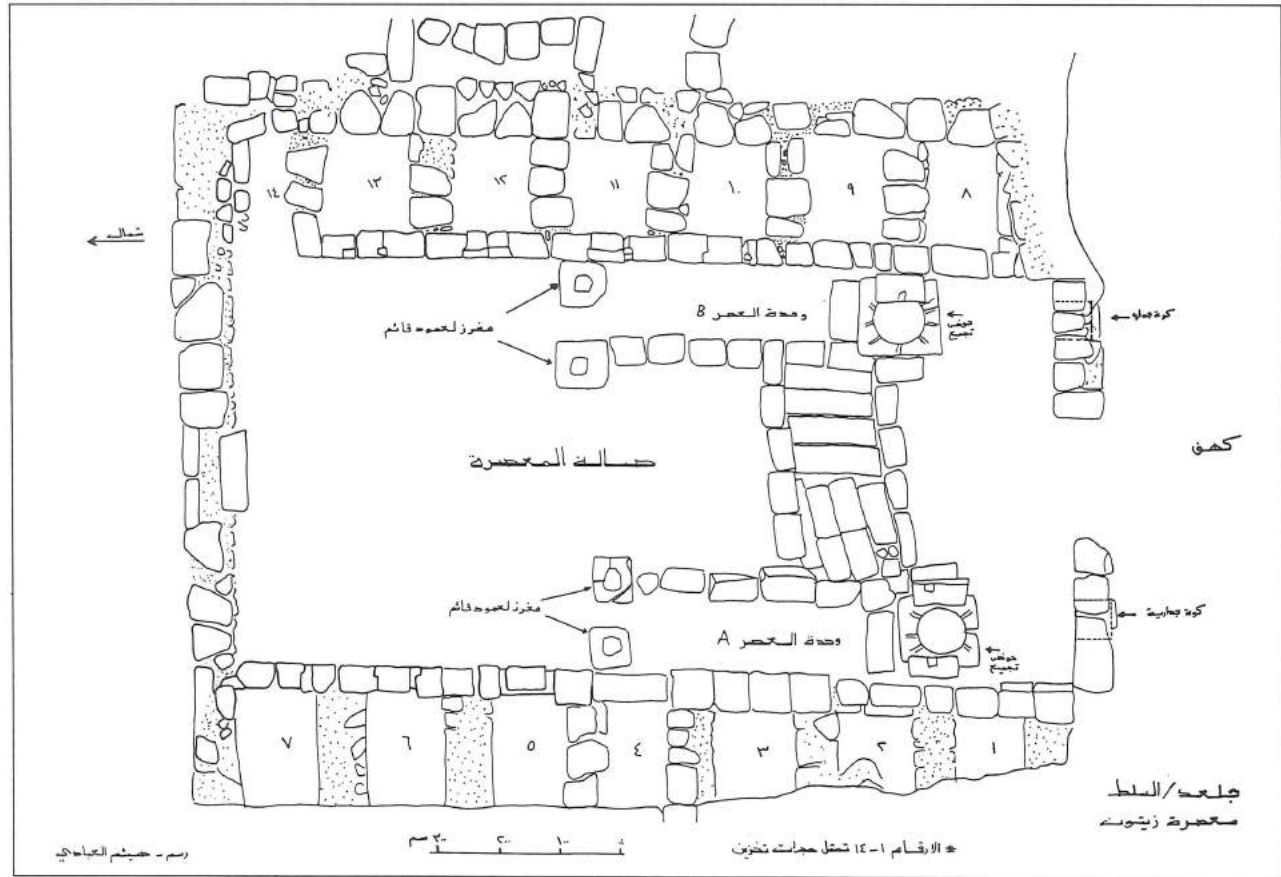
تقع وحدة العصر A في الجهة الغربية من

الموقع

تقع خربة جلعاد على بُعد حوالي ٢٢ كم شمال شرق مدينة السلط، وهي خربة واسعة وغنية بالآثار من عصور مختلفة، خاصة الرومانية والبيزنطية، مثل مدفن روماني جماعي، وطريق روماني مرصوف. طقس المنطقة بشكل عام معتدل وتسقط عليها الامطار بما لا يقل عن ٤٠٠ ملم سنوياً وأراضيها صالحة لزراعة الزيتون والعنب.

