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**IN MEMORIUM  
MARTIN ALMAGRO BASCH**

In August, 1984 Professor Martin Almagro Basch died at the age 73. He was born in Tramacastilla in Spain and educated in Valencia and Madrid. Upon receiving his Doctorate in Library Science and Archives and Archaeology, he was appointed Director of the Institute of Prehistoric Studies at the University of Barcelona in 1940. In the following years and on behalf of this University's Archaeological Museum, Professor Almagro Basch organized and conducted several excavations in Spain, Egypt, Sudan and Jordan. He spent his last years as Director of the National Archaeological Museum of Madrid where he also founded the Spanish Institute of Prehistory. His rich and active research projects and his innumerable publications which exceed 300 books and articles on the history and archaeology of Spain, Europe, North Africa and the Near East have greatly contributed to our knowledge of these countries and helped in clarifying many outstanding historical and chronological problems related to ancient cultures and civilizations. His wide and practical knowledge of the archaeology of the ancient world was a result of his long years of experience in the

field. His particular interest in Islamic Archaeology was reflected during many years of excavation and conservation work at Quseir 'Amra and the Citadel of 'Amman in Jordan.

Professor Martin Almagro Basch's honours include Member of Honour of the German Archaeological Institute, la Medalla Cultural de Oro de la República de Italia, las Palmas Académicas francesas, Doctor of Honours of the University of Bordeaux, and corresponding member of more than a dozen scientific Institutions in Europe and the Americas. In Spain he received la Medalla de Oro al Mérito en las Bellas Artes, la Encomienda de la Orden civil de Alfonso X el Sabio, and the la Gran Cruz del Mérito Civil.

Professor Almagro Basch's dedication to Spanish and European historical and archaeological research in general and to Near Eastern archaeology in particular deserves the international community's profound appreciation. His many colleagues and students remember him as a great scholar and archaeologist, and an enthusiastic, cheerful and generous teacher who trained a large number of professionals. His loss will be deeply felt.



# BEIDHA 1983: AN INTERIM REPORT

by  
Diana Kirkbride

## Introduction

After a sixteen year interval caused by circumstances beyond my control, the excavation of Beidha was resumed in April 1983. The eighth season took place under the auspices of the British Institute at Amman for Archaeology and History, but by the time we were in the field, Beidha had become a joint expedition of the British Institute, the Department of Antiquities of Jordan and Yarmouk University. We are deeply indebted and extend our gratitude to Dr. Adnan Hadidi, Director of Antiquities for his generous support, enthusiastic encouragement and for his stimulating visit to the excavations, and to the Department of Antiquities for their always available help and friendly co-operation; to Dr. A. Badran, President of Yarmouk University, for the sponsorship of the University, the loan of equipment and its transport to and from the camp; to Dr. Mu'awiyah Ibrahim, Dean of Humanities and Science, University of Yarmouk for releasing Mr. Brian Byrd from his duties in the Centre for Jordanian Studies to join the Beidha team; to Mr. Yusef al-Alami, Director of the Jerash/Petra Project for all his extremely practical and highly appreciated help as well as for his visit to the site. We are also deeply indebted to Dr. C.-M. Bennett and her staff at the British Institute for unfailing help, support, advice and hospitality. We also acknowledge our gratitude to Mr. Niazi Shab'an our Department Representative for all his hard work and friendship.

The expedition was honoured by a visit from H.R. Crown Prince Hassan, who spent a day with us.

## The 1967 Season

In 1967 the excavation of Beidha was almost finished and we were sounding the layers below the earliest villages. The work was brought to an abrupt halt by a freak storm that flooded the trenches; an event that was followed closely by the outbreak of war. However, we had found what appeared to be the outer limit of a new quarter of the village lying about twenty-five metres east of the latter. The rest of this area seemed to have been destroyed by later terracing. This quarter consisted of three curvilinear, semi-subterranean structures built in the same style as the earliest houses, but without the wall slots. Each has a carefully laid floor either of large flagstones, clean gravel or small angular stones. The largest has a standing stone in the centre, its sides aligned exactly to the cardinal points, below the floor is a circular enclosure, its perimeter outlined with small sandstone slabs set on edge. Outside the south walls are either a very large boulder with a cup-hole, a huge, shallow, sandstone basin or very big, thin, flat sandstone slabs. As these buildings or enclosures are unlike anything else found on the site, and also because of the standing stone and other very special features this quarter was interpreted as a sanctuary area, perhaps containing graves below or nearby. The finds were scarce but entirely Neolithic in character. Although lying at approximately the same absolute level as Level VI in the village, it was necessary to join the two areas by a trench and a start had been made on this in 1967.<sup>1</sup>

## The 1983 Season

The aims of the 1983 season were thus fairly clear-cut. Firstly to try to find out the nature of the new quarter. Secondly, to join this new quarter to the village by a

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<sup>1</sup> For previous reports on Beidha see Diana Kirkbride, PEQ, 1960, 1966, 1967 and 1968.



trench. Thirdly, to make small soundings inside the village to try to determine the extents of the different main levels at any one period, and to tie up various points left over from the previous work and so on. Fourthly, to try to find the extent of the Natufian horizon that runs below the Neolithic village. This could only be done outside the built-up area as a layer of wind-blown sand almost two metres deep separates the two periods and trenches of this depth in the village would have caused the buildings to be endangered by erosion from below.

Despite having been left open, without maintenance for sixteen years we found the site in an extraordinarily good condition. Some of the sections were weatherbeaten but the majority were still straight and needed only a good clean; a few large bushes were flourishing and removed wholesale where possible; some walls, mostly of Level VI, had suffered serious slippage; aeolian sand to a depth of between 0.10 m. and 0.20 m. covered some of the floors. The initial cleaning did not take as long as we had feared; the site's remarkably good state must be caused by its desert environment.

Four main areas were investigated:

1. Soundings around the "sanctuary" area. Soundings below the floors of two of the three buildings had revealed only sand below one and a series of slight floors below the other. However, there was a thick deposit of a hardened, orange, rusty nature below the earlier, round enclosure which overlies the slight floors. This deposit was found only inside and not outside the enclosures walls.

Results: The adjacent squares to the north proved to contain the remains of Neolithic huts, hearths and camping floors that were earlier than both village and sanctuaries. The largest sanctuary, that containing the standing stone, was founded on these layers and its paved floors cut down through the huts. The lower camp or hut floors run on below the standing stone as we found in our sounding inside the building.

This work was carried down to the underlying soft sand. They had clay

mounds for walls, presumably they had originally superstructures of branches and reeds. The floors were either of stamped clay or fine gravel brought up from the *wadi* bed. Hearths were generally outlined with stones, roughly round and sometimes superimposed. Finds were extremely sparse but all Neolithic: some flints, animal bones, shell and a few shell beads. Some small amounts of charcoal may enable us to date this period.

The impression gained from these somewhat ephemeral remains is that their character is different from the pre-village Neolithic levels sounded below the village itself. The latter contained not only huts, but also big expanses or hardened floors with post-holes in them, areas of hearths some small and others of long standing, and the general accumulation associated with open courts of long duration. These were interpreted as the remains of a semi-permanent camp in use while the inhabitants determined whether or not the region was suitable for permanent occupation, and then while the first proper buildings were erected.

The Neolithic remains near the sanctuaries may have been the living quarters for the area of intense activity as found below the village proper. They show no signs of permanency, but seem to have been in use for perhaps a season or two, then a new hut was built usually partially cutting into an earlier one. We found no accumulation of debris and despite sieving, relatively few finds. This area might also be interpreted as a pre-village hunting camp, although close examination of the finds may throw more light on the subject.

2. Trench Joining the Sanctuary Area to the Village.

This work had been started in 1967, and had revealed the top of a large wall, 2.75 metres wide, coming slightly diagonally from the village and turning sharply south to cut the sanctuaries off from the village.

Results: The part of the wall running back to the village had been robbed anciently until only a scatter of stones on the soft sand underlying the whole site remained.

The excavations here proved thoroughly uneconomic and unrewarding, entailing the removal of about two metres of sand in which a mixture of Nabataean/Roman pottery and some Neolithic flints showed that whatever had been there originally had been removed and the entire area thoroughly churned up. The wall seems to have had two phases. The part running N-S is rougher and could have formed part of the later terracing that had so mauled the site. Some slight evidence and a great deal of hypothesis points towards this interpretation. About four metres south of the point where the wall was standing about a metre high, some very large natural boulders were found. These were over a metre long, one was laid flat in the manner of the huge slabs in the sanctuaries, about five metres away, another had been pushed half over it and a third, also 1.27 metres long and very thick had also been pushed half over and then abandoned (Pl. I:1). It is tempting to suggest that this was the point when the stone-robbers' determination ran out. After removing a large part of the village for their terracing they were faced with the great free-standing stone wall. This was removed until a point roughly coinciding with the large boulders. As the sanctuaries contained even larger boulders and flat slabs they contented themselves with breaking off the top of the standing stone where it rose above the ploughline and abandoned their endeavours. Below this level were the hearths and floors lying directly on the soft sand. Continuing the trench and in view of its unrewarding returns, the width was reduced from ten metres to two metres. At the end against the village deep soundings showed that the third terrace wall of the three main ones that have caused such destruction to the village, cuts straight down and removes every vestige of the buildings leaving only a bare 0.10 m. of tip. In view of this the rest of the trench was abandoned as being unlikely to produce anything in a stratified context, and thoroughly uneconomic as well.

### 3. The Village.

Because the architectural evolution as

developed at Beidha forms its unique contribution to Neolithic studies, it has become impossible to dig further in the site area without destroying part of this evidence. With this in mind, a series of small soundings were made below floors or in open spaces outside the earliest buildings extent. Two houses whose west walls had long been visible in the eastern section were also fully excavated.

Results: Below the main levels small soundings were made with satisfactory results. For example, Level IV in the north part of the village was founded into the pre-village hearths, in the centre of the village the same appears to have been the case. Level III cuts down into IV in the north part and the pre-village levels lie directly below the floor, but this is not the case in the centre where Level IV runs on below. In the eastern part Level IV has been almost entirely removed by Levels III and II which rest just above Level V which has also had most of the exterior walls removed, and so on.

The excavation of the two houses entailed first removing some 1.50 metres of sand before reaching the wall-tops. These proved to be of the Level IV type of house. One has been cut by the third terrace wall across its eastern side. This house has a fine plastered floor and two platforms of stone boulders. One against the north wall, the other near the centre, a quern lay close by. In the north-west corner is a large stone bowl with a neat stone foundation set in the floor round its base. (Pl. I: 2).

The other house was later, its south wall cutting off the entrance steps to the first described. This house had a small round hearth with a raised sill plastered at one with the floor, a rough stone platform, a quern and various ground-stone implements scattered about the floor. On a level with the top of the wall as left by the later terrace, were the remains of the floor of another house of similar type, though probably of later date. Here was the fragment of a plaster red floor with a quern set into it, a flat flagstone table and only a fraction of the interior wall; the terrace wall cuts straight through at this point.

Other soundings were made along the outside, east, of the terrace wall. Its western part did not cut down to the soft sand, but left about 0.50 m. of tip from the village and a number of superimposed plastered floor fragments with no trace of any walls. In the centre of the terrace wall, as we have seen, the village is entirely cut off. In the east three deep soundings revealed no trace of buildings, but deep tip.

#### 4. The Natufian.

In previous seasons the Natufian had been found in quantity along the talus of the *Tell* weathered by Seyl 'Aqlat, soundings inside the village also showed this horizon to be running at least halfway across the build-up area. Further work here would increase the risk of future erosion.

Results: Soundings were made in the trench joining the sanctuary area to the village. The first was made about twenty-five metres from the village, a very deep and narrow trench, but with no result. The second was made ten metres from the village and carried down to more than four metres, again with no result. Soundings **along the talus with Seyl 'Aqlat which had been so prolific in the past** showed that the Natufian peters out from a point roughly midway across the village from N-S. The

sounding made below the northern extremity of the excavated area still produced a fair sample of flints, but in nothing like the number and variety of those further south.

The excavation of Beidha cannot be profitably continued. The site has now been fenced and will be left open for the future.

#### Acknowledgements

We thank the following institutions for their generous support: the British Academy; the British Institute at Amman; the British Museum; the British School of Archaeology in Jerusalem; the Ashmolean Museum, Oxford; the Society of Antiquaries of London; The Department of Antiquities of Jordan; the Gerald Averay Wainwright Foundation, University of Oxford; the University Museum, Manchester.

I also thank the team who, because of the last minute withdrawal of two members, had to double their roles. Mr. Brian Byrd, site supervisor and back-up surveyor, draughtsman and photographer; Mr. Don Bunyan, photographer and site supervisor; Madame Adelaide Fenaille-Kamir, site supervisor and flint sorter; Dr. Howard Hecker, zoologist and site supervisor; Mr. Brian Johnson, architect; Mr. Bob Erskine, surveyor and Mr. Niazi Shab'an, Department Representative and site supervisor.

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# THE 1983 SEASON AT 'AIN GHAZAL: PRELIMINARY REPORT

by  
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and  
Alan H. Simmons

## Introduction

The second campaign of excavations at 'Ain Ghazal began on June 17 and lasted until 11 August, 1983. A two-week extension of the season ensued in one of the excavation trenches for the removal of a spectacular cache of human statues and busts (see below).

The primary goals of the 1983 season were twofold. The first was to link up the excavation areas of the first season in 1982, which entailed a 55.00 m. long trench extending from SQ 3073 (the stratigraphic Step Trench) in the south to SQ 3083, the northernmost probe of the 1982 effort.<sup>1</sup> In addition to providing the means of correlating stratigraphically the disparate 1982 trenches, this plan would also greatly increase horizontal exposure of the east central portion of the site to provide an enhanced appreciation of contemporary use of building and work space as well as to provide a basis for investigating spacial variation in several features of economic, technological, and social aspects of the residents of the village.

The second major goal was to investigate more closely the size of the settlement by digging test trenches along the uphill edge of the site to locate the westernmost structures built by the Neolithic community.

## Preliminary Results

The 1983 season was successful beyond any expectations. The following sections provide a brief summary of the preliminary analyses of the recovered data.

### 1. Site Size.

At the end of the 1982 season, the size of 'Ain Ghazal was estimated to cover 12 hectares. This estimate was based firmly on visible walls and floors exposed in a 600.00 metre (N-S) composite of bulldozer cuts associated with highway construction and commercial development. The east-west axis was less securely based on the distribution of relatively dense scatters of Early Neolithic flint tools and debitage which ranged uphill for some 200.00 metres from the highway.

Nine test trenches of varying sizes probed two areas in the uphill section of the site in an effort to locate PPNB structures. These trenches were located along the transect investigated by Dr. B. Frohlich's resistivity survey in mid-1982, and the test probes were placed near one maximum and one minimum anomaly reading of his results.

The trenches at ca. 200.00 metres west of the highway encountered culturally sterile Pleistocene clay approximately one metre below groundlevel. Around 40.00 metres downslope to the east of these probes, a series of seven test pits revealed a series of potsherds (possibly Chalcolithic through Byzantine periods), flint artefacts (many of which were heavily abraded), and an undateable stone wall running downslope. Finally, at approximately two metres below surface level, PPNB flints and small pieces of burnished and red-painted plaster occurred in association with an ashy matrix. Although this material is evidently not *in situ*, the context clearly indicates that the flints and flooring material must have come from up the slope,

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<sup>1</sup> G. Rollefson, The 1982 Season at 'Ain Ghazal: Preliminary Report, *ADAJ*, XXVII (1983) p. 1-16.

demonstrating that the settlement ranged beyond 160.00 metres west of the highway. This would result in an area of approximately 10 hectares (25 acres) for the village west of the Zarqa.

Although a systematic regional survey of the 'Ain Ghazal vicinity is planned for the 1984 season, casual walkabouts in 1983 revealed that the 'Ain Ghazal settlement also extended on the eastern bank of the Zarqa River. Numerous walls were detected, and one plastered floor with red painting (replastered once) was located near the northern end of a promintory. Flints and ashy soil cover about 1-1.5 hectares (2.5-3.7 acres) in this part of the village. The combined total for both areas of the site is 11-11.5 hectares (27-28 acres).

## 2. Artefacts

### a) Chipped Stone Artefacts

The 1983 season was extremely productive in terms of flint artefacts, numbering an estimated quarter-million pieces (including microflakes and chipping debris). Analysis of this material is currently underway, although a preliminary sample of approximately 5% of the *in situ* material has been sorted and analyzed.

**Table 1. Composition by major artefact class of the chipped stone artefacts in a random sample from the 1983 season at 'Ain Ghazal (Jordan).**

Class	n	%
Blades	3782	24.8
Bladelets	939	6.2
Flakes	4524	29.7
C.T.E.	330	2.2
Burin spalls	61	0.4
Paleolithic	13	0.1
Microflakes	2484	16.3
Other	35	0.2
Debris	2970	19.5
Cores	94	0.6

Tools	(764)	(5.1)
Total	15,232	100.0
Blades	4721	48.3
Flakes	4950	50.7
Cores	94	1.0
Tools	(764)	(7.9)
Total	9765	100.0
Blades	4721	48.8
Flakes	4950	51.2
Total	9671	100.0

Table 1 provides a tabulation of the major artefact class in the analyzed sample. It is interesting to note that the relative frequencies of core trimming elements ("C.T.E."), cores, and debris are not significantly different from the intensively analyzed *in situ* samples from 1982.<sup>2</sup> The blade-flake ratio, however, is significantly different beyond the .001 level for the SQ 3079 vs. the 1983 sample and for the SQ 3067 vs. the 1983 sample, indicating some specialization in tool manufacture in the two 1982 areas. Two areas in the 1983 excavations also appear to have been specialized knapping areas: one locus in SQ 3073 produced only 139 blades vs. 453 flakes, and another locus from SQ 3075 produced 909 flakes and only 70 blades.

**Table 2. Typological composition of a random sample of chipped stone tools from the 1983 season at 'Ain Ghazal.**

Tool Type	n	%
Projectile points	63	11.2
Sickle blades	56	9.9
Bifaces	7	1.2
Knives	6	1.1
Burins	152	27.0
Perforators	35	6.2

G. Rollefson and K. Abu Ghuneima, Technological Analysis of Blades and Flakes from 'Ain Ghazal, *ADAJ*, XXVII (1983) p. 461-470, L.

Villiers and G. Rollefson, Excavations at the PPNB Village of 'Ain Ghazal (Jordan), 1982, *Mitteilungen der Deutschen Orient Gesellschaft*, in press.

Drills/reamers	28	1.2
Drills or point tangs	7	1.2
Scrapers	20	3.6
Raclettes	2	0.4
Endscrapers	7	1.2
Steep Scrapers	7	1.2
Denticulates	38	6.7
Notches	37	6.6
End-notched blades	6	1.1
Wedges	38	6.7
Chisles	1	0.2
Axe/adze/celt	3	0.5
Choppers	9	1.6
Tanged blades	9	1.6
Chamfered blades	4	0.7
Backed blades	10	1.8
Truncated blades	10	1.8
Truncated flakes	6	1.1
Lunates	1	0.2
"Other"	1	0.2
<hr/>		
Total, shaped artifacts	563	100.0
Retouched blades	58	(7.6)
Utilized blades	80	(10.5)
Retouched flakes	15	(2.0)
Utilized flakes	32	(4.2)
Unclassifiable (too damaged)	16	(2.1)
<hr/>		
Total tools	764	

The number of tools in the analyzed sample from 1983 is relatively low (5.1%) compared to 1982, and Table 2 also reveals that there are considerable differences in the relative frequencies of specific tool types compared to the 1982 sample. Projectile points, for example, are much better represented in the more recent season, while burins have taken on a more modest importance. Of note in Table 2 is the lunate microlith with unidirectional backing retouch (Fig. 1: f), found in redeposited fill in SQ 3083. This is very tentative evidence that pre-Neolithic occupations may occur at 'Ain Ghazal, at present still covered by the main village cultural accumulation.

The sickle blades from 1983 continue to maintain the pattern witnessed in the first year's analysis: although many relatively short fragments were found in 1983, these are apparently broken pieces of originally long intact blades used singly, not truncated segments used in a composite tool. Two examples from the recently concluded season indicate two hafting methods. One sickle blade had a unifacially retouched tang (Fig. 1: j), while another still retained asphalt at the unretouched proximal end which in turn preserved small wood fragments from the handle. On the latter specimen, the angle of the grain of the wood and the pattern of sickle gloss indicate that the blade had been set at an angle to the long axis of the handle. As was noted in 1982, many of the sickle blades have sickle gloss on both lateral edges. (it might be mentioned here that one flint knife also retained asphalt on the proximal end of the blade).

**Table 3. Projectile point types in a sample from the 1983 season at 'Ain Ghazal.**

Type	n	%
Abu Ghosh	25	36.2
Simple tang	19	27.5
Bifacial tang "Jericho"	11	15.9
Leaf-shaped	6	8.7
Other	4	5.8
<hr/>		<hr/>
Subtotal	69	99.9
Unidentifiable	3	(4.2)
<hr/>		<hr/>
Subtotal	72	
Arrowheads	10	12.2
<hr/>		<hr/>
Total	82	

Projectile point types are presented in Table 3.<sup>3</sup> The point typology used here is tentative, based on the tang retouch for spear points, and does not strictly conform to other analytical typologies.

<sup>3</sup> Note that the total in Table 3 includes 19 more projectile points than are tabulated in Table 2.

The augmented material comes from unanalyzed flint samples in order to increase the projectile point sample size.

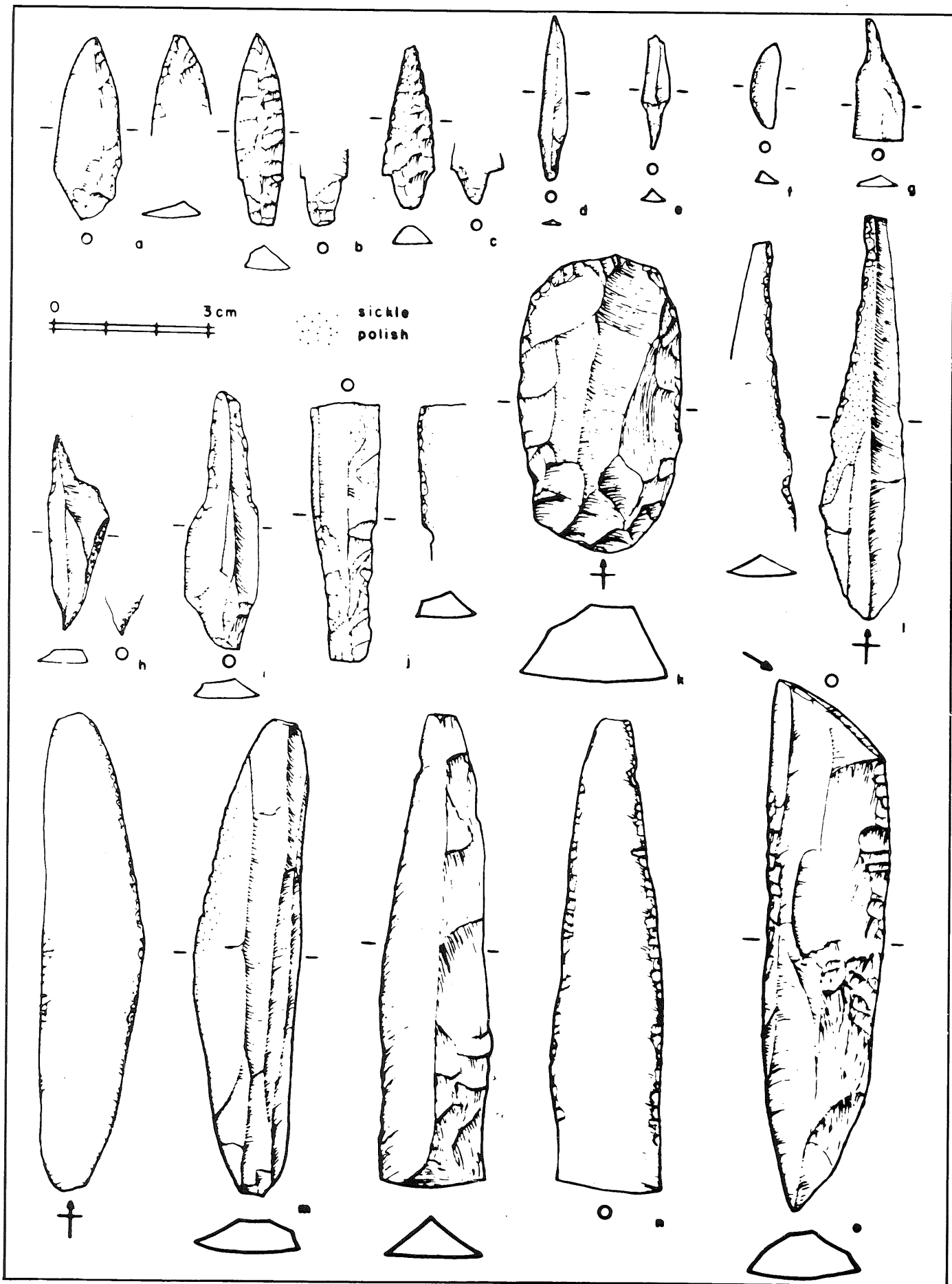


Fig. 1: Chipped stone tools from 'Ain Ghazal 1983. a-e: arrow-heads. f: lunate microlith. g-h: drills. i: borer, j, l-m: sickle blades, k: endscraper. n: knife, o: transverse burin on a retouched blade. (Drawing: Brian Byrd).

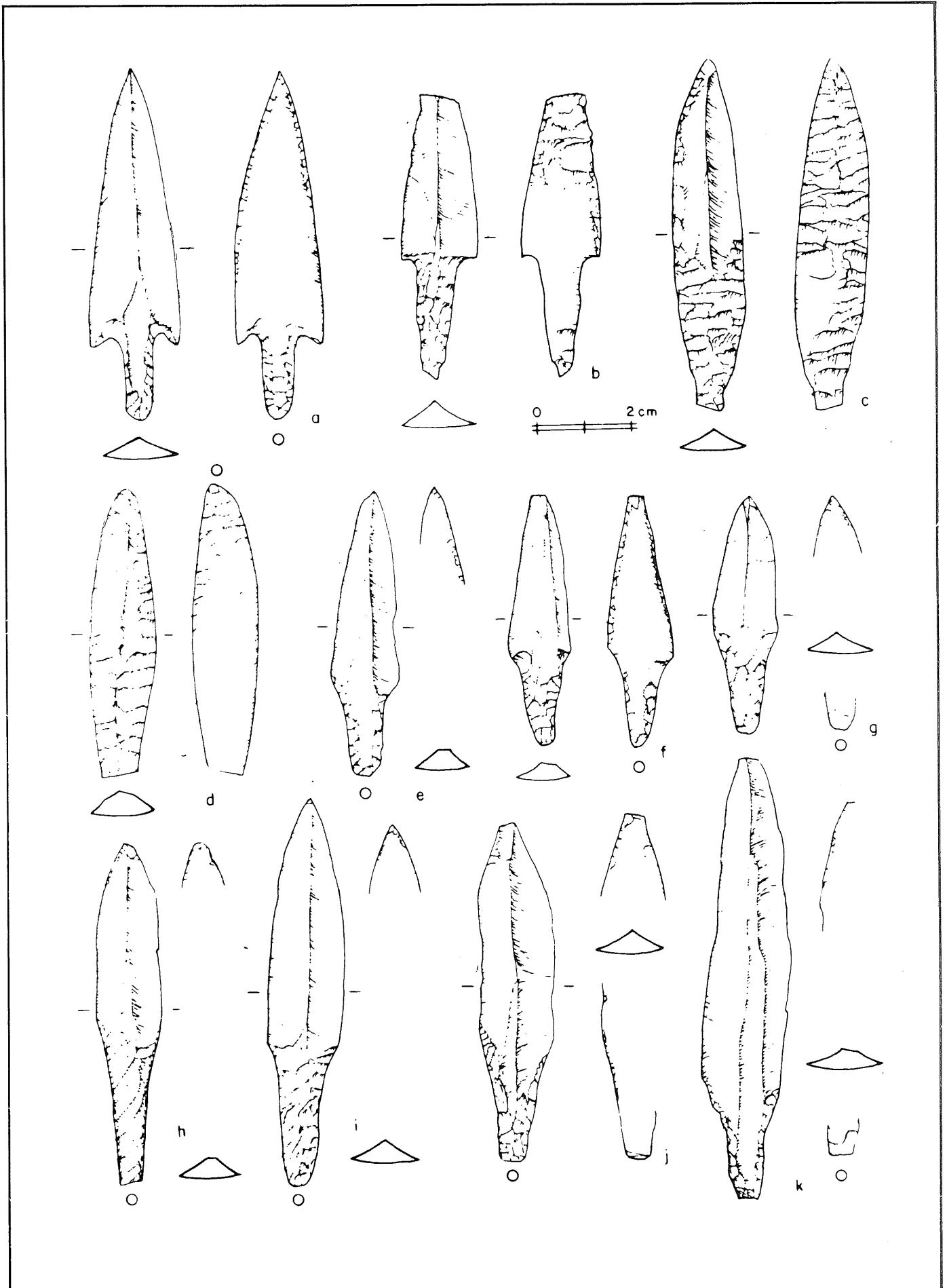


Fig. 2: Spear points from 'Ain Ghazal 1983. a-b: Jericho points. c-d: leaf-shaped points. e, k: simple tanged points. f: bifacial tanged point. g-j: Abu Ghosh points. (Drawing: Brian Byrd).



Arrowheads (Fig. 1: a-e) were more frequent in 1983 than in the first season (only 4% in 1982), and the shapes range from extremely delicate, barely retouched forms (Fig. 1: d-e) to more elaborate pieces (Fig. 1: b-c). Spear points were dominated by Abu Ghosh types, characterized by the oblique retouch scars on the tang (Fig. 2: g-i), although unifacial and bifacial tanged pieces were also relatively numerous. The Jericho points (Fig. 2: a-b) maintain the close similarities of point styles with Abu Ghosh, as well as with Munhata and Beisamoun, although the relative frequencies are quite different for all point types at these sites.<sup>3A</sup>

#### b) Bone Tools

Bone tools continued to be relatively poorly represented (Table 4), especially in comparison with the number of burins in the analyzed chipped stone tool sample. This is compounded by recalling that the figures in Table 2 represent only 5% of the total chipped stone sample (although it is quite possible that considerably more bone tools will be found among the as yet unanalyzed faunal material as well).

The general character of the bone tools continues to evoke a "sewing kit" interpretation. Awls evidently were used for leather working while most of the spatulas and needles appear to have served weaving and sewing functions. The "weav-

ing tool" in Table 4 is a slender, slightly curved bone "wand" about 12 cm. long and 1 cm. thick, tapering to rounded points at both extremities. Two of the spatulas which do not seem to be related to weaving are splayed at one-end and resemble the small wooden "spoons" often associated with small containers of ice cream in recent times.

#### c) Ground Stone

The tabulation of ground stone objects is presented in Table 5. The large limestone mortar, a small limestone mortar, one basalt pestle, a sandstone quern, a basalt stone bowl fragment, a quartzite bowl segment, and a limestone sphere came from surface finds; the limestone "cube" is from the surface of the eastern ward of the village across the Zarqa River.

Limestone continues to be the preferred resource for querns, mortars, and stone bowls. Basalt, not native to the 'Ain Ghazal vicinity and most likely obtained from the Mafraq region, constitutes the most popular raw material for hand-held mullers, discoidal grinding stones, and pestles. The shaped and unshaped fragments of basalt are probably shattered pieces of mullers or discs. The limestone "loomweight" is sub-tetrahedral in form, with a broken perforation near the apex.

#### d) Figurines

The human and animal figurines are

**Table 4. Bone tools from the 1983 season at 'Ain Ghazal**

	Surface	In situ	Comments
Awl	2	65	
Needle	—	4	
Spatula	—	31	Five perforated
"Thimble"	—	1	
"Weaving tool"	—	1	Long, narrow, curved, pointed
Subtotal	2	102	
Polished fragments	—	12	Use unknown
Total	2	114	

<sup>3A</sup> Compare Lechevallier, M. *Abou Ghosh et Beisamoun*, Paris, (1978), p. 46-57; 157-161.

**Table 5. Groundstone objects from the 1983 season at 'Ain Ghazal**

<i>Item</i>	<i>LS</i>	<i>BS</i>	<i>SS</i>	<i>QTS</i>	<i>CNG</i>	<i>FLN</i>	<i>Total</i>
Mortars, large	1	—	—	—	—	—	1
Mortars, small	5	2	—	—	1	—	8
Pestles	6	12	1	—	—	—	19
Micropestle	—	—	—	1	—	—	1
Querns	21	2	2	4	—	—	29
Mullers	9	16	6	8	—	—	39
Discs	3	28	4	—	—	—	35
Stone bowl, thick	17	1	—	—	—	—	18
Stone bowl, thin	3	—	—	2	—	—	5
Pounders	9	—	—	2	1	—	12
Hammerstones	—	—	—	—	—	3	3
Palettes	—	—	1	—	—	—	1
Rubbing stones	3	—	—	2	—	—	5
Polishing stones	—	—	—	—	—	2	2
Loomweight (?)	1	—	—	—	—	—	1
Cylinder	1	—	—	—	—	—	1
Smooth pebbles	—	—	—	—	—	10	10
Sphere	3	—	—	2	—	—	5
Cube	—	—	—	1	—	—	1
Shaped fragments	5	19	1	—	—	—	25
Unshaped fragments	—	7	—	—	—	—	7
Ochre-stained	1	—	1	2	—	—	4
Bitumen-stained	1	—	—	—	1	1	3
<b>Total</b>	<b>89</b>	<b>82</b>	<b>16</b>	<b>23</b>	<b>3</b>	<b>16</b>	<b>229</b>

LS = Limestone  
 BS = Basalt  
 SS = Sandstone  
 QTZ = Quartzite  
 CNG = Conglomerate  
 FLN = Flint

**Table 6. Human and animal figurines from the 1983 season at 'Ain Ghazal.**

	<i>Clay</i>	<i>Plaster/ Chalk</i>	<i>Comments</i>
Human fertility	5	—	Four "Venus"
Other human	12	3	Busts, heads
Bovine	43	—	
Equid(?)	1	—	
"Fox" (?)	1	—	Canid?
Unidentified animals	55	—	Mostly bovines?
<b>Subtotal</b>	<b>117</b>	<b>3</b>	
Appendages (arms, legs)	4	—	Three human
Animal horns	12	1	Seven bovine, one goat
Human bust torsos	—	2	
<b>Total</b>	<b>133</b>	<b>9</b>	

listed in Table 6. The human figurines which can be described as fertility statuettes are all made of clay. Two of them are "tattooed" by means of stippling. One of these, called the "Venus of 'Ain Ghazal", bears many close similarities with Upper Paleolithic "mother-goddesses" from Central Europe (Fig. 3). The other is a squatting figure and evokes stylistic antecedence to specimens from Hacilar and Anatolia (Fig. 4)<sup>3B</sup>. A third fertility figurine is represented only by a distended abdomen with the right hand of the woman resting along its side; the left hand is indicated by traces of rough clay where it broke off (Pl. II: 1). (It might be mentioned at this point that the enigmatic rocker-stamped "Walnut shell" found in 1982 is probably the abdomen of another fertility figurine.<sup>4</sup> Another figurine, this one of unfired clay in contrast to all the others, does not emphasize pregnancy, but that it depicts a nude female suggests that it is still probably related to fertility. It is possible that in view of the unfired state of the clay, and in view of the occurrence of distended abdomens found in isolation, that this statuette may have lost this distinguishing characteristic in antiquity.

Fifteen other human figurines were found in 1983, although the fragmentary state of most of them lends little aid in the interpretation of their meanings. The three plaster examples are rather globular, resembling "snowmen" whose heads have been broken off. It is conceivable that these are highly stylized fertility figurines in view of the rotundity of the forms, although it must be admitted that this is speculative. Among the rest, several are simply the heads whose bodies remain elsewhere at the site. In fact, one small bust is the only complete human figurine found in 1983; all the rest were damaged in one or more parts of the body. It is tempting to note that the absence of heads on most of the recovered figurines parallels the removal of the skulls from most of the human burials at 'Ain Ghazal.

The style of plastic expression is quite variable, ranging from spatulate and almost featureless faces (Pl. III: 1) to a small bald head with nubble-applique eyes to a charming "button-faced" bust with only subtle suggestions of facial features. Striking parallels to the last two figurines come from the aceramic levels of Munhata.<sup>5</sup>

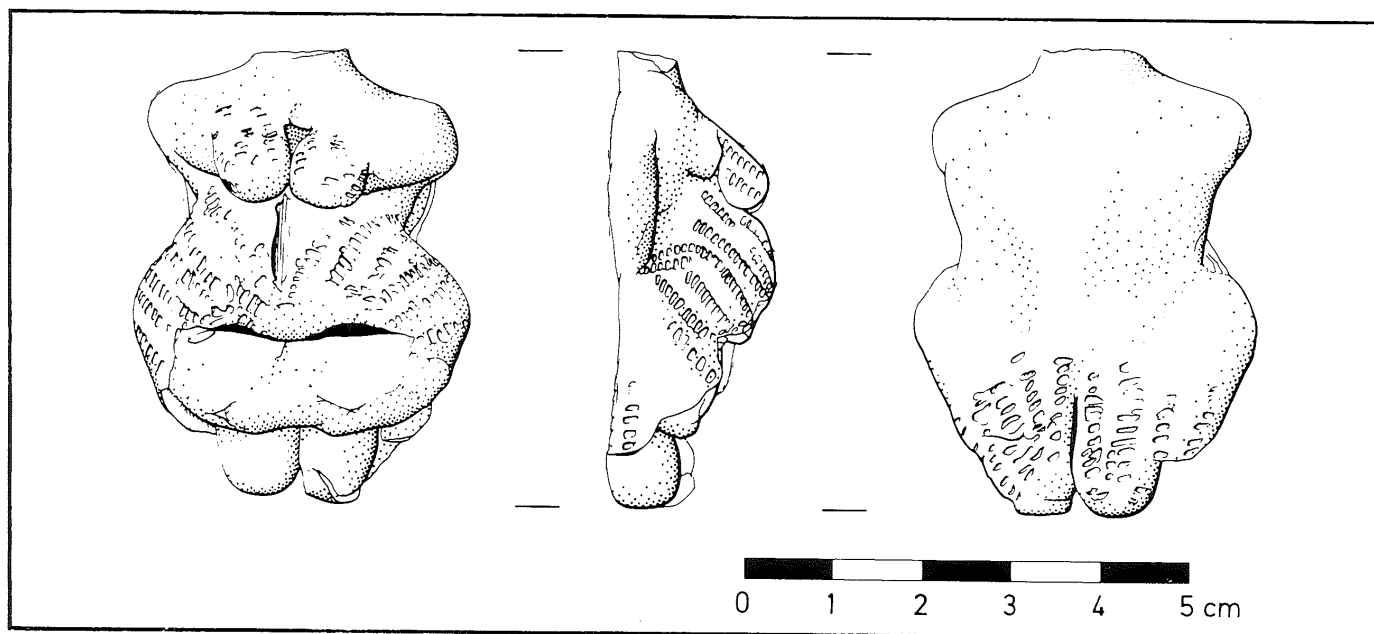


Fig. 3: The "Venus of 'Ain Ghazal" fertility figurine. (Drawing: J. Loynd Cowherd).

<sup>3B</sup> Compare Mellaart, J. *Excavations at Hacilar*, Edinburgh, (1970), Pl. 148, Fig. 222.

<sup>4</sup> G. Rollefson, 'Ain Ghazal: An Early Neolithic Community in Highland Jordan, Near Amman,

*BASOR*, in press, Fig. 3h.

<sup>5</sup> J. Perrot, *La troisième campagne de fouilles à Munhata, Syria*, 43, Plate VI 2 6.

Among the nearly one hundred animal figurines recovered this season, the great majority are probably cattle. While only forty-three were sufficiently complete to confirm this identification, most of the remaining fragmented specimens share a number of similar details. In a restricted area of one locus of SQ 3077, twenty-three unbaked clay animal figurines were found, and all were probably cattle. Another animal torso (the head, rump, and legs are missing) bore incisions emanating diagonally from the spine to represent a mane of hair; this probably represents an equid, although it is not impossible that it is a wild pig. One delightful example is a seated animal with long ears and a prominent tapering snout. Most likely this is a fox or canid, although definite identification is not possible (Pl. III: 2). Most of the isolated horn fragments were broken off cattle figurines, although one piece has the characteristic anterior spine of a goat.

#### e) Small Finds and Objects

A large number of geometric objects came from *in situ* deposits in 1983, although a third of the clay specimens were so poorly preserved that the original shapes could not be accurately determined (Table 7). Among the small clay balls, a majority came from trash deposits in SQ 3078. These geometrics add some substantiation to suggestions that they may be counting tokens, perhaps for administrative purposes, to deal with increasingly complex problems faced by growing Neolithic populations in the Near East.<sup>6</sup>

White-ware fragments continued to appear at 'Ain Ghazal, although the absolute number is small. One bowl fragment is elaborately decorated on the exterior with regularly spaced cross-hatching, deeply incised to create a high relief (Pl. IV: 1). Another sherd was heavily stained on its scored interior surface with red ochre. A



Fig. 4: The "Squatting Venus" fertility figurine from 'Ain Ghazal. (Drawing: J. Loynd Cowherd).

<sup>6</sup> D. Schmandt-Besserat, *The Beginnings of the Use*

*of Clay in Turkey, Anatolian Studies*, 27, p. 133-150.

Table 7. Clay and white-ware geometric objects and utilitarian pieces.

<i>Geometric Objects</i>	<i>Clay</i>	<i>White</i>	<i>Comments</i>
Cylinder	2	1	Both clay unbaked
Ball	59	4	Seven clay unbaked
Cone	11	—	Six unbaked, one incised
Hemisphere	4	—	All baked
Disc	3	—	All baked, one perforated
“Marshmallow”	3	1	One baked
“Loaf”	1	—	Baked, ca. 6x4x2 cm.
Flat Ovoid	4	1	All unbaked
“Bracelet”	1	—	Baked, fragment
Shaped fragment	20	—	
Amorphous lump	22	—	Possible figurines
Total	130	7	
<i>White-ware Vessels</i>			
Bowl base (?)		1	
Bowl/platter sherds		12	
Box		1	Surface, eastern area
“Saucer”		1	ca. 8 cm. diameter
Total		14	
<i>Pottery</i>			
Potsherds, surface		28	
Potsherds, test-pits		18	
Potsherds, excavation		24	Fired. 18 from good context
Bowl-base		1	Sun-dried
Platter		3	Sherds, red ochre coated
Loomweight		3	One late (EB?) from test pit.
Subtotal		77	
Reed-impressed		4	Roofing material?
Total		81	

small thick-sided box came from the surface of the village extension across the Zarqa River.

The 1983 season also produced a small amount of pottery, although two-thirds of the sherds were either found on the surface or disturbed contexts, or they came from the test trenches upslope. Nevertheless, eighteen sherds came from definite PPNB contexts. These examples are of crude workmanship and very ephemeral firing, but they are important indicators of an initial experimentation with ceramic manu-

facture. The sun-dried bowl base has a flat bottom and slightly flaring thick walls, and the three platter sherds, also sun-dried, are coated with red ochre.

Beads from 'Ain Ghazal were relatively numerous in 1983, with a high relative frequency of bone beads compared to the first season of excavations. The carnelian and animal tooth “butterfly” beads have close parallels at Tell Abu Hureyra.<sup>7</sup> The limestone pendants mentioned in Table 8 are all fragmentary remains of probably circular pendants, not bracelets as they

A Moore, A Pre-Neolithic Farmer's Village on the Euphrates, *Scientific American*, 242: 2, p. 62-70.

were identified in 1982<sup>8</sup>

Other small finds are tabulated in Table 9, although it must be admitted that many of the pieces present formidable problems in interpretation. The 7 cm-long subtriangular limestone "token", for example, appears to be stained with asphalt at the apex, and one surface has a red area, but whether the latter is a natural coloration or is the result of staining with red ochre remains to be determined. The scored and incised limestone and sandstone palettes all bear parallel or slightly subparallel grooves; whether these were utilitarian pieces or served some other function is not known. Seventeen pieces of

bone, mostly of birds, served as the resource for the manufacture of bone beads. The bone "toy" is a unique combination of two bird bones: one slender fragment was found inserted into another shorter piece of larger diameter so that the latter could slide freely back and forth along the former.

### 3. Faunal Remains<sup>9</sup>

Animal bones at 'Ain Ghazal are quite well preserved, and consequently it is not surprising that approximately a half-million fragments were recovered in 1983. A relatively large sample has been sorted

**Table 8. Jewelry from the 1983 season at 'Ain Ghazal**

<i>Beads</i>	<i>n</i>	<i>Comments</i>
Turquoise, disc	1	Surface find
Greenstone, disc	7	One surface; some turquoise?
"Alabaster", tubular	1	Material uncertain
Carnelian, tubular	1	Broken
Carnelian, butterfly	1	Broken
Amber (?), tubular	1	Material uncertain
Redstone, disc	2	Material uncertain; coral?
Tooth, butterfly	1	
Bone, disc and tubular	17	
Clay, disc	1	
Clay, tubular	2	
Limestone, disc	1	
Marine shell	1	
Snail shell	3	
<b>Total</b>	<b>40</b>	
<i>Pendants</i>		
Greenstone	2	
Cockle shell	3	
Other marine shell	3	
Mother-of-pearl	3	
Fossil sea urchin	1	
Bone	2	
Limestone, polished	25	Six from the surface
Chalk/plaster	1	
<b>Total</b>	<b>40</b>	

<sup>8</sup> Rollefson *op. cit.*, The 1982 Season... Table 4.

analyzed by Dr. Ilse Köhler-Rollefson. The microfaunal assemblage is being studied by Mr. William Gillespie.

<sup>9</sup> The macrofaunal remains are currently being

**Table 9. Other small finds from the 1983 season at 'Ain Ghazal.**

<i>Item</i>	<i>n</i>	<i>Comments</i>
"Token", polished blackstone	1	Material unknown
"Token", limestone	1	Subtriangular
Incised celt, limestone	1	Broken
Scored palette, limestone	2	Parallel grooves
Incised fragments, limestone	5	Some quern fragments?
Pecked "bun", limestone	1	Intention unknown
Pecked torus, limestone	3	Pendant manufacture?
Incised fragment, sandstone	2	
Scored fragment, sandstone	1	
Incised fragment, basalt	1	Pestle fragment?
Drilled stone sphere, quartzite	2	"Mace heads"
Perforated fragment, chalk	1	
Scored fragment, plaster/chalk	4	
Mica disc, incised	1	ca. 2 cm. diameter
Mica fragment	1	
Bitumen hafting	2	One sickle, one knife
Green Pigment	2	One from surface
Greenstone fragments	4	One surface; copper ore?
Obsidian blade fragments	4	Anatolian
Tooth, polished	1	Broken, pendant?
Mollusc fragments	2	
Eggshell fragments	1	Kind unknown
Bone bead sources	17	Mostly bird bones
Bone "toy"	1	Smaller inside larger

already, and the range of species represented among the remains is quite broad. Goats continue to dominate the taxa, although gazelle, cattle, wild pig, small carnivores (especially fox), hare, and turtles are also well represented. Equids are scarce. Birds, rodents, and other small animals are also relatively numerous, and remains of fish were recovered this year. In general the wide variation of the faunal inventory is remarkable, attesting to a quite varied animal protein diet enjoyed by a population nominally relying on domesticated animals.<sup>10</sup>

Although several goat horn cores exhibit minimal twisting, for the most part there are few firm morphological indica-

tions of a domesticated status for this species. But the persistent occurrence of severe phalangeal pathologies among the goat bones argues strongly for a domesticated state, a conclusion supported by the culling pattern based on the age of death as established by epiphyseal fusion rates.<sup>11</sup> At the current stage of analysis, hard data are not yet available to substantiate the possible domestication of cattle, although Köhler-Rollefson notes a relatively high degree of phalangeal pathologies within this species as well.

#### 4. Paleoethnobotanical Remains<sup>12</sup>

The relatively abundant remains of charred seeds and other plant parts con-

<sup>10</sup> I. Köhler-Rollefson, Personal communication.

Annual Meetings of the ASOR, 20 December 1983.

<sup>11</sup> I. Köhler-Rollefson, Jordanian Goat Husbandry in the PPNB and Today, Paper presented to the

<sup>12</sup> The paleoethnobotanical material is currently under analysis by Ms. Marci Donaldson.

tinued to characterize the sediments excavated in 1983. Preliminary analysis of the samples reflects a different pattern than noticed for the 1982 season. Cereal grains (especially barley) dominate, with peas, lentils, and chickpea in lesser amounts. Several "weeds" have also been identified, although some of these may have had some sort of economic role for the village residents.<sup>13</sup>

## 5. Human Remains<sup>14</sup>

More than fifteen human skeletons were exhumed in 1983, although to date it has not been possible to examine the remains closely. Combined with the fifteen burials from the 1982 season, it appears that several burial "styles" occurred at 'Ain Ghazal: a) subfloor, flexed, skull removed; b) exterior or courtyard, flexed, skull removed; c) exterior, extended, skull intact; and d) sacrificial. The last style was suggested by two newborn infants in a single interment that lay directly above and associated with a "nest" of adult human skulls buried in a pit in SQ 3074.

The four adult skulls (pl. IV: 2) were carefully arranged and are undoubtedly related to the ritual associated with the decapitation of individuals from burials styles a) and b) mentioned above. Two of these skulls still retained plaster in the eye sockets as well as fragmentary remains of plaster still adhering to the cheeks and upper jaw areas. On one of the specimens a thin line of asphalt crossed more or less horizontally across the plaster filling of the eye socket, probably to represent the junction of the upper and lower eyelids (Pl. IV: 3). No other details are available at this time, since the two skulls with the adhering plaster were removed *en bloc* in the sediments in which they were found; they have not yet been "excavated" from this matrix.

While these two plastered skulls are representatives of the "plastered skull

cult" known from Jericho, Beisamoun, and Ramad in Syria,<sup>15</sup> the accompanying two skulls may also at one time have been similarly treated. Surely, the simple association of all four crania in the same carefully arranged disposition suggests that the ritual afforded to any one was afforded to all. Furthermore, the pit in which they were found was evidently not the first resting place for the treated skulls, since the plaster that could have adorned the temples and brows of the two specimens with plaster remaining in the orbits had fallen off somewhere else (no plaster fragments were found in the pit). Very likely, while transporting all four skulls from their original installations, or dating to some other time before their final disposition, the plaster modelling of the other two skulls had become disengaged.

A final point to be made about the treatment of human skulls from decapitated burials concerns several large fragments on a house floor in SQ 3078. Unlike the skulls in the "nest" in SQ 3074, these fragments (probably representing most of the cranium of one individual) bore no evidence of plaster modelling. Instead, the skull appears to have undergone a unique treatment compared to reports from other PPNB sites in the region. The cranial fragments are heavily scored, as if the scalp had been scraped off with a sharp flint tool, after which the skull was painted with red ochre. Although Kenyon reported red paint on one of the plastered skulls from Jericho, the pigmentation was applied in bands across the unplastered crown of the skull.<sup>16</sup> Red ochre covered the entire cranium of the 'Ain Ghazal specimen.

## 6. Shells<sup>17</sup>

The shells recovered in 1983 were much more numerous and varied than in the first season. Marine shells from the Mediterranean included thirteen examples

<sup>13</sup> M. Donaldson, personal communication.

<sup>14</sup> Mr. Scott Rolston is presently studying the human remains from the 1983 season.

<sup>15</sup> H. de Contenson, *Sondage a Tell Ramad, 1963, Annales Archaeologiques Arabes Syriennes*, 14, p. 109-124.

<sup>16</sup> K. Kenyon, *Archaeology of the Holy Land*, London, (1979), p. 34 and Plate 21.

<sup>17</sup> Dr. David Reese has undertaken the analysis of marine shells; while snail shells are being analyzed by Ms. Holly Huset.



of cockle shell (*Cerastoderma* and *Acanthocardia*), seven specimens of dog-cockle (*Glycymeris*), two pieces of helmet shell (*Cassis/Phalium*), and one example each of dove shell (*Columbella*), basket shell (*Arcularia gibbosula*), triton (*Charonia*), and cone shell (*Conus*). The Red Sea was the original provenience of three cowrie shells, four nerites, and three ornaments made of mother-of-pearl (*Pinctada*). Freshwater shells included twenty-two representatives of smooth and costate *Melanopsis praemorsa*, a freshwater gastropod, as well as several freshwater bivalves (*Unio*). Fossil shells included a sea urchin ornament, a number of belemnites and detaliium fragments, a couple of oysters, and a small bivalve.

## 7. Architecture.

The 1983 season revealed the wide complexity of architectural design at 'Ain Ghazal, and at this preliminary stage of analysis and stratigraphic correlation, it is difficult to unravel the variety of expressions of housing needs among the ancient inhabitants.

Perhaps one of the most striking features to emerge in the recently concluded season was the manifestation of so much renovation in interior design during the lifetime of a specific dwelling. The building from SQ 3082, for instance, shows three replasterings of the floor that are associated with the construction of a new interior cross-wall, the later opening of a doorway in that cross-wall, and the subsequent placement of a high semi-circular "screen" in the doorway that partially blocked the passage from one room to the other. Similarly, at least three renovations of wall, doorway, and floor plastering occurred in the building that spanned SQs 3076 and 3077, and two or three phases of reconstruction took place in the house in SQ 3083, including the addition of a room to the original one-roomed dwelling. The Phase IV house in the Step Trench (SQ 3073) reveals an interesting accomodation

of the natural terrain: the floor of the eastern room is 0.25-0.30 m. lower than the floor of the western room. In the doorway connecting these two rooms is a sinusoidal ridge of plaster that appears to have acted as a drainage feature possibly connected with the washing of the floors. This would confirm a meticulous cleanliness for the inhabitants, for as was the case in most houses, the floors are scrupulously clean of artefacts and living debris.

Finally, it should be mentioned that the first evidence of wall decoration appeared during the 1983 season. While it appears that red ochre was used increasingly to cover floors in the later occupation phases at 'Ain Ghazal, dribbled spots and splotches on floors in the earlier phases suggested that the walls of the older periods were the primary recipients of decoration. Unfortunately, little plaster was preserved on any of the standing walls in 1982 and 1983 (walls rarely stood higher than a half-metre). But near a blocked doorway of a building excavated in 1983, one large panel of wall plaster remained *in situ*, and this panel bore an inverted triangular section of red ochre decoration. The panel continued around the doorway itself, and while it could be seen that the decoration also continued around the corner, the blocking stones prevented any observations that might have detected additional patterning. The plaster panel had been severely cracked by the passage of bulldozers above it in 1974, so instead of cleaning the face *in situ* with possible dire consequences, the panel was removed by the conservator in one piece for subsequent treatment in the laboratory.<sup>18</sup>

## The Statues and the Busts

The most exciting results of the 1983 season concern the discovery of the stunning cache of plaster human statues and busts. Fragments of similar human representation had been found in PPNB contexts in Garstang's excavations at Jericho

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<sup>18</sup> The conservator is Mrs. K. Tubb of the Institute of Archaeology, London.

in the 1930's and others from Dame Kathleen Kenyon's campaigns at the same site in the 1950's.<sup>19</sup> The cache from SQ 3076 at 'Ain Ghazal, while obviously very closely related to the Jericho material, is unparalleled in terms of the quantity and preservation of this rare art form in the Near East.

The construction of the Amman-Zarqa highway in 1974 brought the existence of Neolithic 'Ain Ghazal to light, but it also resulted in severe consequences, not the least of which was the outright destruction of a hectare or more of the original settlement. It was a very fortunate turn of events that the topography of the site was so compatible with the needs of the highway program, for if the restraining terrace to limit erosion onto the highway had cut 0.60-0.75 m. deeper, it is probable that the statues and busts would have forever been removed from the archaeological record.

As it was, the considerable bulldozer traffic less than a metre above the cache created considerable damage as a result of the repeated compaction by heavy machinery in 1974. The exposure of the wet plaster statues to the harsh summer climate in 1983 also took its toll, and it was evident within a few days that the drying process was resulting in cracks across the surface of each piece. It was clear that the statues and busts could not be removed individually under normal archaeological field procedures.

After careful assessment of the situation, the conservator<sup>20</sup> determined that the most appropriate means to remove the sculptures would be to take them out in the block of sediments in which they had been protected so well for so long. The arrange-

ment of the cache was such that several of the smaller busts could be removed prior to this process, and these pieces provide the only definite information we have at the present time. During the preparation of the cache for removal, several other aspects of this remarkable collection came to light,<sup>21</sup> and preliminary assessments can be derived from these circumstances. It must be emphasized, however, that the subsequent laboratory work under way will greatly amplify, rectify, and improve the following summary of information.

It appears that the cache originally consisted of at least ten statues approximately 0.80-0.90 m. high as well as a complement of twelve smaller busts ranging from ca. 0.30-0.45 m. in height. All of the pieces were carefully arranged in a single deposit, with the statues lying in a general east-west orientation in two tiers and the busts aligned stacked in an arc at the feet of the statues (Pl. V). An ancient pit had cut across the northern portion of the cache, badly damaging one or more of the statues, and several of the busts also appear to have suffered post-depositional damage. The pit in which the cache was buried does not appear to be associated with any of the buildings in the excavated area, since the pit cut through the floors that were in the vicinity. Unfortunately, the bulldozer activity removed all evidence which could have provided definite correlation with the stratigraphic sequence of occupations of the site. Nevertheless, several C-14 samples from the cache fill are being processed, and absolute dates should be available by the end of 1983.

The construction of the sculptures appears to conform closely to the technique described by Amiran<sup>22</sup> for the Jericho

<sup>19</sup> Kenyon, *op. cit.*, p. 36.

<sup>20</sup> The conservator was flown to Jordan through the generosity of the Department of Antiquities of Jordan. We would like to express our sincere gratitude to Mr. Ma'an Abu Nuwwar, Minister of Tourism and Antiquities; Dr. Adnan Hadidi, Director-General of the Department of Antiquities; and Dr. Crystal Bennett, Director of the

British Institute in Amman for making this arrangement possible.

<sup>21</sup> We would like to thank Dr. Svend Helms for making it possible to remove the block of statues and busts through a system engineered by him.

<sup>22</sup> R. Amiran, *Myths of the Creation of Man and the Jericho Statues*, *BASOR*, 167, (1962) p. 23-25.

examples. For the statues, an inner "skeleton" of twigs and reeds was wrapped tightly with coarse twine to form a "stick-man" around which the plaster was molded. The statue bodies are relatively stylized, with short stumpy legs and feet, generally featureless torsos, elongated necks, and out-sized heads that are flat in profile. The eyes stand out as much whiter than the rest of the plaster, and it is probable that carved chalk was inset to emphasize these features. Adding to the accentuation of this part of the face, each eye was surrounded by a thin filament of a bluish green pigment. A small circle of asphalt attached to the centre represented the iris.

Although in terms of the general characteristics one can consider the depictions as being stylized, in terms of combinations of specific facial features there appears to have been an attempt at individual renditions to distinguish each statue. One face, for example, is relatively long with prominent cheekbones, while another has a distinctive, assertive chin. The third visible face has pudgy cheeks that add a pronounced dimension to an already round, almost adolescent countenance. This last face also bears additional cosmetic treat: three vertical stripes of red ochre occur at the centre of the brow, and three diagonal red stripes adorn each cheek (Pl. VII: 1).

Although the circumstances of the exposure and removal of the statues has prevented the observation of many details, it would appear that one of the statues, at least, is a male on the basis of the featureless chest. Another statue, on the other hand, has breasts which confirm that it is a female. This particular statue is oriented at about 180° to the rest of the statues, with the woman's head lying at the feet of the rest of the group. The position

of the right hand under the pectoral area suggests that attention is being drawn to the breasts, much in the manner of later Astarte figures. Presumably this statue is associated with a fertility rite (Pl. VI).

The busts share several features of basic construction and rendering, although the smaller size and the absence of bodily details imply a lesser role in the ceremonial/ritual calendar. The heads of the busts consist of plaster formed around an inner structure of cord-wrapped twigs and reeds, as is the case for the statues. The neck, also exaggerated in length, consists of a long bundle that penetrates far into the otherwise solid plaster torso base. The facial features follow the general pattern of the statues. The face of one bust that was removed from the cache bears a striking resemblance to the head of a bust recovered by Garstang from Jericho.<sup>23</sup> Garstang noted that the Jericho busts appeared to represent men, women, and children,<sup>24</sup> and the size variation among the 'Ain Ghazal busts tends to substantiate the presence of different generations among the collection. (Pl. A VII).

While the close parallels with Jericho are undeniable, one particular feature brings the closeness of the sculptures from the two sites to a very fine point. A fragment of a foot from one of the 'Ain Ghazal statues bears six toes, a genetic anomaly that is relatively rare among most populations. A photograph of a foot from the Jericho collection<sup>25</sup> indicates that this trait is also present there. The inferences which might be drawn from this congruence in terms of social, religious, and political associations between 'Ain Ghazal and Jericho (and other sites in the region) are quite tantalizing at this preliminary stage of assessment.

<sup>23</sup> Compare with J. Garstang, *Jericho: City and Necropolis, Fifth Report, Annals of Archaeology and Anthropology* (Liverpool), 23: 3-4 (1935) p. 143-184.

<sup>24</sup> Garstang, *ibid.*, p. 166.

<sup>25</sup> Palestine Museum, Negative No. 11267. We would like to thank Mrs. Diana Kirkbride-Helbaek for bringing this to our attention.

## Summary

The 1983 season at 'Ain Ghazal could hardly have been more productive in terms of producing information on nearly the entire scope of the culture of the residents at that large community. The sheer volume of data will take some time to sort out and assess, but combined with the information from the 1982 season, a strikingly clear picture of the lifeways of the Early Neolithic should emerge. Details of the effects of increasing cultural control over herds of animal species promise to provide great theoretical insight into the process of animal domestication, and the variability of Neolithic diets in terms of plant foods also will be better documented. Several aspects of technology indicate a close affiliation of 'Ain Ghazal with the northern area of the PPNB Levant, yet others bear witness of a close association with communities in the Jordan Valley and the Jerusalem area as well.

Although details are still hazy and information still incomplete, it would appear likely that social differences existed among the 'Ain Ghazal community, based partially on the burial styles that have been recognized. Other aspects of the 'Ain Ghazal material culture repertoire suggest that there may have been some division of religious activity into private (individual and family) and public (community wide and possibly inter-site) spheres, although this is an interpretation that requires more space to develop than is available here. The reverence shown in the disposition of the statues and busts would undoubtedly seem to be related to religion, but the connotations of some form of theocratic social control cannot be overlooked.

Excavations will continue in 1984 at 'Ain Ghazal in an effort to broaden our sample of information. The first two seasons have sampled only 1% of the total village area, and consequently next season

will witness investigations of other areas of the village to increase our understanding of the variations to be expected in such a large population centre. Nevertheless, it is already clear that the people of 'Ain Ghazal enjoyed a considerable degree of sophistication in terms of cultural complexity, aspects of human development that only a short time ago were usually ascribed only to later "high civilizations" of the Near East.

## Acknowledgements

A large number of people contributed directly to the success of the 1983 season at 'Ain Ghazal, not the least of which was the regular field and laboratory crew. We would like to thank them all for their invaluable assistance. We would also like to thank the following people and institutions for allowing the season to take place:

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# THE EXCAVATION OF RUJM EL-MEKHEIZIN

by  
Henry O. Thompson

## Introduction

When Dr. Theodore Schneller planned the new Schneller Vocational School at Marka on the northeast edge of 'Amman, he noted an ancient ruin on a knoll (slightly over 720.00 m. above sea level) where he had planned the school director's house; so, he moved the planned house to the eastern slope and preserved the ruins from any disturbance. In 1972, the present director, Dr. Hartmut Brenner, drew the writer's attention to this antiquity site. Further examination in 1973 suggested that it might warrant excavation, as a follow-up of two previous excavations directed by the writer at Khirbet al-Hajjar and Rujm al-Malfuf South.<sup>1</sup> Surface sherding of the Schneller School ruin produced Iron Age pottery similar to the six/seventh centuries B.C. material of these two sites on the western side of 'Amman. No Ammonite towers or remains have been excavated before on the northeast side of 'Amman and this might add to our knowledge of this ancient semitic kingdom. Furthermore, exposed walls indicated this building was square (12.20 m. E-W x 12.25 m. N-S) while the Hajjar and Malfuf towers were round. Two exposed walls indicated a doorway. While later excavation showed these walls to be the end of a corridor, the initial encouragement to dig came from the prior observation that the Ammonite towers to the west of 'Amman, did not have doorways.

Dr. Brenner approved the excavation

on behalf of the Schneller School.<sup>2</sup> Permission was then sought to sponsor the excavation through the Department of Antiquities of Jordan which supervises all the antiquities sites in the country, the Friends of Archeology for funds and the American Centre for Oriental Research for equipment.<sup>3</sup> Mr. Khamis Fahd of Ruseifah, and trained by Dr. Kathleen Kenyon in the excavations at Jericho, was once again hired for technical work. He was assisted by two general labourers from Ruseifah and the expedition was also opened to volunteers who wished to participate. Mr. Fahd also sought the identification of the site from long-time residents of the area who indicated that it is called Rujm el-Makheizin. Rujm el-Mekheizin is listed as site No. 254, an Iron Age site, in the Department's volume, *The Archeological Heritage of Jordan, Part I* ('Amman, 1973), listing over 450 antiquities sites in East Jordan. Compilers drew upon an unpublished survey of the area, conducted by G. Lancaster Harding.<sup>4</sup> The map reference combined with local insistence that Rujm el-Mekheizin is inside the Schneller School, would seem to confirm the site's identity in its Arabic name. The ancient identification remains unknown. The excavation was conducted for two weeks in April 1973.

Three pieces of Roman ribbed ware were found on the surface of the tower at its south-west corner. All other sherds were from the sixth-seventh centuries B.C. with the possible addition of a few pieces of

<sup>1</sup> "The 1972 Excavation of Khirbet al-Hajjar," *ADAJ* 17 (1972) p. 47-72.

"Rujm al-Malfuf South," *ADAJ* 18 (1973) p. 47-50.

<sup>2</sup> His assistance during the excavation is gratefully acknowledged. Thanks to adequate water supplies, storage and work space, and other facilities, all but a minimum of the work was carried on at the site.

<sup>3</sup> The support of all three groups is gratefully acknowledged. Assistance also came from volunteers such as Mr. and Mrs. Kindiger Geissler and especially Ms. Mary Doherty. Loss of work time from rain prevented several other volunteers from participating.

<sup>4</sup> Dr. Bastiaan Van Elderen, the Director of ACOR, supplied the latter data.

Iron I ware. Outside the tower (north-west corner) around several wall stubs, a dozen pieces of Mamlūk/Ottoman pottery were found. The present dating of this material is 1500 A.D.<sup>5</sup> The latter area was labelled Area B in the excavations and will be described first as representing the latest material on the site.

### Area B

Two small trenches were dug at the north-west corner of the tower. "Square" 1 was an L-shaped trench designed to relate the tower to an Iron wall (B.1.5) traceable for 25.00 m. along the western side of the main tower. This long wall appears to be of similar construction as the outside walls of the tower. It consists of large (0.40-1.10 m.) flat limestone blocks, forming a wall usually two courses wide. It was founded on bedrock and in its extant remains varies from one to three courses high. At one point (just opposite the northwest corner of the tower) traces of plaster were found on the western face. The consistency of the plaster is similar to that found on the northern wall (B. 1:6) of the tower and at the juncture of the eastern wall (A.1: 5) with a type of "porch" (see further below) wall on the eastern side, Wall A. 2: 7. Plastered surfaces on the outside of walls have been found at Rujum al-Malfuf South and North, and Khirbet al-Hajjar. While the stratigraphy was disturbed, the wall stubs noted above were built against the plastered surfaces of B.1:5 and 6, suggesting that it had been there prior to the Mamlūk/Ottoman period, and thus most reasonably is original with the tower building itself. While no extensions to the east could be traced, it is possible that Wall 5 is what remains of a courtyard around the tower.

Both "squares" reached bedrock. The surface soil (B.1: 1 and B.2: 1) was a reddish brown soil that appeared consistent down to virgin soil just over bedrock, throughout most of Square 1. Six pieces of Mamlūk/Ottoman pottery were found here. The soil throughout was mixed with small pebbles and stones ranging from

0.05-0.20 m. Virgin soil (B.1:4 and B.2:3) was red soil mixed with jagged bits of weathered bedrock. Locus B.2:2 was a firm gray dirt between surface soil and virgin soil in the E-W trench of B.2, which was aligned with the northern tower wall (B.1:6) and extended 1.50 m. south at its eastern end and 2.50 m. south at its western end (west of the long wall, B.1:5).

Other dirt loci include Locus B.1:7, a soft reddish soil with very few stones, forming a pocket against B.1:5. At first it was thought to be a foundation trench but subsequent excavation indicated it was merely an isolated pocket of dirt. It is possible that it was a small irregular storage pit but no evidence was found for this beyond its location, its softness and lack of stone. The sherds consisted of two Mamlūk/Ottoman and numerous sixth/seventh century B.C. pieces. A very narrow space between Wall B.1:3 and the west baulk of the N-S trench of B.1, left stratigraphy unclear, so the trench was expanded. This led to the clearing of a soft brownish soil, Locus B.1:8 just over a patch of beaten earth floor, Locus B.1:9. Unfortunately, this floor could not be traced as far as Walls 2 and 3, so the exact relationship is unknown. But Mamlūk/Ottoman pottery from Locus 8 on the floor and in Loci B.1:1 and B.2:2 beside Walls B.1:2 and 3, and B.2:4, seem to give a clear date to these walls and the floor was in all probability related to them as the floor of a room bounded by Walls B.1:2, 3, 5 and 6. A small blackened area 1.50 m. from B.1:6 indicates a hearth. However, since Locus 9 lay directly on virgin soil, B.1:9 would also seem to have been the surface soil for the Ammonite period of the tower. The Mamlūk/Ottoman users of the area must have cleaned down the inside of their "house" to that level. A few centimetres of soft brown to gray dirt (Locus B.1:10 and B.2:5) appeared in spots under Walls B.1:3 and B.2:4 while elsewhere the Mamlūk/Ottoman walls rested on virgin soil.

Wall B.1:2 is an E-W wall of unhewn stones *ca.* 0.20-0.65 m. Its extant remains are 0.20 m. wide (one course) by 2.50 m.

<sup>5</sup> Dr. James A. Sauer, then Director of ACOR,

examined the pottery. His assistance is gratefully acknowledged.

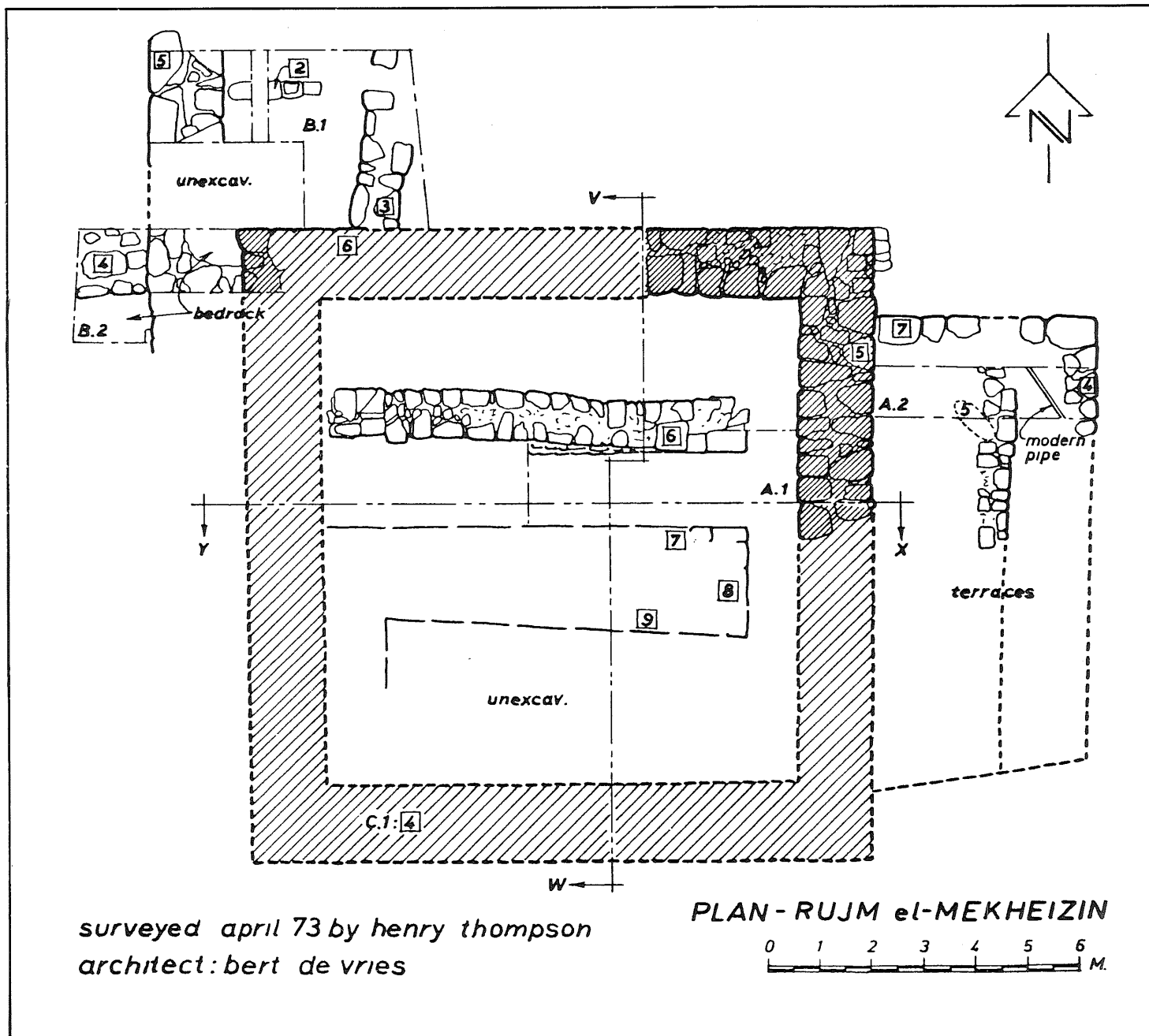


Fig. 1: Plan of Rujm el-Mekheizin

long x 0.30 m. (one course) high. It comes within 0.10 m. of touching B.1: 5 and runs at approximately right angles to it. It stops 0.75 m. from Wall 3, but the gap did not appear to be a doorway. Since the floor, Locus 9, could not be traced this far, however, this remains uncertain. B.1: 3 is made of unhewn stones varying from 0.20 m. x 0.45 m. to 0.25 m. x 0.80 m. Its extant remains are two courses (0.95 m.) wide and one deep (0.20 m.-0.35 m.) by 2.80 m. long (N-S). It extends north of tower wall B.1:6 at approximately a right angle and touches the plaster which coats the north face of Wall 6 at this point. The outside faces of Wall 3 are fairly even but the inside edges

are quite irregular. The inner space was filled with dirt and small rocks indistinguishable from Locus 1. Wall B.2:4 was similarly constructed of unhewn stone ranging from 0.20 m. x 0.30 m. to 0.65 x 0.80 m. Its extant remains are one course high (0.40 m.) and two courses wide (0.90 m. N-S) by 1.25 m. E-W from the long wall (B.1:5) to the western baulk of the trench. It is at right angles to B.1:5 and touches the plaster on the west face of Wall 5, noted above. All three walls are assumed to be Mamlük/Ottoman in date from the pottery in the stratigraphy against them. None had observable foundation trenches.

Wall B.1:6 is the north face of the



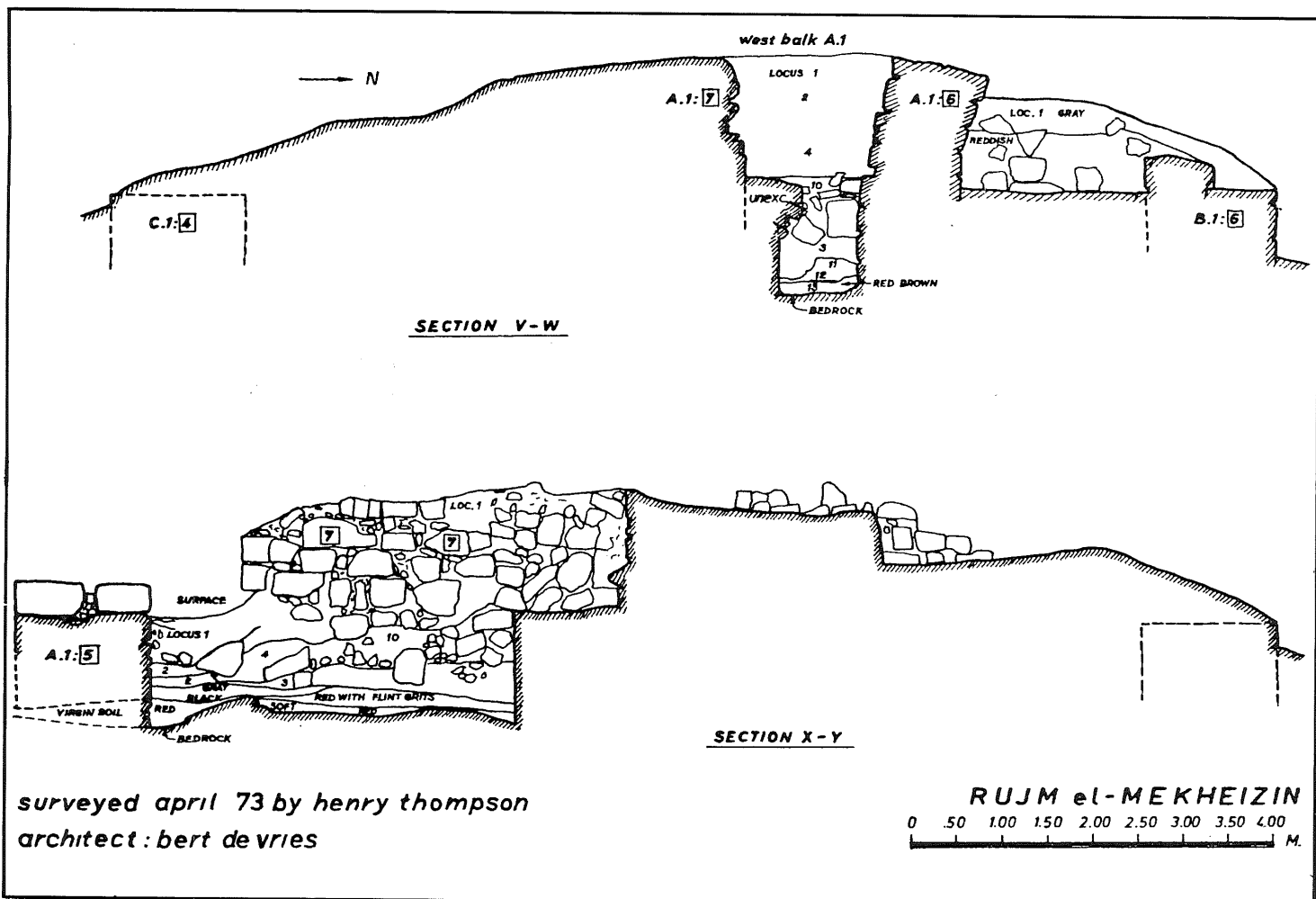


Fig. 2: Rujm el-Mekheizin, Section V-W, Section X-Y.

tower. It is made of unhewn blocks of limestone ranging from 0.50 m.-0.65 m. x 0.50 m.-1.00 m. It is two courses wide (1.50 m.) and up to three courses high with the courses ranging from 0.30-0.50 m. thick. Its maximum preserved height is 1.10 m. and it is 12.20 m. long. The plaster observed on the north face was noted above.

#### Area C

A check was made of the construction at the southwest corner of the tower. This area was designated Area C. Locus 1 was a soft gray, root-filled surface soil with many rocks ranging from 0.10-0.40 m. in size. It overlay a reddish soil with similar sized rocks. Three pieces of Roman ribbed ware were found on the surface while the rest of the sherds here were sixth/seventh centuries B.C.

Wall 4 is the south face of the tower and is of the same description as B.1:6. Wall 3 is of unhewn stone about 0.25 m. x

0.40 m. It is 1.30 m. wide (three courses) and extends 3.00 m. from Wall 4 to an interior wall A.1:7.

#### Area A

Area A was the first area excavated. "Square" 1 is a trench plotted to give a longitudinal section through what originally appeared to be a doorway formed by walls 6 and 7. These later appeared to be interior walls forming a corridor and the soft boulder-filled soil tended to fall away from Wall 7 so these aims were only partially realized. However, the metre-wide trench extending from the east tower wall (A.1:5) for 4.00 m. - 5.25 m. did provide evidence of the stratigraphy within the tower for its preserved height of 2.50 m. above bedrock.

Locus 1 was a dusty gray surface soil 0.10-0.25 m. thick, with small stones about 0.10 m. with the usual roots. It was initially excavated in a small probe from Wall 5 to Wall 6. Excavation was then extended to

the entire trench. Potsherds are sixth/seventh centuries B.C. in date with the possible inclusion of a few Iron I sherds. Locus 2 was a reddish soil with larger stones, up to 0.25 m. It was first observed in the probe trench and continued throughout the extension of the trench. Pottery fabrics were similar to Locus 1, with the additional interest of the only significant pottery find of the excavation. At the bottom of Locus 2, on top of a burn layer (A.1:3) was an almost complete bottle. Its distinctive form and painted decoration have numerous parallels in the Amman area. It has been called an Assyrian import. (Fig. 3.) The many examples might serve as evidence of an extensive commerce between the Ammonites and Assyrians. However, lacking more detailed evidence of that trade, the frequency of this bottle might also be seen as evidence of a fine quality pottery tradition in the Ammonite repertoire itself. One exact parallel is of special interest because it is fairly closely dated to about 650-675 B.C. by the seal of Adoni-Nur in the same tomb. The bottles seem too large for perfume and too small for standard oils. Perhaps they were for perfumed oils or unguents. This function would explain their presence in tombs.<sup>6</sup> An iron object comes from this same locus. It may be a large arrowhead or small spearhead but is now rusted beyond recognition, and would probably disintegrate in any effort to clean it.

The probe trench was stopped at the burn layer, A 1:3, and the trench was extended westward through the corridor. Two additional strata were accumulated here. Locus 4 was a dark, fine, ashy soil with large rocks up to 0.50 m. Potsherds were sixth/seventh centuries B.C. Locus 10 was a loose, powdery, reddish soil, but with small pockets of charcoal and rocks from 0.10-0.75 m. in size. The sherds were similar to Locus 4, plus a few possible Iron I sherds. Both layers are interpreted as fill

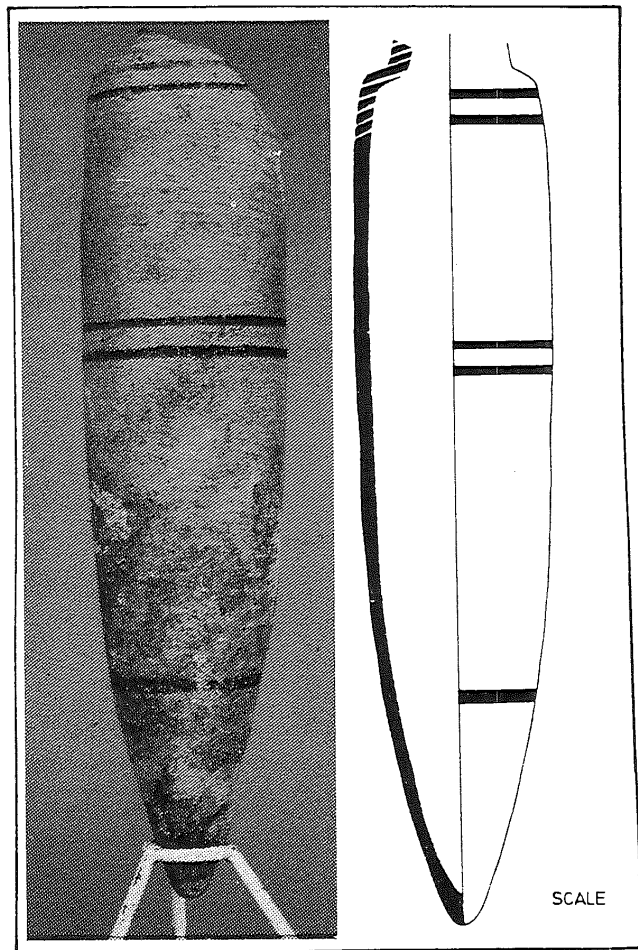


Fig. 3: Rujm el-Mekheizin "The Assyrian" bottle from Area A.

layers built up in the collapse of the upper portions of the interior walls 6 and 7. The lower, Locus 10, lay directly on the burn layer, A.1:3. At the top of 10, the bottom of 4, a distinct change appears in Wall 6 on the north side of the trench. The extant top of the wall (four courses) leans to the north while the lower four courses are fairly straight (vertical). Locus 10 may be the debris of a collapse immediately or soon after the fire represented by Locus 3. At some later date, an earthquake may have shaken the tower and a structural fault caused Wall 6 to shift and lean to the north, while the more firmly built Wall 7 stood firm. Alternatively, the shift and lean may represent a rebuilding but this is not apparent in Wall 7 and the lean to the north would hardly be deliberate. So Locus

<sup>6</sup> G. Lancaster Harding, "An Iron-Age Tomb at Sahab," *QDAP* XIII (1948) p. 92-102. *Ibid.*, "The Tomb of Adoni Nur in 'Amman," *PEFA* VI (1953) p. 48-50. *Ibid.*, "Two Iron Age Tombs from 'Amman," *QDAP* XI (1945) p. 67-74. Ms. E. Henschel-Simon, "Note on the Pottery of the 'Amman Tomb," *QDAP* XI: p. 75-80. Olga

Tufnell, *Lachish Vol. III, The Iron Age*; London, 1953. *Ibid.*, "Notes and Comparisons," *PEFA* VI, P. 66-72. R.A.S. Macalister and J. Garrow Duncan, "Excavations on the Hill of Ophel, Jerusalem, 1924-1925," *PEFA* IV (1926) p. 177f, and Fig. 189 (undecorated specimen). Macalister, "Some Interesting Pottery Remains," *PEQ* [1915] p. 35) an undecorated specimen from Tell al-Ful).

4 is interpreted as additional fall in relation to the quake. While the two loci did not appear to extend to the outer Wall 5, a reexamination of the baulk suggests that in the initial probe trench, Locus 2 consisted of two layers (of very similar consistency) at that point. The lower one is probably equivalent to Locus 10 as being initially deposited directly on the burn layer A.1:3, while the upper one continued up and over Locus 4.

Locus 3 was a burn layer ranging up to 0.50 m. in thickness with numerous pieces of charcoal. With small exceptions, these disintegrated within minutes after excavation. One piece, about 0.05 m., appeared to be formed of rushes and mud while other fragments of charcoal gave the impression of wood and in one case a stick of wood. This suggests a roof of cross beams, brush and mud. The analysis is further confirmed by two roof rollers discovered in Area C, one on the present day surface and the other imbedded in Locus 2. The burn layer would seem to mark the destruction of the tower. The debris layers suggest no further occupation. It is interesting to note that not one sherd of the Mamlūk/Ottoman period was found on the tower itself, suggesting that secondary occupation was confined to the outside of the tower. Since A.1:3 extended throughout the excavated area of A.1, it is assumed that the destruction was total. What remains problematic is the nature or cause of the conflagration. With the possible exception of the iron object in Locus 2, no weapons were found, not even a slingstone. This would seem to argue against destruction by enemy conquest, and in favour of an accidental fire. Further, the complete lack of objects would seem to suggest abandonment or disuse prior to the destruction. The tower seems to be an Ammonite watchtower, guarding the northeast approach to the capital of Amman. There are at least two additional towers in the neighbourhood, one to the southeast and one to the northwest. If Rujm el-Makheizin became disfunctional, it may be either that its purpose was covered by the others or the destruction of Mekheizin came in a time of

relative peace in the Ammonite area. This may point to the mid-seventh century B.C. period when Assyria reigned supreme over the whole area of the Fertile Crescent and small client states like the Ammonites were free to develop in peace.

Under Locus 3 was an interesting reddish soil (Locus 11) with very few stones. It was soft and rather sandy in texture with flint granules and tiny rock fragments. Three small pieces of brick came from this matrix. The pieces were extremely friable and disintegrated when exposed to the air. It is possible that the upper portions of the interior walls had courses of mud-brick which caved in under the roofing material before it burned. It is not impossible, however, that Locus 11 is a clean sand brought in for flooring material. Its upper surface did not reflect flooring use but that could have been obscured by the fire of Locus 3. A more likely floor is a thin black layer, Locus 12, under the flinty sand of Locus 11. This ashy layer was only 0.02-0.05 m. thick but it extended throughout the trench and lay over Locus 13, a red clay-like soil down to bedrock and containing the irregular rock fragments of weathered bedrock. Locus 12 was not a very firm layer so it does not represent a beaten earth floor and its softness in turn might suggest that the tower as a whole was not in use for a very long time. An alternative interpretation could be that Locus 12 represents the floor of a little used basement. The tower walls and interior walls are clearly strong enough to support a second story. If our burn material represents a floor of that upper story and the basement ceiling, the upper floor would have carried the ware of daily use. While the pottery dates the last use of the tower to the Roman period, it is worth noting that the tower of Rujm el-Malfuf North, had unused basement rooms, implying that the functional activity within the tower took place on the upper floor.<sup>7</sup> The pottery of Loci 11 and 12 was the usual sixth/seventh centuries B.C. material.

Wall 5 is the eastern tower wall and is of similar construction as B.1:6 on the north and C.1:4 on the south. It is 12.40 m.

<sup>7</sup> Roger S. Boraas, "A Preliminary Sounding at Rujm el-Malfuf," *ADAJ* XVI (1971) p. 31-46.

long and has a small portion of plaster remaining at the junction with A.2:7, described below. A.2 was excavated to bedrock as was A.1, showing A.1:5 to be founded on virgin soil over bedrock. Outside (east face of Wall 5), this is only 0.02-0.10 m. thick over bedrock but inside (A.1:13) it ranges up to 0.30 m. thick. One would expect that a wall as heavy as the tower wall (1.50 m. thick) would have been founded on bedrock but the same phenomenon was noted in B.1, where Wall 6 rests on virgin soil, Locus 4, rather than bedrock. Apparently the builders considered this firm enough for their purposes. Haste might have been a factor also though the walls appear to have been carefully constructed. The virgin soil foundation applies to the interior walls. A.1:6, as well and presumably then to the other interior walls also.

Wall 6 is made of unhewn stone ranging from 0.30 m. up to 0.80 m. long. It is two courses wide (1.05 m.) and up to eight courses high in its extant remains. The upper four courses are partially broken off the east end which appears to begin 0.95 m. from Wall 5. The upper four courses were shifted and leaned to the north as noted earlier in relation to Locus 4. Each course is about 0.30 m. thick and there are numerous small to medium filler stones which helped maintain a uniform horizontal level to each course, again suggesting careful construction technique as in the outer tower walls. As noted earlier, Wall 6 was probably an interior wall supporting an upper storey raising the tower's height to aid its function as a watchtower. Wall 7 appears to be of similar construction but is much thicker, ranging from 1.80 m. at its western end to 2.20 m. on the east. The eastern end is in fact so thick that initial observation of the above-ground remains, suggested that the eastern end of Wall 7 was another wall and it was recorded as Wall 8 and the southern edge of Wall 7 was recorded as Wall 9.

Area A, "Square" 2 was a trench plotted from A.1:5 across (W-E) what appeared to be a porch or series of terraces in pre-excavation examination. A total of three N-S walls are visible. Wall 3 is 2.00

m. from A.1:5 while Wall 4 is 4.00 m. away. Wall 9 is 9.00 m. from A.1:5. The distance between Wall 9 and Wall 4 raises the question of its relationship to the other walls. This question is strengthened by Wall 7. The latter is an E-W wall of similar appearance (unhewn stones ranging from 0.30 m. x 0.40 m.-0.60 m. x 1.00 m.) to the outer walls of the tower, A.1:5, B.1:6, and C.1:4. It joins but is not bonded to, A.10:5, at right angles, 1.75 m. from the northeast corner of the tower. Plaster, similar in consistency to that found on the outside of B.1:6 and 5, appears in the corner formed by the east face of A.1:5, and the north face of A.2:7. This suggests that A.2:7 is contemporary with the tower walls, except that it is one course wide rather than two. Wall 7 extends 4.30 m. east of A.1:5. Its last stone is a huge boulder which seems to form a corner with the outside (east face) of Wall 4. This further suggests that Wall 9 is an additional feature. However, its visible remains are similar to Walls 3 and 4, although only one course in width is visible. Unfortunately, dense garden shrubbery made it advisable not to excavate Wall 9. Wall 10, an E-W wall near the southeast corner of the tower, cannot be traced further east than Wall 4. However, its visible remains are also similar in appearance to Walls 3, 4 and 9, and no excavation was attempted here. A peculiar feature of Wall 10 is that it is not at right angles to A.1:5 but veers to the north, so the complex of Walls 7, 4 and 10 forms a trapezoid rather than a rectangle.

Wall 3 is about 0.70 m. wide and 8.00 m. long. Its extant remains are two to three courses (0.50-0.70 m.) high and two courses wide. It is built of unhewn stones 0.20 m. x 0.20 m. to 0.30 m. x 0.40 m. in size. Wall 4 is of similar description though the stones range up to 0.60 m. in size. Both walls appear to be dated in the Mamlūk/Ottoman period, as noted below.

Locus 1 was the surface soil between A.1:5 and A.2:3 while Locus 2 was surface material between Walls 3 and 4. This area had been disturbed by a modern water pipe and no further excavation was attempted here. Both loci were gray dusty soil with roots and small stones (.02-0.15 m.) and

the usual sixth/seventh centuries B.C. Iron Age pottery. A single piece of Mamlūk/Ottoman material came from Locus 2. Locus 5 was a modern intrusive burial at the bottom of Locus 1, resting on Locus 6. The latter was a gray soil resting on virgin soil, locus 8. After excavation, examination of the baulk showed variations of colour: gray, reddish gray, red with white grits, and a thin layer of gray clay. The pottery sherds from Locus 6 were sixth/seventh centuries B.C. and Mamlūk/Ottoman. This suggests the latter date for Walls 3 and 4. They are thus comparable to the walls outside the tower exposed in Area B. The complication of Wall 7, however, suggests that the builders here utilized Wall 7, as well as the tower wall, for their later construction.

### Summary

The excavation results confirm the surface sherd analysis that the tower is dated to the sixth/seventh centuries B.C. It is therefore most likely an Ammonite tower, of the square type, similar in function to the nineteen towers on the western side of Amman. As a watchtower, it would have guarded the northeastern approaches to ancient Rabbath Ammon. The strength of the walls indicates a secondary function as a fortress though it is too small to hold more than a tiny force of troops who could have fought only a delaying action. In addition, Wall A.2:7 suggests an adjacent room of unknown function and uncertain design. It is possible that the later Mamlūk/Ottoman Walls 3 and 4 (and possibly 9) followed older foundations, thus preserving for us the original design. Adjoining buildings have been noted on the Ammonite towers to the

West of Amman.<sup>8</sup> A more speculative note is that Wall B.1:5 presently traceable for 25.00 m. but only on the western side of the tower, represents the remains of a large courtyard around the entire complex.

In the Mamlūk/Ottoman period, additional structures were built at the north-west corner of the tower, and built or rebuilt along the eastern side. These may have been squatters or shepherds. The very limited quantity of Mamlūk/Ottoman pottery suggests that their stay was not extensive. Not one sherd of this pottery fabric was found on the tower itself. While the sixth/seventh centuries B.C. pottery was common, if not abundant, the lack of a firm floor may indicate a limited occupation in the earlier period as well, though as noted above, the main occupation may have been on a second floor, now destroyed.

In either case, one might note that the present landscape outside of the well-watered grounds of the Schneller School, is quite barren. There does not seem to be an indication of springs in the surrounding *awdiyah* and the question of water source naturally arises. *Ca.* 5.00 m. northeast of the northeast corner of the tower, is a rock-cut cistern, now plastered and used as part of the water system of the School. Another cistern lies further to the northeast, *ca.* 100.00 m. Workmen who helped build the school from 1958 onwards remembered the large size (up to 8.00 m. deep and 8.00 m. wide at the bottom of a generally round or bell-shaped hole) and their possible use as storage pits by *bedouin*. There was and remains no indication of date. It seems reasonable, however, that the two may have been ancient cisterns dug in one of the two occupation periods.

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USA

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<sup>8</sup> George M. Landes, "The Material Remains of the Ammonite Civilisation," *BA* 24 (1961) p. 71. Cf.

also the report on Khirbet al-Hajjar.

# THE 1982 SEASON AT ABILA OF THE DECAPOLIS

by  
W. Harold Mare

## Introduction

The second season of the Abila of the Decapolis Archaeological Excavation and Regional Survey was conducted June 14 to July 24, 1982. The main sponsor of the excavation was Covenant Theological Seminary. Co-sponsors were Cincinnati Bible Seminary and Grace Theological Seminary (Indiana). In addition, Wilfrid Laurier University, loaned cameras and a portable darkroom for the photographic work.

The core staff decided that the field operations in 1982 should concentrate on an excavation probe (Area A) on the summit of Tell Abila (Pl. VIII: 1) for two reasons. First, because of the rather wide range of archaeological periods represented through the finds of the 1980 surface sherding at that spot. Second, because the ruins of a large rectangular building (designated the "Public Building" during the 1980 Survey) offered an opportunity to date the last phase of extensive construction on the summit of the tell. Dr. Duane W. Roller of Wilfrid Laurier University was the Supervisor of Area A.

Concentrated attention was given to the necropolis of Abila (Areas H and J) along the Wadi Quailbah (east of the site) with Dr. John J. Davis of Grace Theological Seminary as Supervisor. Systematic survey work continued with the regional survey examining transects in radial arms extending 2.5 km. north, south, east, and west to check the continuity or discontinuity of the rural settlements (Fig. 1). The regional survey and the architectural studies were under the supervision of Mr. Michael J. Fuller of St. Louis Community College - Florissant Valley. Extensive architectural drawing of surface structures visible above ground was undertaken by Mr. Kenneth D. Smith of Washington,

D.C. In order to make findings more easily shared and to facilitate the publication of preliminary reports, the staff operated on the basis of agreed upon field procedures. As a necessary part of the excavation, the American expedition has been and is carrying on various geological, botanical and anthropological investigations, both in the field and laboratory.

Assistance was graciously given by the Department of Antiquities of Jordan, Dr. Adnan Hadidi, Director General. He provided a crew of workmen who laboured in each of the sectors listed above. The Department also provided the use of some equipment and arranged for the use of the Hartha Secondary Girls School for staff headquarters. Mr. Sultan Shraidah, Representative from the Department of Antiquities, ably assisted the excavation in numerous ways.

## Area A: The Excavation Probe on Tell Abila

Area A consisted of four squares measuring 4.00 m. by 3.00 m., and excavated down to a maximum depth of 2.66 m. The excavation squares were placed slightly east of the summit of Tell Abila where a number of ashlar blocks were visible, giving indication that this might be the Abila acropolis. The Area A probe was "L" shaped, with Squares 1, 2, and 3 oriented on a north-south axis and Square 4 contiguously to and on the west of Square 3. There was a steep slope from south to north; indication of this by measurement was observed in that the surface level of Square 4 was 441.21 m., and that of Square 1 was 436.83, a drop in twelve metres from south to north of 4.38 m. Pottery sherds in the probe tended in part to come from fill material, making the delineation of occu-

# ANCIENT ABILA AE 82

## REGIONAL SURVEY & EXCAVATIONS

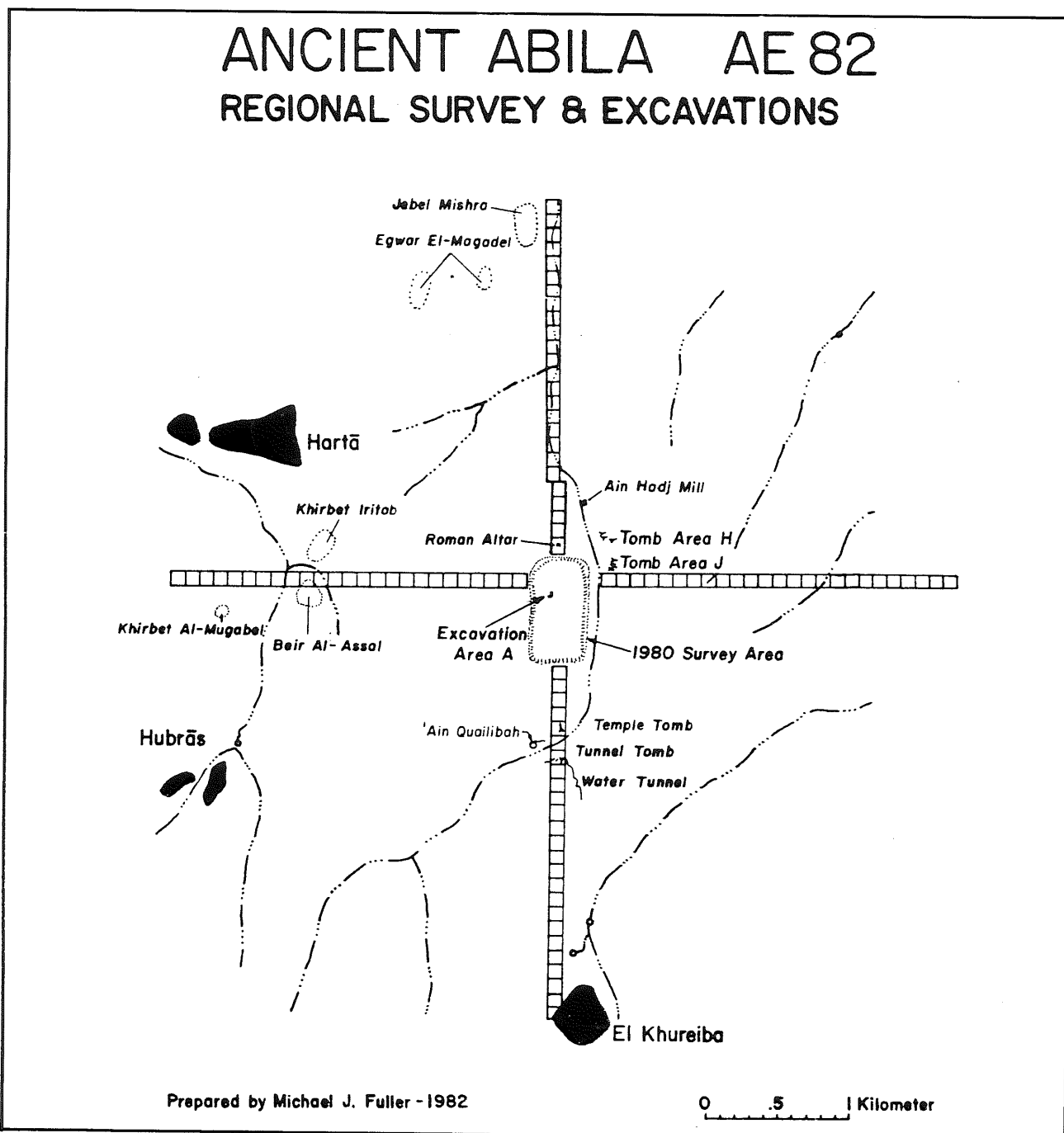


Fig. 1. Map of the Upper Wadi Quailibah, including the Site of Abila.

paternal periods sometimes difficult,<sup>1</sup> especially in square 1 where there were several metres of fill. Although there was a network of walls, particularly in squares 1 and 2, there were no definitive foundation trenches which would have aided in the interpretation.

A jar burial (tentatively Iron IIC) was found in the northwest sector of Square 1:

it was embedded in a bricky matrix containing Iron IIC and Hellenistic sherds and was covered by a mixed fill of Iron Age to Islamic sherds. A mud-brick *tabun* (containing a mix of Iron Age and Hellenistic sherds) protruded west from the east baulk of Square 1. A network of walls (probably of domestic use), some of which were constructed of field stones and architectu-

<sup>1</sup> The stratigraphy of the Area A Probe can be divided into four phases, based mainly on ceramic evidence: Phase 1, Modern and Post-Umayyad; Phase 2, Umayyad; Phase 3, Byzantine; and Phase 4, the Pre-Byzantine phase. The latter can be tentatively divided into three sub-phases: Roman,

Hellenistic, and Iron II C. The distinction of these sub-phases at this point is based primarily on the ceramic evidence and on comparisons of the architectural forms with Pella of the Decapolis. These divisions are based on the 1982 stratigraphic study of Area A by Dr. Cherie Lenzen and Ms. Alison McQuitty.



ral fragments, well laid and mortared (suggesting a Hellenistic or Roman date) was also excavated in Square 1 and also in Square 2. (Fig. 2) These may have made up in part an east-west retaining wall along the north slope of Tell Abila. Other secondary walls (unmortared and of a rougher construction) with Byzantine sherds predominating, were also found in Squares 1 and 2. All of this evidence shows that the range of material and fill in Squares 1 and 2 extends from Iron IIC to the Byzantine periods. It is possible that the basic wall complex is to be dated to around 200 B.C. When the Syrians gained the region from the Egyptians in the Fifth Syrian War and that the secondary wall complex is from as late as the Late Roman or Byzantine periods.<sup>2</sup>

Squares 3 and 4 produced pottery sherds from the Byzantine to the Umayyad periods.<sup>3</sup> The corner of a platform in the southeast sector of Square 3 was constructed of pseudo-isodomic ashlar masonry covered with a thick plaster up to 0.03 m. thick. It is to be dated subsequent to the nearby apsidal structure (a large Christian church), since a wedge-shaped piece of basalt (reused from the church's apse) is built into the platform. The church's apse, uncovered to a depth of four courses, was curved inside and out. It was constructed of facing (exterior of basalt and interior of limestone) and a rubble core. Workmanship was excellent on the facing stones in terms of sharply cut and finely chiseled surfaces. A little less than one half of the apse was uncovered, (pl. VIII. 2) but enough to estimate that the diameter of the apse was approximately 10.50 m. to 11.00 m.; evidence from a curved block adjoining the large apse on its north, as well as traces of the same curve on the surface north of Square 4, seem to indicate that

there is a smaller northern apse, or connecting walls, for a *pastophorion*. The sherds found in connection with the apses are Byzantine. On the preserved surface of the apse and in much of the region on both sides of the apse was a layer of plaster that, due to the Umayyad pottery sherds found there, suggests that the church was destroyed and the plaster surfaces laid subsequent to the time of the Umayyad conquest in A.D. 636. The evidence of violent earthquake activity was possibly responsible for the displacing of ashlar blocks and voussoirs may suggest a date for the church's destruction on into the eighth century, possibly due to the earthquake of A.D. 746 which caused great destruction at nearby Tiberias and Jerash.

#### Areas H. and J: Tomb Excavation along the Wadi Quailibah

Six tombs were excavated in 1982 in Areas H and J along the Wadi Quailibah. Tomb H2 dates from the Early Roman period (63 B.C.-A.D. 135), while the other five tombs (H1, J1, J3, J4, and J5) were prepared and used during the Late Roman period (A.D. 135-324), Early Byzantine (A.D. 324-491) and the Late Byzantine (A.D. 491-661) periods.

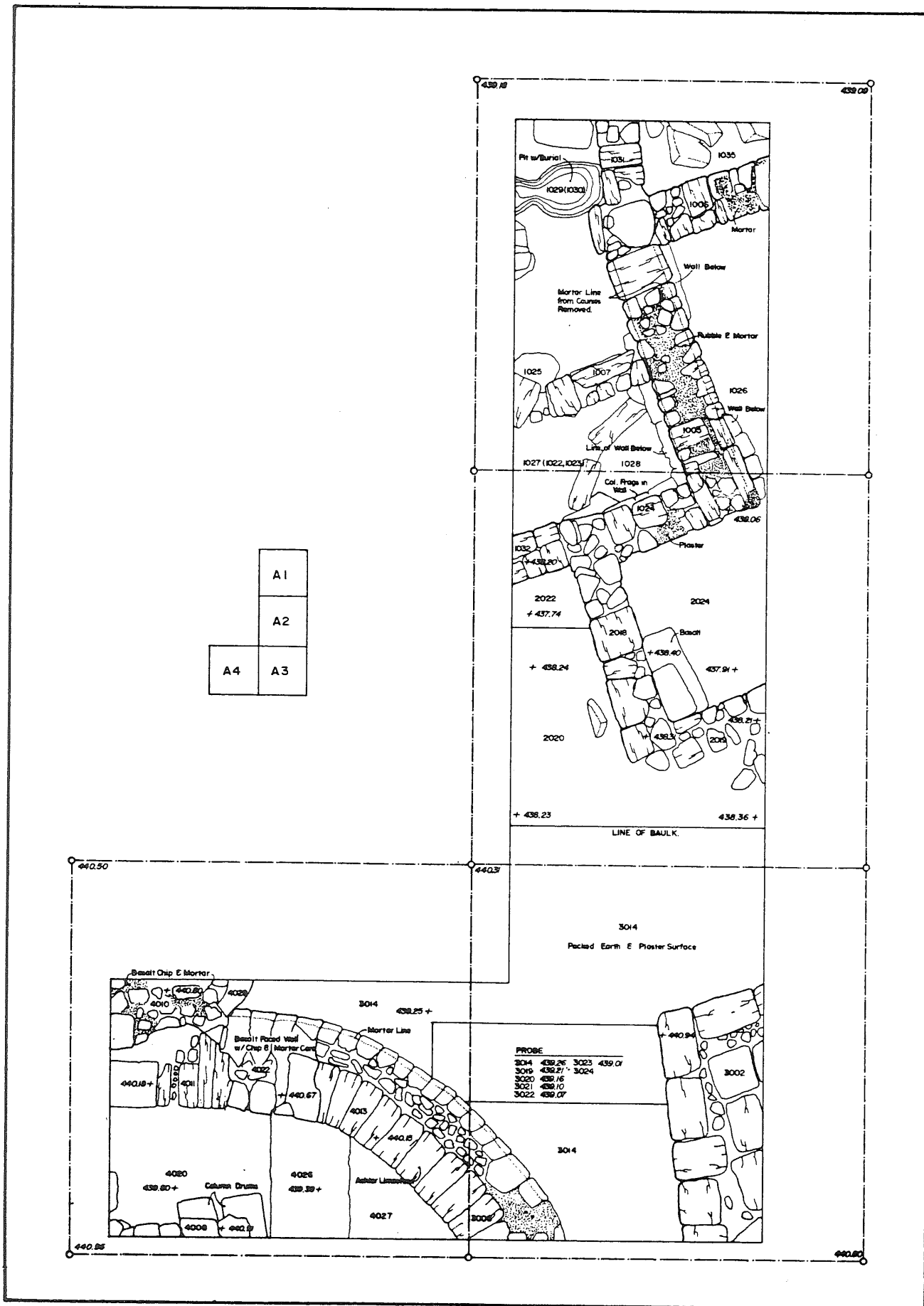
These six tombs represented three different tomb types. The first was the standard single chamber with loculi tombs which were common and are represented at other sites in Jordan in the Early and Late Roman periods. The second type, popular in the Late Roman period, was the single chamber tomb with *arcosolia* cut into three of the walls. The third type shows single trough graves (or, stone-cut benches along one wall of the central chamber) or **trough cut** into larger *arcosolia*.

<sup>2</sup> During the Iron II, Hellenistic, and Roman periods, the evidence seems to point to the sector being used primarily as a domestic area. The fill layers in Area A, Squares 1 and 2 actually contained sherds from the Late Bronze II through the Hellenistic periods. The Hellenistic sherds were primarily of two types: 1) red-slipped bowls and plates with slightly inverted rims; and 2) large coarse ware jars with flattened and folded rims.

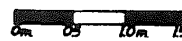
<sup>3</sup> In Area A, Square 4, Wall 4008/4009/4004,

consisting of five voussoirs from the earlier Byzantine Church, judging from the minimal pottery evidence, seems to date to the Mamlūk period (A.D. 1260-1456). In the earlier part of the season the majority of the sherds in Area A, Squares 3 and 4 came from the Umayyad period, but near the end of the excavation, Early Byzantine/Umayyad pottery showed up, with a few Byzantine amphorae sherds being produced; 'Late Roman' fine ware forms came to light in Area A, 3 and 4.





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 AREA A - FINAL COMPOSITE TOP PLAN



Scale 1:25

1 Oct. 1982

K.D. Smith

Fig. 2. Final Composite Top Plan of Area A.

All six of the tombs were excavated stratigraphically, both within the entrance way as well as in the tomb proper. Attention was also given to the interior geotectural characteristics (i.e., subterranean rock-cut features), including a careful study of the masonry work, especially analysis of the tool work of the artisan.<sup>4</sup>

The Early Roman Period (63 B.C. - A.D. 135), Tomb H.2 (Fig. 3)

Tomb H 2 is located about 500.00 m. northeast of Tell Abila on a gently rolling slope beneath ca. 0.30 m. of soil. The excavation of H2 uncovered three rectangular stones positioned on two ledges and blocking the tomb entrance, with a series of steps leading to the tomb proper. Three lines of evidence suggest that the tomb had not been disturbed in modern times: the position of the sealing stones; the minimal amount of soil within the tomb itself; and the presence of only late Roman sherds, indicated that the tomb had not been reopened in modern times. The tomb proper consisted of a small central chamber, with six regularly cut loculi (*kokim* type) radiating from three of its sides; there was no square depression in the chamber floor. The tomb contained at least seven adult burials, with the body fully extended and, in most cases, the head placed into the chamber first. The presence of iron nails in the various loculi indicate that wooden coffins were used for burial here. Artefacts found in the tomb included lamps, glass pieces, juglets, small funerary bowls, bracelets, an alabaster vase, rings, beads, buttons, a bone tool, a fibula, etc. An unusual find included a group of three terracotta figurines in Loculus 6: 1) a rider on a horse; 2) a muse (*Terpsichore*) playing a small lyre with a smaller figure standing at her side; and 3) Dionysius, with a panther on his right and a young boy on his left holding onto the god's garment.

The Late Roman Period Tombs Used on Into the Byzantine Periods. H1, J1, J3, J4, and J5<sup>5</sup>.

The first of these tombs, H1 (located up the slope from H 2), was explored in connection with the 1980 Abila Survey; it had been robbed in modern times. Salvage excavation was engaged in here. The central chamber, (Fig. 4) badly damaged by modern looters, had an off-centre square depression in the floor the origin of which could be interpreted as a vestige of the earlier Iron II and Hellenistic tomb design which included benches around a central depression, or as a conscious representation of a Roman house design with its impluvium basin (for rain water coming from the opening in the ceiling, compluvium) in the central front room (the atrium). The tomb contained fourteen irregularly cut loculi radiating from all four of its walls. The tomb's origin is to be traced to the end of the Late Roman period (ca. the first quarter of the fourth century A.D.). It was used on into the Early Byzantine period; a Greek inscription and a bas relief on the south wall belong to this period. While no crosses were found in the tomb, the relief of stylized angles above Loculus 13 may possibly indicate a Christian re-use of the tomb.<sup>6</sup>

The remaining tombs (in Area J) excavated in 1982 were located on the next hill south of Area H. These tombs (J 1, J 3, J 4, and J5) here showed different styles and periods of use. Of the styles, J 1 was of the loculi type, with a central chamber and eight irregularly cut loculi radiating from three of its walls. Its history of use included the Late Roman through the Late Byzantine periods, as evidenced by the ceramic finds, among which was an ostrakon with a fragmentary Greek inscription. In this tomb, probably a family tomb, were found two bronze coins, one of which has been

<sup>4</sup> Through this study the following were able to be determined: 1) the number of actual tools employed; 2) the nature of the stroke patterns, long, short, etc.; and 3) the degree of the mason's penetration into the rock.

<sup>5</sup> J 2 and H 3 were probes that did not uncover

tombs.

<sup>6</sup> Tomb H 1, in an upper level off to the left (north), evidenced broken remains of stone sarcophagi which had been damaged by tomb robbers. This upper level had been stripped of its stratigraphic soil layers and artefacts and, therefore, excavation was not attempted in this sector.

# ANCIENT ABILA AE82

## Top Plan of Tomb H-2

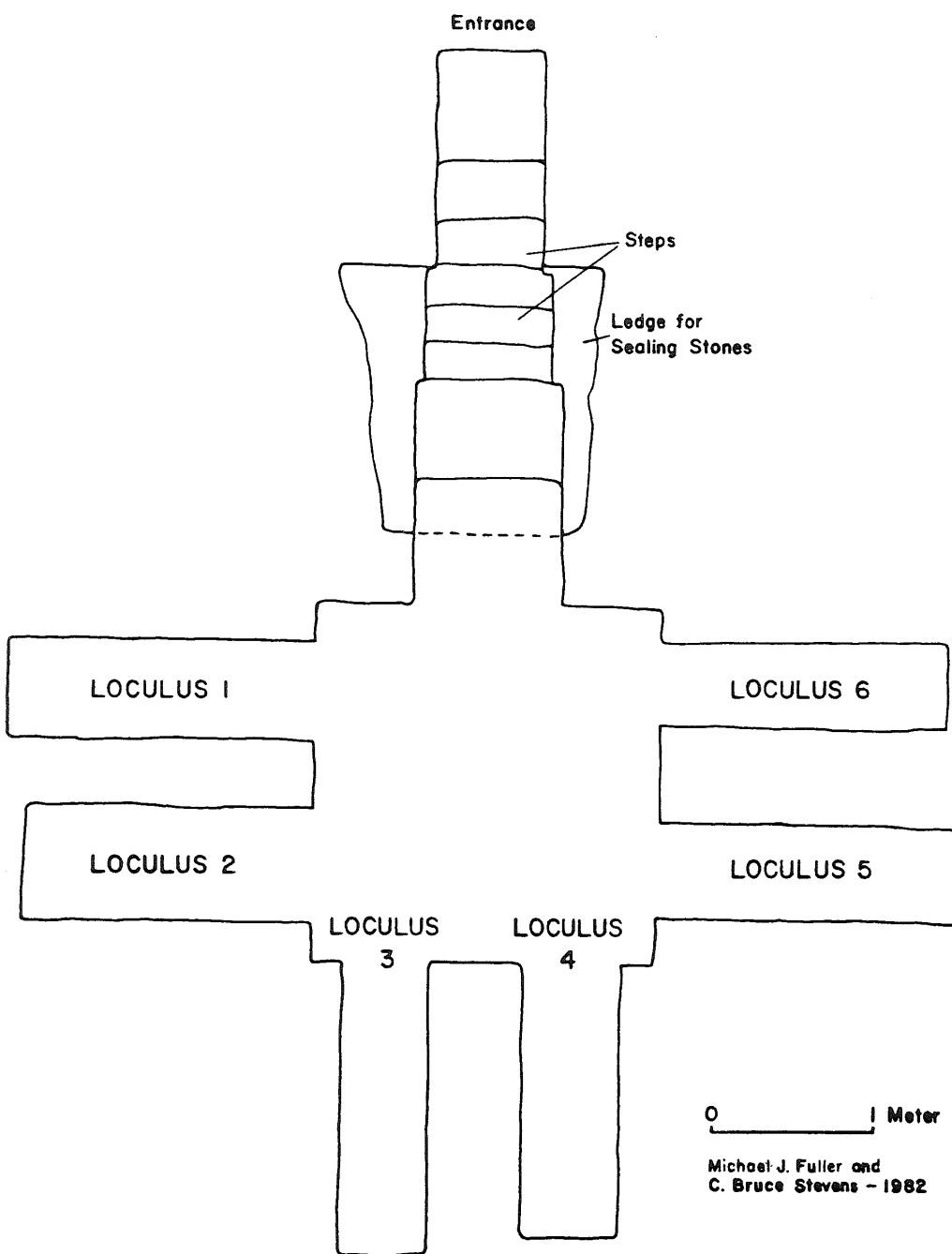


Fig. 3. Top Plan of Tomb H-2.

identified (see section in this report on Selected Finds, coin number 158); iron nails and bronze straps (for the wadded coffins), pins, bracelets and beads, two gold rings (one with a small stone seal incised with a stylized horse, and the other with a small round ruby inset).

Tombs J 3 and J 4 represented the *arcosolium* type. J 3 had three *arcosolia*, one in each of three of its walls. Among the

artefacts were a bracelet, a ring, a small spatula, beads, and an animal bone with a metal ring attached (possibly evidencing some utilitarian or magical purpose). Preliminary evidence revealed skeletal remains of both adults and children. J 4 also with *arcosolia* contained three small crosses (probably inscribed in the Early Byzantine period) above the entrance to the chamber and crosses carved on each side of

# ANCIENT ABILA. AE82

## Top Plan of Tomb H-1

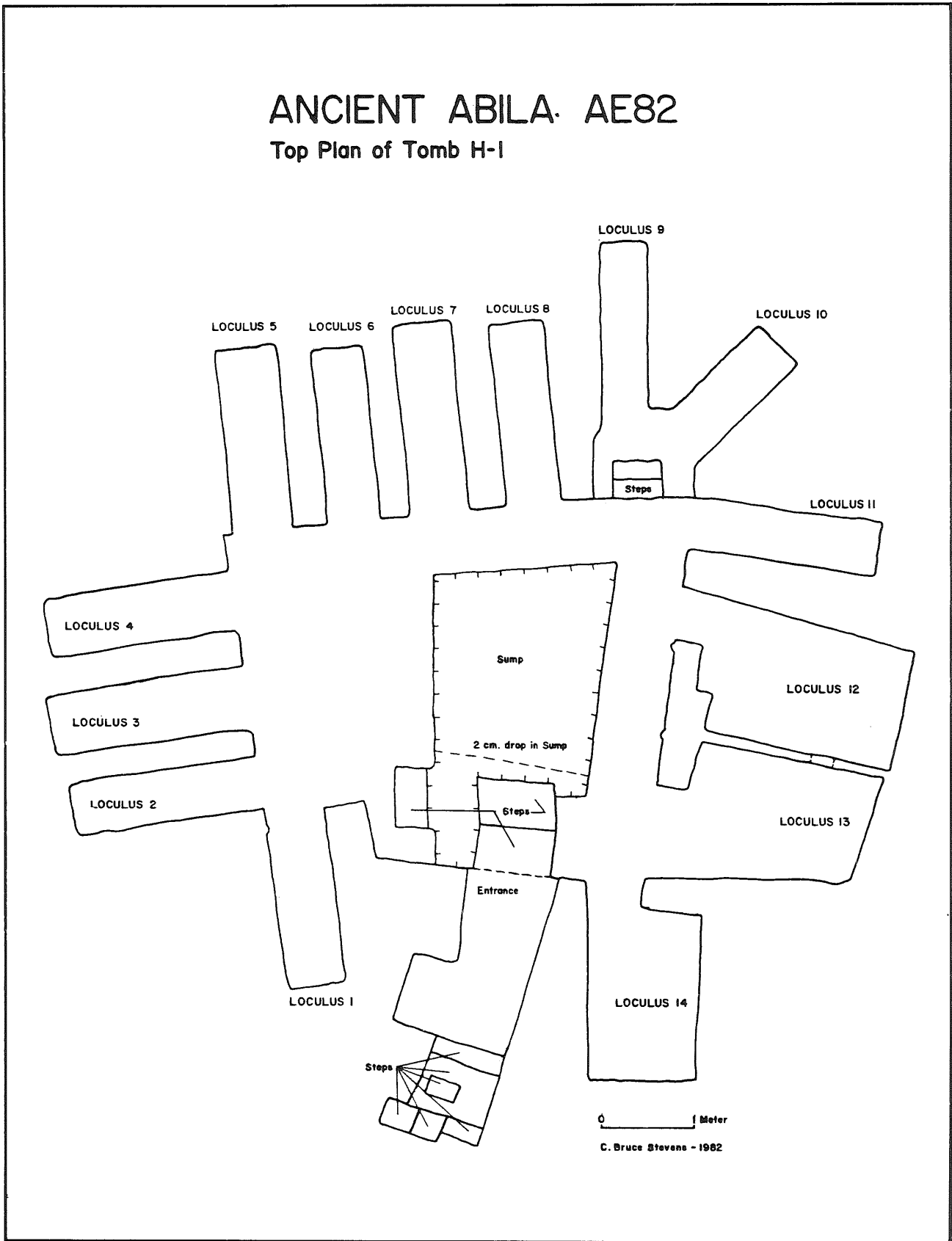


Fig. 4. Top Plan of Tomb H-1.

the *arcosolia*. Tomb J 5, located a short distance south of J 3, was unique in showing a rough cut, rectangular chamber, with a rock-cut bench along the south wall. Evidence points to a Late Roman origin for the tomb. Three adult burials were

found here. Ceramic evidence in the tomb dates from the Late Roman and the Early Byzantine periods.

In the course of the excavation season the Survey Team investigated in detail tomb Area H. It is estimated that there are

at least 100 to 125 tombs in this region, and, in the overall, as many as 1,000 tombs in the bedrock ledges on the various sides of ancient Abila. (Fig. 5)

### Abila Regional Survey: North, South, East and West Transects

Preceding the regional survey, an east-west transect was sherded across the saddle between Tell Abila and Khirbet Umm el 'Amad. The Regional Survey Team laid out radial transects of 100 m. square cells, extending out 2.5 km. distance to the

north, south, east, and west, and the team then did systematic sherding in each of the transects (one man hour of work for each cell). Work in cells NT 1, NT 2, and NT 3 (the cells closest to Tell Abila) established the presence of a Late Roman-Byzantine suburb (Fig. 6) complete with cisterns, winepress, domestic structures, a religious altar, (Fig. 7) sheltered animal pens, and tombs. Farther out in the transect were seen nomadic encampments, evidence of agricultural activities, and a Byzantine farmstead complex (NT 13).

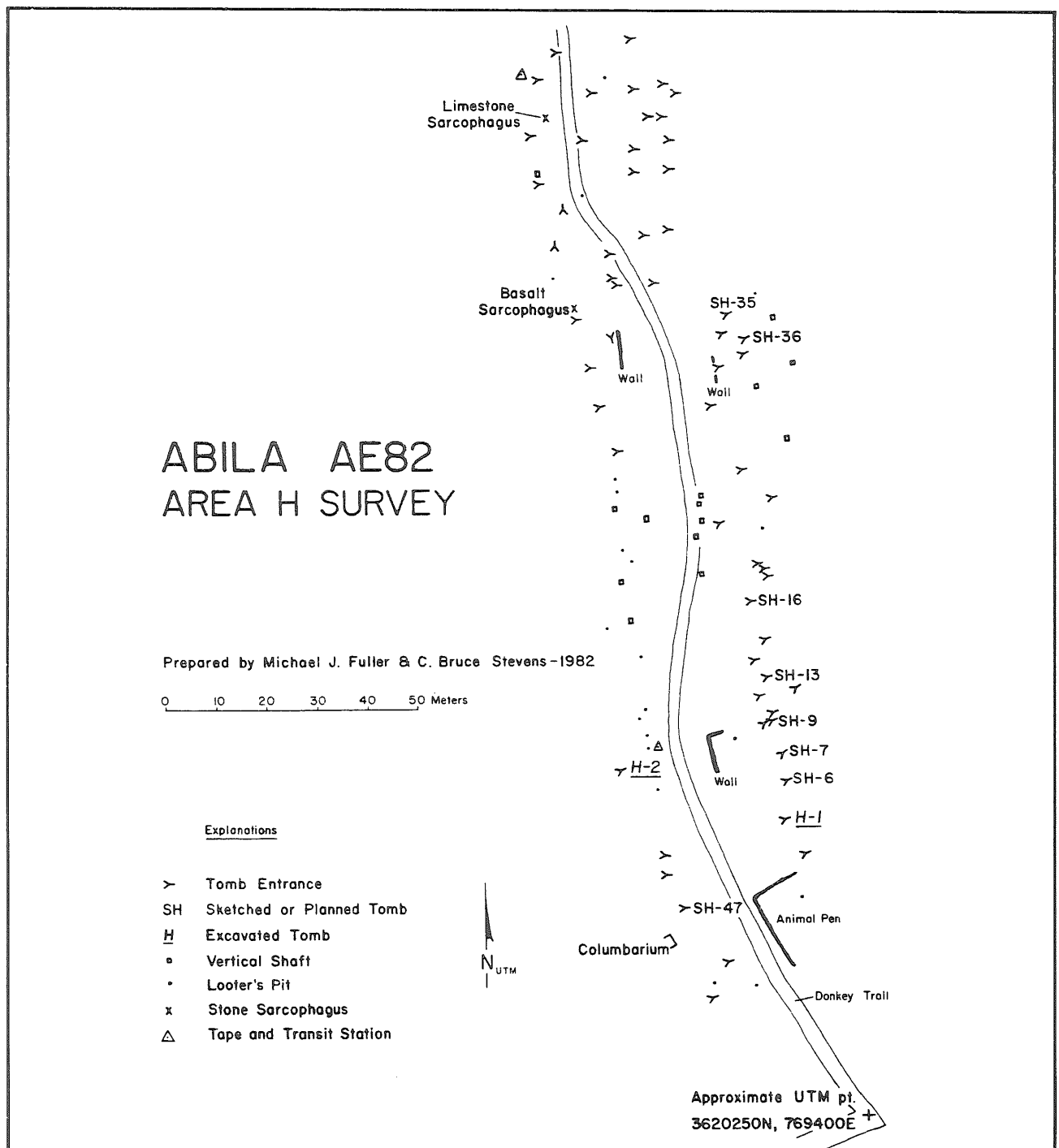


Fig. 5. Plan of Tombs in Area H.

ABILA REGIONAL SURVEY AE82  
NORTH TRANSECT SHEET NO. 1

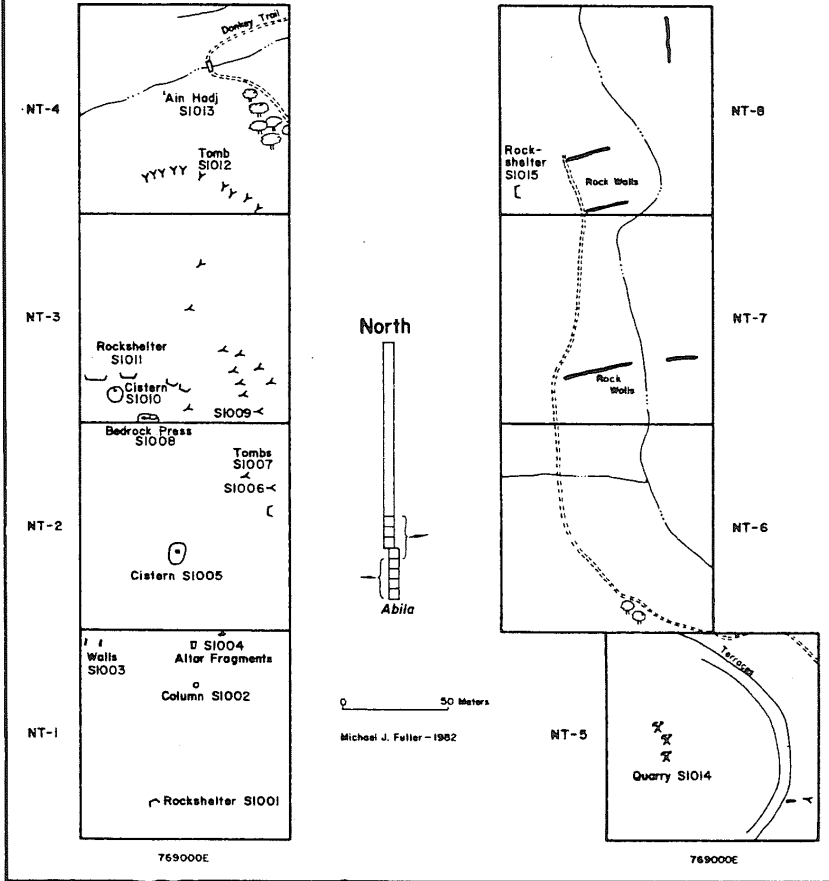
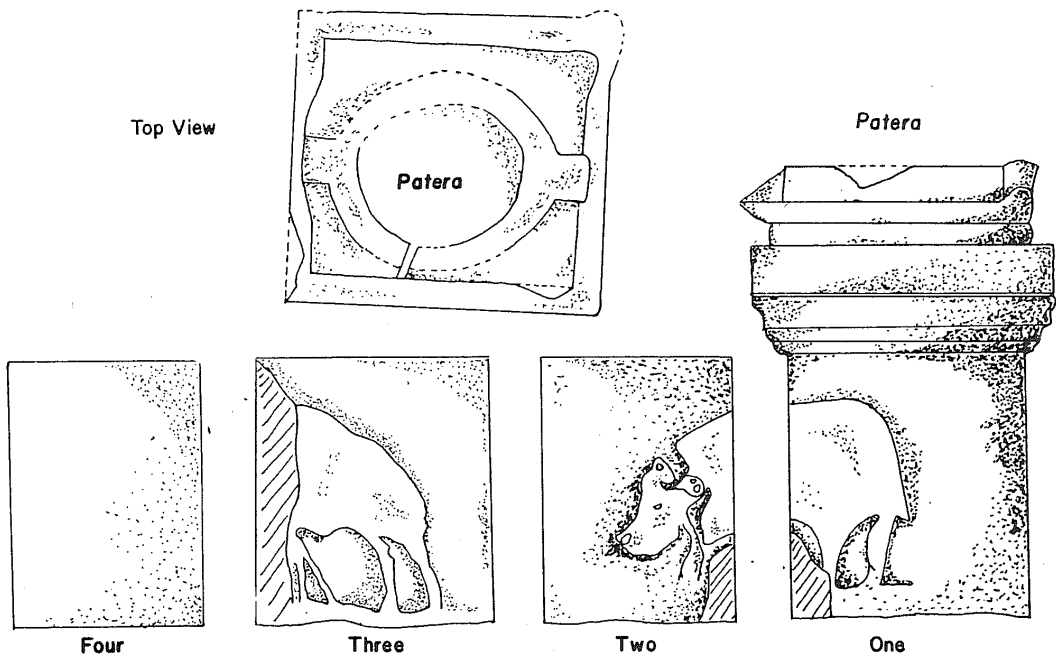


Fig. 6. Plan of the North Transect, Cells NT-1 to NT-8.