الكشف وأعمال التنقيب

تم الكشف في هذه الخربة عن معصرة زيتون تمتاز بسعة مساحتها وإنتاجها الوفير. جاء الكشف عن هذه المعصرة إثر حفرة قام بها مكتب آثار السلط بإشراف سعد الحديدي في الفترة الواقعة ما بين ٢٢ حزيران ولغاية ١٠ أيلول ١٩٩٧م. شارك في أعمال التنقيب علي الخياط وقام بأعمال الرسم هيثم العبادي.



شكل (١) مخطط عام للمعصرة ومرافقها.





شكل(٩) مجموعة الحفر المحاذية للجدار الشرقي للبرج.

الى المزيد من العمل لمحاولة الكشف أكثر عن هذه الأبراج حتى تكتمل الصورة ويزول الخلاف حولها، خاصة فيما يتعلق بوظيفة هذه الأبراج، وعلاقة البرج الدائري بالبرج المربع. كما أننا نؤكد ضرورة أهمية المحافظة على هذه الأبراج وخاصة إذا كانت كاملة.

إبراهيم الزين
هنادي الطاهر
دائرة الآثار العامة

- طول الجدار الواقع على بعد ٧٠ م من الجدار السابق ٥ م، وعرضه ٩٠ سم، وارتفاعه ٧٠ م. وأيضاً تم الكشف عن جدار آخر يعود للفترة الإسلامية في الجهة الشمالية من البرج يلتقي بجدار البرج الأصلي حيث تم الكشف عن ثلاث درجات مبنية في الجدار وقد تكون هذه الدرجات مؤدية الى طابق علوي، خاصة أنه لم يوجد مدخل للبرج في أي من جدرانه الأربعة مما يدل على أن الدخول كان من طابق أعلى. وجدت مجموعة من الحفر غير العميقة لكنها متساوية الأبعاد خارج البرج من الجهة الشرقية، ومن الممكن أن تكون قد استعملت كمعالف أو حفر لتجميع المياه لاستعمالات الماشية (شكل ٩).

تأريخ الموقع

من خلال ما تم الكشف عنه في هذا الموقع ونتيجة للجدل حول تأريخ هذه الأبراج، فقد اشارت جميع الدلائل التي تم العثور عليها على أن هذه الأبراج تعود في تأريخها الى الفترة العمونية (العصر الحديدي الثاني) القرنين السابع والسادس قبل الميلاد. ويؤكد ذلك الدكتور محمد النجار في تقريره عن برج خلد^(١)، والدكتور محمد خير ياسين في تقريره عن حضرة المبرك^(٢).

الخاتمة

توجد في المنطقة إضافة الى البرج العموني ظواهر معمارية أخرى منتشرة على السطح في الجهتين الغربية والجنوبية الغربية، وتحتل ان يكون لها ارتباط وثيق بالبرج لكننا لم نتمكن من التنقيب عنها لضيق الوقت.

لا بد من الإشارة هنا الى أنه وبالرغم من أعمال التنقيب السابقة في الأبراج العمونية، إلا أننا نحتاج

Yassine, Kh. (ed.), *Archaeology of Jordan: Essays and Reports* 1988: P. 17. Amman: University of Jordan.

(١) النجار، محمد: تقرير أولي حول نتائج التنقيبات الأثرية في خلد/ عمان. *حولية دائرة الآثار العامة* مجلد ٣٦ (١٩٩٢) ص. ٤١٢-٤٢٠.



شكل (٦) الغرفة الثالثة ويلاحظ الباب المؤدي إلى الغرفة الثانية.

٨٥سم إلى ٢,٦٧م وارتفاعاتها ما بين ٢م إلى ٢,٦٥م

تم الكشف أثناء العمل عن بعض الجدران الإضافية التي تعود للفترة الاموية مما يشير إلى أنه تم إعادة استخدامها في الفترة الاموية، كما تم الكشف عن جدار ممتد من زاوية الجدار الشمالية الشرقية الى الشمال، وكذلك عن جدارين في الجهة الجنوبية من البرج أحدهما ممتد من زاوية البرج الجنوبية الشرقية الى الجنوب والآخر قريب منه ممتد من جدار البرج الجنوبي الى الجنوب (شكل ٨) وكانت قياسات هذين الجدارين على النحو الآتي:-

- طول الجدار الواقع في الجهة الشمالية الشرقية من زاوية البرج والممتد الى الشمال ٣,٦٠م وعرضه ٩٠سم وارتفاعه ٥٠م .

- طول الجدار الواقع في الجهة الجنوبية الشرقية من زاوية البرج والممتد الى الجنوب ٧,٩٠م وعرضه ١م وارتفاعه يتراوح ما بين ١,٢٠م-١,٧٠م.