ANCIENT ABILA AE82  
ALTAR FROM CELL NT-1



0 10 20 30 cm.  
Prepared by Michael J. Fuller - 1982

Fig. 7. Drawing of Altar Manufactured from Limestone, Cell NT-1.

The West Transect recovered evidence of a suburb of the Roman-Byzantine period in WT 1 and 3. Chalcolithic and Early Bronze sherds were also found in cells WT 1 and 2. Cells WT 3-12 seems to evidence Roman-Byzantine farmsteads. From Cell WT 9 came a Tyrian coin of A.D. 104-107. Architectural features were also found in Cells WT 13-15, 18, and 19; the sherds were predominantly Byzantine.

The East Transect, extending from the bottom of Wadi Quailibah east 2.5 km., discovered architectural features in cell ET 2 which included part of an ancient building, eight tombs, and a dressed stone wall. Byzantine sherds were most abundant, along with sherds of the Hellenistic, Roman, Umayyad, and Mamluk periods. Other cells in the East Transect produced animal pens, rockshelters, and cisterns. Cells ET 18, 19, and 21 produced a number of tesserae and pottery sherds from the Late Roman into the Byzantine periods.

The South Transect (beginning near the centre of Khirbet Umm el 'Amad where the 1980 Abila Survey stopped) extended south across the Wadi Quailibah (near the point of 'Ain Quailibah) and continued on to the southern edge of the modern village of Khureida. Several tombs were examined in Cells ST 4, 5, and 6; one tomb, the "Temple Tomb," was decorated with frescoes of a Graeco-Roman temple, geometric designs, fluted columns with Corinthian capitals, a frieze of running animals, and a portrait. The southern wadi scarp contained a decorated tomb, the "Tunnel Tomb," so named because of an extensive Water Tunnel meandering nearby. In the South Transect there were evidences of scattered Byzantine farmsteads in Cells ST 6-9, ST 14-19, and ST 23-24.

The Water Tunnel survey, a part of the South Transect survey, was one of the most important aspects of the 1982 Regional Survey. Roadbed construction near 'Ain Quailibah had truncated the tunnel, thus the survey team was able to investigate three of the segments, as well as the major entrance along the southern wadi scarp to

the southwest of 'Ain Quailibah. The mouth of the major entrance of the water tunnel is 1.78 m. high and 1.20 m. wide (Pl. VIII: 3) Statistics for the deeper portion of the tunnel indicate that the mean width is 0.64 m. and mean height is 1.43 m. It is estimated that the tunnel extends at least a distance of 2.5 km. Back portions of the tunnel included calcified animal bones, Byzantine-Umayyad sherds, and the base of a Byzantine glass flask.

It is probable that the Water Tunnel was constructed during the Roman period and that it was maintained at least through the Byzantine period, as evidenced by the Greek mathematical inscription found in the *Puteus*, the size of the lamp niches and construction techniques. The water tunnel was cut into chalky limestone which does not exhibit faults or solutional pockets which could have influenced its course. The original entrance of the water tunnel is designated on the Irbid topographic map as an addit symbol at UTM coordinates 3618710N, 768930E.

The Abila water tunnel shows no evidence of being part of a water catchment system, which was true, however, of the tunnels at Philadelphia (Amman) and Capitoliias (Beit Ras). There may have been a similar aqueduct system at Gadara (Umm Qeis), according to Pasha<sup>7</sup> but there are no other literary or archaeological evidence to this effect. Comparable extensive aqueducts were built during the Roman period (cf. the two aqueducts at Caesarea Maritima, the Jerusalem aqueduct, and the one at Syrian Antioch). The construction and use of the Abila Water Tunnel at this period speaks to the city's wealth and integration into the Roman empire; the growth of Abila probably taxed the capacity of 'Ain Quailibah, necessitating another source of water.

#### **Architectural Wall Survey: Architectural Drawing on Tell Abila, the Saddle and Khirbet Umm el 'Amad**

The Architectural Wall Survey concentrated on the features of the Basilica Church on Tell Abila and in the saddle

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<sup>7</sup> P. Pasha, *A History of Jordan and Its Tribes*, Florida, 1958, p. 28.

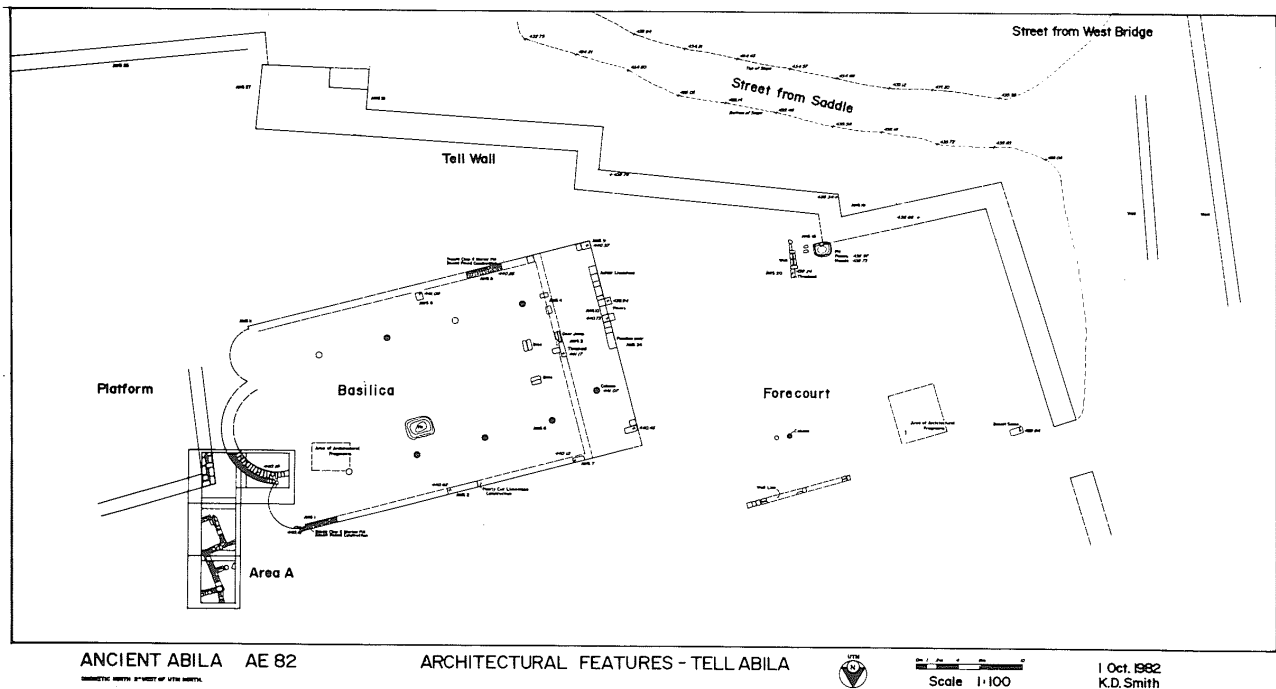


Fig. 8. Synthesis of Wall Structures on the South Portion of Tell Abila and the Area A Excavation Data.

between Tell Abila and Khirbet Umm el 'Amad (Fig. 8). The date for the Basilica building is estimated to be late sixth-seventh centuries A.D., following the model of basilicas in southern Syria, with its form being almost identical to the West Church at Pella.<sup>8</sup> The platform on which the Basilica was built measures 19.90 m. north to south and 33.10 m. east to west (not including the dimensions of the apses). The west wall of the Basilica is 5.25 m. east of the west edge of the platform, but the location of a basalt column drum in this 5.25 m. strip indicates the probability of a colonnaded porch on the west end of the church. Including the porch, then, the Basilica was the same dimensions as the platform, 19.90 m. north-south by 33.10 m. east-west. The centre aisle of the church is 11.30 m. wide and is separated from the two side aisles by rows of columns each having an intercolumniation of 6.57 m. The side aisles are each 2.10 m. wide with walls of 1.20 m. on each side. All of these features were carefully drawn.

To the north and east of Area A on Tell Abila there were numerous traceable wall lines and concentrations of basalt architectural fragments, including several

large well-carved basalt door jambs, a pilaster base (or top moulding), a drum from an engaged column, and several ashlar basalt stones. Also there were two limestone arches set in a wall line. The evidence points to a large, important building located here. Farther east and north on Tell Abila other extensive building remains are to be observed.

The investigation of the wall system that circumscribes portions of Tell Abila points to a long term use and rebuilding of these walls; this suggests the continued importance of Tell Abila over a long period of its history. Most of the wall is of header-stretcher, ashlar limestone. One notable (probably late) exception is the section of wall to the south of Area A, constructed of reused basalt architectural fragments. These fragments include building blocks, and one fragment with cuttings for door or gate bolts in its uppermost face, suggesting that in this sector there may have been an entrance to the top of the tell from the saddle below.

A flight of basalt steps at the far southeast corner of Tell Abila was mapped: they consist of possibly twelve stairs, 2.3 m. wide, with the average riser height of ca. 0.50 m. This stair installation seems

<sup>8</sup> R.H. Smith, *Pella of the Decapolis*, Wooster, 1973, p. 139-155.



to lead to the top of Tell Abila from a terrace level below.

### Flotation and Soil Testing

The limited analysis of soils and some sampling of test units for botanical remains by use of flotation indicated that the climate of Roman Abila was not significantly different than that of today. The evidence showed that among the economic plants utilized were olive, wheat, millet, barley, grape, lentils, hackberry, vetch, and coriander. Soil samples were systematically taken from square 2 of Area A, with judgment samples collected from the other squares. A pH testing of the acidity or alkalinity of the soil deposits with an **Accutronic** pH computer showed a range of pH values for Area A, Square 2, ranging between 6.7 and 7.0 with a mean of 6.8.

### The 1982 Season in Perspective<sup>9</sup>

The 1982 Abila Excavation and Regional Survey<sup>10</sup> contributed to our goal of understanding the archaeological history of ancient Abila of the Decapolis, especially in the Umayyad, Byzantine, and Roman periods. This was true as a result of our excavation of Area A on the summit of Tell Abila. The tomb excavation in Areas H and J particularly added to our understanding of the cultural and material heritage of Abila in the Roman and Byzantine

periods. The Regional Survey also showed the close connection culturally that the immediate suburbs had with the site. The survey of the Water Tunnel just to the south of 'Ain Quailbah raised the intriguing question as to the extent of the expanding population that would need such an increase of water. Future seasons of excavation will increase further our understanding of these periods at Abila, as well as inform us of the broader horizons of the archaeological history of the site.

### Finds

1. Selected Finds from Early Roman Tomb H 2 (Fig. 9, listed by tomb object no. and tomb identification no.).

10 (H 2). Wheel-made bowl. Fine grained texture, reddish-yellow core (5YR 6/8) and gray external slip (5YR 5/1) which extends down from the rim 6.7 cm. Single horizontal incised line 0.30 cm. below the rim. Two-thirds restored, except for missing basal sherds. Existing ht. 9.3 cm.; rim dia. 14.0 cm.

14 (H 2). Wheel-made piriform bottle. Reddish-yellow (7.5YR 7/6). sparse grits. Flattened rim, slightly expanding neck; horizontal ribs smoothed by burnishing. Max. ht. 15.1 cm.; rim dia. 3.8 cm.; max. width 8.2 cm.

21 (H 2). Wheel-made two handle jar.

<sup>9</sup> The 1982 Abila Excavation and Regional Survey had affiliation for the season with the American Schools of Oriental Research and with the American Center of Oriental Research in Amman, as well as always the consistent cooperation and assistance of the Department of Antiquities of Jordan, Dr. Adnan Hadidi, Director General. To all those who contributed to the success of the second season of work the Expedition gives a heartfelt thanks.

<sup>10</sup> The staff of the 1982 Abila Excavation and Regional Survey consisted of the following: Members of the Core Staff: Dr. W. Harold Mare, Director; Mr. Michael J. Fuller, Chief Architect and Surveyor; Dr. John J. Davis, Tomb Excavation Supervisor; Dr. Duane W. Roller, Area A Supervisor; Dr. Cherie J. Lenzen, Pottery Specialist; and Dr. Willard W. Winter, Objects Registrar; Mr. Sultan Shureidah, Department Representative; Area A Square Supervisors: Ms.

Mary-Louise Mussell and Ms. Nancy L. MacLeod, Square 1; Mr. Thomas Lee, Square 2; Ms. Karen Porter, Square 3; and Mr. David Slattery, Square 4; Individual Tomb Supervisors: Ms. Neathery Batsell Fuller; Ms. Kate McGregor; Mr. Shannon McPherron; and Mr. John McGuire; Survey Team Members: Mssrs. C. Bruce Stevens, Charles O. Stovall; Ronald E. Jones; Debra Jo Stockton; Angie Gones; Photographer: Mr. Russell Adams; Architect: Mr. Kenneth D. Smith; General Staff Members: Laima RataVICIUS; Sharon Moriarty; Cathy Gruspier; Pat Dutton; and Alison McQuitty; Consultants: Dr. David C. McCreery, Paleoethnobotanist; Dr. Gary Rollefson, Paleolithic Specialist. We also had the expertise of Ms. Randa Kakish, of the faculty of the University of Jordan, in the area of art history; she also worked on the survey team. Kate McGregor, Earbie Bledsoe, Thomas Nash, and Frances Havey did valuable art work on a number of the objects present in the United States.

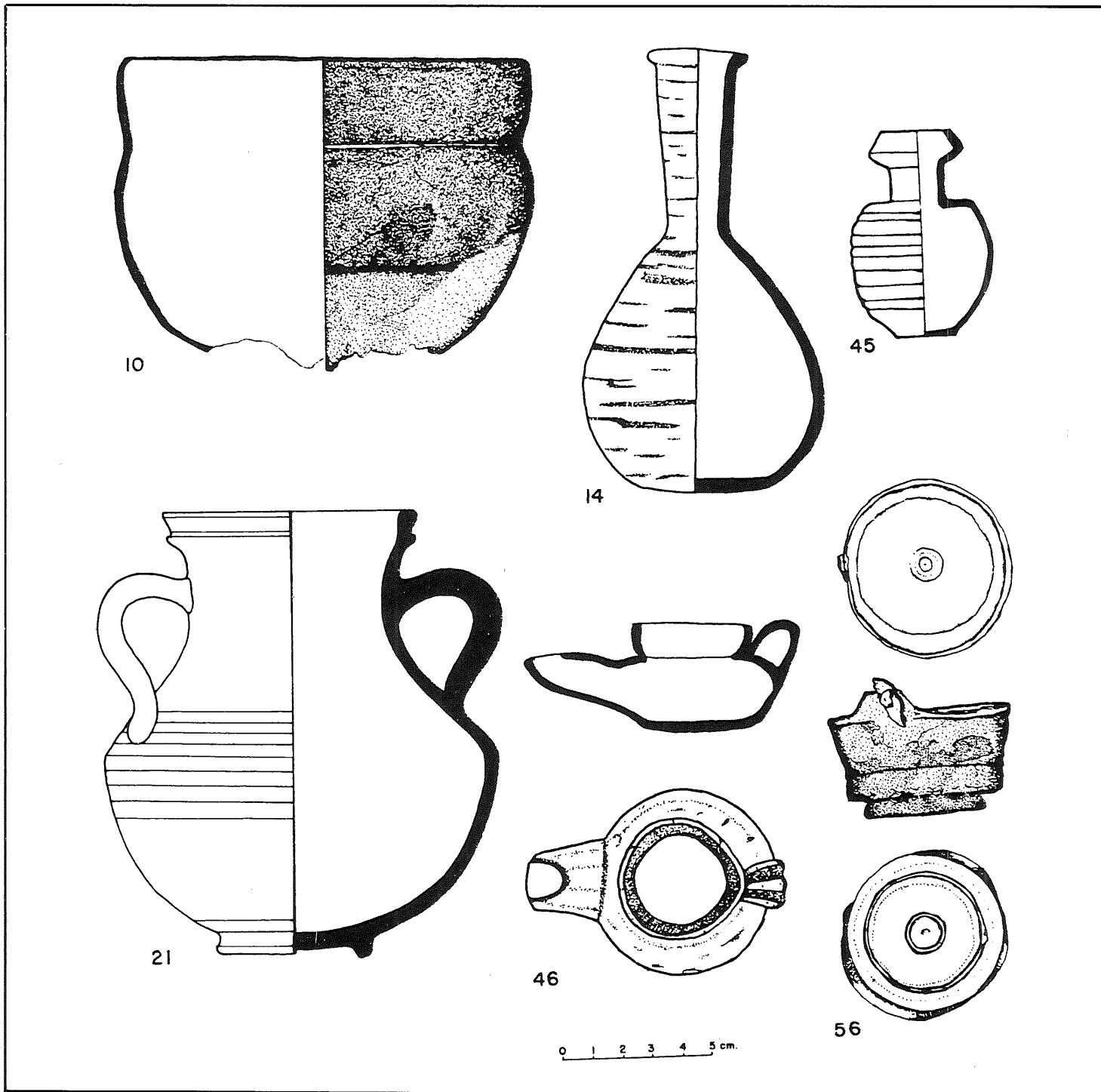


Fig. 9. Selected finds from Early Roman Tomb H-2.

Good quality of manufacture: finely mixed clay, even firing, sparse grits, fired pink (5YR 7/4). Strap handles attached on opposing sides to neck and shoulder. Horizontal broad ribbing over much of the body. Max. ht. 14.7 cm., rim dia. 8.5 cm.; dia. at widest point 12.6 cm. Cf. Dyson 1968: fig. 13.437.

45 (H 2). Wheel-made small bottle. Small white grits, exterior colour red (10R 5/6). Attached neck and horizontal ribs from shoulder to within 1.0 cm.

of base. Restored except for one missing body sherd. Max. ht. 7.1 cm.; rim dia. 2.4cm.; max. width 4.7 cm.

46 (H 2). Wheel-made lamp. White grits, light red (10R 6/6). Attached spout and neck and strap handle. Max. ht. 4.0 cm.; max. length 8.6 cm.; max. width 6.4 cm. Cf. Smith 1973: pl. 57.59.

56 (H 2). Small bronze dipper. Handle missing but rivet preserved. Attached disc base. Horizontal ridge 0.2 cm.

below rim and 1.5 cm. below rim. Originally circular in shape. One side slightly compressed. Surface oxidized with some lime encrustation. Max. ht. 3.7 cm.; max. dia. 5.8 cm. Cf. Meyers, *Meiron*, 1981: Photo 52:1; Fig. 7.6.9.

2. Selected finds from Late Roman-Byzantine Tombs, H 1, J 1, J 4 and J 5 (Fig. 10; listed by tomb object no. and area identification no.)

159 (H 1). Female statuette, carved from chalky limestone. Light gray (10 YR 7/1) to white (10YR 8/1). Figure has braided hair covered by (phrygian) cap; left arm folded under breast; right arm extended along body. Possibly seated, or left unfinished. Face expressionless. Possibly a cult object. Max. ht. 17.6 cm.; max. dia. 4.7 cm.; max. thickness 4.3 cm.

320 (J4). Two piece mold-made clay lamp. Byzantine with Christian motif. Wet slurry with slight patina on under side. Silty clay, reddish-yellow (7.5YR 7/6). Decorative motif: three concentric rings with attached rays around the central orifice; cross surrounded by nodes and on either side a circle filled with nodes. Carbon black on wick orifice. Max. ht. 3.1 cm.; max. length 9.1 cm.; max. width 6.0 cm.

324 (J 4). Two piece mold-made clay lamp. Some white grits. Pink (7.5YR 7/4). Raised candlestick decoration. Carbon on wick orifice. Max. ht. 2.8; max. length 7.7 cm.; max. width 5.4 cm. Cf. Smith, 1973; Plate 66, Nos. 368, 369.

444 (J 5). Wheel-made cooking pot. Good quality clay. Slight exterior evidence of smoke blackening. Partly calcium encrusted. Exterior colour weak red (10R 5/4). Opposing strap handles, attached from rim to body. Horizontal flattened ribbing from neck to bottom; rounded bottom. Max. ht. 14.2 cm.; rim dia. 10.2 cm; max. dia. 19.6 cm.

3. Selected finds from Area A and Regional Survey (Fig. 11; listed by object no. and area identification no.).

268 (A 3). Silver pendant figurine

Mold-made, with hole made above the head for string or cord. Length 2.5 cm.; width 1.0 cm.; max. thickness 0.6 cm. Cf. Negbi, 1976: pl. 42: 1563.

301 (ST 7). Mold-made circular clay lamp. Originally dark gray slip (7.5YR 4/0), largely weathered, exposing a pinkish white (7.5YR 8/2) surface. Depressed broken discus, no handle. Slight nozzle. Decorative motif: double axe-head motif on the top of the discus; rays emanating around discus and double volutes near the nozzle. Faint trace of carbon around the nozzle. Max. ht. 2.1 cm.; max. length 8.5 cm.; max. width 7.3 cm. Cf. Meyers 1981: *Meiron*, pl. 6.2; Meyers 1981, BASOR 244, 21-22.

4. Selected finds: Coins from the tombs, the Regional Survey and Area A (Pl. IX; listed by object no. and area identification no.).

158 (J 1). Bronze nummus, 12 mm., weight 0.5 gm., Place of origin or reign: Rome, Leo I, mint uncertain. Date: Reign of Leo I, A.D. 457-474. Obverse: Diademed bust, facing right: (DNL)EO Reverse: Emperor standing facing, holding transverse scepter in his left hand and globus cruciger in his right. Mint mark below the standing figure is illegible, but coins of this reign were struck in nine mints, including Constantinople, Nicomedia, Cyzicus, Antioch, etc. Cf. Sabatier 1862: 133, pl. VII.6; Ratto 1959: 14, 266.

262 (WT 9). Bronze coin, 16 mm., weight 2.6 gm. Place of origin: Phoenicia, Tyre. Date: A.D. 104-107. Obverse: Veiled, turreted head of Tyche, facing right. Reverse: Palm tree with two bunches of grapes. Date on the coin is illegible. Around the flan occur: (✱MH) ΤΡΟΠΙΟΛΑ (ΕΩΣ ΙΕΡΑΣ).

508 (found ca. 50 m. northeast of Area A). Bronze follis, 22 mm., weight 3.7 gms. Place of origin or reign: Byzantine, Heraclius. Date: A.D. 624/5. Obverse: Standing figures of Heraclius (centre), Heraclius Constantine (left), and Martina (right) each holding a

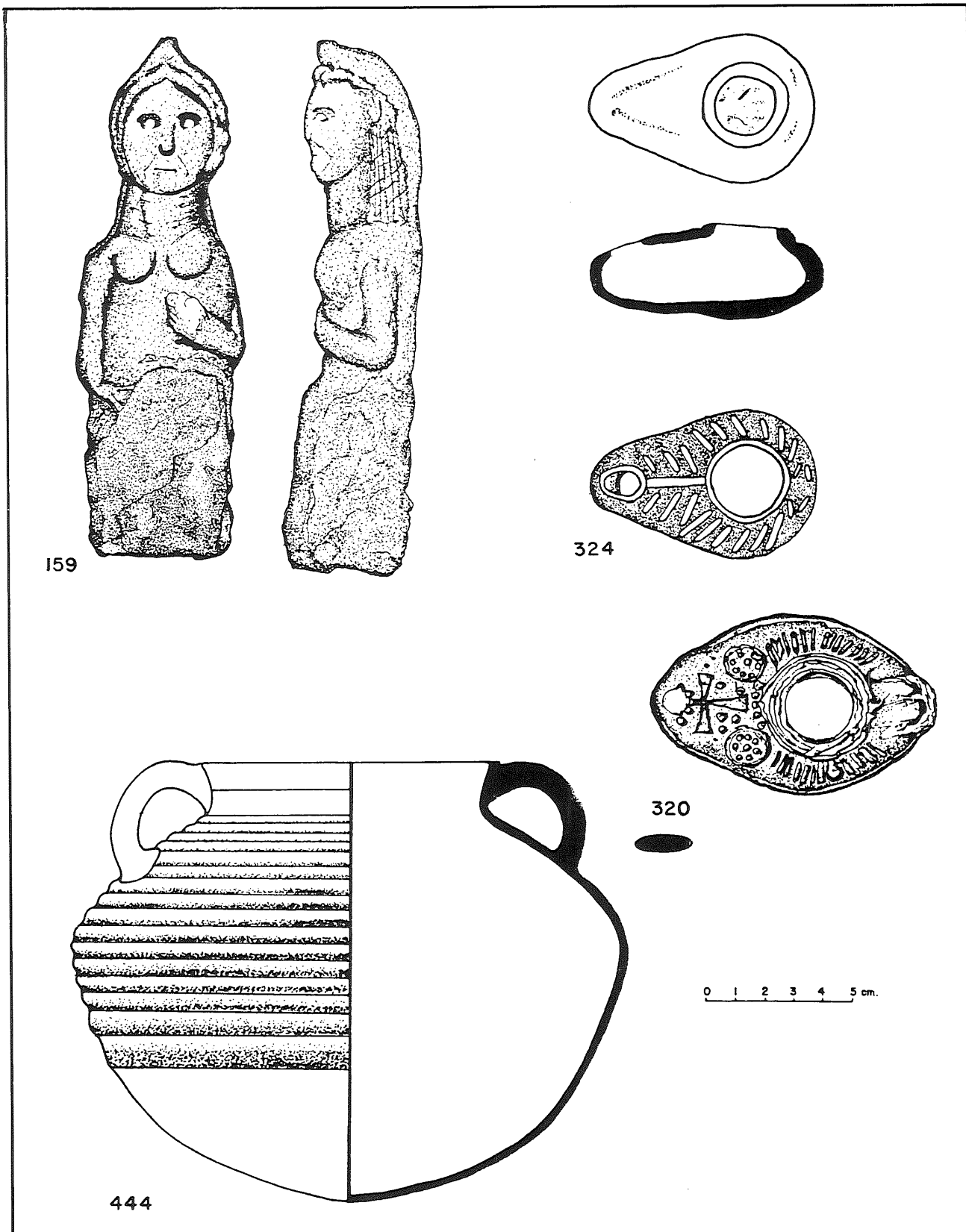


Fig. 10. Selected Finds from Late Roman-Byzantine Tombs, H-1, J-1, J-4, and J-5.

globus cruciger. No inscription. Reverse: Large M (=40 nummi), ANNO, **Ϟ** (monogram of Heraclius), **Ϛ** (these two letters represent the regnal year 15) and **Γ** (the officina workshop number; mint mark uncertain, probably Constantinople: (CON). This coin was

probably overstruck on an earlier 1/2 follis.

#### New Areas of Archaeological Importance

In addition to the extensive number of Roman-Byzantine tombs which

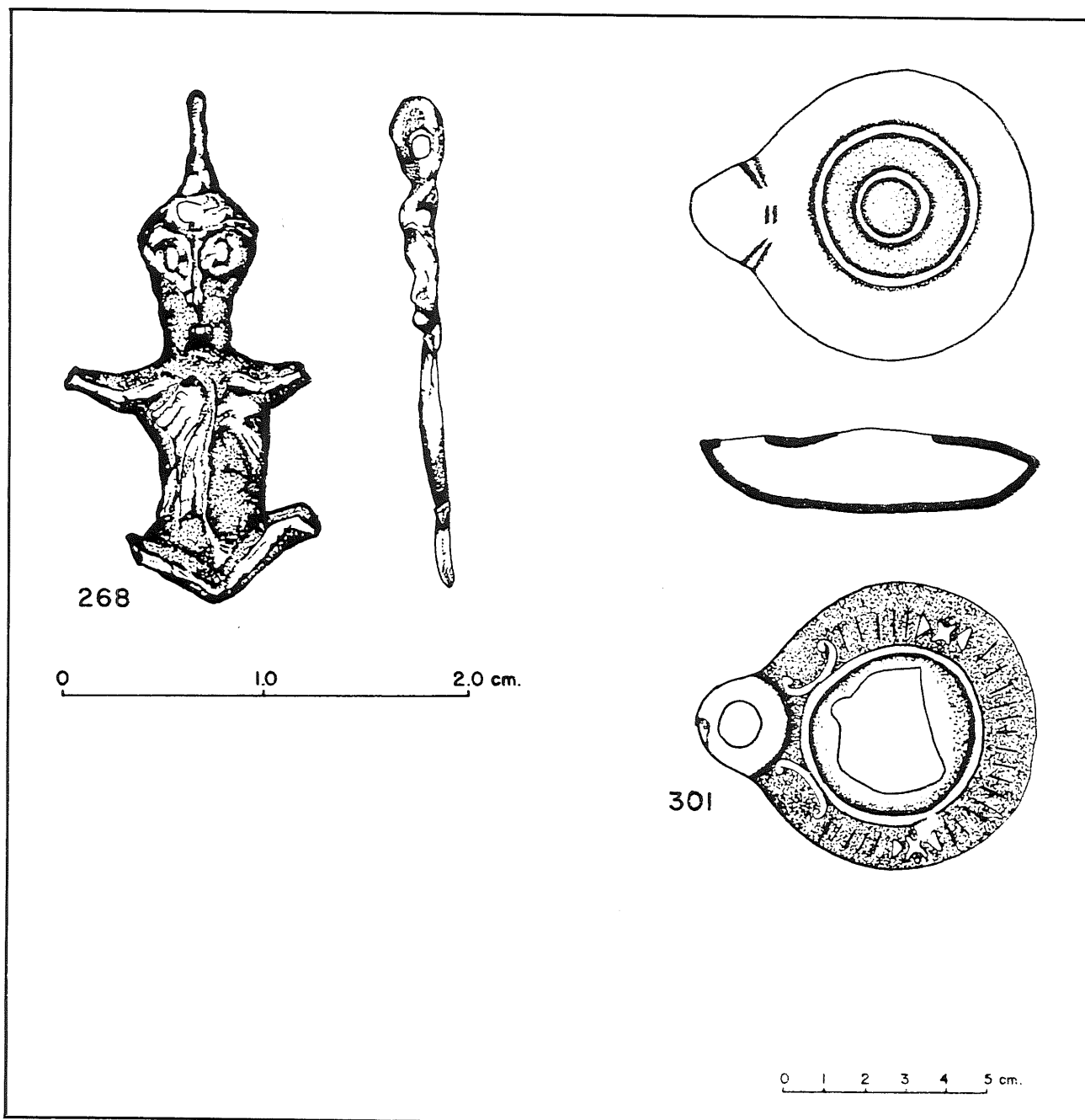


Fig. 11. Selected Finds from Area A and Regional Survey.

are currently being investigated, the presence of Iron Age and earlier tombs need to be searched for in the Abila region. Also, there are extensive surface ruins both on the south tell, Khirbet Umm el 'Amad and in the saddle between it and the north tell, Tell Abila, which invite further investigation and research. In addition to the water tunnel found just to the south of 'Ain Quailibah, there seems to be evidence of the remains of additional water sys-

tems located just to the west (and south) of 'Ain Quailibah. Research in all of this material may give us additional understanding of the nature and breadth of the cultural heritage of Abila and its environs.

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**PRELIMINARY REPORT ON THE  
UNIVERSITY OF SYDNEY'S FIFTH  
SEASON OF EXCAVATION AT PELLA  
IN JORDAN**

by

Anthony McNicoll, Warwick Ball,  
Susan Bassett, Phillip Edwards, Phil Macumber,  
Dani Petocz, Timothy Potts,  
Leanda Randle, Linda Villiers and Pam Watson

## Introduction

The University of Sydney commenced its fifth season as partner with the College of Wooster, Ohio, in the Joint Expedition to Pella on 14 December, 1982. Digging ceased on 14 February, 1983, but work on the site continued until 3 March. The staff of the excavations numbered thirty-one, and up to ninety local labourers were employed.<sup>1</sup>

This preliminary report is a compilation of contributions from ten members of the team, whose names are appended to the sections which they have written.

During the season excavations were undertaken at Khirbet Fahl and in the surroundings. On the main mound the following areas were dug: III (Middle Bronze and Iron Age occupation), IV (Byzantine, Hellenistic and Iron Age occupation), V (Byzantine church), VI (Roman tombs), XI (Hellenistic/early Ro-

man citadel (?) wall), XIV (Chalcolithic occupation) and XXIII (Medieval and Umayyad occupation). The location of these areas is shown in Figure 1. Other work included the commencement of excavations and a survey in the Wadi Ham-meh system which was recognised as a potentially informative area for research on early hominid activity in the area during Macumber's geo-morphological investigations in 1981. Reports on the palaeopathological and archaeo-botanical studies carried out in the 1982/3 season will appear in the second interim report of the Joint Expedition *Pella in Jordan 2*, scheduled for publication in 1984/5.

In this report the contributions on the excavations are presented in chronological order, followed by summaries of the survey and geomorphological investigations.

Anthony McNicoll

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<sup>1</sup> The team consisted of the following: Co-directors Dr. Anthony McNicoll and Mr. Timothy Potts; survey team Mr. Dani Petocz and Ms. Linda Villiers; cataloguers: Dame Margaret Wheeler, Mssrs John Thorne and Ian Biggs; draughtspersons Ms's. Wendy Ball, Kathryn Eriksson and Leanda Randle; conservator Ms. Elizabeth Sandford Willcox; archaeobotanist Mr. George Willcox; house supervisor Ms. Maree Browne; palaeopathologist Mr. Chris Browne; geomorphologist Mr. Phil Macumber; photographer Mr. John Hargreaves; site supervisors Mr. Warwick Ball, Ms. Sue Bassett, Mr. Phillip Edwards, Mr. Jack Hanbury-Tenison, Mr. Stephen Hart, Ms. Leah McKenzie, Ms. Margaret O'Hea, Ms. Yvonne Reynolds, Mr. Ted Robinson, Ms. Kate Streat, Ms. Pam Watson and Mr. Greg Wightman; De-

partment representatives Mssrs. Sultan Shraideh and Hikmat Ta'ani; foreman Mr. Badri Hasan Maadi; cooks Abu Aref and Abu Sami.

The dig was funded by the Australian Research Grants Committee, the Australian National Gallery and The University of Sydney. Contributions were also received from the University of Queensland and the Australian Institute of Archaeology. The invaluable help of Dr. Adnan Hadidi and his staff at the Department of Antiquities in Amman is gratefully acknowledged, as are the many acts of kindness and hospitality of the staff of the British Institute at Amman for Archaeology and History, Mrs. C.-M. Bennett and Andrew Garrard and the Australian Ambassador Mr. Richard Gate, and the Chargé d'Affairs, Mrs. Victoria Kingsmill.

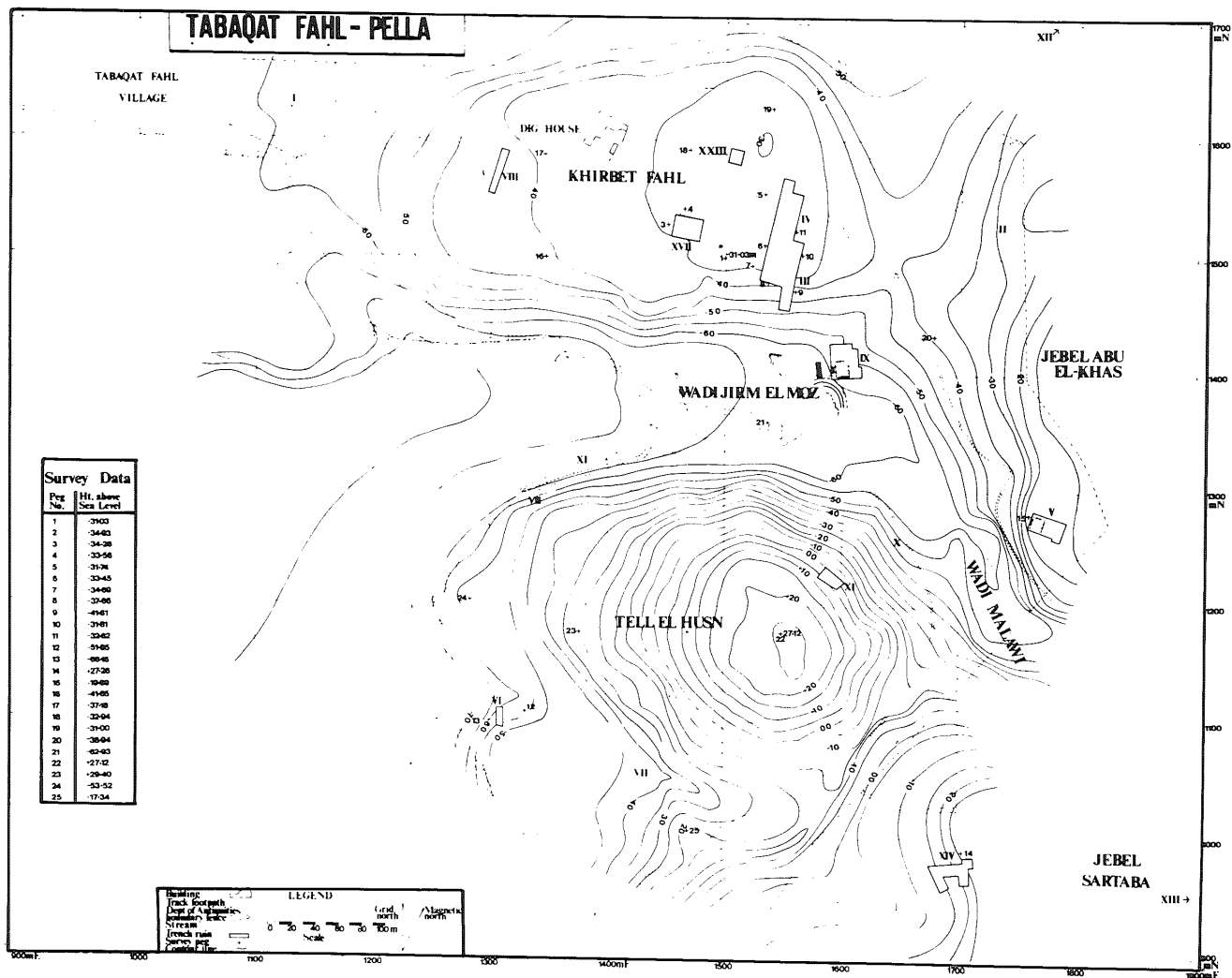


Fig. 1: Pella (Tabaqat Fahl) Excavations. Contour plan showing areas excavated.

## Two Epi-palaeolithic Sites in the Wadi Hammeh (Area XX)<sup>2</sup>

Limited excavations were carried out at two Epi-palaeolithic sites, located respectively near to and at the top of the remnant valley fill in the Wadi Hammeh.

The earlier of the sites, Wadi Hammeh 26, is a Kebaran camp, stratified in natural section due to back incision by the Wadi Himār. Intervening between this and the more recent site of Wadi Hammeh 27, an extensive open-air Natufian settlement, are deposits of silt and travertine up to three metres thick representing the passage of seven millennia.

Wadi Hammeh 26-Kebaran (for location see Fig. 9):

Stratified in a palaeosol directly overlying a conglomerate band, Wadi Ham-

meh 26 is placed at an important transitional zone with respect to the chronology of geological events in the Jordan Valley (Macumber, below).

Within the palaeosol, a dark medium clay band 0.30-0.40 m. thick, finds of lithics, and bone and charcoal fragments were concentrated most densely at a point where an erosion gully had cut deeply through the site. Assuming that the visible section represents a slice through a unimodal, approximately radial scatter of artefacts, the area of the site is estimated at 20.00 m.<sup>2</sup>

Two features further indicate that the site is *in situ* though slightly moved: 1) two sets of conjoinable microliths were found, with both pieces lying within a half a metre of their mates: 2) the astragalus and calcaneum of a wild cat were found within

<sup>2</sup> These sites in the Wadi Hammeh are designated Area XX in the Pella System. The numbers used

in this article (nos 26 and 27), are the designations of the Wadi Hammeh survey (Petocz and Villiers, below), and will take precedence in publication.

half a metre of each other. The bones articulate well and appear to be derived from the same individual.

A total of 1.10 m.<sup>3</sup> of deposit was excavated and dry-sieved through a 2 mm. mesh, with a certain amount of whole matrix being processed through a water flotation unit. Neither internal stratification nor constructional features were evident within the palaeosol. Groundwater flow and strong root action were two obvious agents which had led to its thorough mixing.

The 4,877 unretouched chert elements consist of 67.5% flakes, 23.8% bladelets, 8.2% blades with microburin technique at 0.5% (N=23). The proportion of cortex on flakes compared to blades and bladelets is high; cortical flakes may in large part represent the waste from the primary stages of core reduction, emphasizing bladelet production as the main focus of the industry. Indeed, 66% of the forty-one cores are small, prismatic bladelet cores of which the predominant type is a pyramidal-shaped core worked around one face, with a single striking platform (Fig. 2:18). A number of core tablets (18) attest to the practice of platform renewal by the striking of a transverse blow across the old platform. Bladelets are consistently thin and narrow with diffuse bulbs of percussion and punctiform butts.

The retouched tools (3.8% of total) are dominated by the category of obliquely-truncated backed bladelets (33.2%). (See table 1)<sup>3A</sup> Considering that most of the broken bladelets (32.7%) are probably medial and distal fragments of obliquely-truncated backed bladelets (the conjoinable pieces are of this nature), the index of the latter category may have been up to 65%.

The obliquely-truncated backed bladelets of the Wadi Hammeh 26 are notable for their gracility (mean max. width=3.8 mm., range=2-5.75 mm., N=65). "Various backed bladelets" include a few examples of backing combined with very

fine dorsal retouch on the other lateral edge (Fig. 2:8, 2:3), backing combined with inverse retouch (Fig. 2:9), and backing carried on to form a convex truncation on the butt. A few retouched and backed pieces (Fig. 2:10-12) complete the microlithic component.

Larger retouched tools are few (Fig. 2:16), though alongside the formally patterned tools are a number of large blades and flakes with edge alteration which appear to have been utilised as knives and scrapers. Burins are mainly of the dihedral kind (Fig. 2:17).

One tiny, broken bone point was found, possibly fire-hardened, and exhibiting whittling facets (Fig. 2:19).

Fauna were identified from the new complete bones and diagnostic fragments present, which consisted mainly of phalanges and distal metapodia. Plant species were identified from charcoal fragments.<sup>3</sup>

- Gazella* sp. (gazelle)
- Ovis/Capra* sp. (sheep/goat)
- Sus scrofa* (wild pig)
- Felis sylvestris* (European wild cat)
- Lepus cf. europaeus* (cf. European hare)
- Rodentia* spp.
- Phasianidae* sp. (quail)
- Passeriformes* sp. (song bird)
- Testudo cf. graeca* (cf. Greek tortoise)
- Melanopsis praemorsa* (freshwater mollusc)
- Quercus* sp. (oak)
- Amygdalus* sp. (wild almond)
  
- Pistacia* sp. (wild pistaccio)
  
- Ramnus* sp. (buckthorn)
- Crataegus* sp. (hawthorn)
- Celtis* sp. (hackberry)

A large number of cut and burnt animal bones indicates that the butchering and cooking of animals was an important activity at the site. Of the identified species, *Gazella* and *Testudo* bones clearly show

<sup>3</sup> Willcox, manuscript, 1983.

<sup>3A</sup> Based on Bar-Yosef, O., *The Epi-paleolithic cultures of Palestine*, Jerusalem, 1970, pl. 2: 1-4.



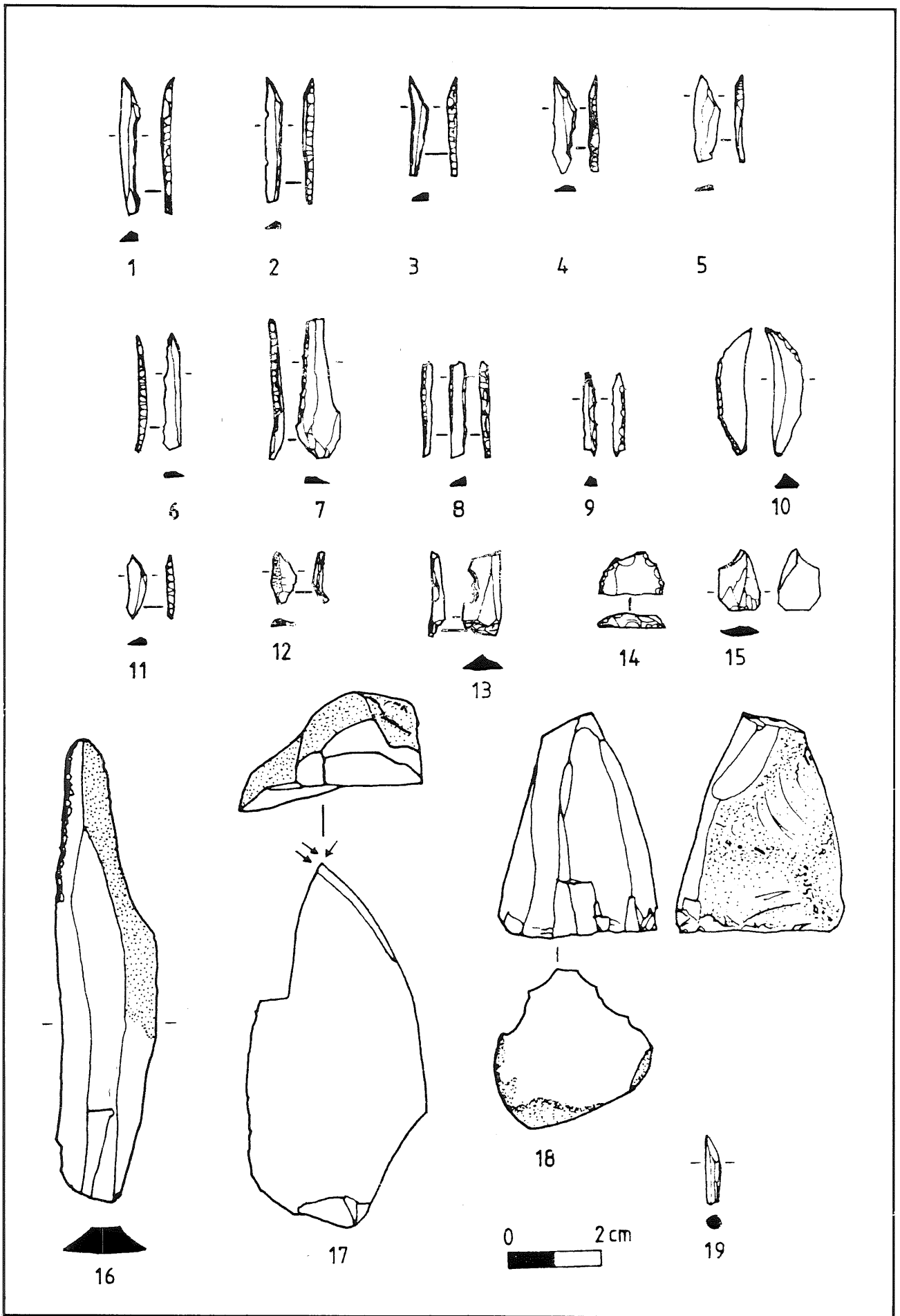


Fig. 2: Pella Area XX - Wadi Hammeh Site 26. Kebaran flaked tools.

traces of burning.

Willcox in discussion has pointed out the early manifestation of open forest species at this site, compared with pollen profile data from more northerly areas.<sup>4</sup> He suggests that open forest associations may have occurred earlier in more southerly latitudes in the Levant, or else microhabitats around the margins of the former Lake Lisan may have allowed the survival of arboreal species.

A radiocarbon date was obtained from a sample of pooled charcoal from the palaeosol: 19,500 ± 600 b.p. (SUA 2101). The result is apparently the earliest radiocarbon date so far reported for a Kebaran site.

#### Wadi Hammeh 27-Early Natufian

Overlying the travertine cap-rock of the Wadi Hammeh bluff, towards its northern end, is a dark clay layer up to half a metre thick. On the eroded, south-westerly face of the bluff this layer is traceable in section for a distance of seventy metres. Surface collections made at various levels on the plateau emphasized the high concentration of chert pieces exuding from this layer, which included hundreds of retouched Natufian tools (Table 1, surface).

At a point where several worked basalt fragments were strewn about four colinear limestone blocks, a 3.00 m. x 2.00 m. *sondage* was sunk back into the hillside. These limestone blocks subsequently proved to be unrelated to an ancient surface; however beneath them, separated by topsoil, were two dry-built wall segments constructed of limestone rubble (Fig. 3, plan; F. 3 and F. 4. Stones are represented by heavy line, pits by thin line; dashed line marks original extent of stone-lines vandalised during the course of excavation). The basal stones of F. 3 were set onto the travertine upon a footing delineated on its west side by a cutting.

Together F. 3 and F. 4 probably represent a section of wall. The gap in between them may have served as a door. Close to the foot of F.4 was an inset basalt bowl (F. 11).

To the west, or "outside" of the wall

were but a few centimetres of deposit, whereas a rich occupation deposit with a depth of 0.40 m. lay to the east of the wall sealed below topsoil layers. The travertine cap-rock which was utilised as a living floor was heavily pitted. While some of these pits appear to have resulted from or been extended by rodent tunnelling, *e.g.*, north of F. 12) others were more clearly man-made and contained several fine objects; a bone point (Fig. 3:9), an agate, a tiny basalt bowl (Fig. 3:10), and lumps of red and yellow ochre together with ochrestained fragments of artiodactyl long bones.

A sample of 2,391 unretouched lithics together with ten single platform and twelve multiplatform bladelet cores were recovered from the test trench. Many of the cores have a soapy texture, as do many of the retouched bladelets, indicating the practice of thermal pre-treatment of chert blanks.

Retouched tools from the *sondage* are fewer than those from the surface (Table 1) but in both collections the type categories represented and the numbers contained therein bear strong resemblances. This is particularly evident with the bladelet categories, which are dominated by Helwan-retouched and inverse-retouched bladelets (Fig. 3:7), notches and denticulates (Fig. 3:3) and Helwan lunates (Fig. 3:4). Microliths other than Helwan lunates are few (Fig. 3:5, abrupt backing, and 3:6). There is a wide range of scrapers in both collections (Fig. 3:1). Burins are dominated by the truncation variety, the commonest type of which is a burin on convex truncation which often resembles an endscraper broken in half (Fig. 3:2). Conspicuous is a fine Helwan-retouched awl (Fig. 3:8), which showed signs of heavy use along both lateral edges. No sherd, or retouched lithic not referable to a Natufian industry was found in any layer of the *sondage*.

Most of the basalt artefacts were broken and re-used in the construction of F. 3 and F. 4. The collection consists of a mortar, a cylindrical, bullet-headed pestle and two pestle fragments, four grinding

<sup>4</sup> J.L. Bintliff and W. Van Zeist, *Palaeoenvironments and Human Communities in the Eastern*

*Mediterranean in Late Prehistory*, BAR International Series 133, Oxford, 1982.

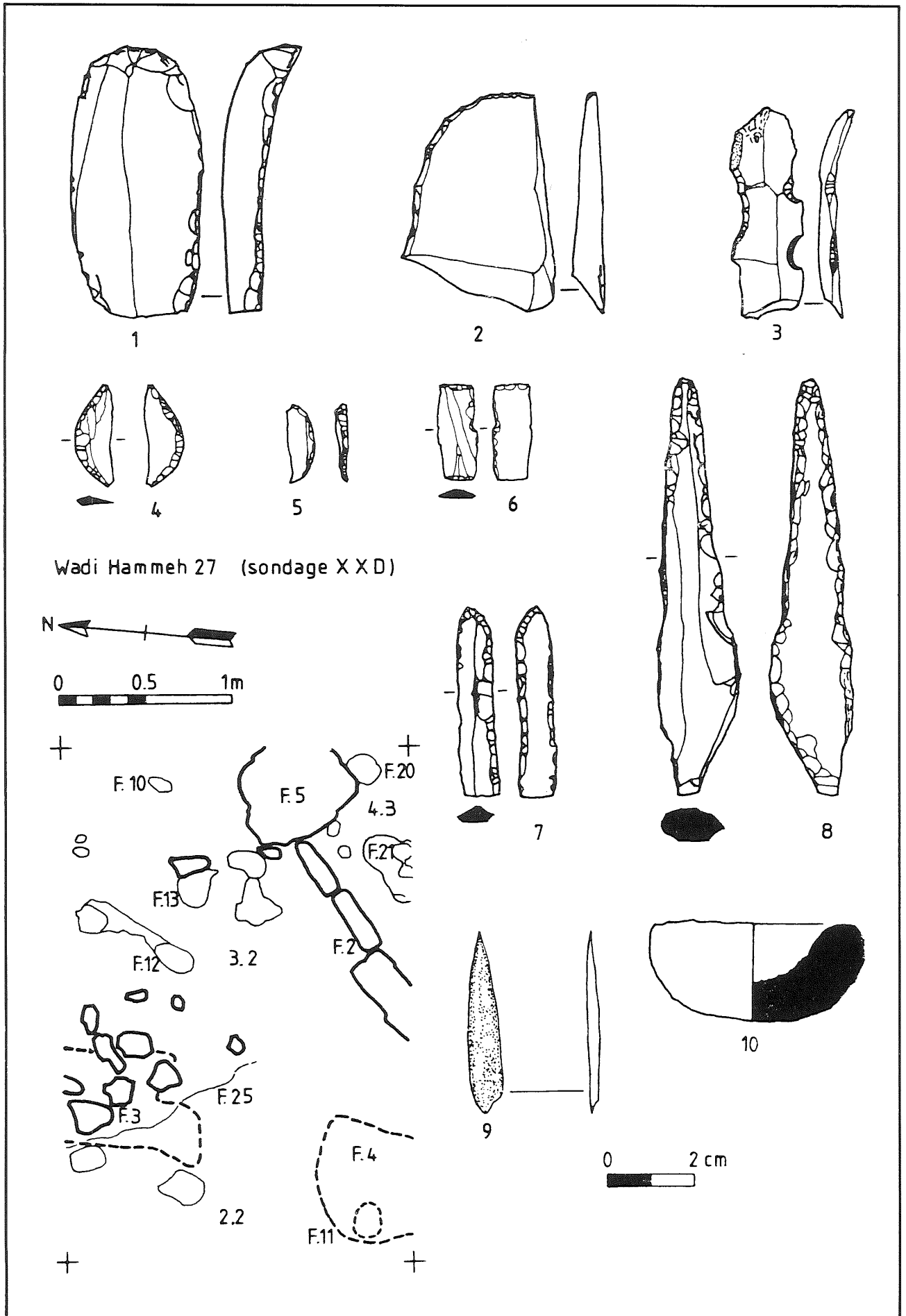


Fig. 3: Pella Area XX - Wadi Hammeh Site 27. Natufian artefacts and plan of sondage.

stones, a large bowl and two miniature bowls.<sup>5</sup>

The plant remains identified from seeds and charcoal fragments provide material evidence for the on-site processing of food plants already suggested by the basalt apparatus and bladelets bearing silica sheen (nineteen examples).

*Quercus* sp. (Oak)

*Hordeum spontaneum* (Wild barley)

*Chenopodium* sp. (Goosefoot)

*Gazella* sp.

*Ovis/Capra* sp.

Crustacea sp.

*Bromus* sp. (Brome)

*Echinochloa* sp. (Grass)

cf. *Caryophyllaceae* sp. (Camp family)

cf. *Lens* sp. (cf. Lentil)

cf. *Cicer* sp. (cf. Check-pea)

cf. *Pisum* sp. (cf. Pea)

*Dentalium* sp.

*Melanopsis praemorsa*

Numbers of *Chenopodium* seeds were found massed together, apparently fused during carbonisation. *Chenopodium* is an example of the sort of food resource that early plant processors may have experimented with, before their shift to the systematic exploitation of a few staple grasses.<sup>6</sup> Among the scant faunal remains to be noted are the marine *Dentalium* shell and the burnt pincer of a crustacean.

Running obliquely across the *sondage* was a series of three slabs of decayed, calcareous mudstone. They were set on edge on the floor and supported with a backing of rubble. A large limestone boulder was jammed up against the eastern end

(Fig. 3, plan F. 2). The southern face of each slab was engraved with an array of concentric square motifs. Root and water action had led to hairline cracks in the slabs, which broke up upon lifting. The reconstructed faces of the slabs are shown in Figure 4.

The two shorter slabs of F. 2 were originally parts of a single slab. This had either cracked *in situ* due to thermal shattering, or more likely, had been rearranged during the lifetime of the settlement. The latter alternative is supported by the find of various carved fragments found at the foot of F.2, and one fragment which was located to the west of F. 3 and F. 4.

The initial, albeit small, sample of lunates have a high proportion of Helwan retouch (81%, N=47). The chronological implications of this factor,<sup>7A</sup> when taken with the other material parallels to 'Ain Mallaha in the single stratigraphic phase so far discovered, and the homogeneity of both lithic collections all point to the existence of a single-period, Early Natufian site, tentatively assignable to the tenth millennium B.C.

The University of Sydney plans to extend its operations at Wadi Hammeh 27 in its forthcoming 1983/4 season. Chief objectives will be the elucidation of the context of the engraved stones, and the investigations of the extent of the settlement across the top of the bluff.<sup>7</sup>

Phillip C. Edwards

<sup>5</sup> J. Perrot, Le gisement natoufien de Mallaha (Eynan), Israel, *L'Anthropologie*, 5-6 (1966) p. 437-483.

<sup>6</sup> Wilcox, *op. cit.*

<sup>7</sup> I would like to thank my postgraduate supervisor Professor J.B. Hennessy for the encouragement to go ahead with this work; Dr. A.W. McNicoll for his support during the 1983 Pella season, and Mr. P. Macumber and Mr. G. Willcox for the opportunity to work with them in the investigation of Wadi Hammeh 26 and Wadi Hammeh 27.

Thanks are also due to the following people

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<sup>7A</sup> Henry, D.O. "An analysis of settlement patterns and adaptive strategies of the Natufian" in *Préhistoire du Levant*, (Colloques internationaux du Centre National de la Recherches Scientifique). 1981, Paris.

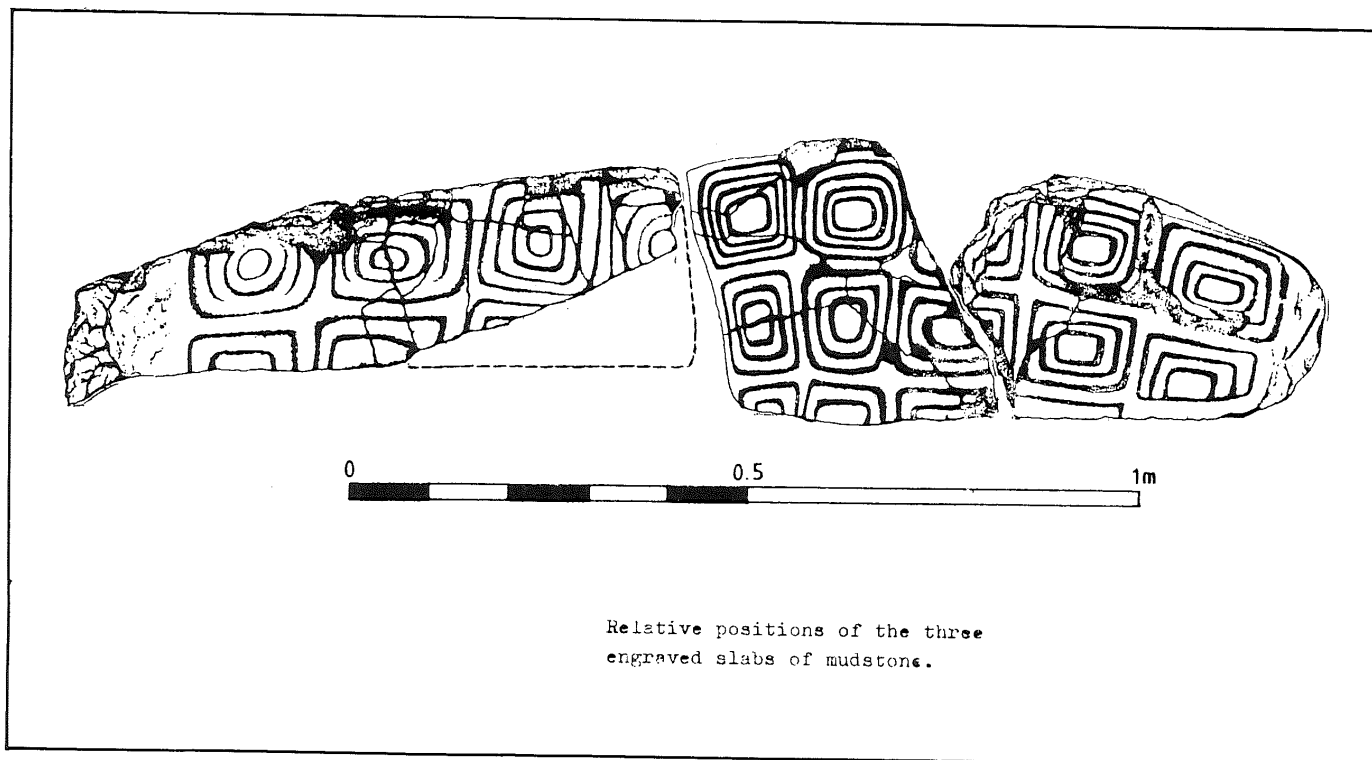


Fig. 4: Incised Natufian stones, arranged as found.

**Table 1: Tool types of Wadi Hammeh 26 and Wadi Hammeh 27**

<i>Tool Types</i>	<i>W.H. 26</i>	<i>W.H. 27</i>	
		<i>Sondage</i>	<i>Surface</i>
Endscraper on flake	—	4	—
Endscraper on retouched flake	1	—	1
Thumbnail scraper	10	1	—
Rounded scraper on flake	1	3	3
Oval scraper on flake	—	—	1
Endscraper on blade	—	—	1
Endscraper on retouched blade	—	1	1
Nosed scraper, thick	—	4	—
Carinated narrow scraper	—	1	—
Nucleiform scraper	—	1	—
Dihedral burin	7	2	4
Dihedral burin, offset	1	2	2
Dihedral burin, angled	1	—	4
Burin on natural surface	—	5	5
Burin, double dihedral	—	—	1
Burin on straight truncation	—	—	1
Burin on oblique truncation	—	4	3
Burin on concave truncation	—	2	4
Burin on convex truncation	—	5	9
Burin, transverse on lateral retouch	—	1	3
Nucleiform burin	1	—	—
Ventral burin	1	4	6
Blade partly retouched on one edge	4	1	1
Blade retouched on both edges	2	—	—
Blade, inversely retouched	—	—	2
Backed blade	—	—	1

Tool Types	W.H. 26	W.H. 27	
		Sondage	Surface
Curved backed blade	—	—	1
Broken retouched or backed blade	1	2	7
Sickle blade, not retouched	—	—	1
Truncated backed piece	—	—	2
Truncated piece	—	2	—
Partially retouched bladelet	2	—	2
Completely retouched bladelet	—	—	1
Bladelet retouched on both edges	1	1	—
Alternately retouched bladelet	2	—	—
Inversely retouched bladelet	—	7	15
Partially or completely backed bladelet	8	—	3
Obliquely-truncated bladelet	3	—	—
Obliquely-truncated backed bladelet	65	—	—
Narrow curved pointed backed bladelet	2	—	—
Narrow micropoint	1	—	—
Helwan bladelet	—	16	25
Various backed bladelets	6	—	2
Broken backed bladelets	63	1	3
Rectangle	—	1	—
Proto-lunate	1	—	—
Lunate	—	1	8
Helwan lunate	—	11	27
Piece with small notch	1	—	—
Piece with large notch	3	5	11
Piece with notches	—	8	24
Denticulated piece	2	4	8
<i>Piece esquillée</i>	—	3	9
Retouched flake	1	5	1
<i>Raclette</i>	—	—	2
<i>Racloir</i>	—	—	2
Perforator/awl	—	3	9
Borer	—	—	6
<i>Lame à machure</i>	—	6	1
Pick	—	—	1
<i>Varia</i>	3	7	11
<b>Total</b>	<b>194</b>	<b>124</b>	<b>235</b>

#### The Chalcolithic site on Jebel Sartaba (Area XIV)

During the 1982/3 Sydney session work continued on the Chalcolithic site located on the lower western slopes of Jebel Sartaba (Fig. 1). Further structures of the terraced settlement were uncovered.<sup>8</sup> The constructional technique of the latest buildings uncovered is similar to that previously reported — walls of unshaped limestone, founded on bedrock,

were freestanding to a height of 0.30-1.00 m., presumably with a superstructure of mud-brick. Floors were of tamped mud and plaster. No evidence of roofing was recovered. The function of the buildings is unclear. Some were presumably domestic, while others, apparently open to the west may have been work and storage areas and possible stables for herded animals. The recovery of two large pithoi bases *in situ* is further evidence of storage above ground as well as in pits.

<sup>8</sup> A.W. McNicoll, R.H. Smith, J.B. Hennessy

Pella in Jordan 1, Canberra, 1982, p. 31-34.

Among the botanical remains recovered by water flotation were two-row hulled barley and emmer wheat; legumes included pea, chickpea and lentil. Olives either wild or domestic, also played a significant part in the economy of this Chalcolithic settlement.

The chipped stone (chert) repertoire includes chisels, fan scrapers, and a fragmentary "mace-head". Among the fragments of ground stone and ceramic vessels are a fenestrated stand, bowls and the storage jars mentioned above — an assemblage comparable with the upper layers of Teleilat Ghassul, excepting the "cornet", which is absent at Pella. The artefacts suggest a date in the middle or second half of the 4th millennium.

Anthony McNicoll

### The Bronze and Iron Ages (Area III)

#### The Middle Bronze Age

Some excavation of the Middle Bronze Age levels in plot IIIC was carried out on the west side of the city wall (wall 3 in McNicoll, Hennessy and Smith, 1982: fig. 6a, pl. 8a). These operations were undertaken on a small scale and their results will be published together with those of the forthcoming sixth season during which more attention will be devoted to this area.

#### The Iron Age: Architecture and Stratigraphy (Areas III and IV)

Towards the end of the season Iron Age deposits were beginning to appear below the Hellenistic levels in plots IVD and IVE. This material also will be published with next season's results when we should have more material and a better understanding of its stratigraphical and architectural context.

The bulk of this year's Iron Age material came from plot IIIN, immediately to the west of IIIC where contemporary deposits were excavated in the 1979 and 1980 seasons (then designated phase 1a)<sup>9</sup>

At the end of the 1982 season the centre of the plot was occupied by an apsidal structure adjoining on the east a stone-paved room extending into plot IIIC which had been destroyed by a fierce fire.<sup>10</sup> It was assumed that the floor of this apsidal structure (16.4) was contemporary with the stone-paved floor, the other side of wall 11/17 and it is clear that the apsidal room as exposed last season is the latest modification of an earlier, originally rectilinear, structure. It is this rectilinear building and the lowest of the four floors which is contemporary with (though slightly lower than) the stone-paved floor to the east. The renovations after the conflagration which destroyed this building (*i.e.*, the apsidal phases) apparently did not extend east of wall 11/17 or, if they did, have been completely removed by later erosion. (This, however, is less likely since the destruction debris in the paved room was preserved immediately under topsoil to a maximum height of 1.35 m. and any higher floor would therefore have involved a significant discrepancy in levels).

All of the 1983 season was taken up in excavating down to the destruction surface of the rectilinear structure over virtually all of the plot. The results will be described from earliest to latest.

The plan of the rectilinear building destroyed by the early Iron Age fire is incomplete, its southern extent having been eroded away and its northern reaches extending beyond the limits of the plot where it cannot be excavated. What we have consists of the stone-paved room bridging plots IIIC/N and adjacent to it on the west a larger unpaved room whose southern wall (wall 46) continues westwards that of the paved room (wall F.18). The northern wall (wall 50) is on a slightly different alignment and stops short of the southern wall with a very small (*ca.* 0.35 m.) western return, more in the nature of a buttress. Continuing the line of the "buttress" are three chert and limestone pillar bases which define the western limit of the room, and at this point the floor (29.5)

<sup>9</sup> Ibid, p. 56 and Fig. 7a.

<sup>10</sup> J.B. Hennessy, et. al., Report on a third season of excavations at Pella, ADAJ, XXVI (1982) Fig. 2.

begins to slope irregularly down to the west to a series of pits (not yet fully excavated). West of the pits near the baulk lay a stone mortar set into the floor, its top flush with the surface; and nearby a basalt quern and its rubbing stone (POs 137 and 141). This all indicates a simple domestic context. In the south-west corner of the plot another wall (wall 47) abutts wall 46 from the south. The area to its east is largely eroded away but to the west of wall 47 remains of a floor (28.3), which may prove to be the continuation of floor 29.5 around the western end of wall 46, are preserved. A small area of contemporary surface north of wall 50 (floor 18.9/19.9) was exposed.

All of the walls consisted of stone for at least the bottom few courses with a brick superstructure, though none of the latter remained *in situ*. The stone foundations of wall 50 were preserved to a maximum height of 0.75 m.

The surfaces of this phase were all covered with a collapse of heavily burnt brick charcoal preserved to a maximum height of 0.80 m. in the western baulk. The charcoal was clearly from roofing beams. Also present, especially in the western half of the plot, were large quantities of carbonised grain, bucket-loads of which were recovered by flotation and proved to be mainly barley with some flax. The artefacts recovered from the debris include a piece of rectangular, blue composition box with relief decoration on the exterior (PO 139; pl. X:1), and a rim fragment of a calcite/alabaster vessel.

There is some later disturbance in this phase. The southern-most 1.50-2.00 m. of the plot have been largely eroded away (except floor 28.3), and the pits from the subsequent apsidal phase (see below) cut through floor 29.5 and wall 46. In the later Iron Age (the penultimate phase represented in IIIN) a semi-subterranean room was sunk down 1.10 m. in the north-west corner of the plot to the level of the destruction floor.

After the destruction the debris was levelled off and the central room rebuilt with an apse at its western end (wall 19)

where previously the "buttress" had been. The apse is narrow and completes its semi-circle in only half the distance to wall 46, which was probably left in disrepair. Two pits (F. 65, F. 69) were cut from the floor south of the apse (floor 23.4), the southern one (F. 65) cutting through the middle stretch of wall 46 whose stones were used for lining its sides. In it were found large quantities of animal bones. Two closely stratified floors were excavated inside the apsidal room (16.5 and 16.7) and to its south (23.2 and 23.4), where a multicoloured frit bead (PO 127) was recovered. A small pit (F. 63), found lined with grey ash, was cut from floor 16.7 towards the western end of the room. Two walls ran westwards from the widest points of the apse (walls 40 and 41). On the floor between them (22.2) were found eight complete and five fragments of large, spherical unbaked clay loom-weights (PO 125, Pl. X: 2), which had been piled up against the outside of the apse, and four fragments of a basalt quern (PO 124). A small stretch of the wall of a room built on a different alignment, slightly later in the phase, cut across the south-west corner of the plot (wall 45). The late Iron Age wash gully (11.3) extended further north at this level almost to the southern tip of the apse thus destroying most of what remained above ground of wall 46.

The last apsidal phase was excavated in the 1982 season and described in the preceding report.<sup>11</sup> The walls of the previous phase all remained in use. The only significant architectural change was the addition of wall 25 running northwards from midway along the northern wall of the apsidal room (wall 19) creating two rooms where previously there had been one. Also now attributed to this phase is wall 44, the rebuilding of the western end of wall 46, with its western return wall 43, running north towards wall 41. As was explained above, the stone-paved room and the deposits further east in IIIC must now be divorced from this apsidal phase and correlated with the original rectilinear building.

<sup>11</sup> Ibid.



## Iron Age Pottery

As the parallels cited below indicate, the pottery associated with the destruction level and the levels immediately above it appear to date to the Early Iron I period *i.e.*, ca. 1200-1075 B.C.<sup>12</sup> Of the Iron Age I types, the handle (Fig. 5:2), the cooking pot (Fig. 5:3) and the various jar (Fig. 6:7-9) and bowl forms (Fig. 6:3,4) may be noted. The presence of Philistine ware (Fig. 5:1) supports an early twelfth to early eleventh century B.C. date for the associated pottery from these levels.

### Figure 5

1. CN 3730. IIIN 29.1. Philistine bichrome body sherd (jar/jug). Fine, well mixed clay with many tiny, sandy grits, fired light terracotta throughout. Painted decoration of black vertical lines and hatched lozenge between horizontal red bands.
2. CN 3687. IIIN 29.1. Jar handle. painted buff. Coarse fabric with many medium chert, lime and sandy grits, fired yellowish-buff throughout, smoothed exterior. Painted decoration in red-brown paint, cross on handle and bands on shoulder above. Parallels: Beth Shan, Fig. 49.5 (Level VI).
3. CN 4075. IIIN 29.3. Cooking pot rim. Very coarse with grits. Parallels: Deir 'Allā 1, fig. 56.43 (Phase D).
4. CN 4098. IIIN 29.5. Cooking pot rim. Very coarse with grits. Parallels: Deir 'Allā 1, fig. 61.41 (Phase F).
5. CN 4074. IIIN 29.3. Cooking pot rim. Very coarse with grits. Parallels: Deir 'Allā 1, fig. 53.58 (Phase C).
6. CN 4101. IIIN 29.4. Cooking pot rim. Gritty, coarse ware. Rim rounded to grooved line interior. Parallels: Similar to Deir 'Allā 1, fig. 61.43 (Phase E).

### Figure 6

1. CN 4078. IIIN 29.3. Cooking pot rim. Very coarse gritty ware. No thickening at rim. Parallels: Similar to Deir 'Allā 1, fig. 61.43 (Phase F).
2. CN 3908. IIIN 29.3. Cooking pot rim. Coarse clay with many small mica grits, fired black with thin brown inner and outer faces. Parallels: Deir 'Allā 1, fig. 53.53 (Phase C). Deir 'Allā 1, fig. 61.38 (Phase F).
3. CN 4130. IIIN 29.9. Base. Buff ware. Fairly well levigated clay, medium sized grits, numerous, mainly chert, some lime, fired grey at core, buff towards edges, buff in and out surfaces. Small circular flat base, string cut. Parallels: Taanach 1, fig. 14.4 (Period IB). Deir 'Allā 1, fig. 48.3 (Phase B). Deir 'Allā 1, fig. 53.13 (Phase C). Deir 'Allā 1, fig. 56.8 (Phase D). Deir 'Allā 1, fig. 58.3 (Phase E).
4. CN 3745. IIIN 29.1. Bowl. Buff ware. Fine, well mixed clay with few small lime grits, fired pale brown-buff throughout. Parallels: Madeba no. 17.
5. CN 3743. IIIN 29.1. Bowl. Buff painted ware. Coarse, gritty ware, with many small to medium sandy and lime grits, fired creamy-buff throughout. Red painted band on lip interior and exterior. Parallels: Madeba no. 33. Ashdod II-III, fig. 74.5 (Area G, str. 7).
6. CN 3904. IIIN 29.3. Bowl. Buff ware. Coarse, gritty ware, with many small to medium sandy and lime grits, fired creamy-buff throughout. Parallels: Beth Shan, fig. 53.2 (Level VI). Ain Shems IV, pl. LX 12 (Str. III)
7. CN 4125. IIIN 29.4. Ridged neck jar rim. Buff ware. Fairly well levigated

<sup>12</sup> Good parallels can be found, for example, from Beth Shan level VI; Deir 'Allā 1 Phases A-F; Taanach 1 Period LB; Megiddo II Str. VIB, VI; and the Early Iron Age tomb at Madeba.

The dates for the Madeba tomb and Deir 'Allā and Megiddo levels follow R.H. Dornemann, *The Cultural and Archaeological History of the Transjordan in the Bronze and Iron Ages*.

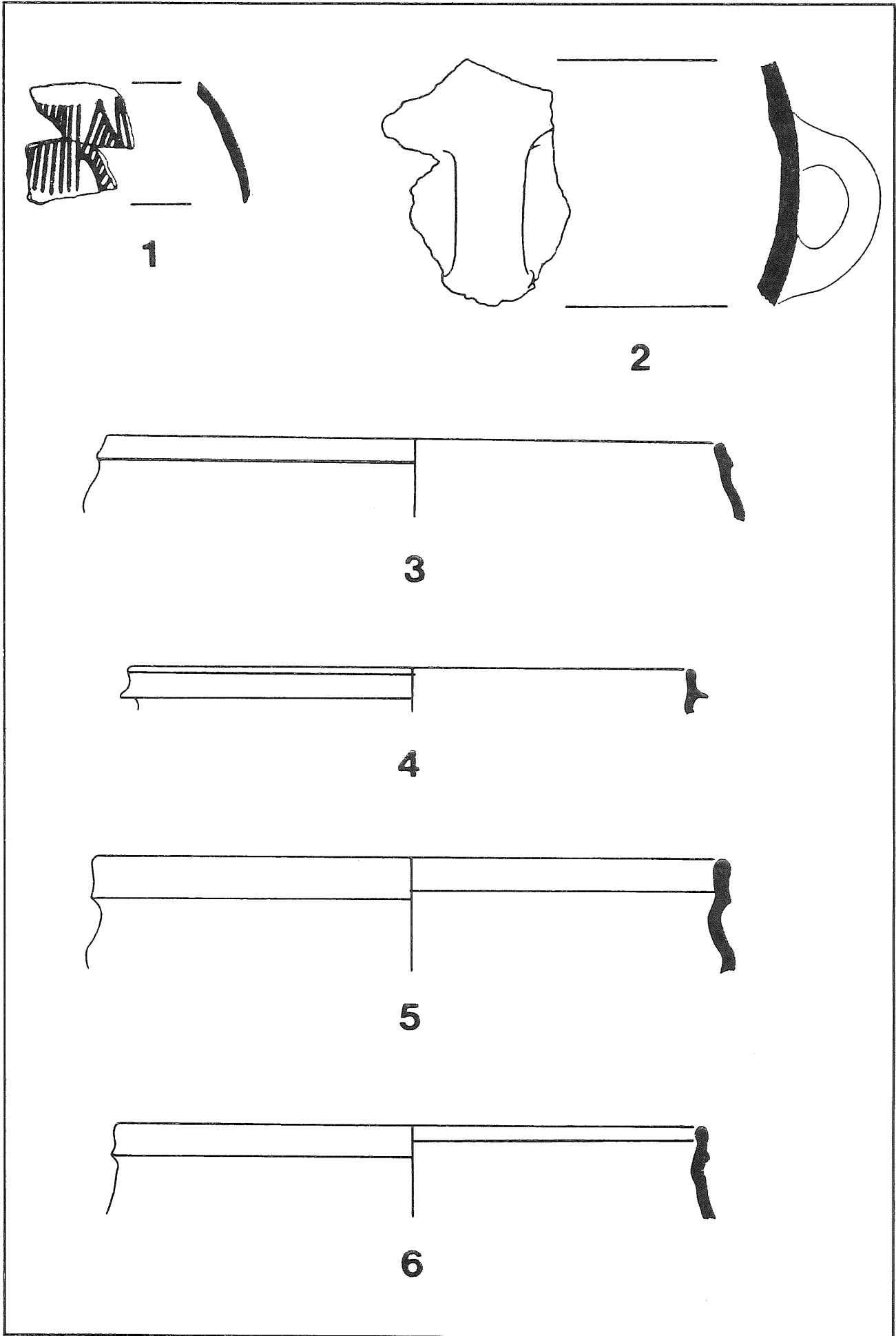


Fig. 5: Area IIIIN. Iron Age pottery.

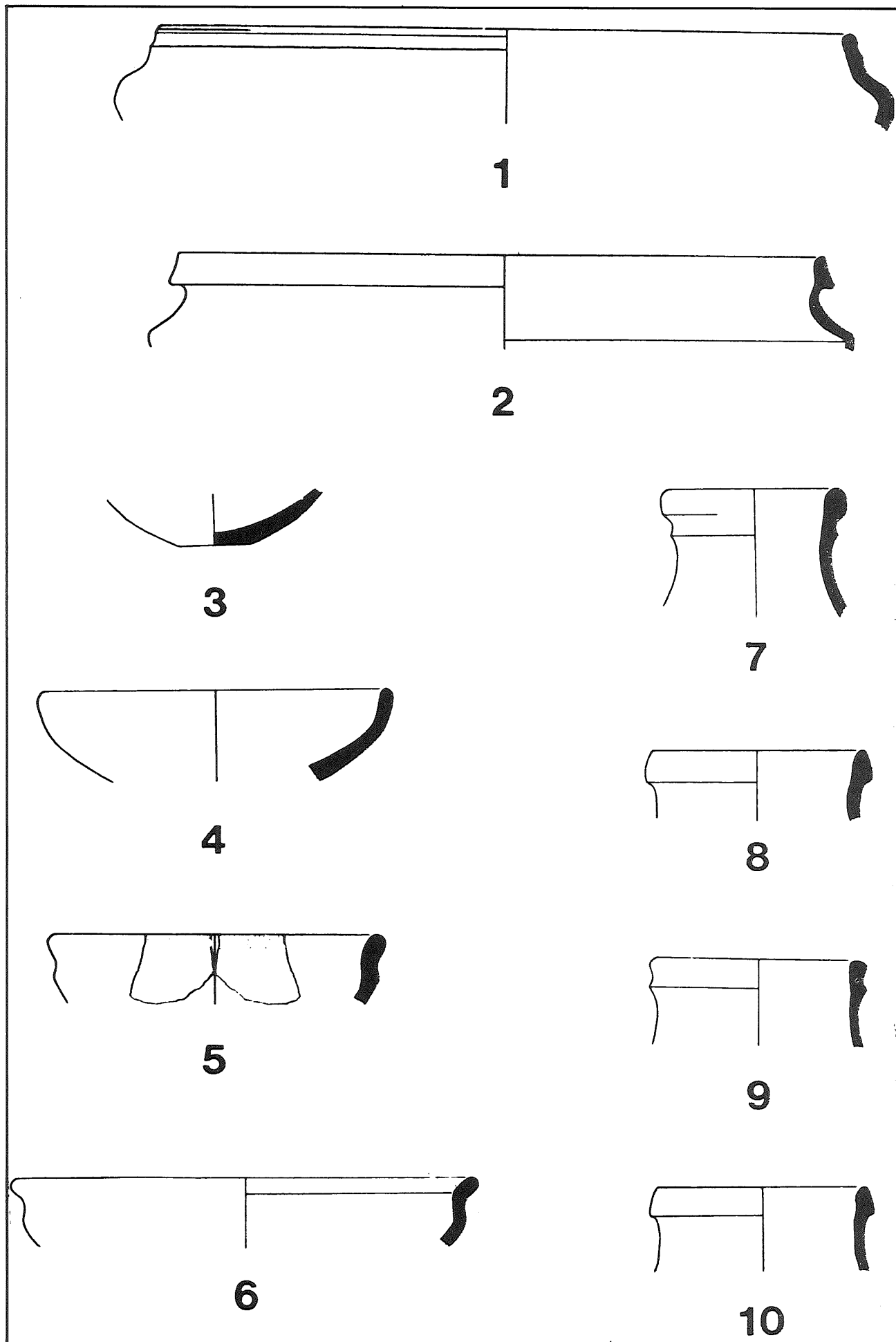


Fig. 6: Area IIIN. Iron Age pottery.

clay with medium and fine grits of chert and lime, fired buff throughout. Slightly burnt in places. Upright neck with ridge.

Parallels: Taanach 1, fig. 11.7, 11 (Period IB).

8. CN 3733. IIN 29.1. Jar rim. Buff ware. Well mixed clay, many small to medium black and chert grits, fired grey-brown but red-brown exterior surface.  
Parallels: Hennessy, J.B. et al. (forthcoming).  
Deir 'Allā 1, fig. 47.2 (Phase A).  
Taanach 1, fig. 6.6 (Period IA).
9. CN 3688. IIN 29.1. Jar rim. Painted buff. Well mixed clay with small to medium sandy grits, fired greenish-buff throughout. Parallels: Megiddo II, pl. 73.8 (Str. VIB).
10. CN 3701. IIN 29.1. Jar rim. Buff ware. Well levigated with fairly fine chert and white grits, fired to brown-grey at core. Upright neck, rim swollen to collar exterior.  
Parallels: Deir 'Allā 1, fig. 47.2 (Phase A).

Leanda Randle

### Hellenistic and Early Roman (Areas III, IV and XI)

During the 1982/3 season small but significant deposits of late Hellenistic material dating to the late second century and early first century B.C. were found in Areas IV and XI.

#### Area IV

In IVD under the Byzantine street part of a room of a late Hellenistic house was unearthed. It was built of mudbrick, and possibly pisé, on stone foundations which rose to roughly 1.00 m. above ground level. In contrast to the late Hellenistic house unearthed in IIIB/C,<sup>12A</sup> the IVD building may well have had an upper

floor. In the decayed mudbrick and pisé (?) collapse within the room were a score or so fragmentary and complete plates, jugs, juglets and lamps, some of which are illustrated on Fig. 7, nos 1-6, both locally made and imported. Whereas small bowls predominated in the repertoire of the IIIB/C house, here plates were most common. It is worth noting that whereas only three small fragments of Eastern Sigillata A were recorded, imported black glazed plates were still being used in the IVD dwelling, which was probably destroyed in the Hasmonean sack of 83/2 B.C.<sup>13</sup> The most precise evidence for the floruit of the house was provided by the five identifiable specimens among the seven bronze coins found; three appear to belong to the quasi-autonomous issue of Akko-Ptolemais in the second half of the second century<sup>14</sup> while two can be identified as coins of Seleucus XII Dionysus (88-84 B.C.)<sup>15</sup>

In plot IVE adjacent to IVD, the stumps of late Hellenistic walls were found, but in most loci the floor surfaces and occupation débris had been removed by the builders of the Byzantine houses which overlaid them.

#### Area XI

High on the steep north-east slope of Tell Husn a 10.00x15.00m. trench was opened immediately south of plot XIA<sup>16</sup> The new trench would, it was hoped, lie athwart the line of the late Hellenistic citadel wall. This expectation was based on the belief that the structure found in XIA was a tower rather than a house. After the removal of topsoil and wash deposits over the whole of XIB it was decided to make a N-S 2.00 m. wide cut in order to locate the wall. In the course of excavation of the 2.00 m. wide trench a sterile layer of loose pebbly conglomerate, more than 4.00 m. deep at the south end of the trench, was encountered. It is evidently part of the infilling of the ancestral pre-Quaternary

<sup>12A</sup> McNicoll, Hennessy and Smith, *op. cit.*, p. 68-71.

<sup>13</sup> Josephus, *Antiquities*, XIII, XV, 2-4.

<sup>14</sup> L. Kadman, *Coins of Akko-Ptolemais*, Jerusalem, 1961, p. 94-100.

<sup>15</sup> P. Gardner, *Catalogue of Greek Coins in the*

*British Museum, The Seleucid Kings of Syria*, Bologna, 1963, nos. 1 and 4.

<sup>16</sup> J.B. Hennessy, et. al., Preliminary report on a fourth season of excavations at Pella, *ADAJ*, XXVII (1983).

Wadi Malawi belonging to a geological epoch preceding the incision of the *awdiyah* (wadis) which exist today. The surface of this conglomerate slopes steeply north, and into it was cut the foundation trench of the sought-after wall, three courses of which were eventually exposed along 5.00 m. of its length (pl. XI: 1,2) after the removal of large numbers of fallen stones.

The front face of the wall is constructed of well-cut tooled-faced ashlar limestone blocks of moderate size (e.g. 0.72 m. x 0.45 m. x 0.18 m.) laid as headers and stretchers. Between some of these were small snecking stones, perhaps indicative of later repair. The headers were bound into a core of large rubble stones set in clay mortar. Because of the steepness of the slope, the rear face, built of roughly shaped blocks, would have been concealed to a considerable height. Lime mortar was used as a bedding layer between the courses.

As fortification walls go, it is quite narrow, but its width, 1.30 m., is sufficient when one considers the impossibility of attack by any sort of engine on Tell Husn's precipitous flanks.

The precise date of the wall is still uncertain. The bulk of the pottery found in the trench consists of fragments consonant with a late Hellenistic date, particularly metallic buff and metallic terracotta wares (most commonly found in storage jars and cooking pots respectively), but several "Herodian" lamp spouts were found in and beneath the tumble of the wall. Since the surfaces relating to the period of the wall's construction have not yet been reached on its north side, these fragments probably indicate no more than that the wall was still in use in the period 25 B.C.-mid-second century A.D. (accepting tentatively the chronology followed by Rosenthal and Sivan)<sup>17</sup>. So, while the bulk of the pottery points to a late Hellenistic date, and while

the style of the wall itself is by no means at variance with such dating, it remains a possibility that the wall was constructed in the Early Roman period.

#### The Hellenistic Fortress on Jebel Hammeh

In 1981 the Sydeny team's field director Mr. Alan Walmsley found traces of walls on Jebel Hammeh and recognized surface sherds as late Hellenistic. His dating was confirmed by further sharding during the 1983 season. The site is referred to in Petocz and Villier's report (below) as no. 17.

As far as can be seen, the fortress is somewhat larger than that on Jebel Sartaba, excavated by the Wooster team.<sup>18</sup> It is apparently rectilinear in plan and may have had a similar berm-like *proteichisma*. While it evidently could have served as a signal station — Mt. Tabor (Attabyrium), Qarn Sartabē (Alexandrium), Pella and the Jebel Sartaba fort are all visible from it — its size suggests that its primary function was to prevent movement down the Hammeh, as the Sartaba fort inhibited attacks down or alongside the Wadi Malawi.<sup>19</sup>

#### Area XIV

The Hellenistic burial ground of Pella is yet to be located, but a clue to its whereabouts may be the imported white ground lagynos (Fig. 7, no. 7) found in a fragmentary state in the topsoil of the Chalcolithic site (Area XIV). Possibly it had been washed thither from a graveyard higher up the slopes of Jebel Sartaba, although more mundane explanations of its presence (e.g. suburban housing, a rubbish dump) can be advanced. Parallels from Aegina and elsewhere<sup>20</sup> suggest a date in the second half of the second century B.C.

#### Hellenistic Pottery (Fig. 7)

1. CN 3926. IVD 10.12. Plate, wall and rim. Imported black glazed ware. Well levigated buff ware, lustrous black glaze

<sup>17</sup> Rosenthal and Sivan, 1978, p. 80.

<sup>18</sup> McNicoll, Hennessy and Smith, *op. cit.*, p. 65-67.

<sup>19</sup> A.W. McNicoll, Pella: une ville de la Décapole à l'époque greco-romaine, *Le monde de la Bible*, 22 (1982) p. 36.

<sup>20</sup> E. Walter-Karydi, V. Felten and R. Smetana-Scherrer, *Ostgriechische Keramik, Lakonische Keramik, Attische Schwrszfigurige und Rotfigurige Keramik, Spatklassische und Hellenistische Keramik in Alt-Ägina II*, 1, Mainz, 1982, p. 83-85.

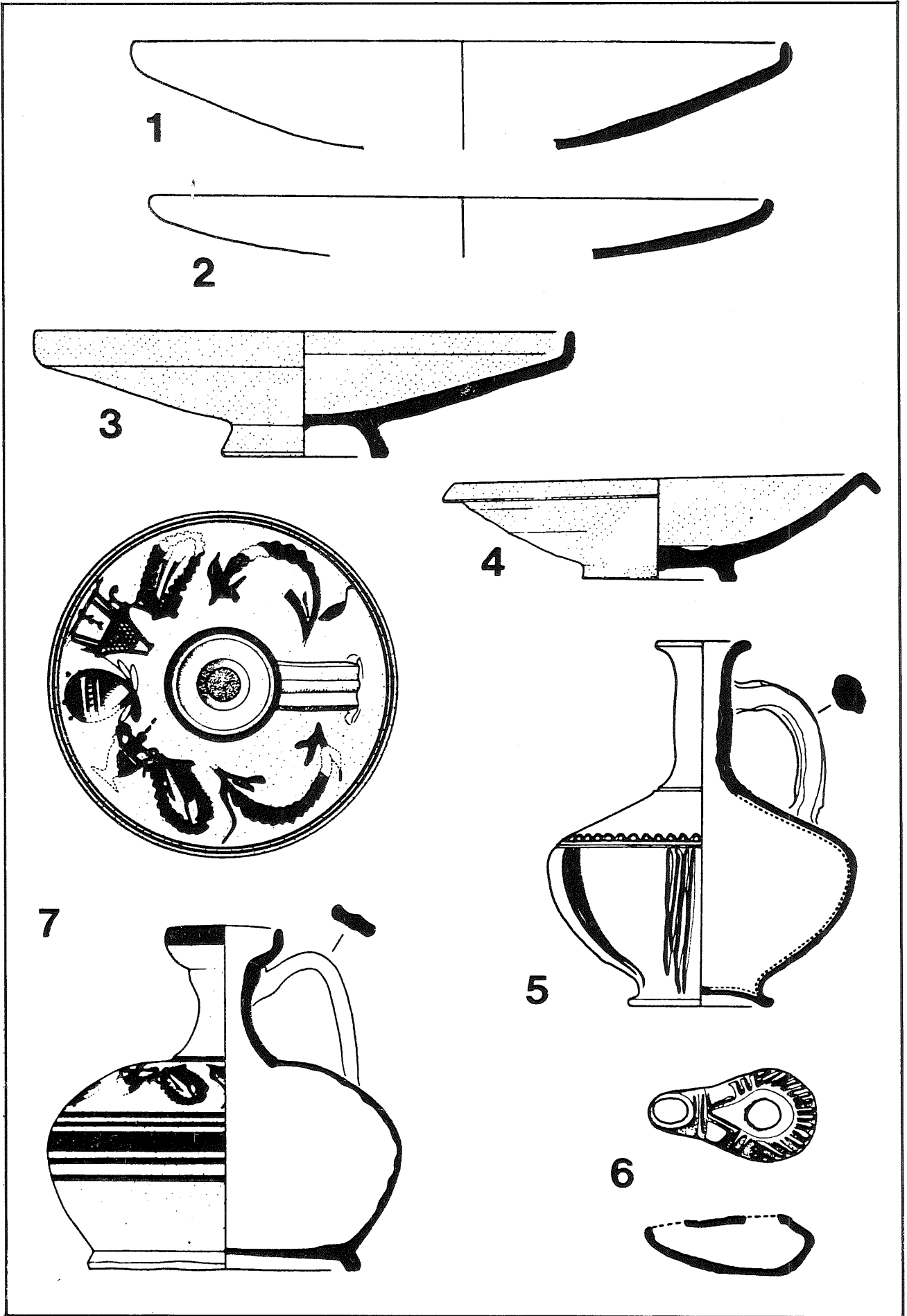


Fig. 7: Areas IVD and XIVJ. Hellenistic pottery.

- i. and o.
2. CN 3930. IVD 10.12. Plate, wall and rim. Imported black glazed ware. Well levigated buff ware, lustrous black glaze i. and o.
  3. CN 3449. (Reg. no. 62002). IVD 10.10. Plate. Coarse light brown ware, core 7.5YR 8/4, surfaces 7.5YR 6/4, with reddish wash i. 2.5YR 6/8, and o. 2.5YR 3/1-4/4, Mohs 6.0.
  4. CN 3450. (Reg. No. 62003). IVD 10.10. Plate. Coarse light brown ware, core 5YR 7/6, with reddish wash i. 2.5 YR 4/4-6/8, and o. 2.5YR 3/1-4, Mohs 5.
  5. CN 3457. (Reg. no. 62005). IVD 10.10. Jug. Coarse light brown ware, core 2.5YR 7/4-6 with dark red slip, mostly 2.5YR 4/1, with patches 2.5YR 6/6, Mohs 4.5. Incised decoration.
  6. Reg. no. 62013. IVD 10.10. Lamp. Grey ware, mould made. Core 10YR 7/1, surface 10YR 4/1, Mohs 6. Impressed decoration.
  7. CN 3276. (Reg. no. 62026). XIVJ 2.2, 1.2, +. Lagynos. Imported red on white ware. Fine well-levigated pink fabric with tiny micaceous and other inclusions, surface i. 5YR 7/4, core n.a. Thick white slip o., 10YR 8/3, with orange to black-orange painted decoration, 5YR 6/6 with variants 5YR 5/8 to 7/6, consisting of parallel horizontal lines at maximum girth, and on upper body and shoulder swags, garlands, an oenochoe and a gazebo/ birdcage (?). Base and body to approx. 1 cm. above base reserved, 5YR 7/4, Mohs 3.5.

Anthony McNicoll

### Roman Period Tombs (Area VI)

Throughout the season, the search for tombs continued under the supervision of Mr. Sultan Shraideh of the Department of Antiquities.

Some time was spent investigating Areas XXI and XI, to the north of the

main *tell* and along the lower western slopes of Tell el Husn respectively, where recent robber activity suggested further investigation may have been fruitful. However, when this was not the case, work resumed in Area VI to the south of Tell el Husn where unrobbed tombs from the Roman period (notably Tomb 39A)<sup>21</sup> have been discovered in previous seasons.

#### Tomb 52

Immediately to the south of Tomb 39A, and with an entrance from the western edge of the same limestone hill-ock, a Roman tomb (Tomb 52) with a rock-cut staircase leading down through the dromos was found. Well-constructed retaining walls of finely dressed limestone blocks flanked the staircase on either side, standing to a height of approximately 1.50 m. At the base of the steps a massive stone door could still be swung on its stone pivots which were housed in the threshold and which projected into a lintel set in the bedrock.

The tomb proper consists of a rectangular central chamber (*ca.* 4.50 x 3.75 m.) hewn from the limestone, with eight loculi opening from it. Five limestone sarcophagi were contained in two of these loculi, but unfortunately all had been both opened and vandalized by robbers smashing their way in through another tomb to the south. Cleaning inside Tomb 52 yielded no objects.

#### Tomb 53

However, outside this tomb was found a single free-standing limestone sarcophagus (Tomb 53) and, although no lid was present, the contents remained undisturbed. Associated with six individuals were objects which seem to reflect two separate periods of use in the late second/third and fourth centuries A.D. At its base were two burials together with five tall opaque balsamaria characteristic of late second/third century types.<sup>22</sup> Overlying

<sup>21</sup> McNicoll, Hennessy and Smith, *op. cit.*, p. 87-101.

<sup>22</sup> J.W. Hayes, *Roman and Pre-Roman Glass in the*

*Royal Ontario Museum, Toronto, 1975, nos. 227, 236, 240; S. B. Matheson, Ancient Glass in the Yale University Art Gallery, Yale, 1980, nos. 159, 160.*

these were a further four burials with associated artefacts including five bracelets (four bronze and one bone), one bronze earring with glass bead, and an opaque double unguentarium with trailed handles and spiral thread, dating to the fourth century A.D.<sup>23</sup>

If this interpretation is correct, it is probable that the sarcophagus was initially sealed after the second/third century interments but the lid was not replaced after the sarcophagus was opened and re-used in the fourth century A.D.

#### Tomb 54

Towards the end of the digging season, an intact rock-cut Early Roman tomb (Tomb 54) was discovered on the edge of a small track south-east of Tombs 52 and 53 in Area VI. The entrance from the west consisted of a simple irregularly-shaped opening in the natural rock-face. Sealing Tomb 54 was a finely dressed limestone slab surrounded by smaller snecking stones.

Roof-fall within the tomb had been extensive (up to 2.00 m.) and this process was accelerated after opening when both the humidity and the temperature decreased rapidly. This problem was further intensified as the tomb had been hewn from a particularly weak sector of rock (a "crush-zone" which became extremely friable when allowed to dry and cool. Consequently, progress was severely hindered within the tomb and the obvious dangers led to its closure before the clearance could be completed.

The tomb itself comprises a large rectangular central chamber (ca. 7.50 x ca. 3.80 m.) with an original height of ca. 1.60 m. Thirteen unsealed loculi open from this main chamber, their height being 0.91 m. Of these, only four (3, 4, 8 and 11; Fig. 8) and a free-standing limestone sarcophagus (16) located in the central chamber were cleared, yielding some fine glass vessels and several other objects.

Unlike other intact tombs found in the Pella region, Tomb 54 is notable for the vast quantity of well-preserved wood it contained (comparatively small amounts of

fragmentary wood were noted in Tombs 12 and 13)<sup>24</sup>, and for the high degree of preservation of the skeletal material.

Large beams of cedar lay amongst the roof collapse within the central chamber, being concentrated around its perimeter, especially along the southern wall. Here the narrow dividing walls between some of the loculi had also fully or partially collapsed. The position of some of these large beams within the rock-fall strongly suggests that they were employed to support the roof during the period throughout which the tomb was in use. It is also highly probable that the tomb had begun to collapse before its projected closure. This would account for the fact that two of the excavated loculi (3 and 4), the entrances of which were blocked with cedar beams and roof-fall, were not utilized at all, and that a carved and decorated limestone sarcophagus in one of the northern loculi (15) remained unsealed while its lid lay broken on the floor nearby.

In addition to the cedar beams, thin planks of pine were found or observed within most of the other loculi. These planks represent the remains of collapsed wooden coffins and, in one loculus (9) on the eastern wall, the central region of a coffin remained standing. Examples of nail holes and dowels were recorded in several planks removed from the excavated loculi.

The collection of complete glass vessels recovered from Tomb 54 includes five balsamaria, four shallow dishes, four bowls, two tumblers and an aryballos. Three ceramic lamps, a small ceramic juglet, a bronze ladle and a pair of leather sandal soles were also among the total object assemblage, none of which would seem inconsistent with a tomb-use period spanning 100 years from the mid-first to mid-second centuries A.D. These objects were associated with a total of six excavated individuals, as shown in Figure 8.

As further work in the loculi became increasingly hazardous after the clearance of the main central chamber, Tomb 54 was re-sealed and the dromos back-filled be-

<sup>23</sup> Hayes, *Ibid.*, no. 361; Matheson, *Ibid.*, no. 324.

<sup>24</sup> McNicoll, Henessy and Smith, *op. cit.*, p. 84-86.



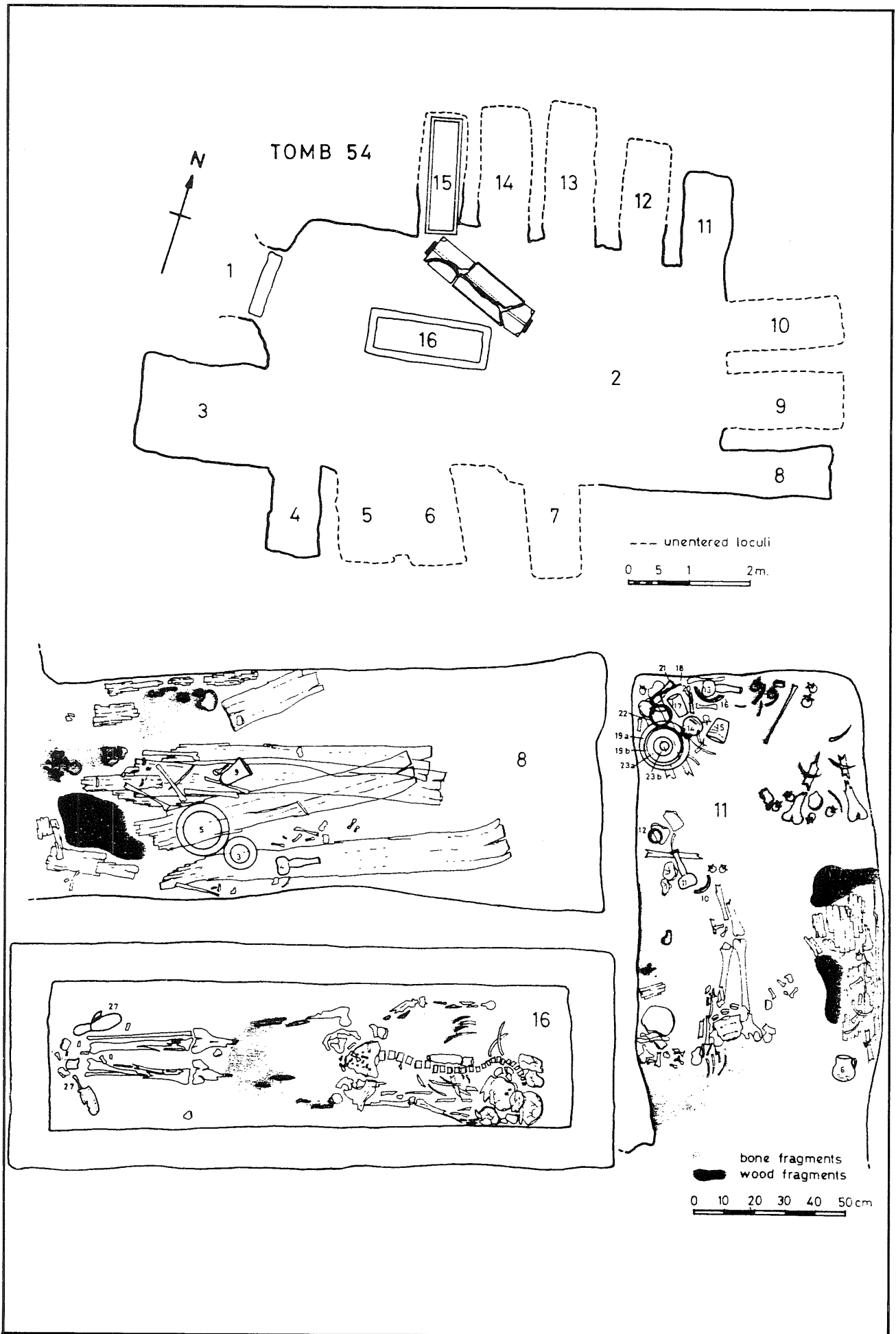


Fig. 8: Tomb 54: plan.

fore the remainder could be safely excavated.

Susan L. Bassett

## Byzantine (Areas IV and V)

### Area IV

Continued excavation in IVE and a brief survey of further deposits has helped to clarify the phases of Byzantine occupation as set out in the preliminary report on the fourth season at Pella.<sup>25</sup>

### Late Byzantine

Again the latest chronological indications are provided by the imported late Roman red slip wares (classifications and dating are from Hayes, 1972 and 1980). A bowl of Late Roman C/Phocaean Ware, Form 10A and another of African Red Slip Ware, Form 104C, were found within a floor matrix. They suggest a late sixth century date for phase III. An African Red Slip Ware, Form 99C (dated between 560/80-620 A.D.) could extend this into the seventh century, although the subsequent phase IV contains material no later than the early seventh century. The latest imported ceramic from phase II is a Late Roman C/Phocaean Ware, Form 3F, dating to the second quarter of the sixth century.

The sixth and seventh centuries would thus appear to have been an active period in domestic building at Pella.

The earliest architectural phase referred to in the previous report, phase I, has proved to be Hellenistic. The sixth century Byzantine walls were built directly on top of the dismantled Hellenistic walls. No indications of occupation during the Roman period have been found in IVE and a similar situation was found in IVD to the north (see the discussion of the street, below).

### Early Byzantine

There are, however, traces of earlier

Byzantine occupation of a somewhat insubstantial nature. A number of loci contained floor levels without any associated architecture. One exception is a poor construction in the west that may have been a rough uncoursed wall (F. 76). Nearby was an ash pit (F. 70), which ran beneath a sixth century wall (22) and partly over a Hellenistic wall (26). To the east, the well-preserved remains of a *tabun* (F. 33), partly underlies a sixth century wall (12), and its associated surface (9.9/15.1) overlies a dismantled Hellenistic wall (27). This suggests that the Hellenistic walls had been demolished well before the next extant architectural phase (II), while the latter has completely obliterated any structures of the intervening period. The only imported red slip piece from the deposits is an African Red Slip bowl Form 91, dating to the first half of the fifth century.<sup>26</sup>

### The Byzantine street

The northern building of phases III, IV and V in IVE, extends further north into IVD, where it opens onto a street.<sup>27</sup> A follis of Maurice Tiberius was found in 1980 embedded within the street surface, which was provisionally dated on this evidence to the end of the sixth-early seventh century. During the 1983 season the street was excavated. The latest imported ceramics are African Red Slip Ware, Form 106 (600-660 A.D.) and Cypriot Red Slip Ware, Form 9C (580/600-end of the seventh century).

A second street surface was revealed beneath the first street level, containing African Red Slip Ware, Form 106, with nothing else later than the mid-sixth century. These two street phases, one earlier in the seventh century and one later in the seventh century, agree with the broad chronology of architectural phases IV and V in IVE. A third surface, separated from the second by an 0.08 m. soft fill, contains little clearly diagnostic material and none of the typical late Byzantine ceramic wares and forms. More analysis is required be-

<sup>25</sup> Hennessy, 1983, *op. cit.*

<sup>26</sup> J.W. Hayes, *Supplement to Late Roman Pottery*,

London, 1980, p. 516.

<sup>27</sup> J. B. Hennessy, et. al., Report on a second season of excavations at Pella, *ADAJ*, XXV (1981).

fore a date can be suggested. Lying immediately beneath this deposit was a thick pure Hellenistic collapse, echoing the sequence revealed in IVE.

Pamela M. Watson

### The Byzantine East Church (Area V)

The excavations of earlier seasons had uncovered the atrium and parts of the nave and aisles of the basilical East Church, which dates in all probability to the 5th or 6th century A.D. During the 1982/3 season the main aim was to delineate the eastern end of the church; additional excavation was carried out along the southern wall to ascertain whether or not there was evidence for the conversion of the church into a mosque in the Early Islamic period.

Excavation of the east end revealed that the church is triapsidal, with an external central apse and an inscribed apse terminating the southern aisle. The eastern end of the north aisle has yet to be excavated but its apse is probably also inscribed. The maximum length of the church (excluding the atrium) is 28.23 m. Each of the two colonnades between nave and aisles was composed of seven columns approximately 2.60 m. apart. The ground plan is slightly asymmetrical as a result of the misalignment of the church's south wall which was constructed either along a natural drop in the escarpment on this side of the building or to follow the line of an earlier wall. Thus the internal width of the church at its western end is 15.61 m., while at the western edge of the chancel it has narrowed to 14.77 m. The asymmetricality is augmented by the main apse being skewed slightly to the north.

Erosion from the western slope of Jebel Abu el Khas above the church had filled the eastern sector of the building to a depth of about 4.00-5.00 m. The main apse stands to a height of 4.78 m. above the threshold of the central door. With the restoration of a fallen block a minimum height of 5.26 m. for the apse is reached, without any trace of springing for a hemidome.

At the east end of the church several of the usual church fittings, or fragments or

traces of them, were found — the chancel, chancel screen, *synthronus*, reliquary container and relic.

The *synthronus* consists of a semi-circular bench set against the central apse, ca. 1.00 m. wide and 1.00 m. high, with three steps leading up to it. The steps' risers were 0.25 m., and the treads 0.23 m. too shallow to sit on with comfort. As with all other elements of the East Church found to date, the *synthronus* had been stripped of its veneer of tiles and stone cladding (in this case marble and slate) before the church's final collapse, so that generally only imprints of the cladding remain in the *synthronus*' mortar.

The *chancel* rose 0.46 m. above the floor of the church aisle. It is not yet fully excavated so there remains some uncertainty whether it extended into the aisles or was confined to the central area. Its projection into the nave appears to have been somewhat less than in many contemporary churches in the area. The chancel was reached by a centrally-placed, finely-dressed marble step 0.22 m. high; between this and the chancel is a marble slab, the top of which is 0.09 m. above the present robbed-out surface of the chancel, presumably at the level of the original floor. Along the front of the chancel are post-holes and slots for the screen, marble fragments of which were found scattered through the surrounding debris. The south end of the screen terminated at a post which stood close to the second column of the nave; how far the screen then ran eastwards — whether to the first column or to the respond — cannot yet be said. In the surviving surface of the south-western sector of the chancel was found a number of amorphous holes which may be related to the *ambo*, now entirely vanished.

The *reliquary container* was found sealed and set into the surface of the chancel. It consists of a beautifully dressed limestone *cippus* or drum with mouldings. Measuring 0.60 m. in height and a maximum of 0.60 m. in diameter, it underwent some rather rough reshaping before it was implanted in the East Church, notably by the cutting of a central round-bottomed hollow (diameter 0.20 m., depth 0.20 m.)

in the top of the drum. The shape of this hollow may indicate that its original function within the church was that of a *thalassa* rather than a reliquary container. Be that as it may, it was later used as the repository for the East Church's reliquary, and the central hollow was sealed by a stout bronze cover which fitted neatly inside it. On top of the bronze cover were four loops, through which pointed iron bars were driven and secured in holes in the sides of the hollow. The spikes were then sealed with lead lugs, which were also partly set in the stone. The whole closure was extremely secure, and no way could be found to remove the cover other than by breaking the iron bars.

The reliquary chamber was filled with fine dust, presumably seepage from outside. Within the dust were some fragments of wood, and a relic casket and lid, both finely carved out of gypsum, in the shape of a miniature sarcophagus 7.5 cm. long, 5.1 cm. wide and 7.5 cm. high (Pl. XII: 1). Within the sarcophagus were a perforated silver tube 7.3 cm. long with a gold band, and an amorphous friable crystalline object, a fragment of which is being analysed at the Institute of Medical and Veterinary Science, Adelaide.

Space does not permit a detailed discussion of the reliquary, but it seems certain that it served some quite different function before its deposition as the relic of the East Church, for its lid and base were both pierced by holes. The hole in the lid was evidently designed to hold the silver tube.

Another major find in Area V was the bronze incense burner suspended on three chains (Pl. XII. 2). Originally it had three feet, but at some point these were broken off, leaving only stumps.

Warwick Ball and Anthony McNicoll

## Wadi Hammeh Survey

### Introduction

The impetus for the survey derived from two previous studies: an analysis of the Lower Paleolithic site of Abu el Khas, located above the Wadi Himār, a tributary of the Hammeh;<sup>28</sup> and a preliminary geological study of the Tabaqat Fahl area with emphasis on the Wadi el Hammeh, carried out in 1981.<sup>29</sup> Both studies highlighted the significance of the Wadi el Hammeh, and the adjacent Bronze Age tomb group discovered at a point of debouchment of the Wadi el Hammeh into the valley by the East Jordan Valley Survey,<sup>30</sup> also indicated potential for ceramic period sites.

The survey of the Wadi el Hammeh commenced in December 1982, and it was originally hoped to cover the area intensively in one season. Owing to the abundance of cultural material encountered however, a second season will have to be undertaken.

### Survey area

The boundaries of the survey area were decided partly on biogeographic features and partly by arbitrary limits. The primary concern was to cover the Wadi el Hammeh drainage system, from its descent from the western edge of the 'Ajlun Highlands to its mouth in the Jordan Valley. The Jordan Valley road thus formed a convenient western limit. The eastern boundary was roughly along the 150.00 m. a.s.l. contour, to exclude the lower wooded areas of the 'Ajlun Highlands which are part of a different physiographic unit. The southern boundary was aligned with the Wadi Himar, its tributaries and the edge of the broad Tabaqat Fahl plain. An unnamed wadi formed most of the northern boundary.

Wadi el Hammeh lies north of the

<sup>28</sup> L.E. Villiers, First report on Palaeolithic sampling at Abu el Khas, Pella, *ADAJ*, XXIV (1980) p. 163-167; and, *Explorations of the lower Palaeolithic period in Jordan: the Abu el Khas site*, unpublished MA Thesis, Canberra, 1981.

<sup>29</sup> P. Macumber, *Geology of the Tabaqat Fahl Area, Northern Jordan*, manuscript: University of Sydney, 1981.

We would like thank the Co-director of the Sydney University Expedition to Pella, Dr. A.W. McNicoll, for his support of this project. Our thanks are also due to the British School of Archaeology in Jerusalem for their much-appreciated financial assistance.

<sup>30</sup> M. Ibrahim, J.A. Sauer and K. Yassine, The East Jordan Valley Survey, 1975, *BASOR*, 222 (1976).

Decapolis city of Pella, and originates as the Wadi abu Saleh in the 'Ajlun Highlands (at approximately 600 m. a.s.l.), between the villages of Khanzira and Kufr Rakib. It drains a fertile upland area before descending the scarp where at about -20 m. b.s.l. it is joined by a tributary and becomes the Wadi el Hammeh (Fig. 9). This wadi is fed by hot springs — the Hammamat abu Dhabli — and flows permanently.

#### Survey aims and methods

The aims of the survey were threefold:

1. to locate, record and identify all cultural remains within the survey area, from the prehistoric to recent periods,
2. to commence collection and identification of lithic artefacts from the stratified deposits of the Wadi Himar, as part of an effort to establish a local chronostratigraphic sequence. The potential of this area had been noted in 1981 during the geological survey,<sup>31</sup>
3. to assess the cultural relationship between the Wadi el Hammeh and Pella, in order to establish a more integrated picture of the history of the Tabaqat Fahl region.

Survey method involved two complementary techniques. Firstly, through the use of aerial photographs, likely archaeological sites were identified and noted for specific investigation. Secondly, and again using aerial photographs, geographic units (e.g. terraces, plateaux, alluvial fans etc.) were delineated and intensively surveyed on foot in closely spaced transects. Sites encountered were recorded on standard pro-forma sheets, and sampled selectively (purposive sampling)<sup>32</sup>, for the purposes of cultural identification. Controlled random sampling (probability sampling, *ibid.*) was used on two of the major sites (Sites 1 and 13) in order to obtain representative samples from different

areas of the sites. In the case of tomb groups, such as Sites 7, 9, 12, 8, 14, 22, 23, a total collection of all visible cultural material from within the tombs and their associated scree slopes was taken in view of the active erosion and tomb looting occurring. At Site 6, 10% of the presently visible fifty-five tombs were sampled.

Site definition was based on the presence of architectural features and/or concentrations of lithic or ceramic materials. As pottery and lithics were collected on all transects, "concentrations" were defined in relation to the overall density of such material occurring in the survey area.

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#### Results of the 1982/3 season

During this season slightly over one-third of the survey area was covered. Twenty-nine sites were found, including twelve sites with lithic concentrations, twelve tomb sites, three quarries, and five settlement sites.

#### Lithics

It became evident this season that the main concentration of relatively *in situ* Lower and Middle Paleolithic remains occurs in the upper eastern reaches of the Wadi el Hammeh system. Most of the material in the lower reaches of the Hammeh, where the survey concentrated this year, is in a secondary (redeposited) context, with the possible exception of artefacts found on the high ground of the travertine-conglomerate outcrops. Lower Paleolithic material has so far been found on top of the eastern foothills and ridges at Abu el Khas,<sup>33</sup> and at Site 30 (Fig. 10). The

<sup>31</sup> Macumber, *op. cit.*, 1981.

<sup>32</sup> C.L. Redman, *Productive Sampling Strategies for Archaeological sites in Sampling in Arc-*

*haeology*, Tucson, 1975.

<sup>33</sup> Villiers, *op. cit.*; and, Final report on Palaeolithic sampling at Abu el Khas, North Jordan, ADAJ, XXVII (1983).

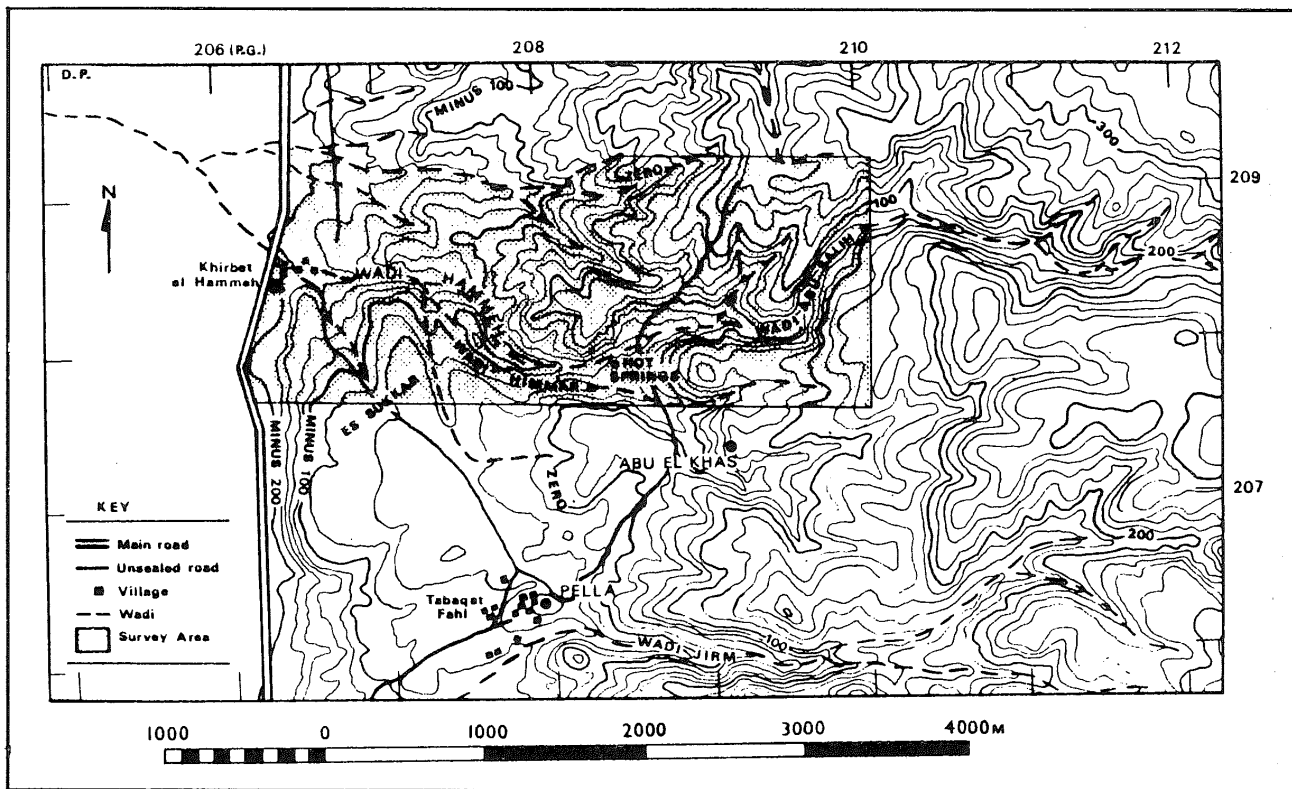


Fig. 9: Wadi Hammeh survey area.

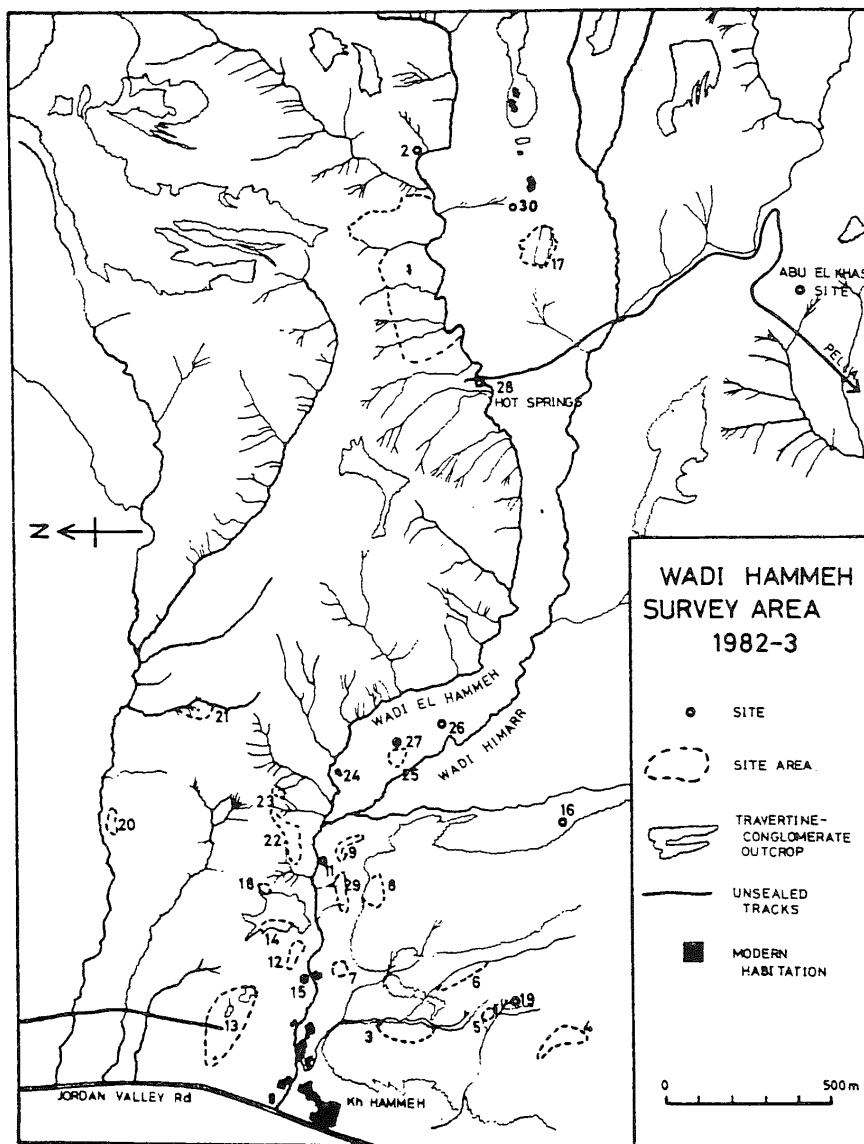


Fig. 10: Survey sites in Wadi Hammeh (map 2).

Middle Paleolithic site of El Hor (Site 1) is located on a series of tongues of land beside the upper Wadi el Hammeh. It is a major quarry/workshop site with possible Acheulian and post-paleolithic material present. Preliminary examination of all survey samples suggests that a number of discrete periods within the Lower-Middle Paleolithic are represented. Confirmation of this by technological and typological analysis would firmly establish the Wadi el Hammeh as an important focus of activity during this period.

The Upper Paleolithic period is sparsely represented. A major problem here however is that assemblages of this period are poorly defined, grading into the Middle Paleolithic and Epipaleolithic at either end. Certainly some indeterminate samples may belong to this period, and it is hoped that analysis of the stratified material exposed in the Wadi Himār will shed some light on this problem.

There is an extraordinary density of Epipaleolithic sites associated with an unusual geological feature: a remnant travertine cap on the high edges of the Wadi el Hammeh along its lower course. At Site 26, an *in situ* Kebaran assemblage was excavated from the base of this formation, while on its top a Natufian habitation site discovered in 1981 (Site 27) was sounded (P.C. Edwards, above). The travertine cap extends westwards on both sides of the Wadi el Hammeh, and Natufian sites and scatters occur over most of its surface (Sites 9, 12, 22, 23). Clearly during the Epipaleolithic period a rich combination of natural resources such as springs, possible swamp or marsh areas, adjacent ecotones of savannah grasslands and open oak forest and the game it supported,<sup>34</sup> would have made this area highly attractive.

No Neolithic sites were found this season although some possibly Neolithic material occurs on the south side of the

Hammeh on an intermediate terrace, and on the high ground of the travertine-conglomerate outcrops there.

The distribution of lithics attributable to the Chalcolithic-Early Bronze period is interesting, being largely restricted to the north side of the Hammeh. There is a concentration around Site 13, a workshop at Site 18, and scatters were found north of Site 18 and between Sites 20 and 21. This pattern tends to suggest that the small tell of site 13 may harbour some settlement remains of this period (see below).

Archaeological investigations of the Quaternary deposits in the Wadi Himār were commenced this season. Artefacts in this sequence ranged from the Lower-Middle Paleolithic periods up to the Epipaleolithic (above and below the travertine cap). It is hoped that charcoal recovered from the middle part of the sequence, in association with artefacts, will provide a radiocarbon date around which a chronostratigraphic sequence may be formulated. Further work in this location should provide a schema of cultural succession which may well have applicability outside of this area. It will also enable much of the culturally indeterminate surface collections to be identified.

#### *Pottery*

Preliminary analysis of pottery collections indicated that the Early Bronze I-III, and 'Abbassid-Fātamid periods were totally absent from the Wadi el Hammeh, while evidence for a Mamluk, Roman and Chalcolithic presence was negligible.

In the lower reaches of the survey area, where the Hammeh is at its greatest point of divergence from Pella, a dense concentration of E.B. IV material was found. Of the seven major tomb groups in this area (sites 6, 7, 9, 12, 22/23), five were found to belong to the E.B. IV period. Moreover a degree of contemporaneity

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Villiers, 1982, *op. cit.*

among the five sites was seen in the ceramics. A common feature was the "trickle" painted pottery known from excavations at Megiddo, Tomb 1098,<sup>35</sup> and El Husn.<sup>36</sup> Although a circular, domed chamber was common to all, two different types of entrance ways were observed within this group. Tombs cut into the hill-slope had a shallow, sunken dromos, while those cutting directly down possessed a typical E.B. shaft entrance. A potential E.B. IV occupation horizon was also indicated on the nearby settlement Site 13, Khirbet el Hammeh. The 1975 Jordan Valley Survey listed Khirbet el Hammeh as having great potential for excavation.<sup>37</sup> The site itself is not under immediate threat (other than the long-term effects of ploughing), but the potentially associated E.B. tomb groups are continually being damaged and looted as new tombs are uncovered. An investigation of the relationship between Site 13 and these burial groups therefore has a high priority.

The Middle Bronze Age and Late Bronze Age in the Wadi el Hammeh was restricted to a small group of five tombs (Site 8). In type they were identical to the E.B. IV tombs of Site 6 and may have been re-used. Only one of these tombs (Tomb 3) produced diagnostic pottery which was clearly dated to the MB-LB transitional period.

Iron Age pottery was sparse except for a scatter on and around Site 7. The remains of a small but substantial building were found here, but the association between sherds and structure remains unclear.

Hellenistic material was found throughout the survey area but with two clear focal points. The first centered around a potential occupation horizon at Khirbet el Hammeh (Site 13), while the second was concentrated on the hill fort of El Husn, above the hot springs (Site 17).

This site was not within the 1982-3 survey area although sherds collected by dig personnel were included in the preliminary analysis. The pottery indicated a late Hellenistic date for El Husn, based on parallels with the assemblage from Jebel Sartaba above the Wadi Malawi, south-east of Pella.<sup>38</sup> It is possible that both forts were part of an eastern defensive network which guarded the area from the hot springs (Site 28) to the main urban centre of Pella.

The major portion of the transect material throughout the survey area belonged to the late Byzantine-Early Umayyad period. A contemporary cultural phase is indicated at Site 13: a square, rock-cut cistern, located in a travertine outcrop at the western end of the site, can be dated to this period. The ceramic evidence from here and Pella suggests that the Tabaqat Faḥl-Wadi el Hammeh area was in intensive use during the Late Byzantine-Early Umayyad period.