شكل (٨) الجدران الإسلاميان ويقعان في الجهة الجنوبية من جدار البرج .

أبعاد الغرفة كانت ٢,٦٤م × ٣,٠٣م وأطوال جدرانها تراوحت ما بين ٢,٥٢م إلى ٣,١١م، أما عرض الجدران فتراوحت ما بين ٩١سم إلى ٥٤م، وارتفاعاتها ما بين ١,٦٢م إلى ٢,٨٠م .

الغرفة الرابعة (شكل ٧)

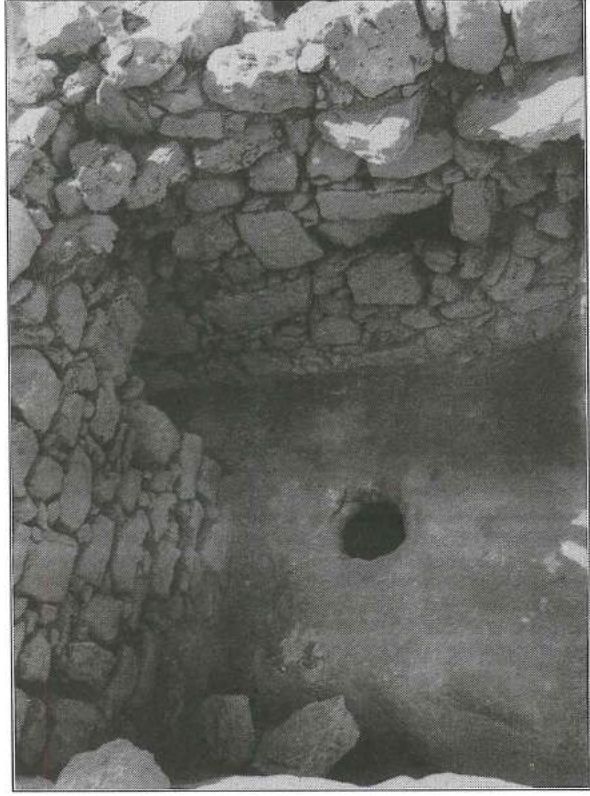
تقع هذه الغرفة إلى الجهة الغربية من الغرفة الثالثة وإلى الجهة الشمالية من الغرفة الأولى، مبنية من ثلاثة صفوف من الحجارة الكبيرة في الجهة الغربية وصفين من الحجارة في الجهات المتبقية، عثر في هذه الغرفة على بئر يقع في الجهة الشرقية من الغرفة بالقرب من الباب المكتشف الذي يقع في الجدار الفاصل ما بين هذه الغرفة والغرفة الثالثة، عمقه ٢,٣٠م وقطر فوهته ١٦سم، أما أبعاد هذه الغرفة فهي ٢,٥٣م × ٢,٩٧م تراوحت أطوال جدرانها ما بين ٢,٥٦م إلى ٣م وتراوح عرض جدرانها ما بين



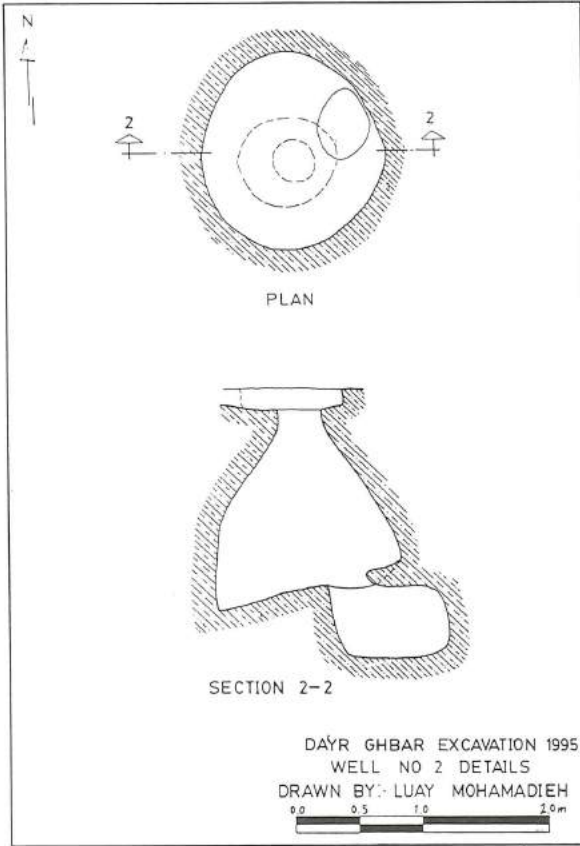
شكل (٧) الغرفة الرابعة، ويلاحظ وجود البابين المؤديين إلى الغرفتين الأولى والثانية، ويلاحظ أيضاً وجود حفرة في الزاوية الجنوبية.