D. Petocz and L. Villiers

### Geology and Geomorphology of the Lower Wadi Hammeh Sites

#### Introduction

In this brief report it is not intended that detailed geological and chronological correlations with other sequences along the Jordanian Rift Valley will be attempted. Instead it is intended that the Wadi Hammeh sequence with its evidence of continuous occupation through the Palaeolithic Era should be initially considered on its own merits, and emphasis thus placed on the environmental reconstruction of the varying occupational regimes. The one departure from this structure arises with the necessity to relate the sedimentary sequences and erosive events to those of the ancient Lake Lisan, the nearby presence and fluctuations of which

<sup>35</sup> P. L. O. Guy and R.M. Engberg, *Megiddo Tombs*, Chicago, 1938.

<sup>36</sup> G. L. Harding, *Four Tomb groups from Jordan*,

*APEF*, VI (1953).

<sup>37</sup> Ibrahim, et. al., *op. cit.*

<sup>38</sup> McNicoll, Hennessy and Smith, *op. cit.*



Table 1A. Sites located in the Wadi Hammeh Survey, 1982-3

<i>Site Type</i>	<i>No. of Tombs</i>	<i>Geographic Position</i>	<i>P.G. Co-Ords</i>	<i>Periods Represented</i>	<i>Preliminary Cultural Identifications</i>	<i>Dominant Periods</i>
Lithic concentration	—	Terrace	208.9E-208.3N	L. Pal; Neolithic?		
Tomb	2	Wadi bank	209.4E-208.6N		Middle Paleolithic	
Lithic conc., Military site	—	Hill slope	206.6E-208.3N	LP/MP?; Epipaleolithic	Roman-Byzantine?	
Quarry	—	Hill slopes	206.6E-207.8N	LP/MP?; Epipaleolithic	Modern; Natufian	
Quarry	—	Hill slopes	206.7E-208 N	Epipaleolithic	—	
Tombs	55	Wadi bank	206.8E-208 N	LP/MP, Epipaleolithic	Early Bronze IV (EB-MB)	
Tombs and settlement	3	Terrace	206.9E-208.4N	LP/MP	Early Bronze IV (EB-MB)	
Tombs	5	Plateau edge	207.1E-208.4N	Epipaleolithic	Early Bronze IV (EB-MB)	
Tombs and lithic concentration	6	Terrace	207.2E-208.4N	Epipaleolithic; EB IV	MB/LBA Transition	
Military site	—	Terrace	207.3E-208.3N		Natufian; Early Bronze IV	
Olive Press	—	Wadi bed	207.2E-208.5N		Modern	
Tombs	24	Terrace	206.9E-208.6N	Epipal; EB IV; Byzantine	Early Bronze IV	
Settlement	—	Alluvial plain	206.7E-208.8N	MP; Epipal; Chalco-EB; Hell.	Byzantine/Umayyad; EB IV	
Tombs, quarry, lithic conc. Mill?	10	Hill slope	206.9E-208.7N	MP; UP; EB IV/Byzantine	Middle Paleolithic;?	
Cave/tomb	1	Wadi bank	206.7E-208.5N		Ottoman Mandate?	
Fort	—	Plateau edge	207.3E-207.8N		?	
Lithic concentration	—	Hill top	209 E-207.8N	LP-MP	Hellenistic	
Tombs	2	Hill saddle	207.2E-208.7N	MP; Chalco-EB	Chalcolithic-Early Bronze	
Lithic concentration	—	Hill slope	206.9E-208 N	MB/LB; Byzantine		
Lithic concentration	—	Alluvial plain	207.1E-209.1N	MP; Post Paleolithic	Middle Paleolithic	
Tombs and lithic concentration	—	Alluvial plain	207.2E-209.1N	LP-MP; Epipaleolithic	Natufian	
Settlement	23	Terrace	207.3E-208.6N	Epipaleolithic; EB IV	Natufian; Early Bronze IV	
Settlement and lithic conc.	—	Wadi terrace	207.4E-208.4N		Ottoman/Mandate	
Lithic concentration	—	Terrace	207.5E-208.2N	Epipaleolithic	Natufian	
Settlement and lithic conc.	—	Plateau	207.5E-208.3N	Epipaleolithic	Kebaran	
Building	—	Plateau	207.6E-208.1N	Epipaleolithic	Natufian	
Tombs	—	Wadi edge	208.5E-208 N	Hellenistic?; Romano-Byz.?	?	
Lithic concentration	1+	Terrace edge	207.1E-208.5N		Early Bronze IV?	
Lithic concentration	—	Hill saddle	209.2E-207.9N	LP-MP	Lower Paleolithic	

have clearly had a primary influence on human occupation during the Epi-palaeolithic times, and probably throughout much of the Pleistocene.

### Physiography

Wadi Hammeh is a westward flowing tributary to the Jordan River which enters the Jordan Valley near the village of Meshariah, about 30 km. south of Lake Tiberias. It is a perennial stream fed by the thermal springs at Hammet Abu Dhabli which emerges at a point several kilometres upstream from the Jordan Valley.

The Hammeh Valley is deeply incised through sequences of Upper Cretaceous to Lower Tertiary limestones, cherts and marls, and Neogene conglomerates, calcareous siltstones, clays and tufa. Prior to entering the Jordan Valley the Wadi Hammeh is joined by the Wadi Himar, a normally dry stream which rises in Cretaceous to Eocene limestones south east of the thermal springs and runs parallel to Wadi Hammeh for several kilometres before joining it. In the vicinity of the spring, the interfluvium between the wadis forms a broad red-brown terrace which, on passing downstream narrows to become a ridge falling steeply northwards towards Wadi Hammeh but less steeply to the shallower Wadi Himar. At the junction of the two wadis the valley widens to form a small basin which extends downstream towards the rift valley, some 600.00 metres further on.

The ridge is largely composed of a sequence of Quaternary fluvial conglomerates and interbedded red-brown pebbly clays. These sediments in turn overlie a steeply dipping sequence of mudstone, bituminous shales and conglomerates which form the floor and lower slopes of the Wadi el Hammeh. Due to a lesser degree of incision, this older sequence is only occasionally seen in Wadi Himar, the floor of which consists largely of conglomeratic sediments.

### *Wadi Hammeh Conglomerates*

The Wadi Hammeh conglomerates

with their interbedded red-brown clays are a remnant of a thick fluvial sequence which once partly back-filled a single ancestral valley whose width spanned both those of the present day *awdiyah* (valleys). Remnants of similar conglomeratic valley fills occur in westward flowing wadis tributary to the Jordan River, for instance Wadi Jirm on which Pella is situated and Wadi Yabis — both of which are to the south of Wadi Hammeh. In all three wadis the pre-conglomerate physiography was essentially similar to that which exists today, *i.e.* east to west running valleys incised into Cretaceous-Tertiary sediments during an earlier phase of graben development.

The pre-conglomeratic landscape has been partially exhumed by a more recent phase of valley incision leading to the present day wadi physiography. The incision is of the order of 20 to 30 metres and this has left conglomeratic residuals to form either hills as at Tabaqat Fahl, or terrace remnants plastered on the walls of wadis, or the ridge between the wadis el Hammeh and Himar; elsewhere, where erosion has not completely removed the conglomerates, they form a pebble base to the valley floors as in the Wadi Himār and Wadi Jirm.

On passing westwards along the ridge between the Wadi el Hammeh and Wadi Himar towards the Jordan Valley, the conglomerates are overlain by a calcareous sequence consisting of grey limey marls, calcareous silts and tufa with a harder travertine cap. These calcareous sediments have a freshwater molluscan fauna containing *Melanopsis praemorosa*. The cap rock forms a small plateau on which a dense accumulation of small scrapers, blades and flakes was noted during the 1981 field season. These occur in a dark grey clay about 0.5 m. thick.

Situated between the calcareous cap and the conglomeratic sequence was a 2.00 m. thick darkish grey clay which contained a number of chert flakes and blades and small pieces of bone and charcoal (Macumber 1981 ms.). The development within the clays of several horizons showing prismatic

soil structure suggests that there was interruption to sedimentation for sufficient time to enable pedogenic processes to operate. At this site there is strong evidence for *in situ* occupation. A detailed account of the site is given by Edwards (loc cit) who has demonstrated the existence of a Kebaran culture and obtained a radiocarbon age of  $19,500 \pm 600$  B.P. (SUA 2101). Based on the presence of Helwan retouch on a large percentage of lunates in the extensive chert tool industry in the thin clay unit *overlying* the calcareous cap, Edwards considers the site to be Early Natufian with a possible age dating to the 10th millennium. The calcareous suit on the Plateau therefore dates from between 19,500 B.P. and 10,000 B.P.

At its western edge the Plateau ends abruptly, giving way to a low saddle which in turn rises to a small butte marking the termination of the ridge where the wadis meet. The butte — here termed the knob — is capped by a somewhat thickened calcareous sequence of calcareous silts, pisolitic limestone and tufa. The uppermost calcareous suite on the Plateau and on the knob are remnants of a once more extensive sedimentary unit which was deposited in the lower regions of the Hammeh valley where it widens prior to entering the Jordan Valley. Downstream from the Knob additional remnants of these sediments occur as terraces on either side of Wadi el Hammeh where they have been extensively used for tomb sites.

At the knob the greatly thickened calcisiltite suite is underlain by a 2.50 m. thick light coloured sequence of 5 calcareous cemented conglomerate bands. The lowermost of these bands is overlain by a carbonaceous silt containing charcoal fragments, and underlain by a bright red-brown gypseous clay — this taken together is interpreted as a palaeosol. Beneath the gypseous clay the sequence reverts to the

normal conglomerates and interbedded red-brown clays found elsewhere up-valley. While only one fine unrolled flake was noted in the calcisiltite sediments, large numbers of chert artefacts occur throughout the underlying conglomeratic sequences — those in the five calcareous bands suggesting a Middle Palaeolithic age, and those closer to the base of the sequence indicating a possible lower Palaeolithic age.<sup>39</sup> In this region chert artefacts are eroding from the conglomerates and occur scattered over the surface on hillslopes, saddles and at valley bottoms.

Down valley, the calcareous sequence continues to thicken and the conglomerates become light-grey as the red-brown clay matrix is replaced by a calcareous matrix; the conglomerates in turn gradually become subordinate to the calcareous silts, pisolitic limestones and tufas. There is thus a partial lateral facies change from non-calcareous to calcareous sediments as the valley widens immediately prior to joining the Jordanian Rift Valley.

#### Occupational Environment

The lateral facies change from conglomerates and non calcareous red-brown clays to a calcareous suite of sediments as the Wadi el Hammeh widens on approaching the rift valley is interpreted as indicating the passage from a valley fill depositional environment towards a rift valley setting where lacustrine conditions exist and chemical deposits predominate. During the late Pleistocene the Jordanian Rift Valley was occupied by Lake Lisan (Neeve and Emery, 1967)<sup>39A</sup> and it is likely that the calcareous sequence was deposited at the head of an embayment of Lake Lisan formed by the mouth of the Wadi Hammeh. That the Wadi el Hammeh conglomerates and their calcareous equivalents were being deposited during the

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<sup>39</sup> L. Villiers, Personal Communication.

<sup>39A</sup> Neeve, D. and Emery, K.O., "The Dead Sea, depositional processes and environments of evaporites." *Geol. Survey Israel Bull.*, 41, 1967.

lifetime of lake Lisan is shown by the 19,500 years B.P. date from the grey clays beneath the calcareous sediments on the Plateau. The range of Palaeolithic industries within the conglomerates at stratigraphically lower levels indicates that deposition of this sequence spanned a considerable period of time at least covering that of Lake Lisan which has been variously dated to a period ranging from 80,000 — 60,000 B.P. up to 18,000-15,000 B.P.<sup>40</sup>

Large numbers of artefacts occur scattered throughout the conglomeratic sequences in the vicinity of the embayment, and although in situ occupational sites have been confirmed only towards the top of the sequence (Edwards, *ibid*), the density of artefact scatter suggests a local source. The distribution of artefacts when placed in the context of facies variations down the Wadi el Hammeh, points to a fairly stable occupational regime existing through Palaeolithic and Epipalaeolithic times. The physical environment suggested by the interfingering lithologies present within the embayment formed at the mouth of the wadi indicates a lake margin setting with perhaps marsh/lagoon and narrow marginal floodplain passing rapidly upstream into a fluvial sequence. It seems likely that the calcareous suite represents a marsh environment with the source of lime being derived from upwelling carbonate enriched groundwaters outseeping along a groundwater discharge zone marginal to the lake.

While Lake Lisan (and perhaps its predecessors) has strongly influenced the physical environment and therefore occupation regime in the lowermost limits of Wadi Hammeh close to the margin of the rift valley, the perennial Hammet Abu Dabli thermal spring is seen as providing an extremely favourable albeit more localized environment especially at times of climatic stress as in the cooler glacial times and during periods of higher aridity.

The combination of hot springs and nearby megalake are clearly the attraction responsible for occupation of this region during palaeolithic times.

#### Neo Tectonics and Wadi Evolution

No discernible dip can be seen in the conglomeratic unit upvalley beyond the Plateau, however the calcareous sediments on the plateau have a very slight tilt of perhaps 1° away from the rift valley. On passing onto the saddle between the Plateau and the Knob there is a significant change perhaps marked by local faulting and thereafter the sediments dip at about 7° towards the rift valley. The terrace developed on the calcareous unit is similarly tilted. Since the tilted sequences at the Knob contain Upper Palaeolithic artefacts, the age of tilting is certainly post Upper Palaeolithic; furthermore since a 1° back tilt also appears on the Plateau sediments, it is likely that this event post dates the Kebaran site dated at 19,500 years B.P. which occurs beneath the calcareous cap.

The incision of the wadi system to give the present day physiography occurred after the deposition of the Plateau sequence; it also appears to post date deposition of the uppermost clay unit in which the Natufian sequence occurs.

This event may coincide with that recorded by Schuldenrein and Goldberg (1981) who suggest that a major erosional phase occurred towards the end of the Pleistocene. Commenting on late Quaternary palaeoenvironments and prehistoric site distribution in the lower Jordan Valley, they note that the primary Epipalaeolithic sites are found at elevations above 180 m., but subsequent Natufian sites occur lower in the landscape, post dating the erosional event. In the case of the Wadi Hammeh however, the early Natufian site lies virtually at the top of the

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<sup>40</sup> Neeve, and Emery, *op. cit.*, Kaufman, A., "U-Series of the Dead Sea basin Carbonates", *Geochim, Cosmochim Acta* 35, 1269-1281; Vogel, J.G. and Waterbolk, H.T., "Groningen radio -

carbon dates. Geological Samples Dead Sea Series, Israel (Lisan). *Radiocarbon* 14/1, 1972, 46-47.

valley-fill sequence and the incision of the wadis closely post dates this site. Given the close proximity of the site to the rift valley, the erosion must be directly linked to the

drying up of Lake Lisan.

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Susan Bassett, Phillip Edwards  
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Timothy Potts, Leanda Randle  
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**PRELIMINARY REPORT OF THE  
EXCAVATIONS IN GADARA  
(UMM QES) IN JORDAN, 1980**

by  
Ute Wagner-Lux and Karel J.H. Vriezen

### Introduction

From October 3rd till November 12th, 1980, the German Evangelical Institute for Archaeology of the Holy Land carried out the fifth excavation campaign in the ancient town of Gadara, today Umm Qēs, in Jordan.<sup>1</sup> During this campaign, work was carried out in four areas - III, IV, V and VI - (Fig. 1).

### Area III

Area III (Fig. 2, Pls. XIII: 1, 2; XIV: 1) is situated in the northern part of the street branching to the south from the main street and below the large terrace, where a Byzantine church had been excavated in 1976-1979 (Area 1), along a row of rooms with vaulted ceilings.<sup>2</sup> In this area, the excavations, begun in 1977 and 1979 in the most northern field (field 1), were completed and work was extended to three further fields (fields 2-4). During this work, the western boundary of the ascent, which comes from the north to the terrace and which was only visible a few centimetres over the surface and the blocked entrance to the vaulted room, adjoining immediately to the south, was exposed. In the southern part of the excavation area (fields 2 and 4) many worked stones, either directly on the pavement of the street or a few centimetres above, were found under different kinds of layers of earth. They are

mainly building blocks of basalt from the facades of the vaulted rooms, which were collapsed westwards to the street. Even if not all the stones of the facades could be found, the material present is sufficient for a preliminary reconstruction of these parts of the buildings. According to this, each facade was constructed of eight basalt-stone layers in the runner-binder-technique, which reached a height of approximately 4.00 m. Profiled door-fittings with a doorstep of 0.10 m. reached the height of the four lower layers and the lintels, consisting of one stone each, are to be counted to the fifth layer of stones. Each door had a height of approximately 2.10 m. and a width of approximately 1.48 m. The seventh layer consisted of horizontally profiled stones, which apparently formed a ledge on the facade. The eighth layer of stones, which began approximately 3.60 m. over the doorstep, had a smooth surface. Apparently this formed the top of the terrace, which covered the ceilings of the vaulted rooms. In the northern part of the area (field 1) the pavement of the street could only partially be found, along the western boundary of the ascent to the terrace, in the northern end of this field and at the border to a smaller western field (field 3, compare Fig. 2). In those parts of field 1, where the basalt pavement was destroyed, a canal hewn out of the rock (0.44 m. wide and 0.62 m. deep; see Fig. 2, A) leading to a cistern (Fig. 2, M) was

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<sup>1</sup> Compare U. Wagner-Lux and K. J. H. Vriezen, *Zeitschrift des Deutschen Palästina-Vereins* 98 (1982) pages 153-162. The excavation campaign was directed by Ute Wagner-Lux. Working with her were: Karel J. H. Vriezen of Vleuten/Holland, Ernst W. Krueger of Jerusalem, Dr. Karl Jaroš of Linz/Austria, Markus Sieber and Lea Apolloni of Basel/Switzerland. The Department of Antiquities of Jordan was represented by "Omar Rshedat and Sultan Shraideh of Irbid. Many thanks to all

fellow-labourers for their tireless cooperation. Our special thanks go to the Director of the Jordan Department of Antiquities in Amman, Prof. Dr. Adnan Hadidi, as well as to the "Deutsche Forschungsgemeinschaft" in Bonn-Bad Godesberg/Federal Republic of Germany, with whose support the work could be done.

<sup>2</sup> Compare U. Wagner-Lux, E. W. Krueger, K. J. H. Vriezen and T. Vriezen-Van der Flier, *ZDPV* 94 (1978) p. 138.

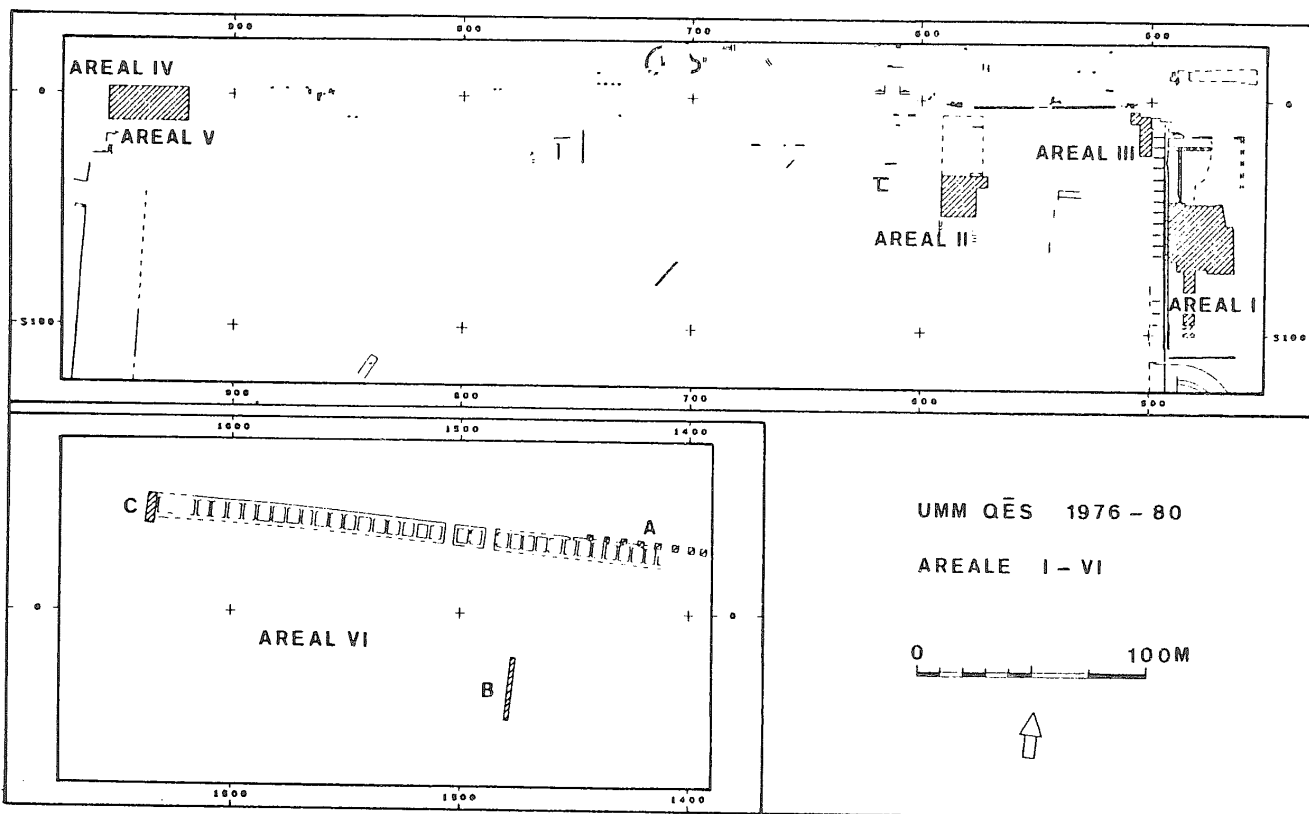


Fig. 1: Umm Qes, complete plan of the areas I-VI.

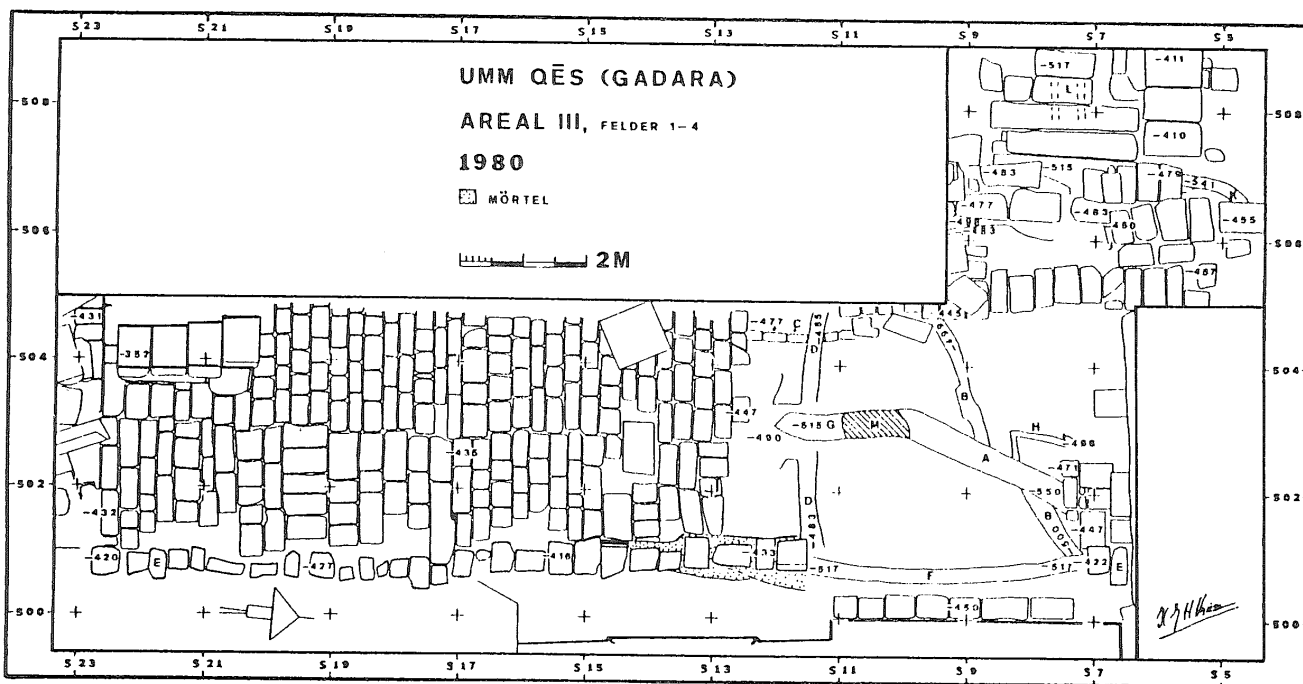


Fig. 2: Umm Qēs, plan of area III.

found under the above mentioned strata and a white mortar layer. Since the cistern is mainly filled with earth, the measurements can only be estimated at 15.00 m. length in the north-south direction and 7.00 m. width in the east-west direction. Apparently the cistern was used for a long time and quite clearly the pavement was damaged when the cistern came to be used again at a later date. It seems that canal A lead the water of the main street of the

town (east-west direction) to the cistern M. In this area, several other waterpipes, constructed one over the other, were found (Fig. 2, B-H), which were also hewn out of the rock or otherwise consisted of ceramic tubes. While the canals A-D and F-H were all situated under the pavement, canal E (north-south direction) is secondary and was built into the street above canal F (compare Pl. XIV: 1 left). - The above described fields of area III (fields 1, 2 and

4) were opened by us to a breadth of 5.00m. (east-west direction). Aiming to find the western side of the so-called side-street and its boundary, the northern section of this area was extended to the west by a 4.00 m. wide field (field 3). However, only three further canals (Fig. 2, J, K and L) could be found; the western boundary of the street could not be determined.

#### Areas IV and V

Areas IV and V (Fig. 1 and 3, Pls. XIV: 2; XV) are situated between 420 and 454 m. west of area III. Here were visible the upper parts of column-shafts on both sides of the road<sup>3</sup> being used today, which almost runs in the same direction as the ancient main road. On the north side of this street there were eight shafts of limestone columns in a row, on the southern side only two and it was supposed that they belonged to the colonnades of the old main street. The excavation site had a length of 34,00 m.; it was 15.00 m. wide. The northern boundary of area IV was drawn just north of the northern columns, the southern boundary 6.00-7.10 m. to the south. The southern boundary of area V was drawn behind the southern row of columns, whereby the excavation spread 3.50-4.50 m. to the north. Between the two areas there was a strip of approximately 4.50 m. wide, which is today being used as the road 0.10-0.15 m. above the ancient street. On both sides of the presently used road - on the north side of area IV and the south side of area V - walls were constructed in modern times in order to support the terrain, which is situated approximately 1.00-2.00 m. above street level. Material of ancient buildings, e.g., bricks, column-shafts, bases, capitals and architrave-parts, were used. During the excavation it turned out that the two column-shafts on the south side of the street in area V (which were drawn into the map of the surface survey of 1974) did not stand *in situ*, but most likely they belonged to the above mentioned modern walls. The

breadth of the street between the northern and southern stylobate of the colonnades is 12.55 m. in average. The breadth of the northern side-walk is 2.90-3.00 m.; the breadth of the southern side-walk 3.00-3.09 m. The northern stylobate is not rectilinear, but juts out between column S 6 and pedestal P 9 by 0.21-0.23 m. Seven column-shafts (diameter 0.70 m.) were found *in situ*, S 1 - S 6 and S 8, all standing on a round base with a square plinth (diameter 0.94-1.02 m.) The distance between the columns S 1 - S 6 (measured centre to centre) varies between 2.78-2.84 m. It is very doubtful if the pedestals of this row, P 7 and P 9, originally belonged to the northern colonnade, since on the one hand there are only bases with column-shafts on this side (S1-S6 and S8, and on the other hand their measurements (P7: 1.08 x 1.14 m.; P9: 0.66 x 0.71 m.) vary greatly. It is surprising that all the columns of the southern colonnade stood on pedestals. There are nine pedestals from pedestal P 11 to base B 19 on the stylobate (height 0.56-0.63 m.; length 0.81-0.92 m. breadth 0.75-0.88 m.), whereas in three cases (B 13, B 14 and B 19) round bases with square plinths rest on these pedestals (diameter 0.80; 0.87 and 0.81 m.). The distance between P12-B13, B13-B14 and B14-P15 is always 3.02 m. (from centre to centre). On the northern side-walk, Area IV, south of S 1, there was found a secondary construction (approximately 0.30 m. high and mainly only one layer of stones) with the southern side missing. Excavation tests down to the rocky soil were conducted in the same area in the parts A and B (compare Fig. 3). In the excavation test A (in the north-western corner of the excavation site) mainly three conduits made of ceramic pipes bedded in mortar were found, under which an opening in the rock lead to a room — most likely to a cistern. The filling material was mixed with numerous fragments of early Roman pottery. In the excavation test B (in the north-eastern part of the area) several (up to 1.50 m. high, partly based on the rock) remains of walls were found as well as a part of a

<sup>3</sup> Compare *ZDPV* 94 (1978) p. 137.



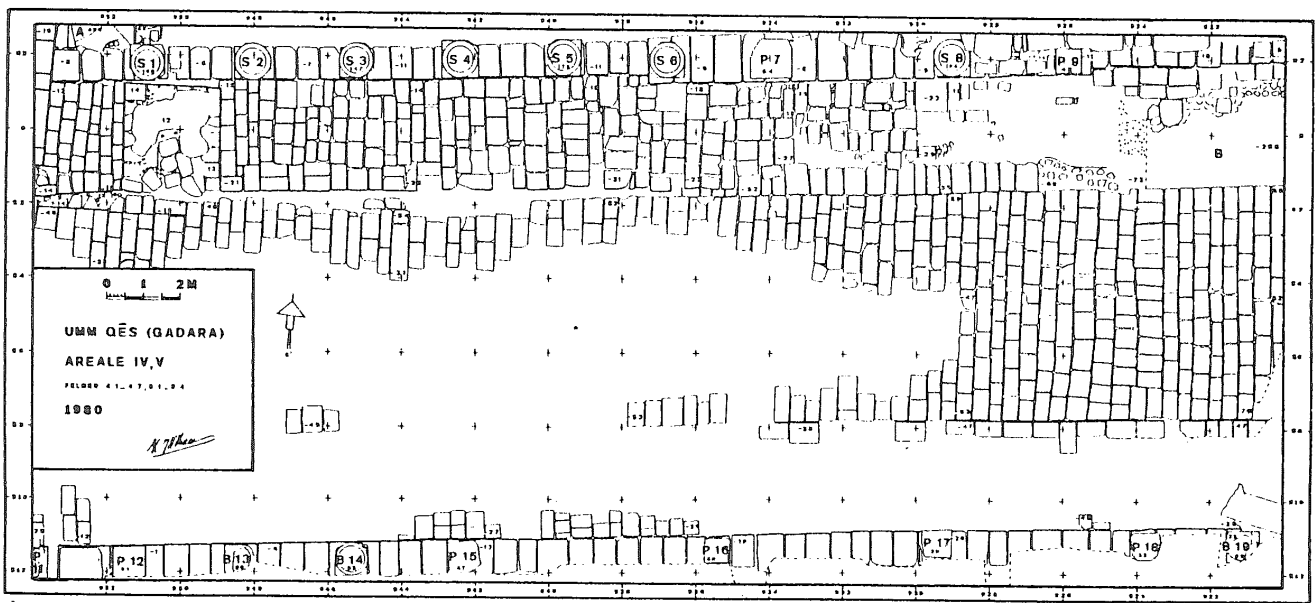


Fig. 3: Umm Qēs, plan of areas IV and V.

plastered basin. As seen clearly in the plan of the Areas IV and V, only a little has been left of the pavement of the southern side-walk of the street. On its western end (north of pedestal P 11) most likely a secondary wall was added in the north-south direction. Both side-walks dip a little to the street. The street itself, which was paved in a regular pattern, was higher in the middle than on the sides and turns eastwards in this area (compare Fig. 3).

Suggestions of dates will not be made until all the material of this excavation campaign, which, apart from Area VI, deals with the main and the so-called side-street of Gadara, has been studied completely.

#### Area VI

In the western part of the ancient town three soundings were made (A, B and C, compare Fig. 1) at the remains of a building, which, during the surface survey of 1974, was thought to have belonged to a hippodrome.<sup>4</sup> Various small excavations on the east side (A) showed that the

building could be prolonged at least 15.00 m. further to the east than first judged in 1974. Diggings at the west end of the remains (C) showed that at a right angle to the ruins of the building there is a wall running in a southern direction. However, without further excavations, nothing more can be noted about this. In the excavation test B (compared Fig. 1), which was carried out at a length of 27.00 m., a breadth of 1.50 m. and a depth of 1.20 m., south of the southern wall of the long-stretched building, many squared building stones and quarry-stones of basalt and limestone, mixed with fragments of pottery, were found. Only the excavation of the whole area can show if and in how far this accumulation of stones has any connection with the ruins situated to the north.

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THE LOWER AND MIDDLE  
PALEOLITHIC IN THE UPPER ZARQA/  
KHIRBET SAMRA AREA OF  
NORTHERN JORDAN: 1982-83  
SURVEY RESULTS

by  
J. Besançon, L. Copeland, F. Hours,  
J. Macaire and P. Sanlaville

### Introduction

Two seasons of survey work were carried out in 1982 and 1983 by the R.C.P. 438 (now E.R.A. 1036) team of the C.N.R.S.,<sup>1</sup> in part of the Jordan catchment: the River Zarqa drainage basin north of Amman, as reported in a preliminary outline.<sup>2</sup> Our aim was to find sequences of fluvial terraces containing Paleolithic artefacts, from which relative local chronologies could be set up. Using a combination of prehistoric and geomorphological studies of these terraces, we hoped to reconstruct the evolution of the Middle and Late Pleistocene in this part of northern Jordan.

We were interested in a certain kind of riverside terrain: banks of rounded, water-worn pebbles, gravels and soils perched as benches above the flood-plains of rivers and *awdiyah* (wadis); these have been recognised by geomorphologists as the remains of the cut and fill (erosion and accumulation) cycles of the Quaternary Glacial (or Pluvial) and Interglacial (or Interpluvial) phases.<sup>3</sup> Most often the terraces are invisible at the surface under layers of agricultural soil, but they can be seen in section at points where the river has

truncated part of the terrace, or where road or rail cuttings have been made. A preliminary reconnaissance in Jordan to find a suitable area was carried out by J. Besançon, F. Hours and M. Muheisen in 1981. At the request of the Dominican fathers of the *Ecole Biblique* in Jerusalem, this included the area of Khirbet Samra, 15 km. north-west of the town of Zarqa, where, during the course of their excavations at this Classical site,<sup>4</sup> they had noted handaxes and other flint artefacts on the surface. Together with J. Sapin in 1982, they had collected these and generously turned the collections over to us for study. Although not strictly a fluvial surface, the basalt bluff upon which Khirbet Samra was built was, however, surrounded by *awdiyah* (tributaries of the Dhulail), the banks of which consisted of Pleistocene terraces, and so this sector was included in the survey.

The areas surveyed form three broadly distinct zones (see map, Fig. 1):

1) The first is the valley of an important upper Zarqa tributary, the Wadi Dhulail, for about 15 km. upstream from its confluence with the River Zarqa; this zone includes the basalt bluffs of Khirbet Samra and the area drained by the Dhu-

<sup>1</sup> The team consisted of J. Besançon, J. Macaire and P. Sanlaville (geomorphologists, JB and JM from the Université Rabelais, Tours and PS from the Maison de l'Orient, Lyon) and L. Copeland and F. Hours (prehistorians, LC from the London Institute of Archaeology, FH from the Maison de l'Orient, Lyon). We had the valuable assistance of our Representative, Mr. Mohammed Osman, and we are most grateful for the support given by Dr. Adnan Hadidi, Director-General of Antiquities, and all at the Department of Antiquities, Amman.

<sup>2</sup> J. Besançon and F. Hours, Prehistory and

Geomorphology in Northern Jordan, *Studies in the History and Archaeology of Jordan*, vol. 2., (in press).

<sup>3</sup> J. Besançon, Chronologie du Pléistocène au Levant: synthèse; in J. Cauvin and P. Sanlaville (eds.), *Préhistoire du Levant*, Paris, 1981, p. 145-153.

<sup>4</sup> J. B. Humbert, Khirbet es-Samra, une ville du *limes arabis* et sa communauté Araméenne, in F. Villeneuve (ed.), *Contribution Française à l'archéologie Jordanienne*, Dijon, 1984, p. 40-43.

lail's own tributaries, many of which arrive from the north (for example, Wadi Qara and Wadi Bellama). The Dhulail is not completely perennial (its bed was dry in September 1982 and 1983), and its water derives ultimately from the Jebel ed-Druze across the Hauran. According to Humbert the village of Khirbet Samra is at the limit of rain-fed agriculture today.<sup>5</sup> It commands a very ancient north-south route as well as the start of an eastward route to Azraq.<sup>6</sup> The area today consists of low plateaux and shallow steam valleys.

2) The second zone comprises the region of the confluence of the Dhulail with the Zarqa river. The Zarqa is a perennially flowing tributary of the Jordan which here begins to change the direction of its flow from northward to westward, below the basalt-covered Dauqara plateau. The relief is more pronounced here, and affluents (such as the Sayih-Saidah, a Dhulail tributary) enter the main valley between basalt-capped *mesas* (e.g., Jebel Bakiya). The river is constricted in the El-Hashimiya area, and has cut a narrow passage between the basalt and the limestone bedrock.

3) The third zone is the valley of the River Zarqa downstream of the confluence with the Dhulail for about 5 km. to El-Bire village (the stream flowing generally north-westwards) and then for another 5 km. to where it makes a turn at the Quneia "elbow" to flow southwestwards toward the Jordan Valley. Well-defined suites of gravel terraces occur here, and in many places they are being quarried for road-metal, cement, etc., or are being "landscaped" into broad agricultural terraces by earth-moving machinery; these often cut vertical sections which reveal the ancient

terrace stratigraphy.

The above-mentioned three zones were chosen (in preference to areas in the Jordan valley proper) as suitable for research into the fluvial sequence on several grounds. Firstly, in our experience of terraces in Lebanon and Syria<sup>7</sup> we had found that in tributary valleys, rather than in the valley of a large main river, the fluvial deposits stood a better chance of surviving the forces of erosion and dismantling than did the main stream terraces. Secondly, we thought that the area was sufficiently upstream in the Jordan drainage system to have been largely unaffected by late base-level changes (in this area due to the rifting of the Jordan Valley) — at least in the recent past, with which we are concerned.<sup>8</sup> Thirdly, it was thought that the various basalts (fossil lava flows) in the area might contribute some radiometric dating and a chronology. Fourthly, it is a contact zone between the cereal-producing Fertile Crescent, and the desert steppe, and therefore had an influence on human occupation. Finally, the area was well supplied with paved roads, bridges and tracks, giving easy access to places where terraces had been eroded; as well as man-made sections such as were mentioned above, there were many natural sections cut by the streams themselves.

### The Geomorphic Setting of the Paleolithic Sites

In the following account, the geomorphic data is based on a detailed report to be published separately.<sup>9</sup>

Samples of the basalts, obtained by J. J. Macaire have been dated by the *Bureau de Recherches Géologiques et Minières*

<sup>5</sup> The site is a station on the Hejaz railway to Medina. it was a stop on the *Via Nova Traiana* linking Philadelphia to Bosra and Damascus (see Kennedy, 1982).

<sup>6</sup> A track goes east to Azraq Oasis via a line of *sabkhas* which, judging by the presence along it of Islamic hunting lodges, may mark an animal migration route between the desert steppe and the east bank highlands; it is also on the north-south bird migration route described at Azraq by Nelson (1973), and hence must have formed an area attractive to hunters.

<sup>7</sup> Besançon *et. al.*, 1978), and the Euphrates tribu-

taries Sajor (see Besançon *et. al.*, 1982) and Balikh (see Besançon and Sanlaville, 1981), among others.

<sup>8</sup> For fuller discussion of the chronology of Jordan Valley tectonics in the Quaternary and how they affected the deposits in our area see Besançon *et. al.*, in preparation.

<sup>9</sup> J. Besançon, L. Copeland, F. Hours. J.J. Macaire and P. Sanlaville, Evolution de la vallée moyenne du Dhuleil et du Zarqa (Jordanie) au Néogène et au Quaternaire. *Revue de Géologie Dynamique et de Géographie physique*, in preparation.

(Orleans), using the Potassium/Argon process. They emanate from the volcanic area of the Jebel ed-Druze and the oldest basalts in our region (B1 and B2 on the map, Fig. 1) are dated to from 7 to 5 million years ago. As lava they twice flowed westwards to our area and spread out over what was then a wide basin, more or less following the course of the present Dhulail, which already belonged to the Jordan catchment. A thin fluvial layer (named by the geomorphologists the Bakia Formation) is interspersed between the two flows. These older basalts were more resistant to erosion forces than were the surrounding limestones, and may be seen today in the form of *mesas* or tablelands perched above the valleys as far downstream to (but apparently no further than) Jebel Bakia. The date places them in the Miocene/Pliocene.

There then occurred a major downcutting phase, linked certainly to the deepening of the Ghôr, which brought about an intensification of the erosion. The Dhulail and Zarqa valleys became wider and deeper than they appear today, and two successive basalt flows (B3 and B4 on the map) spread along them from east to west, probably of a very fluid facies, since we can trace their flow down as far as the Quneia "elbow". They never reached the height of the older mesa basalts. The youngest basalt (B4) has two dates: 2.92 and 3.35 million years ago. The B4 overlies gravels, sterile of artefacts, which we call the Dhulail Formation. Thus our hopes that the basalt would help to date absolutely the prehistoric artefacts were disappointed: they (and the gravels they cover) appear to be too old.<sup>10</sup>

From then onward the Zarqa and Dhulail Valleys went through alternating periods of erosion and accumulation associated mainly with severe climatic changes which occurred in the Middle and Late Pleistocene and Holocene as well as, at the start, with rifting in the Jordan Valley. These climatic changes in the Quaternary caused the build up of substantial pebble terraces during colder or drier

periods while incision of the river bed occurred when temperature and precipitation led to a stabilisation of the valley sides by the vegetation. However, the subsidence of the Jordan rift tended to favour the forces of erosion.

At the end of the survey we were able to distinguish a succession of four, in some areas five, alluvial or colluvial fills (Formations), described hereafter using the following symbols: Q=Quaternary; f=fluvial formation; Qf3=the third oldest (and here the highest) of the three Pleistocene terraces (before the Holocene) which we found, and which we call the Dauqara Formation; it overlies Basalt B4; Qf2 is the second oldest terrace, which we call the Bire Formation; Qf1 is related to the Last Glacial/Pluvial (*i.e.*, Late Pleistocene) and is called the Khirbet Samra Formation (allied to it but undated is the Qf2-1 or Bire-Samra Formation. Finally the Qfo is the Holocene terrace which we call the Sukhne Formation; it fills the flood plain of today.

Qf3, the Dauqara Formation or Complex

This is a high terrace formed when erosion in a Pleistocene climatic cycle, probably in several phases (and later than the last B4 basalt flow) at first incised the floor of the valley and then filled it to above the level of B4. Today it forms the broad *glacis*, easily seen on the left bank of the Zarqa (*e.g.*, sites 21-23, 30 etc.) perched sometimes 50.00-70.00 m. above the present valley floor, but occasionally visible even on the latter. The Formation comprises a cemented conglomerate of large pebbles, mainly of limestone, having a pink-coloured matrix, and covered by a substantial crust. No clear occurrence was noted upstream above el-Hashimiya, where its deposits seem to be buried by later accumulations.

The only man-made implements we could find in Qf3 deposits were rare cores, flakes and one chopper (described below). Although there are many factors which could affect the dating of the Dauqara

<sup>10</sup> The matter would be put in a new light if the B4 dates are too old: it is curious that basalts which

would correspond to the younger basalts in the Yarmouk Valley seem not to be present here.

Formation (such as Jordan Valley rifting, compensatory East Bank uplifting, perhaps-related lava emissions from the Jebel Druze area) it is considered to date to early in the Middle Pleistocene. If so, the Dauqara flakes would be contemporary with Middle Acheulean industries in the Levant, as will be discussed later.

#### Qf2, the Bire Formation

This occurs in the khirbet Samra sector but is more easily distinguished downstream of the confluence, due to the presence in it of numerous, considerably weathered, basalt blocks and pebbles, to the abundance of flint, and to the dark colour of the silty-clay matrix. There is some surface crust. It is usually found overlying the Dauqara Formation (*e.g.*, at Site 30b) against the valley sides. Upstream of Hashimiya the Qf2 deposits seem to be eroded and buried by Qf1 materials.

In the Zarqa valley a Late Acheulean assemblage of bifaces, cores and flakes was picked out of the sections of this Formation. They, too, are brown-patinated and heavily rolled and therefore cannot be younger than the time when the terrace was being built up. The Bire Formation is also Middle Pleistocene, and probably dates to around 200,000 years ago.

#### Qf1, the Khirbet Samra Formation (with Qf2-1, the Bire-Samra Formation)

Often more colluvial than alluvial, the "low" terrace contains an abundance of silty matrix and is not cemented or crusted over. It is sometimes found banked up against the foot of the Bire Formation and appears to represent the last Glacial/Pluvial, the early Würm. What appears to be a different facies (called Bire-Samra by the geomorphologists) occurs upstream of el-Hashimiya, especially in the environs of Khirbet Samra village. As we shall see, it probably represents reworked deposits and contains both Middle and Lower Paleolithic artefacts.

#### Qfo, the Sukhne Formation

This Formation was preceded by a downcutting phase which also attacked the two earlier (Qf1 and Qf2) terraces. It is a low terrace resembling the early Würm one, from which it can be distinguished by its lower position and the presence in it of microliths, pottery and other artefacts of Epi-Paleolithic to Bronze Age date. It no doubt includes several phases, *e.g.*, Final Würm and Early Holocene, sometimes seen banked against the sectioned earlier terraces, and sometimes cut by the modern Zarqa, as at multi-period side 27; 27a is a Kebaran site overlain by 27b, a possibly Neolithic one.<sup>11</sup>

#### Surface sites

There are rich surface sites, not associated directly with the geomorphology, in three areas; the eastern part of the Dauqara glaciais (*e.g.*, site 30), on top of the Jebel Bakia mesa (site 103), and on the volcanic plateau of Khirbet Samra.

Some of these surface sites have produced assemblages of a Late or Final Acheulean, unrolled, with grey patina; post-Paleolithic materials are present at other sites.

#### Conclusions on the geomorphology

In brief, it seems apparent that, perhaps because of the narrowness of the valley and the amount of energy coming from tributary streams (the northern tributaries come from a high rainfall zone;),<sup>12</sup> the Formations do not form a "staircase" suite of regular terraces, in contrast to what one sees in the Orontes or Euphrates valleys and their tributaries in Syria.<sup>13</sup> Here, in the Zarqa and Dhulail valleys, it is often difficult to distinguish the Qf1 and Qf2-1 from the Qfo, and the higher terraces can have various altitudes; it has a pronounced transversal slope, and if the alluvial and colluvial deposits are mainly of the Bire Formation, both more ancient (Dauqara) and more recent (Khirbet Sam-

<sup>11</sup> For fuller illustrations of this material see Besançon and Hours, in press, the artefacts have been given to A. Garrard and his team for analysis.

<sup>12</sup> National Water Master Plan vol. 2 (Atlas), 1977.

<sup>13</sup> Besançon (1981); Besançon and Sanlaville (1981).

ra) deposits can also occur. Distinction between the different Formations is especially difficult upstream from Hashimiya, *i.e.*, on the Dhulail. On the Zarqa on the other hand, where the forces of incision were more energetic, it is much easier to distinguish each formation.

### Analysis of the Archaeological Material

In the two seasons of 1982 and 1983 a total of 4,500 flint artefacts were recovered in the Zarqa/Samra sector. The industries present included Lower and Middle Paleolithic, Epi-Paleolithic, post-Paleolithic, but no Upper Paleolithic. None of the assemblages were found archaeologically *in situ* (*i.e.*, in intact living-floors) but several were in geomorphological stratigraphy. Each assemblage, whatever its context, was classified; the collection has been divided between Yarmouk University and the Department of Antiquities in Amman. An inventory of the sites which we considered to contain Lower and Middle Paleolithic materials is presented in Table 1.

### Methods

This consists initially of fieldwork: the careful, *i.e.* unbiased, collection of as many artefacts as possible from each site located by the geomorphologists. The collections are analysed in two stages, firstly a study of each artefact as part of an assemblage at each of these sites, and secondly an evaluation of the assemblages as chronological units or industries, based on the grouping of sites according to geomorphic context. The first stage includes a study of attributes, as expanded upon below.

#### 1. Analysis of the Attributes of the Artefacts

We study two kinds of attributes, one contributing archaeological, the other geomorphological, information: the first reflects selection and choice on the part of Paleolithic man and the degree of skill he attained in fashioning a mentally-conceived shape of stone tool or weapon;

the second kind refers to the fate of the artefacts after they left the user's hands. By analysing and quantifying both sets of data, and comparing the results with those from known or dated assemblages elsewhere, an idea can be gained as to the stage of development of the knappers and the chronological age of the assemblages. We will examine eighteen attributes (out of a larger number which could be studied): raw material, blank type, flake type, core type, flake-butts, present condition, degree of patination, geomorphic context, and dimensions — length, width and thickness; for the bifaces, additional attributes are dealt with in a special section: tip type, base type, form of cutting edges, face retouch, present dimensions — length, width, thickness, and formal classification into the outline categories of F. Bordes.<sup>14</sup> The variables are defined, and their utility to prehistorians discussed, as we proceed:

#### 1. Raw Material

This is the kind of rock available to, and utilised by, the makers of the artefacts. Flint and chert (abundantly available in the area) were used exclusively (no basalt artefacts were noted). The original colour of most flint or chert artefacts — seen on fresh break-surfaces — is pale, sometimes opaque, beige or greyish pink; near the cortex this can be darker grey or wine coloured. Both good and poor grades of flint and chert were used for artefact making; as many as 38% of the bifaces are made of a dense, rough chert or a mottled and banded chert resembling limestone (Table 13a).

#### 2. Blank

This is the natural form of the rock as utilised by the knappers to make their implements. Originating in seams in the Cretaceous limestone bedrock, the raw material in our sector was available in primary context (as irregularly-shaped *nodules* or as flat-surfaced slabs of *tabular* flint or chert) direct from the bedrock, or in secondary context (the same materials rounded into river *pebbles*, found in the

<sup>14</sup> F. Bordes, *Typologie du Paléolithique Ancien et Moyen*, Bordeaux, 1961, p. 31.

stream beds or river terraces). Although rarely in our sector, *flakes* or *older artefacts* were sometimes reworked or made into new tools.

The blank form is distinguishable only when sufficient cortex has been left on the artefact; it is unrecognisable on, for example, completely-worked bifaces (Table 13b).

### 3. Condition

One of the most important attributes we study, this refers to the present state of the artefacts and indicates what has happened to them since they were dropped by their makers. It is also important to note the condition of the accompanying non-artefacts, since similar rolled condition can give a broad, relative chronological "fix" to an assemblage within a river terrace.<sup>15</sup> "Rolling" is caused by the transport of an artefact by the river whereby not only are its facet margins worn down so that new cortex forms on them, but also the peripheral edges (its most fragile areas) are battered and broken off.

It is normal to have varying degrees of rolling in an *in situ* assemblage whatever the age of the Formation, since it is by chance (*e.g.*, seasonal changes of course by the stream, etc.) that the final condition is determined; some artefacts can be rolled more than once, others hardly at all, and others differently on each face.

It was possible to study the degrees of rolling in more detail on the bifaces (Table 14a) than on the other pieces, so that for the former we have the following condition categories:

*Heavily rolled* the facets are almost obliterated and the piece is barely recognisable as an artefact (as in Fig. 5, 1); *Very rolled*: new cortex has formed on facet margins and the edges are blunted (as in Fig. 7, 1); *Rolled*: facet margins are damaged and edges are battered but all details of the working are visible. *Weathered*: the arte-

facts are largely undamaged but facet margins and edges are smooth to the touch, *i.e.*, slight dissolution or desilicification of the flint through chemical action has occurred. Such pieces are usually found buried in soils covering terraces remnants or encased in the crusts which sometimes form on top of terraces (in this case lumps of calcareous concretions adhere to the surfaces); due to recent ploughing, such pieces also occur on the surface, where they may have "podolithic retouch", plough-marks or thermal fractures. *Fresh*: this means undamaged but not, of course, mint fresh (when the edges will cut the fingers). Such pieces are found embedded in deposits or on recently exposed surfaces. We usually assume that the weathered and fresh artefacts have not been rolled and, if found on a terrace surface, must date to a time later than the build-up of that terrace.

### 4. Patina

The *patina* is often a disappointing attribute to work with; the mechanisms which produce colour changes in flint through time are little understood and the variables (such as the composition and original colour of the flint) are numerous. Nevertheless, the reworking of a broken tip, as shown by differently patinated facets, can inform on man's actions, and differing patinas on each face can indicate the position of an artefact in relation to its context. Patina colours also suggest which pieces "belong together" in a surface assemblage. Sometimes it is necessary to chip a piece slightly in order to determine the patina colour, or succession of colours.

In general, in our sector, the oldest patinas are brown and yellow-brown (47.18%), the grey being slightly younger (46.05%), though older than pale grey or wine (6.74%). The sequence of patination seems to be that flint becomes cloudy or dotted with whitish grey, eventually be-

<sup>15</sup> It is considered that (leaving aside the unlikely possibility of lakeside or seashore rolling, the only natural agency which could have caused the rolled condition of the artefacts was a stream flowing in a stony bed (presumably during a glacial or pluvial). Today, this stream having long since abandoned

that level during the next phase of incision, it left traces of its bed, fossilised as the raised terrace. The rolling cannot have taken place later than the accumulation of the terrace, but artefacts in it could be older, having been derived from earlier formation.



coming uniformly grey or white; this gradually darkens to yellow brown and finally to a deep brown. No black flint or black patinas were seen.

## 5. Geomorphic Context

It is fundamental to our method to establish the relationship of the artefacts of an assemblage (whether *in situ* or on the surface) with the context of the findspot. Clearly, the most valuable context is *geologically in situ*, that is to say the artefacts were picked out of a terrace section, the spot to which the river had transported them. If rolled, they cannot be younger than the terrace, but could of course, be older, as explained in Note.<sup>15</sup> Even if unrolled, but embedded (accompanied by equally unrolled flint fragments) in a conglomerate, artefacts could also be contemporary with the deposit which contained them.

As to surface material, it is also sometimes possible to assign a relative date to a site, taking certain topographical factors into account. An example is site 30, where localities "a" and "b" were on truncated surfaces of the Dauqara Formation and locality "c" was on the surface of the Bire Formation; since the material on all three is so similar typologically and similarly unrolled, we are able to give virtually all of it a post-Bire date. It is also to be noted that not all terrace surfaces contain artefacts; these occur in concentrations, especially in strategic spots such as at confluences of streams on bluffs with a commanding view, as at site 30 and the *Site Eponyme* of the Dominicans, which we call site 135.

As stressed above, the context of our assemblages, even some of those on the surface, is the basis on which we group them according to age.

## 2. Grouping of Sites by Geomorphic Context

Having analysed each artefact of each site, a task done at the end of the field season, assemblages are sorted into "age-groups" based on the relative geomorphic position of the findspot. The *in situ* sites of the Dauqara Formation form one group, those of the Bire Formation another, and

those of the Bire-Samra and Khirbet Samra Formations a third (Tables 2, 4 and 6 respectively). Given that, although transported, the artefacts occur in definite localities within a terrace rather than at random, and that the samples for each site are small, we feel justified in lumping (for purposes of discussion) materials in similar context.

Each of the surface sites is dealt with separately, on its merits, as alluded to above; some collections had to be abandoned as useless, those retained for this study being listed in Table 1. We retain site 135 because of its typological value even though we do not know the context of the findspots (those marked on the bifaces are: Khirbet Samra; Site Est; Site Centre: Site Ouest; Sp. 3; Sp. III 13 Nord; p. 7; p. 2; 2.81.10; and Sp. III 01) except for "Gare", which is at Khirbet Samra railway station. The few artefacts from this spot have been included in our site 5b.

## The Artefacts of the Dauqara Formation

In sections cut into the Dauqara Formation downstream from el-Hashimiya, we recovered forty-two artefacts *in situ* from eight distinct localities: sites 19, 21, 22a, 22b, 31b, 110, 119a, and 124. This is a somewhat meagre sample, but it does serve to certify the Pleistocene (rather than Pliocene) age of the formation. The details of the assemblages are shown in Tables 2 and 3 and the dimensions of the measurable flakes are plotted in Fig. 3.

There are six cores; three are polyhedral, two are for the production of flat flakes and the last, with orthogonal platform, for flakes or blades. There are no blades, and five of the flakes are transverse, the rest being mainly squarish cortex flakes (57%) with large, plain butt (45%); all but one are more than a centimetre thick. The only tool is a bifacial lateral chopper which has a sinuous cutting edge formed by two removals on each side meeting at an angle of 77° (this is fairly evolved for a chopper).

The patina of 80% of the artefacts is yellow-brown or brown; two of the others



are only slightly patinated, the rest are patinated as shown in Fig. 9. As to their condition, 72.2% pieces are rolled to some extent, 34.3% slightly rolled, 22.5% moderately rolled, 15% heavily rolled.

The relative position of the Qf3 (Dauqara Formation) as against that of the other formations in the Zarqa and Dhulail valleys places it in parallel with other terrace systems, e.g., in Syria; the Latamne Formation on the Orontes (Besançon *et. al.*, 1978 a and b), the Berzine Formation on the Syrian Nahr el-Kebir, where the artefact assemblages are more abundant and more characteristic and, so far as Berzine is concerned, the geomorphic position is clearer.<sup>16</sup> On the Euphrates, the Chnine Formation is also comparable geomorphically; it contained only flakes.<sup>17</sup> All these formations are regarded as Middle Pleistocene,<sup>18</sup> and we have placed the Dauqara deposits in the same period. Our forty-two artefacts would not contradict this attribution, given the absence of Levallois debitage, the absence of faceted butts, and the number of yellow and brown patinas. As at Chnine, there were no bifaces, and this trait seems to be characteristic of inland Levant areas, even though the smallness of the samples reduces the validity of this observation. Nevertheless, we are able to compare them with samples from younger formations in the area.

### The Artefacts of the Bire Formation

Younger than the Dauqara Formation, and partly embedded in its terrace, the Bire Formation is particularly distinct downstream from el-Hashimiya on the Dhulail and along the Zarqa below the confluence. We have recovered 114 artefacts *in situ* (including eight bifaces) in nine sites: 22a2, 24, 29a, 106, 116, 118, 119b, 130a and 134; this indicates a somewhat increased intensity of occupation compared to that in Dauqara times, as is usual

in sites younger than the early Middle Pleistocene. The composition of the assemblages and the technical details are analysed in Tables 4 and 5 and Fig. 4, while some of the artefacts are illustrated on Figs. 5 to 8.

There are sixteen cores; four have traces of orthogonal preparation (Fig. 6, 1), eight gave rise to flat debitage (which we can see as a technical improvement, especially since one has two opposed platforms: Fig. 5, 2); one is amorphous and there are two exhausted discs. If this latter form represents an ultimate stage in the reduction of radially prepared cores, it would mark the earliest manifestation of such technology in this region, since there are no other Levallois pieces in Bire assemblages.

The flakes do not differ greatly in shape or technique of production from those of the Dauqara assemblages, except that fewer (47%) are cortex flakes, while slightly more have cortex butts (27% as against 20%). As Table 5 shows, most (32%) have plain butts (usually with wide angle between butt and ventral surface) with almost as many (27%) having cortex butts. This probably indicates a slight advance in core-preparation techniques though there are no Levallois flakes. Transverse flakes are relatively numerous, as in the Dauqara assemblages. There are also six pieces which could be regarded as blades (Fig. 4, left). The thicknesses (Fig. 4, right) seem to cluster more closely than those seen on Fig. 3, right, but this may be due to the small samples involved. Two typical part-cortex preparation flakes are shown on Fig. 6, 2 and 3.

The tools consist of eight bifaces (two ovate, six amygdaloid) which will be described in details below, as well as two choppers and two racloirs. Both of the choppers are bifacial distal types, made on river pebbles. The racloirs are made on heavy cortex flakes.

The patinas are almost equally divided

<sup>16</sup> P. Sanlaville, ed., *Quaternaire et Préhistoire du Nahr el-Kebir Septentrional*, Paris, 1979.

<sup>17</sup> J. Besançon and P. Sanlaville, Aperçu géomorphologique sur la vallée de l'Euphrate Syrien,

*Paléorient*, 7:2 (1981) p. 5-18.

<sup>18</sup> J. Besançon, L. Copeland, F. Hours, S. Muhesen and P. Sanlaville, Le Paléolithique d'el-Kowm: rapport préliminaire, *Paléorient*, 7:1 (1981) p. 39-45.

into yellow-brown or brown (47.18%) and white-grey-beige (46.05%), with a slight element of wine-grey (6.74%).

The reduced number of brown patinas, compared to that for the Dauqara assemblages, is what would be expected in a younger formation, where lighter patinas are more common (Fig. 9). The condition of the artefacts differs a little from that of Dauqara assemblages: all are rolled, 15.7% slightly, 58.4% moderately and 25.8% heavily.

The relative position of the Bire Formation in the Zarqa-Dhulail basin is that of the second oldest fluvial formation before the Holocene, marked as Qf2 on the map. It would therefore correspond to the Jraibiyate Formation (the second oldest before the Holocene on the Orontes), the Abu Jama's Formation on the Euphrates and the Jinderiyeh Formation on the Nahr el-Kebir.<sup>19</sup> All these Qf2 deposits contain Acheulean assemblages characterised by somewhat fewer brown patinas than in the oldest formations, by a very small Levallois element, by the presence of numerous evolved bifaces and by a relatively increased element of tools (on cores or on flakes) than were evident in the preceding formations. For us, this is the Late Acheulean of the Levant, but in the literature, terms such as Middle Acheulean or Middle-Late Acheulean have sometimes been employed<sup>20</sup> and it must be noted that the battered and rolled condition of the bifaces conceals the degree of technical skill attained by their makers. Yet, the absence of Levallois debitage can be regarded as significant on a total of eighty-seven flakes. Taking all this into account, as well as the stratigraphic position of the Bire deposits, an age at the end of the Middle Pleistocene seems fairly certain.

#### **The Artefacts of the Bire-Samra and Khirbet Samra Formations**

As mentioned earlier, upstream from the narrow passage through the basalt at

el-Hashimiya, the relief is flatter and the formations are less visible; the Dauqara does not seem to be present and the Bire is not clearly distinct. In certain places the latter seems to have been planed off, together with deposits of a younger formation which is quite prominent in the area of Khirbet-Samra. This has led the geomorphologists to distinguish two ensembles: the Khirbet Samra Formation (Qf1) proper, at sites 5b, 13, 26b, 107, 109, 115a, 115b, 129a and 132, and the combined Bire-Samra (Qf2-1) material, at sites 7a, 9a, 10, 11 and 12. In the first-named we collected 158 artefacts (including eleven bifaces) at nine distinct sites and in the second, 66 artefacts (one biface) at five sites. Table 6 and 7 give an inventory of the artefacts by type and by site and Table 8 shows the butt and flake types. Artefacts from the Khirbet Samra Formation are shown in Figs. 10 and 11.

Since the samples at each site are small, the prehistorians can do no more than give cautious answers to the geomorphological problems raised. One such problem is that the two formations Qf2-1 and Qf1, while relatively substantial above el-Hashimiya are not in evidence downstream, where the Holocene (Sukhne Formation, Qfo) lies immediately at the foot of the Bire Formation; in contrast, the Dauqara and Bire deposits are not clearly present upstream of the same point (the el-Hashimiya passage). However, archaeologically speaking, the difference between the two areas is of some importance: downstream is a Late Acheulean, evolved even though without Levallois debitage, while upstream in the Bire-Samra and Khirbet Samra Formations the Levallois is relatively important and the assemblages contain material reminiscent of the Middle Palaeolithic. A possible explanation could be that regressive erosion occurred, connected to the rifting of the Jordan Valley, at the end of the Upper Pleistocene; this evacuated the Wurmian deposits in the valley up to as far as

<sup>19</sup> Besançon and Sanlaville, *op. cit.*

<sup>20</sup> F. Hours, *Le Paléolithique inférieur de la Syrie et*

*du Liban, Le point en question en 1980*, in J. Cauvin and P. Sanlaville (eds.), *Préhistoire du Levant*, Paris, 1981, p. 165-184.

el-Hashimiya, but the erosion did not reach the area upstream.

However this may be, we also have to ask if two different ensembles are really present in the upstream area, and in this case the archaeology can give some indications. We may note the presence, in both formations (Qf2-1 and Qf1) the same types of evolved bifaces and Levallois debitage; we see that the Levallois is the same style (the flakes are mainly thick and the cores very well made (Fig. 11, 3), some being bipolar "Nubian" point cores, and that the Levallois Index in each is very similar (26.3 in the Bire-Samra and 21.6 in the Khirbet Samra). The proportion of the patinas is also much the same: in comparison with the patinas in Bire assemblages one can see a decrease in numbers of older patinas, many pieces being virtually unpatinated, and many being wine or grey patinated (Fig. 9). The condition proportions are also similar: unrolled "fresh" pieces number 25.4% in Qf1 and 23.6% in Qf2-1 assemblages; by far the most numerous condition is "weathered" or "slightly rolled" (59.5% in Qf2-1 and 52.5% in Qf1 assemblages). Rolled pieces are slightly more numerous in the Qf2-1 (22%) while in the Qf1 they number 16.79%.

While maintaining separate inventories in Table 6a and Table 6b we conclude that, as regards the artefacts, either one industry or the same mix of industries is involved. To choose between these possibilities we would have to ask: what do the assemblages represent, and what is the date of the formations in which they occur? We can reply very easily to the last question; the stratigraphic position of the deposits, immediately above the Holocene terrace and anterior to it, places them in the Last Glacial/Pluvial.

Having been dated to Qf1, *i.e.*, as the youngest Pleistocene formation in the Zarqa-Dhulail basin and last before the Holocene, the Khirbet Samra Formation can take its place within the chronostraphic sequence of the Middle East. Some of the same traits occur in equivalent Qf1 formations in Syria: Ech-Chir (Nahr el-Kebir), Saroute (Orontes) and Abu Chahri (Euphrates), held to be of Last Glacial date.<sup>21</sup> Indeed, fluvial formations in the Levant interior often contain assemblages analogous to those of the Khirbet Samra Formation in Jordan, while *in situ* industries dating from the same Last Glacial are exclusively flake facies of Levallois debitage, without bifaces; examples are the coastal caves, the Judean caves or the Palmyrene caves. Moreover, the rare Acheulean assemblages which have Levallois debitage,<sup>22</sup> evince use of techniques far less advanced. It would appear, therefore, that what we have at these fourteen sites of the Bire-Samra and Khirbet-Samra Formations are the remains of Acheulean surface sites occupied between the Qf2 and Qf1, mixed in with a Middle Paleolithic (still not very evolved) which could date either from the interpluvial or from the Würm itself.

### The Artefacts of the Surface Sites

Both Lower and Middle Paleolithic material (1,100 artefacts) was recovered from surface sites 3, 4, 5a, 7b, 14, 25b, 30a, 30b, 128, 129b, 130b and 130c, the artefacts of which are inventoried on Table 9. The value of these assemblages is variable in two respects: first, the number of artefacts in the sample and second the number of tools (Table 11). The latter amount to 190 (excluding Levallois pieces) of which 115 are bifaces. The most interest-

<sup>21</sup> Besançon, *Chronologie*, *op. cit.*

<sup>22</sup> Although many instances of bifaces with Levallois flakes are known in the Middle East, these are usually on the surface (Joubata; Goren, 1979) or derived (Kissufim; Ronen *et al.*, 1982) or on river terraces such as at Abu Shahri and Halouandji (Besançon *et al.*, 1982). In stratigraphy, only rare cases of Acheulean with Levallois debitage have been reported: Birket Ram (Goren, 1982), Wadi Qdeir C at El-Kowm (Besançon *et al.*, 1981) and Yabrud I. levels 12, 17 and 23 (Bordes, 1955).

Most stratified Late Acheulean assemblages are of non-Levallois debitage. Examples are Nadawiyeh I (Hours *et al.*, 1983), Lion Spring level 5d at Azraq (Kirkbride and Copeland, in preparation) and from within Qf2 river terraces, such as at Abu Jema'a or Hammam Kebir on the Euphrates (Besançon *et al.*, 1980). One could say that Würmian (Qf1) terraces without a rolled, older, handaxe element are rare, except perhaps in the Negev (Rosh Ain Mor, for example; Marks and Crew, 1972).

ing sites are 4, 30a, 30b, 30c, and site 135 (the *Site Eponyme*), clearly mainly Acheulean, and 3, 5a, 7b, which are mainly Middle Paleolithic. Table 10 shows the types of butts at each site excluding flakes of site 135; some of the artefacts are illustrated in Figs. 13-22, and the dimensions of the flakes at sites 3 and 4 are compared on Figs. 15 and 16.

It is considered that the surface assemblages represent (as do those of Qf1) mixtures. In theory, certain of them could be quite old, for example the assemblage of site 135, mainly collected from the lava bluff B1 which is 4 or more million years old. In fact, the typology and technology of the bifaces (see below), as well as the proportions of Levallois debitage, is uniform in all these stations and is equivalent to that found in the last fluviatile formations. The IL of the total artefacts on Table 9 is 17.51. In contrast, the proportions of bifaces is higher than in the assemblages found in the fluviatile formations: 10.18% on surface sites, as against 6.96% in the Samra Formation sites. If the collections are representative, and if the hypothesis as to the mixture of industries is correct, it could mean that the surface sites were not often occupied in the Middle Paleolithic, but were formed mainly during the Last Interglacial.

The later terraces, such as the Sukhne Formation (containing Epi-Paleolithic or even pottery) are clearly Holocene and do not concern us here.

Having studied the artefacts and their position in the Zarqa-Dhulail basin, we are able to make some general observations: 1) The succession of industries in Jordan follows the same course as that which occurs along the inland rivers (Orontes; Litani; Euphrates), testifying to a relatively abundant population of Late Acheuleans, probably lasting into the Last Interglacial. 2) There is a certain "cultural lag" between the apparent evolutionary stage of the industries and the age of the formations, at least as regards the assemblages contained in (respectively) the Qf1 and Qf2 Formations. The artefacts are more archaic than those in other areas which are attributable to the same periods but found

archaeologically *in situ*. In the Qf1 of the Last Pluvial in our sector we have bifaces and Levallois debitage, but none of the levels of the cave Levallois-Mousterian contain contemporary bifaces. Again, the handaxes of the Bire Formation (Qf2, Penultimate Pluvial) are less evolved than those of the late Acheulean found in caves in the same chronological position (Qatafa; Tabun). The data from the Dhulail-Zarqa valley provide, we think, clear indications that the assemblages contained in the formations are partly older than the formations themselves, which is logical. Hence, it is necessary to maintain the distinction (already observed on the Orontes) between an Acheulean which, although "Late" according to geomorphic position, is not highly evolved from a typological point of view, and another Acheulean which we call "Late Evolved", like that of Gharmachi Ib in Syria.

Many of the data upon which we base these conclusions are contributed by the bifaces (handaxes) of our sector; a detailed study of these follows.

### Attribute Analysis of the Bifaces

In our experience, patterns emerge from attribute analysis of bifaces when a large sample can be examined. For that reason the following account deals only with bifaces, cleavers and picks found in 1982-3, a total of 152 pieces (Table 12). Besides giving further details as to context, raw material, condition blank and patina, an additional set of attributes is studied: formal classification, tip, base and edge types, dimensions and type of face-retouch.

### Context

Effectively, this means the context of the sites where bifaces were found, in relation to Quaternary deposits, and this has already been discussed above. The bifaces are accordingly divided into three groups: In Group 1, the eight bifaces of the Bire Formation; in Group 2, the eight bifaces of the Khirbet Samra Formation (including one from the Bire-Samra group of sites); Group 3 consists of the surface

material, which can be subdivided into: fifty pieces from site 30a, b, c, and site 130b (which we believe to be fairly pure); thirty-seven bifaces from the Dominican's collection, exact context unknown (our site 135); and fifty bifaces from all other sites mentioned on Table 12.

#### Raw Material

As Table 13a shows, on a sample of 127 specimens, an opaque, good-quality flint in pale beige tones was the most popular raw material; together with a few grey-blue or grey-wine tones; this forms 61.4% of the total. Another 38.5% of the bifaces were made of an often very rough, dense grey chert which graded into a material resembling limestone. Nevertheless, twelve of the bifaces were made from it, predominantly at site 30; some were very well made.

#### Blank

A third of the bifaces (34.5%) have had all the cortex removed, making it impossible to determine the kind of blank selected for biface-making. Moreover, many other specimens have only small patches of cortex remaining, so that the division (in Table 13b) into those made on a slab or on an irregular nodule is somewhat subjective; however, twenty-one bifaces were clearly made on rounded river pebbles, some having globular cortex bases. Even the slab or nodule blanks could have been picked up in the form of pebbles, rather than taken directly from bedrock seams, as most show old natural-fracture planes, with traces of battering. Flakes were only rarely used.

#### Condition

As Table 14a shows, all eight of the Group 1 bifaces picked out of the El-Bire Formation (Qf2) are rolled, indicating that they have been transported by the river of Middle Pleistocene date. One would have expected the pieces of Group 2 (Qf1) to be more heavily rolled than they are, if they

really of Qf2 age and have been transported twice.

The presence of five rolled, among the predominantly unrolled, bifaces at surface sites 30a and 130b needs explaining; since they are large and rough, it is conceivable that the two from 30a (Fig. 14) are older than their merely "weathered" companions; they could be contemporary with the Dauqara Formation on the surface of which they were found. (There are artefacts [flakes] in the *in situ* sections of the Dauqara Formation, but not at site 30a). As Table 14a shows, the other site 30 pieces are predominantly weathered or even fresh so that they cannot have been rolled in the river of Dauqara times. Many specimens at 30c are encrusted with calcareous concretions and seem to derive from the crust covering part of the terrace. The other rolled bifaces at surface sites are assumed to have been eroded from their original terraces. When the physical condition of a biface is ambiguous, as on some surface sites, it is not included in the sample, which amounts in Table 14a to 133.

#### Patina

As mentioned earlier, it is normal to have a variety of patinas in *in situ* assemblages, given the number of variables involved, e.g., the composition of the flint, but there is usually a dominating tone, as shown in Fig. 9.

The biface patinas are shown in Table 14b; all are patinated to some extent and a number of surface pieces had two stages of patination. Three of the Bire (Group 1) bifaces are unique in having a deep chestnut patina, similar to that seen in Syrian Middle and Late Acheulean fluvial contexts, such as at Latamne or Jraibiyate<sup>23</sup> and at Azraq (Lion Spring level 5d)<sup>24</sup> In contrast the Qf1 bifaces have patinas similar to those seen in surface sites, where a large majority of pieces are patinated to grey/beige (this most often corresponds to 10YR 6/2 [light brownish grey] on the

<sup>23</sup> J. Besançon, L. Copeland, F. Hours and P. Sanlaville, The Paleolithic sequence in Quaternary Formations of the Orontes River Valley, Northern Syria, *Bulletin of the Institute of*

*Archaeology*, 15 (1978) p. 149-170.

<sup>24</sup> D. Kirkbride and L. Copeland, Results of a sounding at Lion Spring, Azraq (Jordan) in 1956, (in preparation).

Munsell soil colour chart). As to the whitish patinas, it is thought that these originate on certain flint types upon exposure at the surface, and they occur in small numbers in all the groups on Table 14b.

#### Formal Classification

We use the outline categories (and system of determining these) of Bordes, with slight alterations to suit the material of the Zarqa-Samra sector, as in Table 12. This exercise is done partly to render an assemblage comparable to others classified the same way, and partly because — although the forms were deliberately sought and follow detectable patterns, — we do not yet know why Man chose certain shapes in which to form his artefacts.

Two new categories have been added, both of which have already been noted from Central Levant sites such as Tabun and Azraq;<sup>25</sup> one is “D-shaped biface”; examples of these look at first glance like the basal parts of bifaces with tip broken off; but they recur often enough to justify regarding them as a type, the “base” being the rounded tip, the “break” being the base (Fig. 18, 3; Fig. 22, 1). The other category is “bifacial cleaver”; these have either a straight distal edge (sometimes oblique to the axis as in Fig. 18, 2 or a slightly convex transverse edge as in Fig. 21, 1). They are made on nodules rather than on flakes as are African cleavers. An *hacherau biface* according to Bordes, this type corresponds to *biface à bout carré* of other French authors.

Partially flaked pieces are counted according to their outline shape rather than in a separate category of Partial (Fig. 12, 1). Backed bifaces have one lateral cutting edge opposed to hand-hold on the other side. The categories are grouped into three classes, one consisting of discoids and ovates (widest at the centre), the other of amygdaloids and lanceolates (widest at the base), with all the other categories, which usually have small totals, forming a third class. A number of “pointed ovates” occur; this form has been noted in Middle East

assemblages, and is not common in Europe, where it is often considered as an amygdaloid even though widest at the centre.

When amalgamated, the Zarqa/Samra sector bifaces show a predominance (40%) of ovate shapes (the first seven categories of Table 12). This is largely due to the inclusion of the D-shaped pieces and the bifacial cleavers, which are most often oval. The thirty-six amygdaloid and lanceolate shapes (categories 8-14) are also important. Cordiform bifaces are relatively rare in the assemblages (Fig. 12, 3); the sub-cordiform category includes specimens made on naturally-thin raw material, *i.e.*, with cortex on both faces, as well as partially decorticated pieces. The Short Amygdaloids (Fig. 20, 1) are those where the L is less than 1.5 of the W and includes some almost minute specimens (Fig. 22, 2). Bifacial cleavers are also relatively rare, but occur more frequently here than they usually do at Syrian Acheulean sites.

Although the sample is small, the Group 1 bifaces show a 5-to-2 preference for amygdaloid shapes, but these often verge on the ovate form (Figs. 5-8).

Only one piece with a trihedral section was found, slightly rolled on the surface of the Site Eponyme. There is bifacial re-touch on each of the three faces at the tip. Four picks (Fig. 22, 4) show no consistent pattern, and are unlike the picks known from certain Euphrates sites such as Maadan and Hamadine.<sup>26</sup>

#### Tip

Although tip shapes are partly subsumed by the formal classification (cleavers are straight-tipped, lanceolates are pointed, *e.g.*), a closer look reveals that some tip shapes cross-cut the usual outline categories (pointed ovates, and acuminate, *e.g.*). In short, we assume that the various shapes were designed to perform different tasks, about which we can only speculate; their relationship with outline categories remains just as unclear.

Unfortunately, as can be seen on

<sup>25</sup> G. Rollefson, The Late Acheulean site at Fjaje, wadi el-Bustan, Southern Jordan, *Paléorient*, 7:1

(1981) p. 9.  
<sup>26</sup> Hours, *op. cit.*

Table 15a, 24% of the bifaces have no tips; occasionally the break is fresh, but usually signs of reworking of broken tips can be seen, (*e.g.*, on Fig. 17, 2); the reworking most often results in a straight edge.

Of the 104 bifaces with tips, pointed tips (27.8%) slightly outnumber those with rounded (25.9%) or ogival (13.4%) tips. The straight or broad convex tips are seen on the bifacial cleavers (Fig. 22, 1), the narrow acuminate ones on amygdaloids, cordiforms and lanceolates (Fig. 21, 3). Undamaged tips are thin and relatively sharp.

the tranchet method of forming the tip was seen on only two pieces (Fig. 21, 1); one had this feature (where the tip is made by a transverse blow) on each face at the tip.

### Base

Like the tip, base shape was evidently chosen by *man*, but for what reasons we cannot yet say; if the base was worked to an edge the artefact would seem to be a more useful tool than one with pebble cortex base, although the latter may represent a hand-hold.

When present (Table 15b) the basal edging is well *done* and typically Late Acheulean (Fig. 22, 5), although only two “perfect semi-circle bases” were seen.

Many bifaces (for example the D-shaped pieces) resemble cores at the base, with either zig-zag edge formed by alternate removals, or perpendicular, core-platform-like form (“stand-up bases”). Sites 30a, b, c and 130b, where such types predominate, may be factories since some pieces were roughouts, though other specimens, which had been repaired at these places, suggest the sites were also used as habitation areas. Group 1 (Qf3) bifaces are the most evolved, 4 having what appear to be basal edges, and 3 others having a worked base.

The S-twist feature is rare, but present at most sites with good samples. In spite of the apparently rough impression (due to coarse raw material) given by the 30a

bifaces, their edges show just as many “evolved” traits as are seen at the other sites. Meplats are quite common.

Surprisingly for a Late Acheulean group of bifaces, of 117 recognisable bases, 52.9% are without an edge at the base (Fig. 19, 1 and 2), and thus slightly outnumber those with the cutting-edge continuing all around the base (44 pieces; 47%). However, eleven other pieces (Fig. 21, 1) have part of the base edged, and the two categories together form 39.8% of the bases — quite a respectable index of refinement when compared to older (Middle Acheulean) bifaces, where the number of edged bases does not rise above about 20% (*e.g.*, at Joubb Jannine)<sup>27</sup>

### Cutting-edges

The lateral edges of bifaces also represent deliberate action by *man*. We can only assume that edges which are made straight in profile are more efficient for cutting and slicing (and possibly for hafting) than are those with sinuous cutting edges; we further assume that the makers of the former shape were the more skillful knappers. On Table 16a, the first six categories refer to bifaces with two edges, one each side; one-edged bifaces are those with a “back” or hand-hold opposed to an edge, sometimes called “bifacial knives”; three-edged pieces are trihedrals, where all three edges are worked rather than where two edges are worked and the third one represents converging facet-margins.

Amalgamated, 30% of the bifaces (including those of Qf2 sites) show typically “evolved” edges, 39 pieces having both edges straight in profile (*e.g.*, Fig. 21, 1); together with seventy-eight pieces with at least one straight cutting-edge (one-edged included) this gives an Edge Refinement Index of 60. This figure may be contrasted with that of twenty-nine at the older, Middle Acheulean, site of Joubb Jannine, where 71% of the bifaces had sinuous edges.

<sup>27</sup> J. Besançon L. Copeland and F. Hours, *L'Acheule-*

*l'éen Moyen de Joubb Jannine (Liban), Paléorient*, 8:1 (1982), p. 11-36.



## Face Retouch

Fine, scalar retouch on one face, both faces or parts of one or both faces, of a biface is an indication of advanced knapping skill, and represents a secondary or finishing stage such as, was not carried out in earlier Acheulean phases; it may be contrasted with the more primitive stone-hammer or primary flaking methods of the Early and Middle Acheuleans, who did not "finish" their bifaces. Hence, the greater the amount of fine flaking present, the more evolved the biface is thought to be. In practice, it has been difficult to reduce the variables to just six categories as in Table 16b, and many variations are subsumed in these (deliberately vague) categories. The situation is made more complicated in our sector because of the availability of thin tabular flint slabs; there would often have been no need to remove the cortex of the blank in order to obtain a desired thickness. Thus, the presence of cortex over much of the surface of the piece does not necessarily denote lack of knapping skill.

Amalgamated, the 122 recognisable bifaces show that all but fourteen completely rough pieces have some fine flaking, and that fine or mainly fine pieces, totalling fifty-four pieces, amount to 44.2%. Fewer rough pieces might have been expected. This result may be due to the presence of a number of rough-outs (Fig. 18, 1) and *divers* bifaces, probably denoting factory waste. On the other hand virtually the same proportions occur in the *in situ* Group 1 sites. At each site with a fair sample, both well-made, typical and poorly-made atypical pieces occur together, which is normal in the Lower Paleolithic.

## Dimensions: Length and Width

Length and width distributions of all measurable Zarqa-Samra sector bifaces are shown on Figure 23. In rolled assemblages, such as occur in our sector, bifaces have usually lost their tips, but the length can sometimes be reconstructed, following the curve of the edges. The original size of

rolled bifaces can only be approximated, as they may have lost up to 1 cm. all around their edges.

The length is measured on the axis and symmetry of the upper (tip) half, even when the piece is asymmetric at the base. The width is taken at the widest point at right-angles to the axis. When necessary, further measurements are made to determine if a piece is discoid, ovate, amygdaloid or cordiform, according to the Bordian system.<sup>28</sup> "Minute" bifaces are those less than 7 cm. long.

The L/W values on the measurable Group 1 bifaces on Figure 23 form a compact triangle in the midst of the other L/W values, but of course their edges have been reduced (often by 1-2 cm. all around) by rolling and each was originally larger. Virtually all the other values stay within the L=W and L=2W lines, mainly at the centre; exceptions are some of the D-shaped pieces which are short and wide, and the lanceolate and trihedral pieces which are long and narrow. Large bifaces are rare (only two exceeding 17 cm.) but small pieces are quite common, fourteen not exceeding 8 cm. in length. With some lengths reconstructed, the mean length for the surface bifaces is 10.84 cm., and for the *in situ* Qf2 pieces; 11.4 cm. The longest mean length is that for Site 30a: 13.25 cm.; it is between 10 and 9 cm. in Qf1 sites and this lends some support to the observations of D. Gilead,<sup>29</sup> that the dimensions of bifaces decrease through time.

## Dimensions: Thickness/Width

The thickness is taken at the thickest point perpendicular to the axis.

As Figure 24 shows, the thickness values are massed along the W=2Th line between 5 and 11 cm., the Group I bifaces staying close to the line. The thickness was deliberately formed on about half the pieces (by removing cortex), and the rest, with cortex remaining on each face, are not noticeably thicker, *i.e.*, tabular pieces of a certain thickness range were chosen. Exceptions are two larger pieces with globular cortex butts, rough-outs from Sites 30a

<sup>28</sup> Bordes, *op. cit.*, p. 49-53.

<sup>29</sup> D. Gilead, Handaxe Industries in Israel and the Near East, *World Archaeology*, 2 (1970) p. 1-11.



and b. There seems, therefore, to be a certain thickness/width preference, within certain limits, shown by the Zarqa/Samra knappers, to which different raw materials and blanks, such as thin tabular slabs, were made to conform.

### Summary of the Biface Attribute Analysis and Tentative Chronology

We mentioned above the possibility that two of the largest and most rolled bifaces of Site 30a, found on the surface of the Dauqara Formation, might be as old as the Formation; one (Fig. 14) is a large, thick ovate (16.0 x 11.6 x 8.4 cm.), the other a broken lanceolate made on a thin pebble and either would fit well typologically with Middle Acheulean assemblages in Syria.<sup>30</sup> The presence of a combination of "evolved" traits, such as straight cutting-edges, fine flaking, edged bases, symmetric tips and moderate size confirms the Late Acheulean character of the Zarqa-Samra bifaces, over and above the typology, which suggests the same thing. The Group 1 bifaces (which are securely dated to the period of the Qf2 terrace, around 200,000 years ago) form a typical assemblage of ovates and amygdaloids comparable, although the sample is small, to what can be found in a contemporary terrace on the Orontes (Jraibiyate)<sup>31</sup> and on the Euphrates at Hammam Kebir and Abou Jama'a,<sup>32</sup> as well as to some nearer assemblages (see below).

For the rest, for reasons already discussed above, we are persuaded that the Qf1 (and Qf2-1) bifaces are derived Acheulean, probably of the same date as those at the large surface sites such as 135 and 30a, b and c. The latter, most of which are in 'weathered' condition, present certain anomalies in their attributes; the knappers were capable of producing "good" bifaces but did not always do so.

Some of the roughly based specimens had carefully re-worked tips and so were not rough-outs (Fig. 12, 2). Moreover, some of the attributes (presence of some minute or very small specimens, presence of bifacial cleavers and D-shaped types, disregard for the basal part of the biface etc.) are seen in Final Acheulean (Tabun F) and later Yabrudian (Tabun E, Bezez C) industries,<sup>33</sup> to name only two of many other instances. Provisionally, therefore, most of the surface bifaces of sites 30 and 130b might be assigned to a post-Bire date and called "Final Acheulean". Since it is hard to believe that they were made during the Würm, they are more likely to refer to riverside occupations (well above the flood-plain) at the end of the Riss or start of the Last Interglacial/-pluvial, say about 120,000 years ago; although left intact downstream (e.g., at site 30), the upstream Dauqara and Bire deposits were evidently dismantled during the Würm and scattered over a wide area around Khirbet Samra. This interpretation is based on some striking parallels in context and typology with the site of Gharmashi Ib, where an evolved Late Acheulean also occupied an earlier, Qf3 terrace surface overlooking the River Orontes.<sup>34</sup>

### Concluding Remarks on the Zarqa-Samra Paleolithic

The chronology proposed above on the basis of the bifaces is supported by the character of the rest of the assemblages, described earlier. In sum, in the Zarqa-Samra sector we have traces of the presence of Man in the Middle Pleistocene — very faint in the third oldest Quaternary (Dauqara) Formation but quite distinct as a Late Acheulean in the succeeding (second oldest) Bire Formation, which probably was built up during the Penultimate Glacial/Pluvial.<sup>35</sup>

<sup>30</sup> Besançon, L'Acheuléen, *op. cit.*

<sup>31</sup> Besançon, The Paleolithic *op. cit.*

<sup>32</sup> Besançon, *op. cit.*

<sup>33</sup> L. Copeland, The Paleolithic Stone Industries, in D. Roe (ed.) *Adlun in the Stone Age: The excavations of D. M. A. Garrod in the Lebanon, 1958-1963, British Archaeological Reports, 1983.*

<sup>34</sup> F. Hours, 1980; S. Muhesen, 1981. The industry

was *in situ* in a soil overlying the Latamne Formation (Middle Pleistocene, Qf3) and the industry is clearly delineated due to a large sample of artefacts.

<sup>35</sup> No trace of a fourth oldest Quaternary formation was found, such as does exist in the Orontes Valley (the Khattab Formation; Besançon *et. al.*, 1978).

Since it is found, unrolled, overlying Dauqara and Bire surfaces, a later (?Final) Acheulean (with or without Levallois debitage?) seems to have occupied strategic riverside positions, perhaps during the start of the Last Interglacial. Some time later, traces of a Middle Paleolithic suggest the presence of Neanderthal man in the valley; this could refer to the end of the Last Interglacial or to the start of the Würm.

In passing we have mentioned material which is comparable to that in our sector, often (because more familiar to us) at some distance from the Zarqa-Samra sector. However, the Late Acheulean and succeeding facies are very widely distributed in Jordan itself. The nearest published site is that of Abu Sawan at Jerash, a surface assemblage with ovate and amygdaloid biface types closely comparable to ours.<sup>36</sup> To the north there is a large site at Ma'ayan Barukh, where some 6,000 bifaces were collected<sup>37</sup> and another site at Dera'a<sup>38</sup> while to the east, surface material is reported in the Azraq drainage basin,<sup>39</sup> sometimes in fluvial terraces which are only relatively-dated as yet.<sup>40</sup> We know that cave sites were occupied, for example Umm Qatafa.<sup>41</sup> There are, however, three stratified open air sites of great interest, relevant to our work in the Zarqa-Samra sector.

The first is that of L. Villiers at Abu al-Khas in the Jordan Valley near Pella. Here, test trenches were dug into a cemented conglomerate overlooking the Ghôr, from which large flakes and pebble tools, rolled and white-patinated, were

recovered; on the surface at the same spot some bifaces (described as crude) were found.<sup>42</sup> It is tempting to relate the conglomerate with the Dauqara Formation, but we must await further details.

The second site is Lion Spring at Azraq, where D. Kirkbride made a sounding in 1957, finding *in situ* two phases of a Late Acheulean; we have been able to examine these assemblages, which resembles our Zarqa-Samra Late Acheulean typologically and technologically, in having no Levallois technique, few flake tools, but having several bifacial cleavers and D-shaped and other bifaces.<sup>43</sup>

Finally, at the site of Birket Ram, a lake in a volcanic cone in the Golan Heights, an artefact-bearing horizon was located, embedded between basalt flows; the artefacts occurred in and on basalt pebbles and boulders overlain by a red clay of volcanic tuff origin, and the industry consists of small bifaces, many and varied flake tools and cores, while the debitage is said to be Levallois.<sup>44</sup> We await with interest the dating of the basalts, but meanwhile it would seem that the industry differs from any facies found in our sector, resembling more the Final Acheulean of Levallois facies at El-Kowm in site 23c, W. Qdeir.<sup>45</sup>

From all this it appears that Late Acheulean times in Jordan were just as complex culturally (with industrial variations which are only now coming to light) as they are already known to be in the rest of the Middle East and as we know they were in the Last Interglacial.<sup>46</sup>

<sup>36</sup> D. Kirkbride, Notes on a Survey of Pre-Roman Archaeological sites near Jerash, *Bulletin of the Institute of Archaeology*, 1-3 (1958-62).

<sup>37</sup> A. Ronen, M. Ohel, M. Lamdan and A. Assaf, Acheulean artefacts from two trenches at Ma'ayan Barukh, *IEJ*, 30 (1980) p. 17-33.

<sup>38</sup> H. Field, ed., *North Arabian Desert Archaeological Survey, 1925-1950*, Papers of the Peabody Museum, Harvard, 45:2 (1960).

<sup>39</sup> A. Garrard and N. Stanley Price, A Survey of Prehistoric Sites in the Azraq Basin, Eastern Jordan, *Paléorient*, 3 (1977) p. 109-126.

<sup>40</sup> Besançon and Hours, *op. cit.*

<sup>41</sup> R. Neuville and R. Vaufray, L'Acheuléen supérieur de la grotte d'Oumm Qatafa, *L'Anthropologie*, 41 (1931) p. 263-299.

<sup>42</sup> L. Villiers, First Report on Paleolithic Sampling at Abu el-Khas, Pella, *ADAJ*, XXIV (1980) p. 163-167.

<sup>43</sup> Kirkbride and Copeland, *op. cit.*

<sup>44</sup> N. Goren, The Acheulean site of Brekhat Ram, in A. Ronen, ed., *The Transition from Lower to Middle Paleolithic and the Origin of Modern Man*, *British Archaeological Reports*, 1982, p. 117-119.

<sup>45</sup> Besançon, *Le Paléolithique*, *op. cit.*

<sup>46</sup> Gilead, *op. cit.*: Hours, *op. cit.*

The extraordinary variety of facies, with and without Levallois debitage, with or without bifaces, and presumed to be at least of Last Interglacial date, has been discussed by Copeland and Hours, 1981; see their Fig. 3, p. 234.

Our work in the Zarqa-Dhulail basin is far from complete, and many problems, both archaeological and geomorphological, remain to be solved.<sup>47</sup> We hope that our

data, when put together with that obtained from similar research, will contribute to our knowledge of the prehistory of the Middle East as a whole.

J. Besançon  
L. Copeland  
F. Hours  
J. Macaire  
P. Sanlaville

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<sup>47</sup> We would like to find larger samples for the Bire Formation and the Middle Paleolithic, to have

more dates for the basalts, particularly for B4, and to find the "missing" Qf4, for example.



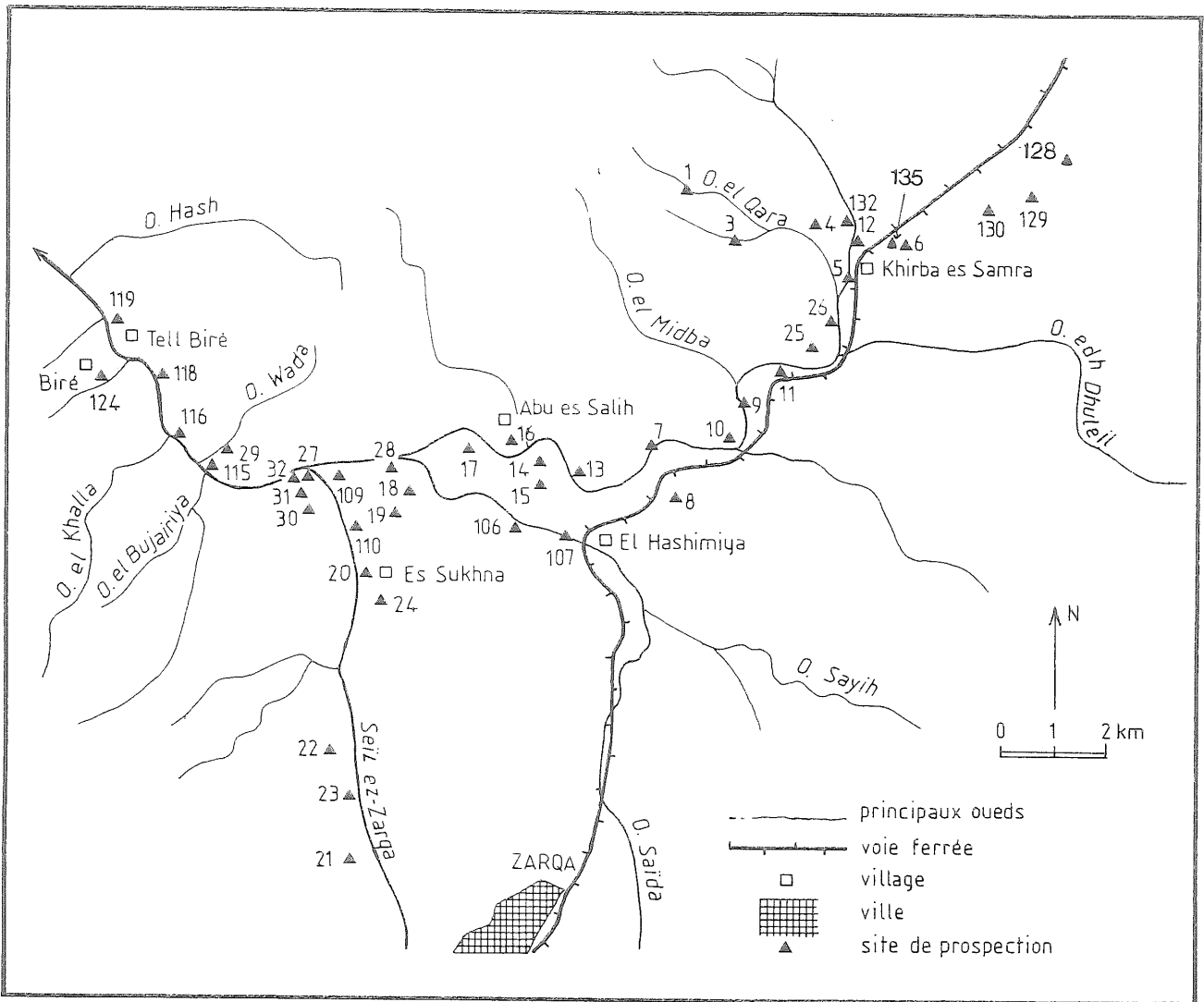


Fig. 2: Location of sites in the Zarqa-Samra sector, 1982-1983.

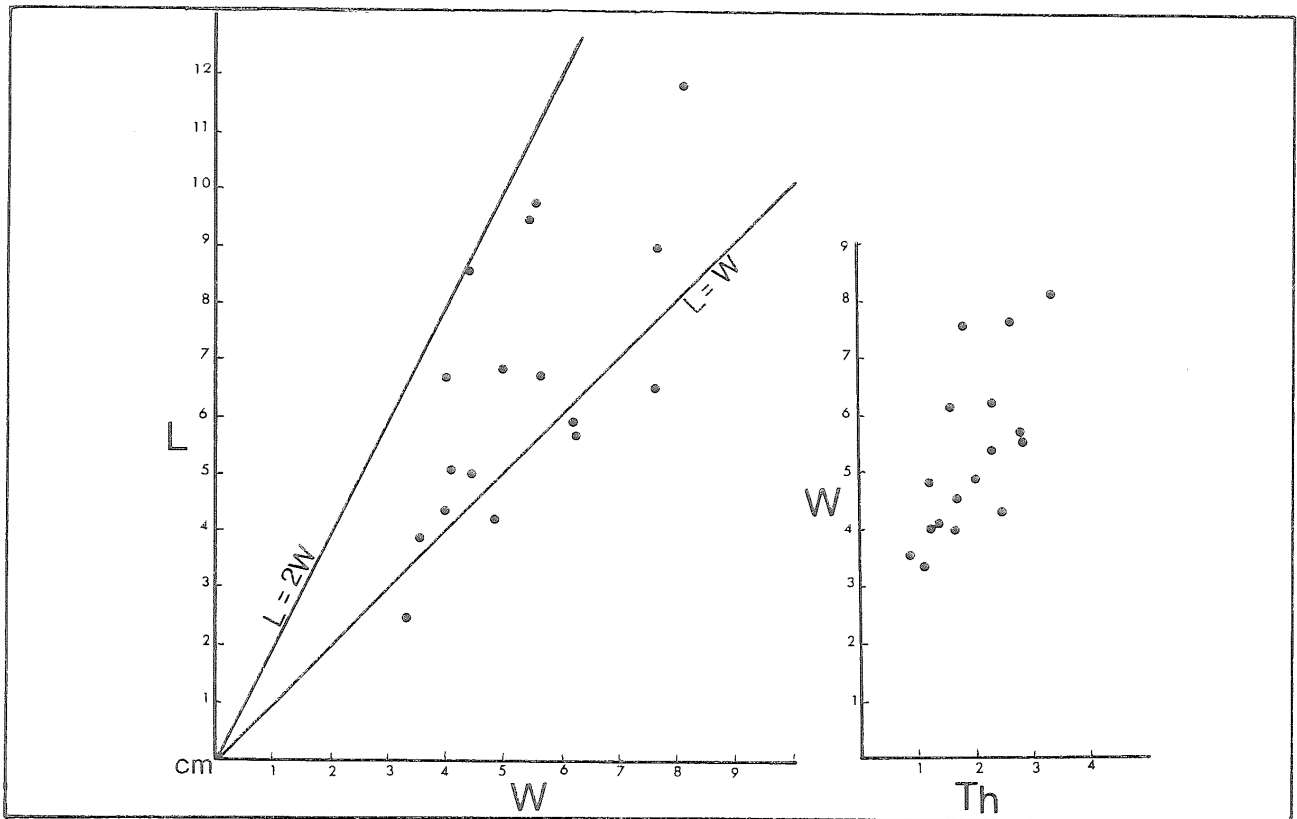


Fig. 3: Length/width and width/thickness of 17 flakes from Dauqara Formation.

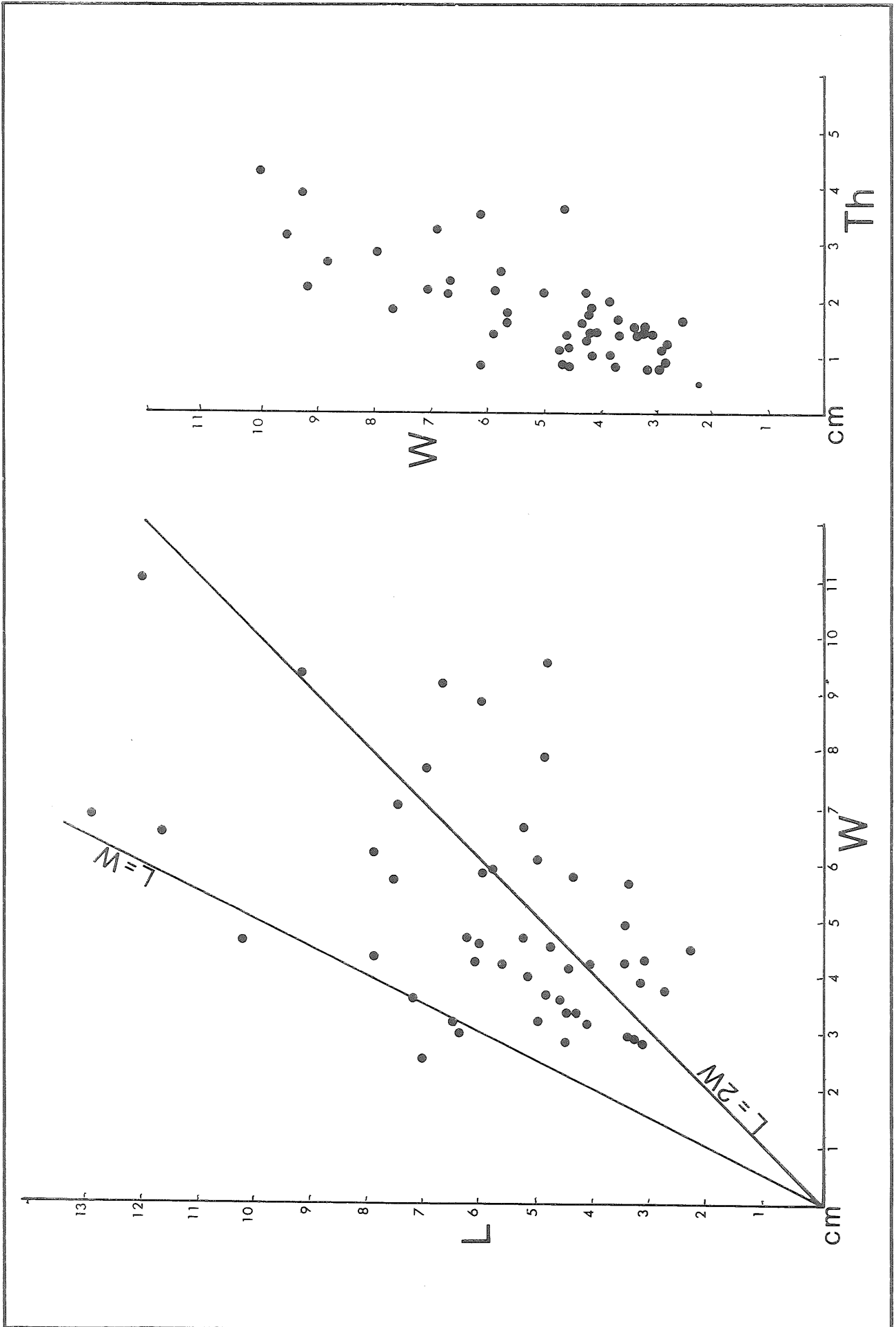


Fig. 4: Length/width and width/thickness of 48 flakes in Biré Formation sites.

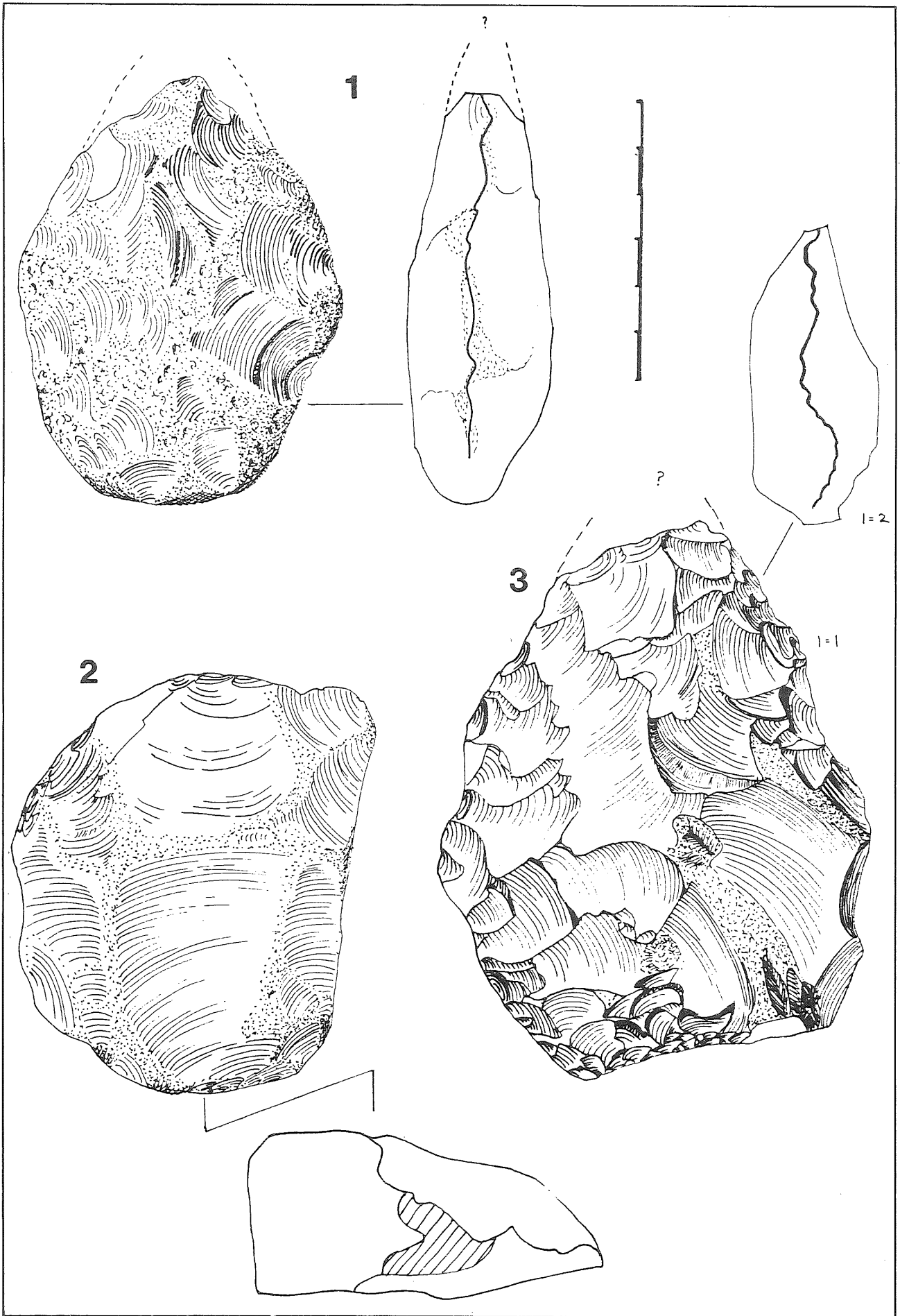


Fig. 5: Artefacts of site 119b (Bire Formation); 1, Extremely rolled, ovate biface; 2, Very rolled unipolar core; 3, Atypical amygdaloid biface rolled, with broken tip.

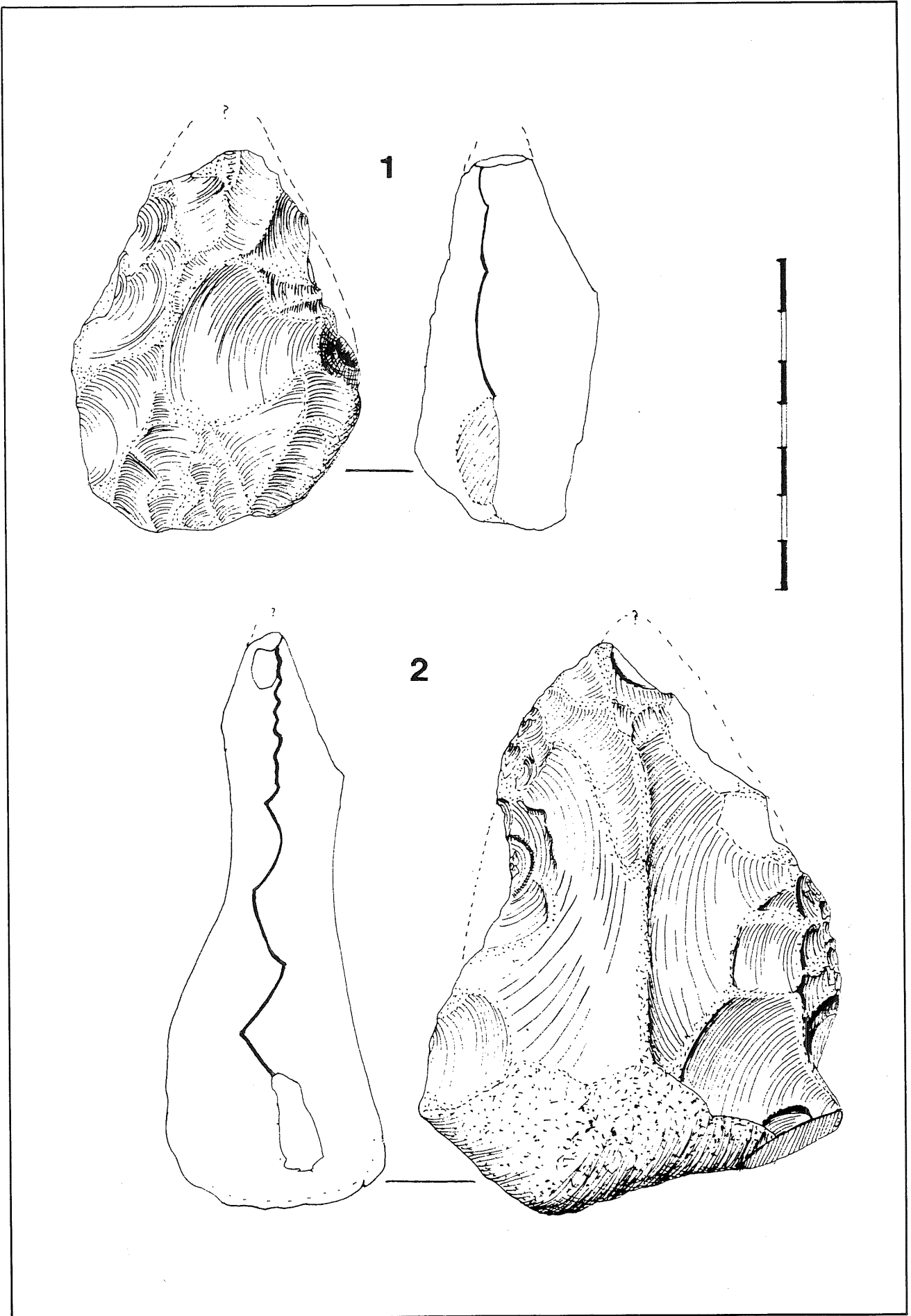


Fig. 8: Artefacts of site 134 (Biré Formation); 1, a typical amygdaloid biface; 2, Broken amygdaloid biface.



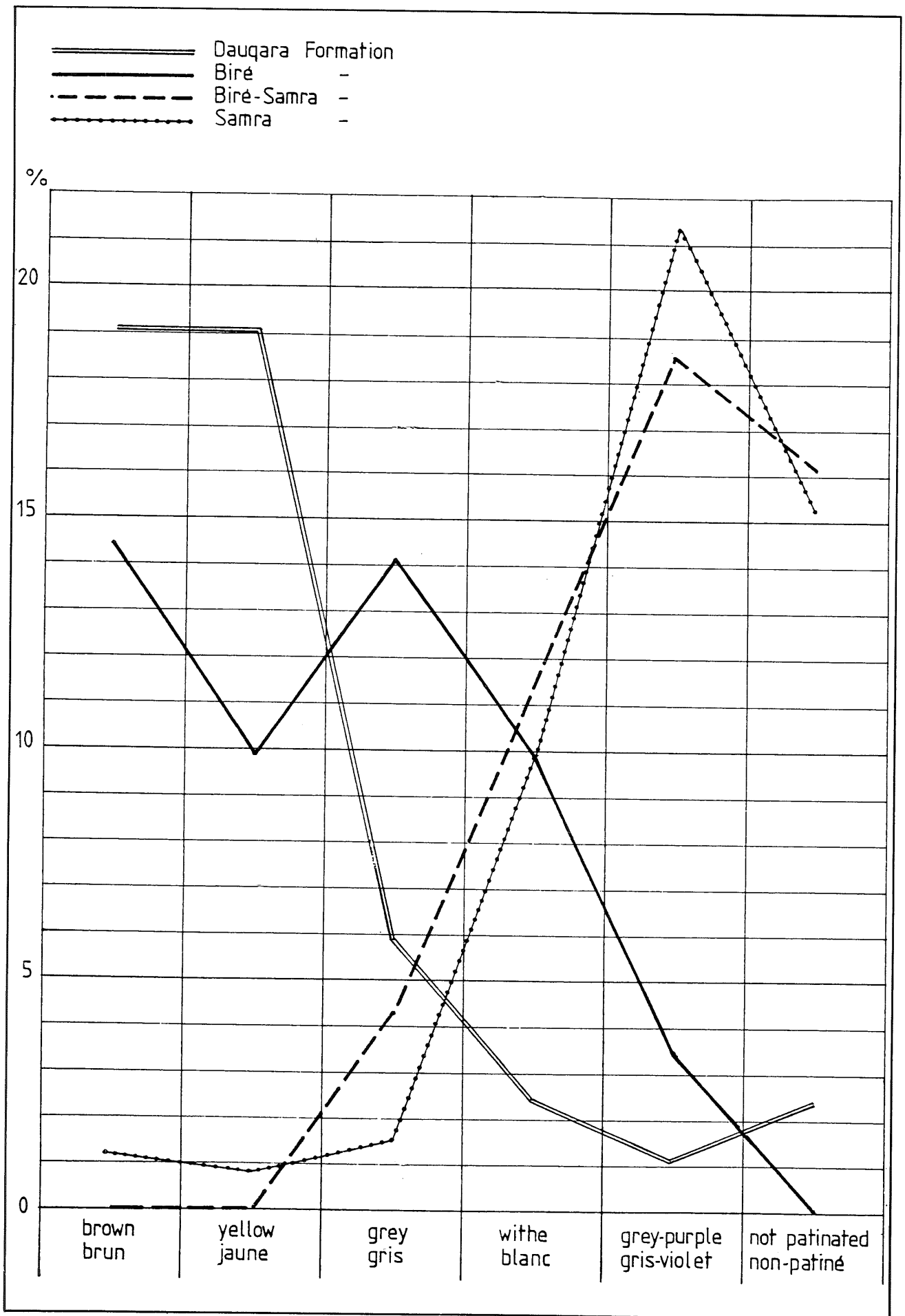


Fig. 9: Patina proportions of the artefacts in four Formations.

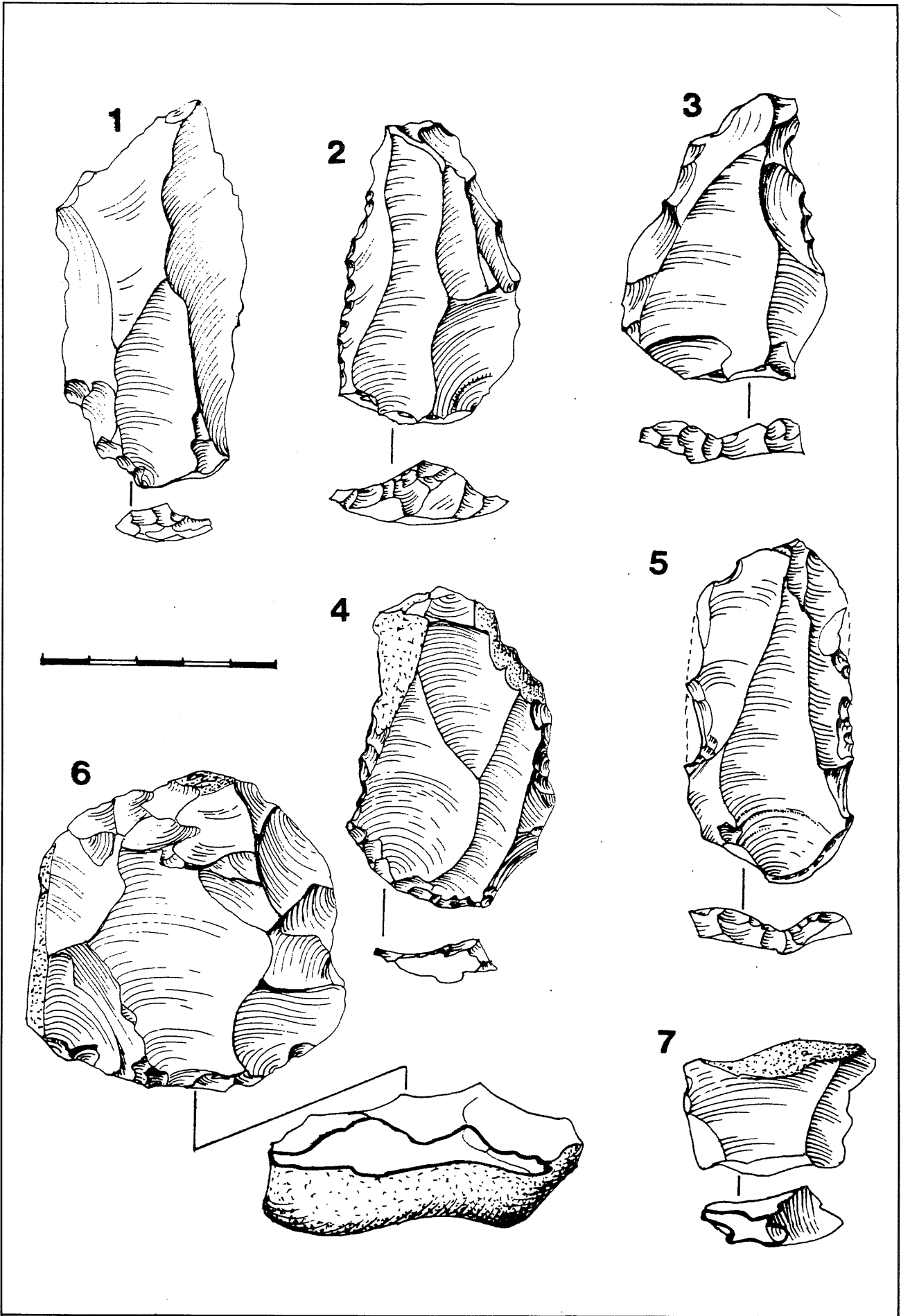


Fig. 10: Artefacts from the Khirbet Samra Formation: 1-2 from site 26b, 3-7 from site 13. 1-3 & 5, Levallois flakes; 4, Atypical Levallois flake; 6, Levallois core; 7, Non-Levallois preparation-flake.

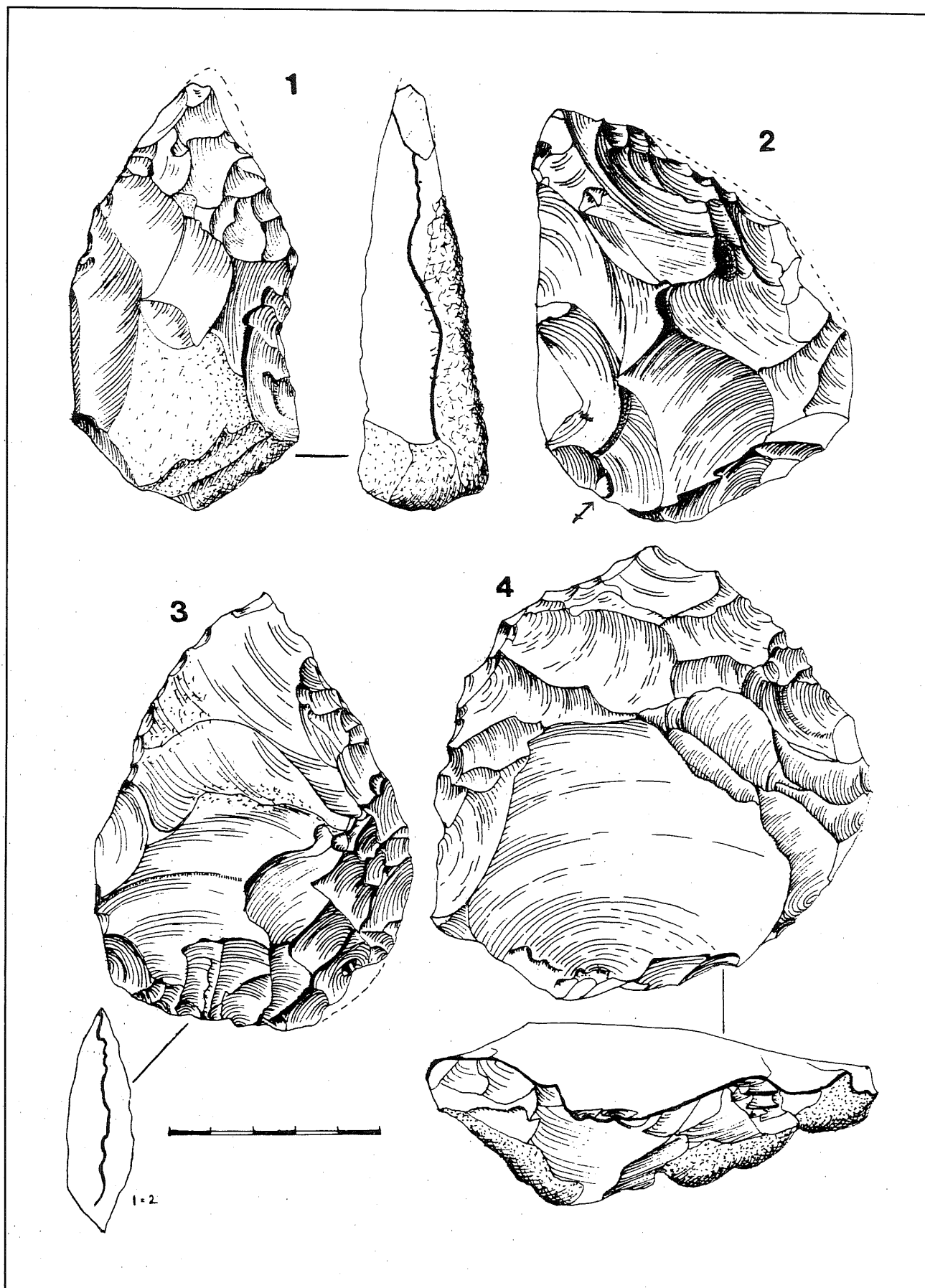


Fig. 11: Artefacts from site 5b, Khirbet Samra Formation; 1, Partial subovate pointed biface, tending to a lanceolate; 2, Bifacial racloir on a flake; 3, Cordiform biface, profile drawn half-size; 4, Classic Levallois core with radial preparation.

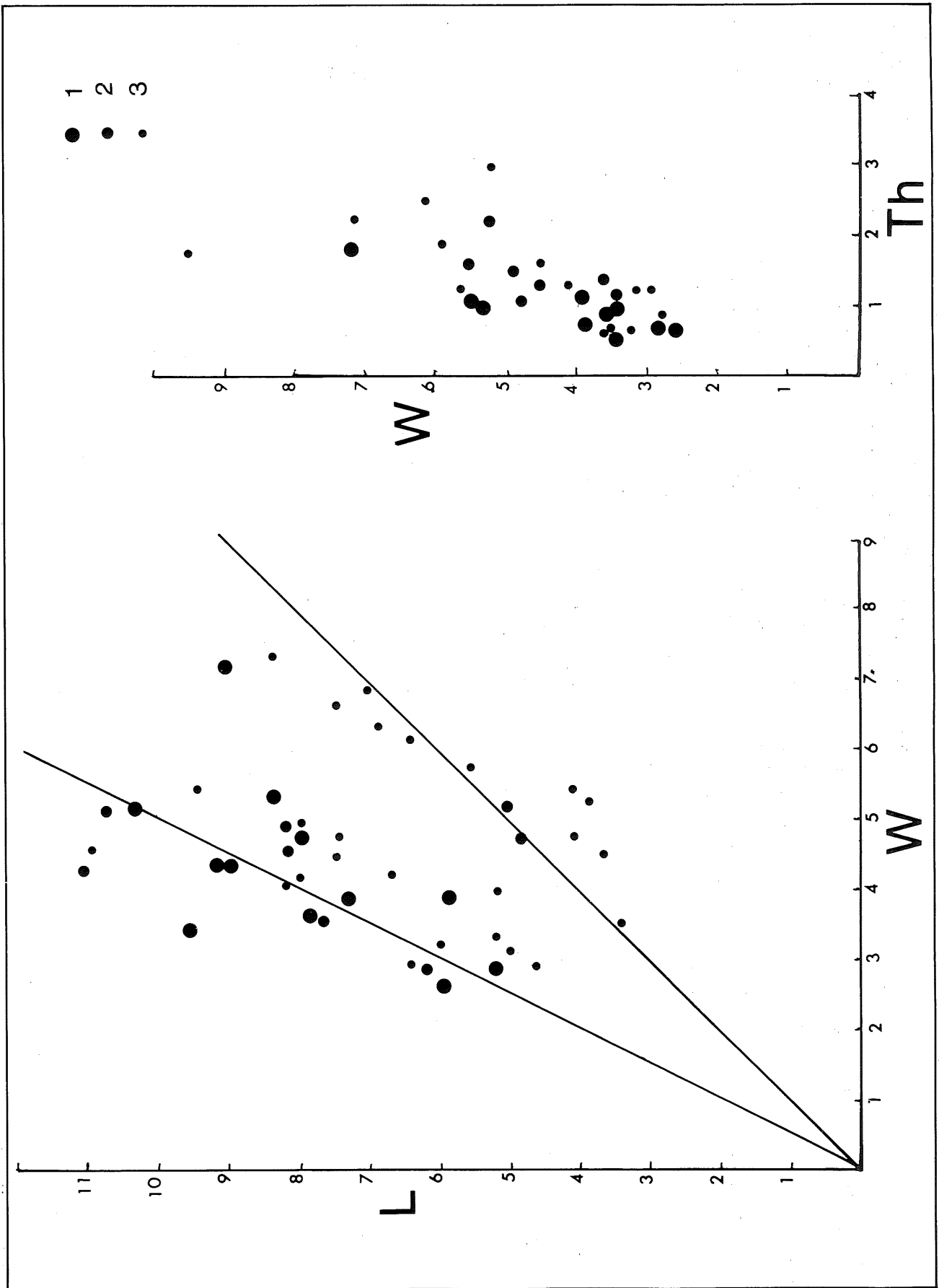


Fig. 12: Length/width of 31 flakes and blades of surface site 7b (Middle Paleolithic):  
 1=Levallois debitage; 2=Non-Levallois debitage; 3=Cortex and secondary preparation-flakes.

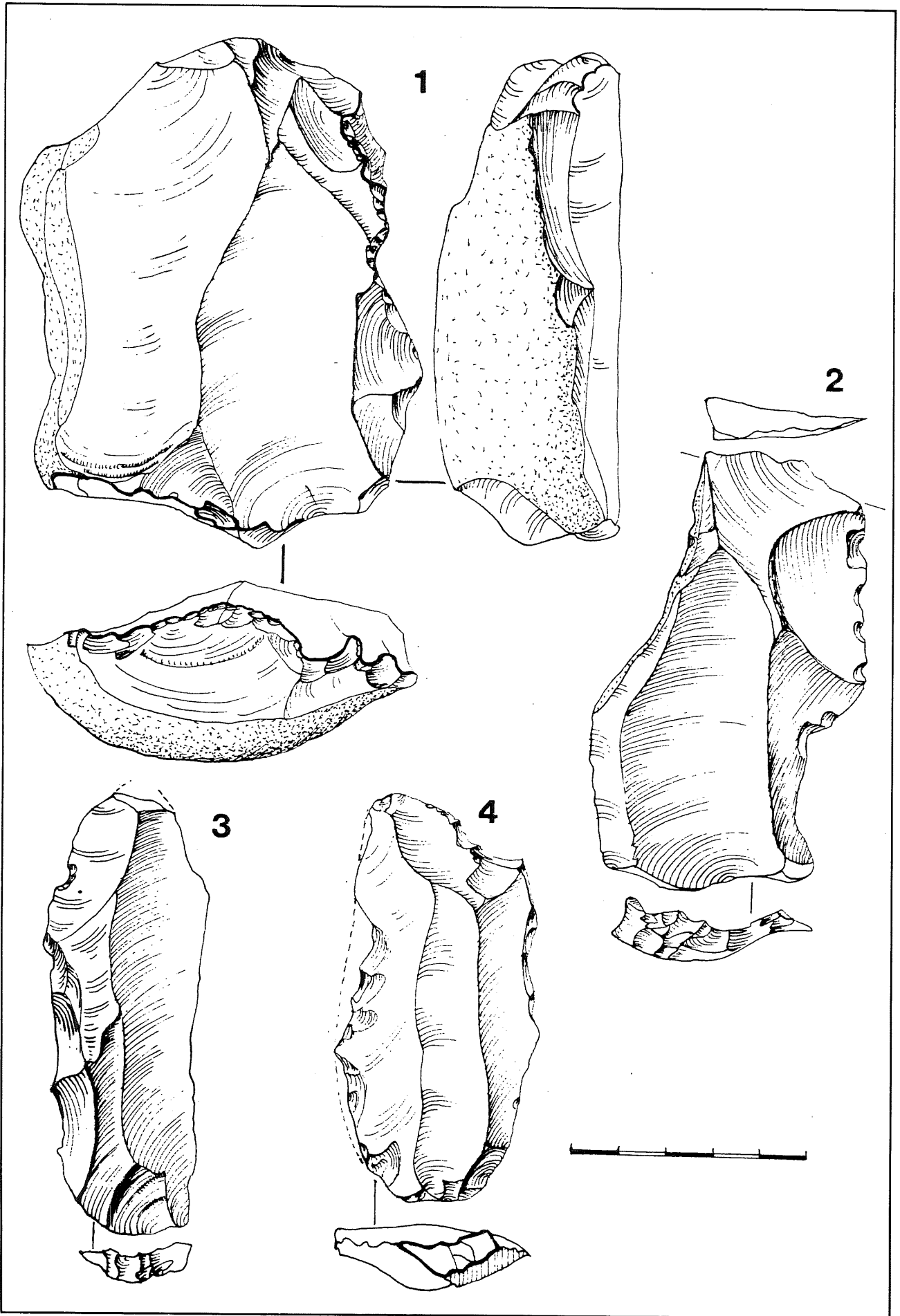


Fig. 13: Artefacts from surface site 7b; 1, Bipolar Levallois blade-core; 2, Atypical Levallois flakes, 3 & 4, Levallois blades from bipolar cores.

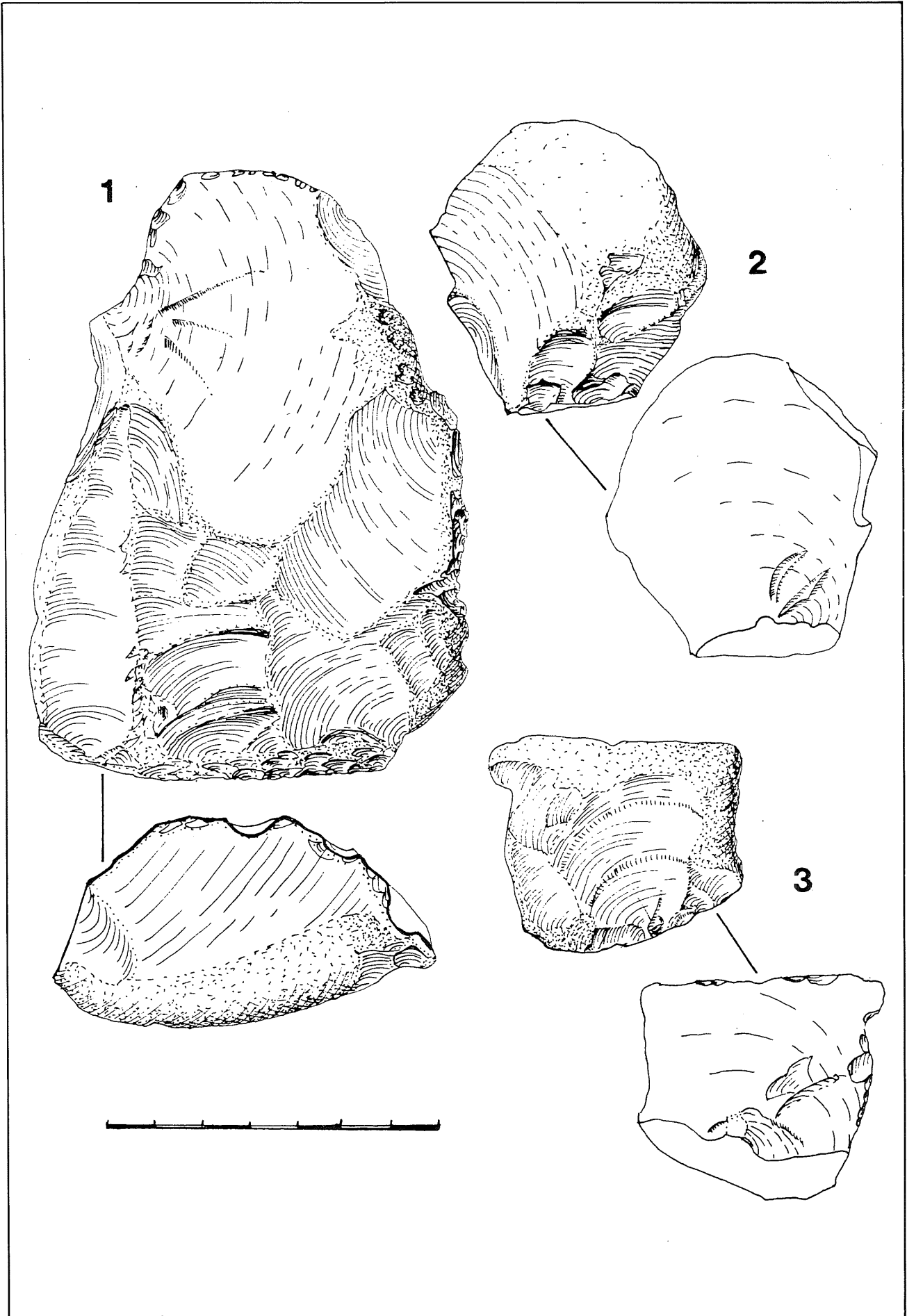


Fig. 6: Artefacts of site 119b (Biré Formation); 1, Unipolar core; 2 & 3, Cortex flakes.

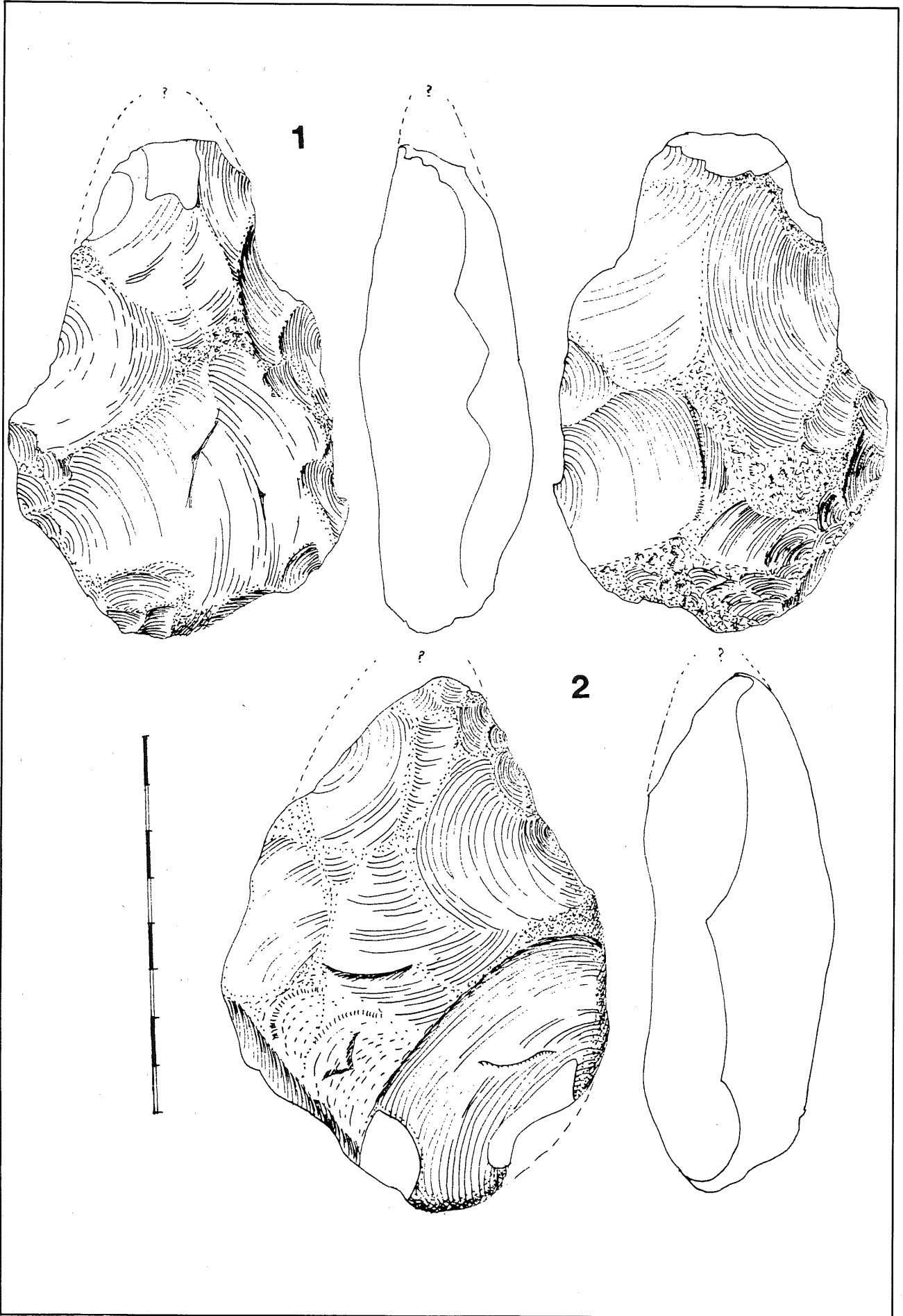


Fig. 7: Artefacts of the Biré Formation; 1, Amygdaloid biface (site 116); 2, Atypical amygdaloid biface (site 134).

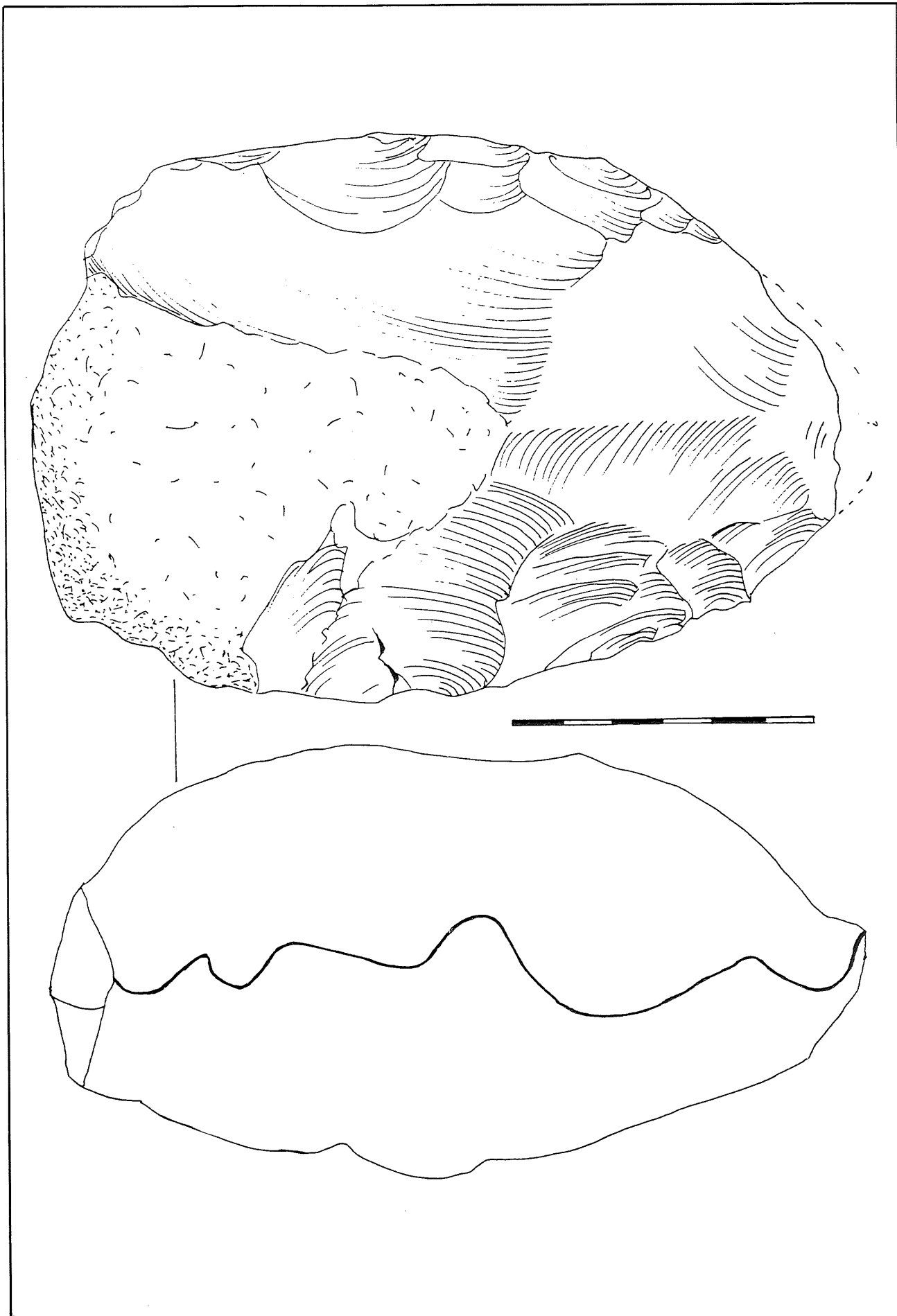


Fig. 14: Large, rolled ovate biface from site 30a.



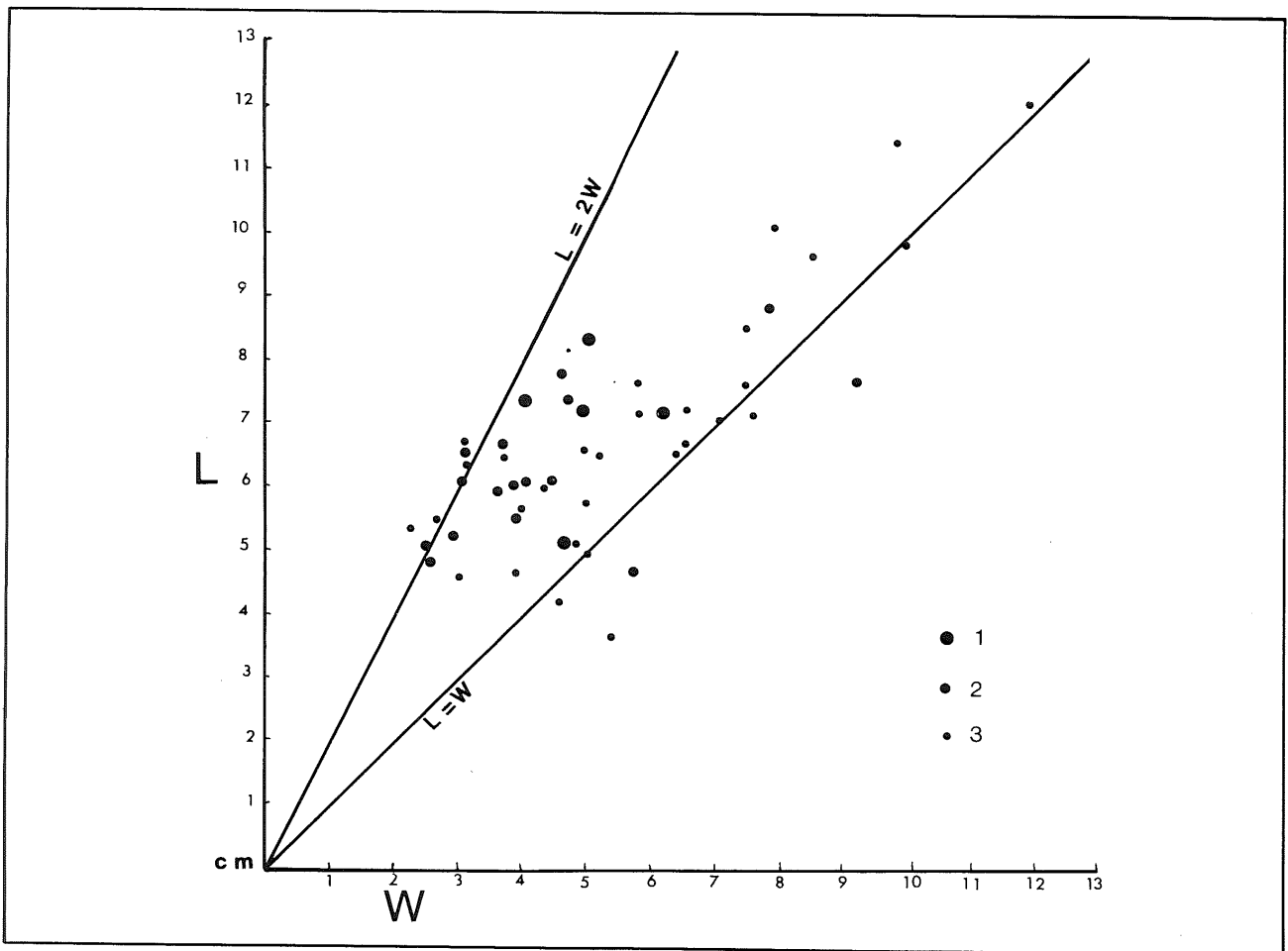


Fig. 15: Khirbet Samra site 4 (Lower Paleolithic). Length/Width of 49 flakes and blades: 1=Levallois debitage; 2: Non-Levallois (flat or orthogonal) debitage; 3: Cortex and secondary preparation-flakes.

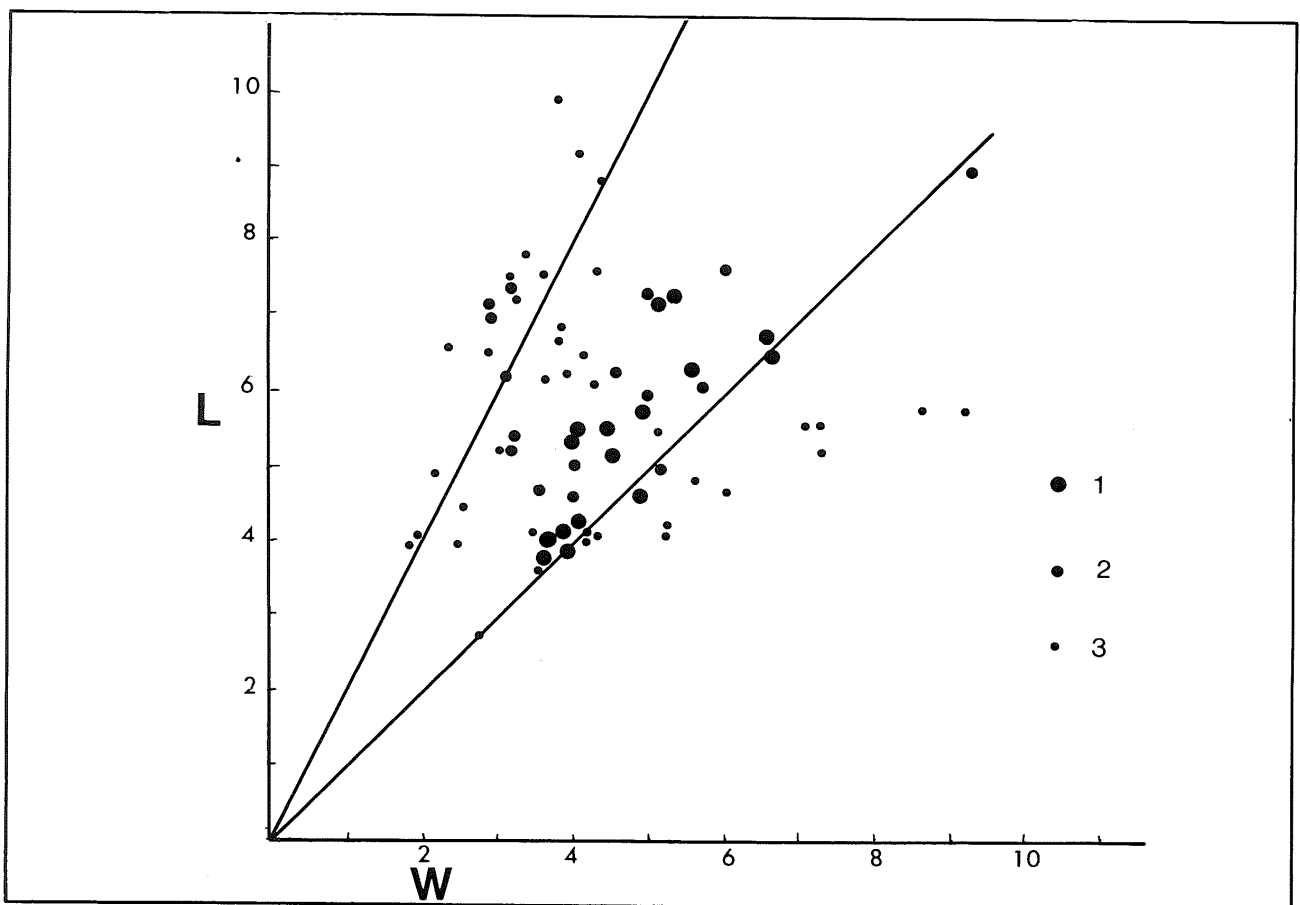


Fig. 16: Khirbet Samra site 3 (Middle Paleolithic). Length/width of 68 flakes and blades: Key as in Fig. 15.

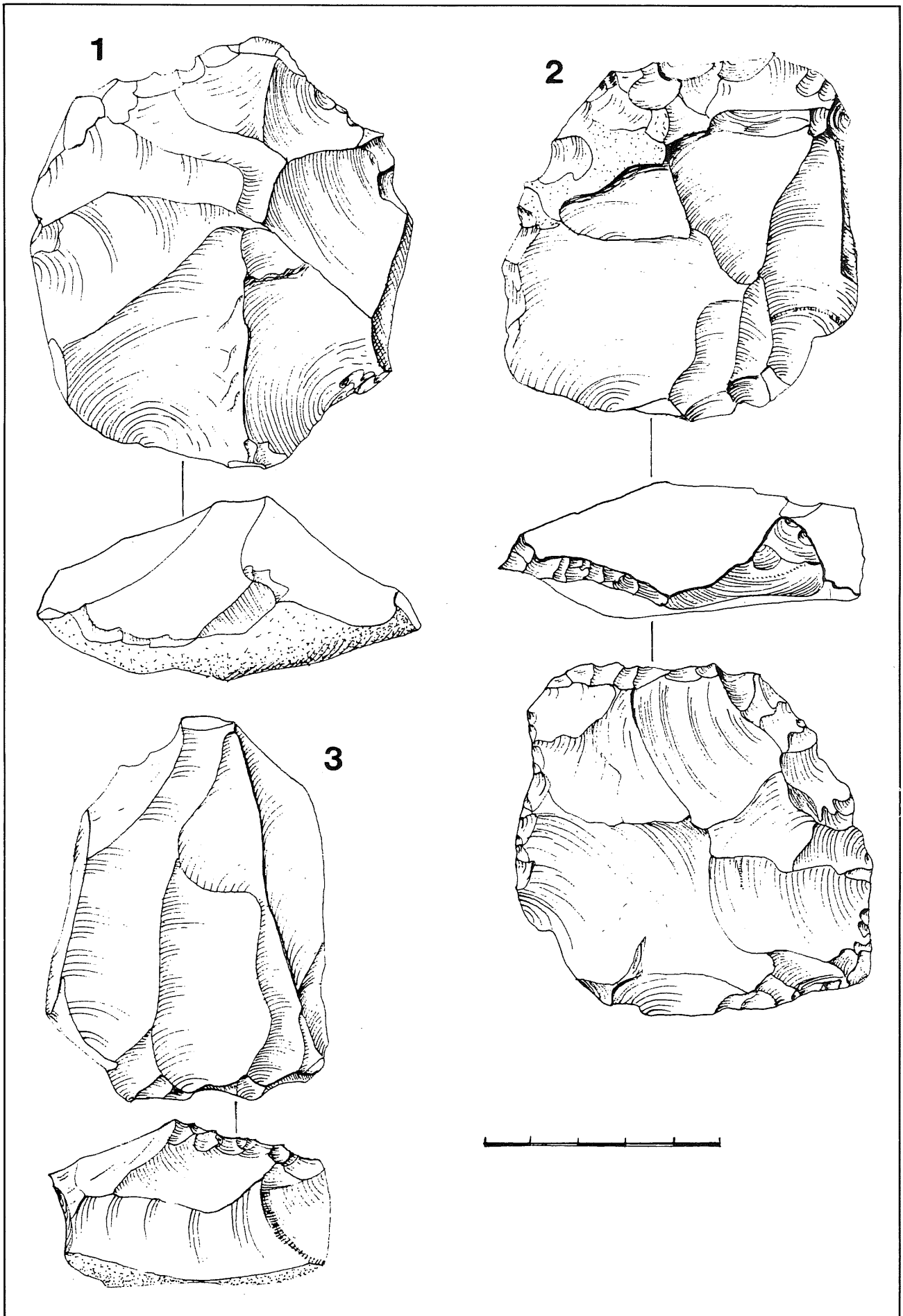


Fig. 19: Artefacts from surface site 30c; 1, Discoid core; 2, Flat debitage core Proto-Levallois; 3, Unipolar core for orthogonal debitage.

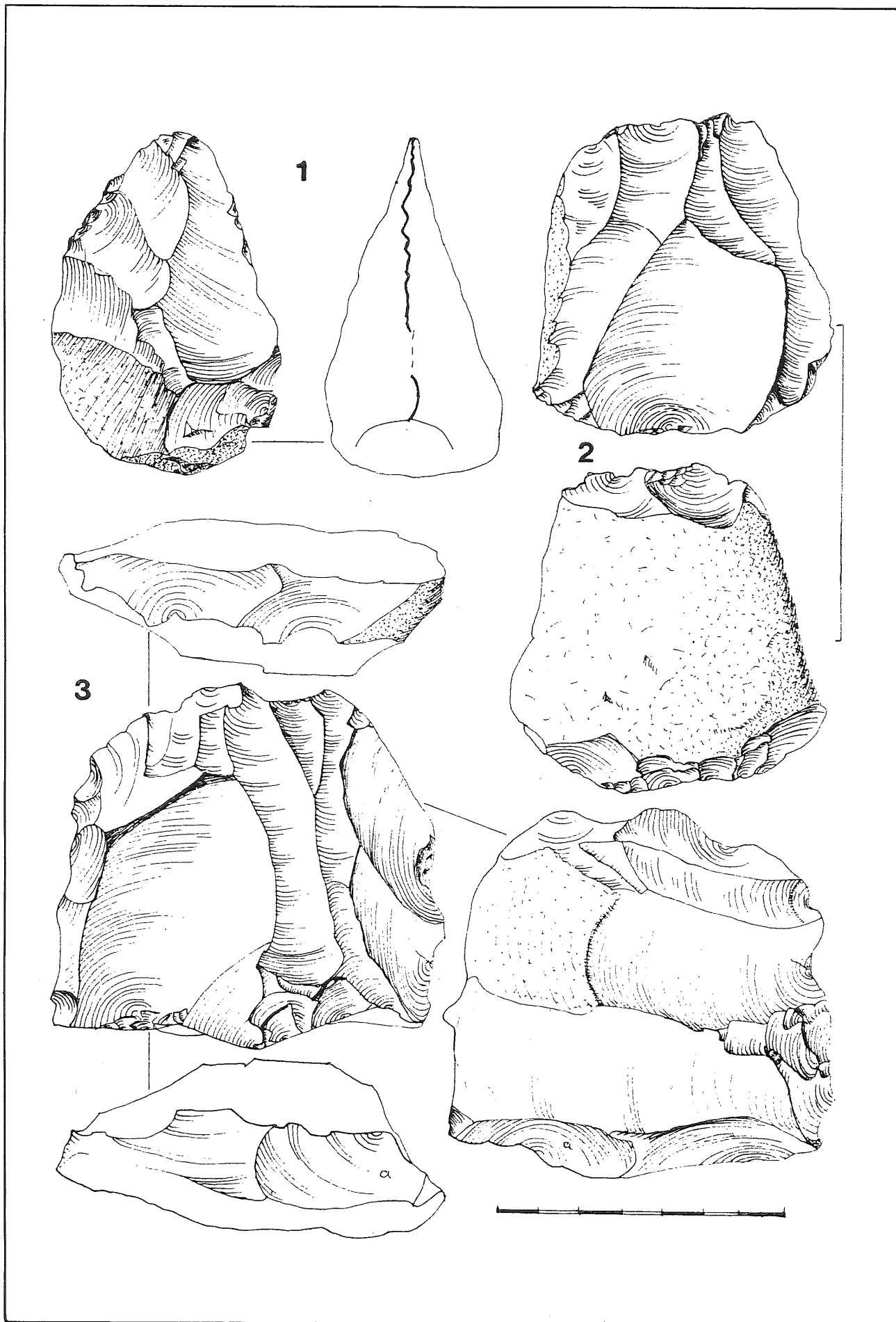


Fig. 20: Artefacts from surface sites 30c (1) and 30b (2 & 3); 1, Short amygdaloid biface; 2, Bipolar core; 3, Double, reversed direction core.

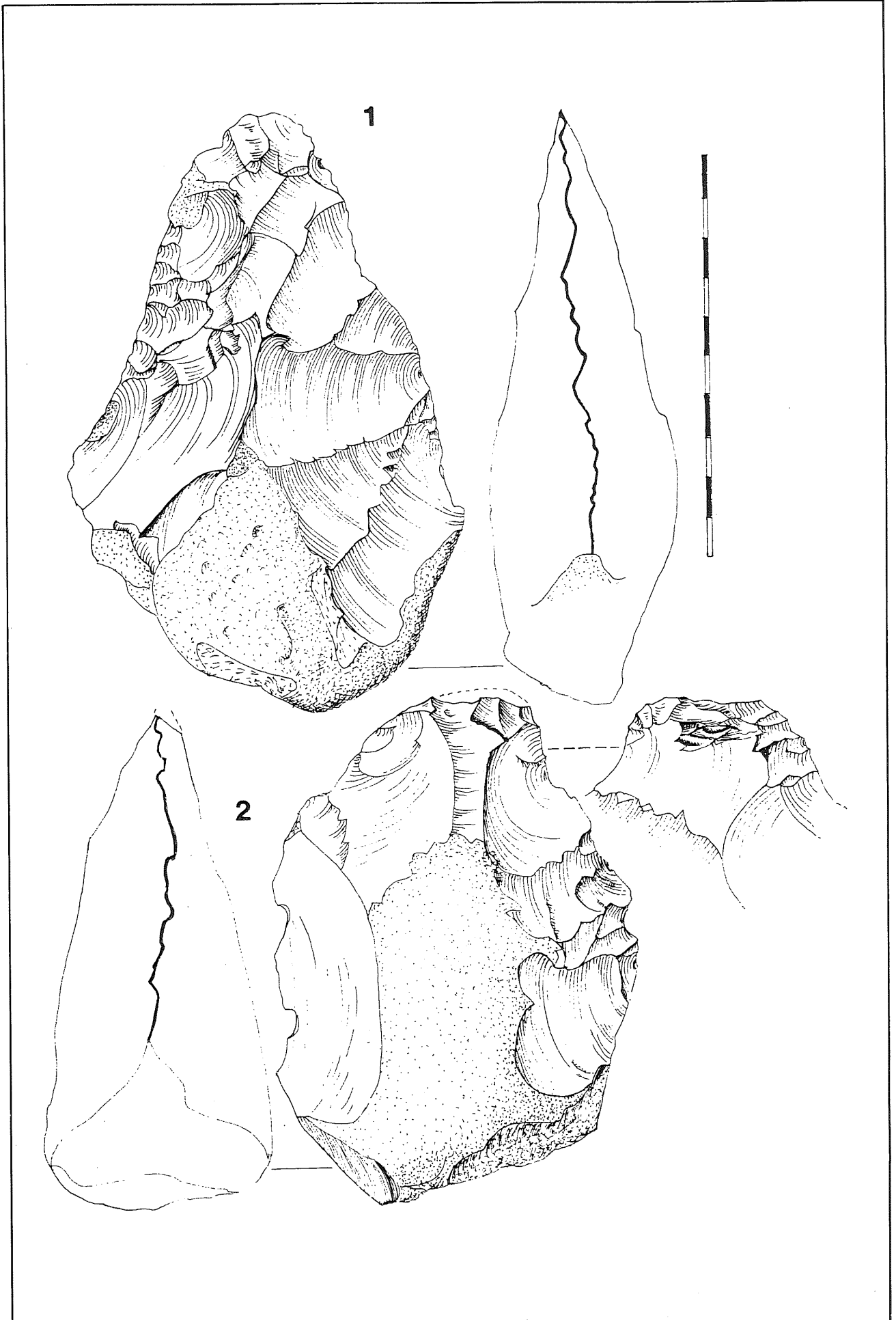


Fig. 17: Artefacts from surface site 30c: 1, Amygdaloid biface; 2, Partial ovate biface.

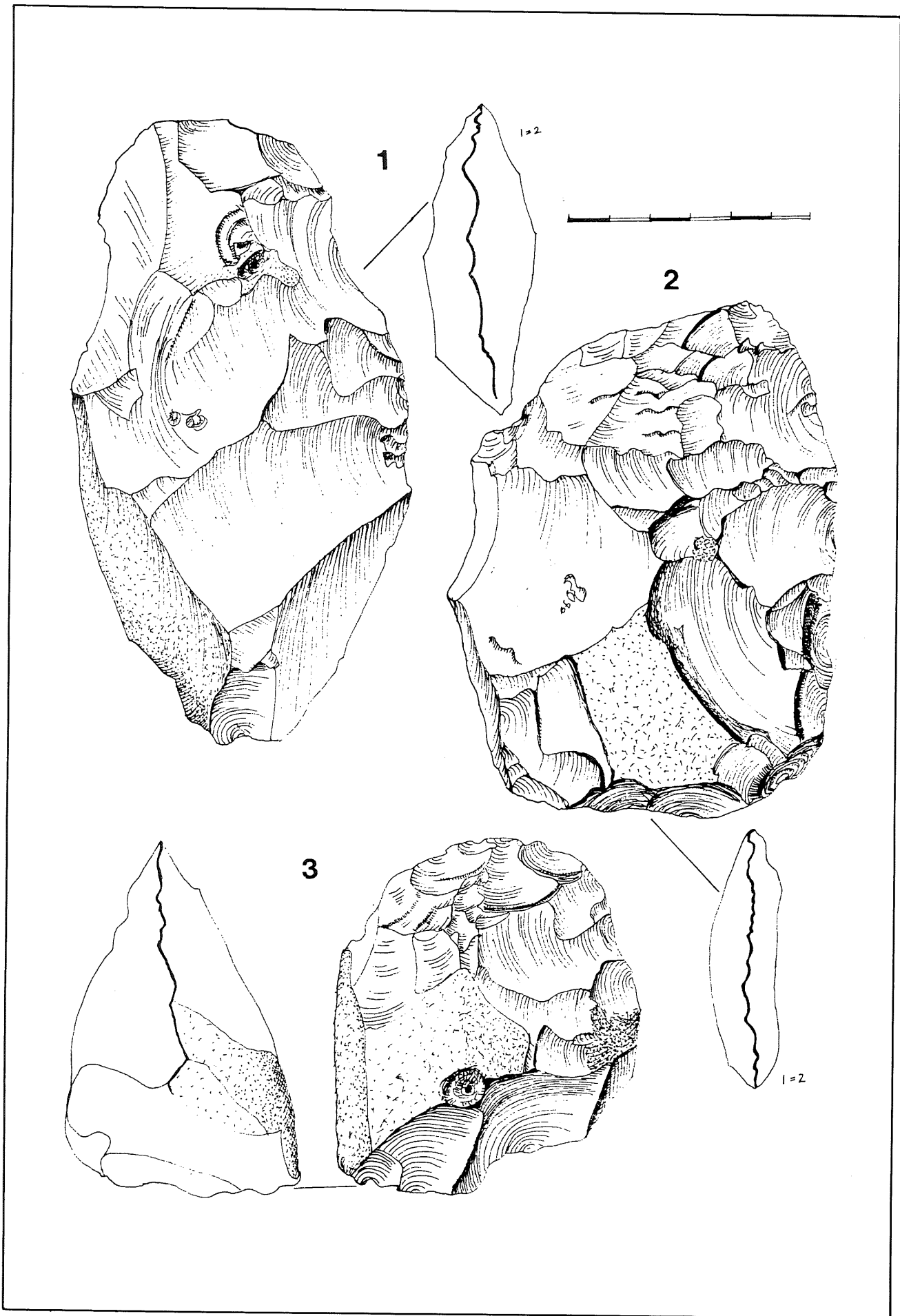


Fig. 18: Artefacts from surface site 30c; 1, Biface rough-out, tending to a bifacial cleaver; 2, Bifacial cleaver with straight oblique tip; 3, D-shaped biface. Profiles of 1 and 2 are drawn half-size.

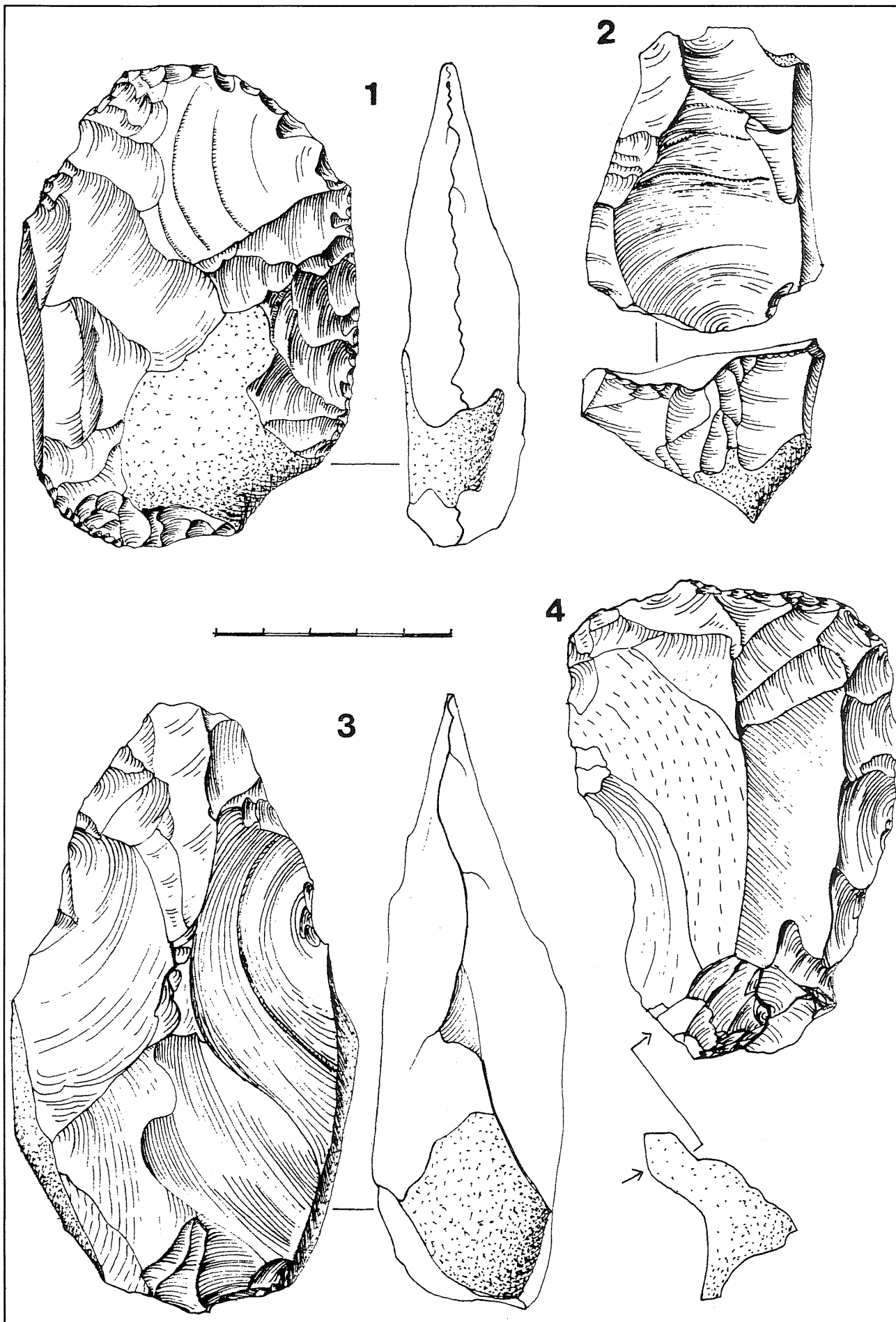


Fig. 21: Artefacts from surface sites 3 (1-3) and 135 (4); 1, Bifacial cleaver or partial ovate biface; 2, Nubian type of bipolar core; 3, Lanceolate biface; 4, Racloir on a flake with cortex butt.

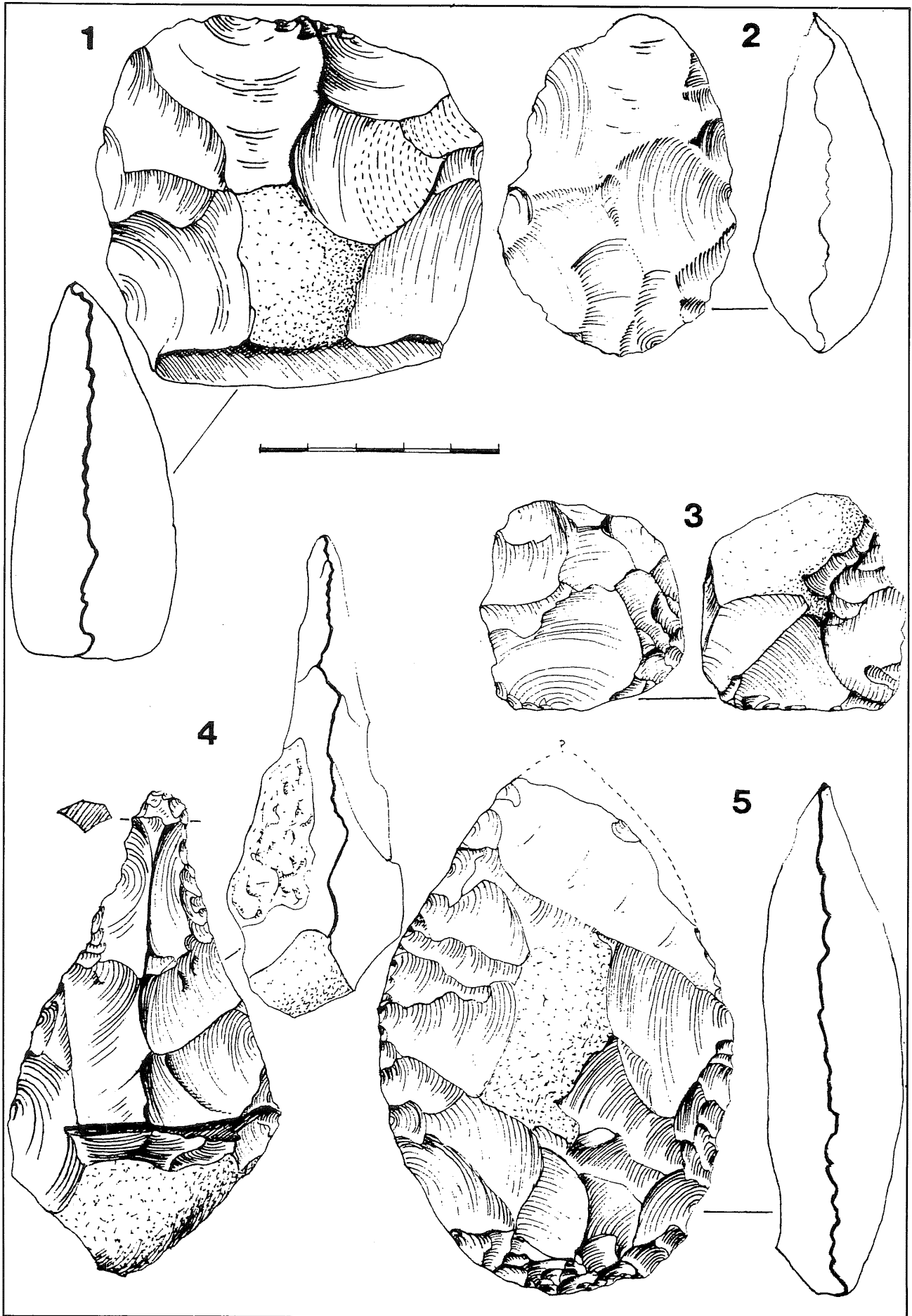


Fig. 22: Artefacts from various surface sites: 1, Bifacial cleaver or D-shaped biface (site 30a); 2, Minute ovate bioface (site 135); 3, Small Levallois core-base (site 14); 4, Pick (site 14); 5, Broken Ovate biface (site 4).

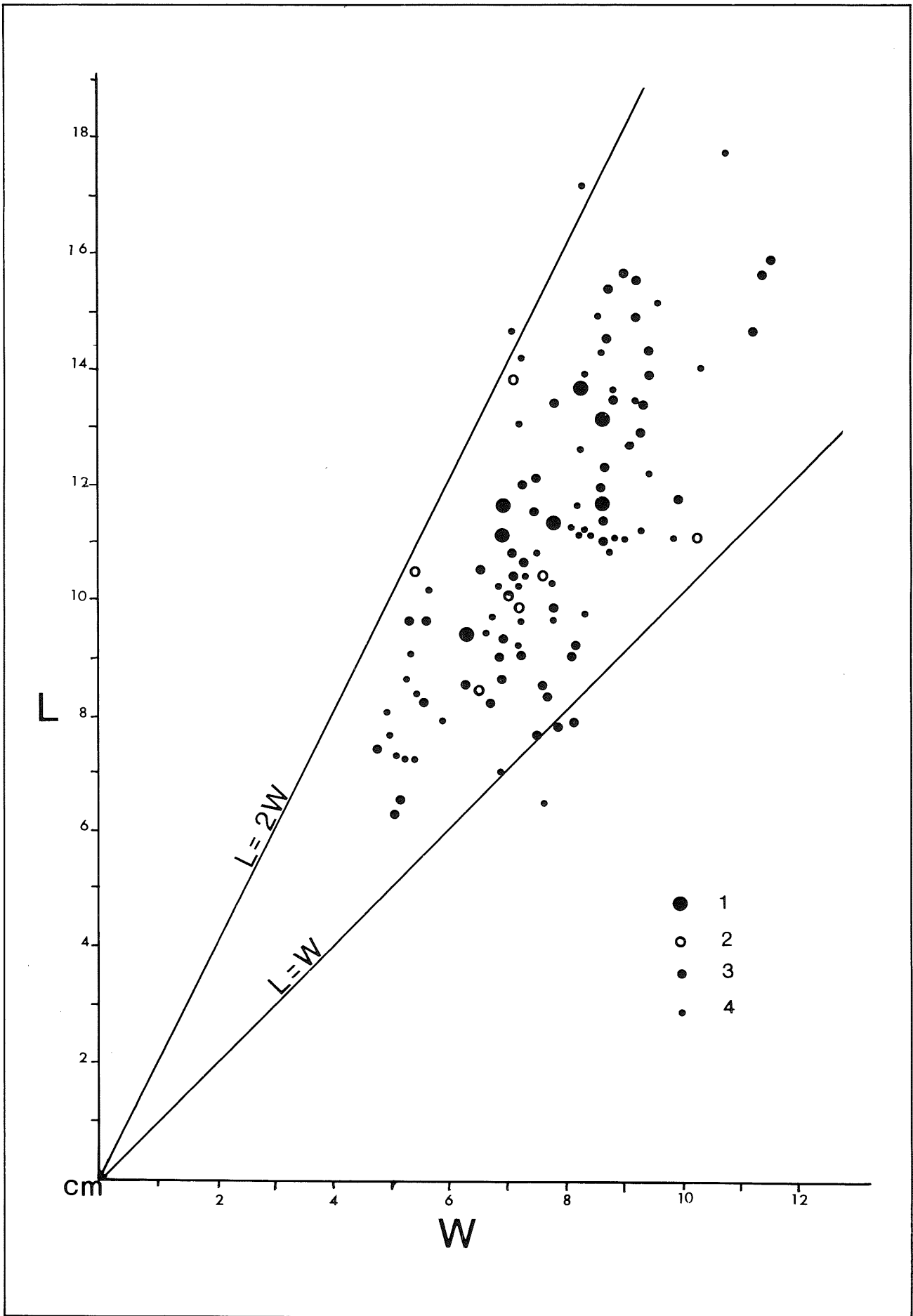


Fig. 23: Length and Width of 100 bifaces in the Zarqa/Samra sector. 1=Qf2 Sites; 2=Qf1 sites; 3=surface of site 30; 4=other surface sites.



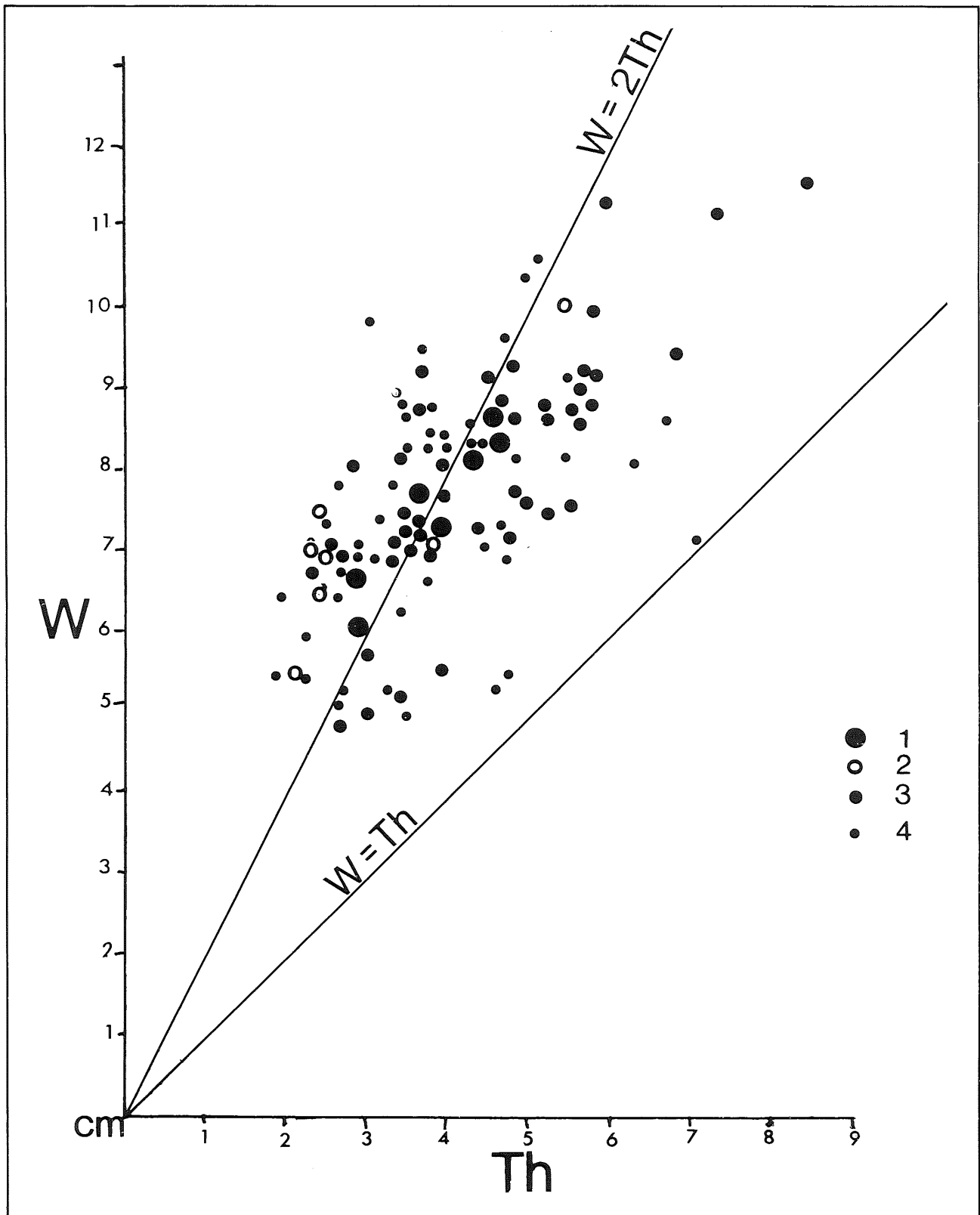


Fig. 24: Width and Thickness of 98 bifaces in the Zarqa/Samra sector.  
 1=Qf2 sites; 2=Qf1 sites; 3=surface of site 30; 4=other surface sites.

**Table 1: Inventory of lower and Middle Paleolithic sites used in this study, listed in chronostigraphic order.**

<i>Formation</i>	<i>Site number</i>	<i>Artifacts</i>	<i>Industry</i>	<i>Remarks</i>
Df3	19	12	Indeterminate	1 chopper
Dauqara	21	2	Indeterminate	interesting because of the position
	22a1	9	Indeterminate	
	22b	12	Indeterminate	
	31b	2	Indeterminate	interesting because of the position
	110	2	Indeterminate	„ „
	119a	1	Indeterminate	„ „
	124	2	Indeterminate	„ „
Qf2	22a2	26	Acheulean	embedded in the Qf3
Bire	24	1	Indeterminate	
	29a	17	Indeterminate	
	106	1	Indeterminate	
	116	6	Acheulean	1 biface
	118	10	Indeterminate	
	119b	39	Acheulean	3 bifaces
	130a	6	Indeterminate	
	134	8	Acheulean	3 bifaces
Qf2-1	7a	34	Middle Paleo	in fact Qf1
Bire-Samra	9a	14	Mixture?	Middle Paleo and 1 biface
	10	4	Middle Paleo	in fact Qf1
	11	5	Indeterminate	
	12	9	Middle Paleo	or older
Qf1	5b	54	Middle Paleo	5 bifaces
Samra	13	26	„	“Middle” Terrace-levallois
	26b	10	„	“Middle” Terrace-levallois
				1 biface
	107	1	„	
	109	27	„	Early Middle Paleolithic
				1 biface
	115a	11	„	
	115b	14	„	Blade industry
	129a	3	indeterminate	Lower Terrace
	132	12	„	Qf1
Surface Sites	3	133	Late Acheulean	
	4	95	„ „	
	5a	162	Middle Paleo	
	2b	94	Late Acheulean	some levallois
	14	24	„ „	some levallois
	25b	20	Middle Paleo	
	30a	66	Late Acheulean	
	30b	103	„ „	
	30c	71	„ „	
	128	45	Mixture	Late Acheulean and Middle Paleo
	129b	18	Late Acheulean	Erosion from Qf2?
	130b	24	„ „	Erosion from Qf2?
	130c	7	Middle Paleo	
	135	248	Late Acheulean	Site Eponyme-various site

**Table 2: Inventory of artefacts in Dauqara Formation sites**

Artefacts	Sites of the Dauqara Formation					110	119a	124	Total
	19	21	22a1	22b	31b				
Cores	4	—	—	2	—	—	—	—	6
Flakes	7	2	9	10	2	2	1	2	35
Core-tools	1	—	—	—	—	—	—	—	1
<b>Total</b>	<b>12</b>	<b>2</b>	<b>9</b>	<b>12</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>42</b>

**Table 3: Flake types and butt types in Dauqara Formation flakes**

Flake types	Butt types			Lipped/			Broken	Unre-cog.	Totals
	Cortex	Plain	Dihed.	Facet.	Punctif.	Removed			
Levallois flake	—	—	—	—	—	—	—	—	—
Cortex flake	7	7	—	—	—	1	2	3	20
Preparation flake	—	4	—	—	—	—	5	1	10
Flat debitage	—	2	—	—	—	—	—	—	2
Orthogonal debitage	—	3	—	—	—	—	—	—	3
Blade	—	—	—	—	—	—	—	—	—
Chips	—	—	—	—	—	—	—	—	—
<b>Total</b>	<b>7</b>	<b>16</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>7</b>	<b>4</b>	<b>35</b>

**Table 4: Inventory of Artefacts at Bire Formation Sites**

Artefacts	Site of the Bire Formation						118	119b	130a	134	Total
	22a2	24	29a	106	116	116					
Cores	6	—	—	—	—	1	5	1	3	16	
Flakes	19	1	16	1	5	9	30	4	2	87	
Core-tools	1	—	1	—	1	—	3	1	3	10	
Debris	—	—	—	—	—	—	1	—	—	1	
<b>Total</b>	<b>26</b>	<b>1</b>	<b>17</b>	<b>1</b>	<b>6</b>	<b>10</b>	<b>39</b>	<b>6</b>	<b>8</b>	<b>114</b>	

**Table 5: Flake types and butt types in Bire Formation Flakes**

Flake types	Butt types			Lipped/			Broken	Unre-cog.	Total
	Cortex	Plain	Dihed.	Facet.	Punctif.	Removed			
Levallois flake	—	—	—	—	—	—	—	—	—
Cortex flake	17	16	—	—	—	1	3	4	41
Preparation flake	3	7	2	—	1	—	2	2	17
Flat debitage	3	1	1	2	1	1	3	—	12
Orthogonal debitage	—	1	1	—	—	—	1	2	5
Blade	1	3	1	1	—	—	—	—	6
'Eclat de taille'	—	—	—	—	—	—	—	—	—
Chips	—	—	—	—	—	—	—	6	6
<b>Total</b>	<b>24</b>	<b>28</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>9</b>	<b>14</b>	<b>87</b>

Table 6: Inventory of Artefacts in Bire-Samra (Qf2-1) and Khirbet Samra (Qf1) Formation Sites

Inventory	Sites of the Bire-Samra Formation					Qf2-1 Total	Sites of the Khirbet Samra Formation					Qf1 Total	Combd. Total				
	7a	9a	10	11	12		5b	13	26b	107	109			115a	115b	129a	132
Cores:																	
Levallois for points	—	—	1	—	—	1	2	—	—	—	1	—	—	—	—	3	4
Levallois for flakes	3	—	—	—	—	3	2	2	—	—	1	—	—	—	—	5	8
Levallois 'sommaire'	—	—	—	—	—	—	2	—	—	—	—	1	—	—	—	3	3
Mousterian	—	—	—	—	—	—	—	2	—	—	1	—	1	—	—	4	4
Proto-Mousterian	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	2	2
Flat debitage	1	—	—	—	—	1	4	1	—	—	—	—	1	—	1	7	8
Orthogonal	—	1	—	—	—	1	1	—	—	—	—	—	1	—	—	2	3
Prismatic	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polyhedral	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	1
Amorphous/fragment	—	—	—	1	—	1	—	—	3	—	—	—	—	—	—	3	4
Exhausted disc.	—	1	—	1	—	2	1	1	1	—	—	1	1	—	2	7	9
<b>Total cores</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>—</b>	<b>9</b>	<b>13</b>	<b>4</b>	<b>6</b>	<b>—</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>—</b>	<b>4</b>	<b>37</b>	<b>46</b>
Flake & flake tools:																	
Levallois	2	1	—	—	1	4	6	2	2	—	3	—	—	—	1	14	18
Preparation	4	1	1	—	3	9	4	9	—	—	3	3	4	—	5	28	37
Cortex	7	3	1	—	1	12	8	8	—	—	6	2	3	3	—	30	42
Flat	6	3	1	2	1	13	6	3	1	1	3	1	—	—	—	15	28
Orthogonal	6	1	—	—	—	7	5	—	—	—	2	—	—	—	—	7	14
'Eclat de taille'	1	—	—	—	2	3	3	—	—	—	—	1	—	—	—	4	7
Blade	—	—	—	—	—	—	1	—	—	—	—	3	—	—	—	4	4
Chips	—	—	—	1	—	1	—	—	—	—	—	1	—	—	—	1	2
<b>Total flakes</b>	<b>26</b>	<b>9</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>49</b>	<b>33</b>	<b>22</b>	<b>3</b>	<b>1</b>	<b>17</b>	<b>8</b>	<b>10</b>	<b>3</b>	<b>6</b>	<b>103</b>	<b>152</b>
Core-tools:																	
Choppers	—	—	—	—	—	—	—	—	—	—	4	—	—	—	—	4	4
Bifaces	1	—	—	—	—	1	5	—	1	—	1	—	—	—	—	7	8
<b>Total core-tools</b>	<b>1</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>5</b>	<b>—</b>	<b>1</b>	<b>—</b>	<b>5</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>11</b>	<b>12</b>
Debris	3	3	—	—	1	7	3	—	—	—	1	1	—	—	2	7	14
<b>Total</b>	<b>34</b>	<b>14</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>66</b>	<b>54</b>	<b>26</b>	<b>10</b>	<b>1</b>	<b>27</b>	<b>11</b>	<b>14</b>	<b>3</b>	<b>12</b>	<b>158</b>	<b>224</b>

Table 7: Tool types in Bire-Samra and Khirbet Samra Formation Sites

Tool types	Sites of the Bire-Samra Formation					Qf2-1 Total	Sites of the Khirbet Samra Formation					Qf1 Total	Combd. Total				
	7a	9a	10	11	12		5b	13	26b	107	109			115a	115b	129a	132
Levallois flake	2	—	—	—	1	3	—	—	2	—	3	—	—	—	1	6	9
Levallois point	—	1	—	—	—	1	—	1	—	—	—	—	—	—	—	1	2
Levallois blade	—	—	—	—	—	—	6	1	—	—	—	—	—	—	—	7	7
Racloir, simple convex	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	2	2
Racloir, bifacial	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	1
Racloir, offset	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	1
End-scrapers	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Denticulate	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	1
Bec	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	1
Various retouch	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Chopper, lateral	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	3	3
Chopper, distal	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	1
Biface	—	1	—	—	—	1	5	—	1	—	—	—	—	—	—	6	7
Pick	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	1
<b>Total</b>	<b>3</b>	<b>3</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>7</b>	<b>16</b>	<b>2</b>	<b>3</b>	<b>—</b>	<b>9</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>31</b>	<b>38</b>

**Table 8, a and b: Types of flake and types of butt at sites of the a) Bire-Samra and b) Khirbet Samra Formations**

<i>Flake type</i>	<i>Cortex</i>	<i>Plain</i>	<i>Facet</i>	<i>Dihed</i>	<i>Lipped/ punctif</i>	<i>Removed</i>	<i>Broken</i>	<i>Unrecog.</i>	<i>Total</i>
a)	Butt types at Bire-Samra Formation sites								
Levallois flake	—	1	2	—	—	—	1	—	4
Cortex flake	4	3	—	—	2	—	3	—	12
Preparation flake	1	3	1	—	—	—	4	—	9
Flat debitage	1	4	1	2	—	—	4	1	13
Orthogonal debitage	—	3	2	1	—	1	—	—	7
Blade	—	—	—	—	—	—	—	—	—
'Eclat de taille'	1	2	—	—	—	—	—	—	3
Chips	—	—	—	—	—	—	—	1	1
<b>Total</b>	<b>7</b>	<b>16</b>	<b>6</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>12</b>	<b>2</b>	<b>49</b>
b)	Butt types at Khirbet Samra Formation sites								
Levallois flake	—	2	8	1	—	2	1	1	15
Cortex flake	8	10	—	1	1	2	5	—	27
Preparation flake	7	6	1	2	1	1	5	1	24
Flat debitage	3	4	1	—	1	—	3	4	16
Orthogonal debitage	1	4	1	—	—	—	1	—	7
Blade	—	—	—	—	—	—	—	3	3
'Eclat de taille'	—	—	—	—	—	—	—	2	2
<b>Total</b>	<b>19</b>	<b>26</b>	<b>11</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>15</b>	<b>11</b>	<b>94</b>

**Table 9: Inventory of artefacts in surface sites**

<i>Technological Inventory</i>	<i>Surface sites in the Zarqa/Samra sector</i>														<i>Totals</i>
	<i>3</i>	<i>4</i>	<i>5a</i>	<i>7b</i>	<i>14</i>	<i>25b</i>	<i>30a</i>	<i>30b</i>	<i>30c</i>	<i>128</i>	<i>129b</i>	<i>130b</i>	<i>130c</i>	<i>135</i>	
<b>Cores:</b>															
Levallois for flake,	6	4	6	5	3	1	3	9	3	1	—	—	—	6	47
Levallois for point	3	—	5	3	—	—	—	3	3	1	—	—	—	5	23
Levallois ' <i>sommaire</i> '	—	—	—	2	—	—	2	—	3	2	—	—	—	—	9
Mousterian	5	4	2	2	—	—	6	15	5	—	1	—	—	11	51
Proto-Mousterian	—	—	—	—	—	—	—	5	—	—	—	1	1	—	7
Flat debitage	9	7	9	4	—	2	5	10	3	2	3	4	—	11	69
Orthogonal	1	3	3	2	3	1	—	7	1	2	3	—	—	6	32
Prismatic	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polyhedral	—	—	—	2	1	1	—	—	—	—	1	—	—	2	7
Amorphous	1	—	—	—	—	—	—	—	—	—	2	1	—	—	4
Exhausted disc	8	5	7	5	2	1	2	9	1	—	2	—	—	9	51
Fragment	—	—	—	—	1	—	—	1	—	—	—	—	—	5	7
<b>Core total</b>	<b>33</b>	<b>23</b>	<b>32</b>	<b>25</b>	<b>10</b>	<b>6</b>	<b>18</b>	<b>59</b>	<b>19</b>	<b>8</b>	<b>12</b>	<b>6</b>	<b>1</b>	<b>55</b>	<b>307</b>
<b>Flakes and flake-tools:</b>															
Levallois flake	15	5	—	13	1	1	1	1	4	2	—	—	1	11	21
Levallois point	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Blade	—	—	—	2	—	—	—	—	—	—	—	—	—	19	21
Preparation	29	22	29	19	7	11	4	10	4	10	2	5	2	17	171
Cortex	13	10	28	14	—	—	8	15	10	6	—	5	2	14	125
Flat debitage	16	7	38	11	2	1	12	—	8	8	1	3	—	32	139
Orthogonal debitage	6	7	25	5	1	—	—	2	1	1	—	—	—	12	60
'Eclat de taille'	—	—	—	—	1	—	—	—	—	6	—	—	—	13	20
<b>Flake total</b>	<b>79</b>	<b>51</b>	<b>120</b>	<b>64</b>	<b>12</b>	<b>13</b>	<b>25</b>	<b>28</b>	<b>27</b>	<b>33</b>	<b>3</b>	<b>13</b>	<b>5</b>	<b>118</b>	<b>591</b>
<b>Core-tools:</b>															
Biface & pick	9	14	3	5	1	1	19	6	20	1	3	4	1	25	112
Chopper	1	3	—	—	1	—	4	10	5	3	—	—	—	—	27
Small bifacial piece	1	4	6	—	—	—	—	—	—	—	—	1	—	12	24
<b>Total core-tools</b>	<b>11</b>	<b>21</b>	<b>9</b>	<b>5</b>	<b>2</b>	<b>1*</b>	<b>23</b>	<b>16</b>	<b>25</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>37</b>	<b>163</b>
<b>Fragments &amp; varia</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>38</b>	<b>39</b>
<b>Site totals</b>	<b>123</b>	<b>95</b>	<b>162</b>	<b>94</b>	<b>24</b>	<b>20</b>	<b>66</b>	<b>103</b>	<b>71</b>	<b>45</b>	<b>18</b>	<b>24</b>	<b>7</b>	<b>248</b>	<b>1,100</b>

**Table 10: Types of flake and types of butt at surface sites in the Zarqa-Samra sector**

Flake types	Butt types	Surface sites, Zarqa-Samra sector								Totals
		Cortex	Plain	Dihed	Facet	Lipped/ Punctif.	Removed	Broken	Unre- cog.	
Levallois		—	7	5	21	—	1	10	1	45
Preparation		25	46	14	7	8	7	35	8	150
Cortex		23	38	2	4	2	8	28	6	111
Flat debitage		8	32	10	14	1	14	24	3	106
Orthogonal debitage		7	19	2	6	—	7	14	1	56
Blade		1	—	—	—	—	1	—	—	2
'Eclat de taille'		—	1	—	—	—	—	—	6	7
Chips		—	—	—	—	—	—	—	—	—
<b>Total</b>		<b>64</b>	<b>143</b>	<b>32</b>	<b>52</b>	<b>11</b>	<b>38</b>	<b>111</b>	<b>25</b>	<b>477</b>

**Table 11: Tool-types at surface sites in the Zarqa-Samra sector**

Tool-types	Surface sites														Total
	3	4	5a	7b	14	25b	30a	30b	30c	128	129b	130b	130c	135	
Levallois flake	14	5	—	7	1	—	1	1	4	2	—	—	—	—	35
Levallois point	1	—	—	1	—	1	—	—	—	—	—	—	—	—	3
Levallois blade	—	—	—	5	—	—	—	—	—	—	—	—	—	—	5
Racloir, single	1	1	—	—	—	—	—	1	—	1	—	—	—	—	4
Racloir, bifacial	1	—	—	—	—	—	—	—	—	—	—	—	—	1	2
Racloir, massive	—	3	—	—	—	—	—	—	—	—	—	—	—	—	3
End-scraper	—	2	—	—	—	—	—	—	—	2	—	1	—	—	5
Burin	2	—	—	—	—	—	1	—	—	—	—	1	—	—	4
Thin denticulate	—	3	—	—	—	—	1	2	—	—	—	—	—	—	6
Thick denticulate	—	3	—	—	—	—	—	—	—	—	—	—	—	—	3
Bec	2	—	—	—	—	—	—	—	—	—	—	—	—	—	2
Borer	—	2	—	—	—	—	—	—	—	—	—	—	—	—	2
Small bifacial piece	—	—	6	—	—	—	—	—	—	—	—	—	—	10	16
Lateral chopper	1	1	—	—	—	—	—	3	2	3	—	—	—	—	10
Distal chopper (& lat./dist.)	—	2	—	—	1	—	4	6	2	—	—	—	—	—	15
Discoïdal chopper	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Burinant chopper	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1
Biface and pick	9	14	3	5	1	1	19	6	20	1	3	5	1	27	115
Hammerstone	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
<b>Total</b>	<b>31</b>	<b>37</b>	<b>9</b>	<b>18</b>	<b>3</b>	<b>3</b>	<b>26</b>	<b>20</b>	<b>29</b>	<b>9</b>	<b>3</b>	<b>7</b>	<b>1</b>	<b>38</b>	<b>233</b>

Table 12: Numbers and categories of 152 bifaces at *in situ* and surface sites in the Zarqa-Samra sector

Biface Categories	Context	Site	Discoid	D-shaped	Bifacial cleaver	Ovate	Elongated ovate	Partial ovate	Subovate-partial	Amygdaloid	Short amygdaloid	A typical amyg.	Cordiform	Subcordiform	Lanceolate	Partial lanceol.	Backed	Pick/trihedral	Divers/bifacial pc	Rough-out	Fragment	Sub-total	Total
1. <i>In situ</i> (Bire, Qf2)	22a2	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	8
	116	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	
	119b	—	—	—	1	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	3	
	134	—	—	—	1	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	3	
2. <i>In situ</i> (Khirbet Samra, Qf1)	9a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	8
	5b	1	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	2	
	26b	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	
	109	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	
3. Surface of distinct sites	3	—	—	1	2	—	—	—	—	1	—	2	—	—	1	—	1	1	—	—	—	9	132
	4	—	1	—	5	—	1	—	—	—	—	—	1	—	2	—	1	—	—	—	3	14	
	5a	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	6	—	1	9	
	7b	—	—	—	2	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	1	5	
	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	
	25b	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	
	30a	—	1	—	1	2	—	2	2	—	6	—	—	2	—	—	—	—	—	—	3	19	
	30b	1	2	—	1	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	6	
	30c	2	—	1	1	1	—	2	2	3	1	1	2	1	—	1	—	—	—	2	—	20	
	128	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	
	129b	—	1	—	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	3	
	130b	—	—	—	—	2	—	1	—	1	—	—	—	—	—	—	—	—	—	1	—	5	
	130c	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	
135	1	3	1	3	—	1	3	1	1	3	—	—	1	—	—	2	12	1	5	—	38		
4. Isolated Surface finds	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	4
	16	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	
	33	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	
	101	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	
Total		5	9	4	19	5	2	10	11	6	17	6	2	7	—	4	5	20	4	16		152	



**Table 13a: Raw Material of 126 bifaces in the Zarqa/Samra sector**

<i>Groups</i>	1	2	3			<i>Sub-total</i>	<i>Total</i>	<i>Percent</i>
Raw Material	<i>In Situ:</i>		<i>Surface:</i>					
	Qf2	Qf1	30 & 130b	135	Other			
Flint: opaque or beige	4	2	12	11	18	47		
Flint: dark-grey-blue	—	—	16	2	5	23	77	61.4
Flint: grey-violet-pink	—	—	1	3	3	7		
Dense chert: Eocene	—	—	—	—	1	1		
Chert: grey-beige	2	2	12	11	9	36	49	38.5
Calcareous banded flint	1	—	9	—	2	12		
<b>Total</b>	<b>7</b>	<b>4</b>	<b>50</b>	<b>27</b>	<b>38</b>	<b>126</b>	<b>126</b>	

**Table 13b: Blanks used to make 139 bifaces in the Zarqa/Samra sector**

<i>Groups</i>	1	2	3			<i>Sub-total</i>	<i>Total</i>	<i>Percent</i>
Blank (support)	<i>In situ:</i>		<i>Surface:</i>					
	Qf2	Qf1	30 & 130b	135	Other			
Irregular nodule	1	—	10	4	7	22		
River pebble	—	2	11	3	5	21		
Tabular slab	1	—	11	4	13	29		
Older artefact	—	—	1	1	—	2		
Flake	—	—	1	1	1	3		
Unrecognisable (no cortex)	5	4	14	13	12	48	48	34.53
Unrecorded	1	1	2	2	8	14		
<b>Total</b>	<b>8</b>	<b>7</b>	<b>50</b>	<b>28</b>	<b>46</b>	<b>139</b>		

**Table 14a: The condition of 133 bifaces of the Zarqa/Samra sector**

<i>Groups</i>	1	2	3			<i>Sub-total</i>	<i>Total</i>	<i>Percent</i>
Condition	<i>In Situ:</i>		<i>Surface:</i>					
	Qf2	Qf1	30 & 130b	135	Other			
Heavily rolled	5	—	—	1	—	6		
Very rolled	2	1	1	3	5	12		
Rolled	1	3	4	10	10	28	56	42.1
Weathered ('smoothed')	—	2	34	10	21	67		
Fresh	—	—	4	3	2	9		
Not recorded	—	1	1	—	9	11		
<b>Total</b>	<b>8</b>	<b>7</b>	<b>44</b>	<b>27</b>	<b>47</b>	<b>133</b>		
Pieces with concretion	3	4	14	12	14	—	(47)	

**Table 14b: Patinas of 129 bifaces in the Zarqa/Samra sector**

Groups Patina	1	2	3	135	Other	Totals
	<i>In Situ:</i>		Surface:			
	Qf2	Qf1	30 & 130b			
White	1	2	6	3	9	21
Pink/wine	—	1	1	9	5	16
Grey/beige	2	3	25	12	20	62
Dark grey	—	1	15	1	3	20
Yellow/brown	2	—	3	1	2	8
Brown	3	—	—	—	—	3
<b>Total in sample</b>	<b>8</b>	<b>7</b>	<b>50</b>	<b>26</b>	<b>39</b>	<b>130</b>

**Table 15a: Types of tip on 137 bifaces, Zarqa/Samra sector**

Groups Types of Tip	1	2	3	135	Other	Sub- total	Total	Percent
	<i>In Situ:</i>		Surface:					
	Qf2	Qf1	30 & 130b					
Pointed	2	3	11	7	6	29		27.8
Ogival/broad point	1	—	7	—	6	14		13.4
Rounded	—	—	10	3	14	27		25.9
Straight (broad)	—	—	2	2	—	4		
	—	—	1	—	—	1		
Triangular section	—	—	1	1	2	4		
Reworked (to rounded)	—	1	6	1	3	11		
(to pointed)	2	—	2	2	2	8		
Other	1	1	1	1	2	6	104	
Absent	2	3	8	10	10	33		
<b>Total</b>	<b>8</b>	<b>8</b>	<b>49</b>	<b>27</b>	<b>45</b>	<b>137</b>		

**Table 15b: Types of base on 138 bifaces, Zarqa/Samra sector**

Groups Types of Base	1	2	3	135	Other	Sub- total	Total	Percent
	<i>In Situ:</i>		Surface:					
	Qf2	Qf1	30 & 130b					
Edged	4	1	10	13	16	44	55	39.8
Partially edged	1	—	2	1	7	11		
Not edged: Cortex	—	4	16	4	2	26		
Worked	2	—	18	4	6	30	62	52.9
Mixed c & w	—	1	1	—	4	6		
Fragment	—	—	1	2	—	3		
Unrecognisable	1	2	2	2	11	18		
<b>Total</b>	<b>8</b>	<b>8</b>	<b>50</b>	<b>26</b>	<b>46</b>	<b>138</b>	<b>117</b>	

**Table 16a: Types of lateral cutting edges on 138 bifaces, Zarqa/Samra sector**  
 \*Straight/sinuous edges are those straight overall with small sinuosities

<i>Groups</i>	<i>1</i>	<i>2</i>	<i>3</i>			<i>Sub- total</i>	<i>Total</i>	<i>Percent</i>
Lateral cutting-edges	<i>In situ:</i>		<i>Surface:</i>					
	Qf2	Qf1	30 & 130b	135	Other			
Both straight	3	2	17	7	10	39		
1 str., 1 str/sinuous*	—	—	11	5	9	25	71	54.6
1 straight, 1 sinuous	1	1	3	1	1	7		
Both str/sinuous	—	—	4	2	2	8		
1 str/sin., 1 sinuous	3	1	7	9	1	21		
Both sinuous	—	1	2	1	9	13		
One edged: straight	—	—	2	—	5	7	59	45.3
str/sin	—	—	2	1	3	6		
sin	—	—	1	—	2	3		
Three edges	—	—	—	1	—	1		
Unrecognisable	1	2	1	—	4	8		
<b>Total</b>	<b>8</b>	<b>7</b>	<b>50</b>	<b>27</b>	<b>46</b>	<b>138</b>	<b>130</b>	

**Table 16b: Types of face retouch on 135 bifaces, Zarqa/Samra sector**

<i>Groups</i>	<i>1</i>	<i>2</i>	<i>3</i>			<i>Sub- total</i>	<i>Total</i>	<i>Percent</i>
Face retouch types	<i>In situ:</i>		<i>Surface:</i>					
	Qf2	Qf1	30 & 130b	135	Other			
Fine (secondary flaking)	2	1	8	7	12	30	54	44.2
Mainly fine	—	1	12	3	8	24		
Mixed fine & rough	2	1	13	9	7	32		
Mixed fine & cortex	—	—	4	1	2	7	68	55.7
Mainly rough	3	1	4	2	5	15		
Rough (primary flaking)	—	1	7	2	4	14		
Unrecognisable	1	3	2	—	7	13	122	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>50</b>	<b>24</b>	<b>45</b>	<b>135</b>		

## Bibliography

- J. Besançon, Chronologie du Pléistocène au Levant: synthèse, in J. Cauvin and P. Sanlaville (eds.), *Préhistoire du Levant*, Paris, 1981.
- ., H. de Contenson, L. Copeland, F. Hours, S. Muhesen and P. Sanlaville, L'homme et le milieu au Proche Orient, *Annales Archéologique Arabes Syriennes*, 32 (1982) p. 211-232.
- ., L. Copeland and F. Hours, L'Acheuléen Moyen de Joubb Jannine (Liban), *Paléorient*, 8:1 (1982) p. 11-36.
- ., L. Copeland, F. Hours, J.J. Macaire and P. Sanlaville, Evolution de la Vallée moyenne du Dhuleil et du Zarqa (Jordanie) au Néogène et au Quaternaire. *Revue de Géologie Dynamique et de Géographie physique*, in preparation.
- ., L. Copeland, F. Hours, S. Muhesen and P. Sanlaville, Géomorphologie et Préhistoire de la vallée moyenne de l'Euphrate, Essai de chronologie du Pléistocène et du Paléolithique de Syrie, *Comptes Rendus de l'Académie des Sciences*, t. 290, 1980, D167-170.
- ., L. Copeland, F. Hours, S. Muhesen and P. Sanlaville, Le Paléolithique d'el-Kowm: rapport Préliminaire, *Paléorient* 7:1 (1981) p. 33-55.
- ., L. Copeland, F. Hours and P. Sanlaville, The Paleolithic sequence in Quaternary Formations of the Orontes River Valley, Northern Syria, *Bulletin of the Institute of Archaeology*, 15 (1978) p. 149-170.
- ., and F. Hours, Prehistory and Geomorphology in Northern Jordan, *Studies in the History and Archaeology of Jordan*, vol. 2, in press.
- ., and P. Sanlaville, Aperçu géomorphologique sur la vallée de l'Euphrate Syrien, *Paléorient*, 7:2 (1981) p. 5-18.
- F. Bordes, Le Paléolithique inférieur et moyen de Jabrud (Syrie) et la question du Pré-Aurignacien, *L'Anthropologie* 59: 5-6 (1955) p. 486.  
*Typologie du Paléolithique Ancien et Moyen*, Bordeaux, 1961.
- L. Copeland, The Paleolithic Stone Industries, in D. Roe (ed.) *Adlun in the Stone Age: The excavations of D.M.A. Garrod in the Lebanon, 1958-1963*, *British Archaeological Reports*, Int. Ser 159, 1983.
- ., and F. Hours, Le fin de l'Acheuléen Moyen et l'avènement du Paléolithique Moyen en Syrie, in J. Cauvin and P. Sanlaville, (eds.), *Préhistoire du Levant*, Paris, 1981, 225-238.
- H. Field, ed., *North Arabian Desert Archaeological Survey, 1925-1950*, Papers of the Peabody Museum, Harvard, 45:2 (1960).
- A. Garrard and N. Stanley Price, A Survey of Prehistoric Sites in the Azraq Basin, Eastern Jordan *Paléorient* 3 (1977) p. 109-126.
- D. Gilead, Handaxe Industries in Israel and the Near East, *World Archaeology* 2 (1970) p. 1-11.
- N. Goren, An Upper Acheulean Industry from the Golan Heights, *Quartär*, 29:30 (1979) p. 105-121.
- ., The Acheulean site of Brekhat Ram, in A. Ronen (ed.), *The Transition from Lower to Middle Paleolithic and the Origin of Modern Man*, *British Archaeological Reports*, Int. Ser. 151, (1982) 117-119.
- F. Hours, Sondages pratiqués en 1979 sur le site de Gharmachi I: rapport préliminaire, Rapport d'activité, R.C.P. 476. *Recherches Anthropologiques au Proche et Moyen Orient*, C.N.R.S. (1980) p. 90-102.
- ., Le Paléolithique Inférieur de la Syrie et du Liban, Le point en question en 1980, in J. Cauvin, and P. Sanlaville (eds.), *Préhistoire du Levant*, Paris, 1981, p. 165-184.
- ., J. Le Tensorer, S. Muhesen and I. Yalcin Kaya, Premiers travaux sur le site de Nadaouiyeh I (el-Kowm, Syrie), *Paléorient*, 9:2 (1983) p. 5-14.

- J. B. Humbert, Khirbet es-Samra, une ville du *limes arabicus* et sa communauté Araméenne, in F. Villeneuve (ed.) *Contribution Française a l'archéologie Jordanienne*. Dijon, 1984, p. 40-43.
- D. L. Kennedy, *Archaeological Explorations on the Roman Frontier in North-East Jordan*, *British Archaeological Reports*, Int. Ser. 134, 1982.
- D. Kirkbride, Notes on a Survey of Pre-Roman Archaeological Sites near Jerash, *Bulletin of the Institute of Archaeology*, 1-3 (1958-1962).
- ., and L. Copeland, Results of a sounding at Lion Spring, Azraq (Jordan) in 1956, *in preparation*
- A. Marks and H. Crew, Rosh Ain Mor. an open air Mousterian site in the Central Negev, Israel, *Current Anthropology*, 13 (1972) p. 591-593.
- S. Muhsen, The Upper Acheulean in Syria, in J. Cauvin and P. Sanlaville, (eds.) *Préhistoire du Levant*, Paris, 1981, p. 185-194.
- National Water Master Plan, Vol. 2 (Atlas), National Research Authority, Amman: July, 1977.
- B. Nelson, *Azraq, Desert Oasis*, London, 1973.
- R. Neuville and R. Vaufray, L'Acheuleen supérieur de la grotte d'Oumm Qatafa., *L'Anthropologie* 41.3 51 (1931) p. 299-263.
- G. Rollefson, The Paleolithic Industries of Ain el-Assad (Lion Spring), near Azraq, Eastern Jordan, *ADAJ*, XXIV (1980) p. 129-144.
- ., The Late Acheulean site at Fjaje, Wadi el-Bustan, Southern Jordan, *Paléorient* 7:1 (1981) p. 5-22.
- A. Ronen, M. Ohel, M. Lamdan and A. Assaf, Acheulean artefacts from two trenches at Ma'ayan Barukh, *IEJ*, (1980) p. 17-33.
- A. Ronen, E. Shachnai and A. Saul, Upper Acheulean in the Kissufim Region, *Proceedings of the American Philosophical Society*, 116 (1982) p. 68-96.
- P. Sanlaville, (ed.) *Quaternaire et Préhistoire du Nahr el-Kebir Septentrional*. C.N.R.S., Paris, 1979.
- L. Villiers, First Report on Paleolithic Sampling at Abu el-Khas, Pella, *Annual of the Department of Antiquities of Jordan*. XXIV (1980), p. 163-167.

# NATUFIAN OCCUPATION IN THE WADI EL HASA SOUTHERN JORDAN

by

Brian F. Byrd and Gary O. Rollefson

## Introduction

With Garrod's research at the cave of Shukbah in 1928 came recognition of the Natufian as a discrete cultural tradition in Levantine prehistory.<sup>1</sup> But it was not until almost 1960 that Natufian settlements were discovered eastward beyond the hills of the Mediterranean vegetation zone of Palestine in the southern Levant. The excavation of Beidha, near Petra in southern Jordan, expanded knowledge of the range of Natufian settlement distribution eastward across the Jordan Valley to the edge of the Jordanian Plateau.<sup>2</sup> Since then, Natufian settlements have been discovered in a variety of environments in Jordan. Archaeological surveys during the last decade have identified evidence of Natufian occupation in the Azraq Basin in the east,<sup>3</sup> in the Black Desert in the northeast,<sup>4</sup> in the Pella area on the east slopes of the Jordan Valley,<sup>5</sup> in the Ras en Naqb area in the south,<sup>6</sup> and now in the Wadi el Hasa drainage in the south.<sup>7</sup>

In 1979 Dr. Burton MacDonald of St. Francis Xavier University, Canada initiated a three season survey project in the Wadi el Hasa drainage system in southern Jordan. More than 1000 sites were recorded during three seasons of work along the southern bank of the Wadi el Hasa, but only two of these clearly date to the Natufian. Both (WHS sites 895... Tabaqa... and 1021 were found during the third season of the project. They are located

near the eastern end of the drainage system. Tabaqa, due to its large size and the diversity of artefacts present, will be the main focus of this paper.

Tabaqa lies along the east side of the Wadi Ahmar three-quarters of a kilometre from its junction with the Wadi el Hasa (Fig. 1). The Wadi Ahmar, one of the larger southern tributaries of the Wadi el Hasa, lies some thirteen kilometres west of the desert highway town of Al Hasa. The settlement of Tabaqa is situated on what appears to be a remnant terrace of the Wadi Ahmar and artefacts are exposed in a series of erosional gulleys in the terrace (Pl. XVI: 1). The location, at an elevation of 705.00 m., has a restricted view of the surroundings. Jebel el Kutuf rises over 200.00 m. immediately to the south and to the west; on the other side of the Wadi Ahmar, there is an escarpment of comparable height. Along the north and east side of the site a small hill encloses the area and inhibits the view as well as access to the Wadi el Hasa. The terrain in the vicinity of the site is rocky with the exception of the terrace and the *wadi* beds.

Few artefacts were visible on the top of the terrace but numerous artefacts were washing out of the sides of the small erosional gulleys that dissect the site. The presence of large numbers of microliths, mainly lunates, clearly indicated that the site dated to the Natufian. The extent of the scatter of artefacts is approximately

<sup>1</sup> D. A. E. Garrod, A New Mesolithic Industry: the Natufian of Palestine, *Journal of the Royal Anthropological Institute*, 62, (1932) p. 257-270.

<sup>2</sup> D. Kirkbride, The Excavation of a Neolithic Village at Seyl Aqlat, Beidha near Petra, *PEQ*, 92 (1960) p. 136-145.

<sup>3</sup> A. N. Garrard and N. P. Stanley-Price, A Survey of Prehistoric Sites in the Azraq Basin, *Paleorient*, 3 (1975) p. 109-126.

<sup>4</sup> A. Betts, A Natufian site in the Black Desert,

Eastern Jordan, *Paleorient*, 8 (1982) p. 79-82.

<sup>5</sup> A. McNicoll, et. al., Preliminary Report on the University of Sydney's fifth season of excavation at Pella in Jordan, *ADAJ*, in press.

<sup>6</sup> D. O. Henry, The Prehistory of Southern Jordan and Relationships with the Levant, *Journal of Field Archaeology*, 9:4, (1982) p. 417-444.

<sup>7</sup> B. MacDonald, et.al., The Wadi el Hasa Survey 1982: A Preliminary Report, *ADAJ*, 1983.

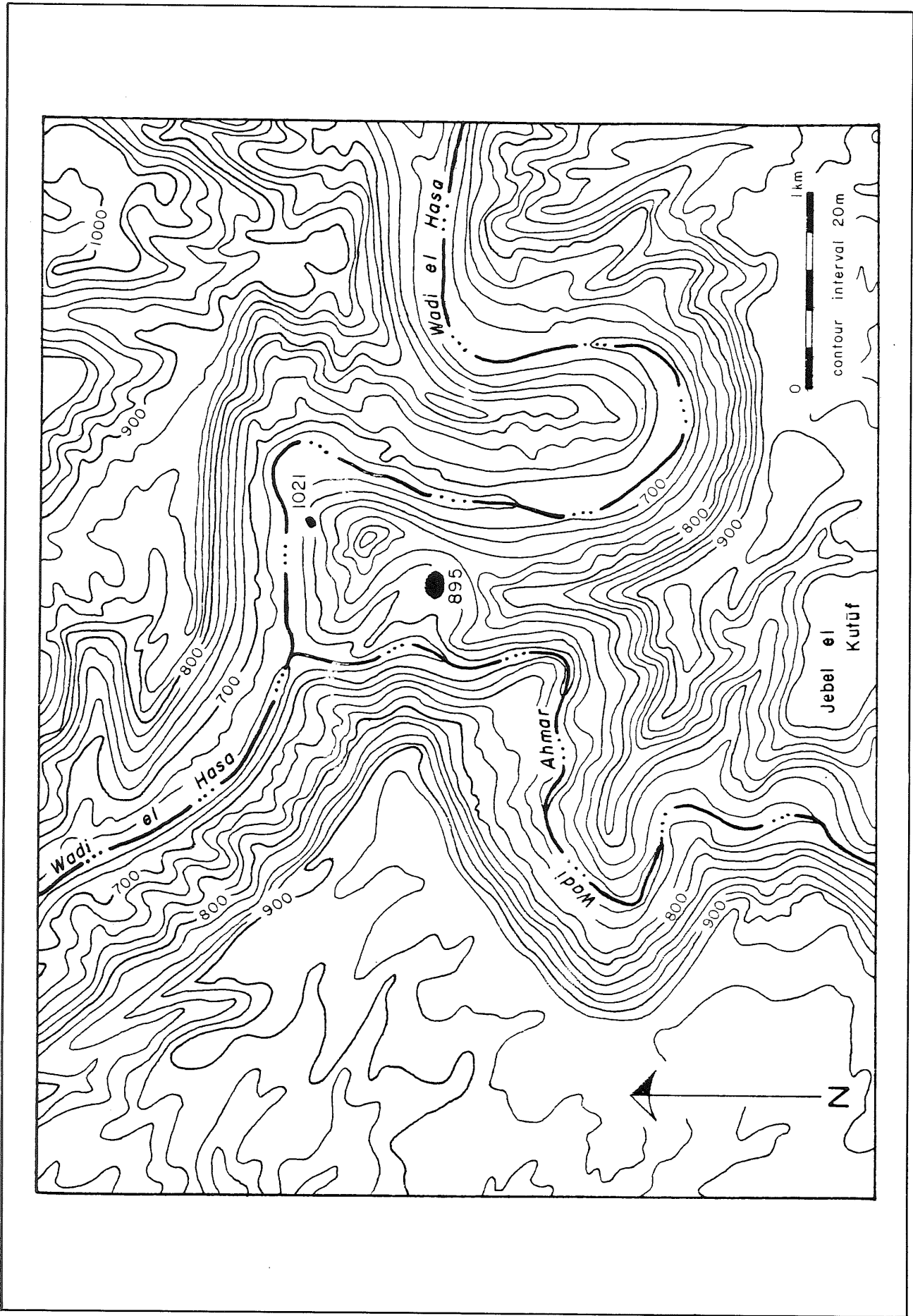


Fig. 1: Topographic Map of the Tabaqa area

50.00 m. x 100.00 m. or over 5,000 square metres in area. However, determination of the actual extent of the settlement or even the size of the *in situ* deposits must await the excavation phase of our research at the site. Nevertheless, the extent and quantity of material suggests a settlement comparable in size to known Natufian base camps,<sup>8</sup> and hence deserves special attention

### Material Remains

#### Chippedstone material

A large sample of chippedstone from Tabaqa was recovered during the survey. However, the sample obtained is not suitable for interpreting comparative frequencies of debitage or tool classes due to the subjective nature of the collection technique. The biases in the collection method have made the material quantifiably unreliable. Despite this, the quantity of each artefact class recovered will be presented and some observations will then be made regarding particular classes of artefacts. Table 1 lists the various chipped stone artefact classes collected. It accurately reflects the bias of the collection method which focused on blades, tools, and cores.

**Table 1: Quantity of Each Artefact Class Recovered at Tabaqa**

Flakes	31
Blades/Bladelets	296
Crested elements	2
Core tablets	2
Microburins (Tools)	3 (169)
<hr/>	
Total	356
Unidentifiable debitage	22

#### Technology

Some observations can be made simply on the presence of particular classes of artefacts in Table 1. Both crested elements and core tablets appear to have been used in the production and rejuvenation of cores. In addition, the presence of three

microburins suggests the technique was used in snapping bladelets during the production of microlithic tools. How frequent was the use of the technique remains unknown.

Some morphological features were recorded on the blades collected. These observations provide insight into the nature of the blade production technology used. Crushed and punctiform platforms are the most common types present (Table 2). Plain platforms were slightly less frequent, and cortical platforms even less common. The longitudinal shape of the blades is generally either flat or incurving (Table 3). Twisted and outcurving blades are rare.

**Table 2: Platform Type of Blades and Bladelets at Tabaqa**

	N	%
Plain	32	19.28
Dihedral	2	1.20
Multiple facet	2	1.20
Crushed	70	42.17
Punctiform	48	28.92
Cortical	12	7.23
<hr/>		
Total	166	100.00

**Table 3: Longitudinal Profile of Blades and Bladelets at Tabaqa**

	N	%
Incurving	144	56.69
Flat	102	40.16
Twisted	7	2.76
Outcurving	1	0.39
<hr/>		
Total	254	100.00

Blade cores dominate the sample of cores collected (Table 4). Only one flake core was recovered. Of the blade cores, single platform types with blades detached from one face are the most common type (Fig. 3:q). Single platform pyramidal cores were also frequent (Fig. 3:r). A smaller

<sup>8</sup> O. Bar-Yosef, The Epipaleolithic complexes in the southern Levant, in *Prehistoire du Levant*, eds. J. Cauvin and P. Sanlaville, *Colloques Internationaux du CNRS*, No. 598, Paris, 1981, p.

401; D. O. Henry, Adaptive Evolution within the Epipaleolithic of the Near East, *Advances in World Prehistory*, 2, (1983) p. 99-160.



number of multiplatform cores was collected.

**Table 4: Core Types at Tabaqa**

	<i>n</i>	<i>N</i>
Single Platform Blade Core		13
Pyramidal	4	
subpyramidal	2	
one face	7	
Opposed Platform Blade core		3
same face	2	
opposite face	1	
Ninety Degree Platform Blade Core		2
same face	1	
opposed and one face	1	
Flake core		1
Unidentifiable Fragments		1
<hr/>		
Total		22

The nature of the lithic technology is similar to the technology described for Palestinian Natufian sites.<sup>9</sup> One clear difference is that most of the cores recovered at Tabaqa tend to be single platform rather than multiplatform.<sup>10</sup>

#### Tools

Over one hundred and fifty tools were collected at the site (Table 5). Of the types collected, endscrapers on retouched blades (Fig. 2:e,f,g,k), lunates (Fig. 3:c-m), notches (Fig. 2:a-d), and retouched pieces are the most prevalent. Burins (Fig. 2:h), truncations, denticulates, and perforators (Fig. 2:i,j) all are more rare. Very few triangles (Fig. 3:n) or trapezes (Fig. 3:o,p) were found and no rectangles, sickle blades or massive tools were recovered.

Lunates were by far the most abundant class of backed bladelets in the sample. The size range of the seven complete lunates clusters closely around the means of the length and the width of the sample: 2.49 cm for the length and 0.70 cm

for the width (Fig. 4). The mean width of the twenty-two broken lunates recovered, 0.718 cm., is similar to that for the complete lunates. It should be mentioned, however, that the sample size is very small and may not be representative of the site as a whole.

Bifacial retouch and interior retouch were the two most common forms of backing used in the manufacture of the Lunates (Table 6). Alternating retouch was used on the remainder of the lunate sample. None of the lunates had abrupt retouch and it occurred only on a few artefacts from other classes of backed bladelets. The common occurrence of interior retouch on lunates at Tabaqa is in contrast to its low frequency at Palestinian Natufian sites.<sup>11</sup>

The range of tool types observed at Tabaqa falls within the parameters of the Natufian. In particular, the apparent abundance of notches, lunates, and retouched pieces, and the absence of sickle blades at Tabaqa is quite similar to the assemblages from two other Natufian sites in southern Jordan: Beidha<sup>12</sup> and Wadi Judayid.<sup>13</sup> However, without a controlled sample from Tabaqa these observations must be regarded as very tentative.

**Table 5: Quantities of Tool Types Recovered at Tabaqa**

	<i>n</i>	<i>N</i>
Scrapers		33
end scraper on blade	3	
end scraper on		
retouched blade	24	
circular scraper	2	
double end scraper	1	
end scraper with lateral notch	3	
Burins		3
on natural surface	2	
on straight truncation	1	
Backed Bladelets		49

<sup>9</sup> D. O. Henry, Examination of artefact variation in the Natufian, in *Eretz Israel*, 13 (1977) IEF; *An analysis of settlement patterns and adaptive strategies of the Natufian, in Prehistoire du Levant*, eds. J. Cauvin and P. Sanlaville, *Colloques Internationaux du CNRS*, no. 598, p. 421-432.

<sup>10</sup> Henry, 1981, *op. cit.*, p. 422.

<sup>11</sup> Henry, 1977, *op. cit.*, p. 235.

<sup>12</sup> D. Kirkbride, Five Seasons at the Prepottery Neolithic Village of Beidha in Jordan, *PEQ*, 98 (1966) p. 8-72.

<sup>13</sup> Henry, 1982, *op. cit.*, p. 437.

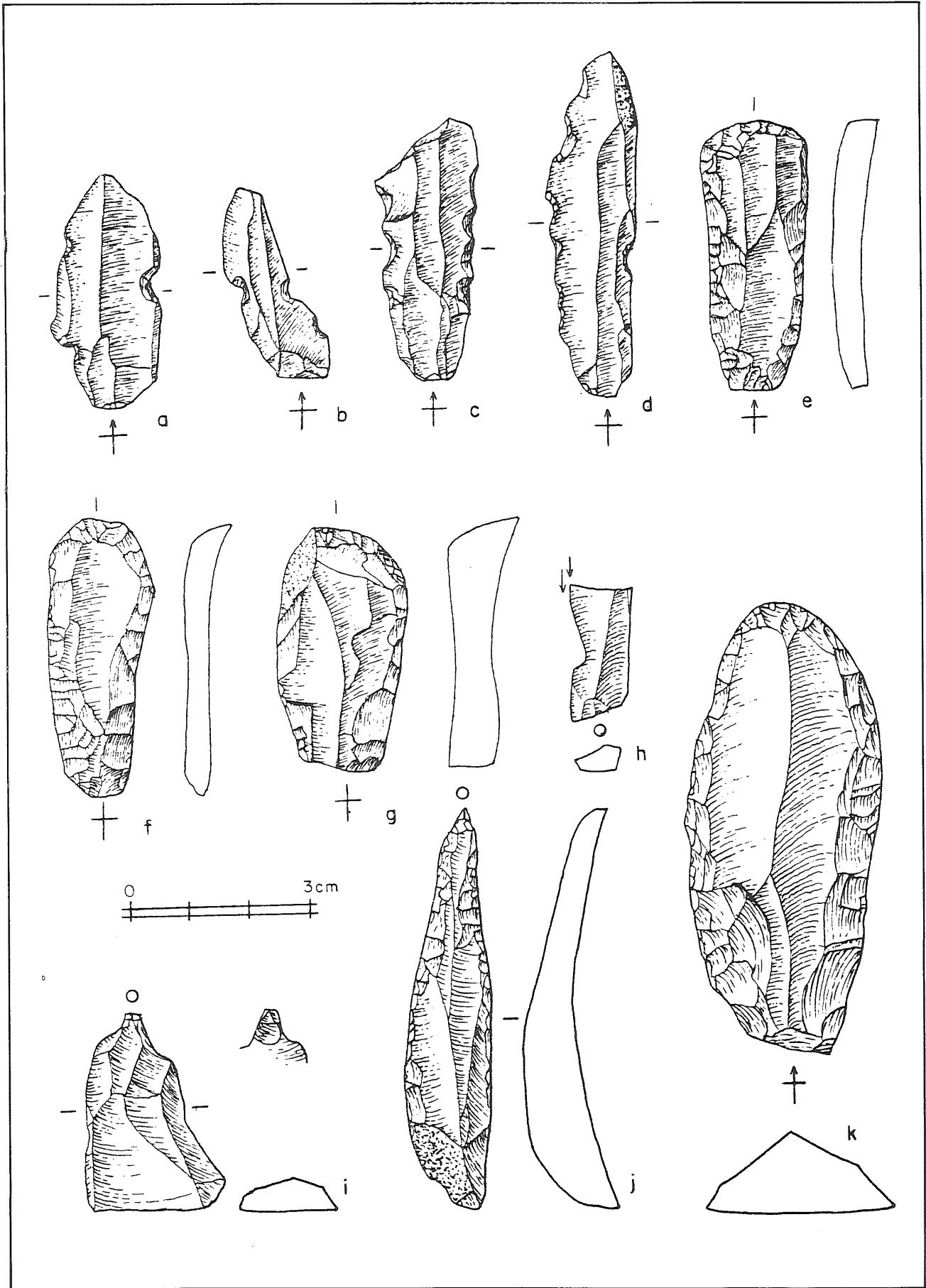


Fig. 2: Chipped-stone artefacts from Tabaqa

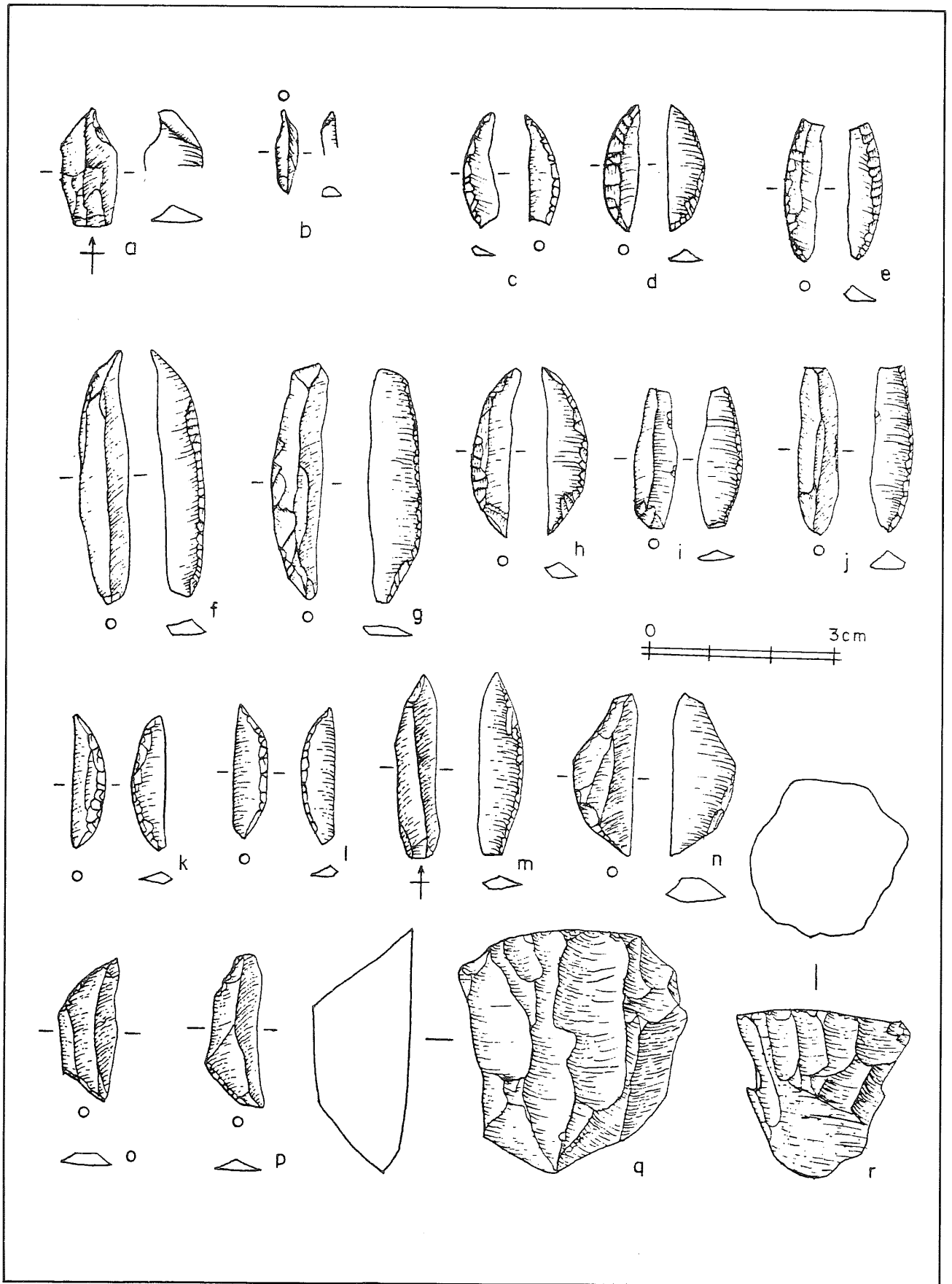


Fig. 3: Chipped-stone artefacts from Tabaqa

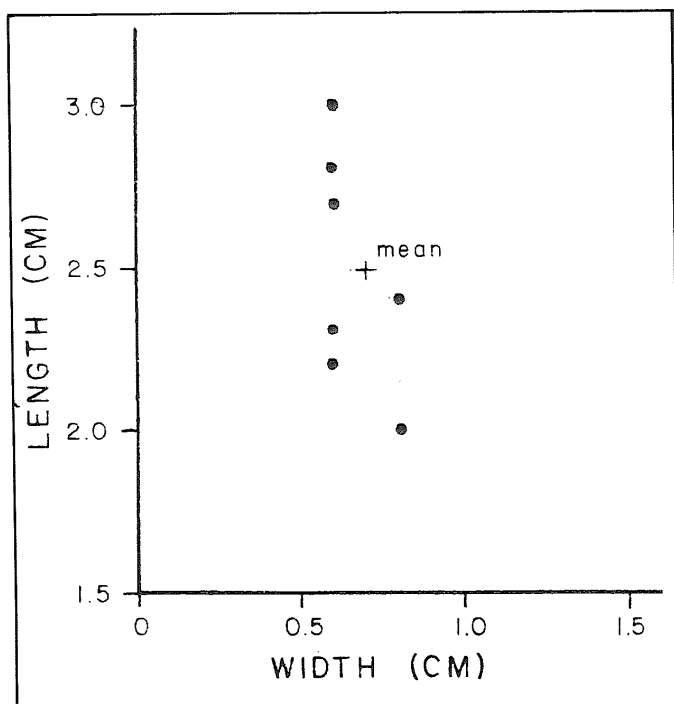


Fig. 4: Size distribution of complete lunates from Tabaqa

lunates	29	
complete (7)		
broken (22)		
triangles	1	
trapezes	2	
partially backed piece	6	
fragment	7	
fragment with truncation	4	
Perforators		6
with retouched tip	3	
with converging backed edges	3	
Truncations		4
straight truncation	1	
oblique truncation	3	
Multiple Tool		4
Retouched Piece		20
unilateral retouch	3	
bilateral retouch	2	
alternatively retouched	2	
partially retouched	13	
Denticulates		9
denticulate	4	
denticulate with retouch	5	

Notches	33
single notch	2
multiple notch	17
multiple notch with retouch	14
Various	8
<hr/>	
Total	169

Table 6: Backing Retouch on Lunates at Tabaqa

	N	%
Bifacial (Helwan)	12	41.38
Interior, semisteep	10	34.48
Alternating, interior & exterior	4	13.79
Alternating, bifacial & unifacial	3	10.34
<hr/>		
Total	29	99.99

#### Non-Chippedstone Artefacts

Groundstone tools, stone beads, bone, and shell were all observed on the surface of the site. Two shell artefacts were collected. The one identifiable fragment was from a cowrie shell. Fragments of three stone beads were also recovered. The beads are finely polished, oval in cross-section, and are made of opal.

The groundstone artefacts included a hand grinder, a fragment of a pestle, and a mortar. The deep mortar had been used to such an extent that a hole was worn in the bottom (Pl. XVI:2). Such extensive use has been observed as Nahal Oren,<sup>14</sup> Hayonim Cave,<sup>15</sup> El-Wad,<sup>16</sup> and Jericho.<sup>17</sup>

#### Discussion

Tabaqa can be classified as a Natufian base camp. This is based on the site's large size, the diversity of chipped-stone tool types, the abundance of lunates, and the presence of groundstone tools, beads, and shell.<sup>18</sup> In Jordan, the sites of Wadi Hammeh 27 in the Pella region and Beidha near Petra appear to be of comparable size to Tabaqa. In addition, only Hammeh 27 appears to have as diverse an assemblage of non chippedstone artefacts as Tabaqa.<sup>19</sup>

<sup>14</sup> M. Stekelis and T. Yizraely, Excavations at Nahal Oren: Preliminary Report, *IEJ*, 13 (1963) p. 12.

<sup>15</sup> O. Bar-Yosef and N. Goren, Natufian Remains in Hayonim Cave, *Paleorient*, 1 (1973) p. 41.

<sup>16</sup> D. A. E. Garrod and D. M. A. Bate, *The Stone Age of Mount Carmel*, vol. 1, Oxford, 1937, p. 41.

<sup>17</sup> K. Kenyon, Earliest Jericho, *Antiquity*, 129, (1959) p. 8.

<sup>18</sup> Bar Yosef, 1979, *op. cit.*, p. 174; Bar-Yosef and Goren, *op. cit.*, p. 67; Henry, 1983, *op. cit.*, p. 138.

<sup>19</sup> McNicoll, *et. al.*, *op. cit.*

The frequent use of bifacial retouch in conjunction with the absence of abrupt retouch on the lunates indicates that the site dates to the early phase of the Natufian between ca. 10,000 B.C. and 9,000 B.C.<sup>20</sup> This assertion is further supported by the average length of the lunates. The average of this admittedly extremely small sample is 2.49 m. In comparison with other Natufian sites this is a large average length and would place the site within the early Natufian category developed for Palestine.<sup>21</sup> The similarity in average width of the complete and the broken lunates at the site further supports this result since as lunate length decreases so does width.<sup>22</sup> It is possible, however, that the large size is due to collection bias with larger pieces being more visible and therefore over-represented in the sample.

Recent work at the early Natufian site of Wadi Judayid has provided a series of early radiocarbon dates: 10,140±800 B.C. (SMU-805), 10,800±1000 B.C. (SMU-806), and 10,834±659 (SMU-803).<sup>23</sup> These results have led Henry to suggest that the origins of the Natufian are in Jordan and subsequent Natufian expansion was to the west and not to the east as has been argued previously.<sup>24</sup> Research at Tabaqa could provide further data to help resolve this problem.

### Context Within the Wadi el Hasa

It is remarkable that only one large Natufian site occurs on the southern fringe of the Wadi el Hasa, and in this regard Tabaqa constitutes a unique opportunity to investigate the reasons for the selection of a settlement area. The only other Natufian presence is site 1021, located approximately a half-kilometre from Tabaqa on the south bank of the Wadi el Hasa some 650 metres upstream from the confluences of

the Wadi Ahmar and the Wadi el Hasa (Fig. 1).

The site, lying some 80 metres south of the Wadi el Hasa drainage channel is much smaller in size than Tabaqa. The scatter of artefacts is not dense and only thirty-five lithics were collected. Of these, three backed bladelets and one microburin were recovered. The color, patina, and morphology of the artefacts is very similar to the artefacts recovered at Tabaqa. Therefore, it appears that the site also dates to the Natufian. In addition to the chipped-stone artefacts present at the site, several clusters of stone were observed. These clusters, being exposed by erosion, may represent remnants of architectural features.

The close geographical association of the two Natufian sites is unusual. A research project focussing on both sites would have the opportunity to contrast the nature and time range of occupation at each site. The results could provide valuable insight into changes in Natufian settlement patterns over time.

### Acknowledgements

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<sup>20</sup> Henry, 1981, *op. cit.*, p. 424.

<sup>21</sup> O. Bar-Yosef and F. R. Valla, L'évolution du Natoufien nouvelles suggestions, *Paleorient*, 5 (1979) p. 141-151; F. R. Valla, Les établissements Natoufiens dans le nord d'Israël, in *Prehistoire du Levant*, eds., J. Cauvin and P. Sanlaville, *Colloques Internationaux du CNRS*, no. 598, Paris, 1981, p. 409-419.

<sup>22</sup> D. I. Olszewski, The Early Occupation at Tell

Abu Hureyra in the Context of the late Epipaleolithic of the Levant, Unpublished Ph.D. Thesis, University of Arizona, 1984.

<sup>23</sup> Henry, 1983, *op. cit.*

<sup>24</sup> D. O. Henry and P. F. Turnbull, Archaeological, faunal and pollen evidence from Natufian and Timnian sites in southern Jordan, *BASOR*, in press.

# AN ARCHAEOLOGICAL RECONNAISSANCE OF WATER HARVESTING STRUCTURES AND WADI WALLS IN THE JORDANIAN DESERT, NORTH OF AZRAQ OASIS

by

D. D. Gilbertson and D. L. Kennedy

## Introduction

The Azraq Oasis lies in the north-east desert of Jordan, some 85 km., east, south-east of Amman (Fig. 1). The oasis comprises a series of mudflats, pools and marshes, usually fed by groundwater, which offer some of the few permanent, natural water supplies in a region characterised by extreme heat and aridity.

Field reconnaissance in July, 1982, revealed the apparently successful production of barley by sedentary bedouin on the floor of the Wadi al-Beida (east arm, Fig. 2) to the east of Azraq Castle. The cereals had been grown using simple terrace and wall irrigation systems fed by pumped groundwater. However, at this site, a substantial wall or barrage was found on the valley floor. The barrage was 35.00 m. in length, 1.50-2.00 m. thick and orientated obliquely across the floodplain. Although its antiquity could not be determined, its function appeared to aid farming by controlling and diverting floodwaters for farming. This and other structures subsequently noted in the *awdiyah* to the north and north-east of Azraq Druze were observed to resemble closely the "early" floodwater control and harvesting structures reported from Jawa,<sup>1</sup> parts of the north east Jordan,<sup>2</sup> in southern Jordan,<sup>3</sup> in the Negev,<sup>4</sup> the Libyan pre-desert,<sup>5</sup> and Algeria.<sup>6</sup> The known dates of construction and usage of

such features vary widely: the Jawa water control structures date to the latter part of the fourth millenium; the Negev structures are Nabataean, whereas those in the Libyan pre-desert date to the Roman period, the Islamic period, and probably up to and including the twentieth century. In the present study area, the absence of excavation, and the absence of dateable pottery, necessitates concentration on the identification of such features, and discussion of their location, relative abundance and environmental relationships. In only a few instances have we been able to assess the relationships of the water control structures to dateable structures.

## Physical Background

Important accounts of the environment of the area are given in Bender (1974), Hemsley and George (1966), Nelson (1973) and Poore and Robertson (1964). In brief, the oasis occupies a shallow depression between the Jebel Druze to the north-west, and the Jebel Ashakif and the Jebel Jathum to the north-east. These northern uplands mainly comprise a series of undulating plains developed on weathered, vesicular olivine-augite basalts of Cenozoic age. The sandy or loamy regolith upon these is often in excess of 1.50 m. thick. A perched water table is often to be found at its base at the

<sup>1</sup> S. W. Helms, *Jawa — Lost City of the Black Desert*, London, 1981, Chapter V.

<sup>2</sup> D. L. Kennedy, *Archaeological Explorations on the Roman Frontier in North East Jordan*, Oxford, 1982, p. 31-36.

<sup>3</sup> Helms, *op. cit.*

<sup>4</sup> M. Evenari, L. Shanan and N. Tadmor, *The Negev*, Cambridge, MA, 1971, p. 95.

<sup>5</sup> G. W. W. Barker and G. D. B. Jones, *UNESCO Libyan Valleys Survey, Summary, 1979-1981*, London, 1982, p. 29.

<sup>6</sup> J. Bardez, *Fossatum Africae*, Paris, 1949, p. 165-212.

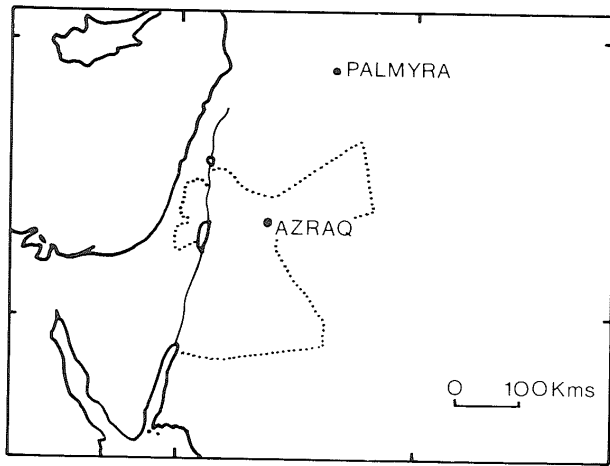


Fig. 1

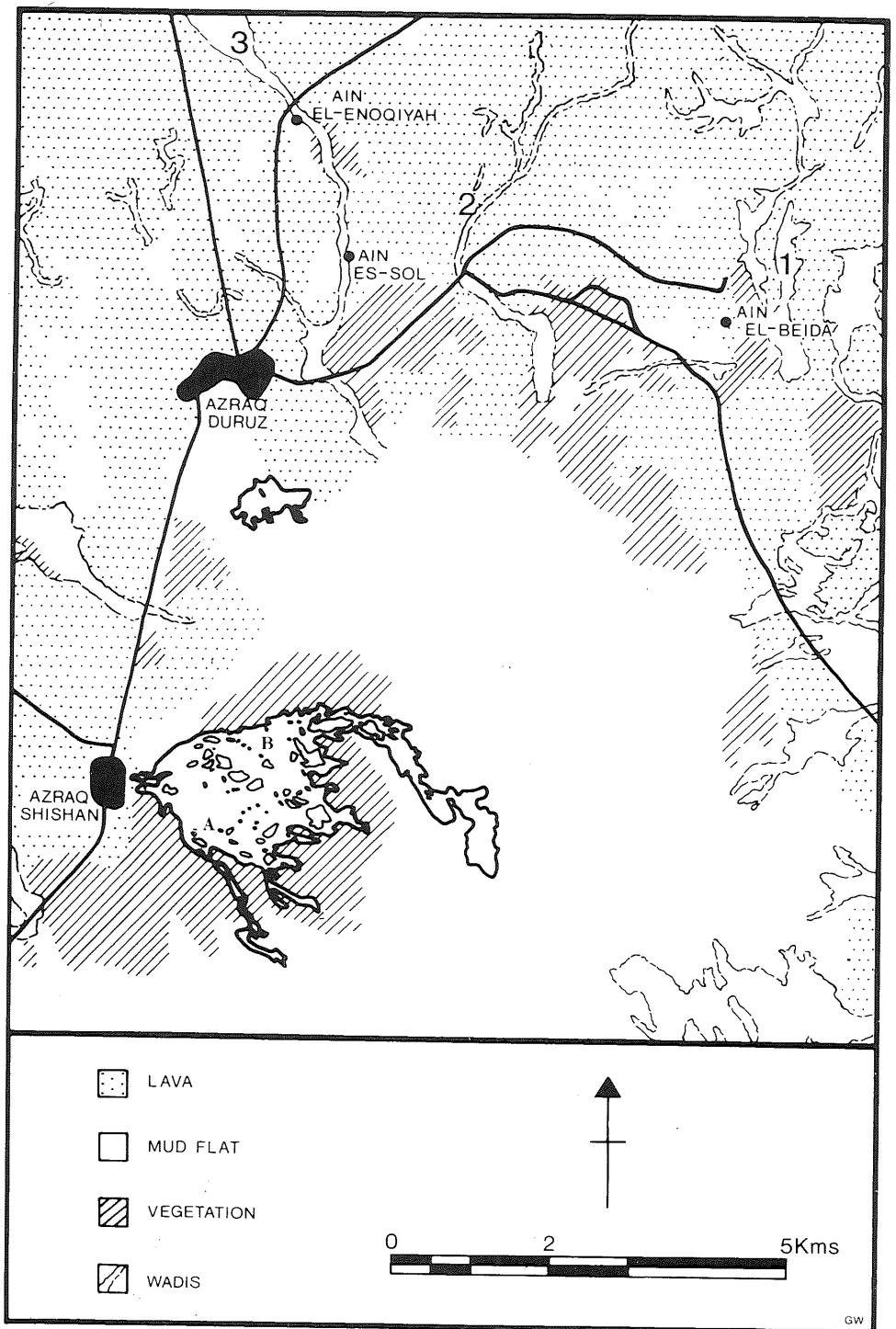


Fig. 2: 1. Wadi El Beida  
2. Wadi Shu'ayib- Huwaynit El-Qaryatein  
3. Wadi El-Enoqiyah.

contact with the underlying basalt. This is in contrast to the rocky hamada and/or shallow soils reported on the basalt at Jawa.<sup>7</sup> Three *wadi* systems are eroded into these basalt surfaces to the north of the Azraq depression. These are the Wadi el-Enoqiyah, the Wadi Shu'ayb-Huwaynit al Qaryatein and the area around the entrance to Wadi al-Beida, which are located in Figure 2. These *awdiyah* have rather narrow, rock-floored and boulder strewn upper reaches, middle sections with occasional large alluvial basins, and lower tracts with narrow, basalt-walled valleys.

The character and stratigraphic relationships of their infill Quaternary deposits are poorly known. At 'Ain el-Enoqiyah (Fig. 3) the *wadi* sides are 3.00-5.00 m. high erosional scarps eroded into the Cenozoic basalts. A complex of low-angle fans, colluvial debris and fluvial deposits give rise to a low terrace 0.80-1.00 m. above the floodplain (the 1.00 m. terrace, Fig. 3) at the scarp foot. Several springs emerge at this level from beneath the basalts (Fig. 3) and are associated with finer grade silts and loams. Temporary exposures in the active channels eroding into the *wadi* floor sediments reveal 0.50-1.00 m. of a lower stratum of red/brown fluvial sands and loams containing well-preserved Levallousian implements. A rubified textural B horizon of a palaeosol may be developed at this level. This feature is overlain by 0.50-1.00 m. of unconsolidated fluvial sands, gravels and cobble deposits which form the modern, aggrading *wadi* floor surface. Coarser, gravelly, fluvial facies between 1.50 and 5.00 m. down yield water to shallow bedouin wells and pits.

The climate of the region offers very few opportunities for growing cereals by conventional agricultural practices. The climate has been classified by Poore and Robertson (1964) as a Saharan Mediterranean of the very warm variety. Daily temperatures average 35°-37°C in summer. On average, less than 100 mm. of precipitation is recorded each year. This scanty precipitation does not fall evenly

throughout the year. The precipitation regime is characterized by very heavy falls, in brief periods, in the months from November to April. The effect is so extreme that the percentage of annual precipitation falling in a single day averages 50%. Potential evapotranspiration is calculated as between 1150 and 2100 mm. per annum.

#### **Wadi Al Beida (eastern arm)**

As noted above, a possible floodwater control structure was found near the mouth of the east arm of the Wadi al-Beida close to its western margin. The structure consisted of a wall, 1.50 m. to 2.00 m. wide, double-faced and rubble-filled, standing 1.00 m. high. It was 35.00 m. long and orientated obliquely across the long axis of the *wadi* floor. Smaller, linear, earthen dams had been built onto this feature on its south-east side, running south-west from its "upstream" end, to produce a V in plan with its point upstream. Those bedouin now settled in the vicinity have placed their daytime tent shelters in its lee and are growing crops in that area to which floodwater would be deflected by the barrage during the rains. Since the original wall and its later additions are not readily explicable in terms of stock enclosures, territorial or other boundaries, the feature is interpreted here as a water harvesting structure. To some extent both may have been superseded by the pumping of groundwater from a spring on the eastern margin of the *wadi*.

In a brief survey of the *wadi* floor and its basalt margins both up- and downstream of the structure, no other features were found which could be interpreted solely in terms of water control. Corrals, huts and other walls were common, but in each case, these appeared to be principally concerned with stock control or habitation.

#### **Wadi Shu'ayb-Huwaynit Al-Qaryatein**

The area covered by the ground survey is illustrated in Figure 2. The *wadi* is

<sup>7</sup> Helms, *op. cit.*



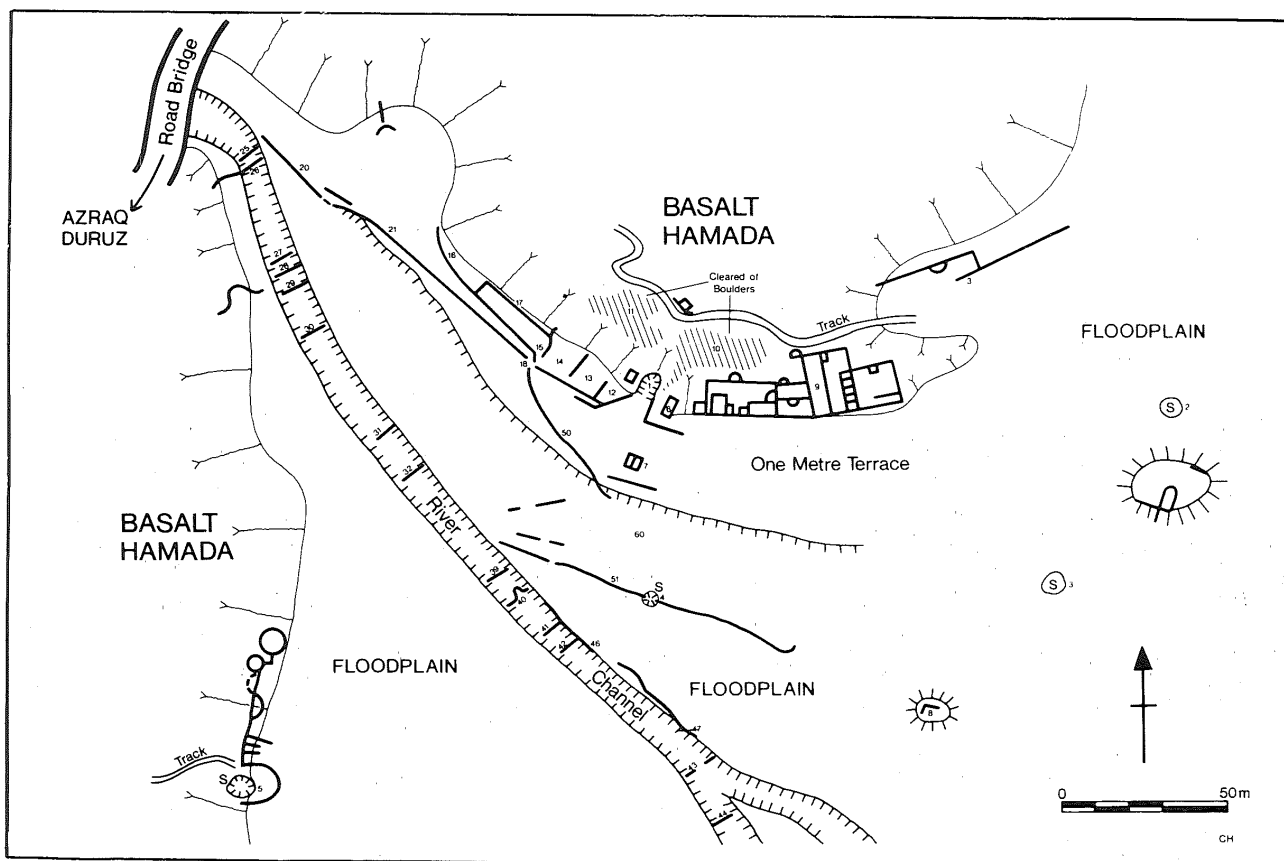


Fig. 3: 'Ain El-Enoqiyah, Azraq.

often rock-floored and boulder strewn. Corrals and broadly similar features are common on the basalt above the wadi sides. No water control structures were found on the *wadi* floor, or at its margins. These were seen to be the site of active and rapid boulder transport by floods. The trimline evidence indicated that floods reach at least 2.00 m. above the *wadi* floor. Minor terraces of finer-grained sediments occur in the *wadi*. Many of these are likely to be ephemeral features, depending for their existence on the characteristics of late-stage erosion and deposition in major floods. Therefore the floors of such *awdiyah* are unlikely to have been developed and used by floodwater farmers.

### Wadi El-Enoqiyah

The areas surveyed in this third *wadi* draining into the Azraq depression are shown in Figures 3 and 4. The *wadi* has four distinct geomorphic units. The upper tracts comprise steeper, rock-floored, boulder-strewn river beds similar to those in the upper reaches of the Wadi Shu'ayb-Huwaynit al-Qaryatein. These enter a

large alluvial embayment of approximately 1.5 km. radius. The *wadi* then continues as a 150.00-250.00 m. broad valley with a well developed alluvial terrace towards the south-east, which ends near the springs and former settlement of 'Ain el-Enoqiyah. Here the *wadi* enters another large alluvial embayment, before turning south at the springs and settlement of 'Ain es-Sol, where it again becomes a 100.00-200.00 m. wide valley. This runs between 3.00-5.00 m. high basalt scarps, with a low terrace described previously.

Although corrals, kites, huts and similar features are abundant on both the margins of the *wadi* and the basalt hamada above them, with the exception of two sites at 'Ain es-Sol and 'Ain el-Enoqiyah, ground survey of the *wadi* failed to reveal any certain features which might be directly related to early floodwater farming. This may reflect a genuine absence in the area, although differential survival is no doubt important. Few structures may be expected to endure on the upper, steeper tracts, whereas the large embayments are efficient sediment traps, and older features may be buried within them.