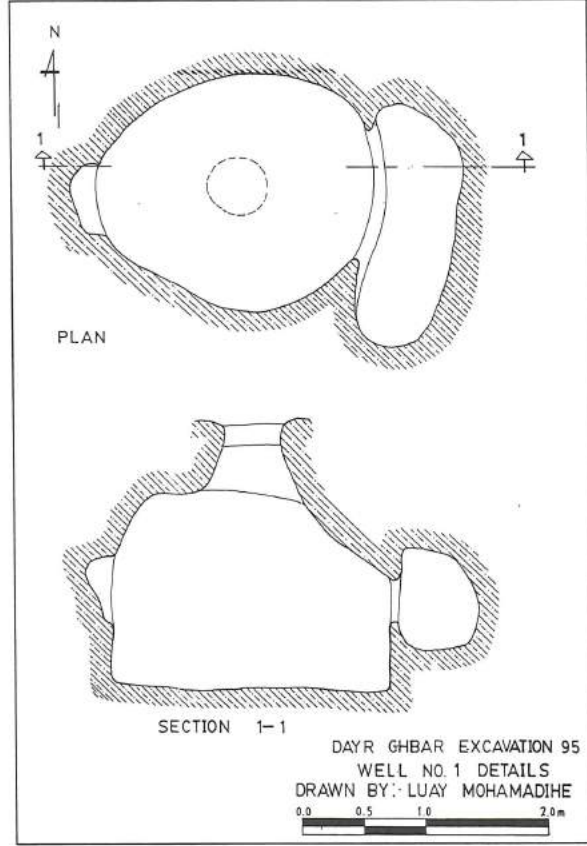
شكل (٤) الغرفة الثانية ويمكن مشاهدة البئر والباب المؤدي إلى الغرفة الثالثة .



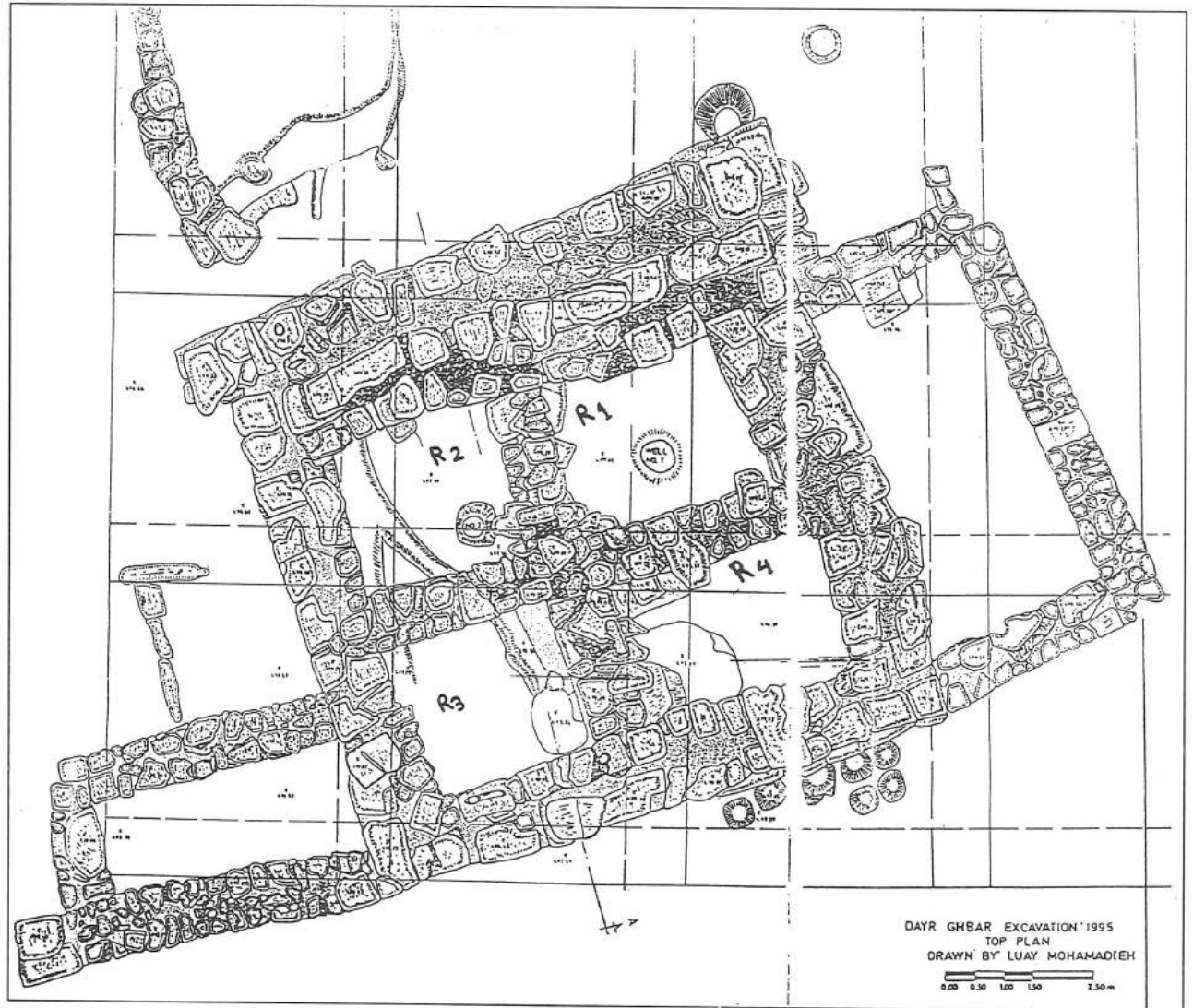
شكل (٢) الغرفة الاولى ويمكن مشاهدة البئر والباب المؤدي إلى الغرفة الرابعة .



شكل (٥) مخطط يبين البئر المكتشف في الغرفة الثانية .



شكل (٢) مخطط يبين البئر المكتشف في الغرفة الاولى .



شكل (١) مخطط برج دير غبار.

٤٦ م وعرضه ٨٠ سم، أما أبعاد الغرفة فهي ٢,٩٦ م × ٢,٧٠ م وتراوحت أطوال جدران الغرفة ما بين ٢,٣٥ م إلى ٢,٩٥ م أما عرض الجدران فتراوح ما بين ٩٠ سم إلى ٣٢ م وإرتفاعاتها ما بين ٥٤ م إلى ٣,٢٠ م. (شكل ٥,٤).

الغرفة الثالثة

تقع هذه الغرفة إلى الشمال من الغرفة الثانية وتتكون جميع جدرانها من صفيين من الحجارة الكبيرة ماعدا الجدار الشمالي المائل نتيجة تساقط الحجارة عليه، عثر على بعض الحجارة الممتدة من جدران الغرفة من الداخل مما يدل على أن الغرفة كانت مسقوفة، عثر في الزاوية الشرقية للغرفة على حفرة محفورة بالصخر عمقها ٨٤ سم وقطرها ٦٥ سم.

يقع باب الغرفة في الجدار الغربي للغرفة (شكل ٦) ويبلغ عرضه حوالي ٧٩ سم وإرتفاعه ٢٧ م أما

الغرفة بالقرب من الباب الذي تم الكشف عنه في الجدار الشرقي للغرفة حيث تراوح قطر البئر ما بين ٢٥ - ٤٩ سم وعمقه ٥٠ م. أما الباب فإرتفاعه ٥٣ م وعرضه ٨٣ سم، أما أبعاد الغرفة فهي ٢,٦٦ م × ٣,٠٧ م، تراوحت أطوال جدرانها ما بين ٢,٥٤ م إلى ٣,٠٧ م، عرض جدرانها ما بين ٩٠ سم إلى ٢,٦٧ م وإرتفاعاتها ما بين ٨٨ م إلى ٣,٠٣ م. (شكل ٣,٢).

الغرفة الثانية

تقع إلى الجهة الشرقية من الغرفة الأولى ويتم الدخول إليها عن طريق باب مشترك بين الغرفتين، جميع جدران هذه الغرفة مبنية من صفيين من الحجارة الكبيرة، عثر في الزاوية الشرقية للغرفة وملاصقة تماماً للجدار الشرقي على حفرة محفورة بالصخر أقل عمقاً من البئر وذات فوهة واسعة نسبياً، يقع باب الغرفة في الجدار الشمالي ويبلغ إرتفاعه

تقرير أولي حول نتائج الحفريات الانقاذية في دير غبار/عمان

اعداد : إبراهيم الزين وهنادي الطاهر

الموقع

تقع منطقة دير غبار غرب مدينة عمّان إلى الجنوب الغربي من منطقة الصويفيه شرق طريق مطار الملكة علياء الدولي. لا يعرف ولغاية الآن لماذا سميت منطقة دير غبار بهذا الاسم، وهل هو الاسم الحقيقي للمنطقة أم أن هناك اسم أقدم غير معروف. وجدت على إحدى تلال المنطقة ظواهر معمارية أثرية تشير كل الدلائل على أنها عبارة عن جدران لبرج يعود تاريخه إلى الفترة العمونية.