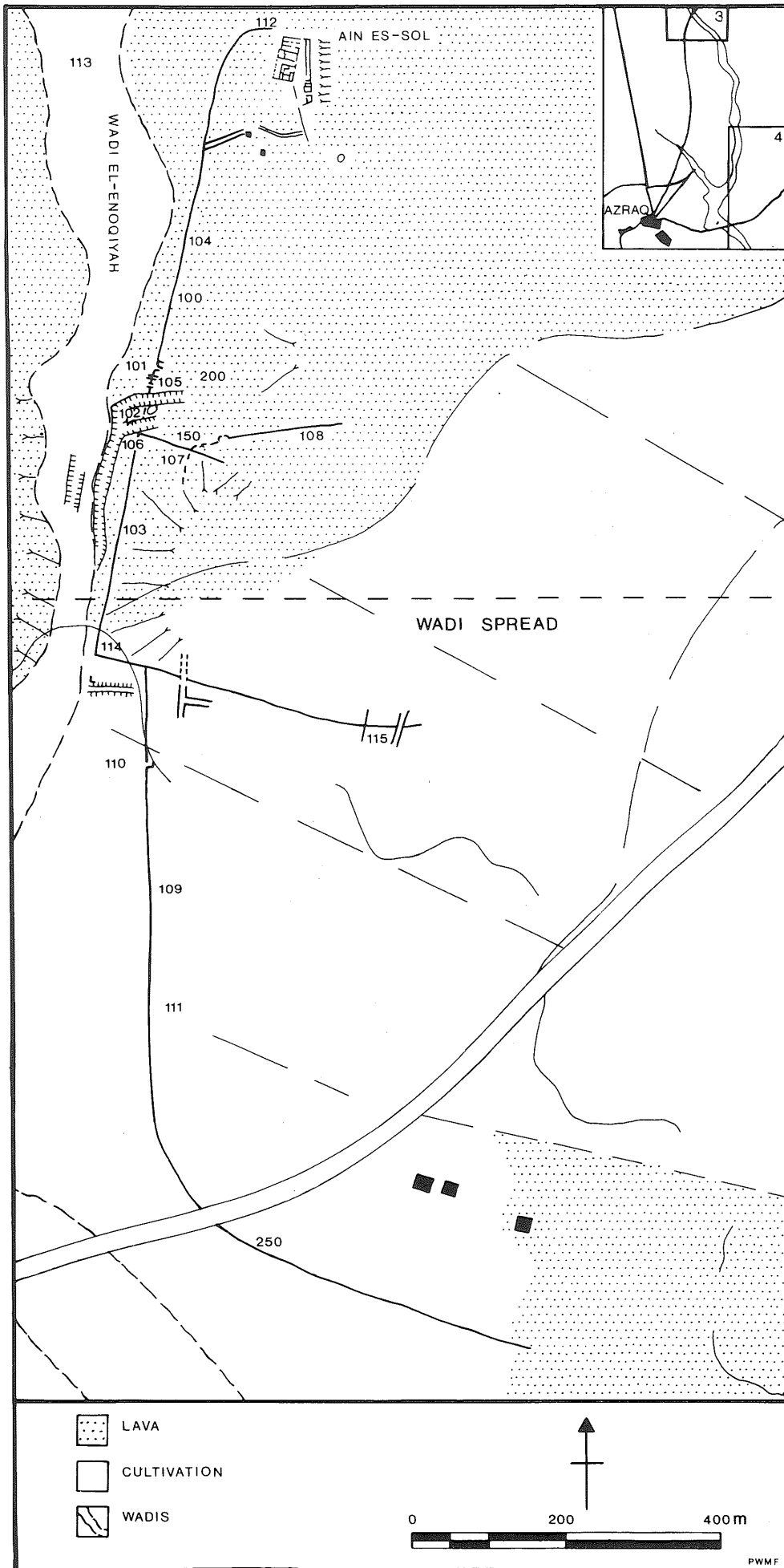


Fig. 4: 'Ain es-Sol and Vicinity, and Key map. Below the dashed line the features were plotted from an ariel photograph.

## 'Ain El-Enoqiyah

The locations of important archaeological sites and geomorphic features are given as numbers in Figure 3 and are described below. The superficial geology was described previously. Several types of structure may be related directly or indirectly to water management at this small, but complex settlement.

### Springs

The main spring (1) is a boulder-lined hollow, 4.00-8.00 m. in diameter. It has been enlarged by natural spring sapping and no doubt excavation at the base of the 4.00-5.00 m. high basalt scarp. Further springs (2-4) on the floodplain are marked by tall colonies of *Phragmites*. A fifth spring (5) probably occurred on the south bank in an area currently being cleared and quarried by well diggers.

### Huts and Corrals

Small huts or houses occur by the main spring at (6), possibly at (7), and on the small inlier of basalt exposed at (8) on the *wadi* floor. Walled enclosures and corrals (9) are common to the east of the spring (1). Many of these contain further subdivisions and possibly the remains of smaller pens or huts. Enclosures (10-11) occur beside a cleared track of unknown antiquity. A further set of oblong enclosures occur on an alluvial terrace immediately in front of the basalt scarp west of the main spring (1). Enclosures (15) is separated from the scarp by a wall (17).

It is difficult to date these structures. Worked flints were noted amongst them as were fragments of pottery. The latter was all coarse ware of red and orange buffs. Unfortunately the pottery fragments were not readily identifiable. They were almost certainly of local origin. No painted or incised wares were noted.

Even today, at this otherwise unoccupied site, bedouin graze their camels and/or goats. In the recent past it was a natural stopping point for travellers between Azraq and the Jebel Druze.<sup>8</sup> In the more

distant past, there is every reason to believe that the spring would have proved attractive both to travellers on the Roman Road (the subsequent Pilgrim Road), as well as to would-be settlers seeking to exploit this traffic and/or the site's limited potential for agriculture. Indeed some of the enclosures might be interpreted as stock pens, others may have been used for crops or kitchen gardens.

### Canals

Of greater importance are the many structures apparently intended to control surface water flow at the site. The most obvious are the two canals (20 and 21), illustrated in Plate XVII: 1. The structures are 1.00 to 1.20 m. in width, up to 1.20 m. high, enclosing water channels of rectangular cross-section between faced basalt boulders. The water channel in canal (21) measures 0.60 m. across. Its depth is impossible to determine since the channel is filled with sediment. Its joins an entrance-like feature in the field boundary of enclosure (15) with the edge of the small terrace scarp where the continuation of the canal, or a further feature, is marked by a 10.00 m. long, dense scatter of worked boulders. Curiously, the surface of this canal slopes from the basalt scarp to the terrace edge with a slope of 1°.

Canal (20) also has a channel with a rectangular cross-section exposed near the present *wadi* channel. The canal's water channel measures on average 0.35 m. across (max. 0.45 m.; min. 0.31 m.) and is approximately 0.43 m. deep. It slopes at 3° from the present *wadi* channel and intercepts the alluvial terrace just below its surface. Again, erosion has eroded this interception point, and it is unclear whether the boulder piles at this site mark its former extension, or a separate but associated structure. It is possible that canals (20) and (21) were previously linked along a line immediately in front of the present terrace scarp.

There is no evidence that canal (20) ever extended beyond the line of the present active *wadi* channel; although the

<sup>8</sup> Kennedy, *op. cit.*, p. 176.

passage of construction vehicles and the building of a new embankment and road bridge for the H-5 and Iraq highway have no doubt brought about the destruction of archaeological remains in this area; consequently, we cannot be absolutely certain of the source of water transported by these canals. The water may have been obtained from a spring, now lost. Alternatively water might have been supplied from floodwater dammed up in the present active channel area by the many barrages that have been mapped immediately downstream in the active channel (25-41).

The maximum water carrying capacity of the canals may be estimated using the Manning formula given in Chow.<sup>9</sup> This equation is derived from studies of open channel hydraulics:

$$Q = \frac{1.49 A R^{2/3} S^{1/2}}{n}$$

where Q is discharge in cubic feet per second (1 cubic metre per second — a cumec = 35.3 cubic feet per second - cfs). A is the cross-sectional area of the channel; R is the hydraulic radius =  $\frac{\text{cross-sectional area}}{\text{wetted perimeter}}$

S is the slope of the channel; n is a coefficient describing the roughness of the channel bed which is related to frictional drag, turbulence, and hence affects flow velocities.

It is impossible without excavation to assess the roughness state of the channel beds. They might have been lined with clay/silt to waterproof the basalt construction. Alternatively, they may have been formed of dressed stones. Appropriate values of Manning's *n* for these possibilities are available in published tables: the most likely conditions are given below:-

Channel type	Manning's n.
dressed stonework	0.013-0.17
earth canal, straight and uniform	0.017-0.025
rock canal, trimmed, smooth and uniform	0.025-0.035

Taking the lower and upper likely values of Manning's *n* of 0.013 and 0.035, and inserting them with the channel measurements of canal (20) into the Manning equations, indicates that when full, the canal would have been capable of transporting the following discharges: 0.2 cumecs in a dressed stonework channel; and at least 0.075 cumecs in a trimmed rock channel. Excavation is needed to assess the nature of the demand placed upon this resource by humans and stock.

The second canal (21) is more difficult to interpret. The slightly larger dimensions of its channel suggest a greater capacity than canal (20). Observations of its exposed surface stones suggest it slopes away from the basalt scarp. Excavation is needed to confirm the channel floor also slopes in this direction. If it does, two possibilities need to be explored. First, that the canal conducted water from springs at the foot of the basalt scarp (or other water control structures) towards the collapsed structure at the intersection with canal (20). Second, its gradient may have been reversed by tectonic activity, in which case, its gradient and discharge capacity estimates would have to be significantly increased.

### Barrages

A complex series of barrages is exposed in the modern, active *wadi* channel in the area immediately downstream of its intercept with canal (20). These features (25-45) are 0.50 m. to 1.50 m. in width, and one or two courses of boulders high. The size (*ca.* 0.30 to 0.50 m. dia.), angularity, and rectangular character of the boulders indicates they have been quarried from the nearby basalt scarps. The boulders and cobbles of the fluvial bars and dunes in the active channel are moderately to well rounded. Occasionally more complex barrages are found, with a double facing of quarried stone, and packing of cobbles obtained from the channel floor.

At points (32) and (34) there are sequences of barrages, three or four in

<sup>9</sup> V. T. Chow, *Handbook of Applied Hydrology*, New York, 1964.

number, the individual barrages being 2.00 to 5.00 m. apart. The size, shape and frequency of these features suggest they were principally intended to impede and dam floodwaters to produce ponds and lakes. Some of these waters may have been led away by the canal described previously, or by oblique *wadi* walls, described below.

The ponding may also have raised groundwater levels locally within the *wadi*-floor deposits, hence favouring deeper rooting, grass-pasture species. To date, no evidence has been found which would suggest these walls are part of field systems, or walls intended to confine animals. The function of barrage (40) is unclear. In plan it forms a convex-upstream hemispherical barrier. It may be a more sophisticated barrage.

#### Oblique Cross-Wadi Walls

Two substantial walls (50 and 51) are orientated obliquely across the *wadi* floor. Feature (51) is up to 1.00 m. across, often double faced with packing, and one to three courses of boulders high. The basalt boulders appear to have been obtained from the basalt scarp rather than the river bed. The wall commences by the barrage (39) which is exposed in the modern active channel. It then traverses a number of small springs marked by *Phragmites*. It terminates with a small recurve, close to a modest hut built on a small inlier of basalt which crops out above the *wadi* floor. This wall is not connected to further walls at either end which might have formed an enclosure. Its substantial form suggests it was intended to withstand considerable stresses, interpreted here as floodwaters. The feature is interpreted as a wall intended to divert and spread floodwater, and hence irrigate the *wadi* floor in area (60), just beyond the small settlement. Its location and orientation have similarities to the feature described at Wadi el-Beida.

The second wall (50) commences near an opening in enclosure wall (15). It forms a barrier *ca.* 0.50 to 0.60 m. wide, with one or two courses of boulders exposed. The

wall curves along much of its length, the convex side facing the main channel. Consequently it encloses and partially protects the *wadi* floor in front of the main settlement. There is no sign of any further features which would suggest this sweeping wall was part of an enclosure. In a flood, this wall would serve to protect the land in front of the settlement from flooding and soil erosion. Water would tend to be diverted to the same general area (60) as achieved by wall (51). In the absence of any other evidence wall (50) is therefore regarded as a structure concerned with flood diversion and soil conservation.

#### Conclusions

'Ain el-Enoqiyah is a complex settlement originally located to take advantage of spring waters at the site, but which during as yet unknown periods, employed barrages, canals and oblique *wadi* walls to control and direct floodwaters. Stock were probably kept and it is likely cereals such as barley were grown on the flood-irrigated land around point (60).

#### 'Ain Es-Sol

The locations of important archaeological and geomorphic features are shown in Figure 4. The small fort and bath house at this spring are described in Archaeological explorations on the Roman Frontier.<sup>10</sup> They are attributed to the Roman (and Umayyad?), periods respectively. Kennedy<sup>11</sup> also describes the major wall (100) which sweeps south from the north-west corner of the site (Pl. XVII: 2). This feature may have had a role in water control.

The basalt scarp to the west has a small terrace of fanglomerates and other colluvial deposits at its base. The *wadi* floor comprises sandy loams, sands, gravels, and cobbles; except where *wadi* (200) enters from the east. The entrant *wadi* floor comprises large fluvial dunes and megadunes of gravel and cobble grade materials. The eastern margin of the *wadi*

<sup>10</sup> Kennedy, *op. cit.*

<sup>11</sup> *Ibid.*, p. 131.

floor comprises a 0.50 to 1.00 m. terrace scarp marking the edge of low fluvial terrace deposits. The main spring lies immediately to the south-east of the bath house.

### Barrages

No reliable field evidence of barrages or cross-*wadi* walls was found in this area. Fragments of walls orientated across the *wadi*, possibly former barrages, are occasionally exposed in shifting minor channels on the floodplain (113).

### Walls

Ground survey confirms that the north-south orientated wall (100) is a substantial and complex construction. In its northern part it is often over 1.00 m. wide and built of several courses of boulders each 0.25 to 0.50 m. high. These have been obtained from the basalt scarp to the west, rather than from the rounded cobbles of the *wadi* floor. North of (104), the wall curves across the *wadi* floor, joining the low terrace at (104) with the buildings to the north of the bath house, which are also on slightly higher ground. From point (104) to (105), the wall is built along the top of the 1.00 to 1.50 m. terrace scarp. There appears to be a deliberately constructed break or entrance at (101). The wall is aligned directly across the incoming *wadi* (200) at point (102), where it is frequently buried in coarse gravels and cobbles.

At the southern margin of the confluence of these, *awdiyah* at point (106), the structures become more complex. Wall (103) is sometimes only 1.00 m. wide as it continues south on the terrace scarp, separating the *wadi* floor from the terrace. However, in parts at least, it lies on a substantial earthen bank. Wall (107) runs eastward with similar topographic relationships along the southern border of the entrant *wadi* (200). However, the major wall (108) soon diverges from (107) and is orientated obliquely across the entrant *wadi*. This is a substantial wall, 1.00 m. wide, often double faced with packing

stones. At point (150), at which (107) leaves (106), there were traces of some sort of structures, these and the wall being difficult to disentangle. A few sherds of coarse pottery were noted amongst these structures.

A dog-leg separates the north-south terrace margin wall from its southward continuation (109), which is also a strong, double-faced 1.00 m. wide wall. An entrance or exit appears to be present at (110). In this region the long north-south wall runs directly across another wide, entrant side *wadi*. Beyond (111) it was not possible to follow this structure with confidence into cultivated and fenced land. It was however, located again beyond this farm, where it crossed the Azraq to 'Ain el-Beida road. On the 1955 aerial photograph, which pre-dates the modern agricultural improvements, the wall can be seen to cross the area both of this farm north of the road, and again to the south of it, where it begins to curve off south-east towards Qa el-Azraq (250). Aware of its former existence south of the road, we were able to detect in the fields, occasional spreads of boulders which marked its course. In a few years it will be totally lost, and but for this aerial photograph record, would have been unknown. One can only surmise that in this region of spreading agricultural activity, that other such archaeological remains have now been irrevocably lost. Access to aerial photographs of even twenty years ago would almost certainly reveal a much more extensive system than is visible today. The dog-leg itself has an extension from (114) to (115) and eastwards across what is today farmed land.

The interpretation of these features presents more difficulties than at 'Ain el-Enoqiyah. From point (112) to (104) the curving wall may have served to protect land immediately in front of the bath house from fluvial erosion. The feature is largely buried. It may prove to have within it a series of drop structures to facilitate irrigation of the enclosed area.<sup>12</sup>

Further south much of the wall system appears to delineate the boundary between

<sup>12</sup> Evenari, *op. cit.*, fig. 70; Kennedy, *op. cit.*, p. 59, 62.

the *wadi* floor and the presently cultivated lands of the terrace. These walls would undoubtedly have served to control flooding and flood damage at high flows, but their principal functions appear to concern the further delineation of natural land boundaries. Where these features cross entrant *wadi* floors at (102) and (109), some flood-damming and irrigation may have occurred. However, the continuity of wall line with the terrace margin suggests that here also the delineation of land divisions was important. Otherwise, at the moment we have only found the single oblique cross-*wadi* wall (108) which may be related to water control with confidence.

### Conclusions

One part of a major wall system at 'Ain es-Sol may have been designed with water or soil control in mind. Cross-*wadi* barrages may have once been present. Otherwise, the wall system appears to be part of a major agricultural land division which adopted natural boundaries separating more important terrace lands from flood-prone *wadi*-floors.

Again little can be said about the antiquity of the wall systems. The system that survives today may have been constructed at the same time as the defended site of Qasr 'Ain es-Sol, itself in use, in the late Roman or Umayyad period. Some confirmation was noted between (106) and (114), where a few distinctive sherds of painted early Islamic pottery were weathered out on the east slope of the *wadi*-sidebank along which the wall lies at that point.

### Discussion

In this survey area, our ground observations have indicated that water control structures are either rare or absent on the basalt hamada, the basalt *wadi*-side scarps, the rock-floored upper *wadi* tracts, and in the wider alluvial embayments. The

three sites where water control structures were noted are all close to groundwater supplies from wells or springs. This is not the usual situation at Jawa,<sup>13</sup> the Libyan pre-desert, or in the Negev.<sup>14</sup> It suggests that in this area of the Jordanian desert, floodwater control was practised to supplement the more important, and more reliable groundwater supplies.

To date, three types of water control structures have been found in the study area: barrages to pond back water; canals to redistribute water from springs or ponded supplies; and oblique cross-*wadi* walls to redistribute floodwater and possibly to protect other floodplain areas from flood damage. The most noticeable wall type *not* found in this reconnaissance is the water harvesting wall built on the hamada to gather storm run-off and lead it to the *wadi* floor. The "kite" walls observed in this study area do not have these properties.

Several inter-related explanations for the comparative local scarcity of water control structures may be suggested. A complete lack of interest in cereal growing might be advanced as an explanation. However, Betts<sup>15</sup> amongst others<sup>16</sup> has commented on the Bedouin optimistically casting seed onto alluvial embayments and mudpans in the hope of gaining a crop. This is essentially the same agricultural practice as found in the Libyan pre-desert. It is worth noting in support of this possibility that there was an abundance of meat on the basalt until comparatively recent times. Gazelle and Oryx were apparently common and figure prominently in the rock graffiti; their entrapment may have been the function of the numerous kites constructed in the area.<sup>17</sup> Cattle are likewise depicted in other rock art on the basalt,<sup>18</sup> whilst numerous species of animal and bird occurred around the Azraq marshes themselves.<sup>19</sup> Furthermore, the region may not have proved attractive for the degree of settled life implied by extensive water gathering systems. These

<sup>13</sup> Helms, *op. cit.*

<sup>14</sup> Evenari, *op. cit.*, p. 95.

<sup>15</sup> A. Betts, The Qa' Mejalla Survey, *Levant*, 14 (1982) p. 1-34.

<sup>16</sup> Evenari, *op. cit.*, p. 4ff.

<sup>17</sup> Helms, *op. cit.*, p. 39-47.

<sup>18</sup> *Ibid.*, p. 26ff.

<sup>19</sup> Kennedy, *op. cit.*, p. 69.



require secure conditions which, so close to a major oasis and not far from an important route, may not have been available except in the relatively short periods of time represented by much of the Roman and Umayyad periods. One has only to recollect the awful reputation of the Azraq region, and the resulting infrequency of travellers even in the historic period up to the early years of the twentieth century.<sup>20</sup>

The climate may have been too hot and dry, with the rainfall concentrated in too short a period to justify the construction of such water-control systems. The area receives approximately 30 to 40% less precipitation than Jawa to the north.

The modern environmental data suggest major hydro-meteorological problems must have been faced by potential builders of water harvesting structures in this area. The structures would have had to content with essentially rare, but sudden and violent floods in those periods when precipitation intensity sufficiently exceeded the high infiltration capacity of the locally deep and porous basalt soils to generate overland flow and so feed surface water into the *awdiyah*. Undermining of structures in the violent floods is also likely to have been common. If the structure diverted too much water into an area then major problems of scour and soil erosion might be anticipated.

In periods of less intensive precipitation, the high potential evapotranspiration rate and high infiltration capacity of the soils on the basalts are likely to promote little run-off; water loss to the lower, perched water table, or to the atmosphere, being the dominant processes.

These problems only seem to have been overcome in the floors of shallow valleys 100.00 to 200.00 m. wide. Here the water control systems appear to have been constructed to supplement the groundwater supply. Elsewhere in the Jordanian Desert, the situation may be different. Our present evidence suggests that in the Azraq type of climatic regime, better opportunities for water harvesting should be available where the hamada soils are

less deep, or are developed upon a more impervious bedrock. In addition, a less concentrated precipitation regime would also be an advantage.

Finally it is worth emphasising that all these considerations derive from field observations only. In the absence of aerial photographs and excavations, both the larger scale of such systems and the socio-politico-economic factors which influenced them, must remain inadequately understood.

## Conclusions

An archaeological reconnaissance of a very hot and arid area of the Jordanian Desert, north of Azraq oasis has revealed the presence of three types of water control structures — barrages, canals, oblique cross wadi walls — around small settlements whose original location appears to be related to the availability of ground water supplies. Floodwaters may have served only to supplement these more reliable water sources. The local scarcity of water control structures, especially on the basalt hamada, may reflect the severity of the prevailing climate, but also the hydrological properties of the deep, basalt soils in the area.

The little dating evidence available, suggests that whatever their actual date of construction, the walls to the south of Qasr Ain es-Sol at least, were functioning in the late Roman/early Islamic period.

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<sup>20</sup> *Ibid.*, p. 71.



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### **Bibliography**

- J. Baradez, *Fossatum Africae*, Paris, 1949.  
G. W. W. Barker and G. D. B. Jones, *UNESCO Libyan Valleys Survey, Summary 1979-81*, London, 1982.  
F. Bender, *The Geology of Jordan*, Berlin, 1974.  
A. Betts, The Qa' Mejalla Survey, *Levant*, 14 (1982) p. 1-34.  
V. T. Chow, *Handbook of Applied Hydrology*, New York, 1964.  
M. Evenari, L. Shanan, and N. Tadmor, *The Negev*, Cambridge, MA, 1971.  
S. W. Helms, *Jawa — Lost City of the Black Desert*, London, 1981.  
J. M. Hemsley and M. George, *Azraq Desert National Park, Jordan, Draft Management Plan*, London, 1966.  
D. L. Kennedy, *Archaeological Explorations on the Roman Frontier in North East Jordan*, Oxford, 1982.  
B. Nelson, *Azraq, Desert Oasis*, Ohio, 1973.  
M. E. D. Poore and V. C. Robertson, *An Approach to the Rapid Description and Mapping of Biological Habitats*, London, 1964.

## NEW EXPLORATIONS OF THE DEIR- PLATEAU (PETRA) 1982/1983

by

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Several visits to the Deir-Plateau of Petra made it certain that former examinations and descriptions of this impressive part of the Nabataean metropolis have been exact only to a certain extent. Important details and over-all views are missing. Therefore, the authors, members of the Natur-historische Gesellschaft Nürnberg, repeated the exploration of the plateau, including the mountain range towering over it in 1982 and 1983 (Figs. 1 and 2).

The most striking monument of the Deir-Plateau is the rock/hewn temple ed-Deir or, as others — especially the Bedouin, — say, el-Fatuma (Pl. XVIII: 1), Léon de Laborde and his draftsman Linant<sup>1</sup> thought themselves the first to visit it. As a matter of fact, the Englishmen Irby and Mangles did see the rock facade from the lofty height of Djebel Harun, but were not able to reach it.<sup>2</sup> Laborde described a steep rock opposite ed-Deir with a row of column bases in front of a large rock chamber (Pl. XVIII: 2). R. Brünnow and A. V. Domaszewski showed little interest in the Deir Plateau.<sup>3</sup> They documented what travellers and explorers had published before, some of these reports are rather puzzling,<sup>4</sup> all they did was to describe ed-Deir, some cisterns, rock chambers and the rock opposite ed-Deir, which was later called “Burgberg” by G. Dalman. It was with much more accuracy that

the Austrian A. Musil explored the Deir-Plateau.<sup>5</sup> But the most precise examination of the site was done by G. Dalman, who published his results in 1908 and 1912.<sup>6</sup> It seems there have not been other noteworthy explorations.<sup>7</sup> In the tracks of the aforementioned, therefore, the Deir-Plateau was explored again.

### The “Burgberg” (Dalman) of the Deir-Plateau

A substantial and outstanding rock opposite ed-Deir<sup>8</sup> numbered M 23 by Musil<sup>9</sup> was named “Burgberg” by Dalman because he regarded the ruins on its top as the remains of a castle which protected the northern entrance to Petra<sup>10</sup> Actually the rock exhibits distinct traces of stone cutting (Pl. XIX:1). On its northern end, after a wall with a supposed former door, a flight of diagonally tooled steps lead to a platform, 28 m. x 12 m., which is partly rock-hewn, partly built of ashlar blocks. Under it a very large cistern (D 489) is hollowed out of the rock, (Pl. XIX: 2). In some places its original plaster of 0.05 m. thickness is still preserved. Two round openings and a few channels led rain water from the platform and the top into the cistern. A broad entrance at the foot of the rock was either closed originally or opened later on. Inside, two bases of columns

<sup>1</sup> L. de Laborde et Linant, *Voyage de l'Arabie Pétrée*, Paris, 1830, p. 59.

<sup>2</sup> Ch. L. Irby and J. Mangles, *Travels in Egypt and Nubia*, Syria and Asia Minor, London, 1823.

<sup>3</sup> R. Brünnow and A. von Domaszewski, *Die Provincia Arabia*, I, 1904-1909, p. 331-338.

<sup>4</sup> *Op. cit.* p. 333.

<sup>5</sup> A. Musil, *Arabia Petraea II*, 1 (Edom), Wien 1907, p. 134-150.

<sup>6</sup> G. Dalman, *Petra und seine Felsheiligtümer*, Leipzig, 1908, p. 20-22; 57; 76; 262-281. *Idem*, *Neue Petra-Forschungen und der Heilige Felsen*

*von Jerusalem*, Leipzig, 1912, p. 28-31.

<sup>7</sup> D. Nielsen, *Journal of the Palestine Oriental Society XI*, 1931, p. 234; XIII, 1933, p. 13. The author concludes that there are no “sanctuaries” on the Deir-Plateau, respectively only one out of the seven mentioned by Dalman.

<sup>8</sup> The name is spelled differently in different languages, in German, for instance, ed-Der.

<sup>9</sup> The letters before the numbers of the monuments refer to Musil (M), Brünnow (Br) and Dalman (D).

<sup>10</sup> Dalman, 1908, p. 277.

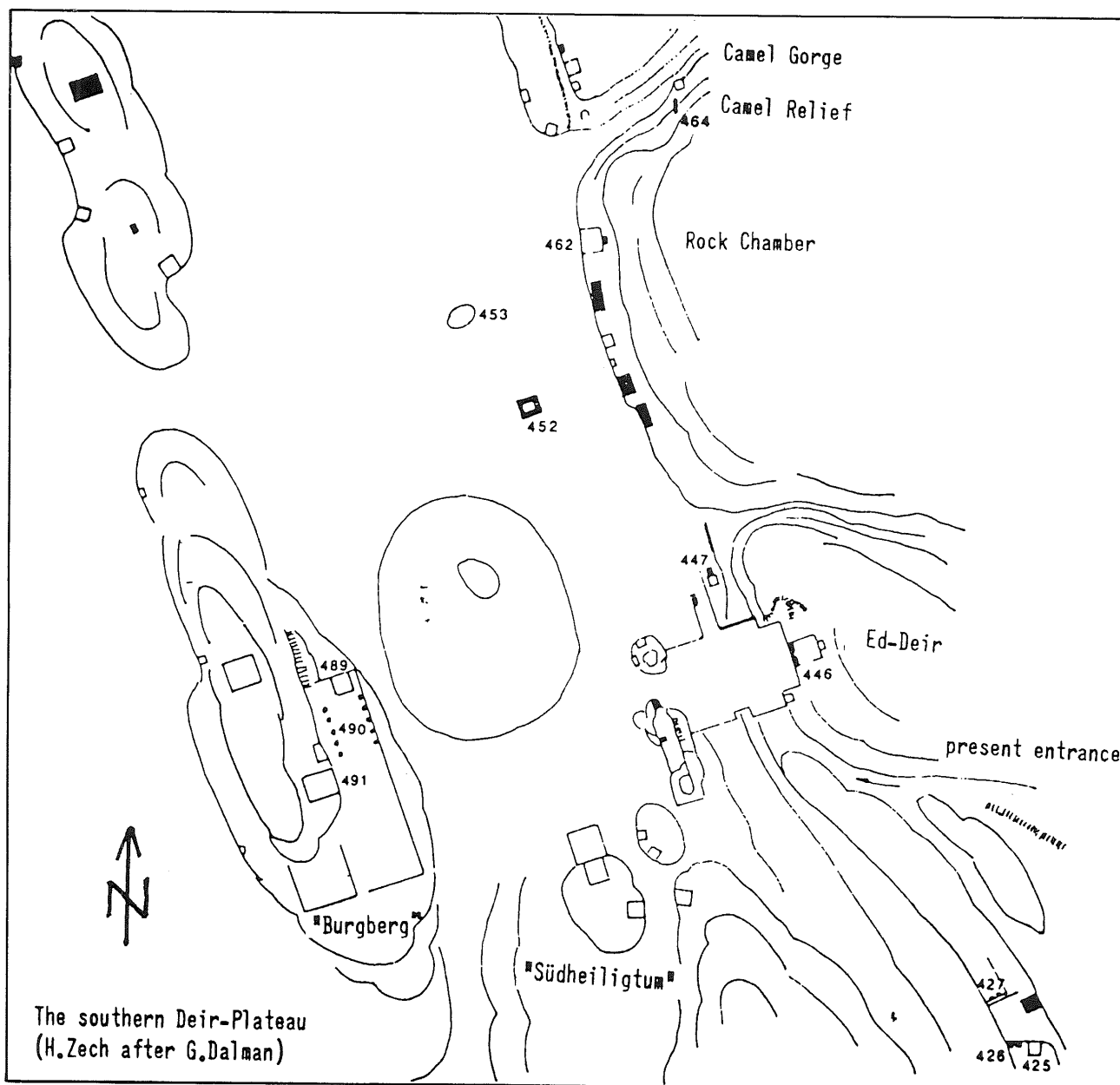


Fig. 1: Sketch Map of the southern Deir-Plateau

(58/65 cm Ø) have rolled down from above. They are diagonally tooled in order to make a stucco covering stick and they may belong to the platform. In the flight of steps (Pl. XX: 1) beside a column drum (58 cm Ø) and an architrave the tumbled fragment of a Nabataean pilaster capital, a "Hörnerkapitell" of 100 m. upper, 0.80 m. lower length and 0.36 m. height, matches another one in the middle of the platform.<sup>11</sup>

Where a water channel from the top meets the flight of steps at the beginning of the staircase, thin slabs replace the stepping stones (Pls. XX: 2, XXI: 1-2). Looking from this spot to the opening of the cistern, a Nabataean letter (SH) incised in a tumbled building stone was detected.

Over the debris-covered steps, it is easy to reach the platform. Kennedy regarded it as the foundation of a Roman

<sup>11</sup> About the "Petraean" or "Nabataean" "Hörnerkapitelle" see A. Jaussen and R. Savignac (*Mission archéolog. en Arabie II*, 1914, p. 396 ff.). Dalman saw a Nabataean invention in the capital (Dalman, 1908, p. 47). He did not acknowledge the explanation of A. Kohl (Kasr Firaun in Petra, 1910, p. 26) and O. Puchstein (AA, 1910, Sp. 10)

who called it a "bosse" of a Corinthian capital. For him it was a special form invented as a pilaster capital, but modified for the use in high tomb facades (Dalman, 1908, p. 267-269; idem, 1912, p. 20-22). P. Hammond calls the "Hörnerkapitell" the "classical Nabataean plain capital" (*BASOR* 226, 1977, p. 50).

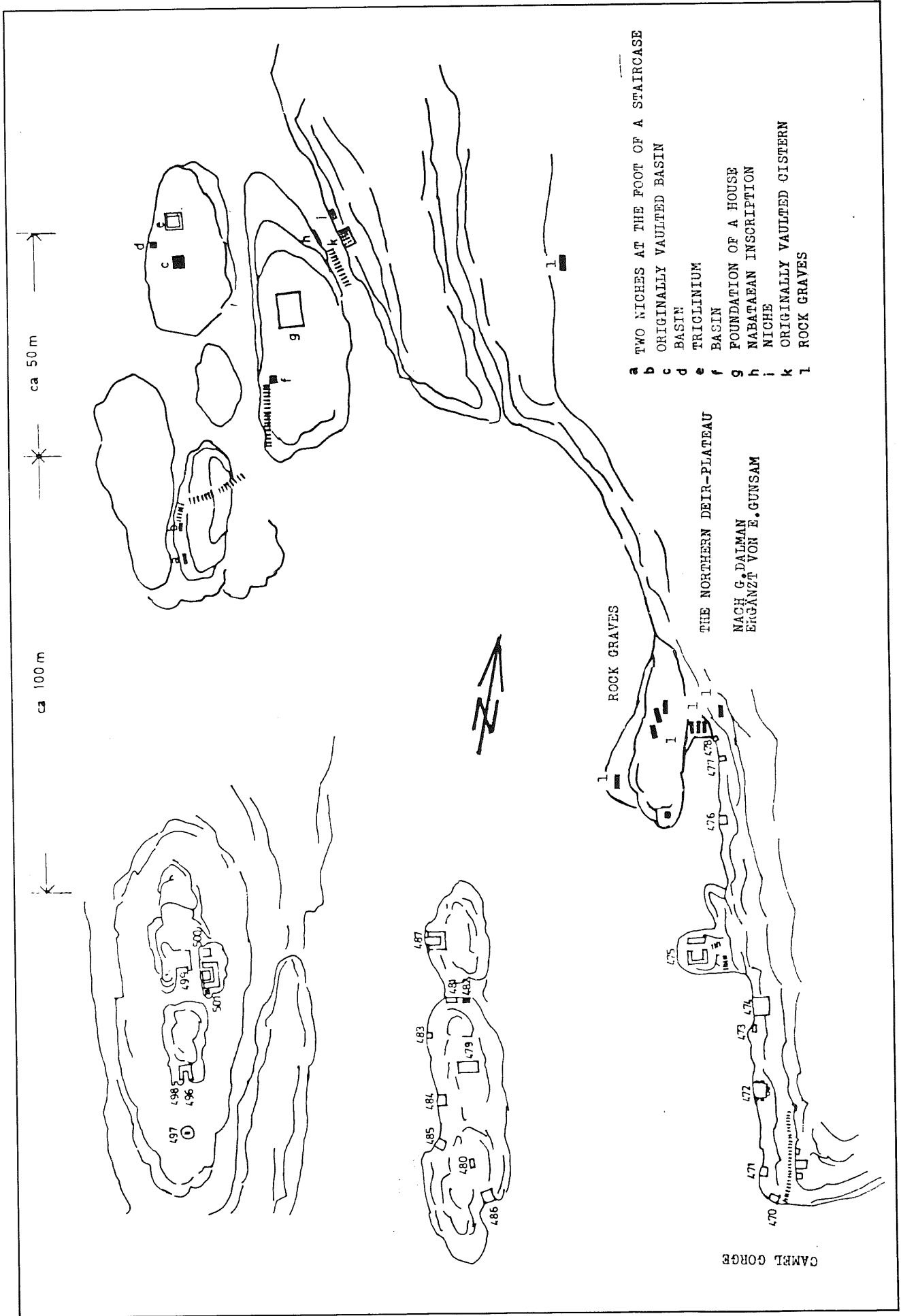


Fig. 2: Sketch Map of the northern Deir-Plateau

temple.<sup>12</sup> There is no doubt, however, that it served as a columnated front-court, a peristyle, for the cella (D 491) at its back,<sup>13</sup> now a yawning hole without any attraction for passing visitors.

On the E-side was a row of columns with a built circuit around it. The bases and even some drums are still *in situ*. (Pl. XXII: 1). The first and the last one were engaged columns on either side of a pilaster. The columns (58-61 cm Ø) are 2.80 m. distant from each other (from centre to centre) with a roughly quadrangular stone of 0.48 m. x 0.44 m. between every two columns, maybe remains of a balustrade. The row of columns begins on the NE-corner of the platform and ends opposite the entrance of the cella. Its continuation there was a built wall. Apart from the remains of these columns, there are only six more drums *in situ* in the W-part of the platform. Surprisingly a drum (?) of 0.72 m. has been found in the debris of the platform. On the foot of the rock three drums and one base of a 0.58 m. column once were part of the peristyle (Fig. 3).

Contrary to Musil's notes,<sup>14</sup> we could not find any traces of columns *in situ* on the S-side. A single second architrave left between the debris of the platform signals the connection of the columns over Nabataean capitals.

### Observations in the Cella

Only on the right wall of the cella is the "Rankenkapitell" (Pl. XXII: 2) is still inserted which Dalman saw on both sides.<sup>15</sup> It belongs to the type known from the Khazne and the thermae of Petra, recently described by Z. Safar.<sup>16</sup> K. Ronczewski called these capitals "italisch beeinflusste Varianten einer spät-hellenistisch-alexandrinischen Kapitellform der frühen Kaiserzeit"<sup>17</sup> A Schmidt-Colinet, by the monotonous, and at the same time chasting

character, is reminded of the Ara pacis-foilage in Rome, Consequently advises a date into the late first century B.C.<sup>18</sup>

A simple pillar under the capital seems unlikely, because a second recess of the same size nearer to the ground indicates some kind of frame for a massive door (Pl. XIII: 1) Former visitors (besides scrawling their names everywhere) were impressed by rectangular plugholes far up to the ceiling of the back wall. Nobody is clear about their purpose, but in the Kasr el-Bint and some rock chambers there are similar holes. In neither case could they have served for a lining of marble. In the cella of the "Burgberg" the highest plugholes still contain metal hooks. Similar to customs all over the world and throughout the times, single inscribed slabs of marble or metal, lamps, carpets, clothes, garlands, weapons and devotional objects were probably hung on these hooks. In the interior of the niche in the middle of the back wall the bottom is hollowed out for plugs or clamp-irons. They correspond rather to a statue of life-size than to an idol block (Pl. XXIII: 2). Later hunters have punched the outlines of ibexes into the smooth surface of the niche. The pedestal of the supposed statue, by the way, has no perpendicular edges. With the sand in the cella removed, it corresponds to the pedestals in the front of ed-Deir.

Summing up the traces of the past, instead of a yawning hole in the face of an otherwise nondescript rock we have to picture a most impressive row of white or red-white stuccoed columns crowned with architraves over Nabataean capitals. From the cistern at the foot of the rock, priests (?) and pilgrims got the water for ablutions and as a refreshment. Behind the peristyle in a mysterious room the rays of the morning sun may sometimes have illuminated the idol block or the statue of the revered deity. A propos to the sunset Dalman has speculated that the portal of

<sup>12</sup> A. Kennedy, *Petra*, 1925, p. 65-66, p. 80.

<sup>13</sup> See Dalman, 1908, p. 277.

<sup>14</sup> Musil *op. cit.* p. 146.

<sup>15</sup> Dalman, 1908, p. 277.

<sup>16</sup> Z. Safar, *Les Chapiteaux de Petra*. In: *Petra - La*

*cité rose du désert*, "Le Monde de la bible", Paris, 1980.

<sup>17</sup> See AA, 1932, p. 37 ff.

<sup>18</sup> *BJb* 180, 1980, p. 190.

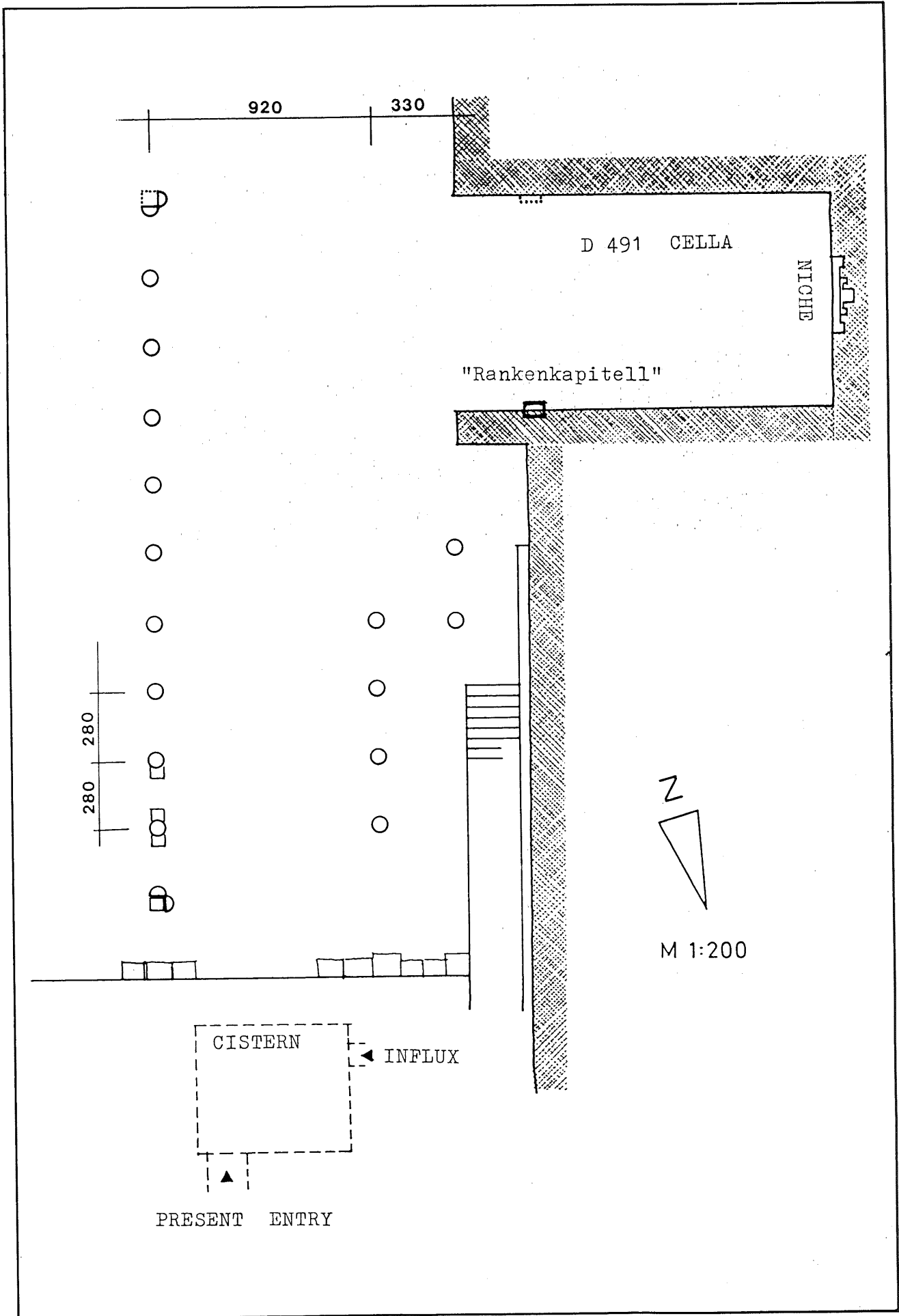


Fig. 3: Plan of the 'Burgberg'-Sanctuary

the temple of ed-Deir was deliberately shifted in order to have the sun shine on the niche in the middle<sup>19</sup> The same may have happened in a cave sanctuary on es-Sela' near Buseira, described by N. Glueck and the author.<sup>20</sup>

What happened when the pilgrims or worshippers had reached the Deir-Plateau? As in Mekka today, processions of the faithful have to be imagined wandering from one sanctuary to the other, either for the purpose of praying to different deities or performing some pseudohistorical or mythical ritual in different places.<sup>21</sup>

There is nothing on the surface of the platform to prove conclusively a late Roman date or Byzantine buildings or later rebuilding. Only the fact that every available space, every promontory, every spot of rock has been built on remains of a fortress (Pl. XXIV: 1). But a similar style of building can be found on that side of the summit of Umm el-Biyara where no aggressor could climb up. It may have been a Nabataean fad. Even the original temple on the top of Djebel Harun covered the whole summit as far as one can make out today.

When did the "Burgberg"-Sanctuary originate? The answer is not difficult. Nothing indicates a reverence of non-Nabataean deities. The "Rankenkapitell" associates the "Burgberg" - Sanctuary with the Khazneh, the temenos of Kasr el-Bint Fara'un, the thermae and the Lion Triclinium.<sup>22</sup> The Nabataean "Hörner-Kapitelle" are also found in the facade of ed-Deir, dated in the reign of Rabel II (75-106 A.D.) by F. Zayadine.<sup>23</sup> Topographical reasons also speak for the contemporaneity ed-Deir and the "Burgberg"-Sanctuary. Both cultic places are as exact as the rock formation allows.

### Two Circular Buildings on Top of the "Burgberg"

On the way to the top of the "Burg-

berg" Dalman had seen and briefly mentioned one "circular building".<sup>24</sup> During the 1982 exploration, two such buildings or rather their ruins were discovered. The more conspicuous one, which was probably seen by Dalman, consists of massive grey sandstone blocks (0.45 m. x 0.40 m. x 0.40 m.) in the northern half, and smaller, carefully tooled yellowish sandstone blocks in the southern half of the circular foundation. The inner diameter is 2.20 m. In the interior and on the slope below, fragments of handmade roof tiles 0.02 m. thick and 0.12-0.15 m. broad were found. With these pottery fragments were made on a wheel and rectangularly bent (to pipes?), and pieces of a greyish chalk mortar without visible connection with the inner walls of the building.

A few metres higher up, near the edge of the sheer cliff, the foundation of a circular building, the second but evidently the more important one, was found. It consists of smooth slabs, 0.10 m. thick, 4.90 m. across, and worked stones which include bases, respectively higher up and drums of engaged columns, at their inner circumference. Only two of the original nine bases have fallen down the cliff but are not to be found there. One of the bases has been cleared of the debris. As the inner surface of the foundation stones it is plastered with stucco of 0.01 m. in thickness (Pls. XXIV: 2, XXV: 1; Figs. 4, 5).

It is not difficult but uncertain, to picture free-standing columns from a certain height on, set up on the engaged columns which were eventually covered by a roof. Of circular monuments with columns only the three tholoi in relief of the Khazneh, the "Corinthian Tomb", the Deir-Temple, and the thermae near the Arched Gate are known.<sup>25</sup> A free-standing tholos has not been found in Petra so far.

### The Top of the "Burgberg"

Above the circular building are the

<sup>19</sup> Dalman, 1908, p. 212, 207.

<sup>20</sup> N. Glueck, *BASOR* 65, 1937, p. 28; *BASOR* 18-19, 1939, p. XXI, p. 26-32; M. Lindner, *Petra*<sup>4</sup>, 1982, p. 261, 264-265, 271.

<sup>21</sup> See J. Wellhausen, *Reste arabischen Heidentums*<sup>2</sup>, 1897, with many descriptions, e.g., p. 109-112.

<sup>22</sup> See A. Schmidt-Colinet, *BJb* 1980, p. 220 ff. and P. Hammond, *BASOR* 226, 1977, p. 47-51.

<sup>23</sup> F. Zayadine, *BJb* 180, 1980, p. 244.

<sup>24</sup> Dalman, 1908, p. 278.

<sup>25</sup> As to descriptions see A. Schmidt-Colinet l.c., p. 221 ff.; F. Zayadine l.c. p. 240; M. Lindner, *Petra*<sup>4</sup>, 1982, pp. 17-37.

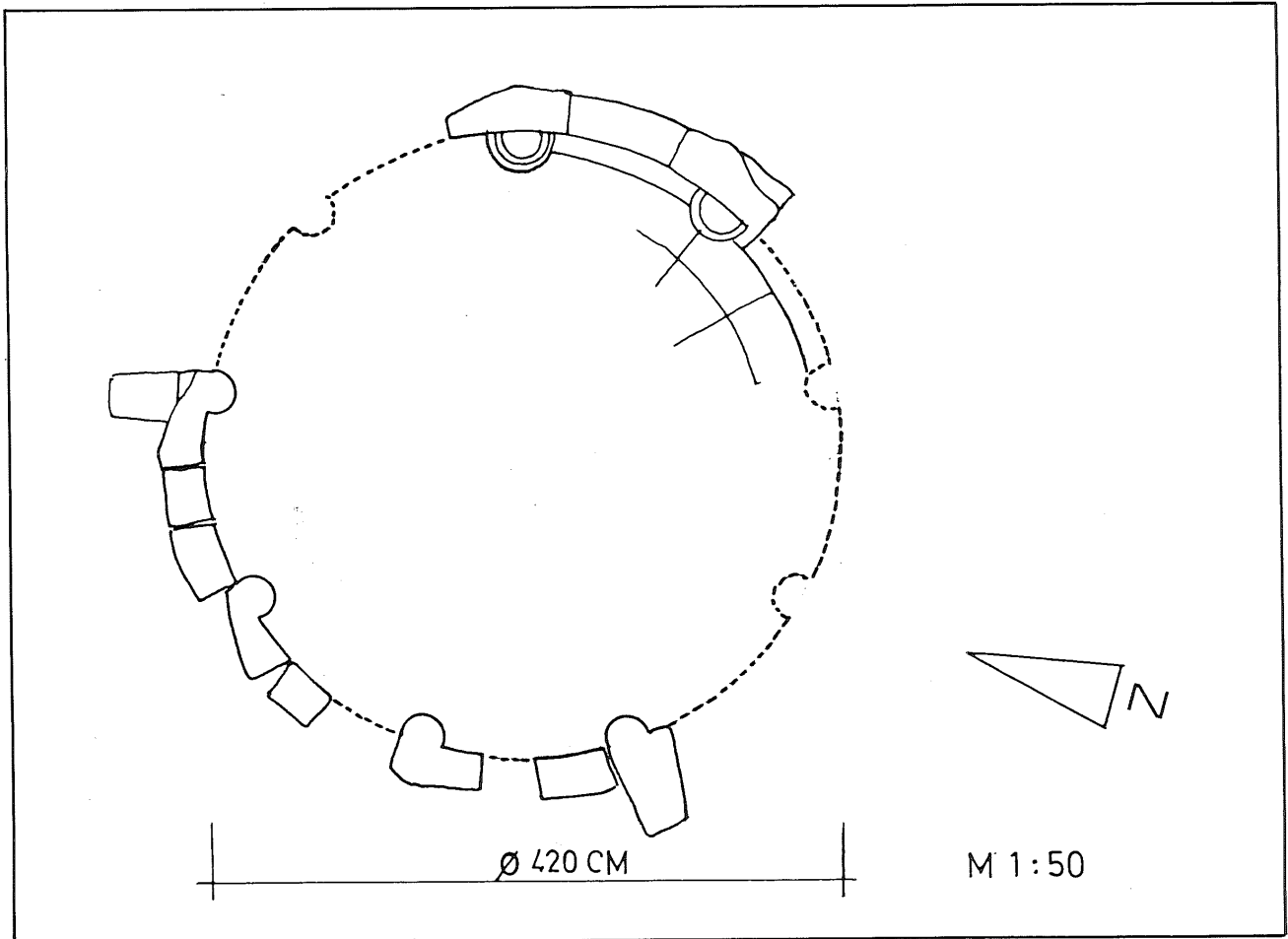


Fig. 4: Plan of the circular building with engaged columns

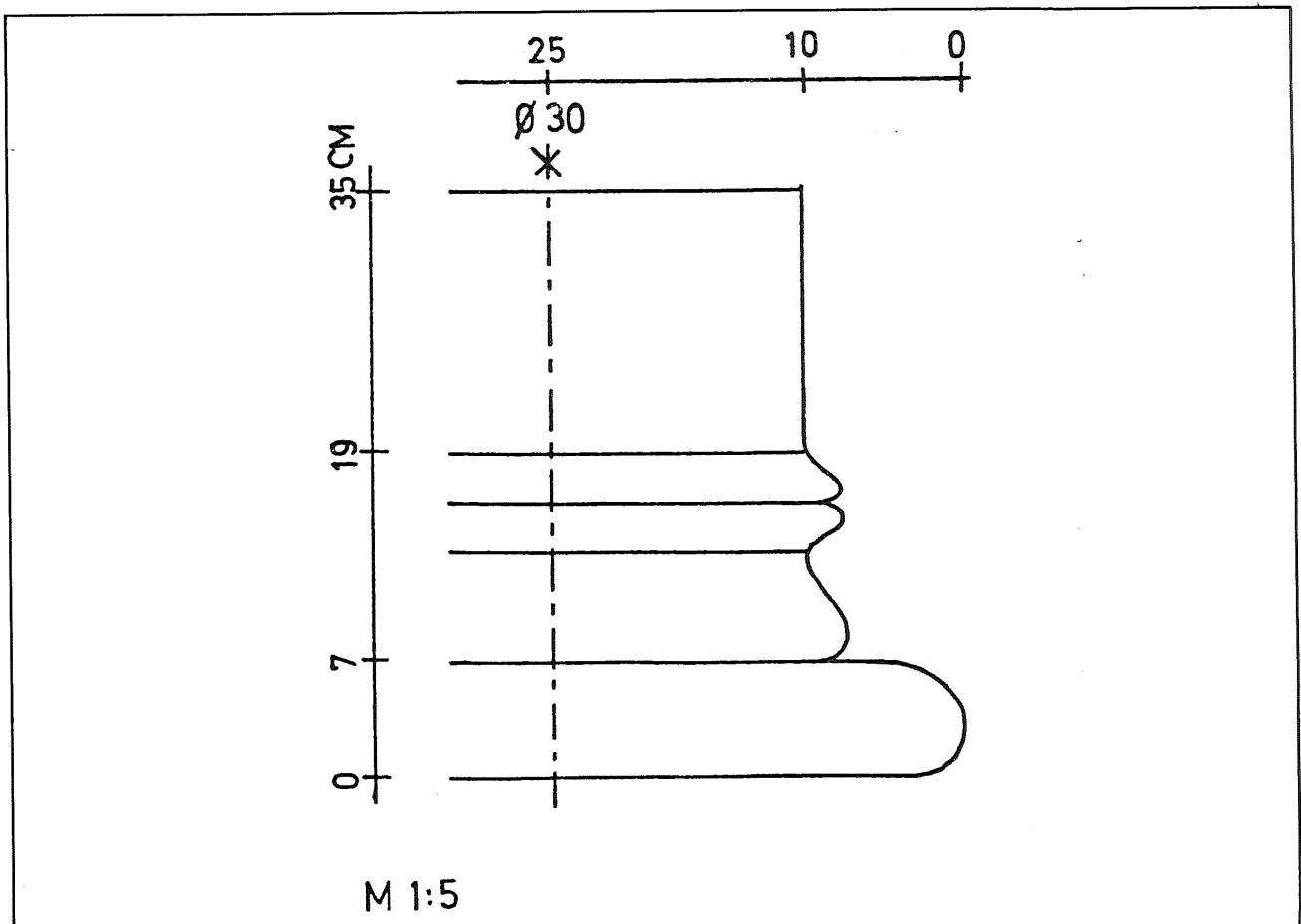


Fig. 5: Drawing of the column base



ruins of another one with interesting details. Musil drew and described the rectangular foundation of a building directed towards the east.<sup>26</sup> These ruins are covered with tesserae of one cubic centimetre, made of fine limestone. These are the same kind of tesserae that can be found on the summit of Djebel Harun<sup>27</sup> There is a pit of ca. 2.00 m. x 1.00 m. in the middle of the small platform, maybe a carelessly dug grave or an illegal excavation. Among the tumbled stones the capital of a pilaster (0.57 m. x 0.53 m. (50) is conspicuous (Pl. XXV: 2).

Dalman called Musil's sketch of the presumed building<sup>28</sup> "little realistic,"<sup>29</sup> Actually, there is almost nothing to confirm the drawing. Today the foundation of two heavily plastered rooms of ca. 3.00 m. x 2.00 m. each are to be seen. We miss them in Musil's sketch, where only the direction of the walls can be verified today. These small rooms are similar to others on the southern end of the rock, where every, even the smallest spot was built on. Because of these alterations the "Burgberg" can be ascended only over the above-mentioned staircase.

Do we have to assume that the "Burgberg" actually was a castle? We would not hesitate to think so, if the splendid building of Umm el-Biyara did not reach to the edge of the abyss where no aggressor was to be awaited. The careful inspection of the ruins on top of the "Burgberg" led to several surprising results. On the east side, facing ed-Deir, 2.60 m. below the summit, (Pl. XXVI: 1) a pavement of hexagonal slabs (0.41 m. Ø) protrudes for over 8.00 m.<sup>30</sup>

The pavement is covered by a cement flooring; and higher up, a few diagonally tooled building stones, 0.60 m. long, may have belonged to a staircase or to the walls

of a building. Without excavation little can be said: perhaps there was a building of several stories; or, much more likely, a succession of buildings. From them might have fallen a flat round stone (0.78 m. Ø) with a smoothly cut hole of 0.28 m. in its centre found in the *wadi*.

The northern part of "Burgberg" is a few metres lower. Here are four tumbled column drums (ca. 0.46 m. Ø). They may or may not have fallen from the southern top. Between pieces of red and yellow painted stucco, fragments of painted Nabataean bowls of the first century A.D. were found (Fig. 6). Remains of walls as drawn by Musil<sup>31</sup> are not to be seen.

Summarizing, it can be said that the "Burgberg" was completed with walls and buildings like a castle. But originally above the columned "Burgberg" - Sanctuary another complex of buildings arose with columns and a circular building of an unknown purpose, altogether a much more complex finding than the cella with its peristyle below it.

### Ed-Deir, the Rock Temple on the Deir-Plateau

The rock-hewn temple ed-Deir has been visited so often that there seemed to be no hope to discover anything new. Most tourists and some experts, however, have overseen the remains of a row of columns on the south side of the court in front of ed-Deir.<sup>32</sup> Where Musil saw only a low wall to protect the sparse soil from being carried away,<sup>33</sup> a mighty substructure is easy to recognize. Today, column drums (0.75 m. Ø) can be seen in the debris with conspicuous and durable stucco ornaments beside some column bases *in situ*, which are interspaced with rectangular stones like on the opposite platform (Pl. XXVI: 2).

<sup>26</sup> Musil, *op. cit.*, p. 146, 112.

<sup>27</sup> M. Lindner, J. Mitt *NHG* 1978, p. 95 (Jahresmitteilungen der Naturhistorischen Gesellschaft Nürnberg). P. Hammond has found tesserae in an anomalous stratum. He explained the find as a fabrication site of tesserae out of former capitals, possibly for a Byzantine church. *AAJ* 20, 1975, p. 28-29.

<sup>28</sup> Musil, *op. cit.*, pp. 146, fig. p. 112.

<sup>29</sup> Dalman, 1908, p. 278, footnote 1.

<sup>30</sup> A similar pavement of smaller slabs has been found, but not published yet by the University of Jordan between el-Habis and Zibb Fara'un in Petra.

<sup>31</sup> Musil, *op. cit.*, p. 143, fig. p. 112.

<sup>32</sup> E. Wilson, *The Century Magazine*, New York, 31, 1, 1885, pp. 3-27.

<sup>33</sup> Musil, *op. cit.* p. 142.

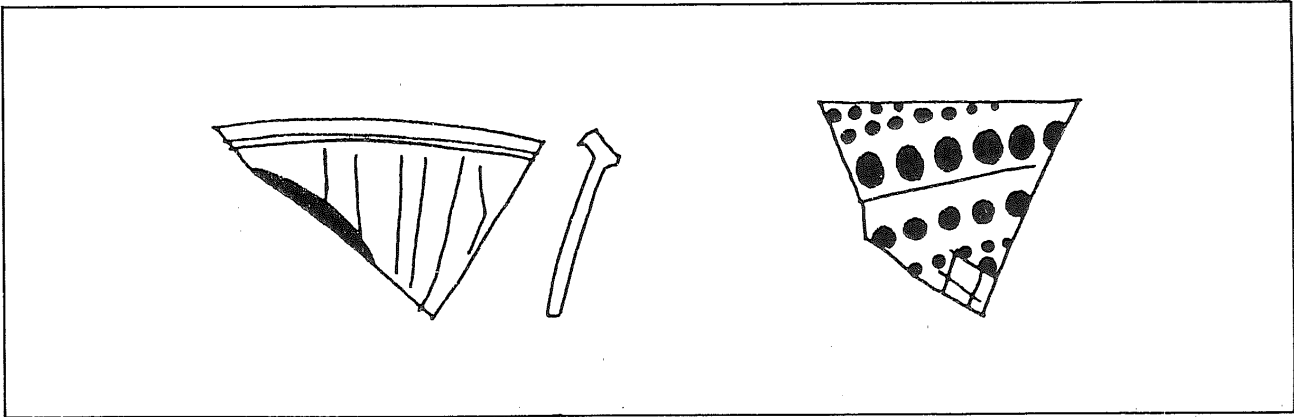


Fig. 6: Fragments of painted Nabataean bowls from the surface of the "Burgberg (Redbrown on red 1:1)

The same stucco ornaments have been described by P. Hammond,<sup>34</sup> who found them on the columns of the Winged-Lion-Temple, built during the reign of Aretas IV (9 B.C.-40 A.D.). It seems that rows of columns on the sides of the court in front of ed-Deir were planned, maybe realized. The two outer wings must have joined or were supposed to join the rock wall on both sides of the monument, where engaged columns of the same diameter as the above-mentioned columns are hewn out of the rock. The southern row should have been the more important one because here the pilgrims entered the court of ed-Deir. The processions probably did not pass through the rock corridor as today, but following the well-known procession way<sup>35</sup> from Petra across the large *wadi* which was filled with rock and debris in the high-time of ed-Deir.

The people of those days did not see ed-Deir as an isolated rock monument or as a "phantasielose Kolossalwand"<sup>36</sup> but as a temple or a tomb facade behind a columned court. On entering or standing before it, they had also before them the rock altar<sup>37</sup> which does seem a little "offsides", if one forgets the original arrangement and unless the flight of steps leading to the altar did not belong to an altar at all, but to the staircase up to the urn.<sup>38</sup> Pl. XXVII: 1)

#### A Rock-Carved Geometrical Design on the Roof of ed-Deir:

After many former ascents, one of the authors (Lindner) discovered in 1982 a geometrical design scratched in the rock of the southern roof of ed-Deir (Pl. XXVII: 2). Maybe it has been overlooked or disregarded by former visitors. The drawing shows an almost equilateral quadrangle open towards the back of the monument. A drawn out middle line is directed to the visible summit of Djebel Harun. Other lines and sectors seem to be as purposefully drawn as they are unintelligible to the authors. An architect's plan should be in the right place here, but also an astronomical design is possible (Fig. 7). The alignment of ed-Deir with Djebel Harun could confirm the thesis of one of the authors (Lindner) about the religious significance of the mountains in the Nabataean period<sup>39</sup>

#### A Nabataean Dwelling in the NW of the Deir-Plateau

Dalman's sketch map with the ingeniously entered rock monuments<sup>40</sup> ends rather abruptly towards the N-end of the Deir-Plateau. Already in 1980 (together with G. and W. Müller) and again in 1982 and 1983 the slopes and gorges beyond the "Rundbogenheiligtum" (D 469)<sup>41</sup> were

<sup>34</sup> P. Hammond, *AAJ* XX, 1975, p. 23, Pl. 5,1 (p. 149); *AAJ* XXII, 1977/1978, Pl. 62,1 (p. 248).

<sup>35</sup> First described by L. de Laborde *op. cit.* p. 59; see also Dalman, 1908, pp. 247-252.

<sup>36</sup> Th. Wiegand, *Petra*, Wissenschaftl. Veröffentlichungen des Deutsch-Türkischen Denkmalschutzkommandos, Heft 3, Berlin und Leipzig

1921, p. 10.

<sup>37</sup> Dalman, 1908, p. 271.

<sup>38</sup> D. Nielsen, *JPOS*, XI (1931), p. 235.

<sup>39</sup> M. Lindner, *JMitt NHG*, 1978, p. 94-95; idem, *Petra*, 1982, p. 277-278.

<sup>40</sup> Dalman, 1908, p. 276.

<sup>41</sup> Dalman, 1908, 279.

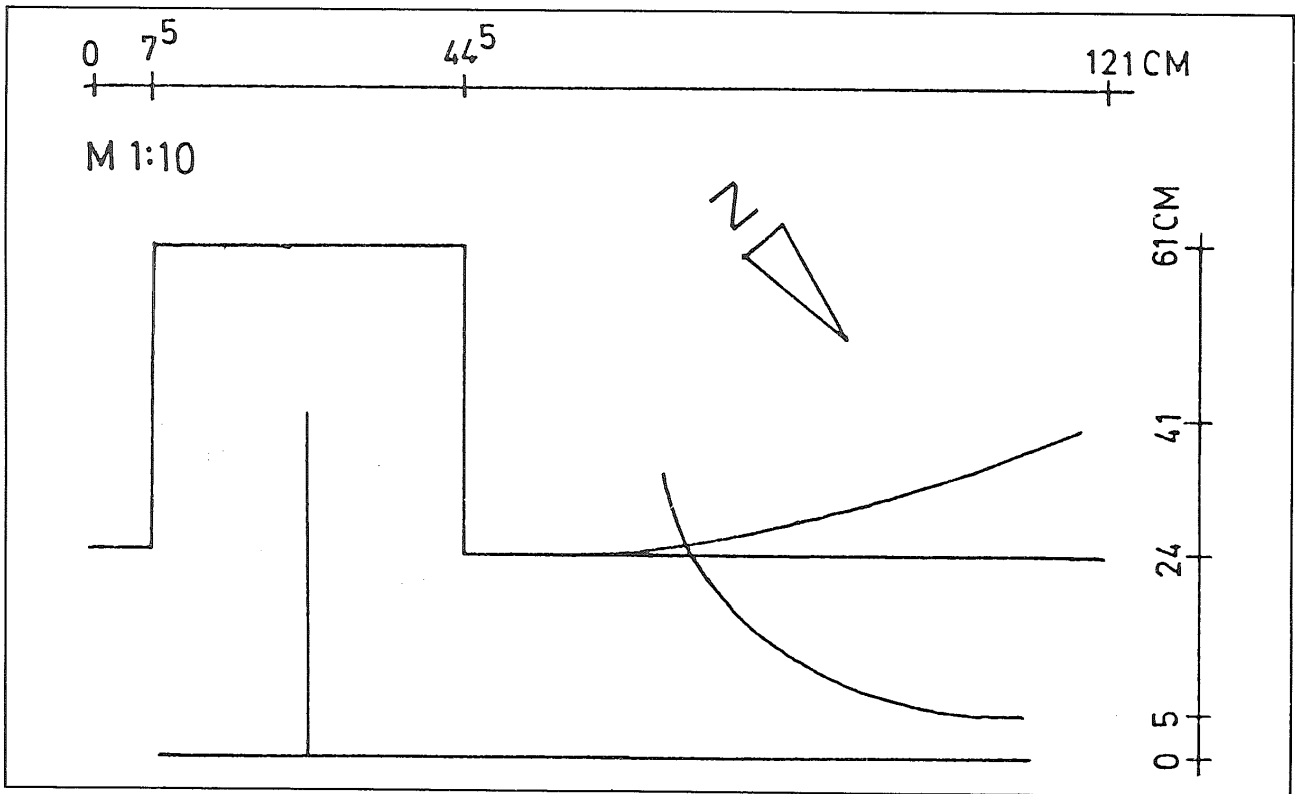


Fig. 7: Drawing of the geometrical design

carefully explored. Some 100.00 m. NW of it, at the foot of a rocky slope are two rounded niches without any traces of idol blocks (Pl. XXVIII: 1). Over three flights of winding stairs and another flight of ten rock steps on the top of a protruding spur of rock, the rectangular foundation (5.50 m. x 4.00 m.) of a house with a cement flooring can be reached. Rain water was collected in a rectangular basin (0.70 m. x 0.60 m.) at the head of the stairs.

The former inhabitants of the house did not have to rely on this water alone. In the NW, below their house, a gorge, which is an easy walk, led to an open-air triclinium (2.40 m. x 2.20 m.) which, collected rainwater for a deep rectangular cistern of 2.00 x 1.00 m. (Pl. XXVIII: 2). There are abutments for two arches, the walls are coated with thick plaster. During the two years that passed since the first visit, a Bedouin had cleared the cistern and the channels so well, that the reservoir was full of drinkable water. From afar, Horsfield<sup>42</sup> had taken a picture of the supposed triclinium. From nearby, the second use as a

water collecting device was evident.

Apparently the water problem was not solved easily on the Deir-Plateau. On the other side of the dwelling a second gorge leads to a much larger cistern (5.70 m. x 5.20 m.) with abutments for four arches, (Pl. XXIX: 2). The space between them was covered of course, as in the cistern below the summit of Djebel Harun. A flight of steps, each 1.20 m. long, facilitated the descent as well as the drawing of water. Above the steps a short Nabataean inscription is engraved in the rock (Pl. XXX: 1). Two thirds of the cistern were built of diagonally tooled ashlar. The lower wall which fitted into an incision in the rock has been torn away. A rectangular idol niche (1.25 m. x 0.60 m.) on the same wall is empty but shows a horizontal cut for a cross-beam. Beside it a semi-circle with a radius of 0.30 m. is scratched into the rock. Maybe there was a thought of carving a second niche at some time. In the cistern, filled with debris, Nabataean sherds reaching back to the first century B.C. were found (Fig. 8).

<sup>42</sup> G. and A. Horsfield, Sela-Petra, *QDAP*, VII, 1938, 11.

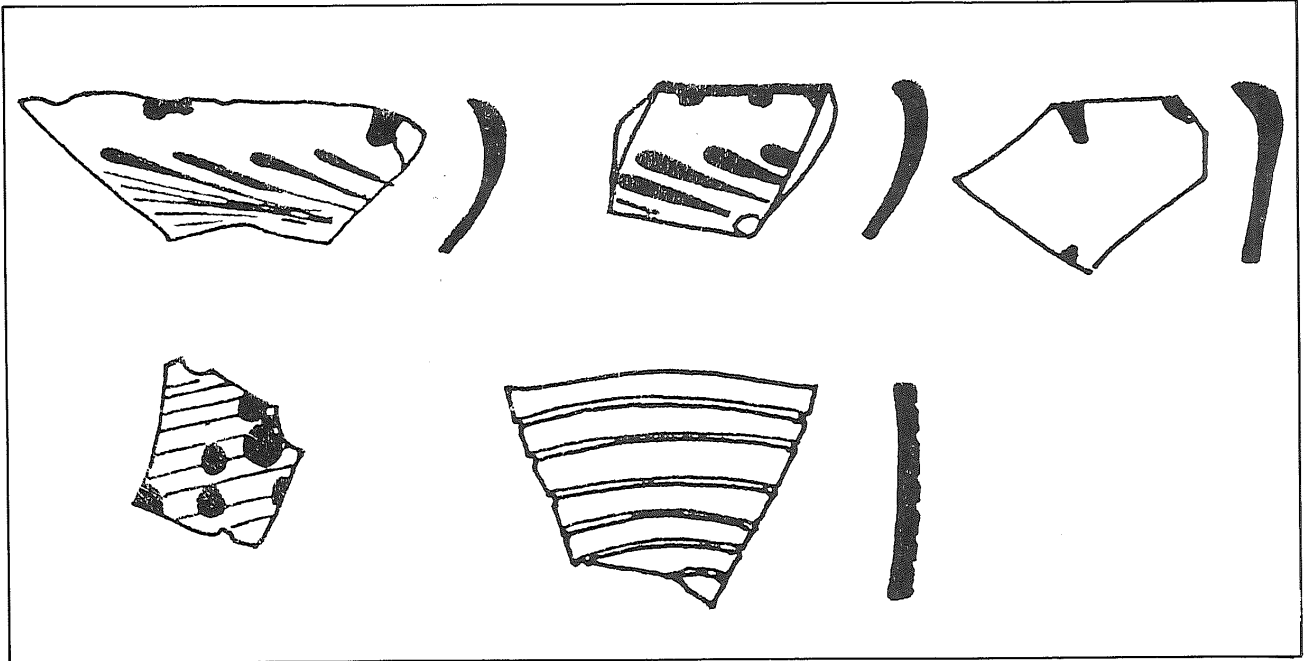


Fig. 8: Painted Nabataean pottery sherds from the surface of the cistern (1:1)

### A Necropolis on the Deir-Plateau

The number of tombs on the Deir-Plateau is small. But exactly at the spot where Dalman stopped his inquiries, because "there were no tombs to be found,"<sup>43</sup> 40.00 m. south of two Nabataean inscriptions on a tumbled boulder mentioned by Musil<sup>44</sup> a necropolis of almost uniform rock graves begins (Pl. XXX: 2). First a grave of the usual size is cut in the rock-bottom of the *wadi*. There is no ledge for cover stones and the compass point is roughly NS. 10.00 m. farther in the same direction, a round cistern marks the end of a small gorge. Following its way, 5.00 m. higher, a spacious yard with worked walls which, opens toward the south is entered. In the foreground are two drums of halved columns (1.00 m., 0.50 m. Ø). Their origin and purpose are a mystery. They were never quarried here, nor is a use in this place easy to imagine. The site is, however, a necropolis without any doubt. Actually, on the rising slope we find more graves, partly fitted out with ledges for covering stones. Some of these are still *in situ*, but no grave has remained completely covered. Above some of them are cup holes, presumably used for sacrifices, one for each dead person. 10.00 m. farther up, two

others are more isolated near the sheer, there are three graves side by side (Pl. XXXI: 1), slope of the Deir-Massiv. All of them are more or less in a NS direction. In the midst of the necropolis on a patinated wall, a well preserved, short Nabataean inscription can be read.

### Cliff-Dwellings on the Slope of the Deir-Massiv

If, from the upper part of the necropolis one follows the W-slope of the Deir-Massiv towards the south, there are a few Nabataean inscriptions, one above the rock chamber D 472 with the six cupboards Dalman has described.<sup>45</sup> Higher up on the slope the visitor is surprised to see eroded cuts in the rock associated with cisterns, apparently rock-cut back walls of built cliff-dwellings (Pl. XXXI: 2). The highest up of these houses owned a pear-shaped, plastered cistern with a round opening. Here an idol niche does not necessarily signal a sanctuary. The houses seem to have been ordinary dwellings. They may have been two-storied or their roofs were used for some purpose, because there are rope holes ("Anbindlöcher") and tool-marks in appropriate positions. As further signs of occupation, Nabataean sherds lie

<sup>43</sup> See note 40.

<sup>44</sup> Musil, *op. cit.*, p. 149.

<sup>45</sup> Dalman, 1908, p. 275.

littered about the surface. It might be of interest that among the surface finds on the Deir-Plateau including the "Burgberg" there were definitely no fragments of 'Ayyūbid-Mamlūk pottery.

### The Water Channeling System of the Camel Gorge

For want of a traditional name the gorge on the Deir-Plateau which is well marked by the Camel Relief (D 464)<sup>46</sup> will be called "Camel Gorge" in this context. This gorge narrows towards the mountain range into two canyons which carry large quantities of water during the rainy season. In order to lead and collect that water, to protect the plateau from torrents and to make agriculture feasible, a water channeling system was installed by the former inhabitants which does honor to its architects.

The system has four main channels. In the N part of the mountain range one channel (I) of 130.00 m. receives the water from the cliffs and carries it into a large basin which has been noted by Dalman (D 469).<sup>47</sup> (Pl. XXXII: 1). Into the same basin, however, flows water from a second channel (II) of 80 m. length coming out of a ravine of the Camel Gorge. From the basin the channel comes out in a twice angled line and ends, it seems, in the open. Probably it crossed the gorge over an aqueduct which has disappeared but whose abutments can be seen on both sides. The presumed channel then joins two other channels (III, IV) coming from the ravine. The resulting channel V ends in the void opposite the basin. (Fig. 9). A little farther, a round shaft (0.70 m. Ø) extends 2.00 - 3.00 m. into the rocky *wadi* bed and opens towards the middle of the *wadi*. The hissing of a viper at the bottom of the shaft prevented further examinations. But, a Bedouin confirmed that he had entered a spacious cistern under the *wadi* bottom.

Also above channel II, on the ramps of the overhanging cliff, carved foundations of houses are to be found. Above channel I rock steps lead up to these ramps. A good example of a well preserved, comfortable dwelling is located at the foot of a flight of steps. Here two rock chambers (470, 471) were noticed by Dalman,<sup>48</sup> who overlooked the original front buildings making the caves habitable. Bedouin have lately cleared the opening of a pear-shaped cistern nearby which contained good water in 1982. (Pl. XXXII: 2).

### A Newly Discovered Idol Niche Above the Camel Relief

During the drawing and measuring of the Camel Relief by E. Gunsam one of the authors (E. Schreyer) discovered a hitherto undescribed idol niche above the relief (Pl. XXXIII: 1). In front of it, a rock-cut installation looking like a biclinium may have served as a sitting place as well as a water collecting device. In the cliff, four rock steps lead to a rectangular vaulted niche with an eroded idol block. The idol has a rounded cavity in its lower half, similar to idols in the Sidd el-Ma'jin.<sup>49</sup> Above the niche the cliff is cut into radiating gutters.

### A Stone-Built Temple on the Deir-Plateau?

In front of the Camel Gorge,<sup>50</sup> with the well-known relief (D 464)<sup>51</sup> and the big rock chamber D 462<sup>52</sup> with a middle niche and numerous Nabataean inscriptions, Dalman mentioned and entered into his sketch map two small ruins.<sup>53</sup> He measured the smaller one of the two (4.15 m. x 3.90m). The other (D 453) was explored in 1982. Because of the rectangular ground-plan and the numerous columns a temple is to be supposed. One of the middle axes is directed towards Djebel Harun, as can best be seen from a spot above the ruin on the slope of the mountain range (Pl. XXXIII:

<sup>46</sup> Dalman, 1908, p. 274, fig. 218.

<sup>47</sup> D 469, Dalman, 1908, p. 275.

<sup>48</sup> Dalman, 1908, p. 275.

<sup>49</sup> Dalman, 1908, p. 308-314. There is nothing known about the meaning of these "hollowed-

out" idols.

<sup>50</sup> Dalman 1908, p. 273-275.

<sup>51</sup> See note 46.

<sup>52</sup> Dalman 1908, p. 274.

<sup>53</sup> Dalman 1908, fig. 206, p. 264.

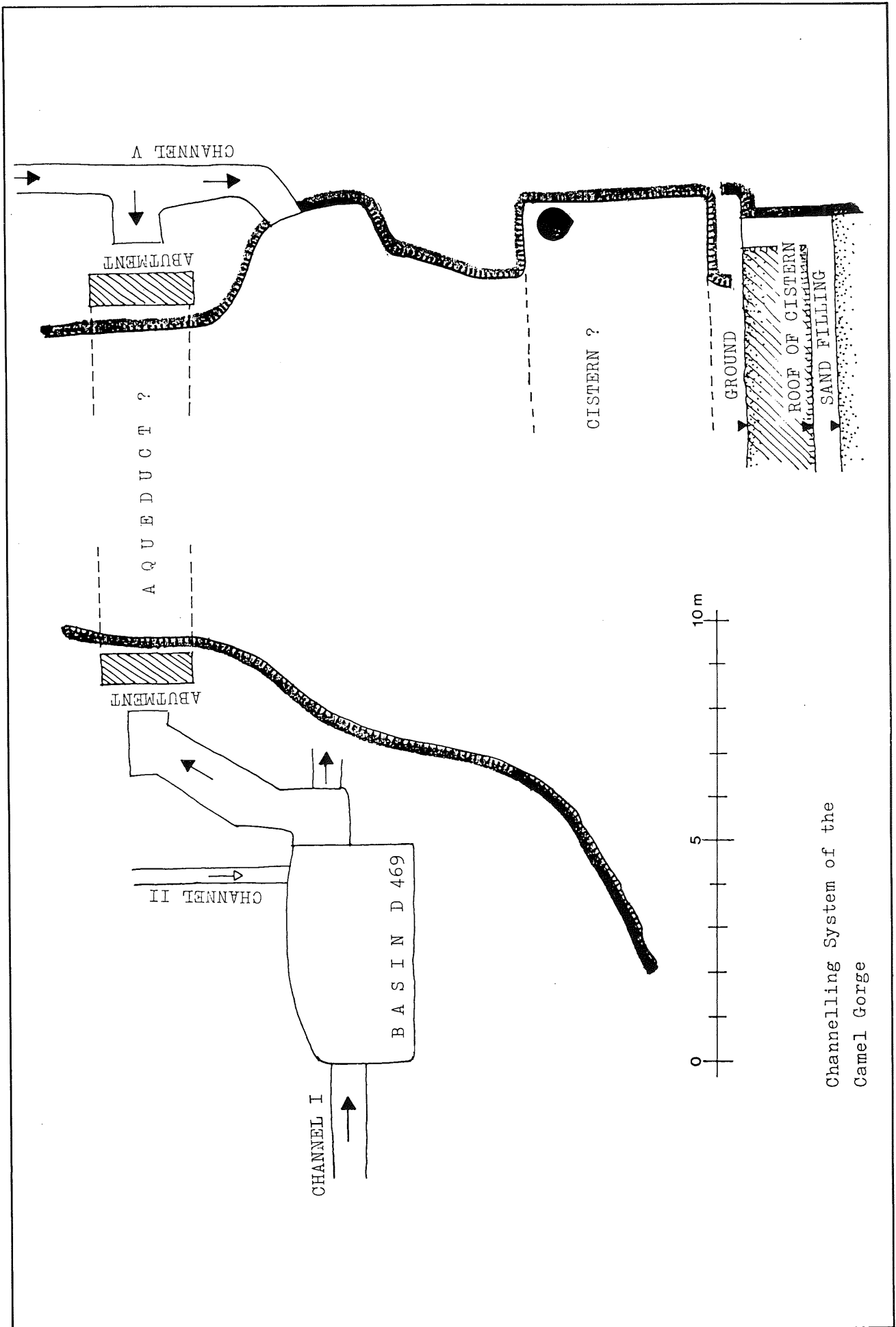


Fig. 9: Plan of the channelling system of the Camel Gorge

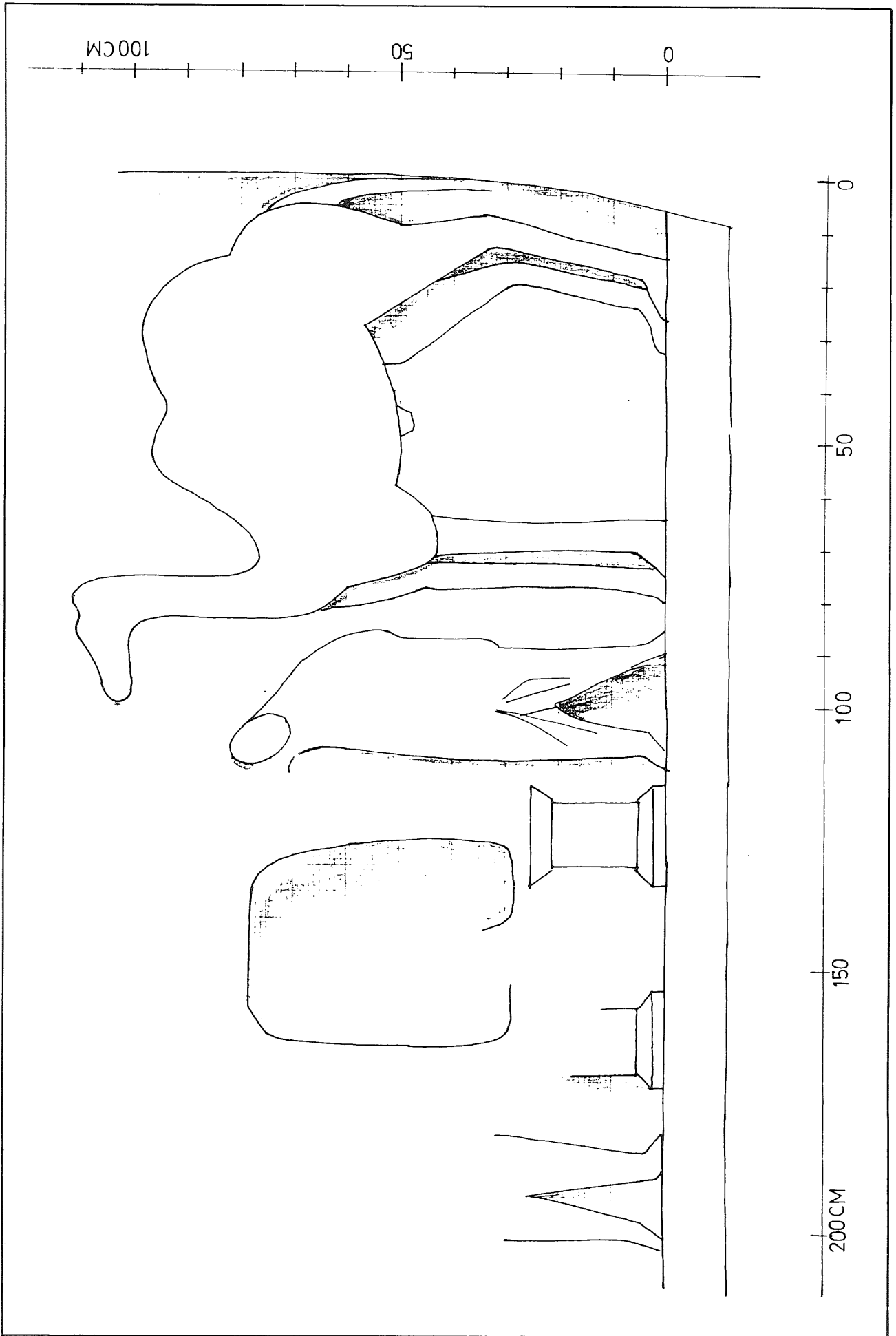


Fig. 10: Drawing of the Camel Relief

2; Fig. 11).

Apparently the entrance was located on the E-side with remains of steps under a portal which has to be imagined. Foundations were found and measured only on the N-side. An unevenness of the site near the NE-corner seems to have been equalized by arches. On a raised platform in the middle of the ruin two bases of columns may be *in situ*. (Pl. XXXIV: 1). There are fragments of architraves, drums of columns, and engaged semi-columns, partly eroded, partly diagonally tooled and well-preserved building stones with bits of stucco (Pl. XXXIV: 2). The bulk of the material is tumbled towards the north, but the direction is not definite. Maybe several quakes or changing shock waves have destroyed the building. Considering the location, not much of the building material has been carried away.

With its *ca.* 19.00 x 13.00 m. the building or the ruins looks small in the relatively wide plain. Actually it is not far from the size of the Winged-Lion Temple (17.42 x 17.42) in the centre of Petra.<sup>54</sup> In front of the assumed entrance, especially at the NE-Corner, densely packed sherds belong to the first, perhaps second century A.D. of Nabataea<sup>55</sup> (Fig. 12: 1-10). The mostly thin and partly painted pottery marks a place of sacrifice. Even if it were washed in from higher up, for instance from the rock chamber D 462, the building must have been there before. Unfortunately the exact ground-plan cannot be seen without excavation, but that it was a temple seems reasonable.

#### A Restored Nabataean Cistern on the Deir-Plateau

Behind the rock altar ed-Deir a gorge, mentioned by Dalman,<sup>56</sup> extends towards the east. It narrows to a ravine of less than 1.00 m. and is filled with sand. From there a channel of 0.60 m., lately repaired, leads

into a large round cistern which former visitors did not notice (Pl. XXXV: 1). A Bedouin succeeded in restoring the cistern and its intake. It contained drinkable water; as a matter of fact, the drinking water for the exploration team. As is typical with Nabataean cisterns, there are several intakes. One of them is a flight of steps. Apparently the builders counted on a big influx of water in the rainy season. The described channel transported the surplus water farther on to a series of other cisterns on the W-slope of the Deir-range (Pl. XXXV: 2).

On both sides of the gorge are many Nabataean inscriptions, well known to the experts, and a few petroglyphs of animals. They prove either the popularity or the holiness of the place. Pilgrims and workers on ed-Deir and the channels may have been the writers on the orderers.

#### The Big Cisterns of the Deir-Plateau

There exists a relation between the amount of stored water in a certain locality and the number of people living or coming to the place. The hitherto mentioned cisterns on the Deir-Plateau are already numerous and spacious. But there are bigger reservoirs to be found. The described channel from the restored cistern near ed-Deir follows the cliff face of the Deir-Massiv in a NNW-direction. Nabataean inscriptions signal the importance of the water channelling system. The remains of not less than twenty-one (!) arches and their abutments demonstrate how the channel was covered. In other places simple covering stones like those over graves were used. The double cistern 454 (7.50 m. x 5.00 m. each) has been only superficially described by Dalman.<sup>57</sup> Actually the walls are thickly plastered. There are the abutments of ten arches. Nine plastered rock steps lead to the interior of the northern cistern and here, above the fifth step, a

<sup>54</sup> P. Hammond, *AJ* XXII, 1977-1978, p. 236.

<sup>55</sup> As to the chronology of the pottery see P. Parr, *A Sequence of Pottery from Petra, Near Eastern Archaeology in the XXth Century*, New York 1970; P. Hammond, *Pottery from Petra, PEQ*, 1973, p. 31-32, 45-46; K. Schmitt-Korte, *Die*

bemalte nabatäische Keramik: Verbreitung, Typologie und Chronologie. In: M. Lindner, *Petra*<sup>4</sup>, 1982, p. 174-195.

<sup>56</sup> Dalman, 1908, p. 273-274.

<sup>57</sup> Dalman, 1908, p. 274.



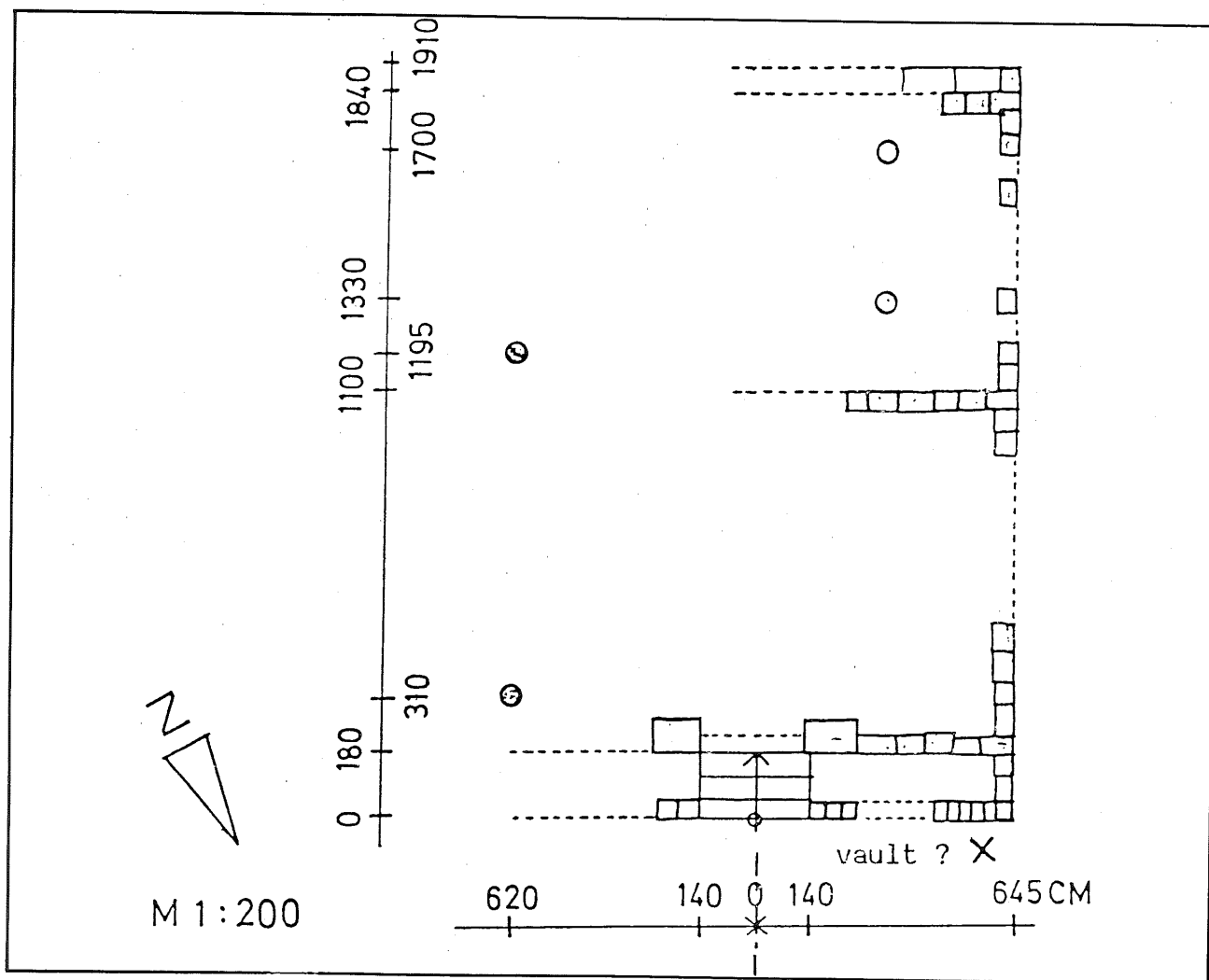


Fig. 11: Plan of the supposed temple

small niche with an idol block is so engraved that everybody who came to get water had to touch it. In a small chamber above the cistern which is difficult to reach now and does not contain anything remarkable, the custodian of the cisterns may have attended to his duties. (Pl. XXXVI: 1).

Directly after the double cistern another one, 9.00 m (!) long and 4.50 m. deep, is followed by the biggest cistern of the Deir-Plateau (D 458). Its measurements are 8.50 m. x 7.00 m. Here, too, Nabataean inscriptions and niches on the cliff mark the importance of the installation. This cistern 458 received its water from the Camel Gorge and its channels in a way that all the water from the slopes could be caught and stored. It seems to the authors that such an amount was not meant alone for the pilgrims coming to worship

on the plateau. There must have been people living up there under much better conditions than the Bedouin, and the explorers, of today.

#### The "Südheiligtum" (Dalman) on the Deir-Plateau

In 1912 Dalman called a complex of rock chambers and courts in the S of the Deir-Plateau "Südeiligtum". On the front of one cave he discovered a short Nabataean inscription.<sup>58</sup> During his stay at the site in 1982, one of the authors (E. Schreyer) discovered a second inscription in a cave opening towards the urn of ed-Deir and visible from there (Pl. XXXVI: 2).

The two week stay at the "Südheiligtum", together with a Bedouin family of eight people, demonstrated how a big

<sup>58</sup> Dalman, 1912, p. 28-30.

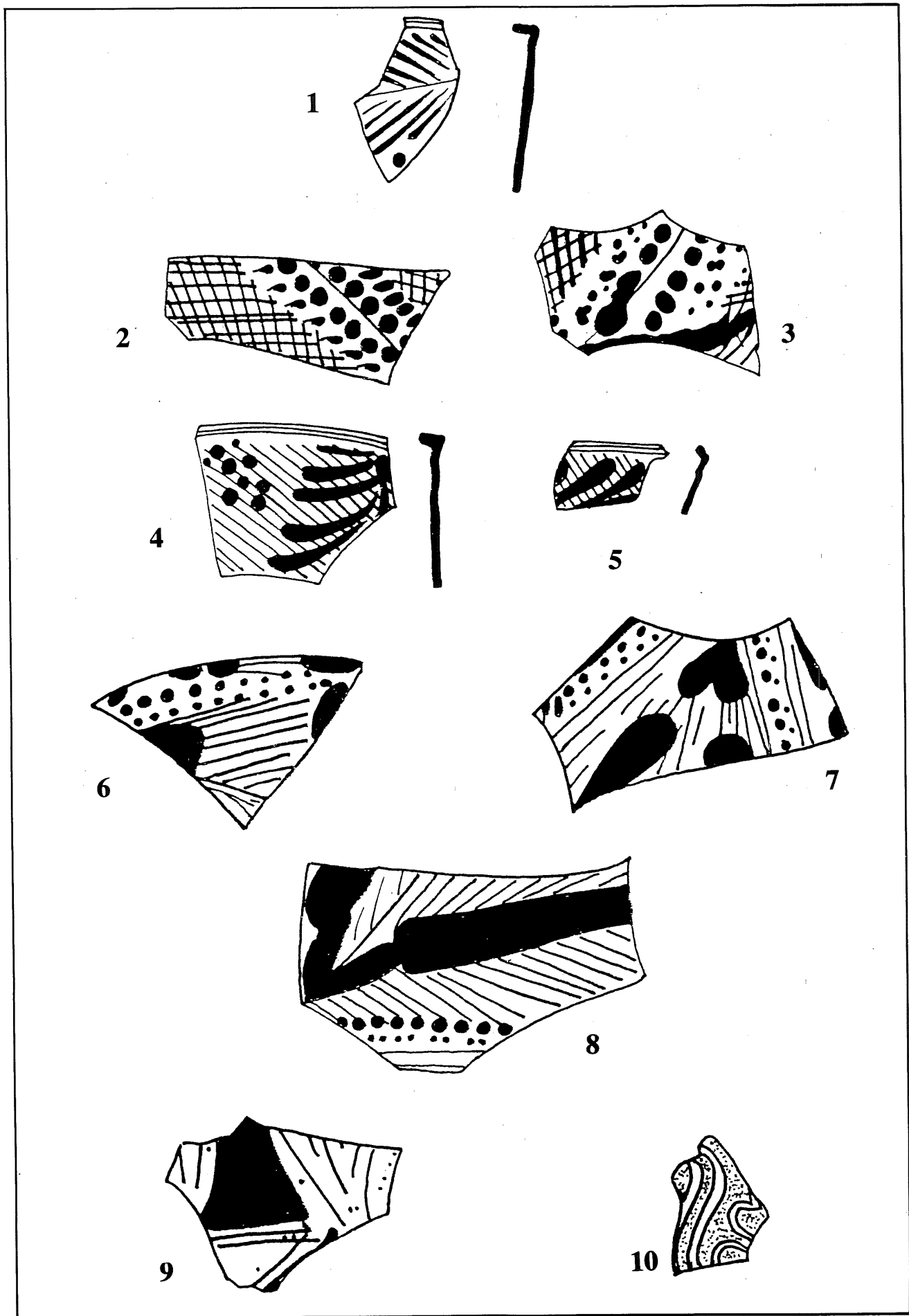


Fig. 12: Fragments of painted Nabataean bowls and of a Nabataean oil lamp (ca 1./2. Cent. A.D.) found in a densely packed collection near the supposed entrance of ruin D 453 (1:1).

family lives and could once have lived in such a dwelling place. The terrace makes it possible to cook, sit around the fire and eat. In the court a large tent is, and could be, erected, under which it is cool and comfortable on hot days and nights. During cold, sandstorm and rain, according to the weather, different rock chambers are, and were, used. The "Guest Cave" is off limits for children, donkeys, cats, dogs and goats. One room is reserved for the female members of the family. The hill above the dwelling place contains platforms and staircases. Their main purpose was not to pray, but to collect water and to prevent it from spilling down unguided to the living quarters. One gorge was closed with a wall of nine layers of ashlar to store rainwater for the rainless season. Near a break in the lower part of the wall a big stone vessel was discovered. There is no reason to assume a "sanctuary" despite the fact that the "Südheiligtum" is located near ed-Deir. Even today the Bedouin sell beverages to the thirsty visitors of the temple. Some Nabataean might have done the same 2000 years ago, and afterwards sacrificed to his god on top of the hill. Maybe he was the custodian of the sanctuary nearby.

### Summary and Conclusion

The Deir-Plateau above and N of Petra was explored by orientalist in the beginning of this century. A more precise examination of the site in the springs of 1982 and 1983 resulted in several new discoveries. The "Burgberg" opposite the rock temple shows no definite traces of a fortification or a castle. There are, however, impressive signs of its former role as a splendid sanctuary. A circular building with bases of columns near the western cliff has not been described so far. The same applies for a pavement of hexagonal slabs and another one which is tessellated. Columns' drums, some of them *in situ*, some tumbled, remind one of peristyles on the E-platform as well as on the "Burgberg" proper, where a succession of buildings seems to be possible. It was one of the aims of the exploration by the members of the Naturhistorische Gesellschaft Nürberg to

ascertain what the monuments and installations on the Deir-Plateau looked like in ancient times. The rock-hewn temple ed-Deir was not meant to stand isolated on an empty plain. It seems that a peristyle of stuccoed columns confined the place and that the pilgrims or worshippers entered the precinct from the then rock-filled *wadi* and not from the narrow corridor which is now in use. On the roof of ed-Deir a geometrical design was discovered that may have been an architect's plan or an astronomical design. A middle line is directed to the visible summit of Djebel Harun. Beyond the monuments described by Dalman in the N of the plateau, a dwelling with triclinium and cisterns and a necropolis of rock graves were found. In the slope of the Deir-massiv remains of cliff houses are further signs of a populated area. Above the Camel Relief which was painstakingly measured and drawn, an idol niche was discovered. Channelling systems begin already in the cliff walls high above the plateau and channels conducted the water of the rainy season into a many spacious cisterns. The ruin of a columned building, most probably a temple was examined.

The pottery fragments found nearby belong to the first centuries of our era. As to the chronology of the big cisterns, some of which are being cleaned and restored by Bedouin right now, there are enough Nabataean inscriptions in close contact with the water channels to date them to Nabataean times. The stay of the exploration team in the "Südheiligtum", a sanctuary according to Dalman, showed an even now usable dwelling place, but in spite of a newly discovered Nabataean inscription nothing that has to be considered as holy or belonging to a cult place was found. It is the result of the exploration that the Deir-Plateau in the high-time of the Nabataean Kingdom or somewhat later was a place of worship as were most of the mountain tops of the region. Compared, however, with other places like Umm el-Biyara, Djebel en-Nmer, Zibb Atuf and Djebel el-Hubta, the sanctuaries here have been more numerous and more splendid. Maybe this was the reason for the equally

numerous traces of ordinary dwellings which seem to belong to an important place of worship.

#### **Acknowledgements**

The authors would like to thank the Department of Antiquities, especially the

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**UMM UBTŪLAH: A NABATAEAN AND/  
OR ROMAN MILITARY SITE ALONG  
THE NORTH SIDE OF THE WADI EL  
HASĀ IN SOUTHERN JORDAN**

by  
Burton MacDonald

**Discovery and Work at the Site**

The large site of Umm Ubtūlah was discovered on 22 May 1982 by the Wadi el Hasā Archaeological Survey (WHS) while working along the northern edge of the so-called Edomite plateau in Southern Jordan.<sup>1</sup> Bedouin living in the area provided the name of the site.<sup>2</sup> The site itself is located on an entrenched meander in the Wadi el Hasā and on its north side<sup>3</sup> (Fig. 1). Photographs were taken of the site on May 22 but it was not possible to visit the site at this date.

Subsequently the team was able to make visits to the site in late May and early June 1982. On the second of these visits two pottery samples were taken from the site. The first sample was collected from the southwest corner of the site and the field reading was 34 Nabataean/Early Roman; 5 Late Roman; 1 Early Byzantine; 2 Late Byzantine; 1 Late 'Ayyūbid/Mamlūk; 7 Undetermined. The second sample, taken from the southeast corner of the site, consisted of 3 Early Bronze; 4 Nabataean/

Early Roman; 9 Late Ottoman; 5 Undetermined.<sup>4</sup> No pottery could be found at the highest elevations of the site. As a consequence of this visit, made on a very hot day and around noon, very little pottery seemed to occur at the site.

On the basis of these field readings plus the observable architecture, it was concluded that the site was a Nabataean and/or Roman military installation which probably was associated with a line of Nabataean and/or Roman fortresses and watchtowers along the south side of the Wadi el Hasā.<sup>5</sup> The size and believed importance of the site, previously unreported, seemed to warrant a return to it in May of 1983 to draw a topographical plan and to attempt to obtain more information.

A team consisting of S. Balderstone, architect and surveyor; N. Beqa'in, representative of the Department of Antiquities of Jordan; G. Mattingly of Johnson Bible College, Knoxville, TN, and a two-year team member of the Central and Southern Moab Survey Project;<sup>6</sup> and the writer returned to the site for three days, 16-18

<sup>1</sup> Team members of the WHS 1982 were E. B. Banning; N. Beqa'in, representative of the Department of Antiquities of Jordan; B. F. Byrd; C. D'Annibale; B. MacDonald; and G. O. Rollefson. On the possibility that this site was seen by N. Glueck on a flight over the Wadi el Hasā on 5 November 1936 see his article "An Aerial Reconnaissance in Southern Transjordan," *BASOR* 67 (1937), p. 24 where he writes: "Continuing over the Wadi el Hasā we saw a great site on a high isolated knoll, situated in the Wādī el Hasā near its northern side. It is situated approximately halfway between er-Ruweihah on the south side of the wādī, and 'Aineh on the north side of the wādī; these sites are approximately 15 kilometres from one another down the length of the wādī. It was a very large walled site, which to judge from its general appearance might well date from the Early Bronze and Early Iron Ages. Situated above a large pool of water in the wādī, it made somewhat of the same impression as Kh. el-Medeiyineh overlooking the Wādī el-Môjib..."

<sup>2</sup> We are not completely satisfied with the name of the site. The name we first gave the site was Umm Umtūlah on the basis of what we heard the Bedouin calling the site. However, this name makes no sense. Arabists in Amman suggested that the site's name could be Umm Ubtūlah since the Bedouin change *b* to *m*. Thus the name would refer to a hanging, clinging plant that probably grew or grows in association with the water of the Wadi el Hasā.

<sup>3</sup> The highest point of the site is at coordinates 332335 on the 1:25,000 scale map, Qal'at el-Hasā, Map Sheet 225/025.

<sup>4</sup> The pottery from the 1982 season was read by S. Thomas Parker.

<sup>5</sup> A report on this Nabataean and/or Roman military monitoring system along the south side of the Wadi el Hasā is presently in preparation.

<sup>6</sup> J. M. Miller, Archaeological Survey of Central Moab: 1978, *BASOR*, 234 (1979) p. 43-52; Archaeology Survey South of Wadi Mujib, *ADAJ*, XXIII (1979) p. 79-92.

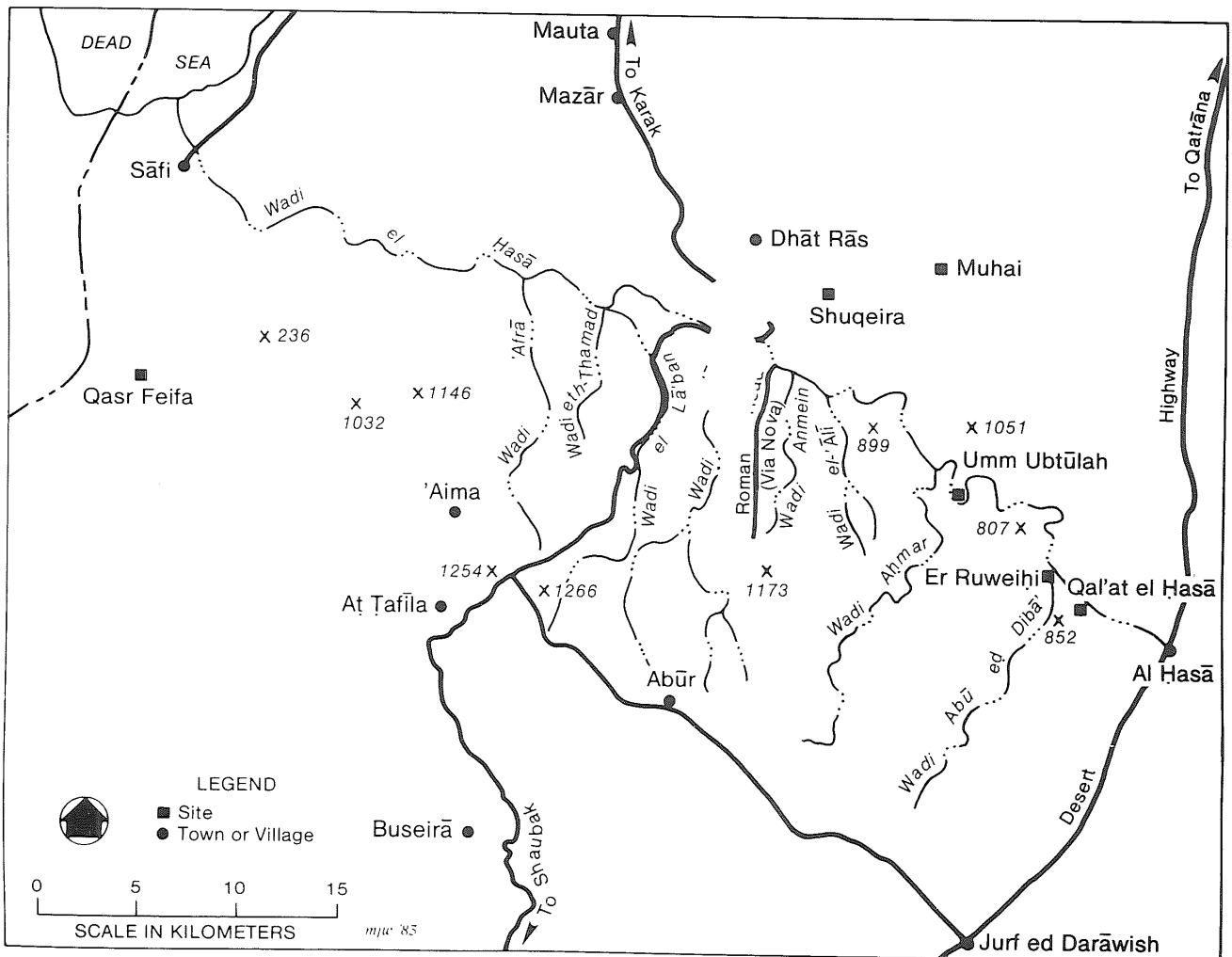


Fig. 1: WHS area and location of Umm Ubtulah.

May 1983. During this three day, working stay at the site the team drew a topographical plan (Fig. 2) took numerous photographs and collected five more pottery samples. In general, an attempt was made to learn as much as possible about the site.

To our pleasant surprise, a great deal of pottery was noted and collected from the lowest elevations of the site. Moreover, while making the topographical plan, the team discovered pottery among the numerous structures planned on the east side of the upper segment of the site. Furthermore, four sherds were collected from a recently robbed tomb (Pl. XXXVII: 1) on the south end of the upper segment of the site. This pottery will be discussed below.

#### Description of the Surrounding of the Site

As previously noted, Umm Ubtulah is located in a huge bend in the Wadi el Hasā (Fig. 1). The lower segment is located on a

south-facing slope on the north side of the wadi while the upper segment is located on the crown of an associated ridge immediately to the north (Pl. XXXVII: 2).

The site is surrounded by good agricultural land on three sides: south, east, and west. The crop being grown in the immediate vicinity of the site is wheat. In early June of 1982 we encountered tomato farmers down the wadi to the northwest of the site at a distance of approximately two kilometres. We did not visit this area in May 1983. On the 1983 visit a bulldozer and a crew of three men were at work clearing more land for the growing of tomatoes approximately one kilometre up the wadi to the east.

Abundant water was noted in the wadi on the occasions of both the 1982 and 1983 visits. A pool, directly below the site to the east and called Birkat Umm Ubtulah by the land-clearing crew, contained a great deal of water. A gasoline pump was noted at Birkat Umm Ubtulah and water

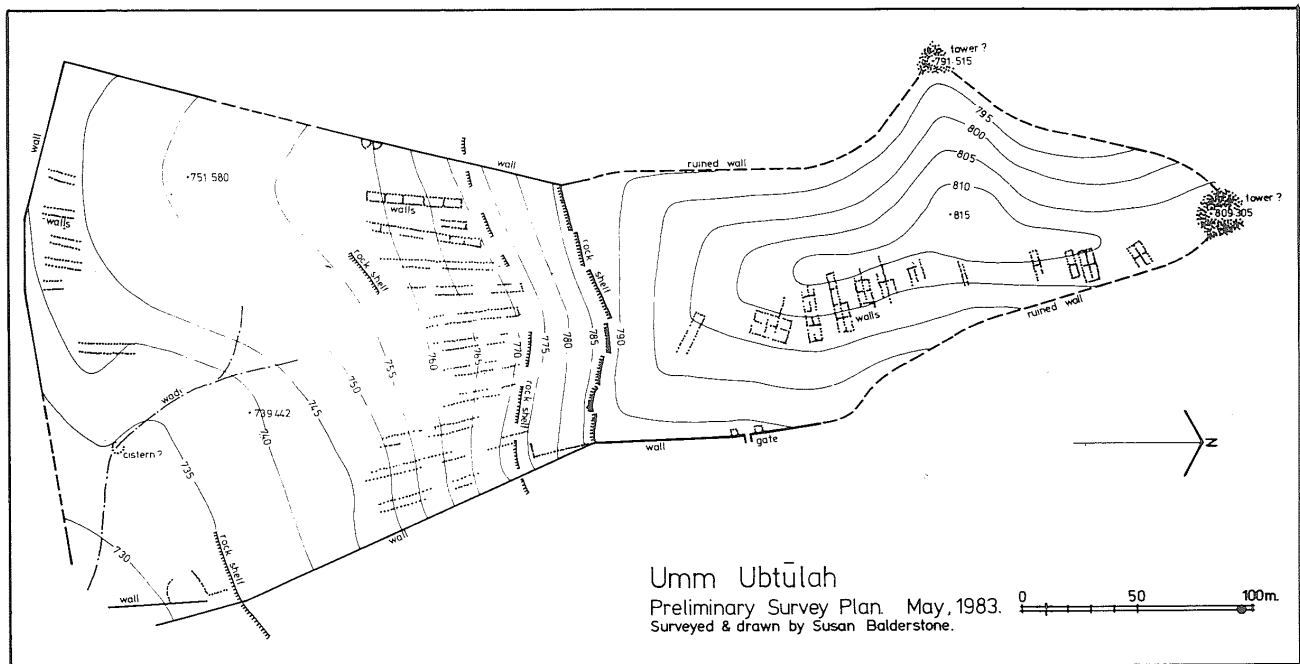


Fig. 2: Topographical plan of Umm Ubtūlah.

pipes lead up to a field on the south side of the wadi to the east of the site. A concrete foundation for a pump was noted on the north side of the wadi, also to the east of the site. Moreover, an aqueduct, chiseled out of bedrock, was noted leading from the pool to a field along the north side of the wadi immediately below Umm Ubtūlah. Other pumping stations and irrigation canals were noted both to the east and north-east of the site.

The vegetation along both sides of the wadi to the south, east, and west of the site was very lush. The growth was so thick that it was impossible to approach the water of the wadi in some places without suffering bodily damage. However, even at these places water could be heard falling over small (?) obstructions in its path.

Sheep and goats are herded by the Bedouin of the region. In both the 1982 and 1983 visits to the site a very large herd of camels was seen on the plateau to the south of Umm Ubtūlah. Bird life in the area of the site is extremely abundant.

There are no permanent dwellers in the wadi in the vicinity of the site. Two Bedouin tents were noted on the north side of the Wadi to the east in 1983 while in 1982 a Bedouin tent was located im-

mediately to the west of the site. The people working in the area told us that the farmers who grow the tomatoes along the Wadi come from El-'Ainā, and just come to the area for the planting, growing, and harvesting of their crop. The wheat in the area is probably harvested by the local Bedouin.

Access to the area of Umm Ubtūlah is presently difficult. The only apparent vehicle road into the site is from the Desert Highway to the east (Fig. 1). The site is approximately 22 km. from the Desert Highway by this road. The road is in poor condition for the most part and the driving time from the Desert Highway to Umm Ubtūlah is approximately 45 minutes. During parts of the rainy season of the year the site is inaccessible by even a four-wheel drive vehicle.

Access by foot or animal is possible along the wadi to the east from Er-Ruweihi<sup>7</sup> (Fig. 1). This route passes directly below Umm Ubtūlah. From this point paths can be taken further along the wadi to the north-west as far as Wadi el-'Ālī; to the south-west up the west side of the wadi Ahmar to Rujm Bakher on the northern edge of the Edomite plateau;<sup>8</sup> to the north and northwest to Muhai and

<sup>7</sup> B. MacDonald, G. O. Rollefson, E. B. Banning, B. F. Byrdm and C. D'Annibale, *The Wadi el Hasa Archaeological Survey 1982: A Preliminary*

Report, *ADAJ*, XXVII (1983).

<sup>8</sup> *Ibid.*



Dhat Ras respectively (Fig. 1). It is difficult walk from Umm Ubtūlah (westward) to the main Karak to Tafilā road along the Wadi el Hasā, although the route from this main road to the Wadi el-‘Ālī is readily accessible (Fig. 1). It is the area directly east of the Wadi el-‘Ālī which makes this route quite difficult for both animals and men because of the steepness of the cliffs on both sides of the wadi.

### Topographical Plan of the Site

In making a topographical plan of the site care was taken not to exaggerate what could be seen on the surface of the ground and in the photographs. We attempted to avoid putting on the plan lines of which we were uncertain. A comparison of the photographs taken of the site from various angles and the topographical plan will show the conservativeness of the latter. We did not want to draw an imaginary plan of the site. We also avoided drawing features which we believed were not ancient. For example, the animal pens which show recent use and which appear in the pictures of the lower segment of the site do not appear on the plan. Furthermore, the piles of stones on the upper segment of the site in which we could clearly see human bones are also not on the plan. These piles of stones are presently burials. They could, however, cover ancient features of the site.

For the sake of description, the site will be divided into main enclosure wall, upper segment, and lower segment.

#### Main Enclosure Wall

The site is enclosed by a very impressive limestone wall (Pl. XXXVII: 2). The enclosed area measures 520.00 m. (North-south) x 250.00 m. (east-west) at its greatest extent. This enclosure wall is constructed of two skins of dry-stone walling with rubble infill. In some places on the east and west sides of the site the enclosure wall still stands over a metre high and its thickness is 1.50 m. on the average. For the most part, the wall is now a heap of rubble. However, even in this state it is impressive especially on the east side near the top of the lower segment of the site. The limes-

tone to build this wall as well as other features of the site would have been available in the immediate vicinity of the site.

#### Upper Segment

The upper segment of the site is separated from the lower segment by a rock shelf (Fig. 2); (Pl. XXXVII: 2). This part of the site encircles the crown of a ridge and measures ca. 270.00 m. (north-south) x 115.00 m. (east-west) at the rock shelf. The upper segment widens out to ca. 120.00 m. at the tower (?) located on the west side of the enclosure wall (Fig. 2).

The enclosure wall of the upper segment of the site appears to follow the contours of the ridge on the west side. On the east side, however, it rises from a small gate (Fig. 2) towards the northern tower (?).

As mentioned above, there are two possible towers on the upper segment. One is located at the northern extremity of the site and is now a heap of rubble (Pl. XXXVIII: 1). It measures ca. 20.00 m. in diameter (Fig. 2). The other is located on the western extremity of a spur running out towards the west. This structure now measures ca. 12.00 m. in diameter (Fig. 2).

The enclosure wall on the west side of the upper segment is most ruined. However, the descent towards the wadi is quite steep here and perhaps the wall was never very strong at this point.

There is a large number of indeterminate structures on the east side of the upper segment (Fig. 2; Pl. XXXVII: 2). These structures are made of rough limestone blocks and appear to be aligned on the slope. The ones at the southern end of this alignment are not parallel to the ones to the north. The probable reason for this is that their orientation has been changed to follow the direction of the slope. These structures are made from large field stones as pillars with smaller stones lying between the pillars. Some of these stone pillars still stand to a height of approximately one metre. The structures are 2.70-3.00 m. wide (north-south) between the walls. They descend the slope in a terrace-step fashion and measure ca. 6.40-4.80 m.

(east-west) from terrace-face to terrace-face. A triple-unit width structure is located on the southern end of the upper segment (Fig. 2). The width of the two exterior units is 6.30-6.50 m. while the width of the interior unit is ca. 4.60 m.

There is a small entrance way located in the eastern wall of this segment. It measures 1.90 m. wide and is flanked on the interior of the wall by two structures measuring 2.70 m.<sup>2</sup> (Fig. 2) Birkat Umm Ubtūlah is located in the wadi directly below this section of the wall. No apparent path, however, was observed leading from this entrance to the source of water.

There do not appear to be any structures on the western side of the ridge within the enclosure wall (Pl. XXXIX: 1). This could be due to sheetwash erosion or to the fact that this is the windy side of the site. Our work at the top of the site was hindered each afternoon by a very strong northwesterly wind.

There are many burials located at the highest point of the site. Human bones were seen among the stones of the northern tower (?) and among a pile of stones at the highest point of the site. These burials probably overlie ancient structures and are most likely built using the stones from these structures. This fact caused difficulties of architectural interpretation and made it impossible to draw a more precise plan of the upper segment. One of the burials had been robbed between our visits to the site in 1982 and 1983 (Pl. XXXVII: 1).

### Lower Segment

The lower segment of Umm Ubtūlah is irregular in shape and measures 250.00 m. (east-west) x 230.00 m. (north-south) at the widest point. It measures 115.00 m. at the rock-shelf separating it from the upper segment of the site. It is located for the most part on a steep slope leading down to the Wadi el Hasā (Pl. XXXIX: 2).

There are more indeterminate structures located in this segment of the site. The walls of these structures measure ca. 0.90 m. thick on the east side of the upper segment of the site. The structures themselves measure from 2.60-3.20 m. on the

interior. They, like the similar structures on the east side of the upper segment, are arranged in a terrace-step, like fashion. They too are aligned in rows running down the slope (Fig. 2; Pl. XL: 1). They measure 7.90-8.30 m. from terrace-face to terrace-face.

The most-westerly observed row on the slope is now comprised of five units (Pl. XL: 1). It is, however, badly eroded. It is impossible to tell how many units originally comprised this and the other rows of these structures.

The topography of the lower segment is such that there is a natural runoff towards the southeast corner of the site. This is probably the cause of the erosion at this corner (Fig. 2; Pl. XL: 2). What may be a cistern is located along the line of this natural runoff (Fig. 2).

Several recently-used enclosures or animal pens are located at the southern segment of the sites (Pl. XXXIX: 2). These pens now separate the rows of similarly-appearing indeterminate structures discussed above from structures on the slope just to the north of the south wall of the site. These two series of structures may have originally been joined. Now, however, because of the animal pens and erosion it is difficult to say just what was their relation in antiquity.

There is no sign of a gate or entrance associated with this segment of the site. However, part of the west enclosure wall is in a very ruined state and the south-east corner of the site is completely eroded (Fig. 2).

An inner wall appears near the south-east corner of the site (Fig. 2). Perhaps this wall was built to replace the outer wall damaged by erosion. Now both walls are cut by an erosional gully (Pl. XL: 2).

### Description of the Pottery from the 1983 visit

Five pottery samples were collected during the 1983 working-visit to the site. The field reading for these samples are as follows:

1. West Corner of Site, lower Segment: 35 Nabataean (1st-2nd c.A.D.); 18 Byzan-

- tine; 1 Late Hellenistic or Early Roman; 1 Roman (1st c. A.D.)-piece of ribbed, red-ware; 5 Undetermined;
2. Southeast portion of the site, lower segment: 7 Nabataean (2nd c. A.D.); 9 Early Bronze, probably Early Bronze I; 8 Late Islamic;
  3. Central region of site, lower segment: 18 Nabataean; 1 late Roman; 4 Ottoman;
  4. East side among structures, upper segment: 31 Early Bronze, probably Early Bronze I--five indicator pieces;
  5. Recently robbed tomb, south end of upper segment: 4 Early Bronze, probably Early Bronze I--red burnished ware; all pieces probably from the same vessel.<sup>9</sup>

Combining the pottery from the 1982 and 1983 visits and dividing it up into the sherds collected on the upper and lower segments of the site one gets the following break-down:

1. Field reading for sherds collected from the upper segment: 35 Early Bronze, probably Early Bronze I;
2. Field reading for sherds collected from the lower segment: 12 Early Bronze, probably Early Bronze I; 60 Nabataean (1st-2nd c. A.D.); 38 Nabataean/Early Roman; 1 Late Hellenistic/Early Roman; 1 Roman (1st c. A.D.); 6 Late Roman; 18 Byzantine; 1 Early Byzantine; 2 Late Byzantine; 1 Late Ayyubid-Mamluk; 8 Late Islamic; 4 Ottoman; 9 Late Ottoman; 17 Undetermined.

### Interpretation and Concluding Remarks

On the basis of the sherds collected at Umm Ubtūlah in 1982 it was concluded, as previously mentioned, that the site was probably a Nabataean and/or Roman camp which was associated with a line of fortresses and watchtowers from the same period along the south side of the Wadi el Hasā. With the discovery of Early Bronze sherds in fairly large number (35) during the 1983 visit our first interpretation was thrown into doubt. Once again we realized the

dangers of dating a site merely on the basis of the sherds collected. What caused even greater concern was the fact that the only sherds found on the upper segment of the site were all dated to the Early Bronze period. All these sherds were collected from among the indeterminate structures on the east side of the upper segment. It seems strange that if the upper segment of the site was inhabited during the Nabataean-Byzantine period that not a sherd was found from this time frame in this upper segment. On the basis of the sherds collected at the site it can be concluded that at least sections of the site were "inhabited" during the Early Bronze period, the Nabataean-Byzantine period, and again during the Late Islamic period.

The architecture of the site is likewise problematic. The building construction of the enclosure wall appears to be similar on both the lower and upper segments. However, it is certainly possible that the enclosing of these two parts of the site is not contemporaneous. The indeterminate structures on the east side of the upper segment as well as on the slope and bottom section of the lower segment appear on the surface at least to be of the same construction technique. It is not unreasonable to conclude that they are contemporaneous. However, they need not be. These indeterminate structures are so regularly aligned that they give the impression of a military settlement.

Following a lecture I gave in June of 1983 at the American Centre of Oriental Research (ACOR) in Amman, I was informed that a similarly appearing and positioned site, called Umm al-Tawabbīn, is located east of Safī on the south side of the Wadi el Hasā. This site was discovered by Dr. David McCreery, Director of ACOR, and included in Dr. Geoffrey King's survey of Byzantine and Islamic Sites in 1982. The latter reports that the site is quite easily the largest in the Ghôr and that it is dated to the Roman period.<sup>10</sup> Thus both Umm Ubtūlah and Umm al-

<sup>9</sup> The pottery from the 1983 season was read by James A. Sauer and Nabil Khairy.

<sup>10</sup> More information on this site will be published by King in a forthcoming issue of *ADAJ*.

Tawabbīn probably served as bases for Nabataean and/or Roman soldiers who served in the fortresses and watchtowers along the Wadi el Hasā.<sup>11</sup> Excavations are needed to provide more precise dating and more detailed architectural information on

Umm Ubtūlah.

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Canada

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<sup>11</sup> I am most grateful to Professor G. W. Bowersock for his comments on this paper. I wish also to thank the members of WHS 1982 for their contribution to the preliminary work at Umm

Ubtūlah. This paper could not have been written without the help of N. Beqa'in, S. Balderstone, and G. Mattingly.



# THE FIFTH SEASON OF THE 'AQABA MA'AN SURVEY 1984

by  
W. Jobling

## Introduction

The 1984 Season of the 'Aqaba-Ma'an Archaeological and Epigraphic Survey was successfully completed during March and April under the auspices of the Department of Antiquities of the Hashemite Kingdom of Jordan. The survey was again funded by the Queen Elizabeth II Fellowships and the Australian Research Grants scheme of the Australian Department of Science and Technology.

This year Mr. Michael Bannigan, Deputy Accountant of the University of Sydney was responsible for photography and assisted with general field work. Mr. Richard Morgan, whose position Mr. Bannigan filled this year, has retained his link with the project by preparing a geographical summary of the Southern Section of the Survey Area and assisting with the preparation of the gazateer and map of the historical geography of the area between 'Aqaba and Ma'an. Miss Geraldine King,

of the Centre for Jordanian Studies at the Yarmouk University, once again was a source of great encouragement and help with the epigraphic aspects of the Survey.

Once again the British Institute at Amman for Archaeology and History provided accommodation and research facilities while its new Director, Dr. Andrew Garrard, gave much appreciated support and guidance. Dr. Garrard has assisted with the lithic analysis included in this year's report. Mrs. Ina Kehrberg has undertaken the lithic and pottery analysis and drawing. However, the Director takes full responsibility for all final comments and publication of all aspects of the survey. Mr. Nabil Baqa'in was again appointed as Department Representative to the Survey.

During the survey this year a large area was traversed from Mudawwara across the old Edomite escarpment and south to Wadi Sabit and Wadi edh-Dhiqa. Over 5,000 kms. were covered and the following sites identified and visited:

Mudawwara  
W. Marmak  
W, Makmi  
Abu Suwwaneh  
Şaraġ  
Teleilat Aš-Şahm  
Huşn 'Ameira  
Teleilat 'Umeira wa 'Amar  
Debabat Aš-Şahm  
Teleilat Mahatat Mudawwara  
Jebel Al Ghal  
W. Fassu'a  
Qalat Fassu'a  
W. Al-Laḥmar  
Ras al-Fars  
Kh. al-Ḥaṣwa  
W. Birat al-Batra  
Ras Kaur el Jama  
Kh. al-Naṣara  
Kh. al-Qirana  
Kh. al-Hadab

Teleilat M. ar-Ramleh  
W. Dhiqa  
El Ghal (see also Jebel el Ghal)  
W. Um Ṭeleya'  
W. Muheish  
W. Şabit  
Jebel Um el Hashim  
Jebel el Qaus  
Jebel Sureibit  
Jebel el-Kara  
Jebel Astar  
Jebel Um Ish  
Jebel er-Ratwa  
Wadi Yutm el Umran  
'Ain el Hashim  
W. el Yutm  
Jebel Tutim  
'Ain Tutim  
W. Dawiqa  
W. en-Nasifa  
Jebel Atra

Although weather conditions, in terms of strong cold winds and dust storms, made survey work difficult (and petrol supply at Mudawwara was hard to obtain), several new pre-history sites were identified and new epigraphic evidence recorded (Fig. 1: Preliminary Map 1984 'Aqaba-Ma'an Survey). A sweep along the Edomite escarpment from Qal'at Fassu'a to Ras en-Naqb established a preliminary survey of this strategic area. The escarpment overlooks the area stretching south to Wadi Ram and 'Aqaba and provides evidence of a large number of sites from a range of periods. Of particular interest are the epigraphic sites in the Wadi Birat al-Batra area and the area around Ras Kaur el Jama. It would seem that these sites are indicative of the human occupation of the heights and vantage points above the Hisma and the caravan trade routes fanning out to Arabia and the Red Sea. The water sources and grazing characteristics of the area make it a valued retreat for pastoral nomads seeking relief from the heat of the summer months further south. The Thamudic epigraphy suggests that it was an area of some significance for the Roman and Late Roman Saracen indigenes.

The Preliminary Map of this year's work will form the basis of a more detailed cartographic study of the historical geography of the area. A computer-based gazateer is also in preparation and is designed to show the archaeological and epigraphic significance of all the toponyms, hydronyms and oronyms registered therein.

#### The Physical Environment: Southern Section of the Survey Area

As a result of the exploration and survey work of the past five years the survey area has been divided into three topographic units:<sup>1</sup> the *escarpment* which

forms the major change in topography, separating the Ma'an Plateau from the Hisma depression; the *inselbergs* fringing the escarpment and predominating in the southern part of the area; and the *Qa'* unit which forms the basin of the Hisma depression.

The area to the east of 'Aqaba and south of the *Qa'* unit is of tremendous geomorphic significance. Predominated by *inselbergs* this area forms the drain of the Hisma depression and the groundwater and subterranean runoff flow out of the *Qa'* unit through this feature. As one moves east from 'Aqaba the twisted and folded intrusion zone morphology gives way to the sheer sided sedimentary remnants and deeply gorged *awdiyah*. Once east of Wadi edh Dhiqa the desert floor starts to lift through low terraced terrain to over 1000 m. where plateaux and tableland topography dominates.

Wadi Um Sahm, 60 km. east of 'Aqaba, can be described similarly to features of the Ras en Naqb escarpment. Its appearance resembles that of Wadi Hafir. It opens out into a *Qa'* unit sweeping south-east towards Mudawwara.

Mudawwara, not only sits near the border between Jordan and Saudi Arabia, but is close to the boundary of the *Qa'* unit and the aeolian plains. The eastern plains are dominated by desolate shifting sands where little geology is exposed.

The Wadi Yutm fold block has been affected by upthrusts and severe distortion because it verges on the lower end of the rift valley. The exposed rocks are sometimes described as part of the *katazone* and are generally of Pre-Cambrian age. Granodiorites and metamorphosed sediments are intruded by dykes from differing intrusion phases that are post-plutonics, -folding and -consolidation. In the Wadi edh Dhiqa area these older *Katazone* rocks are overlain with partly marine, partly lacustrine

<sup>1</sup> W. Jobling and R.V.H. Morgan, Some Aspects of Geomorphology, Climate and Epigraphy

'Aqaba-Ma'an Survey 1982-83, *Liber Annuus*, XXXIII (1983) p. 396-398.