بداية العمل الفعلي في الموقع

نظراً للتطور والزحف العمراني الذي تشهده منطقة عمّان الكبرى والتهديد الحقيقي المتزايد الذي تتعرض له المواقع الأثرية وخاصة الأبراج العمونية، ولحرص دائرة الآثار العامة على الحفاظ على هذه المواقع الأثرية وخاصة لوقوعها في أرض مملوكة، فقد تم تكليف فريق أثري مكون من إبراهيم الزين وهنادي الطاهر وبرفقة الرسام لؤي محمديه لإجراء حفريات إنقاذية لهذا الموقع في الفترة الواقعة ما بين ٦/١ - ١٩٩٥/٧/٣١. وتجدر الإشارة هنا إلى أن هذا الموقع قد تعرض للعبث والتجريف خاصة في الجزء الشمالي منه من قبل مالك قطعة الأرض.

أهمية الموقع

تم العثور في موقع دير غبار على برج أثري يعود تاريخه إلى فترة المملكة العمونية، وتعود أهمية البرج إلى طبيعة بناء وطريقة تحصينه خاصة في الجهة الغربية من البرج، كما يوجد ظواهر معمارية في الجهة الجنوبية الغربية منه قد تكون ملحقات البرج السكنية وعليه، فإن وظيفة البرج المكتشف في منطقة دير غبار كانت فقط لتخزين المحاصيل الزراعية بعكس برج خلدا وأبراج المبرك السلمية، المعمارية والتي كان لها استعمال مزدوج عسكري ومدني، أي في حال تعرض المحصول والسكان للخطر أثناء فترة جني المحاصيل كانت الأبراج تستعمل لحماية السكان والمحاصيل.

تشير الدلائل أن ما تم الكشف عنه يعتبر الطابق الأول لبرج كان مكوناً من طابقين وذلك لوجود بقايا مداميك حجرية ترتفع فوق سقف الغرف، ولوحظ أن

أرضية الغرف منخفضة عن الأرضيات خارج البرج. كما تم الكشف عن وجود أبيار وحفر تخزين داخل غرف البرج، وأيضاً تم الكشف عن ثلاث درجات قد تؤدي إلى الطابق الثاني في الجهة الشمالية من البرج قريبة من زاويته وملاصقة له تماماً.

يتكون البرج من جدار عريض ذو ثلاثة صفوف مبنيه من الحجارة الكبيرة في الجهة الغربية وصفين من الحجارة الكبيرة في الجهات المتبقية (شكل ١) وتراوح أطوالها ما بين ٩,٨٠م في الواجهة الشرقية إلى ١١,٢٠م في الواجهة الغربية، كما تراوحت ارتفاعاتها ما بين ١,٠٥م في الناحية الشرقية إلى ٢,٨٨م في الناحية الغربية .

وعلى الرغم من حادث الحريق المؤسف الذي وقع في خيمة الفخار التي نصبها فريق العمل والذي أدى إلى فقدان كمي كبير منه إلا أن الدراسة التي قام بها الفريق على ما تبقى من الكسر الفخاري داخل وخارج البرج بينت أن هذا البرج كان يحتوى على فترات تاريخية مختلفة.

أما الفترات التي احتوى عليها هذا الموقع فكانت على النحو الآتي:

- العصر الحديدي الثاني-القرنين السابع والسادس قبل الميلاد
- الفترة الهلنستية المتأخرة.
- الفترة الرومانية المبكرة.
- الفترة البيزنطية المتأخرة.
- الفترة الرومانية.
- نهاية الفترة الأيوبية المملوكية وبداية الفترة العثمانية

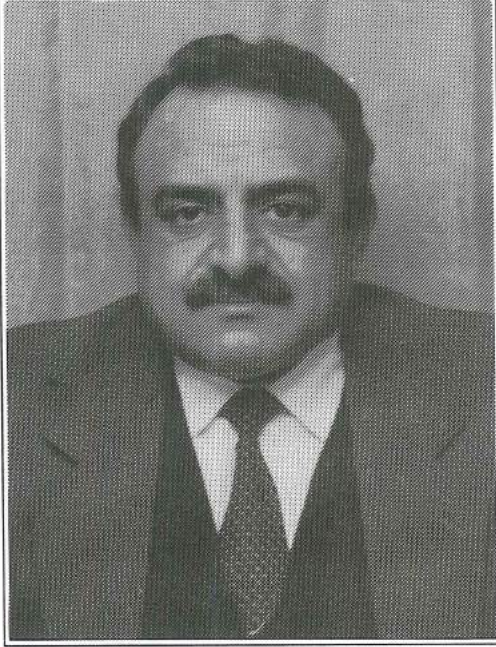
تم الكشف أثناء العمل داخل البرج عن أربعة غرف كاملة:-

الغرفة الأولى

تقع هذه الغرفة في زاوية البرج الجنوبية الغربية، وتتكون من ثلاثة صفوف من الحجارة الكبيرة في الجهة الغربية وصفين من الحجارة الكبيرة في الجهات المتبقية، وقد تم العثور على بعض الحجارة الممتدة من الجدران من الداخل تشير إلى أن الغرفة كانت مسقوفة، كذلك عثر على بئر في الجهة الشرقية من



موسى مصطفى الزيات في الذاكرة (١٩٤٥-١٩٩٨)



بتاريخ ١٩٩٨/٢/٩م فقدت دائرة الآثار العامة أحد أنشط موظفيها السيد موسى مصطفى الزيات، مدير متحف الآثار الأردني.

ولد موسى مصطفى الزيات عام ١٩٤٥م في مدينة عمّان، متزوج وله خمسة أنجال وأربع كريمات منهم من تخرج من الجامعات ومنهم ما زال على مقاعد الدراسة سواء في الجامعات أو المدارس.

حصل موسى مصطفى الزيات على ليسانس الآداب / تاريخ وآثار من الجامعة الأردنية عام ١٩٦٨م، وعمل منذ تخرجه في دائرة الآثار العامة.

استهل عمله عام ١٩٦٩م مساعداً لمفتش آثار معان وكان مركزه البتراء. ثم عُين أميناً لمتحف الآثار الأردني عام ١٩٧١م.

نال درجة الماجستير في الآثار حقل "المسكوكات البيزنطية" من الجامعة الأردنية عام ١٩٧٩م.

تدرج في سلم الخدمة المدنية حتى وصل إلى الدرجة الأولى من الفئة الأولى بعد اجتيازه دورة الإدارة العليا في معهد الإدارة العامة. وأصبح مديراً لمتحف الآثار الأردني وبقي على رأس عمله حتى تقاعد في شهر تشرين الثاني ١٩٩٧م.

شارك خلال فترة عمله بدائرة الآثار العامة بالعديد من المؤتمرات الخاصة بالمتاحف والتي عقدت في عمّان والقاهرة وغيرها. كما شارك في المعارض التي تحكي عن حضارة الأردن عبر ٩٠٠٠ عام والتي اقامتها دائرة الآثار العامة في الدول الأوروبية كالمانيا وفرنسا وبروكسل والنمسا إضافة للمعارض التي أقيمت في اليابان وسنغافوره، كما قام بزيارة استطلاعية للمتاحف في لندن.

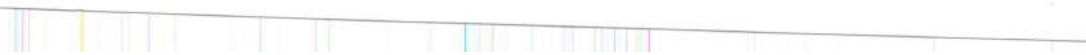
كان موسى مصطفى الزيات يعشق المطالعة وقراءة الشعر وكتب الأدب علاوة على متابعته لمستجدات علم المتاحف. ومن أبرز الصفات التي كان يتمتع بها هي روح الدعابة والمرح إضافة لجديته ودقته في العمل

وقد امتاز بدقة معرفته للقطع الأثرية الأصلية وغيرها عن المقلدة أو المزورة إذ كانت له عين فاحصة لمختلف القطع الأثرية.