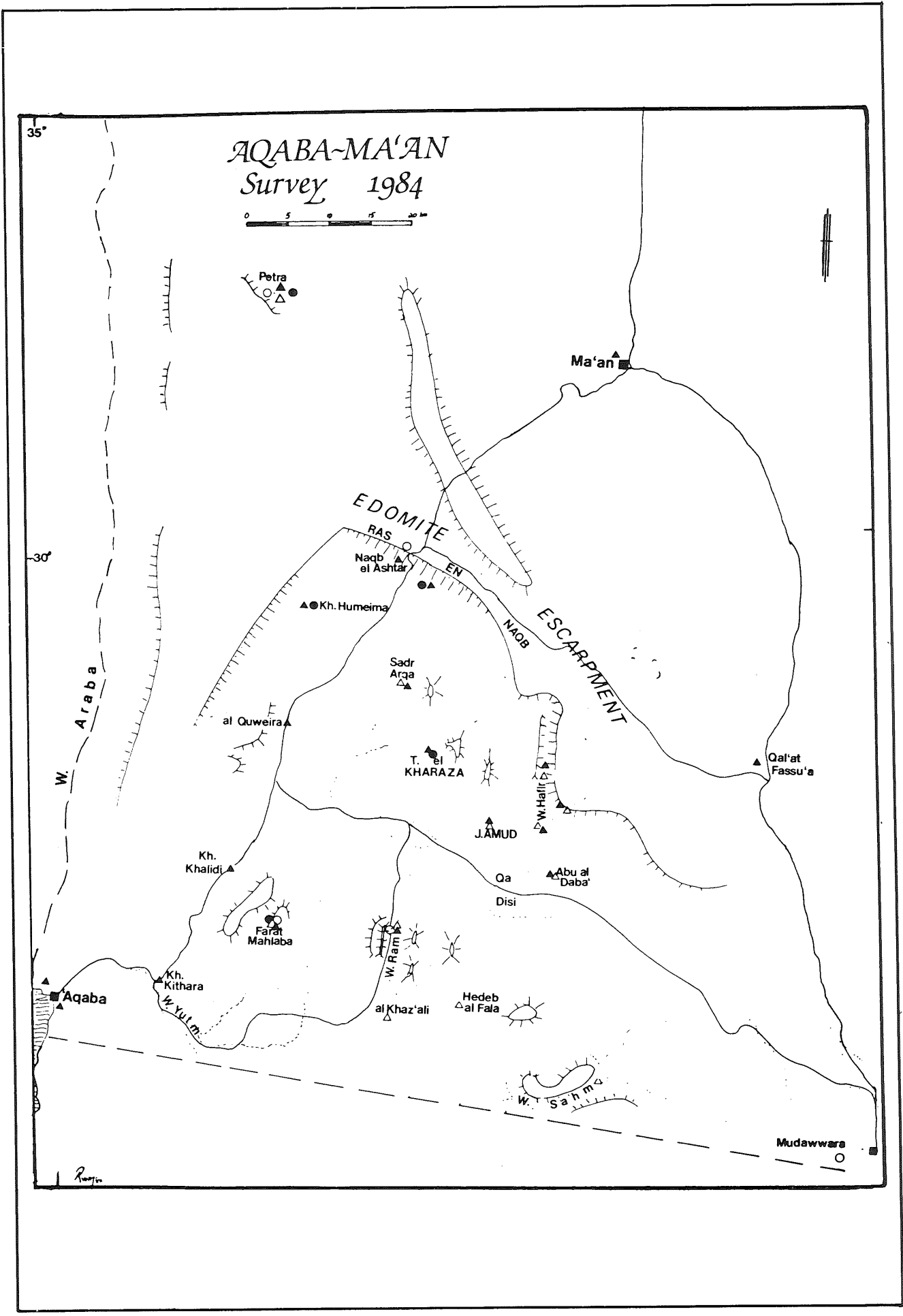


Fig. 1: Preliminary Map: 'Aqaba-Ma'an Survey 1984



sediments of the lower Palaeozoic.

The Wadi edh Dhiqa area is more or less a basin unit which drains back into the Wadi Yutm gorge. It is not dominated by Qa<sup>c</sup> topography because of its well drained nature. It is dominated by aeolian deposits but in places is well-overgrown with hardy desert plants. This area forms a vital crossroad where an encampment to its north-east could watch over a wide open expanse that a majority of trade routes had to cross. Many new epigraphic sites were located here during the 1984 Survey. It is planned to seek permission to continue the exploration and survey of these *awdiyah* in the near future, in a sixth season of the °Aqaba-Ma'an archaeological and epigraphic survey.

The Jebel Um Sahn plateau is deeply dissected by the numerous *awdiyah* which drain this area to the north and the east. The *awdiyah* that flow during runoff-producing storms feed, in turn, the natural and man-made catchments that eventually flow, usually subterraneously, to the Qa<sup>c</sup> unit (e.g., El-Ghal Qa<sup>c</sup> and Abu Suwwaneh Qa<sup>c</sup> and Agricultural Station).

The Sahn plateau gives way to the flatter and relatively open plains of the Mudawwara area. Occasionally sandstone massifs stand above the shifting sands but nothing as striking as the *inselberg* units to the west and north-west. Early prehistory sites occur in this area while epigraphic sites become less frequent. This suggests a palaeo-ecological and environment formula with specific diachronic variations. Water is scarcer in this area than in the Qa<sup>c</sup>, *inselberg* or escarpment units and the modern settler has had to penetrate deep in the palaeozoic sediments to tap the water table (e.g., along Wadi el Muheis).

North of Mudawwara, along the Hejaz Railway, the terrain develops gradually into the escarpment unit, but with a poorly developed terrace to the Ma'an plateau. Resistant strata form highs and lows due to the weathering of the well developed and poorly developed consolidation matrices within each sedimentation layer. This

weathering has been going on for a long time and together with the higher surface aridity of the area, contrasts sharply with the areas to the west of Sahl Abu Suwwaneh and el Ghal. Thus the areas to the east of a line running North-South through Abu Suwwaneh appear to have been hostile or unable to support a density of human occupation similar to that in the more favourable and protected areas to the West.

The southern part of the survey area can be considered as three zones of topographic interest. These topographic and physical factors have affected the occupation of man in the past and continue to do so today. The Wadi edh Dhiqa and Wadi el Muheis zone fits well into the pattern of trade routes and presents probably the most favourable way geomorphologically and in practical terms.

#### Climatic Observations

As in previous seasons attention has focussed on evidence for diachronic weather patterns and comparison with contemporary climatic and ecological conditions. It is tentatively suggested that with respect to climatic variations in the °Aqaba-Ma'an area over the last 5,000 years it is worth noting the inferences of Neuman and Sigrist.<sup>2</sup> In general terms they outline a cycle of climatic changes. From ca. 2,500 B.C., when it seems, settlements in the Middle East were being abandoned, annual rainfall was decreasing to about 2,200 B.C., when there was an intense drought. This drought situation influenced the environment until about 850 B.C. when a more moist climate prevailed. Until Roman times this more favourable climate influenced the growth of forest and an increase of man's activity throughout the Middle East. This parallels with the European climate for that period.

The °Aqaba-Ma'an survey area falls into the middle latitudes. More precisely between 29° and 30°. In global terms this would be similar to central and south-

<sup>2</sup> J. Neumann and R.M. Sigrist, Harvest Dates in Ancient Mesopotamia as Possible Indicators of

Climatic Variations, *Climatic Change*, I, 1978, p. 239-252.

ern China, central and southern USA and North Africa. In some instances it can favourably be paralleled with central Australia. Both Adelaide and Sydney lie in the vicinity of 31°/32° south in the global context.

R. V. H. Morgan has generated a preliminary generalised time: climate chart (Fig. 2). This time-line attempts to show the perceived relative rainfall against time. From our own findings and the evidence of other authors the general pattern of climatic change can be reconstructed as the model shows. The times of favourable climate, those with higher rainfall, are paralleled with times of greatest occupation. Knowledge of the monsoonal patterns also influenced man's impact on the area. When monsoons were prevalent, and better rainfall resulted, sea routes were exploited for trade and piracy. These patterns are reflected in the contemporary accounts and archaeological evidence.<sup>3</sup>

In general it can be postulated that a cyclic pattern of climate may exist for the area. It must be noted, however, that a more detailed study of the climatology and extrapolation of the figures is required to support the theory of a cyclic weather pattern.

#### Epigraphy and Rock Art<sup>4</sup>

As in previous years the epigraphic aspect of the survey was of primary interest. A good range of Thamudic and one new short Nabataean inscription were located, recorded and photographed. A computer-based repertoire of all the inscriptions of the 'Aqaba-Ma'an an Archaeological and Epigraphic Survey is in preparation and will be published separately.

Meanwhile the following is a brief representative selection of some of these new inscriptions:

Plate No. XLI: 1  
AM84/48/28-29 *Khirbet al-Haşwa* (on the Edomite escarpment)

1 'swr

By 'swr

The name 'swr is attested in North Arabian (*HIn* p. 47). It occurs frequently in the Wadi Ram area (*T.I.J.* 31A, 115 etc.)

Plate No. XLI: 2

AM84/54/11 *Wadi edh-Dhiqa*

Situated to the south of Wadi Ram this panel is typical of a concentration of inscriptions and drawings on the *inselbergs* of the area through which tracks seem to have passed south to 'Aqaba via Wadi Yutim and to the south east via Wadi Sahn.

The panel is topped by a well drawn Nabataean inscription:

1. šlm 'lw br yḥy'

Peace 'lw son of yḥy'

The lexeme šlm, usually translated "Peace", marks the beginning of a common pattern, or formula, well attested in Nabataean inscriptions of a similar provenance *Cantineau* II, p. 150; *Qedem* 6, 211 et passim; W. J. Jobling, *ADAJ*, XXV, 1982, p. 203).

The proper name 'lw occurs at Mada'in Saleh (al-Hijr), He 341 (*Cantineau* II, p. 130).

The proper name yḥy' is a tentative reading.<sup>5</sup> The second grapheme in the name yḥy', while clear enough, may reflect the interaction of the author's idiosyncratic style with the sandstone medium. The name yḥy' also occurs at Mada'in Saleh (al-Hijr) (*Cantineau* II, p. 103).

The rest of the inscriptions (Nos. 2-11) on this panel are in the later Thamudic E script and reflect an interesting variety of styles and subject matter:

2. l m'l

By m'l

The name m'l in this form is new; the form m'l is well attested in North Arabian with a questioned form m'l also noted (*HIn* p. 440). It is possible that this may form a compound name of two elements: the nominal element m (*HIn* p. 434) and the theophoric element 'l (cf. *HIn* p. 63 where the etymology "covenant" anger,

<sup>3</sup> G. W. Bowersock, *Roman Arabia*, London, 1983, p. 21.

<sup>4</sup> See List of Abbreviations

<sup>5</sup> The director is obliged to the Abbe J. Starcky for his advice and guidance with this inscription.

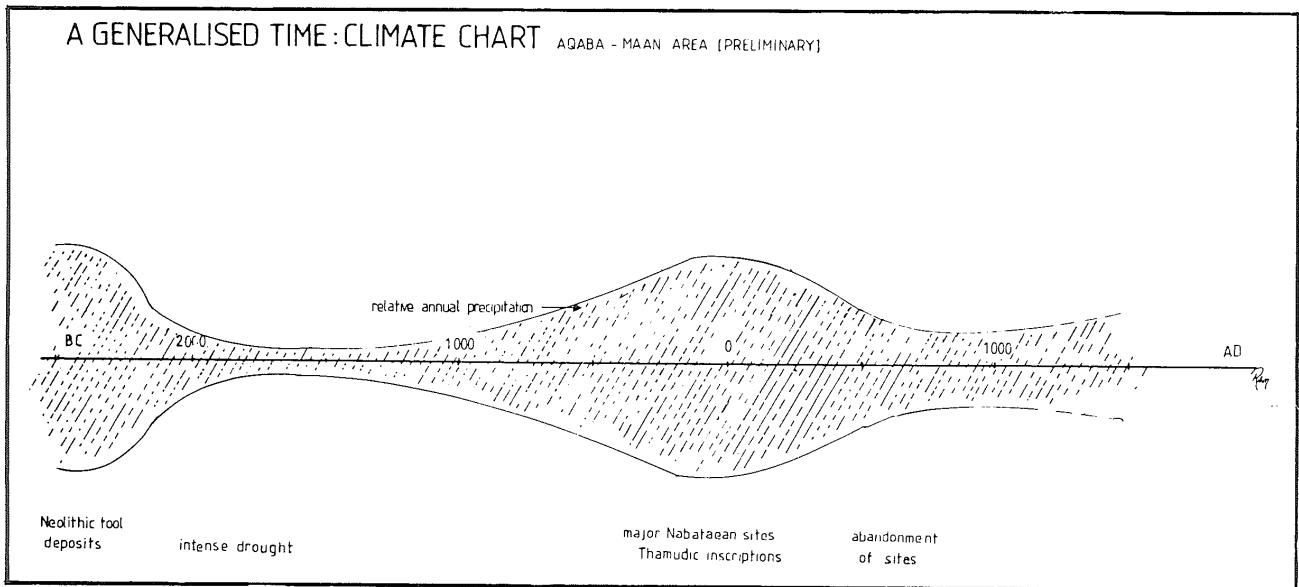


Fig. 2: A Generalised Time: Climate Chart (Preliminary)

faith etc. is suggested).

3. *l dll*

By *dll*

The name *dll* occurs in Safaitic and Thamudic (*HIn* p. 242). An occurrence is noted on a large rock face to the south of Wadi Ram at Wjih el Qattar (*T.I.J.* 30).

4. *l qršm*

By *qršm*

The name *qršm* occurs in North Arabian (*HIn* p. 480). An occurrence of this name has been noted by Harding in the Wadi Ram area at 'Ain el wejihat (*T.I.J.* 275).

5. *l kb't bn 'mr*

By *kb't* son of *'mr*

The reading of the grapheme of the first name is problematical. The name *kb't* is attested in Minaean and the form *kb'* occurs in Safaitic (*HIn* p. 213).

6. *l bršt bn š'dt*

By *bršt* son of *š'dt*

The name *bršt* may be a new occurrence. However the former *brš* occurs in Thamudic (*HIn* p. 101). The root *brš* is attested in the earlier Semitic languages and seems to refer to the *Juniperus phoenicea* (von Soden, *AH* I. p. 139; *B.D.B.* p. 141, cf. *K.B.* p. 148). In later Arabic this root has a wide range of meanings, amongst them the *Datura stramonium*, thorn-apple (*Hava* p. 29 & *Lanne* p. 188).

The name *š'dt* is attested in Thamudic (see *HIn* p. 372). It occurs to the south of

Wadi Ram at 'Ain Abu Nekhelleh (*T.I.J.* 67).

7. *l 'srk bn zd'l*

By *'srk* son of *zd'l*

There would appear to be an unrelated hammering before the *lam auctoris*. The *lam auctoris* may be considered to be poorly formed, however it should be noted that it compares favourably with the *lam* in the final name *zd'l*.

The name *'srk* occurs in Safaitic (*HIn* p. 44).

The name *zd'l* occurs in Safaitic and may be a theophoric Genitive Compound name formed from the junction of *zyd* (*HIn* p. 304) with the theophoric element *'l* (*HIn* p. 296).

8. *l 'qm*

By *'qm*

The name *'qm* may be new, though the Proper Name *'qwm* which is attested in North Arabian may be related to an understanding of the formation and meaning of this name (*HIn* p. 61).

It is possible that the initial *alif* is a prosthetic vowel whose function is to assist with the formation of the Proper Name form from the root *qm* or *qwm* (*Moscatti*, p. 59 & p. 80).

9. *ftht bn 'sk mt*

*ftht* son of *'sk* has died

This inscription and the following one (No. 10), are difficult to read with certainty because to their right are weathered inscriptions and drawings which may be

related. The signs in front of the inscription appear to be a drawing of an ibex and two dogs. The name *ftht* is attested in Thamudic (see *HIn.* p. 461), and occurs within the Wadi Ram (*T.I.J.* p. 142, 343).

The name *sk* is at this stage only a tentative reading, and as such would appear to be new.

Overall the pattern of this sentence is somewhat perplexing, as is its relationship to the next inscription.

10. *l tm'l*

By *tm'l*

The name *tm'l* is attested in North Arabian (*HIn.* p. 137).

11. *l mrt bn m t*

By *mrt* son of *m t*

The name *mrt* is well attested in North Arabian (*HIn.* p. 437). The name *m't* is new, though the forms *m'* and *my* may be related to its formation (*HIn.* p. 434 & 442).

Plate No. XLII: 1

AM84/56/7 *Wadi edh-Dhiqa*

This particular panel which is composed of a humanoid figure, which is inscribed with a prayer, is surrounded by *bovidae* and *capridae*. This panel is situated above a large natural shelf on the wall of an extensive overhang. To the left of this panel and running along the base of the overhang at ground level there are the remains of other badly weathered panels which appear to have contained drawings of similar animals. The overhang itself is situated in a highly walled *wadi* close to the head of the Wadi edh-Dhiqa complex. Around the overhang, and extending out into the *wadi* bed there are the remains of barrages and simple stone wall enclosures. The site appears to have had a long history of usage up to the present day. The overhang is still enclosed by the remains of a series of low stone walls.

The central figure, which is humanoid

in shape, is inscribed with the following prayer:

*h. trsm s'd htf w'ly w'd w gdd*

O, *trsm* help *htf* and *ly* and *d* and *gdd*

The first twelve and the last seven graphemes are reasonably clear. The inscription would appear to be a prayer for aid addressed to the North Arabian astral deity *trsm* (*ARNA*, p. 72). This would appear to be the first example of the veneration of this deity in the *Qqaba-Ma'an* area. It is tempting to speculate that both the icon and the inscription may shed light on the identity of the ancient Arabian stone idols at nearby Risqeh.<sup>6</sup>

The name *htf* occurs in North Arabian (*HIn.* p. 176).

The name *ly* is very well attested in the pre-Islamic onomasticon (*HIn.* p. 433).

The name *d* is also well attested in North Arabian (*HIn.* p. 408).

The name *gdd* occurs in Safaitic (*HIn.* p. 154).

The veneration of the deity *trsm* by the Ancient Semites has a considerable historical pedigree. The prominence of the Saracen veneration of the astral deity *trsm* and the association of this name with that of the Morning and Evening Star, Venus, is well attested in both the Sinai and Southern Palestine. Elusa in Southern Palestine was an important cult centre for the Saracen veneration of Venus.<sup>7</sup> The deity is variously represented from place to place and a variety of animals was often deemed sacred to the deity. It may be coincidental, but those occurring on this panel were also known to be sacred to *trsm* in other areas. It may be that the bovinds and cervids in this instance were considered sacred to *trsm* in this area and that their fecundity was the object of the prayer (*s'd*) ascribed to the deity. Thus both the idol with its inscription and the panels of the surrounding animals may be

<sup>6</sup> See D. Kirkbride, *Ancient Arabian Ancestor Idols*, *Archaeology*, 22, No. 2, (1969) p. 116-121, and No. 3, p. 188-195.

<sup>7</sup> A. J. Wilkinson, *Jerusalem Pilgrims Before the Crusades*, London, 1977, p. 156.  
B. P. Mayerson, *The City of Elusa in the Literary*

*Sources of the Fourth-Sixth Centuries*, *I.E.J.*, Vol. 33, No. 3-4 (1983) p. 247.

C. J. C. Migne (ed.), *Patrologia Latina*, Vol. 23, Col. 42: 27.

D. Manolis Papatomopoulos, *Graeco-Arabica*, Volume III, Athens, 1984, p. 203-205.

considered to reflect the pastoral aspect of the regional economy.

Plate No. XLII: 2

AM84/52/30 Panel 1 Wadi edh-Dhiqa

This panel and the next one (AM84/52/MB) occur side by side as can be seen from the overlap in the photography. Together these panels are part of a very large rock face which is close to a series of rock falls and a large rock shelter which appears to have an extensive history of human occupancy.

1. *l ʿbd bn whblh bn skl*

By ʿbd son of whblh son of skl

The name ʿbd is well attested in North Arabian and frequently occurs as the first element in Genitive Compound names (*HIn.* p. 397).

The name *whblh* is attested in North Arabian (*HIn.* p. 652-653). It is a compound name and contains the theophoric element *lh*.

The name *skl* occurs in Thamudic and Qatabanian (*HIn.* p. 313). It is well attested in the Wadi Ram area (*T.I.J.* 345, 364, 394, 484).

2. *l mnʿt bn mrʿtd bn mnʿt bn ʿfšy*

By mnʿt son of mrʿtd son of mnʿt son of ʿfšy

The name *mnʿt* occurs in North Arabian (*HIn.* p. 569).

The name *mrʿtd* is new, though the name *mrtđ* is attested in North and South Arabian (*HIn.* p. 358).

The name ʿfšy occurs in North and South Arabian (*HIn.* p. 59). It is interesting to note the occurrence of papponymy as attested by the place of the name *mnʿt* in this inscription.

Plate No. XLII. 2

AM84/52/MB Panel 2 Wadi edh-Dhiqa

Situated to the left of Panel 1, this panel contains a range of epigraphic and

glyphic material which is of considerable interest for the human occupation and ecology of this area in Southern Jordan. There are five Thamudic inscriptions of which Nos. 1, 2 & 5 may be by the same hand.

1. *l whblh bn hnlh bn ḥbb bn rṯc*

By whblh son of hnlh son of ḥbb son of rṯc

The name *whblh* is well attested in North Arabian (*HIn.* p. 652-653). It is a compound name and contains the theophoric element *lh* which also occurs in the names *hnlh* and *škmlh* which occur on this panel.

The name *hnlh* is new, though the name *hn* is attested in North Arabian and occurs frequently in compound names (*HIn.* p. 625). As noted above the theophoric element *lh* occurs in this name.

The name *ḥbb* occurs in both North and South Arabian, and is also attested as a frequently occurring component in compound Proper Names (*HIn.* p. 172). This name occurs frequently in the inscriptions on this panel.

The name *rṯc* is new, though the Proper Name *rṯt* is attested in Thamudic (*HIn.* p. 270).<sup>8</sup>

2. *l ḥbb bn bnlh bn ḥbb w dkr dšr skmlh w ḥbb kṯṯ*

By ḥbb son of bnlh son of ḥbb, and may DŠR

remember škmlh, and ḥbb inscribed (it)

This is an interesting inscription because of its length, content and association with other inscriptions on the same panel. It is possible that it is composed of two inscriptions, the prayer to DŠR being added later. This would explain the logic of the final phrase: *w ḥbb kṯṯ*: and ḥbb wrote (it).

<sup>8</sup> However, if the value of the second grapheme is to be read as ḡim then this would give the name *rḡc* (see E.A. Knauf, *ZDPV* Vol. 96, 1980, p. 170, footnote no. 22), and see reference to proposed phonetic status of these graphemes in E.A. Knauf, *Sudsafaitisch, ADAJ*, XXVII (1983) p. 587-596. The root *rḡc* is well attested in later classical Arabic and is a sememe which could be

associated with the meaning or etymology of the Proper Name *rḡc* (see *Hava.* p. 242, Lane, p. 1037). This root also has a wide frequency of occurrence in the other early pre-Islamic languages where isoglosses reflect a relatively common range of meanings (see *B. D. B.* p. 920-921, *K.B.* p. 874).

As it stands in its present form this inscription is composed of three phrases respectively introduced by particles which are distinctive phrase markers. The first phrase, introduced by the *lam auctoris* marker is,

*l ḥbb bn bnlh bn ḥbb*

By ḥbb son of bnlh son of ḥbb,

This phrase, which contains the Proper Names *ḥbb* and *bnlh* discussed above, is further evidence for the frequently recurring practice of papponomy in North Arabia.<sup>9</sup>

The second phrase is introduced by the particle marker *waw*:

*w dkr dšr škmlh,*

and may DŠR remember škmlh,

This phrase is a prayer to the god Dušares (*T.I.J.* 502 & 299). The deity is asked to hold in remembrance (*dkr*) *škmlh*. Whether such remembrance is for good or ill we are not told in this inscription. Similar petitions using the form *dkrt* and addressed to the goddess *Allāt* occur in the Wadi Ram area (*T.I.J.* 45, 58, 156, 170, 481, 489, 506, 520, 521). In these instances the wellbeing or benefit of the person, or persons, mentioned may have been inferred. On this occasion the prayer may have been offered on the occasion of the birth of a new member of the family (i.e., *škmlh*). However this remains a matter for speculation and further research. The compound name *škmlh*, with the theophoric element *lh*, is new, though the Proper Name *škm* is attested in Safaitic (*HIn* p. 354). Again it is noted that the theophoric element *lh* is common to other names on this panel (viz. *whblh* and *hnlh*).

The third phrase is introduced by the particle marker *waw*:

*w ḥbb ktt*

and ḥbb inscribed (it).

This phrase is typical of a formula frequently found in north Arabian and usually associated with a rock drawing or a prayer. As such it may be appropriate to designate it a signature phrase. As noted above its present position and the variations in the style and execution of the script may suggest that the prayer to which it is

appended was drawn some time after the inscribing of the first phrase. On the other hand, it may be that the mention of only one name (i.e., without the genealogy) presupposes the genealogy of the first phrase and as such was added as a post-script. The form *ktt* is frequently used in similar signature phrases in the Wadi Ram area (*T.I.J.* 124, 251, 299, 393, 424). It is worth noting that the natural rock face on which the last two phrases are written is somewhat uneven and provides a difficult medium. This may account for the more cramped style of the script in the last two phrases. However the syntax of the inscription still requires further analysis and comparison with similar statements.

3. *l 'rš*

By 'rš

The name 'rš is quite well attested in North Arabian (*HIn* p. 37). This signature may relate to the drawings just below it at the top of the panel.

4. *l tḥs bn qbbt*

By tḥs son of qbbt

The style and execution of the script of this inscription appears to be in contrast with the longer inscriptions Nos. 1, 2, and 5.

The name *tḥs* is new. However following the suggestion that the first grapheme may be read as a *ḡim* this would give the name *ḡḥs*.<sup>10</sup>

The name *qbbt* is new though the Proper Name *qbb* occurs in Thamudic and Sabaean (*HIn* p. 474).

5. *l whblh bn hnlh bn ḥbb bn rṯ<sup>c</sup>  
b[ ]*

By whblh son of hnlh son of ḥbb son of rṯ<sup>c</sup> son?

This inscription duplicates the genealogy of the first inscription on the panel (see above). It would appear that there was an addition to the genealogy, however. This seems to have been erased. While the reason for this erasure is unknown it is tempting to speculate that the new addition may have been the name of a member of the descent group who subsequently died or was struck off, or out of, the genealogy for some misdemeanour.

<sup>9</sup> See W. J. Jobling, *L.A.*, XXXIII (1983), p. 399.

<sup>10</sup> See footnote 7.

## 6. *l k<sup>b</sup>*

### B *k<sup>b</sup>*

The name *k<sup>b</sup>* is attested in Safaitic (*HIn.* p. 500). This name also occurs in the *Kitab al-Asnam* where it is associated with idol worship and the Ka<sup>b</sup>ah in Mecca.<sup>11</sup>

A preliminary multivariate statistical analysis of the Rock Art of the Wadi edh-Dhiqa panels (AM84/52/30 & AM84/52/MB) has been completed by Mr. Christopher Morgan at the University of Sydney. This graphic data was analysed on a microcomputer using programmes prepared by Professor R.V.S. Wright.

Using six models of analysis an attempt has been made to hypothesize about the character and origins of this data. Based on the evidence of multivariate analysis, it has been concluded that the groupings of figures on these panels are not random and that correlation exists between zonation based on style and based on figure types represented and their abundance in each zone. It is hypothesized that the majority of the artwork in different zones represents the work of artists operating under the two conditions of difference in style and difference in scenes being portrayed. It is envisaged that the recording and cataloguing of Rock Art sites such as this in the <sup>o</sup>Aqaba-Ma<sup>an</sup> area will provide a chronology based on style and content. From this it may then be possible to extrapolate parameters relevant to phases of the history of human occupation and the function of this relationship to the paleo-ecology of the area.

Plate No. XLIII: 2

AM84/45/33 *Abu Suwwana*

This Thamudic inscription occurs with a group of highly stylized human figures in a small overhang on a small *inselberg* at Abu Suwwana which is quite close to the S.S.E. of Qa<sup>c</sup> Disi and close to al-Ghal.

The hunting scene which occurs on the same panel is similar in style and execution to much of the "Thamudic Art" identified

further south in Saudi Arabia.<sup>12</sup>

*l m<sup>l</sup> bn mrt*

By *m<sup>l</sup>* son of *mrt*

The name *m<sup>l</sup>* is attested in Safaitic (*HIn.* p. 434). The name would appear to be of the nominal sentence type and composed of the element *m* which may be construed as predicate of the theophoric element *l*.

The name *mrt* occurs in North and South Arabian (*HIn.* p. 437). This name appears to be related to the form *mr* (*HIn.* p. 437).

## Lithics

This year exploration and survey work around Mudawwara, which is in the south eastern sector of the <sup>o</sup>Aqaba-Ma<sup>an</sup> area, succeeded in identifying a number of new lithic sites. Several of the sites which are to the east of Ma<sup>an</sup>-Mudawwara road occur within the context of extensive remains of large stone circles and cairns which are usually situated around small (*Qi<sup>an</sup>*) or depressions that appear to have held water from time to time.

A good example of these lithic sites and occupation situations is Teleilat Mehatat Mudawwara (Pl. XLIV: 1). Situated close to a number of small (*Qi<sup>an</sup>*) this site has extensive surface evidence of lithic industry. Chert and quartzite artefacts, and a variety of fan and side scrapers were amongst the surface finds. Found *in situ* were several very large shallow flakes (up to 0.17 m. x 0.10 m.) on tabular chert, with prepared platforms and cortex still attached to the exterior surface (Pl. XLIV: 2). Close by these shallow flakes, which were probably utilized as fan scrapers, was also found a polished basalt axe (Pl. XLII: 1).

Preliminary study of the surface collections of lithic remains suggests that this area was occupied to some degree in the late Neolithic and Chalcolithic periods.

<sup>11</sup> Nabih Amin Faris (trans.;, *The Book of Idols (Kitab Al-Asnam)*, Princeton, 1952, p. 38-40.

<sup>12</sup> P.J. Parr et al., Preliminary Report on the Second

Phase of the Northern Province Survey, 1397/1977, *ATLAL*, Vol. 2 (1398 A.H.-1978 A.D.) p. 47-49.

## Pottery Analysis

Some pottery sherds were found at Wadi Marmuk. A preliminary analysis of these sherds by Mr. Stephen Hart of the British Institute suggests the presence of Chalcolithic/Early Bronze I and Roman only.

## Conclusion

The broad spectrum of geomorphological evidence as well as archaeological and epigraphic evidence of the human occupation of these areas reflects physical, cultural and linguistic parameters within significant synchronic and diachronic dimensions. The cultural development and variability reflected therein contributes substantially to the exploration and elucidation of both the definition of early and later forms of the pastoralism which seems to have characterised the occupation of these areas and contributes to the investigation of the various phases of the non-urban and non- (or at least quasi-) agricultural activities of inhabitants of the pre-Islamic periods.

As the studies of Dauphin (1980)<sup>13</sup> and Parker (1976)<sup>14</sup> have also shown with regard to the later (Roman-Byzantine) periods, there is substantial evidence for a high period of human occupation and activity in the areas which are just to the west, and indeed are part of the same geographical complex, of the 1984 survey area.

While much more field work remains to be done with regard to the refining and definition of the topography, climate and biotic communities of the ʿAqaba-Maʿan area, in general the evidence from this season's survey is a contribution to the

elucidation of the history of the human occupation of this eastern sector of the ʿAqaba-Maʿan area.

This season brings to a conclusion the initial phase of the research programme which was concerned with exploration and survey of the area. This season also marks the beginning of the second phase of the research programme which is concerned with in-depth field studies of the epigraphic and rock art remains of the area.

In this regard it may be noted that H.D. Juli<sup>15</sup> has drawn attention to the extent to which historical trends and theoretical assumptions in Ancient Near Eastern studies have tended to limit research on pastoralism; especially nomadic pastoralism as an economic activity with a specialised ecological and material adaptation. It is suggested that further to Juli's research, which focussed on Chalcolithic pastoralism in the Negev of Palestine, and the limited ethnographic data of the Negev Bedouin and the useful archaeological model of pastoralism which this study generated,<sup>16</sup> the two widely separated phases of the Late Neolithic and Safaitic-Thamudic occupation of the non-urban domains in the Ancient Near East have also to be considered.

In particular it is argued that further research into the Safaitic and Thamudic inscriptions and their sociolinguistic and ethnographic significance may provide valuable contributions for the model of pastoralism generated by Juli and the research and conclusions of A.M. Rowton<sup>17</sup> (1973) generally.

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<sup>13</sup> C. Dauphin, Mosaic pavements as an index of prosperity and fashion, *Levant*, Vol. XII (1980) p. 112-134.

<sup>14</sup> S. Thomas Parker, Archaeological Survey of the Limes Arabicus: A Preliminary Report, *ADAJ*, XXI (1976), p. 19-25.

<sup>15</sup> H.D. Juli, *Ancient Herders of the Negev: A Study in Pastoral Archaeology*, University Micro-

films, Ann Arbor Michigan, 1978.

<sup>16</sup> H.D. Juli, *op. cit.*, p. 289.

<sup>17</sup> M.B. Rowton, Urban Autonomy in a Nomadic Environment, *JNES*, Vol. 32, No. 1 & 2, 1973, p. 201-215.

M.B. Rowton, Autonomy and Nomadism in Western Asia, *Orientalia*, 42, Fasc. 1-2, 1973, p. 247-258.



## Abbreviations

- AM:** °Aqaba-Ma'an
- ARNA** F.V. Winnett & W.L. Reed, *Ancient Records from North Arabia*, Univ. Toronto Press, 1970
- B.D.B.** F. Brown, S.R. Driver & C.A. Briggs, *A Hebrew and English Lexicon*, Oxford, 1907 (corrected impression 1962)
- Cantineau** J. Cantineau, *Le Nabatéen*, Paris, 1930, Vols. I & II
- Hava** J.G. Hava, *Al-Faraid, Arabic-English Dictionary*, Beirut, 1970
- HIn** G. Lankester Harding, *An Index and Concordance of Pre-Islamic Arabian Names & Inscriptions*, Toronto, 1971
- K.B.** L. Koehler & W. Baumgartner, *Lexicon in Veteris Testamenti Libros*, Leiden, 1953 et *Supplementum ad Lexicon in Veteris Testamenti Libros*, Leiden, 1958
- Lane** E.W. Lane, *An Arabic-English Dictionary*, 8 Vols., London, 1863-1893
- Moscatti** S. Moscati et al, *An Introduction to the Comparative Grammar of the Semitic Languages*, Weisbaden, 1969
- Qedem** A Negev, The Inscriptions of Wadi Haggog, Sinai, *Qedem* Vol. 6, Jerusalem 1977
- T.I.J.** G. L. Harding and E. Littmann, *Some Thamudic Inscriptions from the Hashemite Kingdom of Jordan*, Leiden, 1952.
- ZDPV** *Zeitschrift des deutschen Palästina-Vereins*

ISLAMIC ART AND ARCHAEOLOGY  
IN THE PUBLICATIONS OF  
MARGUERITE GAUTIER-VAN BERCHEM

*In Memorium*

by  
Fawzi Zayadine



Marguerite Gautier-van Berchem (1892-1984)  
(Photo Foundation van Berchem).

Marguerite Gautier-van Berchem was born in Geneva in 1892, the daughter of Max van Berchem and Elisabeth de Saugy. Her father, a celebrated Orientalist, was trained in Arabic and Islamic civilisation by the German scholars Fleischer and Krehl in Leipzig and Nöldeke in Strassbourg. When he met in Paris with Clermont-Ganneau and Sachau, they convinced him to gain a direct contact with the antiquities of the Near East. He visited Jerusalem for the first time in 1888. This contact with the Holy City made a profound impression upon him. From 1893 to 1895, he travelled between Egypt, Palestine, Syria and Lebanon and published two

volumes on the churches and Crusader castles of Syria<sup>1</sup>. He discovered, during his journeys, that the Arabic inscriptions were the key to Islamic archaeology and history and laid down in 1892 the basis of the *Corpus Inscriptionum Arabicarum*. He worked in Jerusalem between 1888 and 1914 and accumulated photographs of monuments and impressions of inscriptions. The two volumes of the inscriptions of Jerusalem *Ville et Haram* appeared between 1922 and 1927, after his death.

His daughter Marguerite lived at the familial Château de Crans, on the shore of Lake Lemman, where Max van Berchem hosted the famous scholars of his time. She

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<sup>1</sup> Max van Berchem et Edmond Fabio, *Voyage en Syrie*, Le Caire, 1913-15. 2 vols.

received an excellent education in modern languages, music and archaeology and was attracted to the East. Unfortunately, other duties fell to her: in 1914, World War I broke out and she volunteered, with thirty other Swiss personalities such as the writer Jacques Chenevière and the Historian Etienne Clouzot, to join the International Committee of the Red Cross. She worked for four years at the head of the service for the German speaking prisoners. After the War, she was able to join the Ecole du Louvre in Paris and went later to Rome where she studied mosaics. She stayed fourteen years in Italy, and, when the German troops invaded Belgium in 1939, she was advised by the Swiss Embassy to leave the country. She returned to Geneva and joined the Red Cross again, where she created a special service to help the Arabic speaking prisoners. Throughout her life, she was an active member of this humanitarian organisation. In 1934, she participated in the XVth Conference in Tokyo; she accomplished short missions in Nepal (1957), Syria and in Jordan (1964) where she had the privilege to be received by King Hussein. The Red Cross invited her to Morocco and Algeria in 1950. While there, she rediscovered the ruins of Sedrata with the help of the French Air Force (see below).

### Christian Mosaic

The devotion of Marguerite van Berchem to the Red Cross did not prevent her from following her interest in archaeology. In 1924, with Etienne Clouzot, she published a volume on Christian mosaics from the fourth to the tenth century.<sup>2</sup> It was the first comprehensive study of mosaic techniques including the evolution of the art and the description of different themes. More than 300 photographs and drawings illustrated the volume. This work, still very useful, was an excellent preparation for

the study of the Umayyad mosaics in Jerusalem and Damascus.

### The Dome of the Rock and Damascus (Pls. XLVI, XLVII).

Before his death in 1921, Max van Berchem expressed the wish that the Mosaics of the Dome of the Rock "be the subject of a complete and careful study".<sup>3</sup> This wish was fulfilled in 1927-28, when K.A.C. Creswell invited Marguerite van Berchem to undertake this study. She arrived by boat first in Alexandria and then Jaffa. She reached the Holy City and lived at the Prussian Hospice. Father H. Vincent of the Ecole Biblique supported her mission. Although it was not easy at that time for a woman to work in the Muslim sanctuary, she was granted permission to take pictures and examine the mosaics, wearing special trousers, as she said and "perched on the tie-beam of the octogonal colonnade, or at the top of a ten metre high ladder".<sup>4</sup> She had to face, from time to time, the rivalries of the two influential families of Jerusalem but she was able to accomplish the work and publish a detailed and relevant analysis of the mosaics in 1932.<sup>5</sup> She was the first scholar to demonstrate, convincingly, the local origin of the mosaic decoration: it "shows that at the time of the Arab conquest a very refined and dynamic school of art existed in Syria. This school had its own character which had developed and evolved independently of Byzantium."<sup>6</sup> Through her experience in the study of western mosaics, she was able to recognise the originality of the Syro-Palestinian craftsmen: a Hellenistic tradition, represented by the use of acanthus leaves, of the vine scrolls and garlands meets with a Sassanid-Oriental decoration, illustrated by "stylised flowers in the form of lotuses or tulips",<sup>7</sup> and the use of rich jewels (Pl. XLVII). The use of mother-of-pearl against the light, is another characteristic of the oriental technique.

<sup>2</sup> *Mosaiques chrétiennes du IVème au Xème siècle*; dessins de Marcelle van Berchem, Genève, 1924.

<sup>3</sup> M. Gautier-van Berchem, S. Ory, *Muslim Jerusalem*, Genève, 1982, p. 43.

<sup>4</sup> *Ibid.*, p. 43.

<sup>5</sup> K.A.C. Creswell, *Early Muslim Architecture*, Oxford, 1932; re-edited 1969.

<sup>6</sup> *Muslim Jerusalem*, p. 45.

<sup>7</sup> *Ibid.* p. 44.

The mosaics of the Umayyad mosque in Damascus (Pl. XLVIII), built by Walid I (705-715) are of a different style: here a panoramic scene of palaces, pavilions, villages together with an amphitheatre develop along a river in between huge trees. The architectural motifs are influenced by Hellenistic decoration, as it appears in the Pompeiian frescoes, and represent, as related by some Arab geographers, the cities admired by the Umayyads. Despite the tradition related by some of these authors,<sup>8</sup> that the workers were sent by the emperor of Byzantium, at the request of the Caliph, Marguerite van Berchem was inclined to believe that the artists were Syrian natives. She backed up her thesis by careful study of literary sources: the earliest testimony is by the historiographer al-Buladhuri (9th century) who records that al-Walid I had sent 80 craftsmen of Rūm (Christian-Greek orthodox or converted to Islam) and Copts from Syria and Egypt to embellish with mosaics and marble the Mosque of Medine. Muqaddisi (around 985) states that the mosque of Mekka built by al-Mahdi was decorated by Syrians and Egyptians artists.<sup>9</sup> But some authors reject the hypothesis of Arab craftsmen and argue that Syria and Palestine ceased to build prestigious monuments after the Muslim Conquest, for almost a century.<sup>10</sup> However, this argument is not valid, since Christian churches and other monuments continued to be built during the time of Umayyads, as evidenced by discoveries in Syria, Palestine and Jordan<sup>11</sup> and were reported with admiration by the chroniclers.<sup>12</sup>

## Sedrata (Pls. XLIX-L)

This city situated 800 km. South of Algiers and 14 km. of the oasis of Ouargla, became the capital of the 'Ibadite tribes of Berber origin who followed Ibn Rostem. After the destruction of their capital Tahert (modern Tiaret) in western Algeria by the Fātimids in 909, these Kharijite tribes moved to the desert and tapped underground wells. The desolated lands flourished soon and the refugees built a city which prospered in the 10th and 11th centuries, embellished by beautiful houses and palaces within gardens. The first excavations were carried out in 1881 by H. Tarry who discovered a palace decorated with stucco together with the famous well of 'Ain el Safa. P. Blanchet continued the excavations and transported part of the stucco decoration to Paris and Algiers. But the site was reburied by the sands and lost, until it was rediscovered by Marguerite van Berchem<sup>13</sup> in 1950, as mentioned above.

The ruins of the site, traversed by streets and water channels (*segua*) extend over an area more than two kilometres long and not more than 600 metres wide, as proved by aerial photographs, taken in 1951. A hydraulic survey was conducted in January of the same year, but the famous 'Ain el Safa could not be located. A short campaign of excavation followed in February and was stopped because of lack of transportation. A large house, 20.00 by 10.00 metres with a central courtyard was excavated. Many rooms, 7 metres long and only 2 metres wide open on the courtyard, some of them decorated with arches and colonnettes.

<sup>8</sup> Ya'qubi, *Historiae*, ed. de Houtsma, Leyden, 1883, I, p. 340; Tabari, *Annals*, ed. de Goeje, Leyden, 1897-1901, II, p. 1194.

<sup>9</sup> Cited by M. van Berchem, in *Early Muslim Architecture*, 1969, p. 233.

<sup>10</sup> Janine Balty, *Mosaïques antiques de Syrie*, Bruxelles, 1977, p. 154.

<sup>11</sup> A Christian monument was built in 687, under 'Abd el-Malik Ibn Marwan, at Rabbah, near Kerak, *ADAJ*, XVI (1971) p. 75. The Church of the Virgin Mary was decorated with mosaics in 662-3, *ADAJ*, XXVI (1982) p. 419. Other churches

of the Umayyad period, decorated with mosaics were excavated at Qweismeh, Jerash and Rihab. (See M. Picirillo in this issue).

<sup>12</sup> El Walid I visited and admired the churches of the Resurrection (Holy Sepulchre), Lydda and Edessa. Al Muqaddasi, *Ahsan al-Taqasim*, ed. de Goeje, Leyden, 1906, p. 159.

<sup>13</sup> *Documents Algériens*, Série Monographie, N°11, Sep. 1953; *La Nouvelle Clio*, III, n°s 9-10, 1951, p. 389-396; *Ars Orientalis*, I (1954) p. 157-171. See also bibliography below.

In the second campaign (November 1951 to January 1952), a residential complex was discovered at the eastern outskirts of the city (Pl. XLIX). It was a fortified villa, enclosed by a wall of large boulders, preserved to the height of 4.00 to 5.00 metres, and fortified by square towers. Outside the enclosure, square water basins, revetted with local gray stucco (*timchent*) were brought to light. At the northern end of the complex, a house with a central courtyard was uncovered. It includes a large hall (8.00 by 2.00 metres) terminated on both sides by two *iwan* with arches. The walls were revetted with stucco panels (Pl. L), finely decorated with geometrical and vegetal designs. Fifty boxes of this revetment were brought to the Algiers Museum.

According to Marguerite van Berchem, the houses of Sedrata are but a faint image of the rich villas and palaces of the capital Tahert, as they were described by the chronicler Ibn Şaghîr. The architecture and stucco decoration reflect strong North African influence, represented by the mosque of Qairouan. But the excavator had drawn the attention of scholars to the eastern ties as reflected in the Iraqi city of Samarra and the Iranian art centre of Nishapur. These ties could be easily explained by the presence of many *Kharijites* of the Near East who took refuge in the isolated and well protected oasis of Sedrata.

The working conditions were extremely hard because of the arid climate and the frequent sand storms. But with her well known courage and perseverance, M. van Berchem was able to overcome all these difficulties, if the Algerian war had not stopped the excavations.

### The Foundation van Berchem

Max van Berchem donated his archives to the City of Geneva. The valuable documents were first deposited in the Museum of Art and History. They were

later transferred to the '*Bibliothèque Publique et Universitaire*' and placed in the basement of this building. They came to light only in 1973 when the daughter of the Orientalist, already at a great age, fought to establish the Foundation van Berchem and obtain a room in the library, bearing the name of the Swiss scholar. Dr. Solange Ory from the University of Aix-en-Provence was commissioned by Professor Janine Sourdel to work on the classification of the archives. About 400 negatives and photographs were arranged and published in an exhaustive catalogue.<sup>14</sup> Files, containing bibliography, information and personal notes of Max van Berchem were established according to the alphabetic order of sites. Dr. Anouar Louca who was at one time in charge of the archives published a booklet about the Swiss scholar and his work, sorted the correspondence and edited with Ch. Genequand the two volumes of the *Opera Minora*.<sup>15</sup> As pointed out by M. Van Berchem, the role of the Foundation is to promote "the studies related to Islamic and Arabic civilisation, in the frame of the Archives Max van Berchem."<sup>15</sup> The Arab Organisation for Education, Culture and Sciences became aware of the importance of the documents left by the Swiss Orientalist and sent an observer to Geneva to examine and report on it. Saudi Arabia generously donated 10.000 \$ to help publish documents and the correspondance of Max van Berchem with Louis Massignon<sup>16</sup> appeared in 1980, thanks to this support.

### Muslim Jerusalem

I was able, with the help of the Department of Antiquities to fly to Geneva in August 1980 and was kindly invited by Marguerite and her husband Bernard Gautier to their residence on the Plateau of Frontenex (Fig. 2), overlooking Lake Lemman. Both of them were most cordial and hospitable. Marguerite introduced me to the private library and archives of her

<sup>14</sup> S. Ory, *Catalogue de la Phototèque*, Beyrouth, 1975.

<sup>15</sup> Geneva, 1978.

<sup>16</sup> See "*Correspondance entre Max van Berchem et Louis Massignon, 1907-1919*" publié par W. Vycichl, Leiden, 1980.



Fig. 2: The Mansion of van Berchem at Frontenex, Geneva.

father. Seated in the garden, planted with cedar and other memorable old trees, I had the chance to converse for long hours with the venerable lady (she was 91) and obtain first hand information about the work of Max van Berchem and her own career. When she came to talk about Jerusalem and the mosaics of the Dome of the Rock, she became passionate and eager to convince me of her thesis about the Syro-Palestinian artists who created the immortal chef d'oeuvres. As she wanted me to feel what she was explaining, she presented me with her "*La Jérusalem Musulmane, dans l'Oeuvre de Max van Berchem*".<sup>17</sup> and complained that this book in its French version was not accessible to the Arabic speaking countries who were concerned with the fate of the Holy City. H.E. Mr. Ghaleb Barakat, our ambassador in Geneva, was in contact with the Foundation and fully aware of its contribution to the support of Arabic and Islamic Civilisation, especially in the City of Jerusalem. It is thanks to the generosity of H.R.H. Crown

Prince Hassan of Jordan that *Muslim Jerusalem* appeared in 1982. The book of 114 pages contains fifteen chapters and paragraphs, dealing with the history and archaeology of Arab Jerusalem.

Chapter I by Roger du Pasquier considers "Jerusalem and the mystical sensibility of Islam". By his night journey from Mecca to the Holy Sanctuary and his ascension to Heaven (*mi'raj*) from the Rock, the Prophet Muhammed made of Jerusalem the third Holy City of Islam. The *Qibla*, at the beginning of Muhammed's mission, was towards Jerusalem until a revelation commanded the Muslims to face the Ka'ba. The sanctity of the City was also in relation to Abraham who was neither a Muslim nor a Christian but a *hanif* (upright). The place where he intended to sacrifice his son is Mt. Moriah, near Jerusalem. Since the Koran does not specify the son's name, Muslim theologians believed he was Isaac or Ismaël. But there is no consensus on Jerusalem being the only place of sacrifice, as suggested by Dr.

<sup>17</sup> Lausanne, 1978.



du Pasquier: according to Mujîr l-Dîn el Hanbali<sup>18</sup> for example, those who think the son was Isaac, hold that the episode took place in Syria, at two miles from Jerusalem, on the holy Rock; those who regard that the son was Ismaël, place the sacrifice in Mecca. At any rate, Muslim tradition is that at the end of time, “the Ka’ba itself will leave Mecca and hurry to the Rock at Jerusalem (p.7)”

Jerusalem is also linked with the memory of Mary and her son Jesus, who is deemed by the Muslims as a Prophet. The *Mihrab* of Mary’ is placed in the Haram area, probably where the oratory of Zachariah stands today (p. 13). The other sanctuary which the Muslims take into veneration, is the Holy Sepulchre, where the Caliph ‘Omar, according to the tradition, refused to pray. Except for the Fâtimid Caliph el-Hâkim, the Muslim rule of the Holy City demonstrated tolerance and respect for other religions.

Chapter II “Max van Berchem’s visit to Jerusalem” by his daughter begins with a letter from the scholar to his mother, describing his emotion and enthusiasm when he first visited Jerusalem in 1888: “I have seen more beautiful things but nothing so captivating” (p. 18). He returned to the city in 1914 to continue his study of inscriptions but he was full of bitterness because the 1914 war undid all of his work by separating the friends he assembled to work with him on the *Corpus*. Marguerite still remembered the argument he had with his dear friend Herzfeld, after which they had no contact. He was not to return to Jerusalem for he died in 1921, exhausted by his continuous efforts. One of his friends, R.P. Jaussen, wrote that: “he succumbed by the walls of the Holy City”.<sup>19</sup>

In the “Historical notes” (chap. III), S. Ory retraces the history of Bayt el-Maqdis from the Arab Conquest in 638 to the Ottoman period. The Caliph Omar himself supervised the clearance and cleaning of the sacred Rock from the debris left

by the Byzantines and had a rudimentary sanctuary built in the area of the Haram. The role of the Arab Sheikh, Khaled Ibn Thabet el Fahmi, who negotiated the capitulation of Jerusalem is not mentioned by the author.<sup>20</sup> It demonstrates, as I think, that the natives who were tired of Byzantine rule, participated in the surrender of the city to the Arab authority. It is surprising that S. Ory gives credit to the tradition which relates that the Caliph ‘Abd el Malik “forbade the Syrians to go to Mekka” for the pilgrimage (*hajj*). As proved by O. Grabar,<sup>21</sup> this hypothesis has no historical basis, since the Syrian troops who besieged the Ka’ba asked the permission to perform the *hajj* and some Umayyad Caliphs accomplished this duty.

The Latin chroniclers paid homage to the chivalry of Salah al-Dîn, who prevented the bloodshed and protected the Christian monuments. In the Mamlûk period the city was embellished with mosques, hospices and madrasas which constitute the splendor of Muslim Jerusalem and were reported and planned by Max van Berchem. Some of these monuments have been endangered by modern excavations along the wall of the Haram; in June 1969, the madrasa Fakhriyah was partly destroyed and Ribat el Kurd, built by Sultan Qalaoun, collapsed in 1971. El Madrasa el Jawhariyah was destroyed in 1974. The records of Max van Berchem become most precious in the tormented history of the Holy City. A recent work by Dr. Kamel el ‘Asali, *Islamic Institutions of Learning in Jerusalem*, Amman, 1981 (in Arabic) made good use of the photographs and plans of the Foundation’s archives.

The short description of the Dome of the Rock by M. Gautier-van Berchem (chap. V) is followed by the chapter on the mosaics of this monument which cover 1,200 m<sup>2</sup>. The splendid photographs are those of Creswell. They illustrate perfectly the thesis of the author, mentioned above.

“The gilded bronzes of the Dome of

<sup>18</sup> *Al uns al-Jalîl bi tarikh al-Quds wal-Khalîl*, Amman-Beyrouth, 1973, p. 39-41.

<sup>19</sup> Max van Berchem, *Hommage rendu à sa mémoire*, Geneva, 1923, p. 134.

<sup>20</sup> See Oleg Grabar, *al-Kuds in Encyclopedia of Islam*, col. 323.

<sup>21</sup> *Idem*, col. 324.

the Rock” (chap. VII) decorate soffits of the building’s main door or the undersides of the tie beams. The motifs and techniques are unique: the delicate vine scrolls remind one of Hellenistic (Nabataean) vegetal carvings of Corinthian capitals.

In the paragraph on al-Aqsa Mosque, the history of this monument which underwent many transformations is summarized: the sanctuary was built by ‘Abd al-Malik, on the spot of the ‘Omar Shrine. It was destroyed by the 747 earthquake and restored by the ‘Abbāsids and Fāṭimids. It suffered during the Crusades and was restored by the Mamlūks in the fifteenth century. Recent restorations were conducted in 1962-68, until it was burned in 1969.

The analysis of carved woods, (Pl. LI) preserved in the Haram Museum (p. 81) reminds M. Gautier-van Berchem of Greco-Roman traditions; they are all of cypress wood and the author thinks that the panels ornamented not the ceiling but the walls of the Mosque, in the lower part,

above the cyma, because of the nail holes and because the motifs are to be viewed in an **upright** direction. A photograph of the Minbar of Nur el-Dîn with a detail of the carved wood, (Pl. LII) shows that the loss of this gift presented to the Mosque in 1169, is a disaster for students of Islamic art.

It can be said without exaggeration that Muslim Jerusalem was honoured, not only in the works of Max van Berchem, but also in the penetrating studies of his daughter Marguerite. She devoted her life for humanity and for the promotion of Islamic civilisation by her own work and by the creation of the Foundation Max van Berchem. She died in Geneva on January 22nd, 1984 and her last wish was, as she told me, “to rest in peace and that the Foundation stands up”. May these lines be but a modest tribute to her memory.

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## Bibliography of Marguerite Gautier-van Berchem

1. Marguerite van Berchem and Etienne Clouzot, *Mosaïques chrétiennes du IVème au Xème siècle*, Geneva, 1924.
2. E. Lorey at M. van Berchem, 'Les mosaïques de la Mosquée des Omayyades à Damas', *Monuments et Mémoires Piot*, XXX, Paris, 1929, p. 110-139.
3. 'The Mosaics of the Dome of the Rock at Jerusalem and the Great Mosque at Damascus' in: K.A.C. Creswell, *Early Muslim Architecture*, Oxford, p. 150-252; re-edited, 1969.
3. 'La découverte de Sedrata' *La Nouvelle Clio*, III, Nos 9-10, Bruxelles, 1951, p. 389-396.
4. 'A la recherche de Sedrata', in *Archaeologica Orientalia*, in Memoriam Ernest Herzfeld. New York, 1952, p. 21-31.
5. Deux campagnes de fouilles à Sedrata, en Algérie, *CRAI*, Paris, 1952, p. 242-246.
6. 'Uncovering a Lost City in the Sahara; *Illustrated London News*, CCXXII, Jan. 31st, 1953, p. 165-167.
7. 'Sedrata, une ville du Moyen-Age ensevelie dans les sables du Sahara algérien', *Documents algériens, Série monographies, n° 11, Alger, 1953, p. 1-6.*
8. 'Sedrata et les anciennes villes bernères du Sahara dans les récits des explorateurs du XIX siècle', *Bul. de l'Inst. Fr. d'Archéologie Orientale* LIX, 1960, p. 289-308.
9. 'Sedrata, un chapitre nouveau de l'histoire de l'art musulman'. Campagnes de 1951 et 1952, *Ars Orientalis*, I (1954) p. 157-171.
10. 'Le palais de Sedrata dans le Désert saharien' in *Archaeologica Orientalia* in Memoriam Ernst Herzfeld, ed. G.C. Miles, New York, 1952, p. 8-29.
11. With S. Ory, *La Jérusalem Musulmane dans l'oeuvre de Max van Berchem*, Lausanne, 1978.
12. *Muslim Jerusalem*, in the Work of Max van Berchem, Lausanne, 1982.

# HUMAYMA 1983: THE REGIONAL SURVEY

by  
John Eadie

## Introduction

In this century a number of itinerant savants have published descriptions of the visible ruins and ancient artefacts of Ḥumayma—the extensive water system (reservoirs, cisterns, aqueducts), remains of several substantial buildings, diverse surface pottery—but it is only within the last decade that the significance of the site and its environs has been fully appreciated.<sup>1</sup> Located in the north-west quadrant of the Ḥisma, fifteen kilometres from the dramatic al-Shera escarpment that marks the descent from the Ma'an Plateau (1500 m.) to the desert (900 m.), Ḥumayma was the only Nabataean town of any consequence between the capital at Petra, forty kilometres to the north, and Meda'in Salih (ancient Hegra) (Fig. 1). A fragment of Uranius' *Arabicus* (F. Jacoby, *FGrH* 675 F1b) credits its foundation to Aretas III (87-62 B.C.), the son of the Nabataean King Obodas I, who responded to an oracular injunction to build a town on the site of Auara ("which in the Arabian and Syrian languages means white"). Compelling evidence that Auara was the ancient name of Ḥumayma is supplied by the Peutinger Table, which in its list of

Arabian sites locates Auara twenty Roman miles from Zadagatta (Ṣadaqa) and twenty-three miles from Praesidio (Khirbet el-Khalde). These figures, thirty and thirty-six kilometres respectively, are in fact the exact distances between Ṣadaqa-Ḥumayma and Ḥumayma-Khirbet el-Khalde.<sup>2</sup>

Situated as it was on the main "highway" from Petra to Aila, which provided access to the Red Sea through the Gulf of Aqaba, Auara must have prospered early on from the passage of caravans and royal officials through the interior of the Nabataean kingdom. Apart from any inducement that Aretas III may have provided, settlers would have been attracted to a region that could support a life of sedentary pastoralism and agriculture and was generally more hospitable than the seemingly endless desert to the south. How the early inhabitants fared in the new environment is not recorded, but one may infer from the pottery scatter and remains of Nabataean buildings that Auara-Ḥumayma became a prosperous entrepôt soon after its foundation. Whether the submission of Aretas III to Scaurus, the governor of Syria and Pompey's emissary in 63 B.C., affected the development of the

<sup>1</sup> Thanks largely to the survey conducted by David Graf in 1978-80: A Preliminary Report on a Survey of Nabataean-Roman Military Sites in southern Jordan, *ADAJ*, XXIII (1979) p. 121-126; The Nabataeans and the Ḥisma: In the Steps of Glueck and Beyond, in *The World of the Lord Shall Go Forth: Essays in Honor of David Noel Freedman*, 1983, p. 647-664.

The participants in the Ḥumayma project would like to thank the Jordanian Department of Antiquities, and especially its Director, Dr. Adnan Hadidi, for the exemplary assistance provided in 1983. This project has been granted affiliate status by the American Schools of Oriental Research and has been facilitated by the generous cooperation of the American Center of Oriental Research (Amman) and its Director, Dr. David McCreery. The 1983 field season was made possible by grants

from the National Endowment for the Humanities, Dumbarton Oaks, The University of Michigan, the Dorot Foundation, the Gazelum Foundation, and private donors.

Portions of this report are based on interim reports prepared by several project specialists (William Farrand, John Oleson, Lucinda Neuru).

<sup>2</sup> The earlier suggestion that Ḥumayma should be identified with Ammatha, where the *ala antana dromedariorum* was stationed in late antiquity (*Notitia Dignitatum* or. xxxiv. 33), is problematic. As Jaussen and Savignac observed (*Mission archéologique en Arabie*, I [1909], 41ff.), on linguistic grounds Ammatha can be identified with al-Hammam, the late Roman/early Byzantine fort on the outskirts of Ma'an that would have been an equally appropriate station for an *ala dromedariorum*.

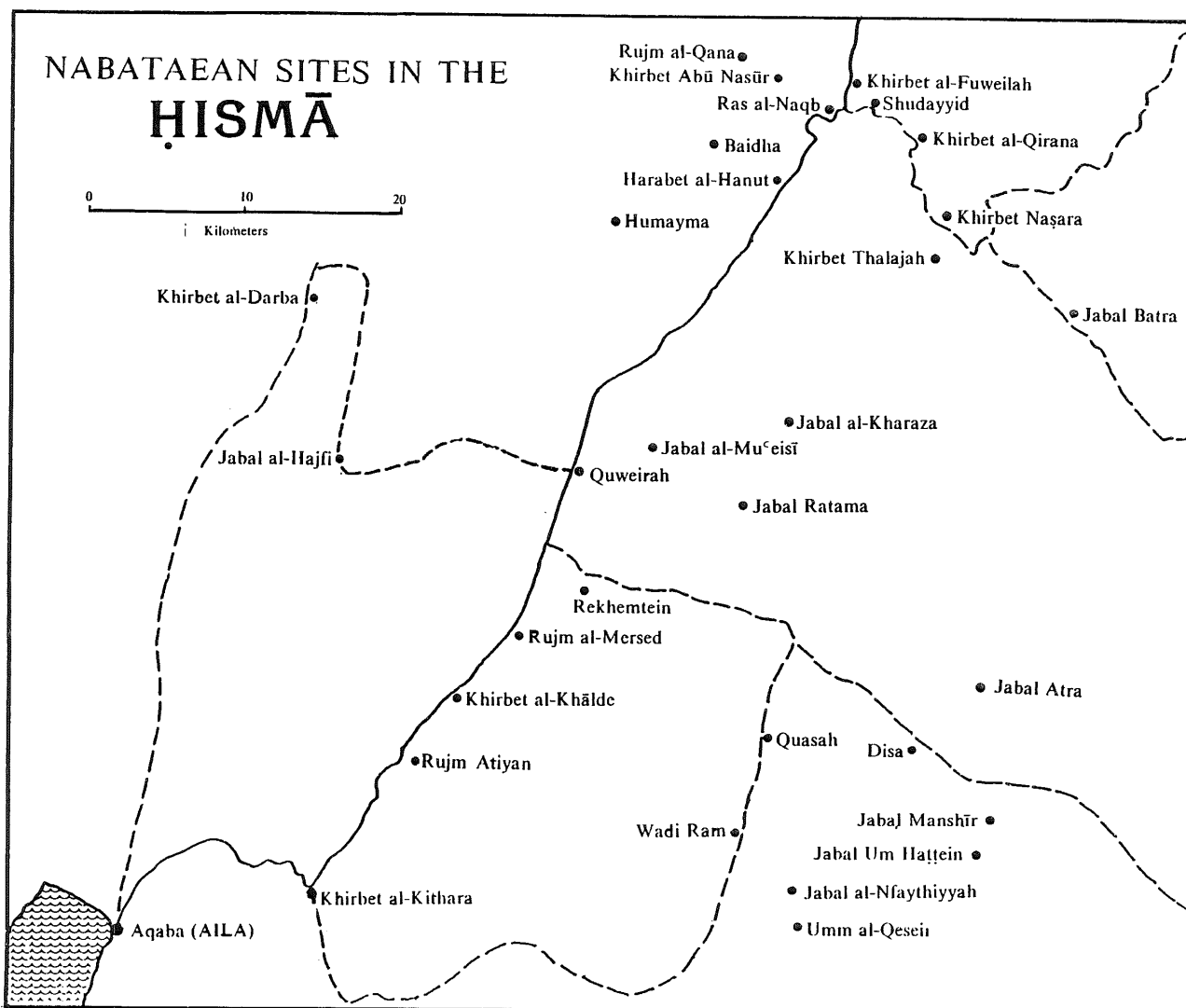


Fig. 1

town is uncertain.<sup>3</sup> Until the site has been excavated we will not be in a position to assess the transition from independence to client status, from Nabataean to Roman management. All that we can say at the moment is that with the construction of the via nova Traiana between A.D. 111 and 114, a finibus Syria usque ad mare Rubrum (*ILS* 2. 5834, 5845a), Auara-Ḥumayma became an important station on the great north-south highway that linked Bostra and Aila.

The Roman-Byzantine town is included in Ptolemy's list of settlements in Arabia Petraea (*Geography* 5. 16. 4), the Peutinger Table (as noted above), and the *Notitia Dignitatum* (Or. xxxiv. 25). The

last certifies that a unit of *equites sagittarii indigenae* was stationed in Haua[r]ae around the end of the fourth or the beginning of the fifth century. From the contemporary Beersheba Edict, which records the annual taxes paid to the dux of Palestina III, we know that Auara was assessed the second highest sum of any of the Transjordan towns, forty-three gold pieces, exceeded only by the military garrison at Adrou-Udruḥ near Petra.<sup>4</sup> The appearance of Auara in these late documents indicates that the town remained an important and prosperous military post into the Byzantine period, although its precise role in the overall defence of the region remains to be determined (Fig. 2).

<sup>3</sup> On Scaurus' coins of 58 B.C. Aretas III, representing the new client-kingdom of Nabataea, submissively kneels beside his camel: M.H. Crawford, *Roman Republican Coinage* (1974) I, p. 446, no. 422.

<sup>4</sup> A. Alt, *Die Griechischen Inschriften der Palaestina Tertia Westlich der Araba*, 1921, 4. For a report on the recent survey/excavations at Udruḥ see Alistair Killick, "Udruḥ — The Frontier of an Empire: 1980 and 1981 Seasons, A Preliminary Report," *Levant*, 15 (1983), 110ff.

# ROMANO-BYZANTINE SITES IN THE ḤISMĀ

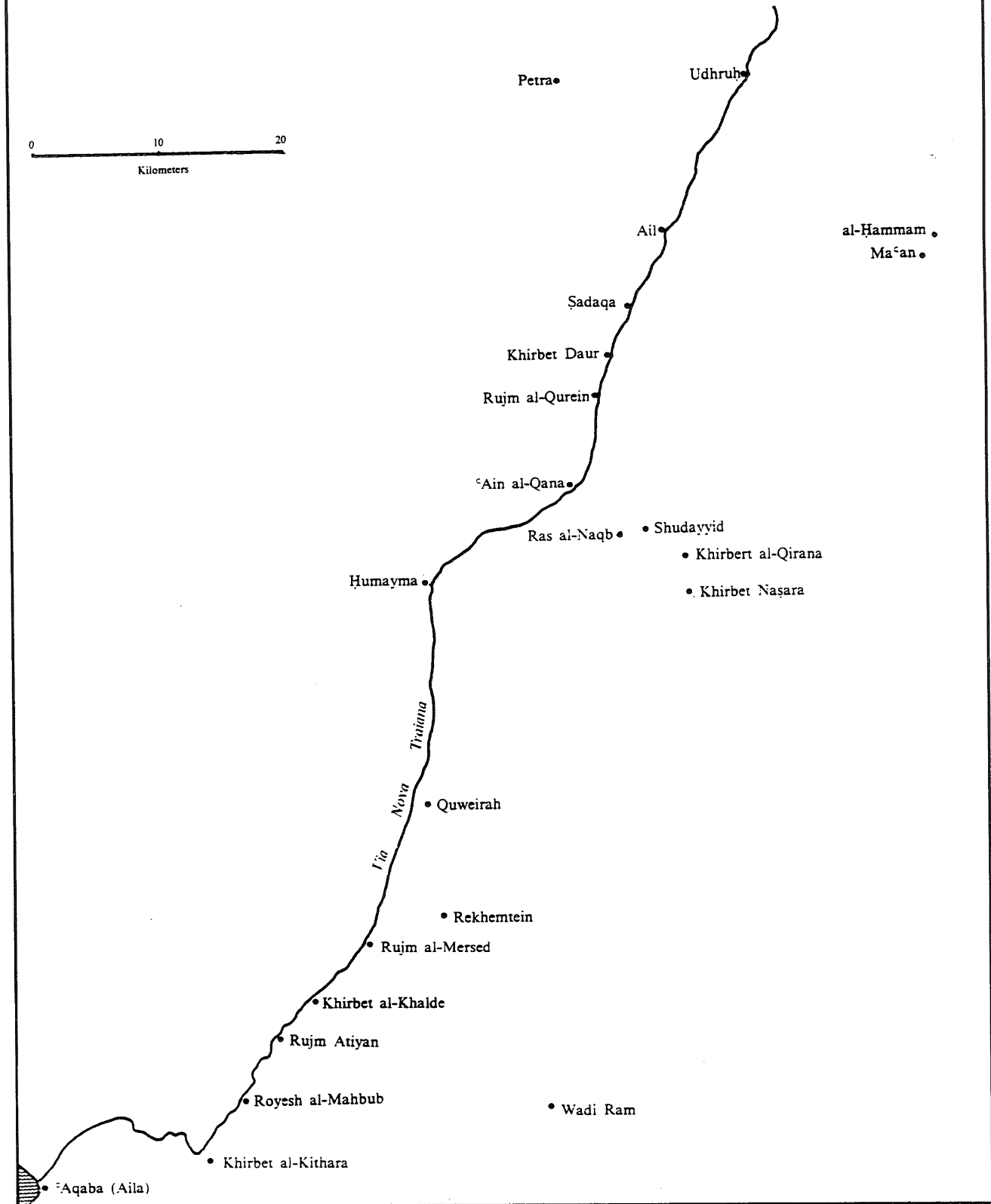


Fig. 2

Auara-Ḥumayma is attested for the last time in the early Islamic period. In 68/687, 'Ali b. 'Abd Allah b. al-Abbas, whose grandfather was an uncle of the Prophet, is said to have purchased the town and to have constructed somewhere on the site a fortified dwelling (Bakri, *Mu'djam* 83, 284). From this strategic redoubt, situated on the caravan and pilgrim routes, the 'Abbāsids allegedly plotted the overthrow of the Umayyads.<sup>5</sup> Unfortunately, it is impossible to determine from this account how much of the town was still occupied in 68/687 or how long it continued to exist as a private estate.

Such scraps of information offer little more than a framework for historical inquiry. They do not describe the material culture, document the successive transitions in local and imperial management, or reveal the response of the inhabitants to the hostile desert environment. Travellers' accounts can be used to supplement the meagre literary/documentary harvest, but caution must be exercised in drawing conclusions from reports that often reveal more about the motives and methods of the observers than the historical significance of Ḥumayma and its environs. Over the past decade, as archaeologists and historians have increasingly given attention to the history of the Nabataeans and to the evolution and organization of provincia Arabia, more systematic surveys have been conducted. The most instructive of these recent investigations is David Graf's inspection (1978-80) of Nabataean and Romano-Byzantine sites in the Ḥisma. Though he initially concentrated on the military installations along the *via nova*, as had most of his predecessors, Graf focused attention on the numerous graffiti found throughout the Ḥisma and on the culture that produced these "messages". In the quarries south of Ḥumayma he discovered

graffiti (Nabataean, Thamudic, Greek) similar to those he had transcribed elsewhere, and in the town itself ample evidence of a thriving Nabataean community — characteristic pottery, sophisticated water system, distinctive stone work. Enough, certainly, to confirm the importance of Auara-Ḥumayma during the Nabataean period.<sup>6</sup>

Our first full season of fieldwork in Ḥumayma (May-June 1983) extended this preliminary investigation in both time and space. Our principal objectives were: (1) mapping of settlements of all periods and the transportation lattice in the region between Ḥumayma and the al-Shera escarpment; (2) investigation of the elaborate water system that sustained the inhabitants of the town; (3) completion of the master urban plan for the town itself and topographic surveys of the major structures; (4) preliminary assessment of ceramic material collected in surface surveys of the town and its environs.

#### Regional Survey (Fig. 3)

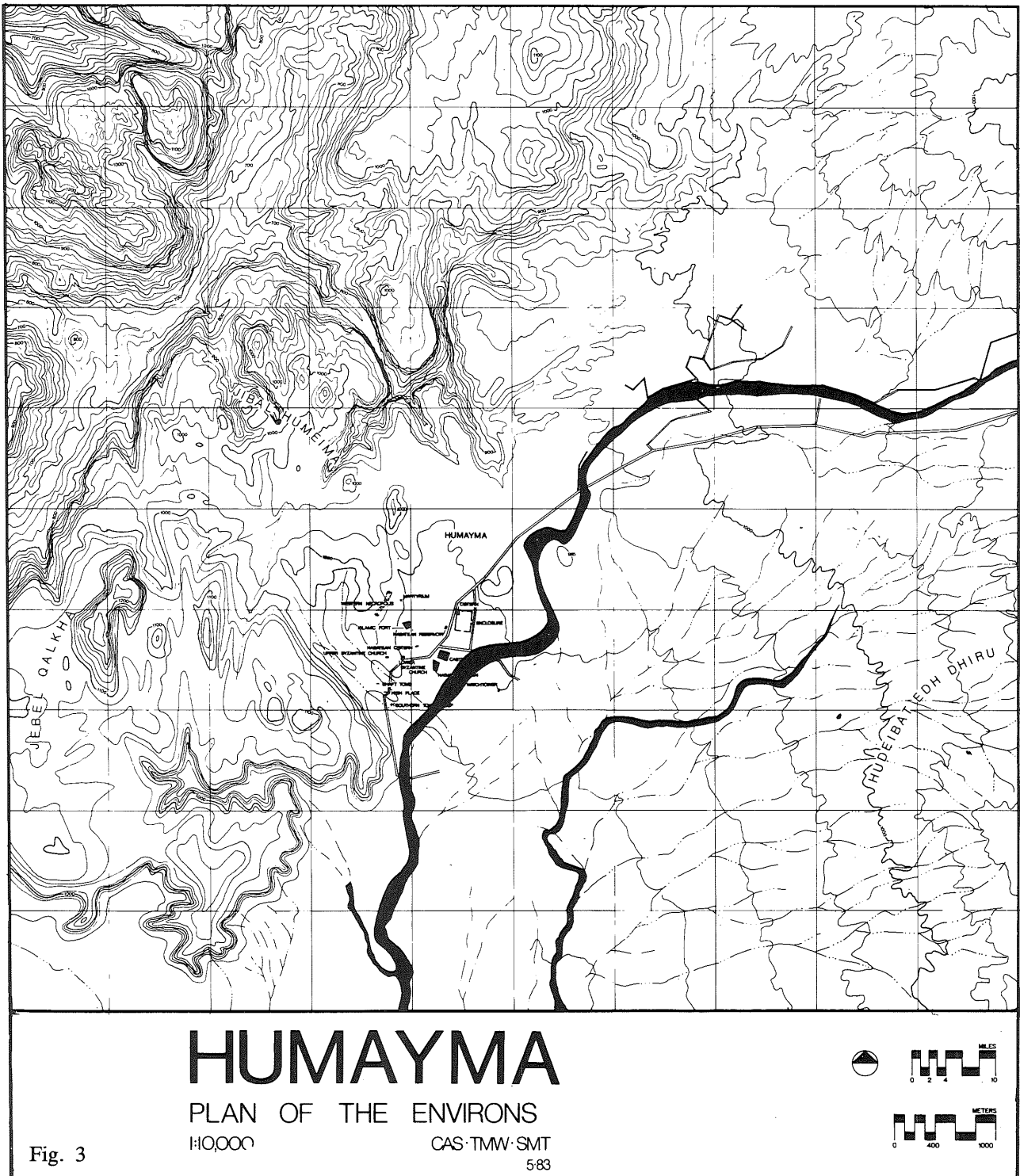
The survey area is demarcated on three sides by natural barriers: the al-Shera escarpment, Jebel Ḥumayma on the west, the Wadi el Amghar; and, on the fourth (east) by the aqueduct from the escarpment to Ḥumayma. Within this area the survey team (Eadie, Farrand, Graf, Oleson) mapped the settlements of all periods, activity-specific rather than satellite towns, and recorded their architectural and geological features. From this inspection, which will continue in the second season, it is clear that all of the Romano-Byzantine sites in the region were associated with the *via nova Traiana*. The earlier Nabataean forts and watchtowers, in contrast, were more widely distributed, situated as they were on hills and high ground rather than the level terrain chosen by Trajan's engineers for the *via nova*.<sup>7</sup>

<sup>5</sup> As this was not accomplished until 132/749, several decades after the purchase, some scholars have questioned the central role in the rebellion that tradition assigns to Auara-Ḥumayma.

<sup>6</sup> Graf has now completed the transcription of 15 "inscriptions" (Nabataean, Thamudic, Greek) of varied length, from a few letters to several lines of text, that were discovered in the area of the

quarries in 1981 and 1983. These have not been recorded previously, and though they do not provide fresh information about specific events they testify to the interests and skills of the inhabitants/transhumants who saw fit to express their thoughts "for all time."

<sup>7</sup> A full report on both the Nabataean and Romano-Byzantine sites in the region will be produced at the end of the second season.



A systematic investigation of the transportation lattice in the region, the *via nova* and secondary roads/tracks, is clearly a *desideratum*. That the *via nova* passed through the Humayma region is attested by an inscribed milestone discovered near Quweira (A. Alt, *ZDPV* 59 [1963] 101: Imp(erator) [Caes(ar)] /divi Ne[r]va[e] fil(ius Nerva)/Traianus [Aug]ustus) Ger(manicus)] /[Da]ci[c]us.) The path of its

descent from the Ma'an Plateau to the desert, however, has long been a matter for dispute. Some earlier scholars (e.g. Jausen/Savignac, Glueck) believed that traces of the road could be discerned in the Ras-en-Nagb area. Laborde and Stein, on the other hand, insisted that substantial stretches of the *via nova* were visible on the western slope of Jibal el Ghana.<sup>8</sup> Our survey has confirmed the latter observa-

<sup>8</sup> Stein's account of the road, together with a discussion of the earlier hypotheses, is contained in his hitherto unpublished *Limes Report*, edited

by D. L. Kennedy, *Archaeological Explorations on the Roman Frontier in North-east Jordan* (B.A.R. International Series 134, 1982), 271ff.

tion. We have traced a reasonably well-preserved segment of the road from 'Ain Ghana to the base of Jibal el Ghana, a distance of five kilometres, and have recorded no less than ten milestones (all anepigraphic) that mark its descent. The road ranges in width from 3.50 m. to 5.00 m. depending on terrain, and is demarcated on either side by stone borders. Trajan's engineers were obliged to construct five viaducts across small *awdiyah* along the escarpment and made good use of the bedrock throughout its course. That this road is indeed the *via nova Traiana* can no longer be doubted.

We were also able to trace the road further south, a stretch never before detected, as it crossed the "badlands"—an undulating terrain divided by numerous deep gullies—between Jibal el Ghana and Ḥumayma. Here, too, Trajan's engineers were confronted with serious challenges, and again they proved equal to the task.<sup>9</sup> Bridging gullies as they progressed, the engineers constructed an impressive all-weather road, in some areas more than 6.00 m. in width, that would permit travellers to move with relative ease from the escarpment to Ḥumayma and beyond. En route travellers would pass under the surveillance of Roman troops and officials assigned to adjacent watchtowers, castella, and mansiones. In 1983 we found several of these structures, none previously recorded, in the stretch across the badlands, and further inspection doubtless will reveal the rest. Before it crosses the Wadi el Amghar the road parallels a well-preserved segment of the aqueduct; in this region another milestone, unfortunately also anepigraphic, was found. Though we did not have time in 1983 to explore the road further south, it is clear from its north-south orientation that the *via nova* passes two kilometres to the east of Ḥumayma. The only secondary road discovered to

date is the intermittently paved surface eight kilometres north-east of Ḥumayma that parallels the modern desert track. Clearance of one section of this road, and excavation beneath the pavement, did not produce conclusive evidence regarding the date of construction. Nor do the three anepigraphic milestones discovered near the road provide any clues, although their placement does suggest that an east-west road of some sort traversed the area in antiquity.

Integrated with the survey of the transportation lattice, but nonetheless distinct, was a comprehensive investigation of water resources and the water distribution system. The maintenance of a town in such an arid zone, where average annual precipitation does not exceed 90 mm., would clearly have been impossible without the careful mobilization of water resources.<sup>10</sup> Travellers to Ḥumayma have invariably observed and praised the elaborate water system (reservoirs, cisterns, aqueduct) the inhabitants developed to ensure survival in the harsh desert climate, but they have had little to say about the relative capacities of the water sources—local and distant springs, catchment areas, *awdiyah*—or the patterns of water consumption over time.

The only spring in the immediate environs of Ḥumayma that may have supplied potable water to the inhabitants is located at the base of the prominent sandstone range one kilometre southwest of the town. The Dushara niche carved into the rock wall a few metres from the spring attests its importance. Although dry during the summer, this spring must have produced a considerable volume of water in antiquity. The sill of the opening is coated with a thick crust of calcereous tufa (travertine), characteristically precipitated from spring water highly charged with calcium carbonate, and more calcereous tufa occurs in the rock-cut cistern (which

<sup>9</sup> A few years earlier, in preparation for Trajan's Dacian campaign, army engineers had repaired and enlarged a road twelve miles long cut into the cliffs along the Danube near the Iron Gates—*montibus excisi[s] ... via[m re]f[ecit]*, *ILS* 5863; cf. splendid photographs in L. Rossi, *Trajan's Column and the Dacian Wars*, 1971, p. 24-25.

<sup>10</sup> Average rainfall: *National Water Master Plan of Jordan*, National Resources Authority, Amman; Federal Republic of Germany, German Agency for Technical Cooperation (1977) III A-2 9, p. 7 and maps. Geology of the region: F. Bender, *The Geology of Jordan*<sup>2</sup> (1974), 20ff; G. Osborn, J. M. Duford, *PEQ*, 1981, 1ff.

today contains water even during the summer) some ten metres in front of the spring.

The inhabitants of the town, however, did not restrict their search for potable water to local sources. Through extraordinary effort they conveyed to Ḥumayma the flow from two perennial springs in the escarpment, fifteen kilometres north/northeast of Ḥumayma. The springs of Jibel el Ghana and Jebel Jamam, still flowing and in use today, are situated in the cretaceous limestone that forms the upper part of the al-Shera escarpment, at approximately 1400 m. above sea level. The ground-level aqueduct between the springs and Ḥumayma—supported by walls, viaducts, and bridges where necessary for levelling—was constructed with blocks of fine-grained white quartz sandstone or friable yellow-marl, hollowed out to form a conduit ca. 0.10 m. wide and 0.13 m. deep. In the sandstone blocks the channel was lined with hydraulic cement. The conduit blocks were set in a packing of small stones fixed in grey mortar, framed by roughly squared blocks of sandstone. Covering slabs over the conduit were found only along the last 2.00 m. of its course.

A probe in 1983 demonstrated that the aqueduct supplied water for the large cistern or open reservoir located at the northern perimeter of the town. The cistern 27.60 m. x 17.00 m; 1.75 m. deep) is constructed of carefully squared blocks of local brown/red sandstone which exhibit the typical Nabataean pattern of diagonal trimming and are arranged in alternate courses of headers and stretches (another Nabataean characteristics).<sup>11</sup> The aqueduct exits the cistern at an angle, and after 87.00 m. crosses a badly disturbed structure that may have served as a *castellum dividiculum* or a settling basin. The conduit skirts a low hill two kilometres north of the cistern, parallels the *via nova* for several kilometres, and then follows a winding course up the gradually increasing slope of the foothills below the escarpment. Appro-

ximately eleven kilometres from the cistern, near the base of Jibal el-Ghana, a "spur line" goes off six kilometres to the east to the spring on Jebel Jamam. Poorly constructed, with a lining of granular terracotta roof tiles, this conduit rises 100.00 m. across a horizontal distance of 250.00 m. — a slope of some 40°–60°. The conduit was not covered, and it is not clear how the water was controlled when the slope levelled off at the base of the Jebel. The main aqueduct follows the contours of the Jibel el-Ghana for six kilometres — over bridges, viaducts, and rock-cut channels— and rises gradually, often parallel with the *via nova* below, to the Ghana spring.

Although probes near the aqueduct did not yield diagnostic material, the associated surface pottery throughout its course is uniformly Nabataean. Indeed, it is a fair inference from the construction technique of the aqueduct and the cistern it supplied in Ḥumayma that the entire water distribution system dates from the period of Nabataean occupation. The spur line to Jamam, on the other hand, appears to have been a later addition, necessitated perhaps by the growth of the town or by the breakdown or unreliability of the main aqueduct.

In addition to spring water for human consumption, large quantities of water would have been required for bathing, industrial processes, livestock, and agriculture. As a result of the 1983 survey, some twenty cisterns have been identified in the ruins of Ḥumayma and its environs. The suburban rock-cut cisterns, situated to take advantage of natural micro-catchments were probably used to supply water for livestock. Within the town the cisterns were constructed of cut blocks of local sandstone/limestone and were water-proofed with a layer of sandy white stucco. Most often rectangular in shape, and roofed by means of stone slabs supported by a series of close-set transverse segmental arches, these cisterns would have provided a fairly reliable source of water for general purposes during the summer months. Ac-

<sup>11</sup> With a capacity of 703,800 litres, the cistern could have been filled in 80 hours, if the flow were

maintained at 2.43 litres/per second (J. Oleson's calculation).



cess to the cistern (30.00 m. x 14.00 m., at least 2.00 m. deep) in the northwestern corner of the fort would have been more strictly regulated. Constructed of regular courses of round-edged blocks of sandstone, and clearly too large to be spanned by the arches typical of the Nabataean cisterns in the town centre, it was designed to receive run-off from a catchment field, roughly one hectare in area, adjacent to the north wall of the fort. As this was located on "Roman" soil, it is unlikely that the civilian inhabitants were permitted to use this open reservoir except in emergencies.

The fertile loessal fields east and north of Ḥumayma may have been prepared for agriculture by the erection of low *wadi* barriers to hold back the run-off from winter rains. The numerous barriers in the broad, shallow water courses tributary to the main *awdiyah* that can be seen today trap some of the winter rain and allow it to seep into the ground. Such subsurface water accounts for the "greening" of the entire region that we observed in May, and the rich harvest of wheat that was produced in June. Barriers of this type, executed in stone, are found frequently on Nabataean sites in the Negev and must have been used by the inhabitants of Ḥumayma.<sup>12</sup> Though none of the walls presently visible is demonstrably ancient, the systematic inspection of nearby fields that we have planned for the second season should produce evidence of parallel techniques.

The uplands to the west of Ḥumayma apparently receive more than the 90 mm. of annual rainfall recorded for the town and must have been in antiquity, as it is today, an attractive region for both pastoralists and agriculturalists. Although we did not discover in the course of the survey any satellite settlements, it is clear from the quantity of wheat under cultivation and from the herds of goats and sheep that this area has long been of vital importance to the inhabitants of Ḥumayma and to transhumants in search of pasturage for their flocks. Nor did we find any trace of an

east-west road, one that might have linked the site with the Wadi 'Araba, and quickly came to the conclusion that an all-weather road, as opposed to a camel or goat trail, simply could not have been constructed over such terrain. The western uplands are cut by deep *awdiyah* that would have defied even Trajan's intrepid engineers.

Although much of the region between Ḥumayma and the escarpment is underlain by soft Ordovician-age sandstone or unconsolidated alluvium of Quaternary age, minimal erosion seems to have occurred since the Nabataean period. The fact that the Nabataeans avoided the badlands in the construction of the aqueduct suggests that the landscape one sees today had already developed. Confirmation that the area has not changed significantly is provided by the aqueduct, which bisects the region on a north-south axis, and its remarkable state of preservation. Had significant erosion occurred, it can be argued, the aqueduct would have been destroyed where it crosses barren rock slopes, ravines, and gullies.

Some topographical changes, however, can be detected. Undercutting of the high bank of the Wadi el Amghar near the town has exposed unconsolidated alluvial deposits of several periods. Two distinct episodes of stream aggradation can be discerned. The upper terrace, four to five metres above the present *wadi* basin, contains sediments marked by calcium carbonate nodules, evidence of a protracted period of soil formation that may have occurred 10,000 years ago. Nodules of this sort do not appear in the lower terrace, 1.50–2.00 m. above the *wadi* basin, which apparently was formed much later, certainly after the introduction of ceramics into the area. Some interruption of *wadi* deposition in the lower terrace is indicated by the weak paleosol (buried soil horizon) that separates two beds of alluvial sand/gravel. A single sherd, poorly-fired and fiber-tempered (Neolithic?), was found in the lower bed; several more recent (Byzantine) sherds were recovered from the upper bed. It is not inconceivable,

<sup>12</sup> Cf. M. Evenari, L. Shanan, N. Tadmor, *The Negev*,<sup>2</sup> 1982, p. 166ff.

therefore, that the interruption of *wadi* deposition, the period of soil formation marked by the buried paleosol, coincided with the Nabataean occupation of Ḥumayma. If so, the wadi may well have followed a different course in the Nabataean period.<sup>13</sup>

### Topographic Survey of Ḥumayma

The objective of the topographic survey conducted by the architectural team (under the direction of L. Vann, assisted by S. Talaat, R. Ziek, and F. Hiebert) was to “gain control” of the site through an investigation (measurement and drawing) of major structures. Primary attention was given to the military installations associated with the Roman “occupation” of Ḥumayma, the most imposing of which is the enclosure (204 m. x 147 m.) in the northeast sector (Fig. 4). Though some earlier investigators identified this structure as a caravanserai, of uncertain date and without parallel in the Ḥisma, the majority have seen in it a conventional Roman fort. Our survey revealed external towers on the eastern wall (the façade that would have been seen from the *via nova*), four symmetrical gates, a number of internal buildings, and a thick perimeter wall—features that suggest that the enclosure was indeed a fort, and a major one at that. If so, it would have been the most important military installation in the Ḥisma, far more impressive than the ruins of *castella* at Quweira, Khirbet el-Khalde, and Khirbet el-Kithara to the south.

In the course of the survey we did discover a castellum (Fig. 5: A, B), similar in size (50.00 m. x 60.00 m.) and design to those mentioned, that had hitherto not been detected. Situated between the large fort and the “Nabataean” town, this *castellum* is large enough for a cavalry *turma* but not an *ala*. That it could accommodate the unit of *equites sagittarii indigenae* assigned to Auara-Ḥumayma by the *Notitia Dignitatum* seems unlikely. The relationship of this castellum to the larger fort, a few

hundred metres to the north, is at present uncertain. We do not know the date of construction or garrison of either fort.

The function of the watchtower (11.00 m. x 15.00 m.) two kilometres southwest of the town, near the probable route of the *via nova*, is clear enough, but nothing can be said on present evidence concerning its relationship to the larger military installations in Ḥumayma or to other watchtower/stations on the *via nova*. From the pottery scatter — which includes fragments of high quality, imported African red slip of sixth century date — it is a reasonable inference that the watchtower was occupied in the late Roman/early Byzantine periods.

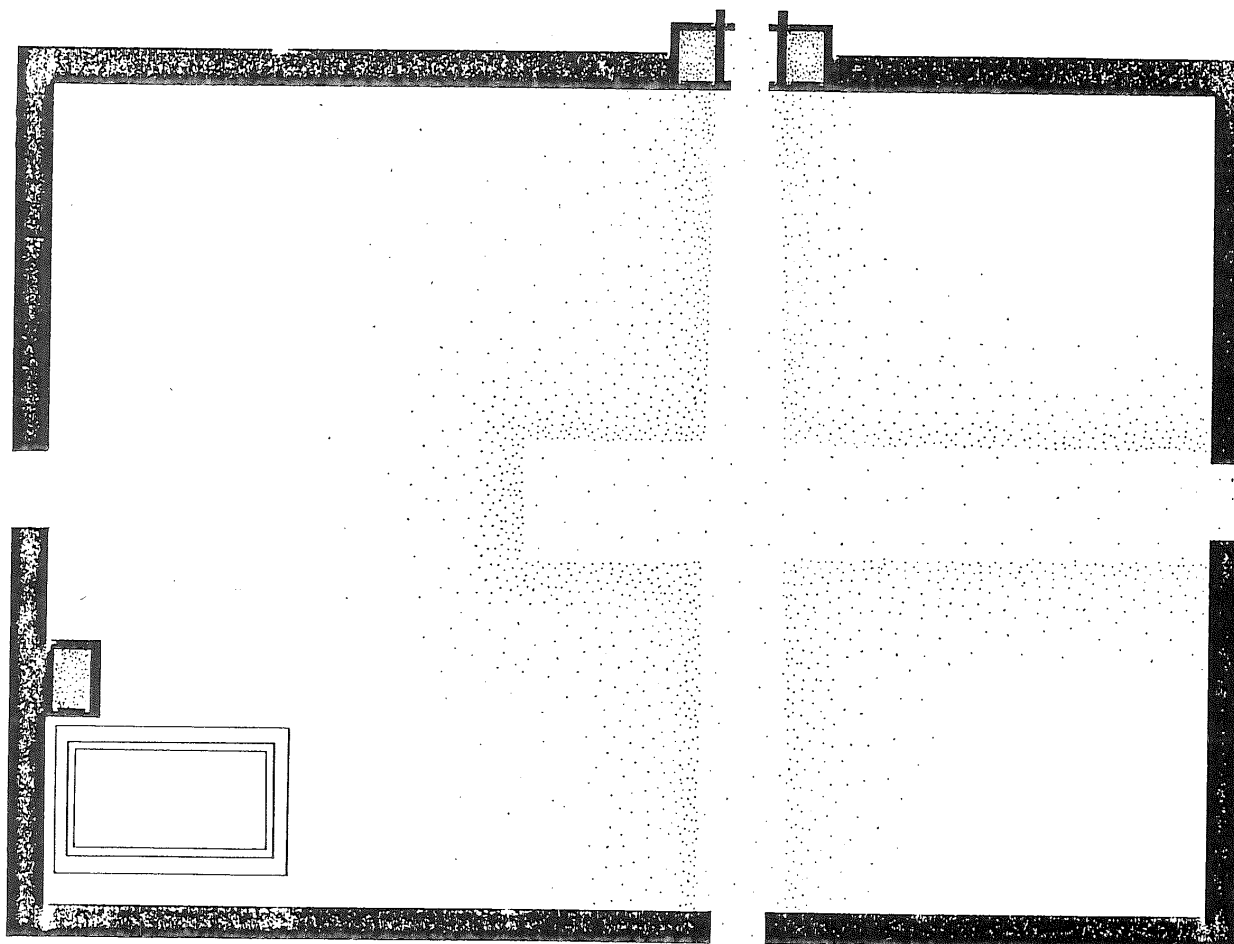
Clearly, much remains to be done. We hope that the excavations planned for the second season will enable us to trace the architectural history of each of these structures and to identify the unit(s) that served in this frontier town.

The presence of Roman military installations in Ḥumayma does not mean that the region was a conventional military zone. There is certainly no reason to believe, a priori, that interaction between Romans and Nabataeans was precluded or frequently interrupted by armed rebellion. The Romans were intruders, but their arrival apparently did not displace the local population or destroy the town that had developed over two centuries. Traces of the Nabataean town, often undisturbed by later construction, can be detected throughout the site.

During the 1983 season we conducted a preliminary investigation of what seems to have been the Byzantine sector of the civilian settlement. Though one cannot rule out the possibility that the Byzantine (and Islamic) buildings rest on Nabataean foundations, this area (clearly the dominant landscape) was developed long after the annexation of Arabia. As the only representatives of the Christian faith in the Ḥisma that have been securely identified, the two Byzantine churches in the area—lower (12.00 m. x 16.00 m.) upper (9.00 m. x 14.00 m.) — are important historical

<sup>13</sup> On the geology and prehistoric landscape of the Ḥumayma region see Donald O. Henry et al, “An

Investigation of the Prehistory of Southern Jordan,” *PEQ*, 115 (1983), p. 1ff.



## HUMAYMA

PLAN OF THE FORT

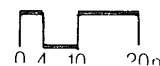


Fig. 4

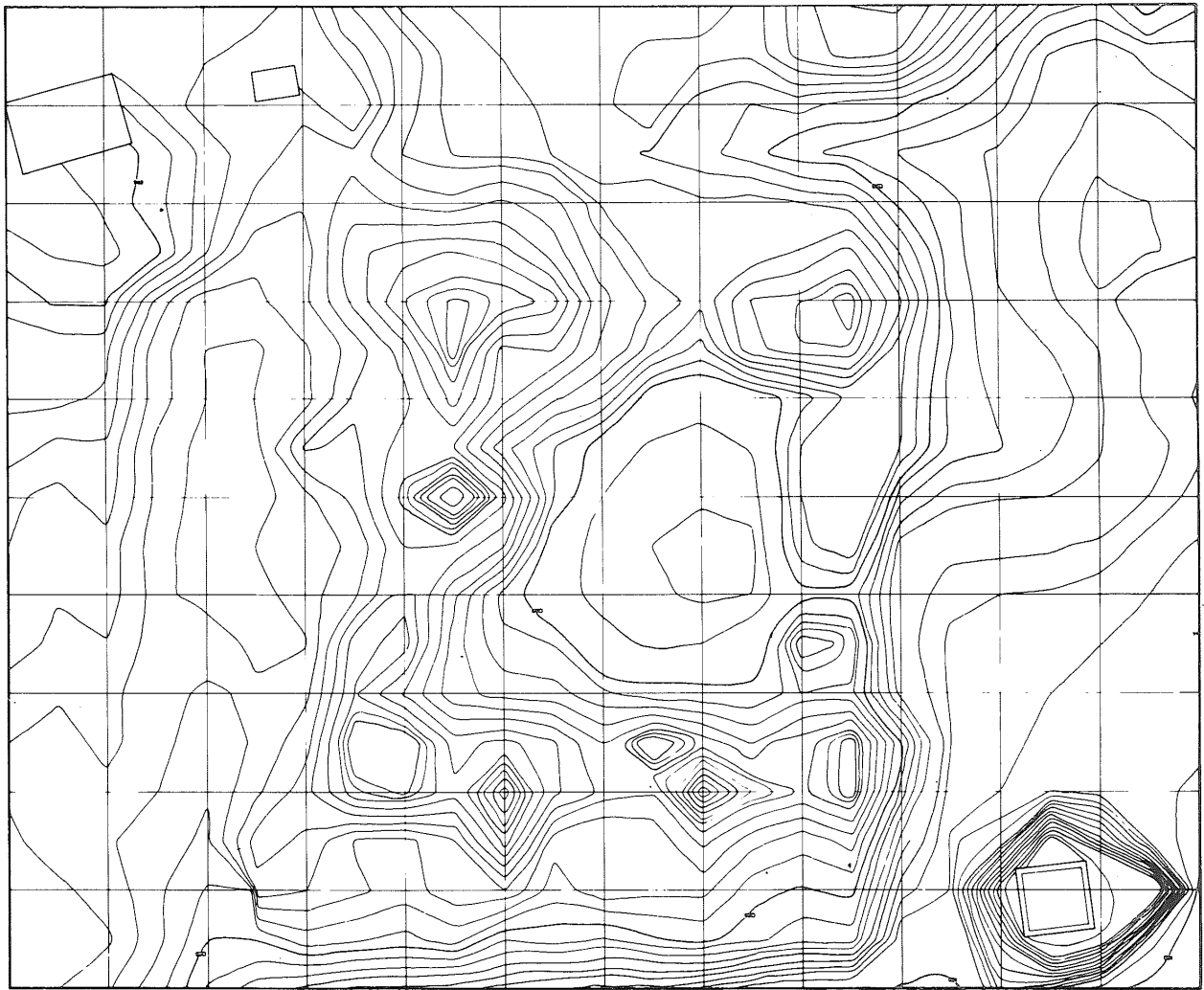
“documents”. Excavation of these two churches, which we have differed until the third season, is expected to produce new data concerning the development of Christianity in southern Jordan. Literary evidence (Nilus Doxopatrius) certifies the existence of a bishop of Auara-Humayma in the sixth century, who was under the jurisdiction of the metropolitan of Bostra, but we do not know when the community was established or its size.<sup>14</sup> Whether the Christians buried their dead in the forty-five shaft tombs cut into the low sandstone hills that delimit the western boundary of the town must also be determined through additional investigation.

### Pottery Project

By the end of the 1983 season we had collected sufficient quantities of surface

sherds to create a preliminary catalogue of ceramic types. The earliest imported wares found to date, eastern sigillata A, suggest that Humayma, more or less from its foundation, was in contact through trade with the wider world (1.1). The sprinkling of Ummayad sherds (11.1-11.3), collected from different sectors of the site and in the course of the regional survey, represent the latest ceramic (and habitation) horizon. Between these termini there was a rich harvest of surface sherds. Nabataean painted and plain ware (2.1-3.4) appear on virtually every square metre of the site and throughout the region. Local production almost certainly continued for some time after the annexation, and this pottery presumably was used simultaneously with the imported wares. It is only in the later centuries (third-fifth) that local “Nabataean” wares seem to give way to the

<sup>14</sup> On Nilus Doxopatrius see A. Musil, *The Northern Hejaz*, 1926, p. 59ff.



HUMAYMA CASTELLUM TOPOGRAPHY 1:100

SMT-FJH-LRR

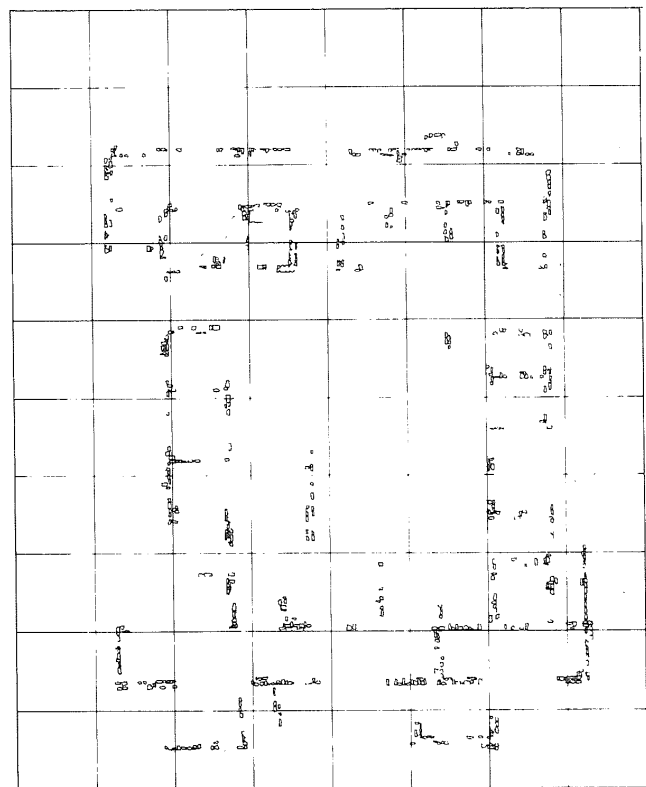
5-83



Fig. 5A

Roman (e.g., African red slip) and Romano-Byzantine ceramics (1.2-1.4). As one would expect, Byzantine pottery is found in abundance on the site. Whether the paucity of Ummayyad pottery reflects a demographic decline following the Byzantine period or simply an accident of survival is at present uncertain (Figs. 6-9).

Stylistic changes in local pottery, increases in imported wares, and the appearance of amphorae of known provenance are important socio-economic data that must be taken into account in assessing trade, communication, agricultural productivity, and demography. If Humayma's role in the larger political economy of the Roman and Byzantine empires is to be understood, it will be necessary to produce a multidimensional typology of ceramic material from stratified contexts. How did the arrival of Roman troops affect the local



HUMAYMA CASTELLUM PLAN IN SITU 1:100 SMT 5-83

Fig. 5B

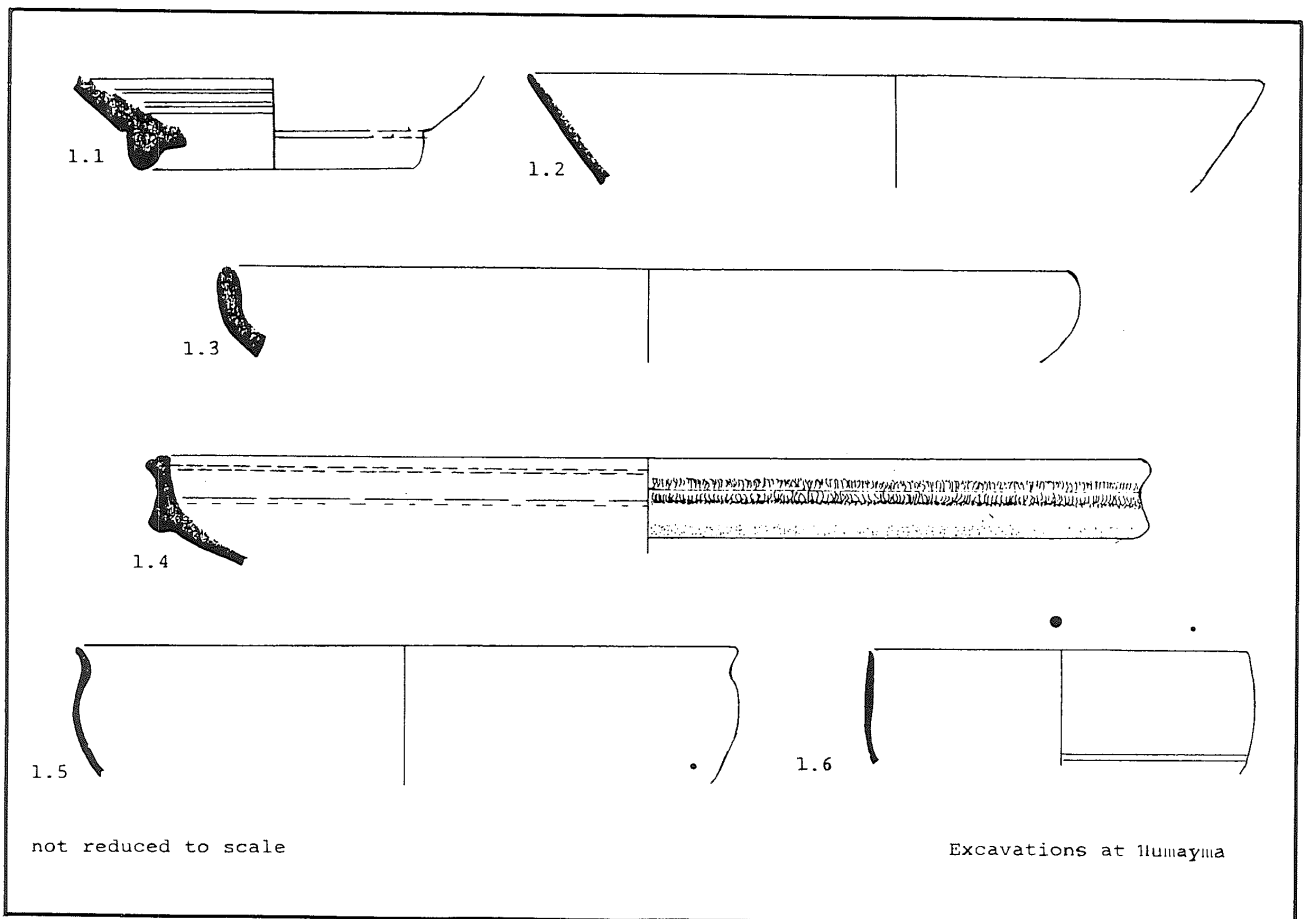


Fig. 6

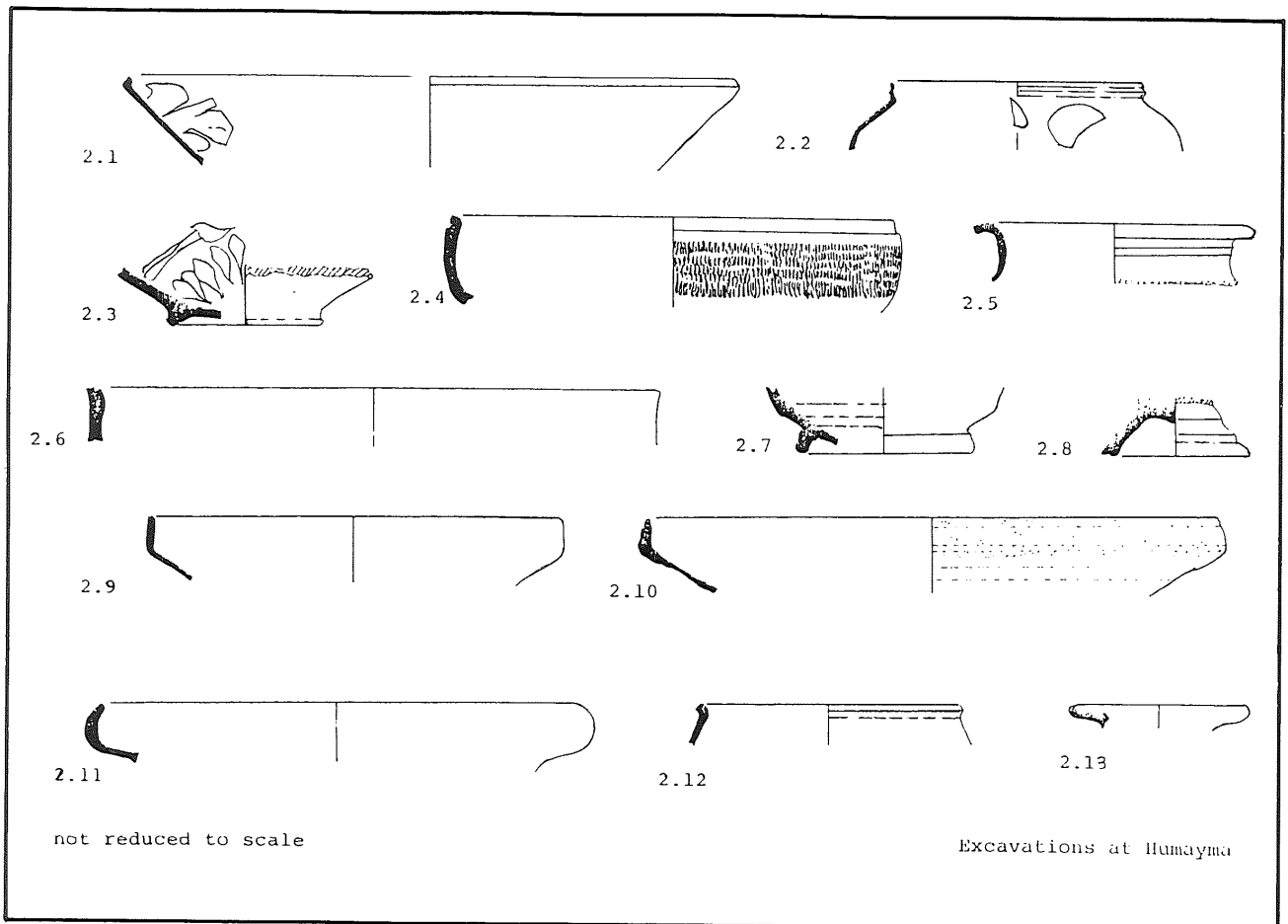


Fig. 7

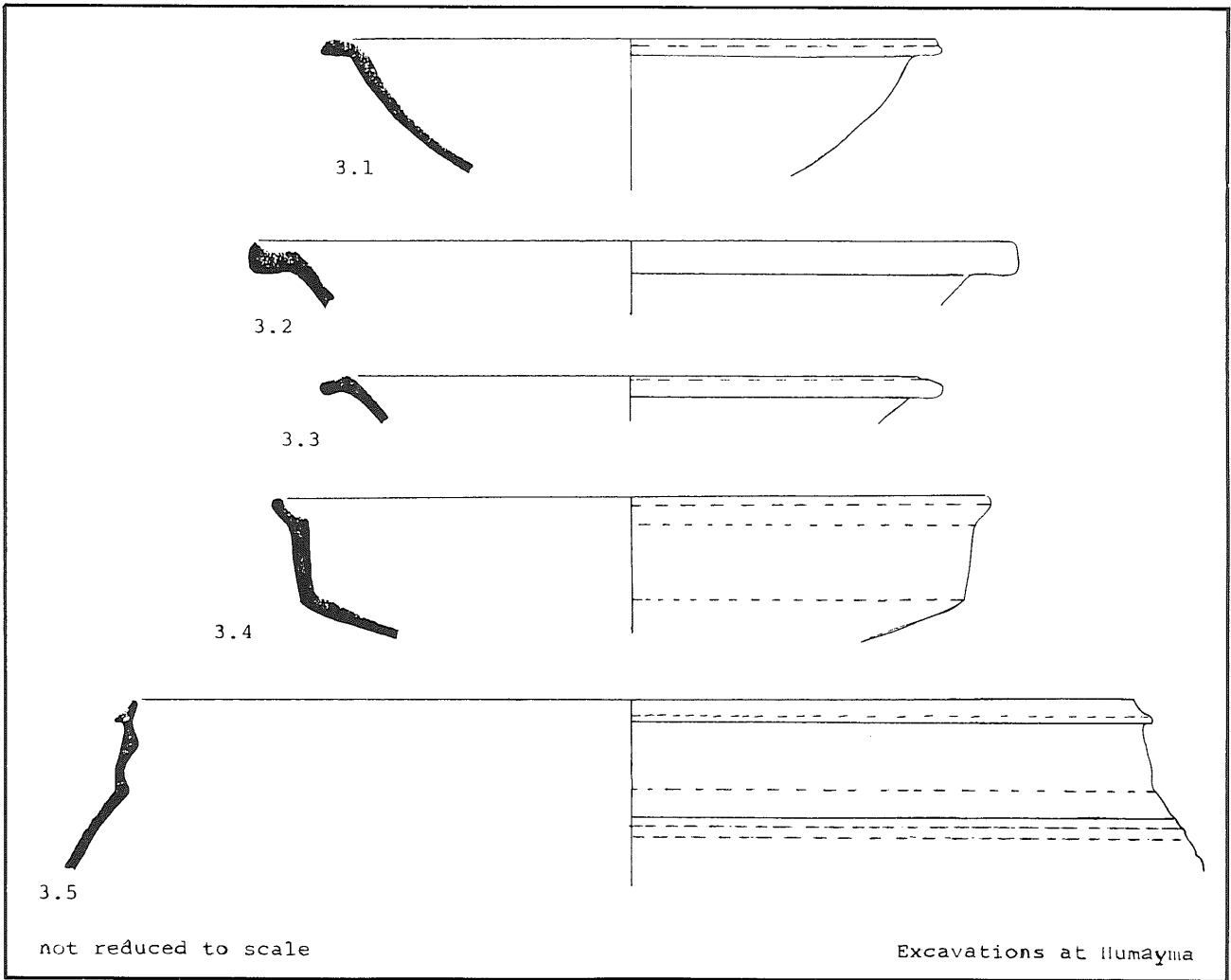


Fig. 8

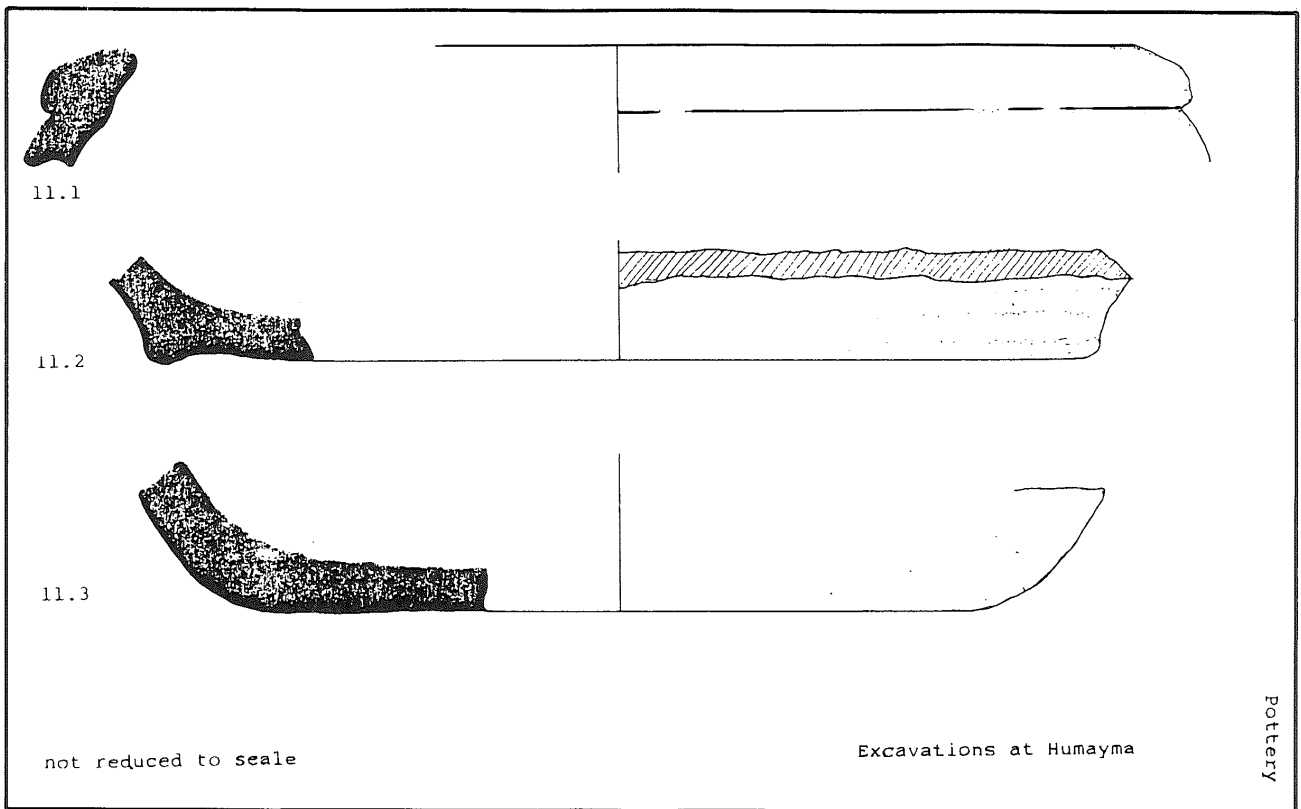


Fig. 9

economy? Did local production of both fine and coarse wares continue after the annexation? Does the importation of African red slip in the third century signal the end of local "Nabataean" production and reflect the increasing Romanization of Ḥumayma? These are some of the questions that the analysis of ceramic material from stratified contexts should begin to answer in subsequent seasons of excavation.

We have only begun to scratch the surface. Most of the broader historical and archaeological questions that led us to

undertake this investigation can be answered only through systematic excavation. Our first season has already demonstrated, however, that Ḥumayma is something more than "a dreary waste of tumbled blocks."<sup>15</sup> As Stein remarked at the end of his report, "brief as the description of the surface remains of Ḥomaima <sic> must be it may suffice to show the importance once attaching to the site."<sup>16</sup>

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U.S.A.

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<sup>15</sup> A. S. Kirkbride and G. Lankester Harding, "Ḥasma," *PEQ*, 79 (1947) p. 21.

<sup>16</sup> A. Stein (above n. 8), p. 275.

THE NEGEV MODEL FOR  
PALEOCLIMATIC CHANGE AND  
HUMAN ADAPTATION IN THE  
LEVANT AND ITS RELEVANCE FOR  
THE PALEOLITHIC OF THE WADI EL  
HASA (WEST-CENTRAL JORDAN)

by  
Geoffrey A. Clark

### Introduction

Knowledge of the paleolithic of Jordan is in a very preliminary state when compared with that of some other areas of the Levant. Despite recent, major efforts by Rollefson<sup>1</sup> and some other prehistorians interested in the early time ranges<sup>2</sup> we are only beginning to appreciate the richness and variety of the archaeological record prior to the Prepottery Neolithic. The Yarmouk University exhibit "Most Ancient Jordan the Past 500,000 years"<sup>3</sup> underscores the fact that the basic time-space systematics of the regional paleolithic and epipaleolithic are beginning to be understood, at least in relative terms. However these studies, which document a human presence here since the Middle Pleistocene, are primarily typological in nature. In no case are they supported by the kinds of paleoecological data which allow for the interpretation of past human adaptations, nor are they linked to a chronology securely founded on radiomet-

ric determinations. In fact, to the best of my knowledge, no isotope dates of any kind have been published for the Late Pleistocene of the country.

There are good reasons for these deficiencies. For one thing, most paleolithic sites so far recorded consist of deflated surface finds where industries from a number of different periods are mixed together in an archaeological composite (or palimpsest) without contextual evidence of any kind (e.g., the paleolithic and epipaleolithic sites recorded by the el 'Hasa, Azraq and Black Desert Surveys)<sup>4</sup> (Fig. 1). These remains can only be separated into distinct components of somewhat subjective typological grounds. Only very rarely have stratified materials been found *in situ*, and to date only a few tests have been made.<sup>5</sup> Because of the relatively high incidence of Lower and (especially) Middle Paleolithic sites, knowledge of these industries is somewhat more advanced than that of the Upper Paleolithic and Epipaleolithic.

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<sup>1</sup> G. Rollefson, The Paleolithic Industries of Ain el-Assad ('Lion's Spring') near Azraq, eastern Jordan, *ADAJ*, XXIV (1980) p. 129-144; Preliminary Report on the 1980 Excavations at Ain el-Assad, *ADAJ*, XXVI (1982) p. 5-35; G. Rollefson and B. Frohlich, The PPNB Burin Site of Jabal Unweinid, eastern Jordan, *ADAJ*, XXVI (1982) p. 189-198; G. Rollefson, Z. Kaechele, and J. Kaechele, A Burin Site in the Umm Utheina District, Jabal Amman, *ADAJ*, XXVI (1982) p. 243-247.

<sup>2</sup> A. Garrard, S. Price, L. Copeland, A Survey of Prehistoric Sites in the Azraq Basin of Eastern Jordan, *Paleorient*, 3 (1977) p. 109-126; D. Henry, Paleolithic sites within the Ras en Naqb Basin, southern Jordan, *PEQ*, 111 (1979) p. 79-85; and, The Prehistory of southern Jordan and relationships with the Levant, *JFA*, 9:4 (1982) p.

417-444; and, Paleolithic adaptive strategies in southern Jordan: Results of the 1979 field season, in *Studies in the History and Archaeology of Jordan*, I, Amman, 1982, p. 41-47.

<sup>3</sup> G. Rollefson, Exhibit: Most Ancient Jordan--the past 500,000 years, 1983.

<sup>4</sup> Garrard, *et. al.*, *ibid.*; B. MacDonald, E. Banning and L. Pavlish, The Wadi el-Hasa Survey 1979: A Preliminary Report, *ADAJ* XXIV (1980) p. 169-184; and, B. MacDonald, G. Rollefson and D. Roller, The Wadi el-Hasa Survey 1981. A Preliminary Report, *ADAJ*, XXVI (1982) p. 117-131; and, A. Betts, Prehistoric Sites at Qa'a Mejalla, eastern Jordan, *Levant*, 14 (1982) p. 1-34; and, A. Betts, Black Desert Survey, Jordan: Second Preliminary Report, *Levant*, n.d.

<sup>5</sup> Rollefson, *ibid.*, Ain el-Assad; Henry, *ibid.*, The Prehistory... and Paleolithic adaptive...



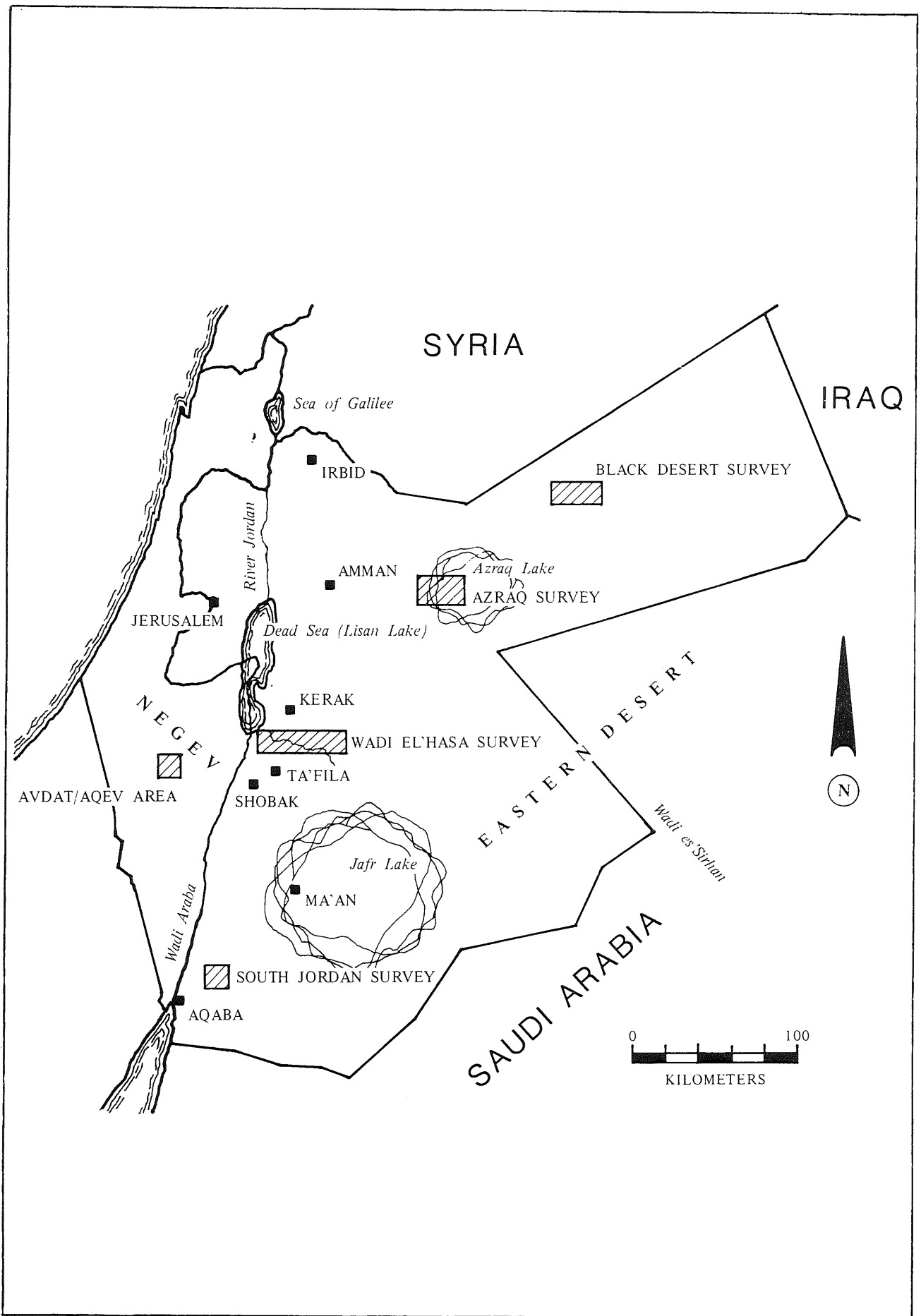


Fig. 1: Map of the Hashemite Kingdom of Jordan showing the locations of the major surveys which have produced Pleistocene archaeological material, the Central Negev Highlands (Avdat/Aqev area), and the very approximate boundaries of fossil Lakes Azraq, Jafr.

## The Levantine Middle And Upper Paleolithic: Some Models To Guide Research

Taking note of our poor understanding of the Jordanian Upper Paleolithic, it might seem premature to speak of models to guide Levantine paleolithic research when in fact what we should be doing is simply trying to improve the corpus of excavated material dating from about 40,000 to about 15,000 years ago. However, research on the Upper Paleolithic of the Palestine littoral goes back almost half a century in the Judean Hills, the area of Mount Carmel and in Lebanon,<sup>6</sup> and work in the central Negev highlands,<sup>7</sup> northern Sinai<sup>8</sup> and in central Syria<sup>9</sup> has intensified greatly during the past fifteen years. While there is much disagreement regarding chronologies, time-space systematics and the significance of paleoecological data,<sup>10</sup>

at least there is the skeleton of a radiocarbon chronology and enough floral and faunal evidence to provide a basis for discussion.

These studies have been taken furthest by the work of the Japanese at Douara Cave (C Syria), by the French in the recent re-excavation of K'sar Akil<sup>11</sup> and by Marks and his colleagues in the Negev.<sup>12</sup> First approximations of settlement pattern models have been attempted,<sup>13</sup> chronologies defined (e.g., in the Negev sites of Boker Tachit, Boker and Ein Aqev, which span the entire Levantine Upper Paleolithic [here 47,000-17,000 BP],<sup>14</sup> assemblages described (at Douara; in the Negev) and arguments made for the adoption of consistent typologies for describing these remains.<sup>15</sup> In a few cases, fairly sophisticated intrasite spatial analyses have been carried out.<sup>16</sup> Site distributions have been examined in relation to quaternary

<sup>6</sup> D. Garrod and D. Bate, *The Stone Age of Mount Carmel*, Oxford, 1937; R. Neuville, *Le Paléolithique et le Mésolithique du Desert de Judée*, Paris, 1951; J. Ewing, Preliminary note on the Excavations at the Paleolithic Site of K'sar Akil, Republic of Lebanon, *Antiquity*, 21:2 (1947) p. 187-196; D. Garrod and D. Kirkbride, Excavation at Abri Zumoffen, a Paleolithic Rockshelter near Adlun in South Lebanon, 1958, *Bulletin du Musée de Beyrouth*, 16 (1961) p. 7-46.

<sup>7</sup> A. Marks, Ein Aqev: A Late Levantine Upper Paleolithic Site in the Nahal Aqev, in *Prehistory and Paleoenvironments in the Central Negev*, Israel, I, Dallas, 1976, p. 227-293; and, Terminology and chronology of the Levantine Upper Paleolithic as seen from the central Negev, Israel, in *Colloque III: Deuxième Colloque sur la Terminologie de la Préhistoire du Proche-Orient* (IX<sup>e</sup> Congrès, U.I.S.S.P.P, Nice 1976, p. 49-76; and, The Upper Paleolithic sites of Boker Tachit and Boker: A Preliminary Report, in *Prehistory and Paleoenvironments of the Central Negev, Israel*, II, Dallas, 1977, p. 61-80; and, Introduction: A Preliminary Overview of Central Negev Prehistory, in *Prehistory and Paleoenvironments in the Central Negev, Israel*, II, Dallas, 1977, p. 3-34.

<sup>8</sup> O. Bar-Yosef and J. Phillips, *Prehistoric Investigations in Gebel Maghara, Northern Sinai*, Jerusalem, 1977.

<sup>9</sup> K. Hanihara and Y. Sakaguchi, *Paleolithic Site of the Douara Cave and Paleogeography of Palmyra Basin in Syria*, I, Tokyo, 1978; and, K. Hanihara and T. Akazara, *Paleolithic site of the Douara Cave and Paleogeography of Palmyra Basin in Syria*, II, Tokyo, 1979; and, H. Suzuki and F. Takai, *The Paleolithic Site at Douara Cave in Syria*, Tokyo, 1974.

<sup>10</sup> A. Marks, The Upper Paleolithic of the Levant,

*Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 369-374; and, The Upper Paleolithic of the Negev, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1983, p. 343-352.

<sup>11</sup> J. Tixier and M.L. Inizan, K'sar 'Aqil: Stratigraphie et ensembles lithiques dans le Paleolithique Supérieur, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 353-368.

<sup>12</sup> A. Marks, Prehistoric Settlement Patterns and Intrasite Variability in the Central Negev, Israel, *American Anthropologist*, 73:5 (1971) p. 1237-1244; and, Ein Aqev..., *ibid.*: Terminology..., *ibid.*; The Upper Paleolithic..., *ibid.*, Introduction..., *ibid.*; The Upper Paleolithic of... *ibid.*, The Upper Paleolithic of the Negev, *ibid.*; and, The Middle to Upper Paleolithic Transition in the Levant, *Advances In World Archaeology*, 2 (1983) p. 51-98; and, A. Marks and D. Friedel, Prehistoric Settlement Patterns in the Avdat/Aqev Area, in *Prehistory and Paleoenvironments in the Central Negev, Israel*, II, Dallas, 1977, p. 131-159.

<sup>13</sup> Marks and Friedel, *ibid.*; Marks, The Middle..., *ibid.*

<sup>14</sup> Marks, Introduction..., *ibid.*

<sup>15</sup> I. Gilead, Upper Paleolithic Tool Assemblages from the Negev and Sinai, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 331-342.

<sup>16</sup> H. Hietala and D. Stevens, Spatial Analysis: Multiple Procedures in Pattern Recognition Studies, *American Antiquity*, 42:4 (1977), p. 539-559; H. Hietala and A. Marks, Changes in Spatial Organization at the Middle to Upper Paleolithic Transitional Site of Boker Tachit, Central Negev, Israel, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 305-318.

paleoenvironments<sup>17</sup> and a regional paleoenvironmental sequence has been established<sup>18</sup> supported by palynological<sup>19</sup> and paleontological evidence.<sup>20</sup> Because of the proximity of the Negev, and of the Palestine littoral, and because of the strong likelihood of past environmental continuity on both sides of the Jordan Rift, these studies are fruitful sources of hypotheses which ultimately can be evaluated using data from our paleolithic sequence.

### Late Quaternary Environments And Archaeological Assemblages In The Central Negev Highlands

Studies of the ways in which humans adapt to their physical and social environments, and the effects of environmental change in the distribution of human societies over the face of the land are an essential part of the long-term study of human biological and social evolution. It has often been noted that archaeologists are in an especially privileged position to understand human adaptation because of the enormous time-depth characteristic of much archaeological data. Although few archaeologists today are environmental determinists, it remains reasonable to assume that for many early hunter-gatherers, the nature of the physical environment imposed constraints which restricted choice in many areas (e.g., subsistence, settlement, social organization, etc.) and which resulted in adjustments between humans and their environments over time which should be detectable in the archaeological record.

One particular constraint, precipitation, is especially important for many areas of the Levant which were, and are, characterized by marginal environments due to aridity. In order to exert some control over the effects of a changing environment, it is first necessary to be able to reconstruct it at various points of interest to the investigator. Tentative late Quaternary Stratigraphic and palynological sequences are available from adjacent parts of Palestine which might be used to provide a set of expectations for Jordan in general and for west-central Jordan in particular. Although caution is urged because the evidence is spotty both in space and time, the late Quaternary of Palestine is well enough studied archaeologically for the time periods of interest here (i.e., the Middle and Upper Paleolithic, the Upper-Epipaleolithic transition) that it should be possible to avoid the dubious practice of using the characteristics of prehistoric stone tool industries to "date" sites and/or to place sites in particular climatic episodes. Of special relevance to the paleolithic of west-central Jordan, where a number of rare *Upper* Paleolithic sites have been reported,<sup>21</sup> is the long paleoclimatic and archaeological sequence developed over the past fifteen years by Anthony Marks and his colleagues for the central Negev highlands. Although redeposited Acheulean industries occur in both areas, the part of the Negev sequence for which relatively fine-grained paleoclimatic data and excavated archaeological remains are available begins about 90,000 years

<sup>17</sup> C. Vita-Finzi, The Hasa Formation: Alluvial Deposition in Jordan, *Man*, 1:4 (1966) p. 387-390; K. Butzer, The Late Prehistoric Environmental History of the Near East, in *The Environmental History of the Near and Middle East since the Last Ice Age*, New York, 1977, p. 5-14; J. Schuldenrein and P. Goldberg, Late Quaternary Paleoenvironments and Prehistoric Site Distributions in the Lower Jordan Valley: A Preliminary Report, *Paléorient*, 7:1 (1981) p. 57-71; J. Schuldenrein, A Micromorphological Study of Soils in the Lower Jordan Valley, Israel, Ph.D. dissertation, unpublished, 1983.

<sup>18</sup> P. Goldberg, Upper Pleistocene Geology of the Avdat-Aqev Area, in *Prehistory and Paleoenvironments in the Central Negev*, 1, Dallas, 1976, p. 25-53; and, Late Quaternary Stratigraphy of Israel: An Eclectic View, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 55-56.

<sup>19</sup> S. Botteman and W. van Zeist, Palynological Evidence for the Climatic History of the Near East 50,000-6,000 BP, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1982, p. 111-132; A. Leroi-Gourhan, Le Levant à la fin du pleistocène et à l'holocène d'après palynologie, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 107-110.

<sup>20</sup> H. P. Uerpmann, The Major Faunal Areas of the Middle East during the late Pleistocene and early Holocene, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 99-106.

<sup>21</sup> MacDonal, et al., The Wadi el-Hasa Survey, 1979 and 1981, *ibid.*; B. MacDonal and G. Rollefson, The Wadi el-Hasa Survey 1982: A Preliminary Report, *ADAJ*, XXVII.

ago, and extends up in time until the end of the Pleistocene (12-13,000BP). This period of time appears to correspond to the Levantine Middle, Upper and early Epipaleolithic.<sup>22</sup>

Early Mousterian (+90,000 -ca. 65,000 BP)

The early part of the Mousterian is associated with the formation of gravel terraces and travertines which attest to a climate considerably wetter than today, since similar deposits are not formed at present anywhere in Palestine. No pollen data certainly pertain to this time range, with the possible exception of a sequence from the site of D-35, in the Avdat/Aqev area (C Negev highlands), where 25% arboreal species is recorded (vs 2% today).<sup>23</sup>

Site D-35 contains a Mousterian industry and is only one kilometre from a perennial spring (Ein Aqev). The archaeological assemblage is similar to that from Level D at coastal Tabun, which Goldberg believes can be correlated with the so-called Naamian Transgression of Sanlaville (= Tyrrenian II-III, with raised beaches at 10-20 metres above sea level). Another "typologically early" Mousterian has been identified at Zuttiyeh Cave (Lower Galilee), where a travertine associated with a Mousterian breccia has been dated by U/Th at 97,000±13,000 BP.<sup>24</sup> Finally, Goldberg<sup>25</sup> reports a travertine about 150 m SSW of D-35 which contains a Levallois-Mousterian assemblage like that from D-35. The travertine site (D-15) was also dated by U/Th and yielded determinations of 74,000±5,000 BP and 85,200±10,000 BP.<sup>26</sup>

The physical stratigraphy at both Negev sites is characterized by channel aggradation at the base followed by increased colluviation near the top. At the beginning of the sequence, the picture is one of a climate wetter and cooler than today's, with high energy transport of abundant coarse materials possible during strong seasonal floods. Sparse pollen samples also indicate a more heavily vegetated landscape than is the case today, with arboreal species (dominated by *Quercus* and *Olea* accounting for 25% of the spectrum. The non-arboreal species are dominated by *Gramineae* and *Cyperaceae* (together 17%), *Chenopodiaceae* (17%) and *Compositae* (13%). All this taken together indicates a paleoclimate which is completely distinct from that of the present, with climatic belts distributed as much as 200-250 kms. south of their present locations and with the desert border well to the south of the Avdat/Aqev area.<sup>27</sup> Sediments in the long sequence at Tabun Cave, Mt. Carmel,<sup>28</sup> as well as those from the Hula Valley (N Galilee) and Birket Ram (N Golan) boreholes also support wetter climates between 70,000 and 40,000 years ago.<sup>29</sup>

Later Mousterian (ca. 65,000-45,000 BP)

The latter part of the Mousterian (ca. 65,000-45,000 BP) is poorly represented in the Avdat area because of an episode of erosion which Goldberg and Horowitz believe to be a general, pan-Levantine phenomenon. They subscribe to this view because *wadi* downcutting is indicated not only in the Avdat region, but also at Tell Fara and in the Wadi Besor (W Negev), and in the region of Qadesh Barnea (E

<sup>22</sup> J. Cauvin and P. Sanlaville, *Préhistoire du Levant, Colloques Internationaux du Centre National de la Recherche Scientifique*, No. 598, Paris, 1981.

<sup>23</sup> Goldberg, *Late quaternary...*, *ibid.*, p. 83.

<sup>24</sup> I. Gisis and O. Bar-Yosef, *New Excavations at Zuttiyeh Cave, Wadi Amud, Israel, Paléorient*, 2 (1974) p. 175-180; H. Schwarcz, P. Goldberg and B. Blackwell, *Uranium Series Dating of Archaeological Sites in Israel, Israel Journal of Earth Science*, 29 (1980) p. 107-139.

<sup>25</sup> Goldberg, *Late quaternary...*, *ibid.*, p. 56.

<sup>26</sup> H. Schwarcz, B. Blackwell, P. Goldberg and A.

Marks, *Uranium series Dating from Archaeological Sites, Nahal Zin, Israel, Nature*, 277 (1979), p. 558-560.

<sup>27</sup> A. Horowitz, *The Quaternary of Israel*, New York, 1979, p. 245.

<sup>28</sup> A. Jelinek, W. Farrand, G. Haas, A. Horowitz and P. Goldberg, *New Excavations at the Tabun Cave, Mount Carmel, Israel 1967-1972: A Preliminary Report, Paléorient*, 1:2 (1973) p. 151-183; and, A. Jelinek, *The Tabun Cave and Paleolithic Man in the Levant, Science*, 216:4553 (1982) p. 1369-1375.

<sup>29</sup> Horowitz, *ibid.*

Sinai). Goldberg<sup>30</sup> suggests a drying trend, during which rainfall and runoff were just sufficient to remove most of the "early Mousterian" deposits. As a consequence, sedimentary "traps" for later Mousterian industries probably did not exist. This phase of erosion and increased aridity terminated in the Avdat area prior to about 45,000 BP.

#### Middle-Upper Paleolithic Transition (ca. 47,000 - ca. 45,000 BP)

Marks<sup>31</sup> has identified a series of transitional Middle-Upper Paleolithic industries at Boker Tachtit and elsewhere in the Avdat/Aqev region which are dated by radiocarbon at 47,000-45,000 BP. These industries are associated with alluvial sand/gravel terraces up to 15.00 m. thick, as a new cycle of aggradation apparently began to fill up to incised landscape after about 45,000 years ago.<sup>32</sup> The length and intensity of this cycle of aggradation is the subject of some discussion because of *lacunae* in the later part of the sequence and because of partially conflicting pollen evidence.

Site D-101, which has a transitional Middle-Upper Paleolithic assemblage dated at 45,000 to 40,000 BP, has produced a combined pollen sample of 90 grains in which the arboreal fraction (excluding riparian tamarisk) is 17% (oak, olive, pine, acacia and cypress are represented). The non-arboreal fraction, however, resembles the rather dry contemporary vegetation of the area. Horowitz<sup>33</sup> cautions that the D-101 sediments were deposited in water, that acacia and tamarisk are typical *wadi*-bed species, that the oaks and olives are probably relics of the Mediterranean flora of Mousterian times and that pine and cypress are wind-transported over long distances, thus effectively disposing of any ecological significance that the arboreal fraction might have had. We are left to conclude, despite the evidence for renewed alluviation, that the Avdat area was rather

dry ca. 45,000 BP, and drier than it was during previous and successive episodes.

#### Upper Paleolithic (ca. 45,000-20,000 BP)

Knowledge of the Negev Upper Paleolithic is also based mainly on data from the Avdat/Aqev area. Upper Paleolithic assemblages there occur rather early (ca. 45,000 BP, coeval with the late Mousterian) and are characterized by a lot of technological and typological variability (cf. below). Marks regards the area as marginally habitable due to aridity during much of the last glaciation and, except during a brief "climatic optimum" (32,000-27,000 BP) when conditions became wetter,<sup>34</sup> suggests that use/occupation might have been confined to the rainy season and/or to the vicinity of perennial springs. Goldberg<sup>35</sup> cites evidence from Ein Aqev (D-31) for continued alluviation during this period, although the sediments corresponding to the Upper (esp. the later) Paleolithic are finer, comprising silts and clays (instead of the earlier, coarser sands and gravels), indicating a decline in runoff energetics when compared with sediments deposited during the Middle-Upper Paleolithic transition. A generally moist, relatively warm climate is indicated up until about 27,000 years ago, when conditions once again became cooler and more arid. Paleoclimate and vegetation in the C. Negev during the Upper Paleolithic were therefore probably Mediterranean in nature and have been compared with those of present-day N. Judea or Samaria, suggesting in turn that climatic belts were distributed some 150-200 kms. South of their present locations.<sup>36</sup>

These conclusions are substantiated by pollen samples from Upper Paleolithic sites D-22, D27a, and D-27b, which have spectra comprising 16% arboreal species, dominated by oak and olive, and with occasional traces of aleppo pine, pistachio, tamarisk, acacia and juniper. Although the

<sup>30</sup> Goldberg, *Late Quaternary...*, *ibid.*, p. 83.

<sup>31</sup> Marks, *The Upper Paleolithic...*, *ibid.*; and, *The Middle to...* *ibid.*

<sup>32</sup> Goldberg, *Late quaternary...*, *ibid.*

<sup>33</sup> Horowitz, *ibid.*, p. 247.

<sup>34</sup> Marks, *Ein Aqev...*, *ibid.*; and, *Terminology...*, *ibid.*; and Bar-Yosef and Phillips, *ibid.*

<sup>35</sup> Goldberg, *ibid.*

<sup>36</sup> Horowitz, *ibid.*

arboreal fraction is a little lower than that of the Mousterian (due to a decline in the frequency of *Olea*, it is indicative of an essentially similar vegetational configuration, although perhaps somewhat cooler and drier than that of the early Mousterian (since olives favor somewhat warmer and more humid micro-climates than those indicated by the rest of the arboreal species). The non-arboreal fraction, dominated by grasses and sedges (25%), chenopodia (35%) and compositae (15%) is essentially the same as that of early (*i.e.*, pre-65,000 BP) Mousterian, indicating humid conditions *vis à vis* those of the present.<sup>37</sup> Horowitz<sup>38</sup> believes that D-22 and the D-27 sites probably fall into the 32,000-22,000 BP interval, corresponding to what he calls his "Second Wurm Stadial". These sites have not been dated radiometrically as yet.

#### Late Upper Paleolithic-Epipaleolithic Transition (23-22,000-15,000 BP)

Goldberg's<sup>39</sup> analyses of the younger sediments in the Boker terrace indicate a larger fine component and more colluvium beginning around 27,000 BP. This is taken to mean declining stream energetics and the onset of a drier trend which lasted until about 14,000 BP. The late Upper Paleolithic site of Ein Aqev (D-31), which has been well dated between 18,000 and 17,000 BP (Marks 1976), occurs in these sediments. At D-31 itself, the underlying strata lack archaeological remains, but replicate the sequence of (coarse) alluvial gravels in which the nearby Boker and Boker Tachtit sites are found.

Two of the Late Pleistocene Avdat/Aqev sites have yielded pollen sequences (D-31, D-34). D-34 is slightly older than D-31 and more or less represents the Upper Paleolithic configuration known from D-22 and D-27 (*cf.* above). The

arboreal fraction goes from 7% in D-34 to only 3% in D-31, with corresponding increases in the non-arboreal component (from 35% to 40% grasses, sedges; from 8% to 28% chenopodiaceae; 9% to 10% compositae). The importance of these changes for making inferences about climatic change should not be overstated, however, since the D-34 sample in particular is poor (65 grains) and contains a lot of tamarisk (39%, excluded in all these percentage calculations). Clearly, though, these data suggest a continuation of the trend toward greater aridity, which apparently reached a maximum around 16,000-15,000 BP.<sup>40</sup> Horowitz,<sup>41</sup> however, notes that both spectra are richer in composites and arboreal pollen than would be expected from the make-up of the contemporary vegetation, which he believes indicates a climatic episode somewhat more humid than today, although drier than previously. Using comparisons with the Hula Valley and Birket Ram borehole sequences, he places the occupation of D-31 and D-34 toward the end of his "Middle-Late Wurm" interstadial phase, a relatively dry episode during which cover in the area consisted mainly of grasses and sedges, with only a few scattered stands of trees. He remarks that climate was still favorable enough to allow for settlement of the central Negev in the vicinity of permanent water sources (*e.g.*, Ein Aqev), but that the "paradise" of Mousterian and early Upper Paleolithic times had ceased to exist in the area. This is in close agreement of Marks<sup>42</sup> impression of marginal utilization after the end of the Mousterian.

#### Epipaleolithic-Early Natufian (*ca.* 17,000-13,000 BP).

The last significant geomorphological event in the Avdat region is the incision of

<sup>37</sup> A. Horowitz, Climatic and Vegetational Developments in Northeastern Israel during Upper Pleistocene-Holocene Times, *Pollen et Spores*, 13:2 (1971) p. 255-278; and, Development of the Hula Basin, Israel, *Israel Journal of Earth Sciences*, 22 (1973) p. 107-139.

<sup>38</sup> Horowitz, The Quaternary..., *ibid.*

<sup>39</sup> Goldberg, Upper Pleistocene..., *ibid.*; Late qu-

aternary..., *ibid.*

<sup>40</sup> D. Henry and A. Lerois-Gourhan, The Excavation of Hayonim Terrace: An Interim Report, *JFA*, 3:3 (1976) p. 391-406.

<sup>41</sup> Horowitz, The quaternary..., *ibid.*, p. 246-248.

<sup>42</sup> Marks, The upper..., *ibid.*; and, Introduction..., *ibid.*

these younger sediments beginning around 23,000-22,000 BP. After this point in time, there is no significant alluvial deposition in the Avdat/Aqev wadis. While a long-term drying trend seems to be indicated, the silty colluvium associated with the Epipaleolithic here (dated at ca. 17,000-12,000 BP) is taken to indicate periodic, slightly moister oscillations during which enough water was available to strip the slopes of vegetation and fines but not enough to allow for the development of a protective mantle of vegetation.<sup>43</sup> Such oscillations are apparently not identified in the pollen record.

The Natufian (post 13-12,000 BP) sees the resumption of somewhat drier conditions, according to Goldberg,<sup>44</sup> a conclusion at variance with the pollen evidence for a substantially more humid climate elsewhere in the Levant between 14,000 and 12,500 BP.<sup>45</sup> Horowitz<sup>46</sup> draws attention to the complete lack of pollen data from the Avdat area during the preceding Kebaran and Geometric Kebaran periods (17,000-11,000 BP) so, although the Avdat region was occupied during this interval (Geometric Kebaran A site D-5 produced no pollen), the paleo-climatic data are equivocal. Horowitz,<sup>47</sup> in discussing the pollen data from the Natufian site of Rosh Zin (D-16), suggests the reappearance of a dry Mediterranean climate, considerably drier than that of the Mousterian and early Upper Paleolithic periods, but more humid than that of the Late Upper Paleolithic known from D-31. Rosh Zin is a *Late* Natufian site and would date after ca. 10,500 BP.<sup>48</sup>

A tentative paleoclimatic sequence for the C. Negev highlands based on the material just discussed is given in table 1. I reiterate that it is the most relevant body of information available as yet to structure

post-survey research on late Pleistocene climatic and industrial change in west-central Jordan. Since these sequences of paleoclimatic change are argued by their creators (primarily Goldberg, Horowitz) to have pan-regional validity (at least as first approximations), they might in particular apply to the Wadi el 'Hasa, where paleolithic remains are abundant. The Negev reconstruction is not without its critics, however. The pollen sequence in particular is often regarded as over-interpreted due to small samples, statistical naiv  t   and use of an anthropogenic environment as a baseline for assessments of the intensity and direction of Pleistocene paleoclimatic changes.<sup>49</sup> A reasonable objective for post-survey research in west-central Jordan would be to derive *independent* paleoclimatic data from optimal lacustrine locales known to exist at the eastern-end of the Wadi el 'Hasa (loci where the anthropogenic component can be eliminated or minimized) and then attempt to assess the significance of any discrepancies with the Negev sequence which might be detected.

The Avdat/Aqev region and the eastern end of the Wadi el 'Hasa are separated by about 100 kms. Since they are on almost the same latitude, there are broad similarities in rainfall (both receive on the average 50-100 mm. per annum), in the kinds of sediments and landforms present and in the elevational distribution of sites.<sup>50</sup> Both are characterized by a mosaic of so-called Saharo-Sindian, Irano-Turanian, and Mediterranean zonal environments (these are composite zonal phytogeographic configurations determined by dominant vegetation, temperature, moisture regimen, elevation, exposures, soils and fauna),<sup>51</sup> and, so far as is known, both have similar kinds and frequencies of archaeological

<sup>43</sup> Goldberg, *Late quaternary... ibid.*, p. 57-58.

<sup>44</sup> *Ibid.*

<sup>45</sup> Horowitz, *The Quaternary...*, *ibid.*; Marks, *Ein Aqev...*, *ibid.*; Marisk, *Terminology...*, *ibid.*; Henry and Leroi-Gourhan, *ibid.*

<sup>46</sup> Horowitz, *The Quaternary...*, *ibid.*, p. 248-249

<sup>47</sup> *Ibid.*

<sup>48</sup> O. Bar-Yosef, *The Epipaleolithic Complexes in the Southern Levant*, *Colloques Internationaux*

*du C.N.R.S.*, No. 598, Paris, 1981, p. 389-408; and, *The "Prepottery" Neolithic Period in the Southern Levant*, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 551-570.

<sup>49</sup> Fish, Personal communication.

<sup>50</sup> G. Clark, *A Preliminary Analysis of Upper Paleolithic assemblage variability from the Wadi el-Hasa, West-central Jordan*, manuscript.

<sup>51</sup> Horowitz, *The Quaternary...*, *ibid.*, p. 28.



TABLE 1.

TENTATIVE PALEOCLIMATIC SEQUENCE FOR THE LATE PLEISTOCENE  
OF THE CENTRAL NEGEV  
(FROM GOLDBERG 1973, 1979, 1981; HOROWITZ 1976, 1979)

ARCHAEOLOGICAL UNITS	SEDIMENTOLOGICAL & VEGETATIONAL CHARACTERISTICS*	AVDAT/AQEV SITES*	MACROCLIMATIC TRENDS	SETTLEMENT PATTERN CHARACTERISTICS	MARKS* (1981, 1983)
<p>EPISPALEOLITHIC - EARLY NATUFIAN [ca. 17,000 - 13,000 BP]</p>	<p>periodic very slightly more humid oscillations 17-12,000 BP followed by contradictory evidence: drier conditions post-13,000 BP indicated by the sediments (Goldberg 1981), wetter conditions post-14,000 BP by the pollen (Horowitz 1979); by the late Natufian (ca. 10,500 BP) a drier climate as indicated by pollen data from Rosh Zin (D-16)</p>	<p>D-5, Rosh Zin (D-16) D-101, Ein Aqev (D-31)</p>	<p>DRYING  SOMEWHAT WETTER</p>	<p>climatic evidence equivocal; possible brief return to radiating configuration during the early Natufian, followed by circulating pattern in the late Natufian</p>	
<p>UPPER - EPISPALEOLITHIC TRANSITION [23-22,000 - 15,000 BP]</p>	<p>continuation of drying trend with arboreal fraction 7% (D-34), then 3% (D-31); NAP indicates slightly wetter conditions than present; erosion beginning ca. 23,000 BP becomes marked after ca. 15,000 BP; formation of colluvial silt lenses after ca. 18,000 BP; maximum aridity ca. 16-15,000 BP</p>	<p>Ein Aqev (D-31) D-34</p>	<p>DRYING</p>		
<p>UPPER PALEOLITHIC [ca. 45,000 - 20,000 BP]</p>	<p>complex sedimentary sequence with continued alluviation characterised by the accumulation of coarse, then fine terrace gravels, sands (until ca. 27,000 BP), then silts, clayey colluvium (until ca. 20,000 BP); decline in runoff energetics over time; climate somewhat more humid (and considerably more humid 32,000-27,000 BP) until ca. 27,000 BP, when a trend toward greater aridity begins; 16% AP at D-22, D-27; climatic belts 150-200 km S of present locations</p>	<p>D-22, D-27a,b D-100 D-34</p>	<p>DRYING  WETTER  DRYING</p>	<p>circulating pattern with no significant intersite variability (i.e., more difficult to distinguish between base camps, limited to activity stations); repeated reoccupation of sites (but without spatial consistency in activity area placement); more mobile settlement/subsistence system tied to increased importance in scheduling in resource procurement in a more arid environment than during the Middle Paleolithic</p>	
<p>MIDDLE - UPPER PALEOLITHIC TRANSITION [ca. 47,000 - ca. 45,000 BP]</p>	<p>new cycle of alluviation with formation of terraces up to 15 m thick; somewhat drier than previously with 17% AP at D-101; NAP much the same as early Mousterian</p>	<p>D-101</p>	<p>DRY  BRIEFLY SOMEWHAT WETTER?</p>	<p>shift to circulating pattern with trend toward increased desiccation; decline in site size, intersite variability and evidence of sedentism</p>	
<p>LATER MOUSTERIAN [ca. 65,000 - ca. 45,000 BP]</p>	<p>drying trend; erosion (wadi downcutting with destruction of many early Mousterian sites), consequently few sedimentary traps for later Mousterian industries</p>		<p>DRYING</p>	<p>radiating settlement/subsistence system with base camps characterised by high artifact density, stratified deposits and the formation of middens, spatially-consistent tool kits; indicative of relatively sedentary pattern or pattern of re-occupation at regular intervals; logistical strategy possible due to optimal climatic conditions (vis à vis Upper Paleolithic)</p>	
<p>EARLY MOUSTERIAN [90,000+ - ca. 65,000 BP]</p>	<p>wet; formation of gravel terraces and travertines; 25% AP at D-35; channel aggradation followed by colluviation; climatic belts 200-250 km S of present locations</p>	<p>D-35, D-15</p>	<p>WET</p>		

\* should be read from bottom to top

\* sites not in stratigraphic order within archaeological units



sites and site-depositional contexts.

### The Upper Paleolithic of Jordan

The Azraq Basin, south Jordan and Black Desert surveys all produced very little material which could unequivocally be assigned to the Upper Paleolithic.<sup>52</sup> The Wadi el 'Hasa survey<sup>53</sup> produced substantial quantities of Upper Paleolithic remains but here, as in other areas, only a few stratified sites were recorded (Fig. 1). As is evident from the publication dates of the above cited projects, all this interest in the Upper Paleolithic is a very recent phenomenon.

### Henry's South Jordan Survey

About the only systematic work so far within the national boundaries which involves Upper Paleolithic *excavation* was Donald Henry's Survey of four areas surrounding the villages of Ras en Naqb and El Qumeira in the Wadi Hisma, southern Jordan.<sup>54</sup> This region is located about 160 kms. due south of the Wadi el 'Hasa (Fig. 1). It was selected because of environmental diversity, and the corresponding expectation of site functional and settlement pattern differences determined ultimately by different adaptations across an altitudinal gradient ranging from 1000.00 m. (Ras en Naqb) to 800.00 m. (at El Qumeira some 20 km. to the South). The study area transected the southern margin of the Jordanian Plateau and the adjacent Wadi Hisma. Divided into four strategically located subunits, it was systematically surveyed on foot over a combined 24.5 square kilometre area, resulting in the discovery of eighty-one prehistoric sites which ranged in time from the lower Paleolithic through the Chalcolithic. Only two stratified, *in situ* Upper Paleolithic sites were found (J403, J412), although five additional deflated surface scatters also contained Upper Paleolithic tools. Both stratified sites, associated with rockshelters, were

tested producing what is, to the best of my knowledge, the only *in situ* Jordanian Upper Paleolithic material excavated to date. Although paleoenvironmental data were reportedly collected,<sup>55</sup> they remain unpublished, so that this discussion must be confined to the characteristics of the lithic assemblages.

Two *sondages* at J412 (Jebel Humeima) yielded 8,746 chipped stone artefacts of which 269 are what Henry calls "tools forms". Numerical data from J403 have not been published. At both sites the retouched component of the assemblage is said to be dominated by simple endscrapers, burins and retouched elements. The assemblages also supposedly share a lithic technology focused upon blade production from prismatic cores. Although retouched pieces account for over 50% of the tools at J412, the majority are discontinuously retouched blades and flakes that were casually manufactured. Abrupt and Aurignacian (scalariform) retouch are rare in the assemblage. While simple endscrapers on blades constitute most of the scrapers, endscrapers on flakes with extensive lateral retouch are also common. The burins are typically made on truncations on thick blades and flakes, but dihedral forms also occur.<sup>56</sup> The high debitage densities together with cores and primary manufacturing debris denote an emphasis on the early stages of lithic reduction at these sites (esp. J412, Jebel Humeima). Although this emphasis on primary reduction was first thought surprising because of an apparent lack of local raw material, chert cobbles were discovered in abundance in the bed of the Wadi Qalkha, less than .5 km. distant.

Henry points out that while blade production was clearly emphasized at these two sites, the presence of large flakes and primary elements that bear evidence of elaborate platform preparation imply that reduction of blade cores began with the removal of a series of flakes (or that there was a secondary technology related to the

<sup>52</sup> Garrard, *et. al.*, *ibid.*; Henry, *The Prehistory...*, *ibid.*; Henry, *Paleolithic Adaptive...*, *ibid.*; Betts, n.d., *ibid.*

<sup>53</sup> MacDonald, *et. al.*, *ibid.*

<sup>54</sup> Henry, *ibid.*

<sup>55</sup> Henry, *The Prehistory...*, *ibid.*

<sup>56</sup> Henry, *ibid.*, p. 427.

production of large flakes). Apparently, only after most of the cortex had been removed did blade production begin. Once blade production had begun, platform preparation and edge strengthening continued throughout the reduction process until the core was exhausted.<sup>57</sup>

Although Henry's tests have not been reported in detail, they provide for the first time a set of expectations about what an Upper Paleolithic assemblage should look like in Jordan. Moreover, enough material has been described to allow for the tentative placement of these assemblages in the broader context of the Upper Paleolithic found elsewhere in the Levant.

### Patterns of Levantine Upper Paleolithic Assemblage Variability

Very recently, a dichotomous pattern of variability in the composition of stratified (rare) and surface (relatively common) Upper Paleolithic assemblages from Lebanon, the Negev, and the West Bank has been identified and described (apparently independently) by Gilead and Marks.<sup>58</sup> In reasonable agreement with one another, both authors have suggested that the Levantine Upper Paleolithic prior to the Kebaran consists of two distinct "traditions" which overlap to some extent with one another in space and time. One of these is the well-known Levantine Aurignacian, characterized by a dominance of endscrapers and burins made of normal blades and flakes. The other, which Gilead has christened the Ahmarian (after Erq el Ahmar, in the Judean desert)<sup>59</sup> is characterized by significant numbers of small blades and bladelets; retouched and backed blades, bladelets and points (>35%) and a relative scarcity of the "classic" Aurignacian diagnostics — endscrapers and burins (≤40%). The Ahmarian has been relatively well dated between 38/41,000 and 17,000 BP; the few radiocarbon

dates associated with Levantine Aurignacian assemblages do not antedate about 29,000 BP.<sup>60</sup>

While both workers come up with basically the same arrangement of sites, thus engendering some confidence in the model, they differ somewhat regarding methodology and the behavioral significance which they attach to the dichotomous pattern.<sup>61</sup> Gilead<sup>62</sup> has suggested that Aurignacian assemblages are primarily associated with Mediterranean phytogeographic zones and reflect adaptations to verdant, more heavily forested zones. The Ahmarian, found mainly in the Negev, is thought to be an adaptation to an open grassland, steppe and desert regime (i.e., should be associated with Saharo-Sindian, Irano-Turanian phytogeographic zones). Henry's sites J403 and J412 are affiliated with the Levantine Aurignacian, which is consistent with the proposed Mediterranean zone adaptation for the industry, given retrodiction of past climatic conditions from the modern environmental setting of the Jordanian plateau and the adjacent foothills.<sup>63</sup>

### Adaptation In The Arid Near East, Or What We Could Study If We Could Control For Chronology And Paleoclimatic Change

Henry<sup>64</sup> has recently published what amounts to an over-arching research design for the study of ancient human adaptation in the Levant. Although linked specifically to his own research area on the southern edge of the Jordanian Plateau, it has relevance for any Levantine archaeological project which is concerned with the early (i.e., preagricultural) time ranges. Fundamental to his approach is the development of an understanding of the paleoenvironmental milieu in which Pleistocene hunter-gatherers lived, and from which they extracted their resources. He takes the position that control of chronolo-

<sup>57</sup> Henry, *ibid.*, p. 428.

<sup>58</sup> Gilead, *ibid.*; and, Marks, The Upper Paleolithic of the Negev, *ibid.*

<sup>59</sup> R. Anati, *Palestine Before the Hebrews*, London, 1963.

<sup>60</sup> D. Henry and. F. Servello, Compendium of C-14

Determinations Derived from Near Eastern Prehistoric Sites, *Paléorient* 2 (1974) p. 19-44.

<sup>61</sup> Marks, *ibid.*

<sup>62</sup> Gilead, *ibid.*

<sup>63</sup> Henry, *ibid.*, p. 428, 430.

<sup>64</sup> Henry, Paleolithic Adaptive..., *ibid.*

gy and environment must precede more problem-specific research designs, and that such controls should be developed independently of efforts to control for variation in archaeological and faunal assemblages. Although Redman<sup>65</sup> has pointed out that these variables should be controlled simultaneously rather than sequentially, to allow for an ongoing feedback process to correct for potential defects in the research design which were not apparent beforehand, if adequate monitors of paleoenvironmental change can be developed, models related to settlement patterns, intrasite compositional variability, intersite organizational networks, site densities, differences in site sizes and site catchments, and in lithic and faunal assemblages over time can be addressed. Ideally such research should proceed in a multistage fashion from a sophisticated site survey research design, developed to insure sample representativeness in terms of site types and environmental parameters, through a testing programme at various levels of scale, and culminate in the excavation of a variety of different site types most relevant for the time periods and questions of interest.<sup>66</sup> However, the Wadi el 'Hasa survey design was judgmental and oriented toward the recovery of *all* evidence of human occupation of the area from earliest times until nearly the present. Although many paleolithic sites were recorded, most consisted of deflated surface scatters without good contextual information. Post-survey research based on el 'Hasa data would be more efficiently accomplished if use were made of the extensive (although less than ideal) information already available. This is possible to do because the most promising Middle, Upper and Epipaleolithic sites have already been identified.

## Settlement Patterns: The Negev Model

Because of the marginal nature of many Near Eastern environments, settlement and subsistence models for the study area are linked more to long and short-term (*i.e.*, annual) variations in the moisture regimen and the effects these have on the distribution of people and their resources at different elevations than to any other single factor. Group size, composition, movement and scheduling are designed to “mesh procurement strategies with the locations and seasonal availability of resources”.<sup>67</sup> So far as settlement patterns are concerned, the bipolar model developed by Peder Mortensen<sup>68</sup> has received considerable attention from Levantine archaeologists, and in particular from Marks and his colleagues working in the C. Negev highlands.<sup>69</sup> Mortensen made a distinction between what he called a “circulating pattern”, in which movements of prehistoric groups were primarily conditioned by seasonal availability of resources, which were in turn determined by seasonal variation in rainfall; and a “radiating pattern”, where in procurement strategies were organized around permanent or semi-permanent base camps, supported by (largely non-residential) exploitation camps. This distinction has recently surfaced again in the ethnoarchaeological literature in terms of a contrast between “foraging strategies”, characterized by “mapping on” to resources through a relatively high degree of residential mobility, and “logistical strategies”, in which base camps play a larger role, and in which collectors provision themselves to a greater extent through specially organized task groups and other adjustments in group size and composition.<sup>70</sup> The two types of orga-

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<sup>65</sup> C. Redman, Multistage Fieldwork and Analytical Techniques, *American Antiquity*, 38:1 (1973) p. 61-79.

<sup>66</sup> *Ibid.*

<sup>67</sup> Henry, *ibid.*, p. 43.

<sup>68</sup> P. Mortensen, Seasonal Camps and Early Villages in the Zagros, in *Man, Settlement and Urbanism*, London, p. 292-297.

<sup>69</sup> Marks and Freidel, *ibid.*

<sup>70</sup> L. Binford, Dimensional Analysis of Behavior and Site Structure: Learning from an Eskimo Hunting Stand, *American Antiquity*, 43:3 (1978) p. 330-361; and, Willow Smoke and Dogs' Tails: Hunter-gatherer Settlement Systems and Archaeological Site Formation, *American Antiquity*, 45:1 (1980) p. 4-20.

nizational strategies would be expected to produce two distinct kinds of settlement patterns, which in turn would be characterized by distinct site catchment data (site catchments would be smaller for circulating foragers, larger for centrally-based, logistically-organized collectors; site contents would be more "homogeneous" in the less-functionally-differentiated circulating pattern, more heterogeneous in the radiating pattern, etc.). Many other expected differences are identified by Binford.<sup>71</sup> Generalized and adjusted to the particulars of the Near Eastern data base, they provide a basis for fairly detailed expectations about site numbers, sizes, types, contents and distributions which can be evaluated to some extent using the Wadi el 'Hasa survey material..<sup>72</sup>

By assuming that changes in settlement patterns are at least partially linked to changes in the moisture regimen, Marks and his colleagues have determined that radiating patterns and greater residential stability should be characteristic of the moister intervals that prevailed during the early Levantine Mousterian and the Natufian, while more mobile, circulating patterns should have been operative during drier climatic episodes (the later Upper Paleolithic, Kebaran).<sup>73</sup> In the case of the Negev data, Marks has been able to test this model partially since he has (for the Levant) relatively fine-grained chronological controls and the regional paleoclimatic sequence outlined in Table 1. Henry has also designed a scenario which will eventually allow an evaluation of the model using his South Jordan data, and I am presently trying to "fine-tune" and test it using the El 'Hasa survey data (this work has not been completed yet). However, in neither of the latter cases are there large numbers of *in situ* paleolithic sites in primary depositional contexts, nor do we have the chronological controls and

paleoenvironmental information available for the central Negev. That the overall model is credible, however, is supported by studies of the movements of Bedouin groups in the area, which are primarily controlled by rainfall distribution.<sup>74</sup> Their settlement patterns, which involve seasonal transhumance between highland (during the dry months of April-November) and lowland zones (during rainy December-March), should be similar to the pattern predicted for the central Negev during arid climatic episodes.

### The Wadi El Hasa Survey

In 1979, 1981 and 1982, a team headed by Burton MacDonald (St. Francis Xavier University) surveyed the south bank of the Wadi el 'Hasa (west-central Jordan) from near its confluence with the Wadi 'Afra, at the western edge of the Jordanian Plateau overlooking the South-East corner of the Dead Sea depression, east to the Desert Highway at the town of Mahattat el 'Hasa, where the wadi disappears in an expanse of alluvial mud flats and lacustrine marls called the Qa el 'Jinz.<sup>75</sup> The survey area (Fig. 1) thus transects the highlands at the eastern edge of the Wadi 'Araba-Jordan *graben* and extends to the western margin of the Eastern Desert, a distance of more than 60 kms. The altitudinal gradient ranges from a maximum of 1250.00 m. in the west to about 750.00 m. in the east, although elevations as low as 200-300.00 m. are recorded at several isolated localities in the survey area.

The present physical appearance of the survey area is largely the result of anthropogenic alteration of Mediterranean woodlands and Irano-Turanian steppe. Evidence of the paleoenvironmental history of the area is presently quite limited, but it is likely that prior to significant human disturbance, upland plateaux were

<sup>71</sup> Binford, *ibid.*

<sup>72</sup> G. Clark, A Preliminary Analysis of Upper Paleolithic Assemblage Variability from the Wadi el-Hasa, west-central Jordan, manuscript.

<sup>73</sup> Marks and Friedel, *ibid.*; Marks, The Upper Paleolithic..., *ibid.*; and, The Upper Paleolithic of the Negev..., *ibid.*

<sup>74</sup> R. Patai, *The Kingdom of Jordan*, Princeton, 1958; S. Helms, Paleo-Bedouin and Transmigrant Urbanism, in *Studies in the History and Archaeology of Jordan*, I, Amman, 1982, p. 97-113.

<sup>75</sup> MacDonald, The Wadi el-Hasa, 1980..., *ibid.*; MacDonald, *et. al.*, The Wadi el-Hasa, 1982..., *ibid.*

characterized by open woodland, oak-pistachio (*Quercus calliprinos/Pistachia atlantica*) forest associations, whereas slopes and valleys tributary to the wadi were probably covered by Irano-Turanian dwarf shrub *Artemisetum* steppe vegetation.<sup>76</sup> The degradation of the oak woodland has resulted not only from the clearing of farmland on the watershed, but also from its exploitation for timber and charcoal. Uncontrolled grazing, especially after the Byzantine period, has prevented regeneration of forest while simultaneously reducing brush cover, so that the water table has dropped and the rate of erosion has increased somewhat (perhaps dramatically) in recent historical times.<sup>77</sup>

The survey area as a whole receives between 200 and 300 mm. rainfall per annum, but the precipitation gradient declines markedly with elevation from west to east, averaging 50-100 mm. in the study area proper. As is true throughout the Levant, precipitation is almost entirely a seasonal phenomenon, being restricted in the survey area to the months of October through May. Structural movements associated with the tectonically-active Rift Valley have created drainage base levels which, combined with high surface water runoff, have caused extensive erosion clearly expressed in the landscape relief. The most striking geomorphological features of the survey area are the deeply entrenched wadi systems resultant from the movements of complex drag fault systems (e.g., the Wadi el Hasa itself, Wadi 'Afra, etc.),<sup>78</sup> Wadi lattices thus dissect the high tablelands (esp. in the

west) creating a stark, rugged landscape which during the dry months is practically devoid of vegetation. Microclimatic regimes are distributed over this landscape in thin, elevation-dependent bands which are largely a function of orographic effects on the terrain.<sup>79</sup>

Over 1000.00 m. of stratigraphy are exposed in the survey area. The most important strata are Mesozoic Kurnub sandstones of Upper Jurassic to Lower Cretaceous age (140-125 MY), and the 'Ajlun and Bal'qa marine limestone series, laid down during the Upper Cretaceous (80-60 MY). Intrusive volcanic basalts of various ages from isolated plateaux and dikes. It is on the 'Ajlun-Bal'qa limestone caps that one would expect to find the oak-pistachio forest association; juniper would tend to occur on the Kurnub sandstone.<sup>80</sup> Water from the winter rains is retained throughout the year in the limestones, and weathering has produced fertile *terra rossa* soils there in some localities.<sup>81</sup> Both the limestone and the sandstone are aquifers, and springs are sometimes associated with deep exposures (although one of the consequences of the lowering of the water table has been the disappearance of some of these).<sup>82</sup> These water sources create pockets of hydrophilic vegetation in an otherwise-arid landscape characterized by such secondary landforms as talus screes, colluvial fans, erosional features related to sheetwash, deflation pockets, desert pavements (esp. in the east) and ancient alluvial terrace fragments.<sup>83</sup>

The Wadi el 'Hasa Survey produced more than 100,000 artefacts from early

<sup>76</sup> A. Horowitz, Preliminary Palynological Indications as to the Climate of Israel During the last 6,000 years, *Paléorient*, 2:3 (1974) p. 407-414; A. Horowitz, Some Pollen Spectra from the Neogene of Israel, *Pollen et Spores*, 16:1 (1974) p. 59-65; H. Wright, The Environmental Setting for Plant Domestication in the Near East, *Science*, 194 (1976) p. 385-389.

<sup>77</sup> S. Willimott, et. al., *Conservation Survey of the Southern Highlands of Jordan*, Durham, 1964.

<sup>78</sup> H. Busk, On the Normal Faulting of Rift Valley Structures, *Geology Magazine*, 82:1 (1945) p. 37-44.

<sup>79</sup> F. Bender, *Geology of Jordan*, Berlin-Stuttgart, 1974; M. Evenari, et. al., *The Negev*, Cambridge, 1971; K. Sanford, Structure and Evolution of the Levant and North Africa, *Nature*, 154 (1944) p.

569-571.

<sup>80</sup> A. Quennel, *The Structural and Geomorphic Evolution of the Dead Sea Rift*, *Geological Society of London Quarterly*, 1958, p. 1-24.

<sup>81</sup> A. Riefenberg, *The Soils of Palestine*, London, 1947.

<sup>82</sup> D. Burdon, *Handbook of the Geology of Jordan*, Amman, 1959.

<sup>83</sup> *Ibid.*; and E. Huntington, *Palestine and Its Transformations*, London, 1911; and, C. Vita-Finzi, Slope Downwearing by Continuous Sheetwash in Jordan, *Israel Journal of Earth Sciences*, 13 (1964) p. 88-91; and, C. Vita-Finzi, Observations of the late Quaternary of Jordan, *PEJ*, 96 (1964) p. 19-33; and, Vita-Finzi, The Hasa Formation..., *ibid.*

1,100 sites representing no less than fifty-one culture/stratigraphic and culture/historical units extending from the Acheulean up to the end of the Ottoman Empire (AD 1918)<sup>84</sup> Data relevant to the contemporary environmental setting, elevation, associated landforms, features, site size and artefact density were also collected from sites ranging in area from a few dozen square metres to abandoned cities covering many hundreds of hectares. Understandably, responsibility for the analysis of these data sets has been delegated to more than a dozen individuals, for the most part regional specialists in particular time ranges.

Although these survey data are less than ideal because in the sampling design and because of poor resolution due to the high incidence of multicomponent sites, I am trying to use them to determine if there are systematic regularities in site characteristics and placement for *all* of the “early” data (*i.e.*, for the Lower, Middle and Upper Paleolithic; Epipaleolithic, Natufian and Prepottery Neolithic). When completed, this research should allow an informal test of the Mortensen/Marks model, and the C Negev paleoclimatic sequence insofar as crude temporal control is possible (based on the characteristics of the lithic assemblages) and data relevant to environmental parameters have been recorded. This effort at studying the organizational characteristics of settlement-subsistence systems over time can only be regarded as a “first approximation”, however, since we have no secure paleoenvironmental information from the region itself, nor adequate descriptions of *in situ* single-component lithic assemblages (cf. below).

With only a few exceptions, the “ear-

ly” sites were identified as such on the basis of the stone artefacts. Most of the sites with substantial numbers of lithic remains lacked features and consisted of deflated surface scatters exposed on the flanks of the wadi and its tributaries. Altogether 1,074 sites were recorded and of this total 126 (12%) had at least some pieces which were regarded as Upper Paleolithic. Sites with Upper Paleolithic remains were initially identified as such by Rollefson using the widely-recognized criteria of large blades, flake and blade endscrapers and burins, in combination with assessments of the relative degree of patination *vis à vis* other artefacts on the site surface, and the overall condition (fresh, abraded to varying degrees, etc.) of the pieces. By a process involving the successive elimination of Lower and Middle Paleolithic components (which fortunately are both better studied and quite distinctive here), and the less-well-defined Epipaleolithic and Pre-pottery Neolithic, a subset of sites was identified which consisted in the main of Upper Paleolithic materials.

During May and June, 1983, I analyzed the lithics from the sites classified by Rollefson as Upper Paleolithic. The analysis consisted of a discrete and metrical study of the technology, morphology and surface condition of 920 artefacts from 66 sites. In addition, formal tools were classified according to two widely-used typologies for the Upper Paleolithic,<sup>85</sup> debitage was classified according to a morphological typology designed to isolate stages in the reduction process.<sup>86</sup> The objective of this exercise was (1) to allow me to become familiar with the Wadi el ‘Hasa Upper Paleolithic collections (my previous work had been on terminal Pleis-

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<sup>84</sup> MacDonald, *et.al.*, The Wadi el-Hasa, 1981..., *Ibid.*

<sup>85</sup> D. de Sonneville-Bordes and J. Perrot, Essai d'adaptation de méthodes statistiques et paléolithiques, *Bulletin de la Société Préhistorique Française*, 50 (1953) p. 323-333; and, Lexique typologique du Paléolithique supérieur, *Bulletin de la Société Préhistorique Française*, 51, 52, 53 (1954-1956); F. Hours, Remarques sur l'utilisation

de listes-types pour l'étude du paléolithique supérieur et de l'épipaléolithique du Levant, *Paléorient*, 2:1 (1974) p. 3-18.

<sup>86</sup> G. Clark, El Asturiense Cantabrico, Madrid, 1976; and, The Asturian of Cantabria: Early Holocene Hunter-gatherers in Northern Spain, Anthropological Research Papers of the University of Arizona, No. 41, Tucson, 1983; J. Tixier, *et. al.*, *Préhistoire de la pierre Taillée, I: Terminologie et Technologie*, Paris, 1980.



tocene hunting and gathering adaptations in northern coastal Spain), and (2) to allow for the compilation of a numerical summary of major morphological types and a statistical profile of both the formal tool and debitage components. This in turn allowed me to identify with greater precision those sites which had *significant* Upper Paleolithic components, and to determine those which might have "transitional" Middle/Upper and Upper/Epipaleolithic industries. These data, in combination with published and unpublished field observations by survey team members, permitted determination of those few sites which were both stratified and *in situ*, and which had a high probability of containing Upper Paleolithic industries and fauna. These are Sites 621, 623, 1065, and 1067. All four are located at the eastern end of the survey area, at the northwestern edge of Pleistocene Lake el 'Hasa, in association with lacustrine marls, alluvial terrace fragments and colluvial deposits related to the ancient shoreline.

#### Lake El 'Hasa

In June, 1983, I mapped the probable maximum extent of what I am calling Pleistocene Lake El 'Hasa (Figs. 2, 3). This was done by determining the maximum elevation of the accordant, flattened summits of the unconsolidated lacustrine marls which are so prominent a feature at the eastern end of the wadi, near the point where it debouches onto the Qa el 'Jinz. The tops of the marls, which lie at about +820.00 m, are remarkably uniform (Fig. 4). Although heavily eroded near the present-day wadi course and east of the village of el 'Hasa, they are extremely well preserved at what was probably the northwestern end of the former lake. The accordant, platform-like summits of these marls certainly identify what must have been the most recent maximum water level in the lake. The approximate maximum surface area of the lake was about 48 km<sup>2</sup>.

certainly very small in comparison with that of the Jafr (1000-1800 km<sup>2</sup>.) and Azraq (700 km.<sup>2</sup>) Pleistocene lakes.<sup>87</sup> However, at this very preliminary stage of investigation, the possibility (in fact, likelihood) or more extensive lacustrine deposits cannot be ruled out, nor can the possibility that the el 'Hasa 'lake' might simply have been part of a larger Pleistocene lake, the eastern margins of which have been obliterated by erosion.

If the mapped boundaries are approximately accurate, it seems likely that the lake was breached and drained by continuing headward (eastward) erosion of the wadi, perhaps facilitated by the fault at its northwestern end indicated on Figures 2 and 3. When this event occurred is not known, but a date earlier than the early Holocene seems unlikely since there are no indications of paleolithic or epipaleolithic occupation or use of the lake floor. All paleolithic and epipaleolithic sites in the area are found above 815.00 m.

#### A Research Design for the Paleolithic Sites of the Wadi El 'Hasa

It should be clear from the beginning of this essay that the paleolithic in Jordan does not suffer from a lack of relevant comparative models which can be used to structure research designs, but, by the same token, any serious attempt at interdisciplinary research must start from scratch with the collection of the kinds of information which will inform us about Pleistocene flora, fauna and climatic regimen in the area of interest. None of this "background" research has been accomplished for west-central Jordan in general, non for the Wadi el 'Hasa in particular. It will require years of effort and many projects before the picture reaches a level of adequacy equivalent to that of Palestine, and probably another half-century or more (assuming that the tempo of research on the early time ranges is sustained here)

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<sup>87</sup> R. Huckriede and G. Wiesemann, Der jungpleistozäne Pluvial-See von el Jafr unter weitere Daten zum Quartaer Jordaniens, *Geologica et Paleontologica*, 2:1 (1969) p. 73-95; A. Garrard,

The Environmental History of the Azraq Basin, Paper presented at the Second International Congress on the History and Archaeology of Jordan, April, 1983.

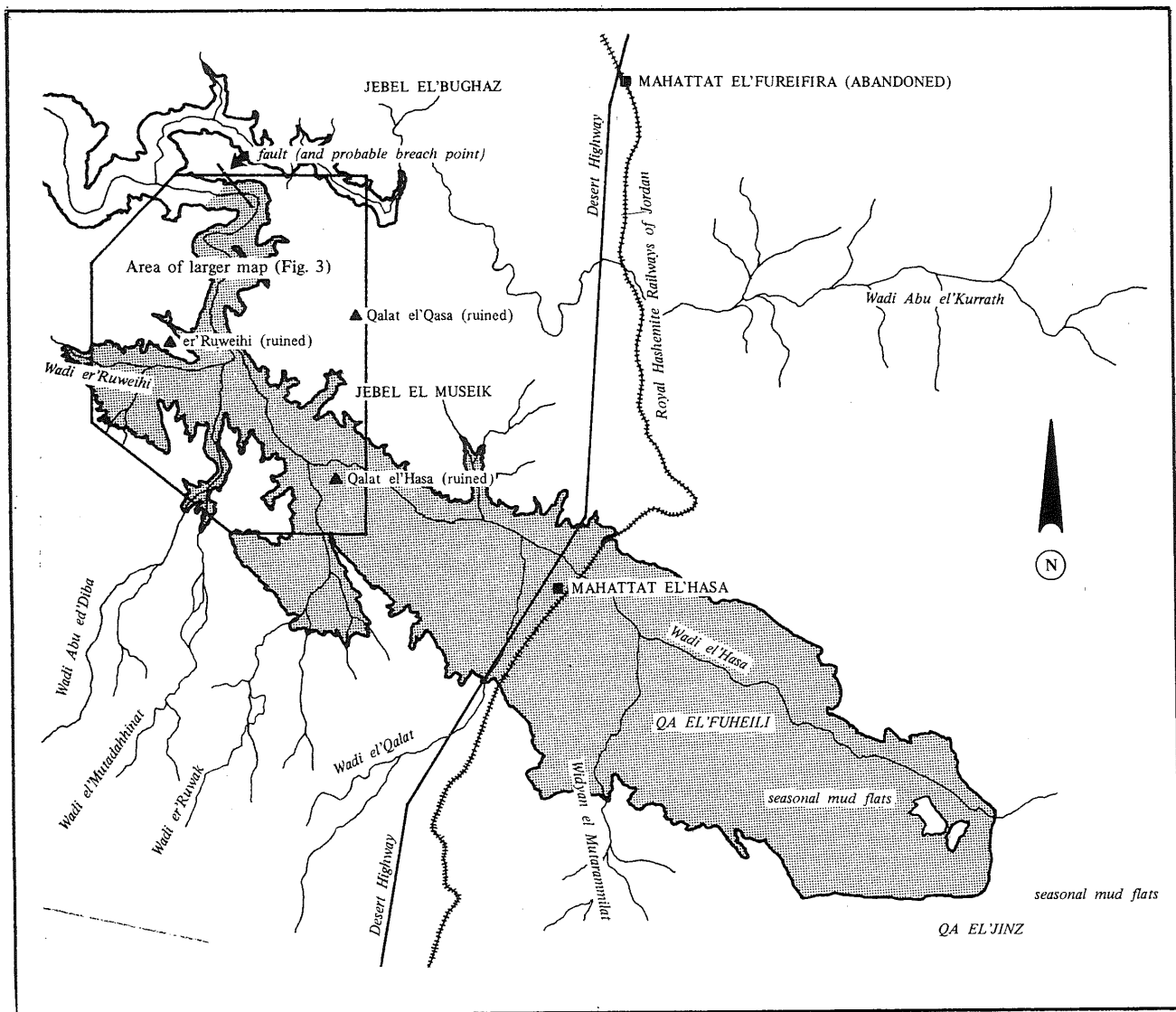


Fig. 2: Pleistocene Lake el Hasa. The maximum extent of the former lake was determined by plotting the elevation of unconsolidated marls located in the northwest end of the lake bed where they are well preserved at a height of +820 metres above sea level (vertical datum: mean sea level of the Mediterranean at Gaza, 1959). The approximate area of the lake was about 48km<sup>2</sup>. The paleolithic sites are concentrated along former lakeshores and present-day wadi banks in the northwest corner of the lake bed, but are scarce elsewhere due to erosion. Source: Sheet 31511, Series K737 (the 'Aina sheet'); 1:50,000, contour interval 20/10 metres. U.S. Army Map Service, Corps of Engineers (1959, revised 1967).

before we begin to approach the state of knowledge presently available in western Europe. In light of these considerations, and with obvious funding constraints in mind, it seems most realistic to suggest that a research program for the paleolithic of west-central Jordan be structured initially around rather general objectives or goals, and that it proceed by a series of stages which are more or less "self-contained" (*i.e.*, which are not dependent upon a continuing source of funds) and which make maximum use of the Wadi el 'Hasa survey data already collected by MacDo-

nald and his colleagues in 1979, 1981 and 1982.

The MacDonald survey identified four open-air sites with rare, stratified *in situ* Middle, Upper and Epipaleolithic deposits.<sup>88</sup> These are sites 621, 623, 1065 and 1067, all located near the eastern end of the Wadi. Reasonable first steps would be to make controlled surface collections and stratigraphic tests at each site, since the nature and extent of surface disturbance is not known. Multidisciplinary studies of lacustrine geomorphology, pollen, macrofloral, faunal and sediment data should also

<sup>88</sup> MacDonald and Rollefson, The Wadi el-Hasa..., *Ibid.*



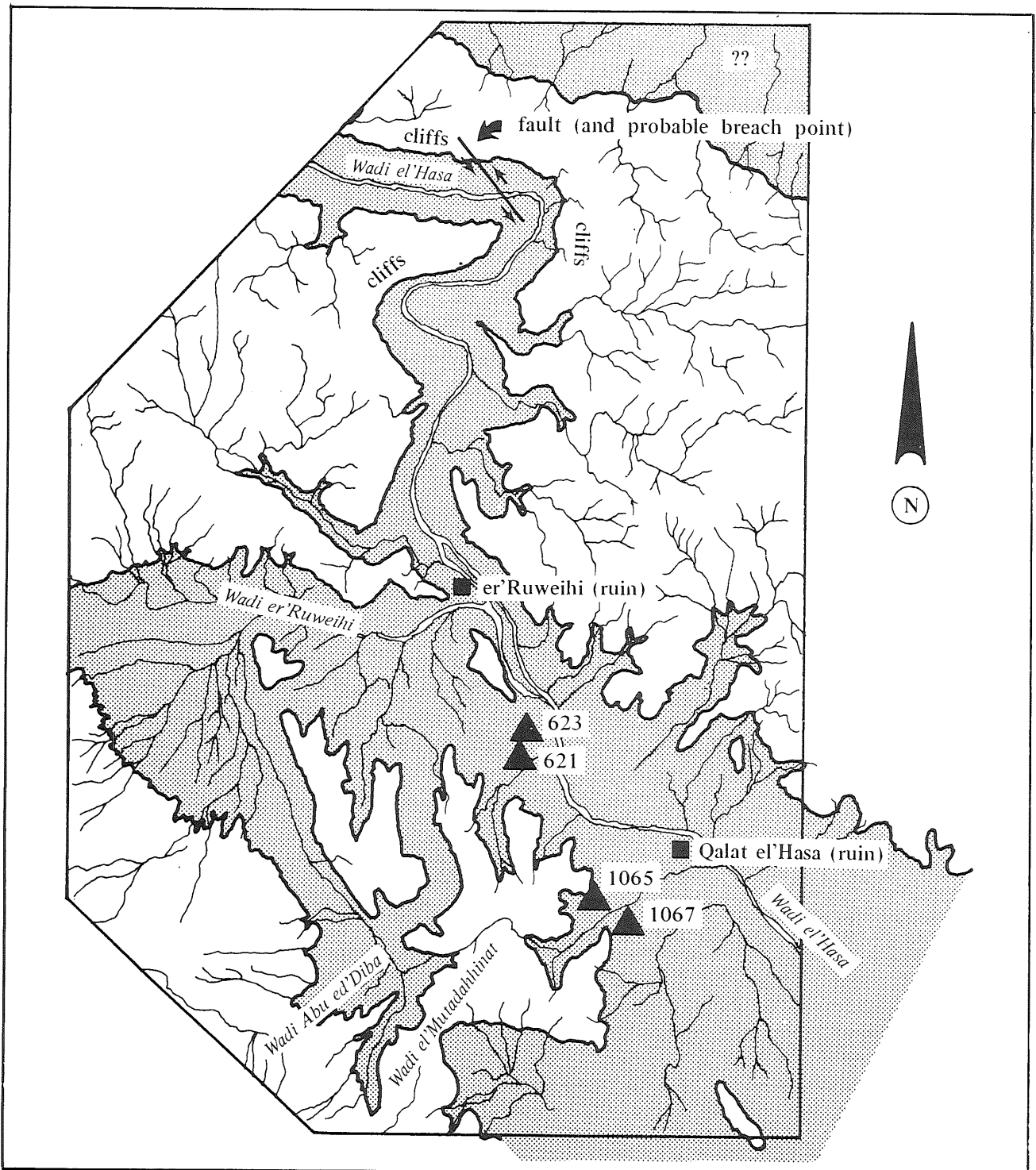


Fig. 3: Detail of the northwest end of the lake, showing locations of Sites 621, 623, 1065 and 1067. Lake margin plotted at +825 metres above sea level. Source: Sheets 225-025, 225-015, Palestine Grid (the Qalat el 'Hasa sheet); 1:25,000, contour interval 5 metres. Huntington Aerasurveys, Ltd., Department of Lands and Surveys, H.K. of Jordan (1953).

be undertaken in order to reconstruct as much as possible of the succession of late Pleistocene paleoenvironments in the region given what will initially be rather limited exposures. The el 'Hasa data should then be compared with the sequence of paleoenvironmental change reconstructed for the central Negev highlands by

Goldberg and Horowitz (Table 1). Tests in non-cultural deposits should be undertaken at the same time to secure pollen and sediment samples free of the likelihood of contamination due to human disturbance. Shell from the marls might be suitable for U/Th dating.<sup>89</sup> It is hoped that these initial efforts will provide a strong basis for

<sup>89</sup> Garrard, *Ibid.*

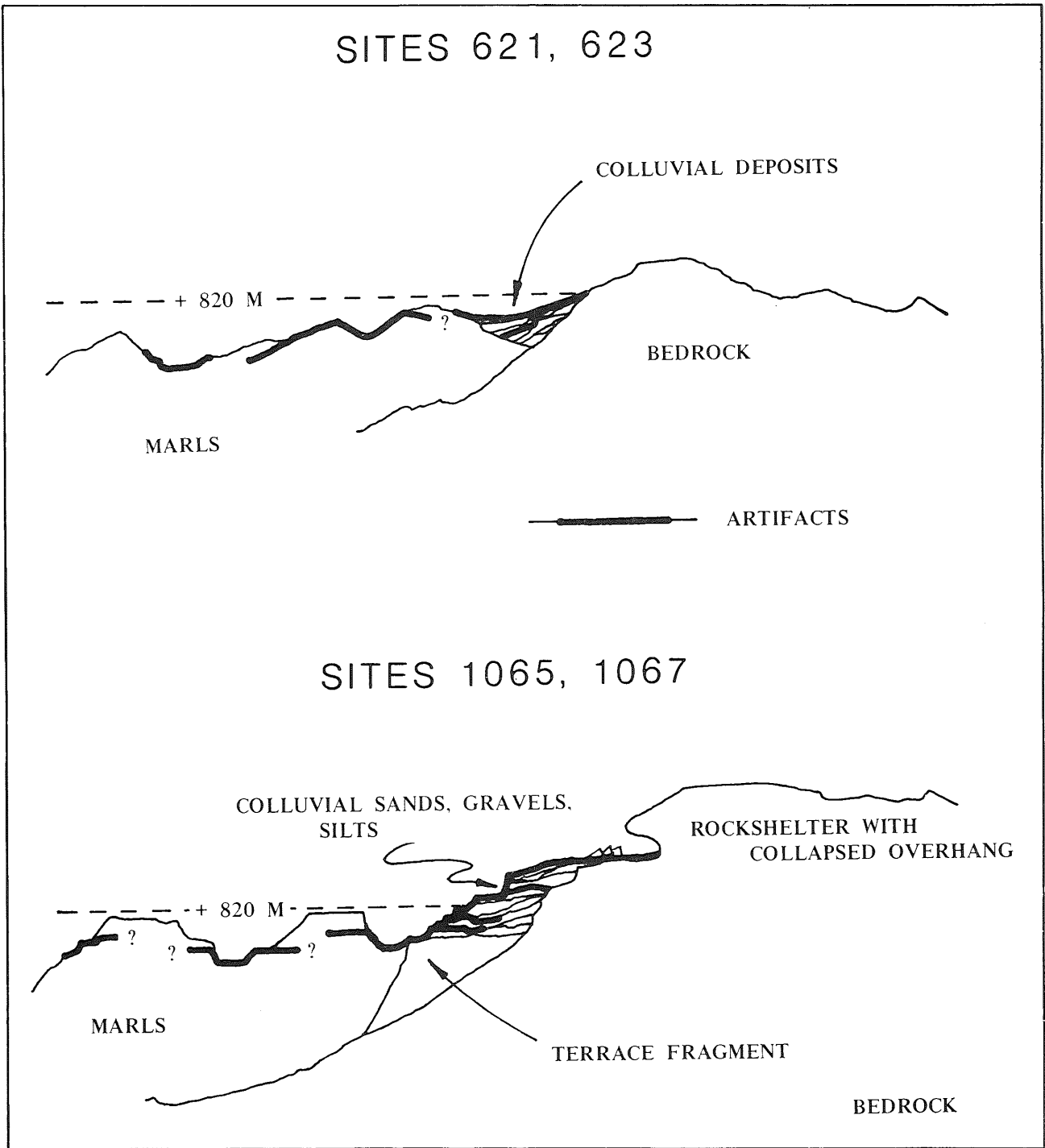


Fig. 4: Hypothetical geological sections through Sites 621, 623, 1065 and 1067. Artefact scatters are indicated by thickened, dark lines. No scale.

continued research on the earlier phases of human use and occupation of west-central Jordan.

Sites 621 and 623 (Middle-Upper Paleolithic Transition)

Sites 621 and 623 are believed to document the transition from the Middle to the Upper Paleolithic, since they contain "classic" Mousterian pieces (levallois flakes, blades, points, cores) in association

with typical Levantine Aurignacian artefacts (blades, blade endscrapers, blade cores, "Emireh points" [points and blades with thinning retouch on the ventral surface of the proximal end]). Termed "base camps" by Rollefson,<sup>90</sup> they are part of a group of three penecontemporaneous sites (the third is 622) located along the shore of the el 'Hasa lake near the eastern terminus of the survey area (Fig. 3). Another similar site, 634, is located nearby in a small

<sup>90</sup> MacDonald and Rollefson, *Ibid.*

rockshelter in the Wadi el 'Ali. Unlike most of the numerous Middle and Upper Paleolithic scatters discovered by the survey, these sites are characterized by stratified, *in situ* deposits which can probably be related to fluctuations in the level of the lake. At 621 and 623, there are stratified Middle Paleolithic levels overlain by undisturbed Upper Paleolithic deposits. Charcoal and bone were observed at 621, suggesting that if disturbance had occurred subsequent to deposition, it was probably minimal and also fairly recent. These sites appear to be eroding out of the contact between the lacustrine marls, preserved at various places in the wadi debouchement, and the limestone substrate. A hypothetical geological section through 621 and 623 is presented in Fig. 4. Site 621 covers an area of approximately 800.00 m<sup>2</sup>, Site 623 about 2400.00 m<sup>2</sup>.

#### Sites 1065 and 1067 (Upper-Epipaleolithic Transition)

Upper Paleolithic habitation is well documented in the eastern portion of the Wadi el 'Hasa, comprising about 20% of the 298 sites discovered in the 1982 season (when this part of the wadi was surveyed). Two other apparent "lakeshore encampments" contain enormous quantities of Aurignacian and Aurignacian/Epipaleolithic tools, cores and debitage. These are Sites 1065 and 1067. Site 1065 is large (ca. 2800.00 m<sup>2</sup>), and is situated at the mouth of a small *wadi* at its confluence with the former Pleistocene lake. In addition to the extraordinary density of artefacts on the sloping *wadi* bank and along a long but shallow rockshelter (in some places >200/m<sup>2</sup>!), layered deposits of charcoal, ash and bone are visible to a depth of at least a metre in a cut made in the *wadi* bank by persons unknown. There is therefore the certainty of stratified deposits at 1065, and the exciting possibility of living floors and associated features. Site 1067 may be associated with 1065. An enormous surface scatter covering ca. 15000.00 m<sup>2</sup>, it

consists of artefacts concentrated through erosion in gullies and other small depressions on top of the marls some 500.00 m. SE of 1065. Inspection of the site in June, 1983, failed to identify the source of the artefacts, although they were pretty clearly associated with the marls rather than being derived from the adjacent *wadi* slopes. The amount of disturbance suffered by Site 1067 cannot be ascertained without excavation but its location within the lake marls indicates a shrinking or oscillating lake level. A hypothetical geological section through Sites 1065 and 1067 is shown in Figure 4.

#### Some Observations On Methodology

##### Sampling Questions

As is often the case with sites only cursorily inspected and not previously investigated, the precise nature of the context of the archaeological remains is not apparent. While the situation seems to call for a combined surface collection and testing strategy of some kind, it should be one which can reasonably and efficiently be accomplished by a small number of people and which takes the likelihood of surface disturbance into account. A "coarse-grained" block-provenience collection strategy should provide a satisfactory compromise between efficiency, sample representativeness and adequate control over the horizontal distributions of artefacts.<sup>91</sup> Moreover, such a design should be flexible enough to accommodate the differences in site context noted above.

Since Sites 621, 623 and 1065 appear to be more similar to each other than to Site 1067, a systematic surface collection aimed at providing a representative sample of surface lithic debris while simultaneously controlling for horizontal distribution could be based on a grid of 1.00 x 1.00 m. squares. More detailed provenience data are probably not warranted since surface materials are almost certainly deflated. However, some patterning may

<sup>91</sup> C. Redman, Productive Sampling Strategies for Archaeological Sites, in *Sampling in Archaeology*, Tucson, 1965, p. 147-154; R. Whallon, Spatial

Analysis of Occupation Floors I: Application of Dimensional Analysis of Variance, *American Antiquity*, 38:3 (1973) p. 266-278.

emerge (it would be a shame to miss it if it did), and it may be possible to locate precisely the point(s) of origin for the lithic scatters. Site sizes vary from ca. 800.00 m<sup>2</sup> (621) to ca. 2800.00 m<sup>2</sup> (1065), so that a complete collection strategy would obviously be impractical (there are an estimated 500,000+ artefacts on the surface of medium-sized Site 1065 alone). In order to achieve a balance between uniform coverage and sample representativeness, a stratified unaligned sampling design could be employed in which each site would be divided into units comprising a number of quadrats or blocks adjusted for site size, and a random sample of grid squares could be selected within each of these.<sup>92</sup> Sample fractions would vary from a minimum of about 15% to a maximum of 50%. Insofar as Sites 621, 623 and 1065 are more or less continuous scatters of debris, this design should work reasonably well, taking site size, artefact density and available manpower requirements into account.

Site 1067 poses something of a problem since the artefacts have accumulated in erosional features in the marls, and do not form a continuous distribution. A "dendritic transect" design could be operationalized here, wherein transects divided into 1.00 m. units and corresponding to gully lengths and axes will be sampled until a 20% sample of the population of 1.00 m. transect units is obtained for each gully. While the artificial character of this expedient is recognized,<sup>93</sup> the objective is to obtain a more or less representative sample of the surface debris (since impressionistically 1067 closely resembles 1065 in composition) and, perhaps more important, to pinpoint where the artefacts are coming from (which will be done simply by inspect-

ing the gully banks). Since 1067 surface material is clearly disturbed, a more rigorous sampling design does not seem to be worth the extra effort required to implement it.

### Standardized Description

Ideally, the surface collections should be described by widely-accepted, standardized typologies in order to allow for comparison with collections from other Levantine paleolithic sites. This is not so easy as it sounds, however, since there is an apparent absence of generally-agreed-upon typologies in the region and a tendency to ignore the fact that different kinds of typologies have been devised with different objectives in mind. Most paleolithic research in the Near East has emphasized morphological typologies and has sought to describe variability in lithic assemblages in time and space, and to order assemblages (based on similarities and differences in standardized morphological type frequencies) into larger industries.<sup>94</sup> While such descriptive work is essential for delimiting the range of variability found in paleolithic assemblages for revealing recurrent patterns in this variability, and for allowing assemblages to be arranged and compared in a spatial and temporal context, it has led to an unfortunate emphasis on explaining lithic variability as primarily due to the operation of cultural traditions, a problem by no means confined to the paleolithic archaeology of the Near East.<sup>95</sup> As a consequence, however, similarities between lithic assemblages tend to be interpreted as indicating "cultural" relationships between the makers of the assemblages, either through social contacts across space or "genetically" (via gener-

<sup>92</sup> C. Redman and P. Watson, Systematic, Intensive Surface Collection, *American Antiquity*, 35:3 (1970) p. 279-291.

<sup>93</sup> G. Clark, Sites 37 (Atapuerca Open Site), *Anthrological Research Papers*, No. 19, Tempe Arizona, 1979, p. 118-133.

<sup>94</sup> A. Jelinek, The Middle Paleolithic of the Levant: Synthesis, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p. 299-302; and, The Middle Paleolithic in the Southern Levant from the Perspective of Tabun Cave, *Colloques Internationaux du C.N.R.S.*, No. 598, Paris, 1981, p.

265-285.

<sup>95</sup> H. de Lumley, Le paléolithique inférieur et moyen du Midi Méditerranéen dans son cadre géologique, *Supplement a Gallia Préhistoire*, Paris, 1971; and, Les civilisations du Paléolithique moyen en Languedoc Méditerranéen et en Roussillon, in *La Préhistoire Française*, Paris, 1976, p. 1005-1026; and, Les civilisations du paléolithique moyen en Provence, *La Préhistoire Française*, Paris, 1976, p. 989-1004; and, H. Laville, J-P. Rigaud, and J. Sackett, *Rock Shelters of the Perigord*, New York, 1980.

ationally transmitted behaviour) through time. While some aspects of variability among lithic assemblages can indeed probably be ascribed to cultural tradition,<sup>96</sup> it is also very likely that an important part of this variability is due to several other factors (*e.g.*, human adaptation to changing environmental conditions, changes in the technology used to make stone tools, even changes in the raw materials available for knapping). At a minimum, the distinction should be made between *morphological* typologies (based exclusively on shape or form) and *technological* typologies (based on the manner in which reduction take place).<sup>97</sup>

The four collections obtained from the surface sampling phase will be described according to the fifteen technological and morphological variables used in 1983, by the modified Hours<sup>98</sup> typology for re-touched tool groups advocated by Gilead (1981) and by the fifteen-part debitage typology developed by Clark.<sup>99</sup> Since for the Middle/Upper Paleolithic transition at Boker Tachtit, it has been shown that technology and morphological typology vary independently of one another,<sup>100</sup> and since it is at least a strong possibility that a similar transition characterizes the el 'Hasa material from Sites 621 and 623, a concerted effort will be made to keep separate morphological and technological classifications, and to make use of the technological variables employed by Marks & Kaufman, in the description of the Boker Tachtit lithic assemblages and core reduction sequences. Since no complete description of a representative sample of *any* of the Wadi el 'Hasa lithic sites has been attempted so far, these data will supplement the evaluation of the purposive samples which I am presently undertaking.

#### Test Excavations

Stratigraphic trenches at 1065 and 621, with more limited soundings at 1067, 623, and possibly 634, should be undertaken to

control for the relationship of the sites to the fluctuating lakeshore and to obtain paleoenvironmental samples. Sites 1065 and 621 have stratified, *in situ* deposits which contain charcoal and faunal material. They are located a few metres above what appears to be the highest stillstand of Pleistocene Lake el 'Hasa (at *ca.* +820.00 m.), marked by the accordant flattened summits of the unconsolidated marls which are so prominent a feature of the wadi in this part of its course. In each case the trenches should extend from exposed bedrock through the cultural deposits and into the marls, such that it should be possible to pick up the contact between sediments which are essentially poorly-sorted colluvia resultant from slope wash (these contain the cultural deposits at 1065 and 621) and the fine, homogeneous, water-laid, lacustrine marls (which appear to have stratified industries in them at 623 and 1067). In addition to these stratigraphic tests, every effort should be made to open broad horizontal exposures if it is determined that in fact occupation surfaces are present. These limited excavations will almost certainly yield materials suitable for radiocarbon dating (and thus provide what will probably become the first Upper Paleolithic C-14 dates for Jordan), as well as equally unique faunal, macrofloral, pollen and sediment samples.

#### Summary and Conclusions

Studies of the ways in which humans adapt to their environments, and the effects of environmental change on society are essential to an understanding of human culture, both past and present. Because of its great time depth, archaeological research is perhaps uniquely able to focus on environmental conditions and modes of adaptation not observable today. This is especially true of the later part of the Upper Pleistocene, a period which saw the emergence of morphologically modern hu-

<sup>96</sup> S. Yi and G. Clark, The Upper Paleolithic of Northeast Asia and New World Origins, *Current Anthropology*, 26:1, forthcoming.

<sup>97</sup> Marks, The Middle..., *ibid.*

<sup>98</sup> Hours, *ibid.*

<sup>99</sup> Clark, *El Austuriense...*, *ibid.*; Clark, The Asturian..., *ibid.*, Tixier, et. al., *ibid.*

<sup>100</sup> Marks, *ibid.*

mans around 40,000 years ago, and which witnessed the transition from foraging to domestication economies some 25-30,000 years later.

The Upper Pleistocene comprises the last interglacial and the last series of glacial episodes.<sup>101</sup> It was characterized by changes from environmental conditions very similar to those of the present to conditions quite different from any found in the world today. The environmental changes of the last glacial involved much more than a simple drop in mean annual temperatures accompanied by expansion of the continental ice sheets. They consisted of a complex series of worldwide changes that are still not fully comprehended, including shifts in a number of climatic parameters such as cyclonic patterns and annual distributions of temperature and precipitation, changes in ocean currents, alterations of coastal geomorphology due to sea level regression; changes in the nature, periodicity and intensity of geomorphic processes and the hydrology of streams and lakes, and changes in the distribution of plant associations and animal communities. Human societies of the Middle, Upper and Epipaleolithic were forced to adapt to this incredible variety of interrelated environmental factors. Although the magnitude of change was dampened to some degree in the Levant by virtue of its southerly location, at least when compared with Europe, the impact of paleoclimatic perturbations must nevertheless have been profound in a region considered 'marginal' by many because of its relative aridity.

The programme of surface collection and testing of four stratified *in situ* Middle-Upper Paleolithic and Upper-Epipaleolithic sites in the Wadi el 'Hasa should provide quantities of modern-quality data on Late Pleistocene environments and on human adaptation in the Levant over a period of some 30,000 years. By controlling for chronology and macrotopographical setting through time, we should be in a position to begin to characterize inter- and intrassemblage variability in Upper Paleolithic industries and

fauna, and to compare those characterizations with patterns known from better-studied areas of the Levant. Multidisciplinary analysis of artefacts, sediments, geomorphology, pollen and faunal remains from the excavations can be combined with regional survey data and directed toward the reconstruction of a series of Late Pleistocene hunter-gatherer adaptations between 47,000 and 17,000 BP, the approximate span of the Levantine Upper Paleolithic.

More specifically, the el 'Hasa research can be used to test models for changes in paleoclimates and linked changes in technology, settlement patterns and human adaptation developed by Anthony Marks and his colleagues for penecontemporaneous sites in the Avdat-Aqev area, central Negev highlands. Separated from the study area by about 100 kms., the central Negev highlands is the region closest to the Wadi el 'Hasa for which reasonably complete paleoclimatic and archaeological sequences are available. Since both areas are on almost the same latitude, there are broad similarities in precipitation regimes, in the kinds of sediments and landforms present and in the elevational distribution of sites. Both are characterized by similar phytogeographic mosaics and, so far as is known, both share similar kinds and frequencies of archaeological sites and site-depositional contexts. Meaningful comparisons between the two areas are dependent upon establishing better temporal, functional, seasonal and structural controls for the el 'Hasa sites than are presently available. Only when data are generated which are comparable to those from the central Negev highlands can we begin to reconstruct regional settlement/subsistence systems at various points in time and, ultimately, begin to explain long-term changes in human adaptation to a succession of regional Levantine environments.

While it is possible to attempt to make some of these same comparisons using the surface-collected survey data on hand, the survey collections are from deflated, multi-

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<sup>101</sup> Butzer, *ibid.*

component sites where the characteristics of the archaeological assemblages and their temporal placement can only be very roughly determined on the basis of prior knowledge of excavated assemblage composition from sites *outside* of Jordan. I have suggested that work done in Syria, Lebanon, Palestine and the Negev is likely to have major implications for the description and explanation of variability in Jordanian Upper Paleolithic assemblages, and that models developed elsewhere in the Levant can be considered hypotheses against which to evaluate Jordanian data. However, to be credible, such evaluations must be firmly based upon excavated samples from known and dated paleoenvironmental contexts. Without such data, any conclusions about the nature of Jordanian Upper Paleolithic assemblages, subsistence and settlement patterns, inter- and intra-site variation could be dismissed simply by asserting that our samples are archaeological composites and our temporal controls so bad as to preclude meaningful comparison.

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# TRANSJORDAN AND EGYPT ON THE MOSAIC MAP OF MADABA

by  
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## Introduction

The famous mosaic map of Madaba from the sixth century A.D. is one of our main sources for the topography of Roman and Byzantine Palestine on both sides of the river Jordan and the Dead Sea, and of Lower Egypt.<sup>1</sup> The *Deutscher Verein zur Erforschung Palästinas* (German Palestine Exploration Society) restored the map in 1965.<sup>2</sup> A first volume containing plates and photos was published by H. Cüppers and by myself in 1977.<sup>3</sup> The commentary will follow as soon as possible, together with an introduction to the topography of Byzantine Palestine. Here I am confining myself to a discussion of some problems concerning Transjordan and Lower Egypt as far as represented on the mosaic map, and to an explanation of my approximations and solutions. A general summary and introduction, especially about Transjordan, will be useful.

What can be seen on the Madaba Mosaic map east of the river Jordan, east of the Dead Sea, and in the *Wādī'l-ʿArabā*? Unfortunately, the mosaic is fragmentarily preserved. Some clear representations, however, can be recognized (from north to south) Beyond the river Jordan we see the lower part of *Nahr az-Zarqā* running into the Jordan. Near the badly preserved lion chasing a gazelle there are remnants of two cities surrounded with palm trees: the left one is ancient *Bethnambris* (modern *Tall Nimrīn* in the *Wādī Šuʿēb*), the right one is ancient *Livias* or *Iulias* (modern *Tall Ikta-*

*nū* and *Tall ar-Rāma*). South of *Livias* the *Wādī Zarqā Māʿīn* is running into the Dead Sea, and still in the mountain-region we see the hot springs of *Baaras*, to be restored [θ EPMA B] ἈΠΟΥ (i.e. *Ham-mām az-Zarqā Māʿīn*). Between the *Wādī Zarqā Māʿīn* and the *Wādī'l-Mūğib* there is a very interesting representation of the hot springs called *Kallirrhōē* (modern ʿAyn *Zāra*), where Herod the Great spent his last days, according to Flavius Josephus.<sup>4</sup> Between *Wādī'l-Mūğib* and *Wādī'l-Ḥasā* we note from east to west: 1. [Χαρ]αχμωβα (*al-Karak*); 2. Βητομαρσεα η κ(αι) Μαιουμας, Αἰα, and Θαραις, all of them to be discussed later on; 3. the ancient names of the Dead Sea: "Salt, also Pitch Lake, also the Dead Sea". In this area the highland east of the Dead Sea is given geographically in a quite exact manner, forming three levels of dislocation towards the sea-shore. South of river [Z]APEΔ *Wādī'l-Ḥasā*) we find: 1. Τὸ τοῦ αἰγίου Λ[ωτ] "the sanctuary of Saint Lot", and 2. Βαλακ γ ἢ κ(αι) Σ[ηγωρ ἢ νῦν] Ζοορα "Balak, also Segor, now Zoora", known from the story in Gen. 19 — both of them situated in the *Gōr aš-Šāfi*. At this point the *Wādī'l-ʿArabā* is beginning, the desert of which is represented in yellowish cubes and explained by the inscription EPHMI[A] "desert". General informations about Lower Egypt will follow.

## Betomarsea, Aia, and Tharais

Underneath the symbol of

<sup>1</sup> Cf. P. Palmer and H. Guthe, *Die Mosaikkarte von Madaba*, I. *Tafeln*, Leipzig, 1906; M. Avi-Yonah, *The Madaba Mosaic Map*, Jerusalem, 1954.

<sup>2</sup> Cf. H. Donner and H. Cüppers, *Die Restauration und Konservierung der Mosaikkarte von Madaba*, Vorbericht, *ZDPV*, 83 (1967) p. 1-33, pl. 1-12.

<sup>3</sup> H. Donner and H. Cüppers, *Die Mosaikkarte von Madaba*, Teil I: *Tafelband*, Weisbaden, 1977; quoted as Donner-Cüppers.

<sup>4</sup> Cf. H. Donner, *Kallirrhōē, das Sanatorium Herodes' des Großen*, *ZDPV*, 79 (1963) p. 59-89; H. Schult, *Zwei Häfen aus römischer Zeit am Toten Meer, ruğm el-bahr und el-beled (ez-zāra)*, *ZDPV*, 82 (1966) p. 139-162.



[Χαρ]αχμωβα (*al-Karak*) there is a building pretty much similar to the sanctuary of Saint Elisha near Jericho, with a central dome flanked by two side vaults, cylindrical in shape.<sup>5</sup> It seems to be surrounded with plants and waters, perhaps indicating the exceptional luxuriance of vegetation in a spot blessed with plenty of water. The inscription runs as follows Βητομαρσεα ἢ κ(αὶ) Μαιουμας “Betomarsea, also Maiumas”. The meaning is clear. Betomarsea is the Greek transcription of Hebrew *bēt-marzēʿh*, in Aramaic *bēt-marzēʿhā* “the house of a cultic congregation called *marzēʿh*”, in Jer. 16:5 rendered θῖασοῦς by the Septuagint.<sup>6</sup> Maiumas was a popular licentious feast with water festivals and symposia, widespread in the ancient Near East and mentioned in Ugaritic, Phoenician, Palmyrenian, Nabatean and Hebrew texts.<sup>7</sup> Its golden age was in the first half of the first millennium A.D. In our inscription it is combined with Betomarsea: one pagan abomination is explained by another one!

For what reason, however, is this combination represented on the Madaba map? Scholars were never at a loss for an answer. They called attention to Num. 25:1-5: The Israelites sinned with Midianite women at Beth-Baal-Peor, and this fact was identified by Rabbinic sources with *marzēʿh*;<sup>8</sup> therefore, the mosaic artist represented it on his map. But this solution seems unlikely. Beth-Baal-Peor was situated north of mount Nebo in the *Wādī ʿAyūn Mūsā*,<sup>9</sup> cp. Eusebius, *Onomasticon* 48; 3-5 and 168: 25-27. Maybe the exact knowledge of the site was lost in the sixth century, but the mosaic artist ought to have

known from the Bible and from Eusebius that it had been near Mount Nebo and not in the vicinity of *al-Karak*. M. Avi-Yonah<sup>10</sup> took for granted that the mosaicist rejected this location, being influenced by a mid-rashic tradition according to which the tents of the Ammonites and Moabites, in which Israel sinned, stretched for three parasangs from Beth-jeshimoth to *Tūr Talgā*, i.e. perhaps *Ġabal Umm at-Talāġa* near *al-Karak*. This suggestion is as unconvincing as R.T. O’Callaghan’s idea:<sup>11</sup> the artist could have located the shameful Beth-Baal-Peor as far as possible from his home town Madaba. Others considered, because of the faint similarity of the names, the village *Mazraʿ* or *Hirbat al-Bulēde* or even *Bāb ed-Drāʿ* (A. Musil<sup>12</sup> and F.-M. Abel<sup>13</sup>): places which are situated below the last dislocation level of the mountain-chain east of the Dead Sea, being too far from *al-Karak*.

The artist’s localizations are correct and trustworthy in general, especially as he had no lack of space. Let us take him at his word and search for Betomarsea in the area where he put it: north-west of *al-Karak*, not too far from the city. We should insist on the following principle of interpretation: the localizations on the mosaic map are to be taken as correct unless there are strong reasons not to do so. In our case there are no reasons against it. The peculiarity of the symbol representing a building on a ground rich in water and vegetation gives every reason to believe that the artist meant a distinct building at a distinct spot: the house of a *marzēʿh*-congregation, still existing in the sixth century near *al-Karak*, a curiosity in the

<sup>5</sup> Donner - Cüppers, pl. 17.53.54.56.104.105.

<sup>6</sup> For discussion cf. O. Eißfeldt, *Kleine Schriften* 4 (1968) p. 285-296; 5 (1973) p. 118-142; P.D. Miller, *AnOr*, 48 (1971) p. 37-49; M. Dahood, *idem.*, p. 51-54; M. Heltzer, *IEJ*, 12 (1972) p. 255; W. V. Soden, *ZA*, 62 (1972) p. 281s.; A. F. Rainey, *IOS*, 3 (1973) p. 61; T. L. Fenton, *UF*, 9 (1977) p. 71-75; M. Dietrich-O. Loretz, *UF*, 10 (1978) p. 421s.

<sup>7</sup> Cf. K. Preisendanz, *Maiumas*, *RE*, XIV, 1 (1928) p. 610-612.

<sup>8</sup> First proposed by A. Büchler, *Une localité énigmatique mentionnée sur la mosaïque de Madaba*, *Revue des Études Juives*, 42 (1901) p. 125-128. For the Rabbinic sources cf., e.g., *Midrash Sifre*

*R.* § 131; *Targum Pseudo-Jonathan to Num. 25: 2 a.o.*

<sup>9</sup> Cf. O. Henke, *Zur Lage von Beth Peor*, *ZDPV*, 75 (1959) p. 155-163.

<sup>10</sup> *Loc. cit.*, p. 41.

<sup>11</sup> R. T. O’Callaghan, *Madaba (Carte de)*, *Dictionnaire de la Bible*, (ed. L. Pirot et A. Robert), Suppl. V, fasc. 26 (1953) p. 677.

<sup>12</sup> A. Musil, *Moab. Vorbericht über eine ausführliche Karte und topographische Beschreibung des alten Moab*, *Anzeiger der Kaiserl. Akademie der Wissenschaften Wien*, 1903, p. 181.

<sup>13</sup> F.-M. Abel, *Géographie de la Palestine II*, 1938, 1967,<sup>2</sup> p. 284.

Christian Byzantine empire, perhaps the late successor of a Nabatean *marzḥā*-congregation. The conditions for the localization of Betomarsea according to the mosaic map are as follows: 1. Betomarsea was situated west or north-west of *al-Karak*; 2. one must not go beyond a line on which Aia and Tharais are located, i.e. not beyond *Ḥirbat ʿAy* and *al-ʿIrāq*; 3. One has to pay attention to road communication with *al-Karak*; 4. Springs or at least one remarkable spring are to be presumed.

The region northwest of *al-Karak* is characterized by the *wādīʿl-Karak*, also called *Sēl al-Karak*, connecting the city with the peninsula *al-Lisān*. The region is rich in water. Its topographical description could be better; the maps are incomplete and differ in details.<sup>14</sup> I am indebted to Mr. Mahmūd Ahmad aṣ-Ṣōb for useful information. He was an inhabitant of *al-Karak* in the sixties who lived with part of his family in the *Wādīʿl-Karak* and was well acquainted with the region. As far as I can see, primarily two spots come into question for the localization of Betomarsea:

1. *ʿAyn Zāra*, two road kilometres north-west of *al-Karak*, one of the main springs for the water supply of the city, situated in a very nice green headwater with many trees and bushes.
2. *Mūmyā*, about eight road kilometres north-west of *al-Karak*, near a village called *Baddān* which the maps wrongly localise on the left side of the *Wādī*, but it is situated on the right side. My informant insisted on the name *Mūmyā* for the spot on the left side; this name is not mentioned in the maps. It is an area with five springs near a *Ḥirba*. The historical identity of the names *Mūmyā* and *Maiumas* cannot be excluded, but it is not certain at all. Further investigations are necessary.

The localization of the villages Aia and Tharais<sup>15</sup> is difficult as well, because these villages are not mentioned in the Bible or in other literary sources. Accord-

ing to the mosaic map they are located west or south-west of *al-Karak*, apparently on the second level of the mountain-chain towards the Dead Sea, on the same line — so to speak — and not too far from each other. Seen from *al-Karak*, they seem to be the last villages on the slope. That is all we can say. The very best suggestions, based on the mosaic map and on the similarity of the names, are as follows: *Ḥirbat ʿAy* for Aia and *al-ʿIrāq* near *ʿAyn Tarʿīn* for Tharais, both proposed by A. Musil<sup>16</sup> and by Ch. Clermont-Ganneau.<sup>17</sup> We have to leave out of consideration older identifications, e.g. with *al-ʿAyna* or *Dāt Rās* on the northern bank of *Wādīʿl-Ḥasā*, because these places are much too far from *al-Karak*. *Hirbat ʿAy* and *al-ʿIraq*, however, are suitable locations on the following grounds: 1. they are situated south-west of *al-Karak*; 2. They are situated on the second level as described above, and 3. they are located near an old Roman road which connected *al-Karak* with the *Gōr an-Numēra* and the *Gōr aṣ-Ṣāfi*.

I visited *Hirbat ʿAy* and *al-ʿIrāq* in 1963. At *Ḥirbat ʿAy* on the eastern slope of *Wādīʿl-Fuḥēt* I found potsherds from Early Bronze, Middle Bronze, Iron II, Roman and Byzantine; there were no painted Mamlūk sherds, but some from the time after the Mamlūks. A road, not paved with asphalt, is going from *Ḥirbat ʿAy* to the northeast along *Wādī Kamannā* and *al-Ifranġ* to *al-Karak*. Its predecessor, bordered on both sides and with remains of road ballast, can be seen here and there. Beyond any doubt, this is the first part of the Roman road going from *al-Karak* by way of *Kaṭrabbā* down to the *Gōr an-Numēra* and *Gōr aṣ-Ṣāfi*. Impressive remains of this Roman road appear west of *Kaṭrabbā*.<sup>18</sup> At *al-ʿIrāq* on the northern slope of *Sēl Ġdēra* which runs into *Wādīʿl-ʿIrāq* I found some Roman and Byzantine potsherds, not far from *ʿAyn Tarʿīn*. Explorations are difficult there, because the

<sup>14</sup> Cf. 1:100 000 South Levant, N.H.36.F.6 Karak; 1:25 000 The Hashemite Kingdom of Jordan, sheet 210/065 Karak.

<sup>15</sup> Donner-Cüppers, Pl. 17, 18, 53, 55, 56, 57, 104, 105, 106, 107.

<sup>16</sup> See note 12.

<sup>17</sup> Ch. Clermont-Ganneau, La carte de la Palestine d'après la mosaïque de Madaba, *Recueil d'archéologie orientale*, 2 (1897/98) p. 169.

<sup>18</sup> Cf. N. Glueck, AASOR, XVIII-XIX (1939) p. 148, ill. 49.

modern village is situated on its own *tall*. About 150 m. southeast of the *tall* there is a *ḥirba* with some ruined houses and walls, called *al-balad al-qadīm*, with Arab potsherds from the times after the Mamlūks. I was told that the last inhabitant of *al-balad al-qadīm* left his house about fifty years ago. Obviously, the settlement was located in Roman and Byzantine times at the spot of modern *al-ʿIrāq* near *ʿAyn Tarʿīn*. After the Mamlūks the inhabitants partly emigrated from there to *al-balad al-qadīm*, and about fifty years ago they returned to the *tall* of *al-ʿIrāq*.

To summarize: the identifications of *Aia-Ḥirbat ʿAy* and *Tharais-al-ʿIrāq* are based on the following grounds: 1. the situation of both villages southwest of *al-Karak*; 2. the names *Ḥirbat ʿAy* and *ʿAyn Tarʿīn* near *al-ʿIrāq*; 3. the relative location of both villages to each other; 4. the pottery; 5. the situation at or near the Roman road to the Dead Sea. I think these identifications are correct.

#### Petra on the Mosaic Map of Madaba?

At the edge of the preserved part of the mosaic, south of river [Z]APEΔ (*Wādī'l-Ḥasā*), one can see two and a half black letters which are not represented on the plates of Palmer and Guthe and in the reprint of these plates by Avi-Yonah. They appeared during the restoration work in 1965.<sup>19</sup> We read ME, the third letter could be A, Λ, or Δ. Undoubtedly, these letters are the traces of a longer inscription, but of an inscription of which kind? A place name or the last line of an inscription not belonging to a town or a village? Is it a biblical reminiscence or a profane representation? Was there a symbol for a locality of the usual type with walls, towers and roofs, and if there was such a symbol, was it represented above the inscription or right of it or below? Does the inscription refer to the land of Edom or to the gulf of *ʿAqabā* or even to the peninsula of Sinai? We don't know. The fact that only two and

a half letters are preserved doesn't make the attempts for completion totally hopeless. I am reminded of another case on the same mosaic map: two and a half letters at the edge of the mosaic underneath the city of Neapolis could indeed be restored to an inscription of forty-one letters, namely the legend of "Dothaim where Joseph found his brothers pasturing".<sup>20</sup> Is there any chance to get an inscription merely based on the letters MEA, MEΛ or MEΔ

It seems to be impossible, especially if we have to suppose a profane representation or an inscription like *Aia* and *Tharais* being not far from our traces; for the number of literary references about the land east and southeast of the Dead Sea is small. The chances, however, increase if the inscription referred to is from the Bible. In this case we can trace back to the main sources from which the mosaic artist borrowed his information: the Greek Bible (Septuagint) and the "Onomasticon of Biblical Place Names" written by the bishop Eusebius of Caesarea and translated into Latin by St. Jerome. We have to take into consideration: either the remnant letters belong to an inscription which described one of the events mentioned in the Bible or to a place name or to the name of a region known from the Bible. In order to illustrate what I mean, I will call attention to three biblical reminiscences on the southern or south-eastern part of the mosaic map. They are of that kind which could be expected here:

1. Ραφιδιμ ἔνθα ἐπελθόντι τῷ Αμαληκ ὁ Ἰσραηλ ἐπολέμησεν "Raphidim where Israel fought against the coming Amalek";<sup>21</sup> cf. Ex. 17: 8-16.
2. Ἐρήμος Σιν ὅπου κατεπέμφθη τὸ μάννα κ(α ι) ἡ ὄρτυγομήτρα "The wilderness of Sin where the manna and the quails were sent down";<sup>22</sup> cf. Ex. 16: 1-36 and Num. 11: 4-34.
3. Ἐρῆμ[ος ἔνθα/ὄπου] τοὺς Ἰσραηλιτᾶς ΕΩΩ(?)ΙΝ (= ἔσωσεν?) ο Χάλκουσ ὄφισ "The wilderness where the serpent of brass

<sup>19</sup> Donner-Cüppers, pl. 53, 58, 107.

<sup>20</sup> H. Donner, *ZDPV*, 83 (1967) p. 25-27.

<sup>21</sup> Donner-Cüppers, Pl. 39, 81, 126.

<sup>22</sup> Donner-Cüppers, pl. 41.81.82.126.

saved the Israelites”;<sup>23</sup> cf. Num. 21: 4-9.

The sequence of these biblical events marks the horizon of the Old Testament narratives, to which an allusion could be expected here. The chronological and geographical dead-line, so to speak, is given in Num. 21: 12: because in this text the arrival of the Israelites at river Zared (= *Wādī'l-Ḥasā*) is reported. Therefore, three traditions come into question: 1. the stay of the Israelites at Kadesh Barnea, the death of Miryam, and the water brought forth by Moses out of the rock (Num. 20: 1-13; mentioned by Eusebius, *Onom.* 112: 8-12); 2. how Edom refused passage to Israel (Num. 20: 14-21; not mentioned by Eusebius); 3. how Aaron died on mount Hor (Num. 20: 22-29; mentioned three times by Eusebius, *Onom.* 46, 14-16/126, 19s./176,7s.). Only the items no. 2 and 3 are on the short list, because item no. 1 — Kadesh Barnea — is located much more to the south. But we need not care about this matter, for there is no account in the Septuagint and no item in Eusebius' *Onomasticon* concerning those events, the remnant letters MEΑ, MEΛ or MEΔ could really fit in.

After having tried to find out the supposed inscription in this way, but without any success, we may examine all the items in the Greek Bible and in Eusebius' *Onomasticon* referring to places, towns and villages in the land of Edom, in the southern desert regions and in Moab as well, the latter because topographical mistakes on the mosaic map cannot be excluded. All research, however, doesn't give any result, as far as I can see.

Should not we regard it as hopeless? Or should we say: nothing ventured, nothing gained? Let us step back and look at the mosaic map on the whole and state a simple question: A traveller, a modern tourist for instance, is going from north to south on the east bank of Jordan and east of the Dead Sea, passing *Wādī'l-Mūḡib* and *Wādī'l-Ḥasā*, to what place does he

want to go? He wants to go to Petra, of course. Did travellers in the sixth century A.D. as well? In all probability, they did not. The Christian pilgrims, for example, did not go to Petra, as far as we know.<sup>24</sup> The splendour of Petra had been diminished, its political rank was lost, it had become a provincial town. But it was still situated near the famous ancient royal road, the *via Traiana* from Bostra to Aila; it was the residence of a Christian archbishop, and it is still mentioned in Byzantine literature after the decline of its political power: seventeen times in Eusebius' *Onomasticon*, in the *Descriptio Orbis Romani* by Georgius Cyprius,<sup>25</sup> on the *Tabulae Peutingerianae*<sup>26</sup> and elsewhere. Should not it have been represented on the mosaic map of Madaba as well?

The items on the subject from Eusebius' *Onomasticon* are as follows:

1. 142,7-8: Πέτρα. πόλις ἐν γῆ Ἐδὼμ τῆς Ἀραβίας, ἣτις ἐπεκλήθη Ἰεχθοήλ, ἡ καὶ Ῥεκεμ παρὰ Ἀσσυριοὺς ὀνομάζεται. “Petra, a city in the land of Edom, province of Arabia, which was called Joktheel, which is also named Rekem by the Syrians.”

2. 144, 7-9: Ῥεκεμ, αὕτη ἐστὶν Πέτρα πόλις τῆς Ἀραβίας ἧς ἐβασίλευσε Ῥοκόμ, ὃν ἀνεῖλον οἱ υἱοὶ Ἰσραήλ. Λέγεται δὲ αὐτὸς βασιλεὺς Μαδιάμ “Rekem, that is Petra, a city of the province of Arabia, which was ruled by Rokom whom defeated the Israelites. The king himself is also called Madiam.”

The place name *Ἰεχθοήλ* is mentioned in II Kings 14: 7: “He (king Amaziah of Judah) slew Edom in the Valley of Salt, ten thousands, and took Seia by war, and called the name of it Joktheel, unto this day.” Eusebius explains this text on *Onom.* 110: 22: Ἰεχθοήλ. Πέτρα ἐν βασιλείαισιν “Joktheel, (that is) Petra in the Books of Kings.” He adds in *Onom.* 72: 28-29, misinterpreting the “Valley of Salt” (in Hebrew *gē hammelah* as if it be a place name: Γημελά. χώρα Ἐδὼμ. Ἄ δὲ καὶ

<sup>23</sup> Donner-Cüppers, pl. 39, 41, 81, 82, 126.

<sup>24</sup> H. Donner, *Pilgerfahrt ins Heilige Land, Die ältesten Berichte christlicher Palästinapilger (4.-7. Jahrhundert)*, Stuttgart, 1979.

<sup>25</sup> 1044: Πετραὶ μητροπολις; ed. h. Gelzer (1890) p. 53.

<sup>26</sup> K. Miller, *Die Peutingersche Tafel*, reprint, 1962, 9, 5.

Σύμμαχος φάραγγα αλών “Gemela, land of Edom, but according to Aquila and to Symmachus valley of salt.” Γημελά or, in the Septuagint, Γαιμελε is a mere transcription of Hebrew *gē hammelaḥ* which is treated as a place name, although it is no place name, but the name of a valley.

From all these items we are able to combine or to reconstruct the texts of two inscriptions, both referring to Petra:

- 1.(1)[ΠΙΕΤΡΑΕΝΓΗΕΔΩΜ  
 (2) ΤΗCΑΡΑΒΙΑCΗΚ,ΙΕΧΘΟ  
 (3) ΗΛΗΚ,ΡΕΚΕΜΕΝΘΑΕΠΙΑ  
 (4) ΤΑΞΕΝΜΕCΙΑCΤΟΝΕΔΩΜΕΝΤΗ]  
 (5) ΜΕΛ[A]

(1) Petra in the land of Edom, (2) province of Arabia, also Jokthe- (3) el, also Rekem, where slew (4) Amaziah Edom in Ge(5)mela.

- 2.(1) ΡΕΚΕΜΗΚ,ΙΕΧΘΟΗΛ  
 (2) ΗΝΥΝΠΙΕΤΡΑΕΝΘΑ  
 (3) ΕΠΙΤΑΞΕΝΑΜΑCΙ  
 (4) ΑCΤΟΝΕΔΩΜΕΝΤΗ  
 (5) ΜΕΛ[A]

(1) Rekem, also Joktheel, (2) now Petra, where (3) slew Amaziah (4) Edom in Ge(5)mela.

Of course, the exact wording cannot be reconstructed; other slightly varying approaches remain possible. Someone will perhaps prefer other forms of some Greek words: *Ιεκθοηλ* instead of *Ιεχθοηλ*, *Αμασις* instead of *Αμεσσιας*, *Γαιμελε* instead of *Γημελα*. As far as the phraseology is concerned, the reconstruction should be as close as possible to similar inscriptions on the mosaic map of Madaba. Indeed, the mosaic artist preferred an arrangement of longer inscriptions in four or five lines. There are lots of examples for division of words, for short lines at the end and for abbreviations κ(αί)

If Petra was represented on the mosaic map of Madaba, its inscription approximately looked like one of the two suggested reconstructions. But was it represented on the map? I don't know. If anyone has other and better explanations for the two and a half letters ΜΕΛ, ΜΕΛ or ΜΕΔ, he is kindly requested to let me know.

### The Representation of Lower Egypt<sup>27</sup>

Considering the Delta of the Nile we have to make a primary observation: the representation of Lower Egypt totally differs from the other sections of the mosaic map — a matter which scholars usually have not paid attention to.<sup>28</sup> A clear description of the differences is the first step to a pertinent interpretation of this neglected part of the mosaic.

1. The mosaic map on the whole is an illustration of God's salvation history according to the Holy Bible, Old and New Testament. The representation of the Nile Delta, however, does not fit into this principle. It can be recognized by the *desiderata*, i.e. by the lack of important biblical themes which are to be expected on the map. The story of Joseph (Gen. 37: 39-50), e.g., is missing: that story according to which Joseph settled his father's family in the land of Goshen in the eastern part of the Delta, the modern *Wādī at-Ṭumēlāt*. Nothing is reported of Israel's stay in Egypt (Ex. 1-12), of their building the store cities of Pithom and Raamses (Ex. 1:11), of the Exodus from Egypt (Ex. 13-15). The figure of Moses is totally absent, and the crossing of the sea of reeds is not mentioned — the latter, probably, because Byzantine tradition localized this event at the northern point of the gulf of Suez.<sup>29</sup> Furthermore, we find no trace of

<sup>27</sup> Cf. H. Donner, *Das Nildelta auf der Mosaikkarte von Madaba*, *Fontes atque Pontes, Ägypten und Altes Testament*, 5 (1983) p. 75-89.

<sup>28</sup> Except A. Schulten, *Die Mosaikkarte von Madaba und ihr Verhältnis zu den ältesten Karten und Beschreibungen des hl. Landes*, *Abhandlungen d. Königl. Gesellschaft d. Wissenschaften*, Göttingen, phil. hist. Kl. IV, 2 (1900) p. 30-33, 103, 115-121; A. Jacoby, *Das Geographische Mosaik von Madaba*, *Die älteste Karte des hl. Landes*, ein

*Beitrag zu ihrer Erklärung*, *Studien über christliche Denkmäler*, 3 (1905) p. 35-43; R.T. O'Callaghan, *loc. cit.* (note 11), p. 696-702.

<sup>29</sup> Cf. the pilgrim's report of the nun Etheria or Egeria (around 400 A.D.), chapter 7: translated into German and explained by H. Donner, *Pilgerfahrt* (note 24), p. 95-99; from the century of the Madaba map: the report of an anonymous pilgrim from Piacenza (around 570), chapter 41 (H. Donner, *loc. cit.*, p. 304-306.

the Prophet Jeremiah's stay in Egypt (Jer. 42-44) nor of the escape of the Holy Family to Egypt (Mat. 2) which is said to have reached Heliopolis or even Memphis.<sup>30</sup> Inscriptions in the style of the mosaic map referring to these biblical themes can easily be invented, e.g.

α) Τάνις, ἔκ ταύτης ἦν ὁ ἅγιος Μωϋσῆς (οἱ ὅθεν ἦν ὁ ἅγιος Μωϋσῆς οἱ ἐνθα/ὄπου ἐτέχθη ὁ ἅγιος Μωϋσῆς "Tanis, whence came Saint Moses (or: where Saint Moses was born);<sup>31</sup>

β) Γεσέμ. (χώρα τῆς Αἰγύπτου) ἐν ἣ κατώκησεν Ἰακώβ ἅμα τοῖς υἱοῖς αὐτοῦ "Goshen (land of Egypt), where Jacob dwelt together with his sons".<sup>32</sup> Such proposals and other ones eliminate the problem for the mosaicist. The question arises: why didn't he do his duty?

2. The main literary source of the mosaic map is Eusebius' Onomasticon of Biblical Place Names. But the mosaicist who used the Onomasticon exhaustively for the Palestinian sections of his map, did not use it for Lower Egypt. Eusebius mentions 10 or 11 items in the Delta of the Nile, the mosaicist 14, but only two of them can be found here and there — namely Sais and Tanis. The same is true with regard to other suggested sources the mosaicist took as a basis: the books of Flavius Josephus, the Bible commentaries of Origenes and St. Jerome, the so-called Διαμερισμὸς τῆς γῆς ("the distribution of the earth"),<sup>33</sup> a.o. We get the following impression: the mosaicist used a small library of important ancient books, but when he began to prepare the mosaic of Lower Egypt, he closed the door of this library and did not use it anymore. Why did he do so, and which sources did he really use for the Delta of the Nile?

3. The mosaic map of Madaba is the most exact example of cartography before

the beginning of modern cartography in the nineteenth century. Naturally, there are some more or less important geographical and topographical mistakes, but they cannot diminish the value and exactness of the map. In the relatively small section of the Nile Delta, however, the accumulation of mistakes and inaccuracies is striking. The sites of both cities Xoïs and Sais have changed: Xoïs was situated near modern *Sahā*, about twenty-four kilometres southeast of *Tall Fara'ūn* (or *Fara'īn*), i.e., east of the Sebennitic arm;<sup>34</sup> and Sais was located near *Kafr az-Zayāt* north of *Ṣā al-Ḥagar* at the arm of Rosette, i.e., west of the Sebennitic arm.<sup>35</sup> Consequently, the Saitic arm is misrepresented on the Madaba map: it did not branch off to the right, i.e., to the east, but to the left, i.e. to the west, seen from the Sebennitic arm. The village HNIKIOY (ἠ Νικίον) is unlocalized; it must have been situated east of the Canopic arm in the Prosopitic district.<sup>36</sup> On the map it is represented too far to the east. The position of Pelusium (*Tall al-Faramā*) was mainly on the east side of the Pelusiac arm;<sup>37</sup> on the Madaba map we find it on the west side. Finally, the Nile Delta is drawn in a false geographical relation to Palestine. The coastline of the Mediterranean Sea really turns west south of Gaza, but on the Madaba map it turns east.<sup>38</sup> This is the same incorrectness as on the so-called map of St. Jerome, a twelfth century copy of a Roman world map originating from the seventh or eighth century. The reason is quite clear. If the mosaic artist would have represented the coast-line correctly, he would have had to abandon the rectangular size of his map: the coast-line going from top to bottom, and the Nile with its arms coming from the right side — totally impossible on a church floor. Moreover, a conflict would have been produced between real geography

<sup>30</sup> H. Donner, *Pilgerfahrt*, p. 309, note 205.

<sup>31</sup> According to Etheria 9,5: H. Donner, *Pilgerfahrt*, p. 102, note 80.

<sup>32</sup> According to Eusebius, *Onom.* 62: 10-11.

<sup>33</sup> Cf. A. Jacoby, *loc. cit.* (note 28), p. 34.

<sup>34</sup> W. Helck, *RE* II, 9 (1967) p. 2152-2155.

<sup>35</sup> H. Kees, *RE* II, 1 (1920) p. 1758-1759.

<sup>36</sup> Perhaps identical with *Ibšadī*, about 8 km. west of

*Sersena*=*Arsinoë/Cleopatris*, or *Kōm Rāzin*, about 9 km. south-west of *Menūf*. see H. Kees, *RE*, XVII, 1 (1936) p. 342-344. The basic note can be found in Ptolemaios, *Geogr.* IV, 5 (§ 49 Nobbe): ἀπ' ανατολῶν πρὸς τῷ Μεγάλῳ Ποταμῷ Προσωπίτης, νόμος, καὶ μητροπολις Νικίου.

<sup>37</sup> H. Kees, *RE*, XIX, 1 (1937) 407-415.

<sup>38</sup> Donner-Cüppers, pl. 38, 84, 122, 124.



and religious geography.<sup>39</sup> For in the ancient Christian tradition the Nile was one of the rivers of Paradise, and the Paradise was situated in the east, according to Gen. 2: therefore the Nile had to run from the east to the west without any regard to the geographical facts, even though people may have known the geographical truth.<sup>40</sup> But the other mistakes cannot be explained in this way. The question arises: did the mosaicist ever see Lower Egypt? And once more: which sources did he use?

As far as the representation of the arms of the Nile is concerned, the second question can easily be answered: it is based on the oldest description of the Delta we know, namely Herodotus, Hist. II, 17:3-6. The text runs as follows: "The Nile intersects Egypt in two, from the cataracts unto its mouth. Until the present city of Kerkasoros it is running as one Nile; after this city it is split into three arms. And the arm going to the east is called the Pelusiac arm (Πηλούσιον στόμα); the other one is going to the west and is called the Canopic arm (Κανωβικὸν στόμα). The arm going straight ahead, however, runs as follows: coming from above (ἀνωθεν φερόμενος) it reaches the top of the Delta; from this point it intersects the Delta, flows into the Sea and keeps a quantity of water which is neither insignificant nor unknown. It is named the Sebennitic arm (Σεβεννυτικὸν στόμα). There are still two other arms, branching off from the Sebennitic arm and running into the Sea: their names are Saitic (Σαῖτικόν) and Mendesic (Μενδήσιον). The Βολβιτικὸν στόμα and the Βουκολικόν are no real arms, but artificial canals."

The representation on the mosaic map corresponds exactly with this description. There are three small differences only: 1. The name Bulbitic (Βουλβυτικόν) on the Madaba map instead of Βολβίτινον in

Herodotus' description is without parallel. Probably, it is nothing but an error, or the mosaicist used another text of Herodotus than we have.

2. The artist did not distinguish between the "canals" (ὄρυκτα) and the real arms, the reason of which is clear: he wanted to draw the arms in the Delta symmetrically. There was no need to differ from Herodotus. He only had to interpret him, because Herodotus does not describe how the arms are running.

3. The Mendesic arm, mentioned by Herodotus, seems to be absent. But it can easily be demonstrated that it originally was represented on the map. The inscription Σεβεννυ[τικὸν] is completely preserved until Y. Of the following letter T two white cubes are still existing, forming part of a horizontal line, the cross-beam of the T. If this cross-beam is lengthened to the left, trying to restore the whole letter T, it becomes clear that the inscription together with the Sebennitic arm slightly deviated to the right. On the other hand, however, the black left limitation-line is slightly moving to the left. From these observations we have to conclude: another arm of the Nile which is not preserved branched off from the Sebennitic arm to the east, i.e., Herodotus' Mendesic arm.

So far, things are clear. According to what principles, however, the mosaic artist chose the cities and villages to be represented in the Nile Delta? Neither according to biblical traditions nor to pilgrims' requirements. Or did he want to portray the Christian Lower Egypt in Byzantine times by giving the ecclesiastical centres and bishops' residences? If it be the case, one could compare the Madaba map with the lists of Byzantine bishoprics, the most important and most complete of which is the *Descriptio Orbis Romani*, written by Georgius Cyprius during the reign of the

<sup>39</sup> Fine examples of religious geography in the pilgrim's report of Etheria: H. Donner, *Pilgerfahrt*, p. 84 (Note 12), 87s, (note 23), 109 (note 97).

<sup>40</sup> Fl. Josephus, *Ant.* I, 1,3: "Finally, the Geon is

running through Egypt and is called 'streaming towards us from the east'; the Greeks call it Nile." Cf. Eusebius, *Onom.* 60, 3-4: Γαιῶν ὁ παρ' Αἰγυπτίους Νεῖλος, ἐκ Παραδείσου μὲν Προϊῶν, κυκλῶν δὲ "πάσας Ἀιθιοπίαν"

emperor Phokas (602-610)<sup>41</sup> The *Descriptio* mentions fifty metropolis cities, the Madaba map fourteen only. Moreover, five of these fourteen cities are not mentioned in the *Descriptio*, and on the other hand, significant bishops' sees are lacking on the Madaba map: e.g., Bubastis, Leontopolis, Naucratis, Taua, Cleopatris, Busiris a.o. In a word, this is certainly no representation of ecclesiastical Lower Egypt in the sixth century.

Consequently, there is no other possibility but to examine the relations of the represented cities to the road system in the Nile Delta. Briefly, there are three main roads, running approximately along the collateral lines of the triangle. We know these roads from the written itineraries, e.g., from the collection of *Itinerarium Antonini*,<sup>42</sup> and from the *Tabulae Peutingerianae*, a Roman road map originating from the third or fourth century and preserved in a medieval copy.<sup>43</sup> The first main road runs from Pelusium to Memphis, the second one from Alexandria to Memphis, the third one from Pelusium to Alexandria. Nobody will be surprised hearing that all cities and villages represented on the Madaba map were situated at one of these main roads, except Thennessos. Thennessos, known from Byzantine and early Arabic sources, was a commercial town and a seaport upon a small island within the lagoon region of *Birkat* or *Baḥr Manzāla*, nowadays *Tall* or *Kōm Tannis*. This town, of course, was connected with

the inland: there must have been roads, although we do not know them, probably to Heracleopolis parva, i.e. Sethroites, or to Tanis, or to both of them. The strange rhombus near Thennessos seems to be a hint of the lagoon region in the north-western part of the Delta.

To summarize: the mosaic artist used the classical description of the Delta, written by Herodotus, and a profane Roman-Byzantine itinerary, the latter not being identical with the *Itinerarium Antonini*, but similar to it. One cannot exclude that he also used a Roman-Byzantine road map. But it seems better to assume that he did not, for the inaccuracies in localizing the places and minor arms of the Nile are more intelligible provided that he did not make use of a map which could have corrected him. It was sufficient to know where the big cities of Pelusium, Alexandria and Memphis were situated; after that, he could complete the representation according to his itinerary.

Finally, the capacity of the mosaic artist is to be admired: using only a few and poor literary sources, and probably without having seen the land, he created the oldest map of Lower Egypt we know, a map which is more reliable than all its successors until the beginning of modern cartography.

Herbert Donner  
Kiel - Germany

<sup>41</sup> Ed. by H. Gelzer, Leipzig, 1890.

<sup>42</sup> Ed. by O. Cuntz, *Itineraria Romana*, I, 1929. For general information on the itineraria see W. Kubitschek, *RE*, XI, 2 (1916) p. 2308-2663.

<sup>43</sup> Ed. by K. Miller, *Die Peutingersche Tafel*, 1887/88, reprinted 1962. Cf. K. Miller, *Itineraria Romana*. Römische Reisewege an der Hand der *Tabula Peutingeriana* dargestellt, 1916, reprinted 1964.





# AN ETHNOGRAPHIC AND ARCHAEOLOGICAL STUDY OF CLAY OVENS IN JORDAN

by  
Alison McQuitty

## Introduction

Clay ovens are still in use and are one of the most common installations found on archaeological sites. The object of this research was and is to increase the amount of information that such ovens can provide to the archaeological record, particularly in terms of interpretation, and to contribute to the archive of customs and activities that are fast disappearing in contemporary Jordanian society.

Following Olivier Aurenche in his comprehensive study of contemporary and Neolithic building techniques in Syria, Iraq, the Iranian plateau and Anatolia, an oven is defined as "*une construction dans laquelle le combustible ne brûle pas à l'air libre, comme dans le foyer, mais dans un espace partiellement ou presque totalement clos, ou l'air ne pénètre que par un ou plusieurs orifices préalablement ménagés.*"<sup>1</sup>

## Methodology

Fieldwork was carried out in north-west Jordan during July and August 1983. A total of twenty-three contemporary ovens from the villages of Ashrafiah, Beit Ras, Hartha, Al Mughayir, Tabaqat Fahl and Taiybeh were examined in detail and these are being compared with twenty ovens from the archaeological sites of Deir 'Alla, Tell Irbid, Jerash and Pella although reference is being made to other sites in the Levant (fig. 1). Of the twenty-three contemporary ovens studied, seventeen belonged to the *tabun* type, one to the *tannur* type and five to the *wagdiah/arsah* type. Twelve of the archaeological ovens were *tawabeen*, four were of the *tannur* type and

four were of the *wagdiah* type. These ovens were drawn, photographed and plans of the spatial arrangement of the ovens and their environs were made. The comparison between the ethnographic and archaeological data is still underway and therefore any conclusions are tentative and open to revision.

## Typology

In forming a typology of contemporary and archaeological ovens, the main factors considered were form, fabric and context.

### Fabric

Clay ovens are now made of special fine mud, tempered by varying amounts of chaff, goat or sheep hair and small pebbles. The variation in quality of fabric does not appear constant in any one period but is constant from site to site, village to village. In present society this can be attributed to fact that only one or two women per village still know how to make the ovens. The ovens are built up in rough coils, smoothed on the interior, baked in the sun and fire-hardened by use.

### Form

The chief variable governing the form of ovens is the position of the fire and its method of control. Clay ovens are now used mainly for baking bread; but, before the advent of gas and paraffin stoves, they were used for all types of cookery. However, the following descriptions will largely refer to bread.

The *tabun* (fig. 2) is the type of oven most commonly used today in the villages of northern Jordan and is found with great

<sup>1</sup> Olivier Aurenche, *La Maison Orientale*, Paris, 1981; p. 248.

# NORTH-WEST JORDAN

a map showing the sites of ovens studied.

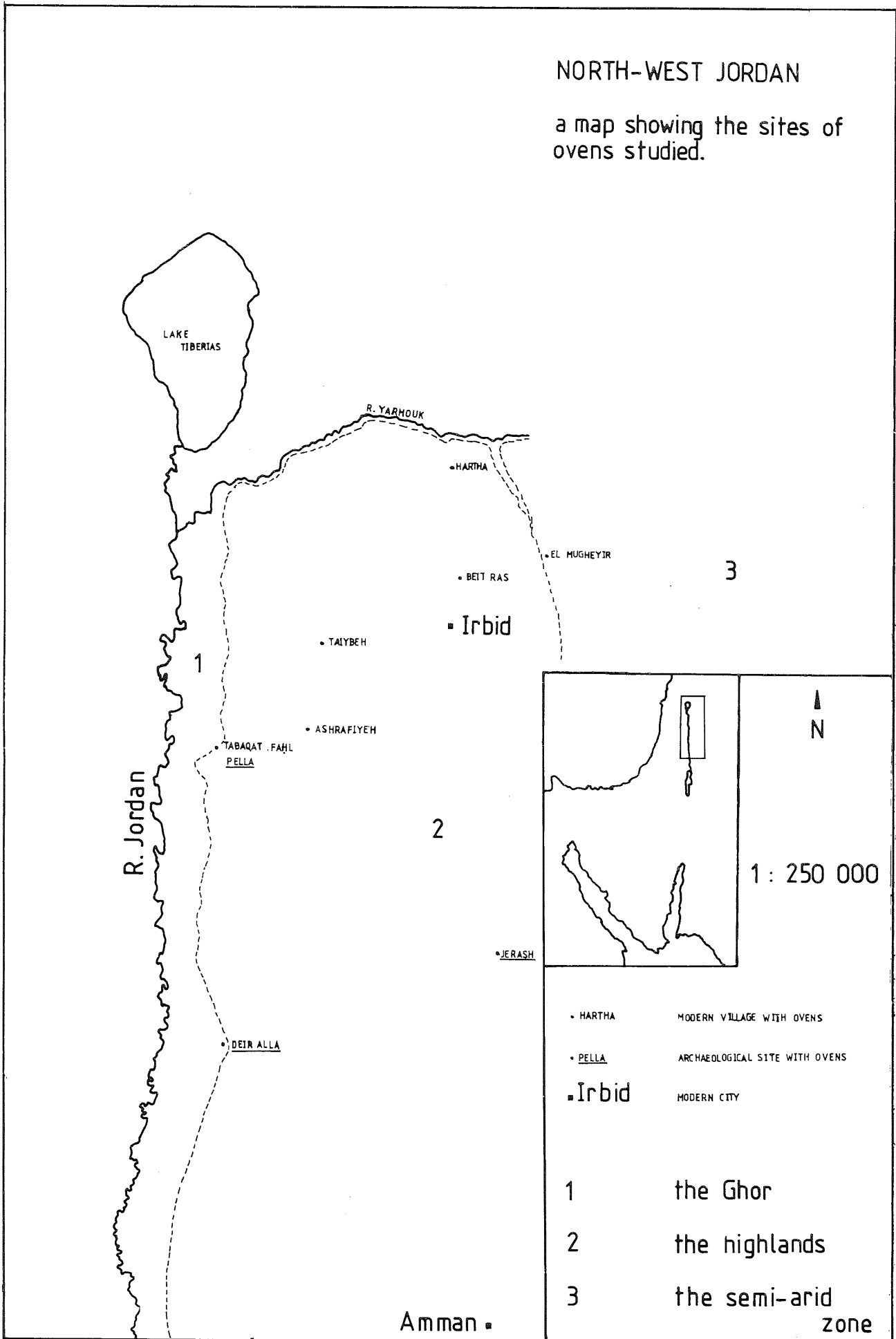


Fig. 1: A map of North-west Jordan showing the location of ovens studied.

regularity on archaeological sites. The earliest example in this area, northern Jordan, is an early Iron Age *tabun* from Pella.<sup>2</sup> They are dome-shaped, on average 0.80 m. in diameter and 0.30 m. high. The floor of the *tabun* is hard and varies in its composition; varying from those with a base of black wadi pebbles, or pot sherds to those with a smoothed clay base. The form and fabric of the archaeological *tawa-been* do not differ greatly from those found today and therefore it seems likely that the method of use was similar to that of today.

The method of use involves lighting a fast, wood fire in the *sanur* (fig. 2) prior to use and when an adequate temperature is reached, raking out the ashes and slapping the pancakes of bread onto the floor of the *tabun* (Pl. LIV: 3). After use, the *tabun* is covered with a heap of slow-burning, heat-retaining dung. Therefore, on an archaeological site it would be expected to find a large area of fine white dung ash around the *tabun* with a concentration of darker burning and charcoal by the *sanur*. Dung ash can be distinguished archaeologically as it contains fibres whereas wood ash is powdery with lumps of charcoal. In the 10th century B.C. levels at Pella, uncovered by the Australian team during their 1983-4 excavation season, such an arrangement of ash was found. The use of *tawa-been* in antiquity, therefore seems similar to that of today.

The *tannur* (figs. 3, 5) is not in use today in this area of Jordan although large examples can be seen in bakeries where they were in use twenty years ago. They are commonly found on archaeological sites, the earliest example from north-west Jordan being a late Bronze Age (1550 B.C.) *tannur* from Tell Irbid (Pl. LIII: 3)<sup>3</sup>. Comparative data suggests the following mode of use and manufacture. The oven was free-standing to a height of 1.00 m., in a mud superstructure, often packed with pottery and jar-like in form. The fire

appears to have been built at the base of the oven where there was a small opening to rake out the ashes. Often, the archaeological interpretation is that these ovens were dug down into the ground which would make ash clearing impossible, although there maybe two variants on this type. From the remains of these ovens it seems plausible that the jar-like interior was formed first and that subsequently the superstructure was built up around it, the resulting gap being packed with pot sherds and ash. The bread would have been baked by slapping the pancakes of dough onto the oven walls.

The *wagdiah/arsah* is a type of oven frequently found in present day villages, but not often recognized archaeologically (fig. 4). A complete example has however been retrieved from the Iron Age levels at Deir 'Alla (Pl. LIII: 1). The present day examples are about 0.80 m. high and domed. Halfway up this clay superstructure and bonded into the walls, is placed a disc-shaped metal sheet under which the fire is built and on which the bread is baked. Prior to the existence of sheet metal it is likely that some sort of clay plate was used as is now the case in Egypt.<sup>4</sup> This might also explain the "hot-plates" at Bab edh Dhara<sup>5</sup>, which are pottery discs, about 0.20 m. in diameter.<sup>5</sup> The advantages of the *wagdiah/arsah* given by the villagers and drawn from observation are: it is portable; the bread baked is larger since one "loaf" covers the whole disc rather than several smaller "loaves" baked on the floor or walls of an oven; less fuel is required for firing the oven since it is not banked overnight with dung.

### Context

Figure 6 shows a modern *tabun* house and its position within the courtyard. The stone dwelling house is forty years old and is of typical construction of this region and

<sup>2</sup> Sydney University Expedition to Pella, 1983/4 excavations.

<sup>3</sup> Northern Jordan Project, 1984 excavation at Tell Irbid.

<sup>4</sup> Fawzeyya & Kamel Rizqallah, *La Preparation du*

*pain dans un village du delta Egyptien*, Cairo, 1978; p. 8.

<sup>5</sup> ed. Walter E. Rast & R. Thomas Schaub, *The Southeastern Dead Sea Plain expedition: Interim Report of 1977 Expedition*, ASOR, 46; p. 19.