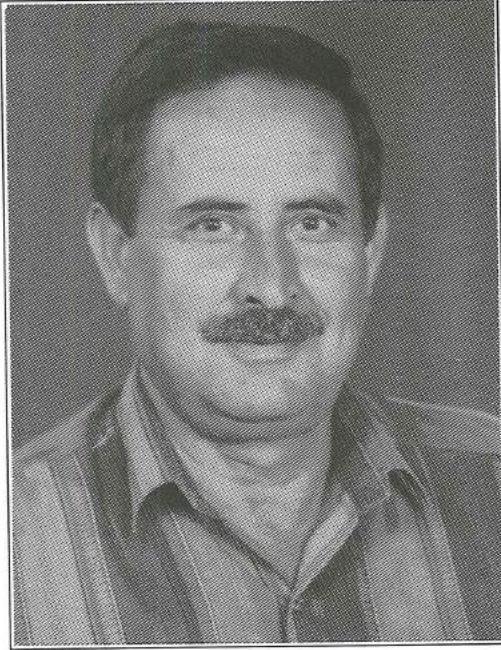
حاز على محبة ومعزة زملائه في الدائرة وكل من عمل معه كان يَكُنُّ له الاحترام والتقدير لأمانته وصدقه وحسن تعامله.

رحم الله أبا الحكم وأسكنه فسيح جنانه وستبقى ذكراه خالدة في نفس كل من عرفه علامة مميزة للموظف المخلص لعمله ولزملائه وللإنسان المؤمن الصادق.

سهام بلقر
عائدة نفوي
دائرة الآثار العامة



علي موسى علي صالح في الذاكرة (١٩٤٣-١٩٩٧)



في جامعة اليرموك في تشرين أول من عام ١٩٩٧م إلى أن توفاه الله إثر حادث سير مؤسف في ذات الشهر على طريق جرش / اربد وهو في طريقه لحضور هذه الدورة.

رحم الله علي موسى وأسكنه فسيح جنانه، فقد كان مثال الخلق العالي، والنشاط الدائم، والثقافة الواسعة، عاش للواجب وارتحل للرفيق الأعلى وهو يؤدي الواجب.

اسماعيل ملحم
دائرة الآثار العامه

ولد علي موسى علي صالح عام ١٩٤٣م في بلدة دير محيسن قضاء القدس. تزوج عام ١٩٧١م، وله ثلاثة أنجال وثلاث كريمات. حصل على بكالوريوس آثار من الجامعة الأردنية عام ١٩٦٧م، وهو من خريجي أول دفعة في بكالوريوس الآثار. كان مغرمًا بمطالعة كتب التاريخ والآثار والدين وكان يناقش كل ما يقرأ.

- باشر عمله في دائرة الآثار العامة عام ١٩٦٨م بوظيفة مفتش للآثار في مكتب آثار الكرك ثم في جبل القلعة في عمان.

- عمل مفتشاً لآثار مادبا بين الأعوام ١٩٧٢م - ١٩٧٤م.

- عمل مفتشاً لآثار جرش منذ عام ١٩٧٤م شارك خلالها في العديد من أعمال الترميم مثل ترميم المدرج الجنوبي وأثناء خدمته في جرش أشرف على اكتشاف كنيسة (ماريوس) من العصر البيزنطي قرب قوس هديران.

- شارك في دورة ترميم وصيانة في إيطاليا سنة ١٩٧٧م.

- شارك في العديد من الحفريات والمسوحات الأثرية مع البعثات الأجنبية في أم الرصاص وحسبان وجرش.

- أشرف على العديد من الحفريات العرضية والانقاذية في جرش وعجلون ومادبا.

- عمل مفتشاً لآثار عجلون على فترتين في الثمانينات وفي عامي ١٩٩٥ - ١٩٩٦م.

- عاد ليعمل مفتشاً لآثار جرش عام ١٩٩٦م، وكانت آخر مشاركاته في دورة الإدارة العليا التي عقدت



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لجنة التحرير
الدكتور غازي بيشة - المدير العام
الآنسة منى زغلول
السيدة إينا كيهبرج

قيمة الاشتراك السنوي
خمسة عشر ديناراً أردنياً (للأردن)
خمسون دولاراً أمريكياً (لبقية الاقطار شاملاً البريد السطحي)

تصميم وإخراج كمبيوتر: ماجدة ابراهيم
طباعة: مطابع المؤسسة الصحفية الاردنية «الرأي»

الآراء المطروحة في المقالات لا تمثل بالضرورة رأي دائرة الآثار العامة

تقبل المقالات حتى تاريخ ٣١ أيار من كل عام وتُرسل باسم:

حولية دائرة الآثار العامة

ص.ب: ٨٨

عمّان - الأردن

تلفاكس: ٠٩٦٢-٦-٤٦١٥٨٤٨



حولية دائرة الآثار العامة

المجلد الثاني والأربعون

عمّان
١٩٩٨

المملكة الأردنية الهاشمية