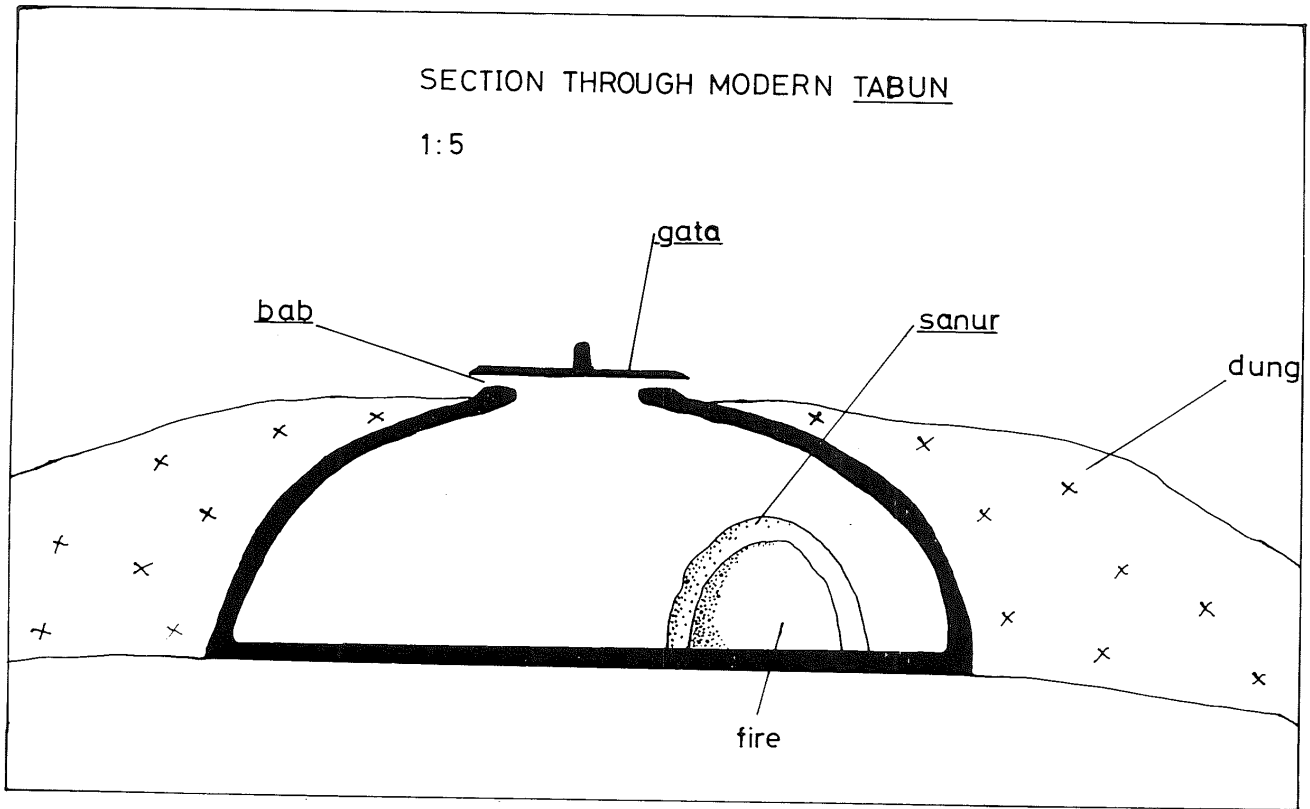


Fig. 2: A section through a modern *tabun*.

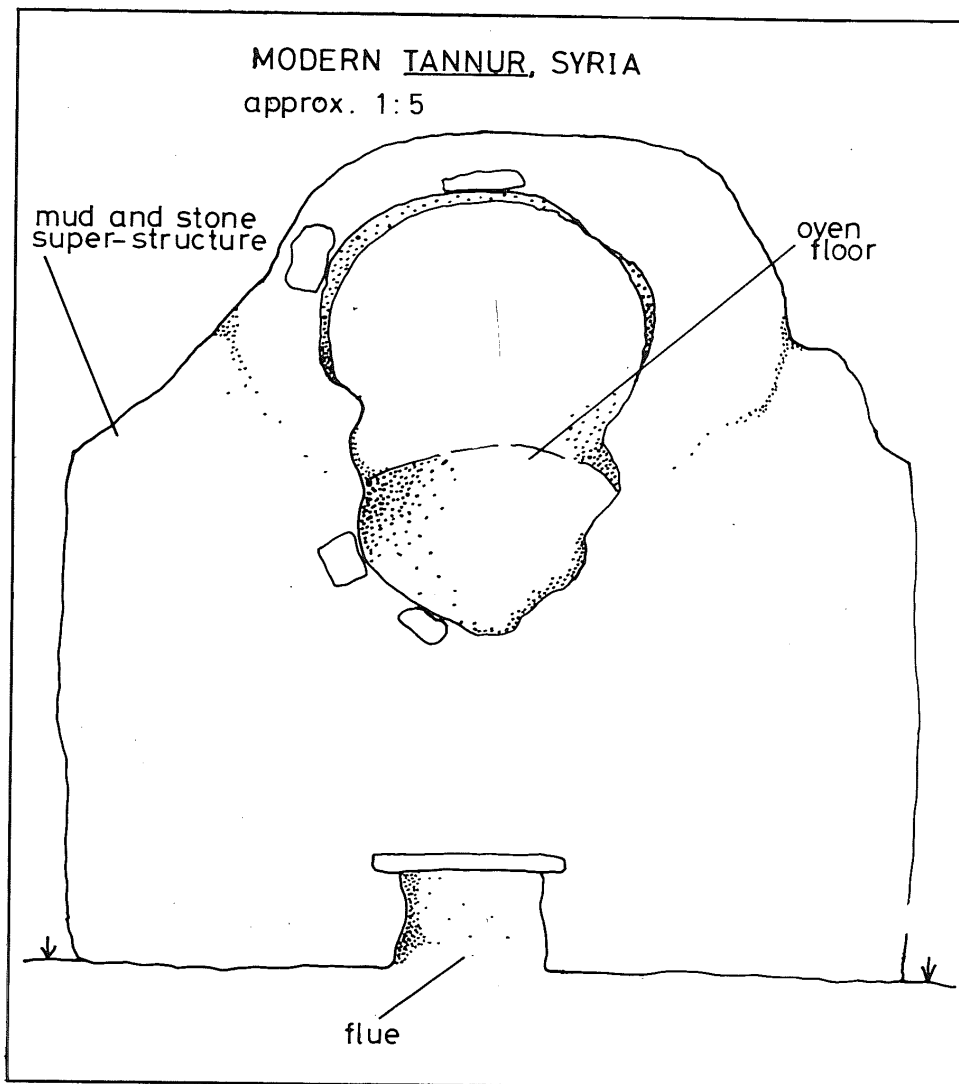


Fig. 3: A modern *tannur*, Syria.

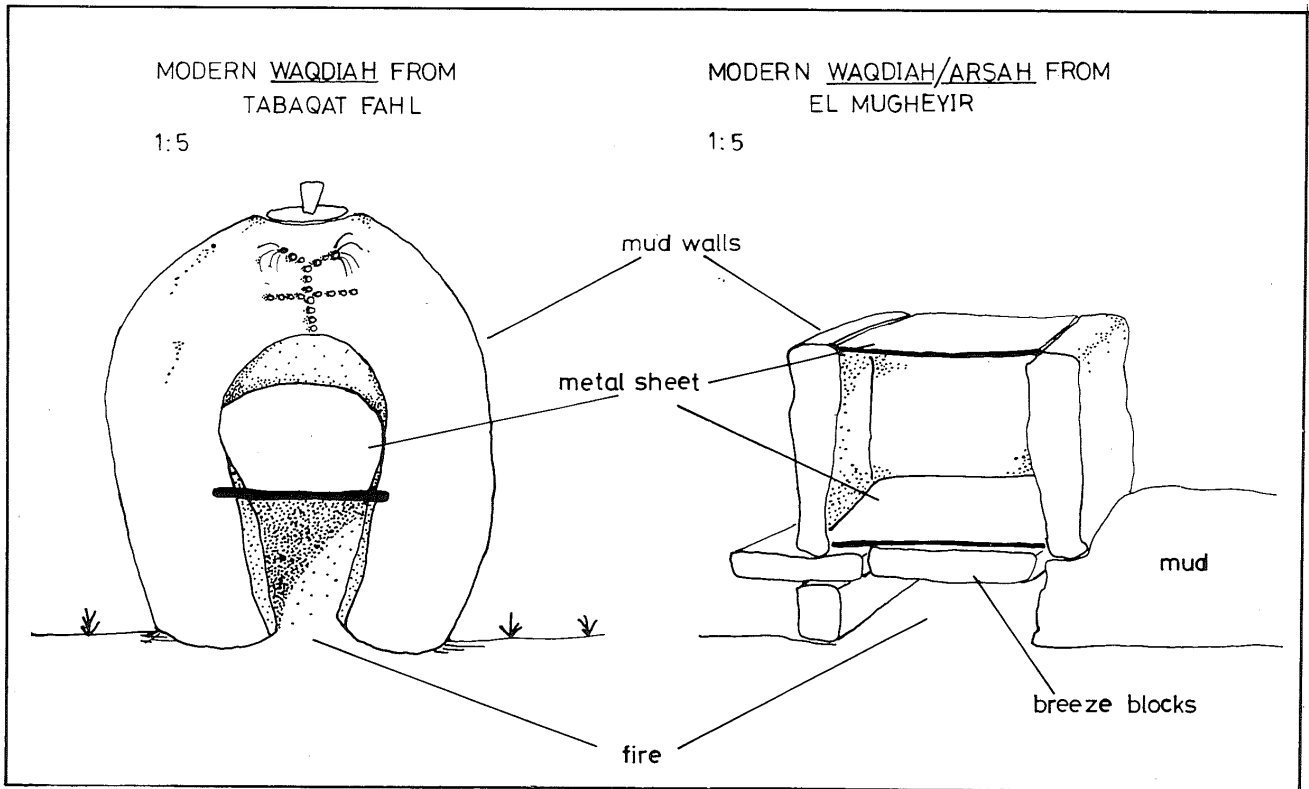


Fig. 4: A modern *wagdiah* and a modern *arsah*.

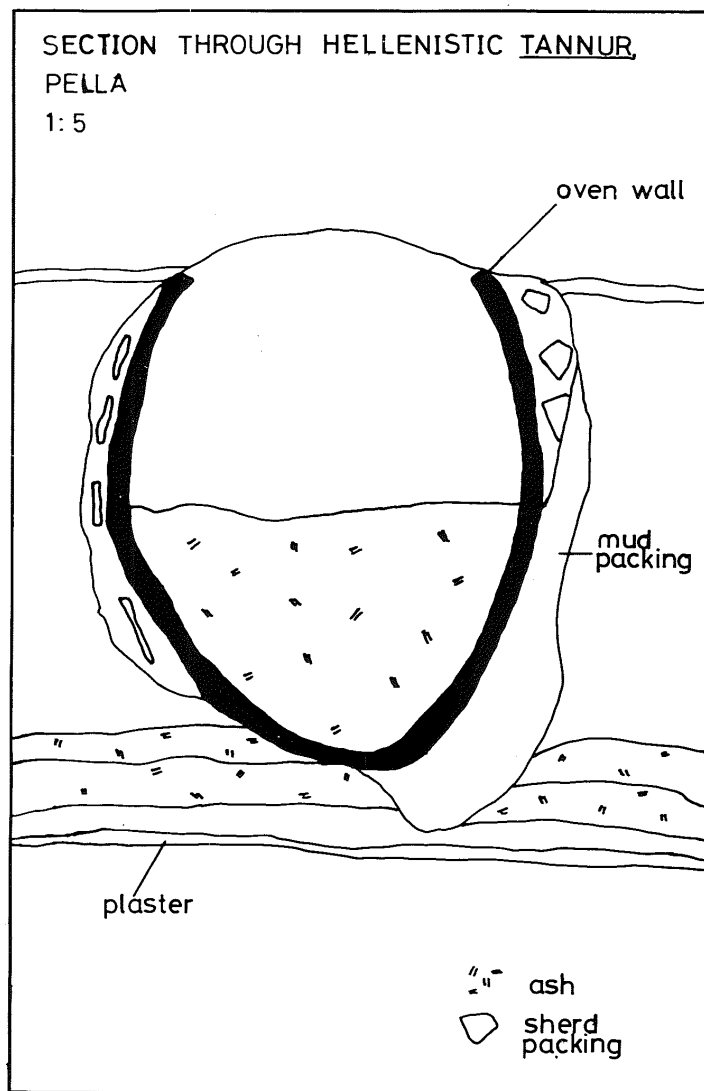


Fig. 5: A section through a Hellenistic *tannur*, Pella.

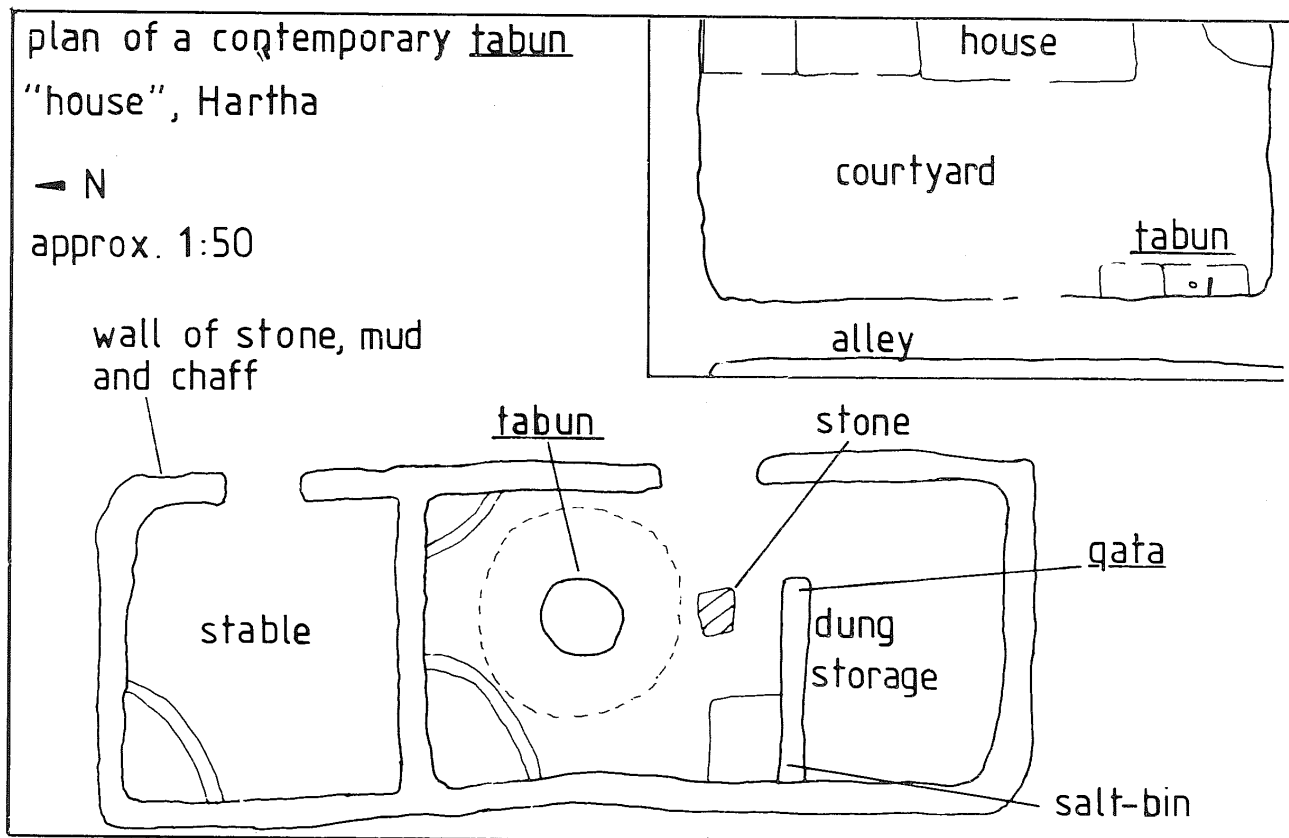


Fig. 6: A plan of a modern *tabun* house and courtyard, Hartha.

period. The twenty year old *tabun* house is built of stone and mud and is next-door to the stable. The *tabun* house shows several built-in internal features:

1. The salt-bin (Pl. LIV: 2)

This bin is made of chaff, mud and water. It has a small hole at the bottom from which the salt was taken, and an opening at the top through which the salt was originally poured. Often stores which require dry surroundings are kept in such *tabun* houses and frequently there is a bench along one side of the wall upon which to store material.

2. The *qateh* (*qat'e*)

The *qateh* is a dividing wall, usually 1.50 m. high, retaining the fuel store. It can be made of mud and stone, breeze blocks or stone. If there is not such a feature, the fuel is stored in a heap outside the *tabun* house. Such internal features may explain the bewildering number of seemingly vague mud and stone features that are often encoun-

tered in association with ovens on archaeological sites.

The roofing material of these houses again varies from stone-vaults, mud and iron girders to wooden beams packed with reeds. In all cases the charring and smoke-blackening and the amount of ash produced by the oven is enough to suggest that the traces of one such house is the result of fire destruction rather than mere use.

The archaeological *tawabeen* found at Jerash seem to have been within some kind of structure; and, examination of the Iron Age levels at Pella suggest that this was also the case (fig. 7).<sup>6</sup> The excavations at Pella also showed that two types of oven, *tabun* and *tannur*, were often found in association with each other. The possibility that they had different functions and were used in tandem with each other should be considered. In Egypt a study of bread-making in the Egyptian delta showed that a bread oven of the *wagdiah/arsah* type and a cooking oven of the *tannur* type for heating water, etc., were located together in the oven house.<sup>7</sup>

<sup>6</sup> ed. Basil Hennessy, Anthony McNicoll, Robert H. Smith, *Pella in Jordan*, Canberra, 1982; p. 61.

<sup>7</sup> Fawzeyya & Kamal Rizqallah, *La Préparation du pain dans un village du delta Égyptien*, Cairo, 1978; p. 6.

Consideration of the wider distribution of ovens, i.e. whether communal or individual, is hampered slightly by the small area exposed in archaeological excavations and the increasing use of town bakeries today. Evidence from the excavations in northern Jordan does not point to the existence of communal ovens and although one oven is used by up to seven households today, its size does not differ. Large communal ovens are reported from elsewhere, e.g. Palestine,<sup>8</sup> so this may be a regional variation or represent a distinction in the type of occupation, e.g. town/village.

The oven house itself has a varying life. Many of the ovens are housed in old Ottoman dwellings while the most recent are housed in concrete breeze-block constructions. The oven itself is in use for three-fifteen years and replaced on the same site. Information such as this is valuable for the archaeologist since it gives some idea of the time period which a single oven and its environs represent in the archaeological sequence, given that the fabric varies little.

As Figure 6 shows, in contemporary courtyard arrangements the stables are very often located next to the oven house. Fuel, and particularly dung, is a major variable governing the use of ovens, especially *tawabeen*, because of its necessity in the firing process. It has been frequently pointed out that in areas where firewood is scarce, dung is valued as an alternative.<sup>9</sup> Lack of available dung to serve as fuel because of the decreasing habit of stabling animals is the most frequently given reason in northern Jordan for the demise of *tawabeen*. The relationship between the practice of stabling animals and the use of clay ovens is an interesting one and possible to pursue archaeologically.

Wood produces a fast, hot flame suitable for heating the oven. Dung gives out a smouldering, long-lasting heat reaching temperatures of 600 C.<sup>10</sup> The various types of fuel therefore, seem to be

selected for their various heat-giving properties. The way in which this knowledge was used in early pottery firing and kilns is being investigated. At present, in northern Jordan, the evidence for the use of cooking ovens rather than hearths is later than the use of kiln-fired pottery.

## Conclusions

One of the major advantages of looking at a particular aspect of material culture over a long period of time, including the present, is that the fluctuations in form, function and regional variation can be detected. The archaeological study has, as yet, not been great enough to permit more than a few such conclusions. Some conclusions are:

1. The almost invariable housing of all types of ovens in the present, nineteen out of twenty-three studied, suggests that either the climate has grown considerably worse, or that the interpretations of ovens being open in courtyard could be reconsidered.
2. The remarkable similarity of ovens in the present to those throughout antiquity indicates a continuity of population and its traditions in spite of changing empires and rulers.
3. The relative time scale that a sequence of ovens represent in the archaeological record can be invaluable for a study of coarse, domestic pottery.

Clay cooking ovens are as much of a material culture remain as ceramics or flint tools and their potential for adding to the information about past cultures is as great. In addition, this study seeks to show that understanding of a material object in the past can be increased by examination of a similar object in the present.

## Acknowledgements

Thanks are given to Dr. Adnan Hadi-di, Director of the Department of Anti-

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<sup>8</sup> ed. Karen Seger, *Portrait of a Palestinian Village*, London, 1981; p. 107.

<sup>9</sup> Ilse Kohler, *Domestikation des Kamels*, Hannov-

er, 1981, p. 61.

<sup>10</sup> Henry Hodges, *Artifacts*, London, 1964; pp. 166-9.



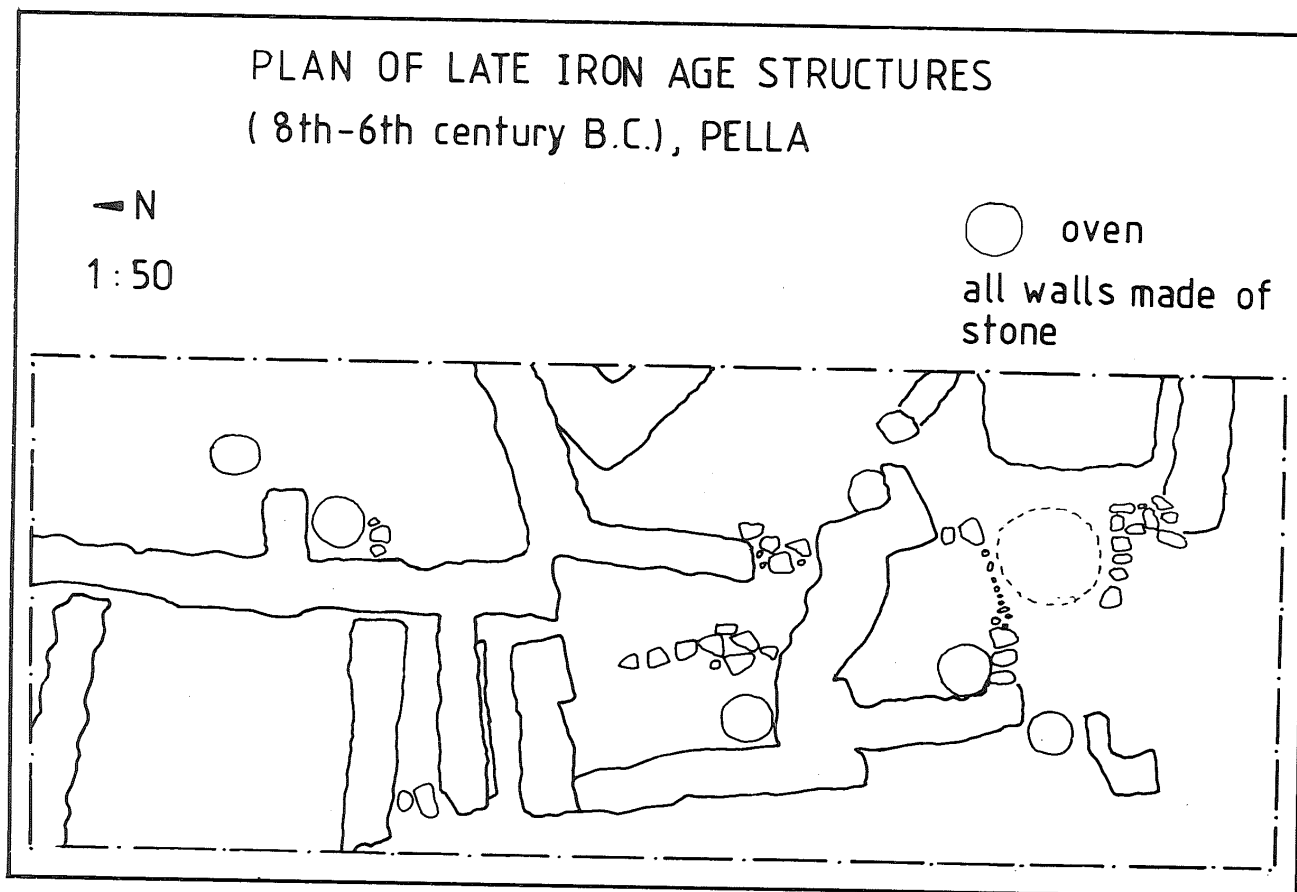


Fig. 7: A plan of the Iron Age distribution of ovens, Area VIII, Pella.

quities of the Hashemite Kingdom of Jordan; the Department of Antiquities in Amman and Irbid for their support, in particular Ms. Maha Jeyousi, Mr. Sultan Shraideh and Mr. Hekmat Ta'ani; and, Dr. Andrew Garrard, Director of the British Institute at Amman for Archaeology and History.

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## **Bibliography**

- Olivier Aurenche, *La Maison Orientale*, Paris, 1981.  
ed. Basil Hennessy, Anthony McNicoll, Robert H. Smith, *Pella in Jordan*, Canberra, 1982.  
Henry Hodges, *Artifacts*, London, 1964.  
Ilse Kohler, *Domestikation des Kamels*, Hannover, 1981.  
ed. Walter E. Rast & Thomas Schaub, *The Southeastern Dead Sea Plain Expedition: Interim Report of 1977 Expedition*, ASOR, 46.  
Fawzeya & Kamel Rizqallah, *La Preparation du pain dans un village du delta Egyptien*, Cairo, 1978.  
ed. Karen Sager, *Portrait of a Palestinian Village*, London, 1981.



**OBJECTIVES, PROCEDURES, AND  
FINDINGS OF  
ETHNOARCHAEOLOGICAL  
RESEARCH IN THE VICINITY OF  
HESBAN IN JORDAN**

by  
Øystein S. LaBianca

**Introduction**

This preliminary report describes the objectives, procedures, and findings of ethnoarchaeological research carried out in Jordan between October 1, 1980 and March 10, 1981 by Øystein S. LaBianca, principal investigator, and Asta S. LaBianca, photographer. The report describes the questions which originally motivated the research, the process of thought and inquiry which led to the discovery of the importance of the concept of the "food production system" for interpreting the archaeological record at Tell Hesban and its vicinity; introduces concepts for use in studying food production systems; and shows how these concepts guided in the execution of an ethnoarchaeological survey of present-day food production in the vicinity of Hesban, how this fieldwork, in turn, made possible the formulation of a hypothesis about how food production systems change, and finally, how this hypothesis makes possible reconstruction of ancient food production regimes from the fragmentary data of the archaeological record.

**Objectives**

This research constitutes a continuation of the Heshbon Expedition<sup>1</sup> in the sense that it is concerned with finding answers to questions which have arisen in the course of synthesis and preparation for

final publication of the findings which have resulted from five seasons of archaeological excavations at Tell Hesban (Biblical Heshbon, adjacent to the present-day village of Hisban) and four seasons of archaeological site reconnaissance by means of surface surveying in the region within a 10 km. radius of Tell Hesban (henceforth referred to as the "study area"). Among the questions which had arisen were the following:

One, why is it that there has been such enormous variation in the intensity of settlements in the surveyed area and at Tell Hesban throughout antiquity? For example, Ibach's<sup>2</sup> surface survey resulted in the following wide-ranging differences in the number of sites identified to various historical periods:

ca. 1550 - 1200 B.C.	Late Bronze	5 sites
ca. 1200 - 918 B.C.	Iron I	28 sites
ca. 918 - 332 B.C.	Iron II-Persian	59 sites
ca. 332 - 63 B.C.	Hellenistic	17 sites
ca. 63 B.C. - A.D. 193	Early Roman	54 sites
ca. A.D. 193 - 365	Late Roman	45 sites
ca. A.D. 365 - 661	Byzantine	125 sites
ca. A.D. 661 - 750	Umayyad	32 sites
ca. A.D. 750 - 1200	'Abbāsids-Crusader	0 sites
ca. A.D. 1200 - 1456	'Ayyūbid-Mamlūk	49 sites
ca. A.D. 1456 - 1870	Late Mamlūk-Ottoman	0 sites

<sup>1</sup> See the bibliography for Hesban references.

<sup>2</sup> R. Ibach, the Heshbon Region Survey, Heshbon

Author's Conference, Andrews University, Berrien Springs, Michigan, March 22-27, 1981.

Tell Hesban itself has a correspondingly fluctuating settlement history judging from the descriptions of its occupational strata provided by Herr, Mitchell, Storfjell, and DeVries for the Iron, Hellenistic-Roman, Byzantine-Early Arab, and 'Ayyū-bid-Mamlūk eras respectively:<sup>3</sup>

Strata 20-18	ca 1200 - 918 B.C.	Iron I	Small Village, destroyed and rebuilt
Strata 17-16	ca. 918-539 B.C.	Iron II	Village developing into town, destroyed
207 year gap	ca. 539-332 B.C.	Persian	No sedentary occupation attested
134 year gap	ca. 332-198 B.C.	Early Hellenistic	No sedentary occupation attested
Stratum 15	ca. 198-63 B.C.	Late Hellenistic	Small fortified settlement, some caves used
Stratum 14	ca. 63 B.C.-A.D. 130	Early Roman I	Small village, many cave dwellers
Stratum 13	ca A.D. 130-193	Early Roman II	Rapidly growing village
Strata 12-11	ca. A.D. 193-365	Late Roman	Village becoming temple town, earthquake
Strata 10-7	ca. A.D. 365-661	Byzantine	Major town with temples, churches, acropolis
Stratum 6	ca. A.D. 661-750	Umayyad	Town continues to grow, sudden decline
Stratum 5	ca. A.D. 750-969	'Abbāsids	No architectural remains, artefacts only
239 year gap	ca. A.D. 969-1200	Fātimid-Early Crusader	No sedentary occupation attested
Stratum 4	ca. A.D. 1200-1260	'Ayyūbid	Small village in beginning stages
Stratum 3	ca. A.D. 1260-1400	Early Mamlūk	Large-scale reconstruction using Roman-Byz ruins
Stratum 2	ca. A.D. 1400-1456	Late Mamlūk	Gradual abandonment of Early Mamlūk town
414 year gap	ca. A.D. 1456-1870	Late Mamlūk - Ottoman	No sedentary occupation attested
Stratum 1	ca. A.D. 1870-1980	Late Ottoman-Modern	From cave dwellers to major villages

Two, why the apparent difference from period to period in the amount of investment in public works? For example, a large reservoir was constructed on the *tell* during the Iron II period, while the Late Roman and Byzantine inhabitants constructed and maintained numerous silos, cisterns, paved streets, temples, churches,

<sup>3</sup> L. G. Herr, Tell Hesban, Jordan: The Iron Age, Paper presented November 15, 1979; L. A. Mitchell, Tell Hesban, Jordan: The Hellenistic and Roman Remains, Paper presented December 30, 1979; J. B. Storfjell, Tell Hesban, Jordan: The

Byzantine and Early Arab Remains, Paper presented December 30, 1979; B. DeVries, Tell Hesban: Archaeological Remains in the Ayyubid-Mamluk Period, Paper presented November 7, 1979.

and other impressive public works. They also paved roads throughout the surrounding region. During the Early Mamlūk period and also in the present-day village, many of these Roman-Byzantine cisterns and reservoirs were reused. Compared with these periods, the Iron I, Persian, Hellenistic, 'Abbāsids, Fātimid, Seljuq-Zengid, Early Crusader, Ottoman and Early Modern settlers in this region invested relatively little in the construction of public works.

Three, why the apparent difference from period to period in the kinds of quantities of animals exploited by the inhabitants of Tell Hesban? For example, while sheep and goats, cattle, swine, horse, donkey, and camel were attested in most strata, cattle was relatively much more important during the Iron periods, while during the Roman and Byzantine periods swine, chicken, horse and donkey were more important than cattle, sheep and goats. In contrast, during the Mamlūk period, chicken, camel and wild game play a prominent role in the economy of Tell Hesban. In the earlier Iron periods, however, the chicken is absent and camel and wild game are relatively unimportant.<sup>4</sup> Today poultry, followed by sheep, goats, cattle, horses and mules are the dominant species.

These were the types of questions which motivated the present research which had as its main objective *to ascertain what the underlying organizing principles are that might account for the manifest variation and covariation through time in settlement intensity, investment in public works, and kinds of animals exploited at Tell Hesban and in the surrounding region during the various periods* Why, for example, do we find an association between the intensity of settlement in the region surrounding Tell Hesban, intensity of invest-

ment in public works on the *tell* itself, and intensity of exploitation of certain species of animals? How are these and other covariances to be explained?

The research task which these questions pointed to was that of constructing and refining a model positing assumptions and hypotheses about the interrelationship between settlement patterns, public works, landuse and diet. I arrived in Jordan with this realization and a very rudimentary model in mind<sup>5</sup> My research, therefore, aimed at refining the conceptualization of the components of this model and to seek to understand and document the interrelationship of these components by means of analysis of pertinent literature, interviews with persons with various pertinent expertise, and ethnoarchaeological study of Tell Hesban and, more importantly, the region surveyed previously by the Heshbon Expedition surface survey team.

### Procedures

After obtaining the necessary permits and accommodations for myself and my family to live and work in Jordan, I began to work on refining the components of the model and studying their interrelationship. This task was simplified by a strategy decided upon before coming to Jordan, thanks to the advice of Dr. Hunt; namely to focus attention upon the interrelationship between two of the components: that between landuse and diet. The question I sought to answer was what is the effect of landuse upon diet? Since this presumably was a question of practical concern to a developing nation like Jordan, I anticipated, correctly it turned out, that somewhere, some pertinent research had already been done and that it was my task to "dig it out" from the literally hundreds of specialist reports and published articles about the Middle East in general and

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<sup>4</sup> A. Von den Driesch, Mammal Remains from the Tell Hesban Excavations, Heshbon Author's Conference, Andrews University, Berrien Springs,

Michigan, March 22-27, 1981.  
<sup>5</sup> See the Bibliography for LaBianca, 1979, and for Geraty and LaBianca.

Jordan in particular.<sup>6</sup>

The result of this search and interviews was that not only did I find the studies documenting the inter-relationships of landuse and diet;<sup>7</sup> but, also that both landuse and diet were variables dependent upon a third variable, the food production system, i.e., the “purposive, institutionalized, and interconnected activities” carried out by a society in its quest for food.<sup>8</sup> Furthermore, I began to realize that settlement patterns and investment in public works can be treated as variables dependent upon the food production system. This led me to ask and search for an answer to two other questions: if the food production system is the organizing principle which underlies settlement pattern, investment in public works, landuse and diet, what are the factors which determine the character of such systems in various places throughout the world? What are the factors which shape food production systems in semi-arid countries like Jordan?

Again, these questions were not new, and indeed I found many pertinent articles and books, but found myself most influenced by: Arnon 1972; Boesrup 1965; Clawson et. al. 1971; Cox and Atkins 1979; Duckham and Masefield 1971; Grigg 1974; and Kates, Johnson and Haring 1977. This

literature introduced me to such concepts “agroecosystems”, “farming food chains,” “locating factors,” and “dry land livelihood systems,” all of which are pertinent to answering the two questions I was asking. Indeed, thanks to this and other literature I began to understand the interdependencies which exist between the various components of my emerging model, and to understand the complex synergistic processes whereby food production systems change over time.

It remained, however, to operationalize the model so that not only by means of environmental and ethnographic data, but also by means of the fragmentary data of the archaeological and zooarchaeological record, the model could serve as an *investigatory device* whereby long term changes in food production systems could be studied. To this end, six parameters of food production systems were identified, each of which could be measured independently of the others archaeologically as well as ethnographically, and each of which afforded a different clue to the character of the food production system. The six parameters and their particular data requirements follow:

Climate:-

Measured in terms of mean daily

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<sup>6</sup> The search for the pertinent studies took me to the following libraries in Amman, the University of Jordan Library; the “Jordan Room” of the University of Jordan Library; the United Nations Documents Depository at the University of Jordan library; the reading room in the Department of Agriculture Building at the University of Jordan; the library at the Department of Research and Extension of the Ministry of Agriculture; the Royal Scientific Society Library; the Natural Resources Authority Library and the British Council Library.

Experts whom I asked for guidance and favours along the way included Dr. S. Tukan, Nutritionist, University of Jordan; Dr. Ahmed Faqih, Chairman, Department of Nutrition, University of Jordan; Dr. Walid Abu Gharbieh, wheat expert, Department of Agriculture, University of Jordan; Abdullah al Masri, UNDP World Food Programme field expert; Ralph Monte, Director, CARE-Jordan; Adel-Raouf Nabulsi, wheat expert, Ministry of Agriculture; Fouad Koshier, USAID agricultural officer; Jack Thomas, USAID population officer; Charles R. Jenkins, USAID agricultural officer; Dr. Usama Bilbeisi, Director, Department of Research and Extension, Ministry

of Agriculture; Hussam Ghishan, field expert, Kerak extension Office, Ministry of Agriculture; Dr. Joseph Nazarella, Physician, Madaba Hospital, Tarique Nicola Bajjalli, Madaba farmer; Shogi Keradchi, Director, Agricultural Extension Office, Ministry of Agriculture, Madaba; Farouk Shleeff, Administrative Director, CARE-Jordan. These names are presented in the approximate order in which they appear in my journal.

<sup>7</sup> L. Evora, Survey of Beliefs and Practices Affecting Food Habits in Jordan: A preliminary Report, Amman, CARE-Jordan, March, 1979.; E. M. H. Lloyd, *Food and Inflation in the Middle East: 1940-45*, Stanford, 1956.; J. M. May, *The Ecology of Malnutrition in the Far and Near East*, New York, 1961.; P. F. M. McLouglin, *African Food Production Systems: Cases and Theory*, Baltimore, 1970.; S. M. Yacoub, Sociological Evaluation of a Pilot Project for Bedouin Settlement: A Case Study, Faculty of Agricultural Sciences, American University of Beirut, Publication No. 40, 1969.

<sup>8</sup> R. Dyson-Hudson and N. Dyson-Hudson, the food production system of a semi-nomadic society: the Karimojong, Uganda, in *African Food Production systems*, Baltimore, 1970, p. 93.

temperatures and the distribution and amount of ground and surface water available over one year. Archaeologically, macro- and micro- climatic changes can be inferred from ancient plant and animal remains, and from present-day conditions. Ethnographically, climatic data can be obtained from meteorological records available from government agencies and from interviews with local residents.

#### Topography:-

Measured in terms of amount of elevational change, soil and vegetation characteristics within 1 km. of settlement. Archaeologically, topography can be inferred from stratigraphic excavations, ancient plant and animal remains, and present-day conditions. Ethnographically, topographic data can be obtained from cartographic and natural resource assessments available from government agencies and from stereoscopic aerial photographs analyzed in conjunction with field observations.

#### Settlement:-

Measured in terms of population numbers and the distribution and character of dwellings and public buildings within a settlement and the distribution and character of settlements within a region. Archaeologically, settlement can be inferred from the distribution and character of architectural and artefactual debris found within settlements and regions. Ethnographically, settlement data can be obtained from cartographic, population and economic assessments available from government agencies and from field surveying carried out with or without the aid of aerial photographs.

#### Operational facilities:-

Measured in terms of the distribution and character of water collection, storage, and distribution works, terracing practices, draft power sources, fencing works, animal shelters, food processing facilities, food storage facilities, and food distribution facilities within a settlement and within a region. Archaeologically, operational facilities can be inferred from the distribution and character of architectural, artefactual, plant and animal remains uncovered by excavations or discovered by means of surface surveying. Ethnographically, data

about operational facilities can be obtained from records maintained by various government in charge of development of agriculture, commerce, public health, communication, etc. Field surveys with or without the aid of aerial photographs can also provide pertinent data.

#### Landuse:-

Measured in terms of the distribution and types of crops and stock produced on lands within and surrounding settlements and within regions. Archaeologically, landuse can be reconstructed from analysis of plant and animal remains and from present landuse. Ethnographically, data about landuse can be obtained from records maintained by various government agencies concerned with agricultural production. It can also be obtained by means of landuse surveys carried out with or without the aid of aerial photographs.

#### Diet:-

Measured in terms of the proportion of various plant and animal foodstuffs consumed by individual households within settlements and within regions. Archaeologically diet can be reconstructed from plant and animal remains. Ethnographically data about diet can be obtained from government survey data concerned with public health and nutrition, from local hospital and physician's experience, from household diet surveys and from analysis of household refuse.

Since the archaeological data I needed to reconstruct the food production regime had been gathered during previous seasons by the Heshbon Expedition, it remained for me to complete the ethnographic survey of the village of Hesban and, in particular, the region within a 10 km. radius of the village — the area previously studied by Ibach.

In January 25, 1981, we moved to Madaba, Jordan. The pertinent data was collected primarily by means of walking tours around Hesban, Madaba and Jalul, interviews with several residents in each of these places, automobile-assisted tours across most of the landscape accessible by auto and through 31 of the 36 villages in the study area, and recording of agricultural data collected by the local agricultural



extension office. Collection of data was aided by the use of an instrument similar to the one shown in Appendix 2, the use of a tape-recorder for recording observations and interviews, black and white and color photography, regional maps, and the assistance of several local experts. In addition to these means I also kept a daily journal into which my observations and reflections by the end of each day was recorded.

In all, 31 villages were visited. These include El Wakhyan, Al Loba, El Mukkhyat, Ain Musa, Kufeir Abu Sarbut, Kufeir Abu Khanan, Jureina, Gharnata, El Aresh, Mushaggar, Hesban, El Manshiya, El Al, Es Samik, El Mansura, El Rawda, Um el Kutein, Naur, El Amriyah, El Adissyah, Abu Nugleh, Um el Asakar, Um el Basatin, Um el Gabbya, Um el Amad, Um el Zeituna, Um el Rumana, Manja, Hanina, Jalul, and Madaba.<sup>9</sup>

### Findings

In the previous section I described the procedure followed in order to develop a general model or investigatory device for discovering the organizing principles that account for the apparent systematic relationships which seem to exist between settlement intensity, investment in public works, and the kinds of animals exploited at Tell Hesban. In this section I reconstruct, by means of data gathered using this device, the development of the present day food production regime on the fields of Hesban. Thereafter the systematic relationships embedded in this analysis of the present are made explicit in the form of a hypothesis. How this hypothesis can be used as the basis for reconstructing the food production regimes of ancient Hesban is discussed last:

The Present Day Food Production Regime:-

Geographically, Hesban is located approximately 20 km. south-west of Amman near the western edge of the highland edging the Jordan Valley. Approximately 8 km. to its north lies the town of Naur, and 10 km. to its south lies Madaba, the headquarters of the surrounding district.

Standing on the summit of Tell Hesban, which lies some 880 m. above sea level, one has a panoramic view of the surrounding region. To the north lie the "northern heights," some of which appear as gently rolling hills, others appearing as steep escarpments. To the west lie the "western slopes" which lead gently at first, then steeply down into the Jordan Valley. To the south and east lie the "southern" and "eastern" plains which disappear in the horizon to the south and in the desert to the east. Looking north and west, one notices small patches of cultivated land in the valleys and on the gentle slopes, and in the distance scrub and forest clinging to the bedrock which crops up everywhere in these northern hills and western escarpments. Looking toward the plains to the south and east one sees large expanses of cultivated fields interrupted only by occasional villages and the road.

In January, the mean daily temperature ranges between 10-14° C in the western slopes, but remains at 8° C in the northern hills and in the plains. In June, the mean daily temperature ranges between 26-30° C in the western slopes, while it ranges between 24-26° C in the northern hills and on the plains. Rainfall is most abundant in the northern hills where the annual amount ranges between 400-500 mm. rainfall annually, with the southern plains receiving consistently above 300 mm. The annual rainfall at Hesban is about 400 mm<sup>10</sup>. Most of this rainfall occurs between November and March. While the northern and western parts drain into the Jordan Valley Basin, the southern and

<sup>9</sup> At various times I was accompanied by the following individuals on my tours to these villages: Issa Ghishan, Husam Ghishan, Asta LaBianca, Diab Abu Assef, James Flannagen, and Erik LaBianca. In various ways, all of these individuals helped me make the pertinent observations and obtain information from local residents. I am

particularly indebted to Husam for teaching me about horticulture on these tours.

<sup>10</sup> K. Ferguson and T. Hudson, *The Climate of Hesban, Jordan*, Heshbon Author's Conference, Andrews University, Berrien Springs, Michigan, April 22-27, 1981.

eastern plains drain into the the dead sea Basin. The principle *awdiyah* (wadis) in the region are Wadi Hesban and Wadi Kufrein and their tributaries. These *awdiyah* (wadis) flow primarily during the rainy season, while about thirteen springs, especially in the northern and western parts, flow for longer periods, though not every year in all instances. The most active springs are 'Ain Hesban and 'Ain Musa. Otherwise, groundwater lies several hundred metres below the surface and has to this day not been tapped by means of well shafts.

Over the past 100 years, food production on this landscape has evolved from predominantly production of camels, sheep and goats by nomadic and semi-nomadic subsistence pastoralists to today's production primarily of wheat, olives, grapes, chicken, cattle, sheep and goats by sedentary market-oriented farmers. This transformation has been accompanied by interrelated changes in settlement pattern, operational facilities, land use and diet, as well as by a change in the general appearance of the landscape.

In the previous century, two great tribal confederations vied for control of the pastures of this landscape. One of these was the semi-nomadic sheep and goat breeders of the Adwan confederacy who in the summer would graze their sheep and goats in the hills and plans of this landscape, but who would descend to the lower slopes, valleys and plains of the Jordan Valley during the cold months. There they generally had permanent homes with agricultural lands. The other was the nomadic camel and horse breeders of the Beni Sakhr confederacy who, beginning in the previous century, maintained agricultural lands on the eastern plains of this landscape during the summer months, but who would penetrate with their animals to the lower lying desert areas to the east during the cold winter months. Attached to the Beni Sakhr were a small number of Palestinian "fellahin" who produced grain on a

share-cropping basis for the tribesmen on their lands in exchange for protection against the Adwan tribesmen.

During most of the Ottoman period, this landscape was used exclusively for pasture by nomadic tribes.<sup>11</sup> It was not until the later part of the nineteenth century that year round settlement by market-oriented cereal producing mixed farmers began. These early cultivators included members of the Adwan confederacy and other tribes such as the Azizat, Keradchi, and Ma'ayeh who had come up from Kerak around 1880. At first these early semi-sedentary farmers, whose numbers were less than 1000, camped year around in tents pitched near caves which they and their animals retreated into during the coldest months of the winter. As their numbers increased they began to re-inhabit ancient tell sites like Hesban, Madaba, Jalul and Um Romana where they began to reuse the intact Roman cisterns and the available building materials. These early dwellings are readily recognizable as one tours the villages in this region. Most of them constructed from stones removed from nearby Roman-Byzantine ruins and cemented using mud. Furthermore, these buildings have walls with minimal or no windows and their roofs — made of tree-logs, mud, and straw — rest upon one, two, or three imposing Roman arches which result in each house being open in the centre and divided into four, six, or eight stalls along two opposite walls (Pl. LV: 1, 2)

This architecture makes good sense in light of the feuding and raiding within and between the Adwan and the Beni Sakhr which prevailed in this region during pre-monarchy days, because not only were these buildings fortresses protecting their human occupants from attackers, they served also as protective shelters for animals, lest they be stolen, and as grain storage facilities — grain being stored in granaries constructed in one or more of the stalls between the Roman arches. Thus, these fortified farm houses served as homes and

<sup>11</sup> W. Hutteroth, The pattern of settlement in Palestine in the sixteenth century, in *studies on*

*Palestine during the Ottoman period*, Jerusalem, 1975.

as operational facilities in an era when sedentary food production was at the mercy of nomadic predation.

Not only the architecture, but also the distribution of dwellings within villages and the distribution of the villages themselves within the region can be understood with reference to the organizing influence of the prevailing, largely animal-based food production system. Thus, on the village level, these early fortified farm houses tended to be located in a clump often right next to each other thus "saving a wall." Indeed, at Hesban one finds evidence of a group dwellings built in a U with a wall enclosing the exposed courtyard to the north. By clumping their dwellings together in this manner, these early villagers ensured the protection of their families and belongings through joining forces in defending themselves against attackers.

On the regional level it is significant to note that settlements tended to be located especially on the plains to the south and east, but also in the gently rolling hills to the north. This follows from their emphasis on grain production, primarily wheat, barley, and millet, which is easiest produced in these less hilly and flat regions. The western slopes and the hillier regions in the north were only seasonally inhabited by tent-dwelling pastoralists of the Adwan confederacy herding their animals. Tree-crops like olives and grapes, and vegetables were generally not produced in this region during these early days of sedentary agriculture for fear of the trees being felled during raids, and the lack of horticultural and viticultural knowledge. The diet of the inhabitants, therefore, consisted primarily of cereals, fermented milk in the form of yoghurt and leban, milk fat in the form of butter and ghee, and the meat of sheep, goats, and camels. Since there were no paved roads, the fruits and vegetables that seasonally became available were hauled by camels and donkeys, the chief means of transportation until the mid-twentieth century in this region.

Intensification of food production in the present century was, as suggested earlier, accompanied by changes in settlement pattern, operational facilities, land

use, and diet. To begin with, the number of villages and towns increased from less than twelve in the region at the turn of the century, to twenty-four in 1955, and approximately thirty-six in 1980. This increase is reflected in the changes in population as well: from only a few thousand persons at the turn of the century to about 13,000 persons in 1955 and about 40,000 persons in 1980. These figures suggest a growth in the size of the villages as well: indeed, aside from the disproportionate growth of towns like Madaba and Na'ur, especially the villages in the northern hills and on the western slopes have grown, while those on the eastern plains have actually peaked and are experiencing a declining population. Except for in the case of Na'ur, Madaba, Hanina, and El Manshiya, where growth is also related to the emergence of government services, centralization of markets, industry (Hanina) and mining (El Manshiya), population dynamics in all of the other villages are linked to food production changes.

For example, the noticeable growth in the size of villages in the hilly regions, and the establishment of many new villages, has occurred simultaneously with the recent shift to market-oriented tree and vegetable production which had its beginnings with the arrival of large numbers of Palestinian refugees who brought with them experience in vegetable and tree crop production *and* the rapidly growing demand for these products in the urban areas. By this time, the fear of nomadic predation had also fairly ceased to exist as a practical obstacle to these enterprises, thanks to Glubb Pasha and the Arab Legion he organized to pacify the countryside. Thus, today the windows in the newer cement homes are much larger and there is greater distance between dwellings. Interestingly, however, among many long time residents of the region, the fear of nomadic predation still exists as a mental obstacle.

Facilitating this shift to intensified market-oriented production, not only of grains, fruits and vegetables, but also of chicken and eggs (produced on large commercial chicken farms), beef, and sheep

- 1974 Wheat in Jordan: Demand and Supply Estimations and Projections. Amman: Royal Scientific Society, Economic Research Department.
- Strickland, K. L.
- 1974 Report to the Government of the Hashemite Kingdom of Jordan on Sheep Production and Disease. Rome: FAO. Report No. WS/F7227.
- UNDP and FAO
- 1972 Dryland Farming Jordan: Farm Management Surveys in the Baq'a Valley, Rome: FAO, Technical Report No. 3 AGS: SF/JOR 18.
- 1970 Dryland Farming Jordan: A Socio-Economic Study with Special Reference to Land Tenure Problems in the Abu-Nuseir and Mubis Villages, Baq'a Valley. Rome: UNDP-FAO AGS:SF/JOR Technical Report 1.
- Vemury, M.
- 1980 Beliefs and Practices Affecting Food Habits in Jordan. Amman: CARE - Jordan.
- Wander, H.
- 1966 Analysis of the Population Statistics of Jordan. Amman: Department of Statistics Press.
- Yacoub, S. M.
- 1969 Sociological Evaluation of a Pilot Project for Bedouin Settlement: A Case Study. Faculty of Agricultural Sciences. American University of Beirut. Publication No. 40.

## Appendix 2

### VILLAGE FOOD SYSTEM SURVEY OBSERVATION GUIDE

DATE \_\_\_\_\_  
 VILLAGE NAME \_\_\_\_\_ ROAD SIGN SPELLING \_\_\_\_\_  
 KM FROM MAIN ROAD \_\_\_\_\_ PANORAMIC APPEARANCE \_\_\_\_\_  
 CONDITION OF ACCESS ROAD \_\_\_\_\_ LOCATION ON MAP VERIFIED \_\_\_\_\_

#### A. Topography of Village Hinterland

1. Slope—no slope, less than 20% slope, 20-40% slope, more than 60% slope
2. Ease of Cultivation — easy, medium, hard
3. Soil Depth — in metres of cultivatable soil
4. Soil Texture — heavy clay loam, calcium soil, light clay loam
5. Biochemical Status — high pH, normal pH, acid
6. Soil Stability — good, fair, poor
7. Vegetation — Batha, garigue, woodland, forest

#### B. Landuse on Village Hinterland

1. Tree Crops—Olives, grapes, almonds, pears, apricots
2. Vegetable Crops—tomatoes, cucumbers, lentils, cauliflower, eggplant
3. Cash Crops—tobacco
4. Grain Crops—wheat, barley, millet, sorghum, maize
5. Pasture Animals — Sheep, goats, local cattle, foreign cattle
6. Barnyard Animals—chicken, geese, turkeys, doves, rabbits, pigs

#### C. Operational Facilities

1. Waterworks — reservoir, cisterns, aqueducts, water tanks, water-line hook-up, pumping stations, roof-collection facilities.
2. Terracing Works — terraced wadis, terraced slopes, diversion dams, detention dams
3. Draft Power — Camels, oxen, horses, mules, donkeys, tractors
4. Processing Works — olive presses, grape presses, mills, trasing grounds, combines

- Commercial Press.
- 1954 Jordan - Hedjaz Railway. Consulting Engineers Report. London: Westminster Rendel, Palmer & Tritton.
- Howard Humphreys and Sons
- 1978 Water Use Strategy: North Jordan. Volume 2: Water Resources. Reading, Berkshire: Howard Humphreys and Sons, Consulting Engineers.
- Hyslop, J. D.
- 1978 Jordan's Agricultural Sector. Amman: USAID.
- Interdepartmental Committee on Nutrition for National Defence
- 1962 The Hashemite Kingdom of Jordan Nutrition Survey, April-June 1962. Amman: Jordan Development Board.
- Kannan, W. and Y. Attieh
- 1974 Jordan: Agricultural Development. Amman: Jordan Press Foundation.
- Kasapligil, B.
- 1956 Plants of Jordan with Notes on their Ecology and Economic Uses. Amman. Ministry of Agriculture, Forestry Department.
- Konikoff, A.
- 1943 Trans-Jordan: An Economic Survey. Jerusalem: Jewish Agency for Palestine.
- League of Nations
- 1927- Statistical Yearbook. Geneva: Economic Intelligence Service.
- 1944
- Lorenz, V.
- 1968 Physical Planning in Jordan: Regional and Town Planning. Amman: Ministry of Interior for Municipal and Rural Affairs.
- Merry, D. L.
- 1970 The Bedouin of Southeast Jordan: An Ethnographic Study of the Beni Sakhr tribe and a comparison of their lore and customs with those contained in the Book of Judges. Ph.D. Dissertation. New York University. Ann Arbor: University Microfilms 70-15, 970.
- Nabulsi, A. R. et. al.
- 1974 A Working Paper for Developing and Increasing Wheat Production in Jordan. Amman: Ministry of Agriculture.
- Pasha, P.
- 1958 A History of Jordan and Its Tribes. Coral Gables, Florida: University of Miami Press.
- Pedersen, J. R.
- 1968 Food Grain Storage, Marketing, Handling and Transportation in Jordan. Manhattan, Kansas: Food and Feed Grain Institute, Kansas State University.
- Salah, Hassan Abd el Kadir
- 1969 A Regional Study of the East Jordan Valley with special Relation to the Problems of Soil and Water Utilization. Ph.D. Dissertation University of Durham.
- Salem, F. S.
- 1972 Critical Analysis and Evaluation of Marketing in Jordan. Ph.D. Dissertation Texas Technical University.
- Sawer, E. R.
- 1926 Dept. of Agriculture, Forests and Fisheries. Palestine. Annual Report 1926.
- Schmissaur, W. E.
- 1976 Economic Evaluation of Dryland Wheat Technologies Introduced in Jordan. In Final Report of Contract AID/sa-C-1024 between Agency for International Development and Oregon State University, N. Goetze, ed. pp. 79-124. Oregon: Oregon State University, Department of Agricultural and Resource Economics.
- Stetieh, A. M. and M. A. Smadi

- Kingdom of Jordan (Printed in Great Britain by Benham and Company Limited, Colchester.
- CARE - Jordan  
 1980 Rainwater Runoff Management and Other Techniques for Improving the Use of Arid and Marginal Lands. Amman: CARE - Jordan.
- Chatty, D.  
 1978 The Current Situation of the Bedouin in Syria, Jordan and Saudi Arabia and their Prospects for the Future. Amman: University of Jordan, Faculty of Economics and Commerce.
- Evora, L.  
 1979 Survey of Beliefs and Practices Affecting Food Habits in Jordan: A Preliminary Report. Amman: CARE - Jordan (March 1979).
- FAO  
 1974 Final Report to the Ministry of Agriculture of the Hashemite Kingdom of Jordan on Farm Management and Production Economics. Rome: FAO JOR/71/527 (based on the work of F.A. Kutsal).  
 1974 Draft Report of the Rainfed Areas Agricultural Development Project Preparation Mission in Jordan. Volume 1. Rome: FAO Investment Centre Report No. 14/74 DDC JOR 2.  
 1967 Jordan Country Report. Rome: FAO.  
 1955 Report to the Government of the Hashemite Kingdom of Jordan on the Development of the Livestock - Dairy Industry. Rome: FAO Report No. 427.  
 1954 Report to the Government of the Hashemite Kingdom of Jordan on Agricultural Development. Rome: FAO Report No. 217.  
 1952 Report to the Government of the Hashemite Kingdom of Jordan on Agricultural Development. Rome: FAO Report No. 49.
- Fernea, R. A.  
 Social Soundness Analysis: The Jordan Valley Farmers Association. Amman: USAID.
- Fikry, M.  
 1979 The Maqarin Dam and the East Jordan Valley: Social Analysis for the Maqarin Dam Project. Washington, D.C.: USAID Contract AID/afr/C/1132.
- Food and Feed Grain Institute  
 1968 Report on Food Grain Storage, Marketing, Handling and Transportation in Jordan. Manhattan, Kansas: Kansas State University, Food and Feed Grain Institute.
- Glubb J. B.  
 1938 The Economic Situation of the Trans-Jordan tribes. JRCAS.
- Gutman, M. and N. G. Seligman  
 1979 Grazing Management of Mediterranean Foothill Range in the Upper Jordan River Valley. Journal of Range Management 32: 86-92.
- Hashemite Kingdom of Jordan  
 1979 Agricultural Statistical Yearbook and Agricultural Sample Survey 1979. Amman: Department of Statistics Press.  
 1978 The Multi-Purpose Household Survey (Houses Characteristics), September-December 1976. Amman: Department of Statistics Press.  
 1975 General Results of the Agricultural Census 1975. Amman: Department of Statistics Press.  
 1967 Report on Agricultural Census 1965. Amman: Department of Statistics Press.  
 1966 Review of Spring Flow Data. Amman: Natural Resources Authority. Department of Research and Investigation. Hydrology Division. Technical Paper No. 40.  
 1964 Seven Year Programme for Economic Development 1964-1970. Jordan: The

Coloquium as LaBianca 1979a above.

- A. Von den Driesch, Mammal Remains from the Tell Hesban Excavations. Heshbon Author's Conference. Andrews University, Berrien Springs, Michigan (March 22-27), 1981.
- S. M. Yacoub, Sociological Evaluation of A Pilot Project for Bedouin Settlement: A Case Study, Faculty of Agricultural Sciences, American University of Beirut, Publication No. 40, 1969.

## Appendix 1

### Selected Technical Reports on Food Production Consumption and Related Subjects for the Country of Jordan

Abu Howayej, B.

1973 Agricultural Atlas of Jordan. Amman: Ministry of Agriculture.

Abu Jaber, K.S.

1978 Development and Its Effect on Traditional People: The Bedouins of Jordan. Amman: University of Jordan, Faculty of Economics and Commerce.

1978 Development and Its Effect on Jordan's Society. Orient: Deutsche Zeitschrift fur Politik und Wirtschaft des Orients. Heft 1, pp. 99-110.

Abu, Jaber, K.S., F. Gharaibeh, S. Khasawneh, and A. Hill

1976 Socio-Economic Survey of the Badia of Northeastern Jordan, Amman, Faculty of Economics and Commerce.

1978 Bedouins of Jordan: A People in Transition. Amman: Faculty of Economics and Commerce.

Arar - und Hydrotechnik GMBH

1977 National Water Plan of Jordan, 7 volumes. Amman: Natural Resources Authority.

Arar, A. A.

1978 Some considerations for Increasing the Supply of and Reducing the Demand for Useable Water in Jordan. Amman: Jordan's National Water Symposium (19-22 March, 1978).

Aresvik, O.

1976 The Agricultural Development of Jordan. New York: Praeger Publishers.

Bailey, E.T.

1967 Pasture and Fodder Plant Introduction and Establishment Problems (Jordan). Rome: UNDP-FAO. Report No. TA 2405.

Barghouti, S.

1976 The Role of Agricultural Cooperatives in Improving Wheat Production in Jordan. Amman: Ford Foundation.

Barhoum. M. I.

1976 East Jordan Valley Villagers versus Social Institutions. Amman: Ford Foundation.

Ben-Arieh, Y.

1968 The Changing Landscape of the Central Jordan Valley. Scripta Hierosolymitana. Publications of the Hebrew University, Jerusalem. Volume 15 (studies in Geography Pamphlet No. 3).

Broadbent, E. E.

1967 Livestock and Meat Marketing in Amman. Rome UNDP-FAO Report No. TA 2422.

Burdan, D.J.

1959 Handbook of the Geology of Jordan. Amman: Government of the Hashemite

- (Jordan), "L. T. Geraty, Chairperson. Annual Meeting of the Middle East Studies Association of North America, Salt Lake City, Utah (November 7, 1979).
- A. N. Duckham, and G. B. Masefield, *Farming Systems of the World*, London, 1971.
- R. Dyson-Hudson and N. Dyson-Hudson, The food production system of a semi-nomadic society: the Karimojong, Uganda, in *African Food Production Systems*, P.F.M. McLoughlin, ed. p. 92-123, Baltimore, 1970.
- L. Evora, *Survey of Beliefs and Practices Affecting Food Habits in Jordan: A Preliminary Report*, Amman: CARE-Jordan (March 1979).
- K. Ferguson and T. Hudson, The Climate of Hesban, Jordan, Heshbon Author's Conference. Andrews University, Berrien Springs, Michigan, March 22-27, 1981.
- L. T. Geraty, and Ø.S. LaBianca, Analysis and Integration of the Biophysical and Ethnographic Data from Tell Hesban (Jordan) and Vicinity. Final Performance Report to the National Endowment for the Humanities. Andrews University. Berrien Springs, Michigan (November 15, 1980).
- D. B. Grigg, *The Agricultural Systems of the World*, Cambridge, 1974.
- L. G. Herr, Tell Hesban, Jordan: The Iron Age. Paper presented at the Symposium "Towards an Understanding of the Iron Age at Tell Hesban (Jordan)", L. T. Geraty, Chairperson. Annual Meeting of the American Schools of Oriental Research, New York City, New York (November 15, 1979).
- W. Hutteroth, *The pattern of settlement in Palestine in the sixteenth century, in Studies on Palestine during the Ottoman Period*, M. Ma'oz, ed., Jerusalem, 1975.
- R. Ibach, The Heshbon Region Survey. Heshbon Author's Conference. Andrews University, Berrien Springs, Michigan (March 22-27), 1981.
- R. W. Kates, D. L. Johnson and K. J. Haring, Population, Society, and desertification, in *Desertification: Its Causes and Consequences, Secretariat of the United Nations Conference on Desertification*, ed. p. 261-317, New York, 1977. Pergamon Press.
- Ø. S. LaBianca, The village of Hesban: an ethnographic preliminary report. Andrews University Seminary Studies, 14 (1976) p. 189-200.
- Agricultural Production on Hesban's Hinterland, 198 BC-AD 969. Paper presented at the Colloquium "The Classical Period at Tell Hesban in Jordan", L. T. Geraty, Chairperson. Annual Meeting of the Archaeological Institute of America, Boston, Massachusetts (December 30, 1979).
- Agricultural Production on Hesban's Hinterland in the Iron Age, Same Symposium as Herr 1979 above.
- Temporal variability in Nomad-Sedentary Relations in Central Transjordan during the Islamic Era: The Zooarchaeological Evidence, same Panel as DeVries 1979 above.
- Temporal Variability in Nomad-Sedentary Relations in Central Transjordan: The Zooarchaeological Evidence, Paper presented at the Panel "Current Research Reports: Old World Archaeology and Archaeological Method," Annual Meeting of the American Anthropological Association, Cincinnati, Ohio (November 30, 1979).
- E. M. H. Lloyd, *Food and Inflation in the Middle East: 1940-45*, Stanford, 1956.
- J. M. May, *The Ecology of Malnutrition in the Far and Near East*, New York, 1961.
- P. F. M. McLoughlin, ed. *African Food Production Systems: Cases and Theory*, Baltimore, 1970.
- L. A. Mitchell, Tell Hesban, Jordan: The Hellenistic and Roman Remains. Same Colloquium as LaBianca 1979a above.
- M. Rostovtzeff, *Caravan Cities*, Oxford, 1932.
- J. B. Storfjell, Tell Hesban, Jordan: The Byzantine and Early Arab Remains. Same



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## Bibliography

- I. Arnon. *Crop Production in Dry Regions*, Volumes I and II, London, 1972.
- R.S. Boraas and S.H. Horn, eds., *The First Campaign at Tell Hesban*, Andrews University Seminary Studies, 7 (1969) 97-216.
- The Second Campaign at Tell Hesban*, Andrews University Seminary Studies 11 (1973) p. 1-144.
- The Third Campaign at Tell Hesban*, Andrews University Seminary Studies 13 (1975).
- and L.T. Geraty, eds., *The Fourth Campaign at Tell Hesban*, Andrews University Seminary Studies 14 (1976).
- The Fifth Campaign at Tell Hesban*, Andrews University Seminary Studies 16 (1978) p. 1-200.
- E. Boserup, *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure*, Chicago, 1965.
- M. Clawson, H. H. Landsberg and L. T. Alexander, *The Agricultural Potential of the Middle East*, New York, 1971.
- G. W. Cox, and M. D. Atkins, *Agricultural Ecology: An Analysis of World Food Production Systems*, San Francisco, 1979.
- B. DeVries, Tell Hesban: Archaeological Remains in the Ayyubid-Mamluk Period. Paper presented at the Panel "Towards an Understanding of the Islamic Era at Hesban

ca. A.D. 661-750	Umayyad	High
ca. A.D. 750-969	Abbasids	Medium-Low
ca. A.D. 969-1200	Fatimid - Crusader	Low
ca. A.D. 1200-1260	Ayyubid	Low-Medium
ca. A.D. 1260-1456	Mamluk	Medium-High
ca. A.D. 1456-1870	Late Mamluk - Ottoman	Low
ca. A.D. 1870-1950	Early Modern	Medium
ca. A.D. 1950-1980	Modern	High

This proposed reconstruction of the ancient and modern food production regimes of Hesban and vicinity reveal that through time, there has been oscillations back and forth between low, medium and high intensity food production regimes since the Late Bronze period. It also suggests that these oscillations have generally been long-term, occurring over periods of time lasting from a few decades to hundreds of years. No doubt, the process was much more gradual than this representation indicates in the case of most alterations. Obviously much more study is needed to understand the particular causes and processes which lie behind each alteration. In this study the groundwork has been laid for such future research in that by means of the procedures discussed here, the necessary information about the type of food production regime which existed at various times in the first place, can now better be reconstructed.

## Conclusions

This report has presented concepts and procedures for systematically reconstructing food production regimes on the basis of various types of archaeological data. These concepts and procedures have enabled us to begin to offer answers to the questions asked at the outset of this research, including why we find an association between intensity of settlement in the region surrounding Tell Hesban, intensity of investment in operational facilities and public works, and intensity of exploitation of certain species of animals. Central to these procedures has been the development of an investigatory device for use in

constructing local food production alteration hypotheses. These hypotheses, in turn, promise to make the task of simulating the structure of food production regimes and alteration of such regimes more fruitful.

Of general interest also may be the implications of this research for our understanding of the history of Transjordan. There has been a tendency among scholars, beginning perhaps with Rostovtzeff<sup>12</sup> to argue that "the growth of Transjordanian towns is to be accounted for by trade alone." This hypotheses has tended to minimize the importance of food production in accounting for the character of settlement in Transjordan. Indeed, in some scholarly circles and publications, including a recently published guide to the antiquities of Jordan, it is stated that during certain periods, when there were no "towns" in Transjordan, the region was "lifeless".

As is clear even from this preliminary report, this is a misguided understanding of the history of Transjordan. It is misconception which follows from a focus on "trade alone" in accounting for the growth of towns in this region. The fact is, however, that the growth of towns in Transjordan cannot be understood apart from a focus on local food production as well. Trade and local food production must *both* be reckoned with in any attempt to account for the pattern of settlement on the Transjordanian landscape. Indeed, it is only as patterns of food production are reckoned with that the misconception that there were periods of "lifelessness" in Transjordan is dispelled.

<sup>12</sup> M. Rostovtzeff, *Caravan Cities*, Oxford, 1932, p. 62-64.

slopes.

Third, the surface survey site descriptions will be examined to ascertain the use and to plot the location and date of the remains of any operational facilities throughout the region — mills, wine presses, olive presses, cisterns, reservoirs, water channels, paved roads, etc. — for according to the hypothesis, under low intensity production, investment in operational facilities will be minimal, at best concerned with water works and animal shelters; under medium intensity production, investment in such facilities will be in accordance with the production, processing, storage and marketing needs of grain farmers; whereas under high intensity production, investment in such facilities will be in accordance with the production, processing, storage and marketing needs of orchardists and gardeners, as well as grain farmers.

Fourth, the stratigraphic data from Tell Hesban will be examined to ascertain changes over time in population densities on the *tell* and the nature of the dwellings, public buildings, and operational facilities constructed or used during the various cultural periods. Thus, during periods of low intensity production, our hypothesis predicts that there will be no signs of sedentary occupation on the *tell*. During periods of medium intensity production, we will expect to find some type of evidence of fortifications or defensible location of dwellings on tops of mounds. We will also expect to find objects and operational facilities consistent with mixed production of grains and sheep and goats. During periods of high intensity food production we will expect to find operational facilities and objects consistent with

the production of fruits and vegetable in orchards and gardens, in addition to the facilities needed to produce, process, store, and market grains.

Fifth, the animal bone data from Tell Hesban will be examined to ascertain changes over time in the types of animals produced for draft power and meat. Thus during periods of medium intensity production we will expect to find the remains of large numbers of cattle (used for ploughing grain fields) in addition to plentiful remains of sheep and goats. On the other hand, during periods of high intensity food production we will expect to find a rise in the numbers of horses, mules, and donkeys (used for draught on terraces), while we will expect a decline in the quantity of sheep and goats (due to removal of pasture lands on hills) and a rise in barnyard animals (such as pigs and poultry) and other imported sources of meat (including game and fish). Furthermore, we will expect that the sheep and goats eaten during periods of medium intensity production will be younger than those eaten during periods of high intensity production due to differences between those systems in their ability to supply sheep and goat meat.

A tentative summary-reconstruction of the food production regimes of ancient and modern Hesban follows. It is based on preliminary analysis of surface survey reports, reports on the stratigraphic and object findings at Tell Hesban, reports on the bone finds from Tell Hesban, and ethnographic data about the recent history of food production in Jordan. These data have been analyzed using the procedures described above.

<i>Period</i>		<i>Intensity Level of Food Production Regime</i>
ca. 1550-1200 B.C.	Late Bronze	Low-medium
ca. 1200- 918 B.C.	Iron I	Medium
ca. 918- 539 B.C.	Iron II	Medium-High
ca. 539- 332 B.C.	Persian	Low
ca. 332- 198 B.C.	Early Hellenistic	Low-Medium
ca. 198- 63 B.C.	Late Hellenistic	Medium
ca. 63 B.C. - A.D. 193	Early Roman	Medium
ca. A.D. 193-365	Late Roman	Medium-High
ca. A.D. 365-661	Byzantine	High

plants and animals they eat except that the mixed farmer eats more meat. Dwellings consist of readily defensible houses, caves, and tents in season.

Under *high intensity food production regimes*, actual population numbers are relatively high and the majority of the producers are permanently settled orchardists, gardeners and grain farmers. While the olive and grape growing orchardists are settled primarily in the hills and on the slopes, the grain producing farmers remain on the plains. Investment in permanent operational facilities are high, especially in the case of the orchardists who need to build and maintain terraces and presses. While oxen remain the principle source of draught power on the plains, horses, mules and donkeys are favoured in the hills and slopes because they are better able to manoeuvre on the steep terraces. The staple diet continues to include grain, but it includes more vegetables and fruit in season. There is far less red meat eaten, however, because most of the potential pasture land is under cultivation. As a result barnyard animal such as poultry and pigs play an important role in the diet. Furthermore, the existence of good transportation facilities, needed to market the crop, encourages import of exotic foods in the form of fish and wild game. When red meat does become available, thanks are due to the semi-nomadic and nomadic herdsmen who graze their animals on the stubble fields in the summer. These herdsmen tend to sell their older animals — those which cannot make another migration to the desert. As a result, the red meat which is consumed in villages tends to be that of older sheep and goats.

The *intensification of food production regimes* tends to be sequential from low to medium to high, whereas the relaxation of such regimes may be sudden involving an alternation from high to low. While low intensity regimes tend to be subsistence oriented, medium intensity regimes tend to be transitional or partially subsistence, partially market-oriented; while high intensity regimes tend to be primarily market-oriented. The transition from low to medium intensity regimes is associated

with hostilities between subsistence-oriented pastoralists and semi-market-oriented cultivators, because the latter is laying permanent claims on lands previously held by the former. On the other hand, the transition from medium to high intensity food production tends to be associated with political stability maintained by centralized powers. These centralized powers tend to provide the incentives for intensification of food production through providing markets, building roads, and maintaining political stability in the countryside.

### The Ancient Food Production Regimes

While it is beyond the scope of this preliminary report to offer quantitative data pertinent to reconstructing the food production regimes of ancient Hesban, it seems appropriate to provide an idea of the way in which the above hypothesis can be used as a device for making sense out of the fragmentary archaeological record. This was the original motivation for the fieldwork effort needed to derive this hypothesis in its present form.

The reconstruction process begins with analysis of the surface survey maps. First the number of sites within the study area will be used as a basis for estimating the size of the population in the study area during each of the archaeologically defined cultural periods. According to our hypothesis, herein lies the first clue to the food production regime, for, it associates low intensity production with a relatively small population, medium intensity production with a relatively larger population, and high intensity production with a relatively large population.

Second, the location of sites — whether on the plains, in the hills or in the slopes, will be examined, for according to our hypothesis, under low intensity production there are no or only a few permanent sites anywhere in the region; under medium intensity production sites will tend to be located on the plains and gently sloping hills; whereas under high intensity production sites will be numerous throughout all four natural resource zones, including in the difficult terrain in the western

and goat meat, was the improvement of the road system in the region throughout the late sixties and seventies. The introduction of the tractor had the impact of reducing the quantity of draught animals, especially oxen, maintained in the cereal growing villages of the plains. On the other hand, donkeys, horses, and mules gained an importance in the hilly villages where they generally perform better than tractors as draught power on the steep terraces. Significant also is the fact that as the hilly regions were being terraced for tree crop production, they were simultaneously being removed as pasture resources. This shift resulted in a general reduction in the sheep and goat population maintained by settled villagers and at the same time it led to an increase in the proportion of goats in the herds because of the fact that goats are hardier than sheep and can graze the remaining steep slopes unsuitable for terrace development. However, the stubble fields which remain on the plains following summer harvest of cereals continue to be grazed by the sheep and goat herds of market-oriented nomads who still migrate in and out of the region during the summer and fall.

Changes in the diet reflect the changes in the land use. Whereas formerly the staple diet in this region consisted primarily of grains and milk products, supplemented by camel, sheep and goat meat, today there are more fruit and more vegetables in the staple diet, and the meat of chicken is consumed as often or more often than that of sheep and goats even among nomads who formerly thought it beneath them to eat chicken. Still, however, the milk products of sheep and goats continue to be important.

#### Levels of Food Production Intensity:-

Thanks to the assumptions and parameters furnished by our general model it has been possible to relate data about changes in topography, settlement, operational facilities, land use and diet in our study area to overall changes in the regional food production system which have occurred since the middle of the previous century. The functional relationships

embedded in the preceding analysis will next be made explicit in the form of a local food production alteration hypothesis.

Food production on the lands within the 10 km. radius of Hesban is constrained by at least four distinguishable natural resource zones: the relatively moist, but hilly "northerly heights"; the mountainous escarpments and crevices of the relatively moist "western slopes"; the gently rolling hills and plains of the relatively drier "southern plains"; and the flatlands of the relatively dry "eastern plains." This diverse natural resource tends to favour diverse food production strategies coexisting in a "food production regime." For example, intensity of food production on this natural resource can be either low, medium, or high, depending on the kinds of crops and animals emphasized by each regime.

Under *low intensity food production regimes*, actual population numbers are low and the producers are nomadic or semi-nomadic herdsmen producing sheep and goats on the hills and slopes and camels on the plains. They occupy the land seasonally, dwelling in tents and caves and making only minimal investments in permanent operational facilities, mainly reusing ancient cisterns. Landuse consists of unimproved pasture lands and the staple diet consists of milk and its by-products, supplemented by various edible plants, dried figs or dates, grains and meat.

Under *medium intensity food production regimes*, actual population numbers are relatively higher and the producers are semi-sedentary mixed farmers producing grains on the plains and sheep and goats on the hills and slopes in the winter and on the stubble fields in the summer. While these mixed farmers occupy the land year-around, there are also semi-nomadic and nomadic herdsmen who pasture their animals on the land seasonally, maintaining trading relations with some of these farmers and hostile relations with others. Using primarily oxen to pull the plough, these farmers produce wheat for themselves and barley for their animals. Their diet is much like that of their semi-nomadic and nomadic counterparts in terms of the

5. Fencing Works — stone fences, wire fences, mud fences, brush fences
6. Animal Shelters — caves, tents, old buildings, aluminium sheds
7. Storage Installations — Silos, granaries, storage buildings, large jars
8. Transportation — pickup trucks, large, horse-drawn carriages, camels, donkeys, private cars
9. Communication — paved roads, dirt roads, pats, radios, televisions, post offices

**D. Village Settlement Pattern**

1. Fixity — degree to which community is migratory or sedentary
2. Compactness — dwellings clumped close together, dwellings strung out along roads, dwellings widely dispersed
3. Size — 1-0 dwellings, 11-25 dwellings, 26-50 dwellings, 51-100 dwellings, more than 100 dwellings
4. Type of Dwellings — neo-Roman stone houses, simple unpainted cement houses, elaborate painted cement houses, add-on cement houses, mud houses, tents, caves, shacks
5. Public Buildings — mosques, shops, schools, meeting halls, post office, suq, government office buildings
6. Ethnic Groups — Ajarma, Circasians, Palestinians, Thoabyya, Nabulsi, Sarabne, Balqawie, Keratchi, Azzizat, Maayeh

**E. Archaeological Remains**

1. Waterworks — reservoirs, cisterns, aqueducts, water-lifting works
2. Terracing Works — terraced wadis, terraced slopes, dams
3. Processing Works — wine process, olive process, mills
4. Fencing Works — Stone fences, mud fences, large walls
5. Animal Shelters — caves, craals, stables
6. Storage Installations — silos, granaries, storage buildings, jars
7. Communication — pave roads, communication towers
8. Domestic Dwellings — mud houses, stone houses, caves
9. Public Buildings — temples, churches, mosques, baths
10. Fortifications — large walls, guard towers
11. Pottery — Iron, Persian, Hellenistic, Nabataean, Roman Byzantine, etc.
12. Bones — sheep or goat, cattle, equine, poultry, fish, etc.
13. Tombs — Islamic, Byzantine, Roman, Iron, Bronze



## BOOK REVIEW

by  
Henry MacAdam

*Archaeological Explorations on the Roman Frontier in North-East Jordan: The Roman and Byzantine Military Installations and Road Network on the Ground and in the Air*, by David L. Kennedy (including unpublished work by Sir Aurel Stein and with a contribution by D.N. Riley), *British Archaeological Reports* (International Series # 134), 1982. 374 pp. 50 figures, 58 plates. £20.00

When the final segment of the *Princeton University Archaeological Expeditions to Syria in 1904-05 and 1909* was published in 1949 one era of frontier research was closing just as another opened. The various Princeton teams had conducted ground surveys which focused on sites in Syria but included selected localities in central and northern Jordan as well. The multi-volume result included a corpus of epigraphy (Greek, Latin, Nabataean, Safaitic, Syriac and Arabic) and a monumental study of architecture--secular, religious and military. The new era overlapped the old by about a decade, beginning with the publication of Père Poidebard's *Trace de Rome* in 1934 and continuing with Sir Aurel Stein's comparable aerial and groundwork resulting in a *Limes Report* which languished unpublished and nearly forgotten for forty years (the typescript dates from September, 1940).

David Kennedy's new volume for *B.A.R.* is both a tribute to and a continuation of the work begun by earlier explorers and scholars. Nearly half the book is devoted to the author's own fieldwork at and near the sites of Qaşr al-Ḥallabāt and Qaşr al-Azraq; the other half is the initial publication of the relevant chapters of Stein's *Limes Report*, a catalogue of lesser-known Roman military sites in north-east Jordan, and three appendices which discuss ceramic evidence from the sites surveyed, an essay on the role of aerial photography in Jordan (particularly Ro-

man Jordan), and a brief review by D. N. Riley of Archaeological features in aerial photographs from the 1930's of the great Azraq depression.

Kennedy's contribution constitutes what he himself calls the "core" of the book:

"A visit to Jordan in 1976 led to an acquaintanceship with a number of the Roman military sites... It seemed to me... that both the detailed knowledge of individual sites and our overall conception of the Roman frontier in Arabia were seriously defective... the relative neglect of the military installations in the N.E. of the country suggested the area as especially suitable for further work" (p. 5.)

Kennedy then deliberately chose two sites long ago surveyed and published--Ḥallabāt and Azraq--precisely because their location and complexity offered a representative example of frontier "defences in depth." Additionally, the architectural and epigraphic material already published for each site established a relatively clear chronology of occupation and lastly, there was every indication that a new survey would produce more epigraphic material. Thus the author made three visits to north-eastern Jordan: a brief tour in 1976, a five week campaign in 1978, and another brief visit in 1981. The results of these far exceeded the goals, and we are indeed fortunate to be presented with a volume of manageable size containing a wealth of new and important information.

At Qaşr al-Ḥallabāt the fort and outlying structures were carefully re-investigated and the new plans subsequently drawn and published are far more accurate than those produced by Butler for the Princeton Expedition publications. Some architectural fragments plus an already-published Nabataean tombstone suggest that the site had been occupied



before the Roman period. There is to date tenuous evidence for a Nabataean presence at Azraq, but investigation outside the fort is hampered by a small village which has blossomed since WW II. What is interesting, and different, is that the 79.00 m. x 72.00 m. *castellum* at Azraq (about twice the size of that at Ḥallabāt) is a Diocletianic building constructed *within* an earlier (probably Severan) and much larger *castrum*. The direct evidence for this is the very clear outline of a large (250.00 m. sq?) camp in aerial photos of Azraq taken in the 1920's (see now Bowersock, *Roman Arabia* [1983] 119-120 and Plate 12--a much better photo than those offered by Kennedy, Plate XVIIb and Plate XVIII a & b); the indirect evidence is the series of Severan inscriptions from nearby military installations clearly associated with Azraq--Qaṣr 'Uwaynid and Qaṣr Asaikhin. The evidence for the earlier fortress is completely lacking at ground level, and Kennedy's two-week sojourn at the site precluded even a *sondage*. Clearly some excavation of this site is now necessary.

The epigraphical results of Kennedy's surveys are likewise worth noting. More than forty inscriptions (mostly Greek and Latin and a few Nabataean) are published in the *Report*. One half of these are re-publications, often with improved readings. The other half are new. Kennedy has already established himself as a first-rate epigrapher; military inscriptions such as these associated with sites on the eastern *limes* of provincia Arabia are his specialty.

Notable among the published texts are eight new fragments of the Anastasian edict found at Ḥallabāt; this brings the known total to seventy-six with more still to be found when clearance work at the site has progressed (pp. 41-48). One may also note Kennedy's inscription 13 (pp. 90-91) in which he improves on the reading by G.W. Bowersock (*JRS*) 61 [1971] 241), and his # 19 (pp. 124-125) where a careful reading reveals the name of the Arabian governor L. Marius Perpetuus and thus anchors the text (and the building) firmly to ca. 200-202. More interesting than any of these is the since-lost Latin military inscription discovered by Stein at Azraq in

1939 (Kennedy, # 36). Working from a photo of an ink squeeze on the stone taken by Stein, and notes made by René Mouterde based on Stein's squeeze, Kennedy managed cautious, plausible restorations of some lines. He demonstrated convincingly that units of five legions had joined with the garrison legion of Arabia, III Cyrenaica, for some project. Mouterde had identified three of these, the XI and VII Claudia and I Italica; it is to Kennedy's credit that the names of the III Flavia and I Illyricorum are also to be read. Independent attestations of the four legions from the Moesias in the east ca. 295, and the mention of the legio I Illyricorum (presumably raised by Aurelian and garrisoned at Palmyra), prompted Kennedy to assign the inscription a date at the end of the third century. During the preparation of this review Kennedy learned that the stone was rediscovered with the fort at Azraq, along with fragments of other Latin inscriptions. These are to be examined by Kennedy in Jordan and eventually published.

We are perhaps most indebted to Kennedy for the painstaking fieldwork from which grew the chapter on "Roads and Routes in North-East Jordan". This region was hitherto never systematically investigated, and even when some survey work was undertaken mistakes were made in the identification of ancient sites. One initial difficulty in tracing the ancient road-system east of the *via nova Traiana* is that no traces of paved surfaces were found (p. 138). Thus the approximate locations of some roads were initially guessed, and only later substantiated by physical evidence. Apparently aerial photography offered no assistance here, since it is not invoked in plotting the line of roads. Here one senses acutely the loss of Stein and other photographs (see below). Also of limited use were the few ancient maps of the region which survive in medieval copies (e.g., the Peutinger Table and the sheets which illustrate Ptolemy's *Geography*; on this see Bowersock, *Ibid.*, Appendix IV).

Given those restrictions and uncertainties, the results are nevertheless encouraging. For the *via nova* itself, place-names in the PT such as Hatita and

Thantia, long identified with Hadid and Umm al-Jamāl respectively, are shown by Kennedy to correspond more accurately to modern Khirbit (or Kal'at) al-Samrā' and Thughrat al-Jubb (pp. 148-154). These new identifications are the direct result of Kennedy's careful treks along certain stretches of the *via*, some not traversed before, culminating in the revelation that Roman reckoning of distances in Jordan incorporated the use of the "long" *stade* (pp. 150-151), the mileage standard used elsewhere in the Near East.

The survey also includes a discussion (lacking fieldwork) of the road system as it extends into the Syrian Hawran and adjacent regions. Here again, Kennedy questions some long-held assumptions such as the equation of the PT notation "Rhose" with Bostra (p. 158) and the identification of the PT's "Aenos" with the Trachonite town of Phaena (mod. Mismayah). These two identifications are particularly important, since the road shown on the PT passes through Rhose, thence to Chanata (Canatha/Qanawāt), on to Aenos and still farther north to Damascus. Both Poidebard and Maurice Dunand (*MAIBL* 13 [1933] 521-557) believed that the road shown on the PT depicted the trans-Leja highway surveyed and mapped by them in the late 1920's. Neither noticed that the trans-Lejā road *by-passed* Chanata, included nearby Suwaydā (Dionysias) and terminated at Bostra. Kennedy also notes that mileage distances on the PT between Aenos and Chanata do not correspond with the actual mileage between Phaena and Qanawāt; the distance between Qanawāt and Burāq (Constantia) do accord more closely. More importantly, the PT's depiction of the Roman road-system in southern Syria *antedates* the trans-Lejā highway and probably describes the situation obtaining in northern provincia Arabia between the completion of the *via nova* (115) and the completion of the trans-Lejā link (c. 175).

For roads east of the *via nova* in south Syria Kennedy relied upon earlier travel reports and surveys (e.g., Khirbit al-Subayqa), but on the Jordanian side this could be supplemented with on-site in-

scriptions. By far the most famous of these eastern roads is the *Strata Diocletiana*, the major line of defense and communication which ran along the edge of the steppe from Iraq to central Jordan. Although Kennedy's ground survey included only the southernmost portion of this, the area he concentrated upon was the least known. Milestone texts, for the most part fragmentary, are published on pp. 171-186 *passim*. Once again the discussion takes us across the modern border into the Syrian Jebal al-'Arab (Auranitis). It brings into focus the rise to prominence of Shaqqā, a village of obvious antiquity on the northernmost edge of Auranitis. It was long ago noted (*SEG* 7. 1055) that Shaqqa was elevated to city-status under the name *Maximianopolis* and eventually it achieved colonial rights (see A.H.M. Jones, *CERP*<sup>2</sup> 285 and note 82). But the *reason* for such political distinction has hitherto remained obscure. The geographical location of the village is the key; it stands, as Kennedy notes (p. 186) where the *Strata* north from Sa'ane bifurcates, one branch going north-west to Damascus, the other north-east to Dumayr. Its strategic position assured its sudden pre-eminence during the Tetrarchy, but one must also note (as Kennedy did not) that this must have been a deliberate choice, perhaps to discredit the nearby *colonia* of Philippopolis (Shuhbā). How else are we to interpret such a decision, when it would have been a simple matter to designate Philippopolis as the juncture of the two northern arms of the *Strata*? At any rate, Shaqqā's sudden elevation in status (*ca.* 295) parallels closely that of Suwaydā/Dionysias *ca.* 175 (at the expense of Canatha) when the trans-Lejā highway was built. What emerges clearly from this entire issue is the need for a systematic ground and aerial study of the road system in southern Syria. Poidebard and Dunand limited themselves to the easternmost sector of this region, and even then the survey was incomplete. The road system in the central and western Hawran is known only imperfectly, and remains today a major gap in the comprehensive study of the eastern *limes*.

Chapters 6 and 7 (some 100 pages

together) are devoted to Stein's aerial/ground surveys in Iraq and Jordan and the sections of the subsequent *Limes Report* completed but never published. Kennedy's introduction to this material makes fascinating reading; he has judiciously kept his notes and commentary to a minimum. The total amount of material that constituted the Stein collection filled 100 boxes on file in the Bodleian Library. In spite of Stein's methodical care and cautious duplication of almost everything (including photos) to avoid loss, Kennedy learned to his dismay that "all of the aerial photographs taken later in 1938 in Iraq and all of those taken over Jordan--some 350--are missing, as are all the finished plans and maps" (p. 205). Chapter 6 concludes with a complete catalogue (pp. 204-218) of the Stein collection, including descriptions of the lost photos.

Chapter 7 is devoted to the *Limes Report*, Stein's posthumous contribution to frontier studies. The complete typescript runs to 120,000 words, but Kennedy excerpted only the sections relevant to his own study. Even so, the reader is left to marvel at Stein's incredible energy and stamina, and the extent of territory he managed to cover in the little time remaining to him before the outbreak of war. It is impossible to summarize the richness and diversity of material in these pages of the *Report*. One may note that Stein's personal observations included the use of basalt slabs for house-building, tribal migratory patterns in the Jebal al-ʿArab, a frustrated attempt to survey the Wādī Sirhān, a note on silting-beds for water preservation, the completion of Brünnow and von Domaszewski's survey of the southernmost *limes* from Maʿan to ʿAqaba (including a visit to Udrūḥ and the Wādī ʿAraba), the identification of *Praesidio* in the TP with modern al-Khaldi, the discussion of an aqueduct system in the Sharā, hills, remarks on Roman road construction and the remains of a Roman bridge across the Wādī al-Ḥesā, some cogent observations on the water supply available to the Roman *castrum* at Lejjūn, and poignant concluding remarks on Qasr al-Ḥallabāt.

The volume concludes with a list of archaeological sites in north-east Jordan

which would benefit from further field-work or in the case of a few (e.g., Dayr al-Kahf, Qasr al-Ḥadid) from excavation. Kennedy himself hopes to undertake an excavation at Azraq in the near future (p. 308). The results of surface sherding are offered as an appendix with the specific caveat that interpretation of the dates obtained is very problematical. No mention is made, nor drawing photograph included, of stamped military roof-tiles from any of the sites, which is itself remarkable. This may simply be due to chance and the limitations of surface discoveries, but even multi-season excavations at Lejjūn and Udrūḥ have not produced them. My own preliminary survey of the proposed site of the legion encampment at Bostra produced a half-dozen military tiles. These are of little use in dating. But they inarguably demonstrate *military* occupation of a site.

Appendices B and C deal with the role and function of aerial photography in Jordan. Appendix B (written by Kennedy) is a résumé of early aerial surveys in the Near East during and shortly after WW I, and offers selected case studies of photographic research from area-wide, regional-wide and specific site perspectives, emphasizing cultivation patterns. Kennedy's concluding remarks draw attention to the Aerial Photographic Archive for Archaeology in the Middle East which he founded at the University of Sheffield in 1979.

Derek Riley contributed Appendix C, which demonstrates what can be learned from aerial photos once a ground survey has been conducted and the photo/ground information transferred to scaled maps. The area he surveyed is that near Azraq, utilizing photos taken in 1922, 1927 and in the early 1950's. The results will be of particular interest to pre-historians and anthropologists.

The entire volume is profusely illustrated with plates, drawings and maps--not all of equal quality. Photos frequently have no point of orientation, and on some multi-view plates (e.g., pp. 104-105) the individual photos are oriented in opposite directions. In the computation of mileage distances on pages 150-152 some mention might have been made of travel-time be-

tween road-stations in areas where substantial sections of road-paving is extant. Luckily there is one indication of travel-time for a military unit in Jordan *prior to* the construction of the *via nova*; p. Mich. 406 (A.D. 107) preserves a remark that "Bostra is eight days' march from Petra"; one wonders how quickly the same military could traverse that distance once the *via* was built. Footnote references and the bibliography listings are not coordinated closely enough to avoid confusion with works produced by the same author in one year — e.g., a reference to "Poidebard, 1934 b" has no corresponding indicator in the bibliography and one must go through individual listings to select the work in question. Transliterations of Arabic place-names are consistent if not accurate, and the glossary of common terms on p. v is helpful.

This volume represents a major step in the process of recording and evaluating

the physical evidence of Roman military sites in one selected area of Jordan. The approach is pragmatic, systematic and broad enough in scope to utilize published material from adjacent regions (and occasionally north Africa) for purpose of contrast and comparison. The survey work done at Azraq is especially exemplary, not least for the constant awareness that Azraq and its satellite outposts are a complex *unit*, one part of which cannot be examined in isolation but always with a view to its related components. This aspect has previously been neglected, or at the least underestimated. One hopes that Kennedy has the good fortune to continue his fieldwork in Jordan, and that future volumes of frontier research are as worthy of emulation as this one.

Henry Innes MacAdam  
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## KHIRBET SALAMEH

by

C.J. Lenzen  
and Alison McQuitty

During the winter and spring of 1984, Khirbet Salameh, a small installation on the north-north-west side of Amman, across from the University of Jordan campus, was partially excavated. The site consists of a rectangular installation measuring 20.00 x 20.00 m. The construction of the building was as follows: bedrock, square-cut stones and chinking without any other mortar to a height of 2.50 m. (pl. LVI: 1).

On a lower terrace, a seven-coursed wall was excavated. Although the function of this wall remains unclear, it may have served as a retaining wall of some sort.

The material culture remains from the site consisted primarily of coarseware pottery sherds and basalt mortar fragments. The pottery primarily dates to the Hellenistic through Roman periods; with the pottery from the sealed layers within the installations dating to the Roman period.

The installation showed signs of reuse during the later periods. In all probability, it was used as a permanent base serving a transitory population.

C. J. Lenzen  
Alison McQuitty  
Irbid, Jordan



## TELL IRBID

by  
C.J. Lenzen  
and Alison McQuitty

The municipality of Irbid's expansion programme for the business district of the city required the removal of major sections of *Tell* Irbid during the summer of 1984. As a consequence, rescue excavation was conducted by the Department of Antiquities and the authors.

The *tell* is the focal point of the modern city and is visible for a considerable distance. Following 1921, the top of the *tell* was levelled and municipal and government buildings were built on top. Throughout the period from 1948 until today, the *tell* and the surrounding area has gradually been developed.

The 1984 rescue excavations concentrated on gaining a stratigraphic history of the *tell*. Two stratigraphic probes were excavated along with two tomb areas.

The two tomb areas excavated were located on the east side of the *tell* near the tombs excavated in the 1960's. Neither of these contained *in situ* material. The only material cultural remains recovered were potsherds dating from the early Bronze through Hellenistic period.

The two stratigraphic probes excavated were on the north side of the *tell*

across the massive wall which surrounded the ancient city and on the west side of the *tell* (Pl. LVI: 2). The wall surrounding the *tell* was made of large basalt boulders and was rebuilt during the Iron IA period. The building of the wall occurred in all probability during the Middle Bronze Age. On the west side of the *tell* domestic installations dating from the Late Bronze Age and Iron I periods were excavated.

In addition to the excavated trenches, the *tell* and surrounding area were surveyed by the authors. The pottery collected indicates extensive occupation during the Early Bronze, Late Bronze, Iron Age, Roman, Byzantine and later Islamic periods. Minimal pottery evidence indicates Chalcolithic and early Islamic occupation.

The recently conducted work on *Tell* Irbid and the surrounding area form an integral part of the "Irbid/Beit Ras Project."

C. J. Lenzen  
Alison McQuitty  
Irbid, Jordan





## A ROMAN TOMB IN HAM

by  
Sultan Shraideh  
and C.J. Lenzen

Ham, a small village located six kilometres south of Irbid and near Kufr Yuba, is, like most of Jordan, undergoing extensive development. In the spring of 1984, a late Roman (mid-third century A.D.) tomb was uncovered by a road-working crew. The tomb was excavated by Mr. Sultan Shraideh and Mr. Wagieh Karasneh of the Department of Antiquities. A full report on this tomb will appear in a forthcoming *ADAJ*; below is a summary of the results of the excavation.

The tomb was originally a limestone cave. The cave was prepared for burials, probably representing two phases of use, by the chiselling of loculi and the building of dividing walls. Supportive evidence for the reuse of the tomb during antiquity was found during excavation. This was partially evident as the door had been left ajar and

then re-sealed with mud. The total inside size of the tomb was 24.40 m. x 10.00 m. The numerous sarcophagi in the tomb were all made from the same soft limestone; they were unadorned, except for the "horns" on the lids; and, they had all been opened in antiquity. Lamps and glass were found in the tomb, but were not *in situ*.

The most impressive part of the tomb was its facade (Pl. LVII). To the left of the doorway, a tombstone (not pictured) was found. The tombstone and doorway were all carved from limestone. The doorposts were decorated with a snake (left) and a torch (right) whereas the lintel was decorated with a head flanked by two flowers.

Sultan Shraideh  
C. J. Lenzen  
Irbid, Jordan



# THE AZRAQ PROJECT, 1984

by  
Andrew Garrard

The Azraq Project was begun in 1975 in order to learn more of the history of environment, settlement, culture and subsistence in the presently arid zone of South-West Asia at the time that farming and settled village life was developing around the Fertile Crescent.

In 1975, the author and Stanley Price<sup>1</sup> made a survey of fifteen localities around the Azraq Basin and found the region to be rich in sites of late Acheulian to Pottery Neolithic date. Evidence was also found for a large Pleistocene lake at the centre of the depression.

In 1982, the author and a small team<sup>2</sup> returned for a second season to make a geomorphological survey of the former lake and of two of its tributary *awdiyah* to obtain more information on settlement patterns and to try to locate stratified late Glacial and early Holocene sites. In the western *awdiyah*, sedimentary evidence was found for alternating wet and dry phases and a number of Upper Palaeolithic, Epipalaeolithic and Neolithic sites were found intercalated in these deposits. In the Azraq region sediments indicated that the last major lake rose to cover ca. 700 sq. km. (fig. 1) and Epipalaeolithic sites were found stratified beneath and above these deposits. Neolithic sites were also found by the present lake side. If prehistoric nomadic movements had any similarity to those of today, it is possible that the two areas were used seasonally by the same populations.

In order to obtain dates for the environmental sequence and in order to begin a reconstruction of the region's prehistory, a programme of soundings was begun in autumn 1984. In this first season, five Upper Palaeolithic to Pre-Pottery Neolithic B sites were sounded in a tributary of the former Azraq lake, 55 km. to its south-west (Wadi el-Jilat - fig. 1). For maximum retrieval, all the material from *in situ* deposits was coarse sieved, floated and wet sieved through a 1.5 mm. mesh. Soil/pollen and carbon samples were also collected from each deposit.<sup>3</sup>

One of the sites excavated contained late Upper Palaeolithic material (W.J. 9) whilst three others date to the late Epipalaeolithic (W.J. 6, 8, 10). One of the latter (W.J.6) had three phases of occupation separated by semi-sterile levels. In the uppermost phase were three prepared floors, two of which were covered in a red pigment. The latest site sounded (W.J. 7) appeared to be a Pre-Pottery Neolithic B hunter's village. A circular semi-subterranean hut with walls built from single slabs of limestone placed on end, was partially excavated. Although domestic sheep and goat were being kept at contemporary settlements in more fertile areas to the west, the subsistence at W.J. 7 appeared to be based on the local fauna: gazelle, ass, fox, hare and tortoise.

In autumn 1985 the author hopes to sound a probable Pottery Neolithic site in Wadi el-Jilat to see if there is any evidence

<sup>1</sup> A. N. Garrard, and Stanley Price, N.P., A survey of prehistoric sites in the 'Azraq Desert National Park' in eastern Jordan, *ADAJ*, XX (1975) p. 83-90.

A. N. Garrard, Stanley Price, N.P. and L. Copeland, A survey of prehistoric sites in the Azraq Basin of Eastern Jordan, *Paléorient*, 3, (1977) p. 109-126.

<sup>2</sup> A. N. Garrard P. Harvey, F. Hivernel, and B. Byrd, The environmental history of the Azraq Basin, in A. Hadidi (ed.) *Studies in the history and*

*archaeology of Jordan Vol. 2* Amman, Department of Antiquities, 1985.

A. N. Garrard, B. Byrd, P. Harvey and F. Hivernel, Prehistoric environment and settlement in the Azraq Basin, A report on the 1982 survey season, *Levant*, 17 (1985) p. 1-28.

<sup>3</sup> The artefacts are being studied by Brian Byrd and Alison Betts, the animal remains by Andrew Garrard, the plant remains by Susan College, the soil/pollen samples by Christopher Hunt and the C14 samples by the Oxford University Radiocarbon Accelerator Unit.



for pastoralist activity in the desert region by the sixth millennium. The intention is also to sound a series of sites related to the former lake at Azraq, in order to establish a chronology for the last major pluvial period in the region, and to see if there is any evidence for seasonal complementarity

with contemporary sites in the Wadi el Jilat.

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# ABU NSEIR EXCAVATION

by  
Khaled Abu Ghanimeh

## Introduction

When I received a report that some people were searching for gold in the Abu Nseir area, I and the inspector for Amman's antiquities, went to the site. We found that a tomb area had been disturbed. Artefacts were found throughout the area.

## The Site

The Abu Nseir tell is located 4 kms. north of Sweileh. It overlooks the Beq'ah Valley and the Amman-Jerash highway. The area is rocky, with many caves. The foundations for two square towers were observed and a large north-south wall.

A square was excavated near the western tower on May 11th, and work was continued until June 30th 1981. Two courses of stones were found, standing 1.50 m. in height. The stones measured 1.00 X 0.77 X 6.70 m. The tower was built on bedrock and is dated to the eighth/seventh centuries B.C. (late Iron Age II), based on the recovered pottery.

Two tombs were also excavated. The first tomb had an entrance measuring 1.17 m. high with five steps leading into the burial chamber. The chamber measured 2.50 m. x 1.70 m. and was 1.44 m. high. The tomb contents had been disturbed and bones and artefacts were scattered throughout the tomb. The artefacts date the tomb to the same period as the western tower.

The second excavated tomb was undisturbed. It was closed with a rock which hid the six steps leading to the burial chamber. The walls of this tomb were covered with plaster. The only material culture remains from the tomb were sherds dating to the Iron Age and the Mamlük period.

A wine press in (Fig. 1), similar to the one found at Umm es-Summaq, was also found here (1983). There were two squared basins, 5.00 x 5.00 m., within a one-course wall enclosure. Two smaller basins for straining the wine were also found. The pottery found here dates the press to the Byzantine period.

## Abu Nseir Excavation 1981

No.	Description	Parallels	Plate
1.	Bowl, buff ware, inverted rim, shallow ring base, medium hard ware.	1. L. Harding: Iron Age Tomb at Sahab. QDAP. XIII. 1948 Fig. 3. p. 97, No. 9	LVIII: 1:1
2.	Bowl buff ware, grooved rim, flat base, medium hard ware, red burnished	1. L. Harding: The tomb of Adoni Nur in Amman. P.E.F.A. No. VI. 1953. Fig. 21. No. 67. 2. L. Harding: Iron age tomb at Sahab. QDAP. Fig. 3. No. 7-8. p. 97.	LVIII:1:2
3.	Bowl, inverted rim, 4 knob handle, medium hard ware, red burnished, shallow ring base.	1. L. Harding: Iron age tomb at Sahab. QDAP. XIII 1948. Fig. 3. No. 11, p. 97	LVIII:2:3
4.	Bowl, everted rim, grooved below the rim, small disc base, medium hard ware burnished inside and outside.	1. L. Harding: Iron age tomb at Sahab. QDAP. XIII. 1948. Fig. 3. p. 97. No. 8.	LVIII:2:4



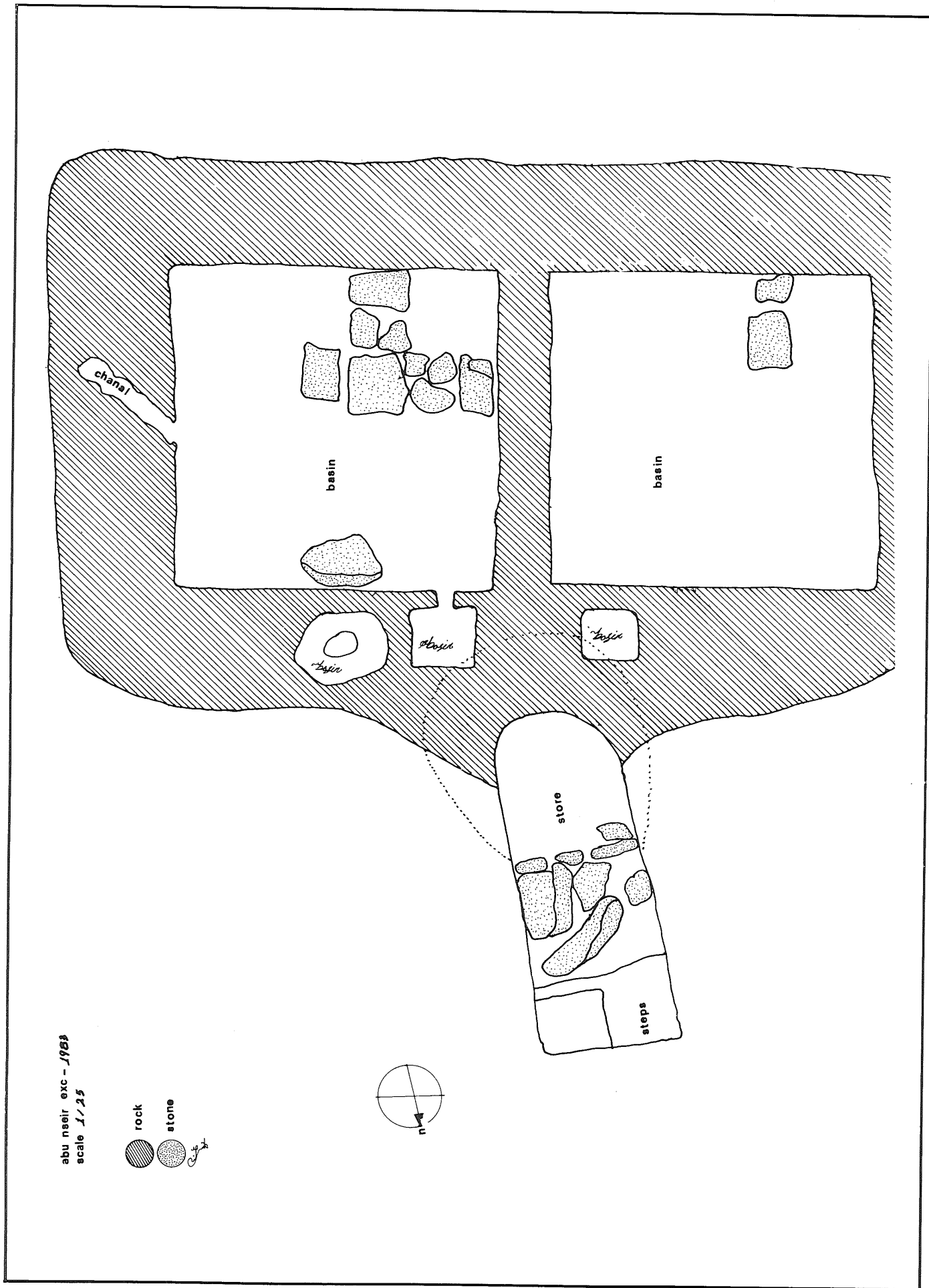


Fig. 1

- |     |   |   |            |
|-----|---|---|------------|
| 5.  | Bowl, everted rim, medium hard ware, whitish colour burnished flat base.  | 1. L. Harding: Iron age tomb at Sahab. QDAP. XIII. 1948. Fig. 3. p. 97. No. 7-8.  | LVIII:3:5  |
| 6.  | Bowl, carinated body, inverted rim, knob handle, one missing, burnished inside and outside, medium hard ware, disc base, broken and mended. Part of body missing. |   | LVIII:3:6: |
| 7.  | Bowl, inverted rim, 4 knob handle, red burnished inside and outside, shallow ring base medium hardware, broken and mended.  | 1. L. Harding: Iron age tomb at Sahab. QDAP. XIII. 1948. Fig. 3. No. 11. p. 97.   | LIX:1:7    |
| 8.  | Lamp, hardware wide flanged rim, deeply pinched, nozzle, buff ware, blackened nozzle, ring base.  | 1. L. Harding: Iron age tomb at Sahab. QDAP. XIII: 1948. Fig. 7. p. 101. No. 74.<br>2. L. Harding: The tomb of Adoni nur in Amman. P.E.F.A. Vol. VI. 1953. Fig.: 21: No. 84.<br>3. R. Dajani: An Iron Age tomb from Amman ADAJ: Vol. XI. 1966. Pl. IV. No. 115.   | LIX:2:8    |
| 9.  | Lamp, wide flanged rim, pinched nozzle, flat base orange ware.  | 1. R. Dajani: Four Iron age tombs from Irbid. ADAJ. XI. 1966 Pl. XXXIII. No. 15.  | LIX:2:9:   |
| 10. | Pottery lamp, wide flanged rim, elongated black nozzle, deeply pinched, slightly broken ring base. Buff ware. incomplete, L. part of rim and body missing.        | 1. L. Harding: Iron age tomb at Sahab. QDAP. XIII. 1948. Fig. 7. No. 72. p. 101.  | LIX:2:10   |
| 11. | Lamp, wide flanged rim, elongated deeply pinched nozzle. blackened nozzle, round base. orange ware, part of rim missing.  | 1. L. Harding: Iron Age tomb at Sahab. QDAP. XIII. 1948. Fig. 7. No. 75. Fig. 8. No. 80.<br>2. L. Harding: Two Iron age tombs from Amman. QDAP. XI. 1945. P. XVII: 14.<br>3. S. Saller: Liber Annuus. Vol. XVI. 1965-66. P. 200. Fig. 14. No. 8.<br>4. M. Piccirillo: Una Tomba Del Ferro I A Madaba Liber Annuus. Vol. XXV. 1975. Tav. VIII. No. 6.<br>5. R. Dajani: Four Iron age tombs From Irbid. ADAJ. XI. 1966. Pl. XXXIII. No. 14. | LIX:2:11   |
| 12. | Lamp, wide flanged rim, elongated pinched nozzle, buff ware, incomplete (part of body and nozzle missing).  | 1. L. Harding: Iron Age tomb at Sahab. QDAP. XIII. 1948: Fig. 8. No. 81. p. 102.<br>2. L. Harding: Two Iron age tombs-Amman. QDAP. XI. 1945. p. 70. No. 16.<br>3. R. Dajani: An Iron age tomb from Amman. ADAJ: Vol. XI. 1966 No. 111. Pl. IV.  | LIX:3:12   |
| 13. | Lamp, wide flanged rim, elongated pinched nozzle buffware, incomplete, part of nozzle and rim missing.  | 1. L. Harding: Iron Age tomb at Sahab. QDAP. XIII. 1948. Fig. 7. No. 75, p. 101, Fig. 8, No. 77: p. 102.  | LIX:3:13   |
| 14. | Lamp, wide flanged rim, elongated medium pinched nozzle, blackened nozzle, pink ware, incomplete mended.  | 1. L. Harding: Iron age tomb at Sahab. QDAP. XIII. 1948. Fig. 8. No. 78. p. 102.<br>2. R. Dajani: An Iron Age tomb from Amman. (J.J. Sharqi). ADAJ. Vol. XI. 1966. Pl. IV. No. 114.<br>3. S. Saller: Iron Age tomb at Nebo. (Jordan) Liber Annuns. Vol. XVI. 1965-66. Fig. 14. No. 16. p. 200.  | No Plate   |
| 15. | Juglet, one loop handle, inverted trefoil rim,  | 1. L. Harding: Iron Age Tomb at Sahab.  | LX:1:15    |

- rounded base, Reddish-yellow ware, incomplete, rim is missing.
16. Juglet, one loop handle grey and black grits, reddish-yellow ware, traces of red slip, Possibly trefoil rim, disc base, incomplete. rim is missing. QDAP. XIII. 1948. Fig. 5. P. 99. No. 44.
17. Jug, rounded body, ridged-grooved rim, Loop handle, shallow disc base, Red colour.
18. Dipper Juglet, Loop handle inverted rim, rounded flat base, buff ware, complete.
19. Decanter. (Small size) ridged rim, handle drawn from the ridge of neck, disc base. Grey ware, burnished
20. Spouted juglet, Loop handle triangular rim in a section, rounded base, orange burnished slip, vertical brown painting, complete.
21. Spouted juglet, Loop handle, reddish ware, brown and white painting, disc base, incomplete.
22. Small Juglet, Loop handle, triangular rim in section, round flat base, dark-grey colour, burnished black slip. incomplete.
- 23: Assyrian bottle, painted base, traingular rim in section, short neck, creamy burnished colour, burnished and decorated with horizontal brown bands on neck and body, complete.
24. Small dipper Juglet, one Loop handle, Pinched grooved rim, globular body, rounded base reddish ware, red slip, complete.
25. Juglet, one loop handle, turned over rim, short-neck, dark grey colour, black burnished slip, flat base, complete.
1. L. Harding: Two Iron Age Tombs from Amman. QDAP. XI. 1945. p. 71. No. 32. Pl. XVII
2. L. Harding: Iron Age tomb at Sahab. QDAP. XIII. 1948. Fig. 5. No. 49. p. 99.
3. R. Dajani: An Iron Age tomb from Amman. ADAJ. Vol. XI: 1966. Pl. VI. No. 33.
1. L. Harding: Iron Age Tomb at Sahab. QDAP XIII. 1948. p. 99. Fig. 5. No. 51.
2. R. Dajani: ADAJ: Vol. XI. 1966. p. VII. No. 5. Pl. VI. No. 5A. p. 42-43.
3. F. Zayadine: Tomb du fer II A Samarre-Sabaste; Revue biblique 1968, Fig. 2 No. 4. Planche LXI.
1. L. Harding: Iron Age Tomb at Sahab. QDAP. XIII. 1948. Fig. 5, No. 38. p. 99.
2. L. Harding: Two Iron age Tombs in Amman. ADAJ Vol. I. 1951. Fig. I. No. 19.
1. L. Harding: Iron Age tomb at Sahab. QDAP. XIII. 1948. Fig. 6. No. 57: p. 100.
1. R. Dajani: An Iron Age tomb from Amman. ADAJ. Vol. XI. 1966; Pl. V. No. 99.
1. Awni, K, Dajani; An Iron Age tomb at Al Jib. ADAJ: Vol. 2 & 3, p. 70. Pl. IX No. 20.
1. L. Harding: Iron Age tomb at Sahab. QDAP. XIII, 1948, Fig. 5; No. 45. p. 99.
1. L. Harding: Two Iron Age tombs at Amman. QDAP. XI. 1945. p. 71, No. 21.
2. L. Harding: Two Iron age tombs in Amman. ADAJ. Vol. I. 1951, p. 39, No. 13.
3. R.W. Dajani: An Iron Age Tomb from Amman (J. Jofeh al Sharqi) ADAJ. Vol. XI, 1966, No. 62, Vol. IV.
4. L. Hardi:ag: Iron age Tomb at Sahab. QDAP XIII. 1948, p. 98, No. 34. Fig. 4.
5. L. Harding: The tomb of Adoni Nur in Amman. P.E.F.A. Vol. VI. 1953. Fig. 22. Pl. VI. No. 95, 96.
6. L. Harding: Iron Age Tomb at Sahab. QDAP XIII, 1948. P. 95-No. 42. Pl. XXXV.
1. L. Harding: QDAP XIII, 1948. Fig. 5 No. 39, p. 99.
1. R. Dajani: An Iron Age tomb from Amman (J. Jofeh Al Sharqi) ADAJ. Vol. XI. 1966. Pl. V. No. 94.
2. L. Harding: Two Iron Age tombs in Amman. ADAJ. Vol. I. 1951. Fig. I. No. 24.
- LX:1:16
- LX:1:17
- LX:1:18
- LX:2:19
- LX:2:20
- LX:2:21
- LX:3:22
- LXXI:1:23
- LX:3:24
- LX:3:25

		3. L. Harding. Two Iron age tombs from Amman. QDAP. XI, 1945. pl. XVIII, No. 64. No. 94: is similar to Amman tomb c. Fig. 1. 24 (ADAJ. 1-2) dated, 8-7 Cent B.C. and 10 lach. III. Pl. 75-35.	
26.	Assyrian bottle, pointed base shortneck, buff ware, short neck decorated with horizontal brown bands, burnished, complete.	1. L. Harding: Two Iron age Tombs, Amman. QDAP. XI. 1945. Pl. XVII, No. 22. 2. L. Harding, Two Iron age Tombs, Amman. QDAP. XI. 1945. Pl. XVIII, No. 56. 3. L. Harding, Two Iron age tombs at Sahab. QDAP. XIII. 1948. No. 33. Fig. 4, p. 98. 4. L. Harding, The tomb of Adoni Nur in Amman. P.E.F.A.: Vol. VI, 1953. Fig. 22, No. 95.	LX:1:26
27.	Amphoriskoi (small) Two broken loop handle ridged neck, possibly mushroom rim, rounded body, disc base, reddish ware, traces of red burnished slip, incomplete.	1. R. Dajani: An Iron age tomb from Amman (J.J. Al Sharqi) ADAJ. Vol. XI. 1966. Pl. II. Fig. 3, No. 14.	LX:3:27
28.	Small bowl, slightly everted rim, concave base, white grits, reddish, yellow ware.	1. L. Harding. Two Iron Age tombs from, Amman. QDAP. XI. 1945. Pl. XVII. No. 7.	LIX:3:28
29.	Double ended rim, lightly red ware, convex base, nozzle slightly pinched. incomplete.	1. L. Harding, Two Iron age tombs in Amman. QDAP. XI, 1945. Pl. XVII, No. 17. 2. L. Harding: Two Iron age tomb in Amman. ADAJ. I. 1951. Fig. I. No. 15. 3. R.W. Dajani: An Iron age Tomb from Amman (J.J. Al Sharqi). ADAJ. Vol. XI. 1966. Pl. IV. No. 121. p. 45. No. 121, is similar to Amman tomb A. QDAP. XI p. 70, no. 17.	LIX:3:29
30.	Tripod cup. One loop handle thick-flat everted rim, straight sided body, reddish ware.	1. R. Dajani: An Iron age tomb from Amman (J.J. Sharqi) ADAJ. Vol. XI, 1966. Pl. VIII. No. 48.	LXI:2:30
31.	Tripod cup, one lug handle straight sided body, ridged inverted rim, brown and white painting on rim, orange beige ware (creamy).	1. L. Harding. Two Iron age tombs. Amman. QDAP. XI. 1945, p. 70, no. 13.	LXI:2:31
32.	Juglet, rounded base, pinkish colour, incomplete mended.		LXI:2:32
33.	Rounded bowl, flared up rim, slightly everted, disc base, pinkish-yellow slip, burnished, incomplete, mended.	1. L. Harding, Two Iron age tombs. ADAJ. Vol. I, 1951; Fig. I, No. 9	LXII:1:33
34.	Slightly carinated shallow bowl, thick flat carinated rim, red burnished slip incomplete, mended.	1. L. Harding: The tomb of Adoni Nur in Amman. P.E.F.A. No. VI. 1953; Fig. 21, No. 64.	LIX:1:34
35.	Small Juglet, one loop handle, rounded base, reddish yellow ware, red burnished slip.	1. S. Saller: Iron Age tombs at Nebo. Liber Annuus XVI. 1965-1966, fig. 34; No. 16.	LX:3:35
36.	Upper part of Juglet, handle starts from middle of neck to the body, orange ware, incomplete, mended.		LXI:2:36
37.	Small bracelet incomplete	—	LXII:2:37
38.	Small bracelet incomplete	—	LXII:2:38
39.	Small bracelet incomplete	—	LXII:2:39
40.	Small bracelet incomplete	—	LXII:2:40
41.	Earrings, broken into pieces	—	No plate

- |     |   |  |           |
|-----|---|--|-----------|
| 42. | Iron object, (pieces), rusted   | —  | No plate  |
| 43. | Shell, perforated   |  | LXII:3:43 |
| 44. | Scarab perforated   |  | LXII:3:44 |
| 45. | Jug, ball shaped, disc base orange ware, hole in body, incomplete.  | 1. L. Harding: Two Iron age Tombs in Amman. ADAJ. Vol. I. 1951, Fig. I. No. 27.  | LX:2:45   |
| 46. | Juglet, one handle, concave base incomplete, mended.  | —  | LX:3: 46  |
| 47. | Deep bowl, carinated rim, gross on surface, disc base, complete, mended.  | 1. R. Dajani: Jabal Nuzha Tomb at Amman. ADAJ. Vol. XI. 1966. Fig. 14; Pl. XV.   | LXII:1:47 |
| 48. | Krater, tripod loop handles on base, thick flat rim, reddish, yellow colours, mineral inclusions two bands of brown colour and in between wide red band, ring base incomplete mended. | 1. S. Saller, Liber Annuus. Vol. XVI; 1965-1966. Fig. 35. No. 10.  | No plate  |
| 49. | Lamp, wide flanged rim, blackend pinched nozzle, disc base, light red ware, incomplete, mended.   | —  | No plate  |
| 50. | Lamp, wide flanged rim, blackened, pinched nozzle, disc base, pink ware, complete.  | 1. S. Saller: Iron age tomb of Nebo, Liber Annuus. Vol. XVI, 1965-66. Fig. 14. No. 18, p. 200.<br>2. L. Harding: Iron age tomb of Sahab. QDAP. Vol. XIII, 1948. Fig. 8. No. 78-83. | No plate  |

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# SOME NOTES ON SOUTH SAFAITIC

by  
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## Introduction

As can be seen from thousands of inscriptions and some other sources, the Arabian peninsula is the home of a great many languages and dialects. These can conveniently be classified through the use of only one criterion, which has turned out to be of special significance, i.e., the definite article. One possible distinction can be gained from the position of the definite article. Languages with suffixation belong to the Old South Arabian type, recently called Sayhadic;<sup>1</sup> languages showing a prefixed article belong to the North Arabian type.

According to the elements used, the following groups of the North Arabian languages can be classified further.<sup>2</sup>

North Arabic, with the article *ha(n)*- which comprises all varieties of Old North Arabic, i.e., Safaitic, Thamudic, etc.,

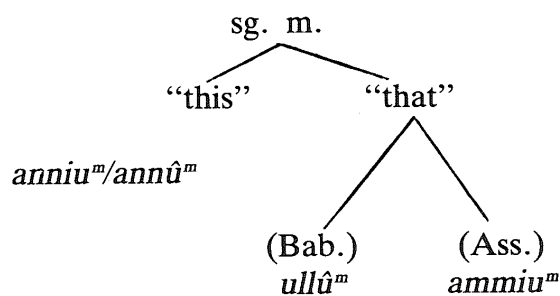
Central Arabic, with the article (')*al*- to which Classical Arabic belongs,

West Arabic, with the article (')*am*-, a feature which has been reported, e.g., for the Yemenite dialect.<sup>3</sup>

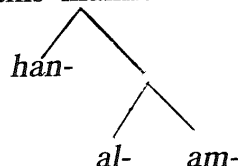
It is obvious that the articles in question can be derived from demonstrative elements. This process could be traced up to modern dialects, cf. modern *hal-beet* "this house" and *has-suu* "this bazaar"<sup>4</sup>

with classical *haada* 'l-bait resp. *haada* 's-suuq,<sup>5</sup> if it turns out that this *hal*- should not contain a demonstrative particle *haa* (without *ḏ*.)<sup>6</sup>

It would appear worth mentioning in this context that relevant demonstrative elements with *n*, *l*, and *m*, resp., are already found in Akkadian, in which a demonstrative pronoun with *n* is distinguished from a demonstrative pronoun with *l* or *m* (according to the dialect) in a way equivalent to our distinction between "this" and "that".<sup>7</sup>



In following this scheme, we are now able to classify the North Arabian groups in this manner:



If we continue by using the form of the article as a criterion of classification, we

<sup>1</sup> This paper was read at the Fourth International Conference on the History of Bilad al-Sham that took place in Amman, October 1983.

A.F.L. Beeston, *Languages of Pre-Islamic Arabia*, *Arabica* 28 (1981). p. 178-186.

<sup>2</sup> For a somehow different classification cf. Beeston l.c.

<sup>3</sup> C. Rabin, *Ancient West Arabian*, London, 1951; p. 34. with further references. The existence of the (')*am*- article in the Tayyi' dialect (*op. cit.*, p. 205) leads him to consider it as a genuine feature of West Arabic, although the dialects of this region exhibit a "heavy dominance of the h(n) article"

(Beeston, *Languages* p. 185).

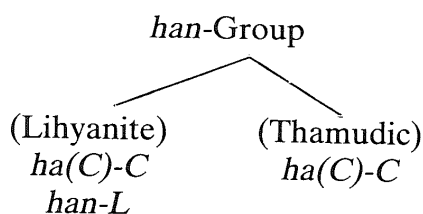
<sup>4</sup> H. Grotzfeld, *Syrisch-arabische Grammatik*, Wiesbaden, 1965, p. 21.

<sup>5</sup> Cf. C. Brockelmann, *Grundriß der vergleichenden Grammatik der semitischen Sprachen*, vol. 1, Berlin, 1908, p. 318.

<sup>6</sup> As demonstrated by W. Fischer, *Die demonstrativen Bildungen der neuarabischen Dialekte*, 's-Gravenhage, 1959, p. 47.

<sup>7</sup> W. von Soden, *Grundriß der akkadischen Grammatik*, Rome, 1952, p. 46-47, cf. already Brockelmann, *Grundriß* p. 316-317.

shall arrive at the following division of the *han*-group. In one branch, the article is retained only before laryngals; in the other one, there are no visible traces of *n* left:



The first branch is represented by the Liyanite inscriptions, the second by the great bulk of Thamudic and Safaitic inscriptions whose classification, according to script, character cast, and language style, can be called the “greatest unsolved problem of Arabic epigraphy”.<sup>8</sup> One group of these inscriptions, first found in the South Syrian Şafâ’ and later also in adjacent areas of Jordan and Saudi Arabia, can clearly be separated from the others because of its characters and its organization.

The remaining Old North Arabic inscriptions are usually labelled “Thamudic”, a general term for all inscriptions that have not been characterized in a positive manner. Indeed, the division of the “Thamudic” inscriptions into six different groups, as done by F.V. Winnett,<sup>9</sup> has been a great step forward in that it has made further progress possible.

Although Winnett has already detected some similarities between his Thamudic E, later on dubbed Tabuki,<sup>10</sup> and Safaitic,<sup>11</sup> it is only recently that these connecting lines have been stressed, which does not mean, however, to imply the existence of a homogeneous group.<sup>12</sup> In order to emphasize the cultural unity with Safaitic, inscriptions of the Tabuki type which, in script and language, show specific Safaitic traits, i.e., the marked affiliation and the three-part structure, are called

South Safaitic.<sup>13</sup>

It is a peculiarity of some Southern texts that the verb *w $\bar{t}$ m* is used instead of *wgm* “to mourn”, which was already noted by G. L. Harding and E. Littmann in their “Some Thamudic Inscriptions”,<sup>14</sup> which contains the most extensive group of South Safaitic texts published to date. This has just been successfully investigated by E.A. Knauf<sup>15</sup> who has thus helped to clear the way for some further observations. E.A. Knauf suggested that the letter  $\text{ç}$ , which had so far been identified as  $\bar{t}$ , be read in these texts as *g*, cf., e.g., the reading of the verb *wgm* and the personal names *'gmc*, *grm*, *grf*, *gml* and *gmhr* which could not be interpreted in a straight forward way when reading  $\bar{t}$  instead of *g*.

This unusual orthography can be explained by the historical merging of *t*, and  $\bar{t}$  in  $\bar{t}$ , which made the letter  $\bar{t}$  available for the use of *g* which must be assumed to have altered its phonetic nature. It appears appropriate to give this matter some more consideration. South Safaitic is phonemically characterized by having lost its interdental (affricate →) fricative series which merged with the dental stop series.

(a)  $\bar{t}$  merged with *t*, as can be seen from words with etymological  $\bar{t}$  that are written with *t*, as (TIJ 280) *t'r*, instead of  $\bar{t}'r$ , and (TIJ 105) *tmd*, instead of  $\bar{t}md$ <sup>16</sup>), thus leaving the now-obsolete letter  $\bar{t}$  for other purposes.

(b) Now if  $\bar{d}$  did merge with *d* in the same way, we may expect to find some instances of *d* for etymological  $\bar{d}$ . There are, however, only some cases of  $\bar{d}$  for *d*, as in (TIJ 490) *z $\bar{d}$* , instead of *zd*, and (TIJ 69) *y $\bar{d}$ c*, instead of *yc*.<sup>17</sup> This seems to indicate that the letter  $\bar{d}$ , currently used in phrases with *d $\bar{k}$ r* ‘to remember’ and *d $\bar{t}$ -l* ‘of the family/tribe of’, represents both  $\bar{d}$  and *d*. The rare instances of written  $\bar{d}$ , as in (TIJ

<sup>8</sup> F. V. Winnett, *A Study of the Liyanite and Thamudic Inscriptions*, Toronto, 1937, p. 20.

<sup>9</sup> Winnett, *Study*.

<sup>10</sup> F. V. Winnett and W. L. Reed, *Ancient Records from North Arabia*, Toronto, 1970, p. 70.

<sup>11</sup> E.g., Winnett, *Study*, p. 49, 53.

<sup>12</sup> V.A. Clark, Three Safaitic Stones from Jordan, *ADAJ*, XXIV (1980), p. 128.

<sup>13</sup> Cf. R. M. Voigt, Einige altnordarabische Inschriften, *ZDPV* 97 (1981), p. 179.

<sup>14</sup> I.e., *Some Thamudic Inscriptions from the Hashemite Kingdom of the Jordan*, Leiden, 1952, abbreviated as *TIJ*.

<sup>15</sup> Südsafaitisch, *ADAJ*, XXVII (1983), p. 587-596.

<sup>16</sup> *Op. cit.* § 2.3.1.

<sup>17</sup> *Op. cit.* § 2.3.2.

58) *wd*, (TIJ 198) *scd*, and (TIJ 494) *hđn*<sup>18</sup>, should then be seen as cases of historical orthography.

(c) As to the third member of the interdental series, the emphatic *z*, South Safaitic, as the ‘Thamudic’ scripts in general, but contrary to North Safaitic, did not develop a specific character for it. At least in script., *z* merged with the corresponding voiced emphatic dental (*d*), not with its voiceless dental counterpart (*t*), as we may expect from Aramaic. Cf. the following personal names containing *d* instead of etymological *z*:

(WIJ 349) *cdmn*, with root *czm*.

(WIJ 352) *dnt*, with root *znn*.

In other personal names, it is not quite clear whether South Safaitic *d* represents North Safaitic *d* or *z*, as it may be in (WIJ 58) *gd*, for which different roots can be given.

The loss of the three interdental fricatives, as demonstrated above, may be summarized in the following scheme, which shows the phonological develop-

of transition that has been dated to the first half of this millennium.<sup>21</sup> The evidence provided by South Safaitic shows, however, that there may have been antecedents in other places and dialects at different times.

In addition to the merger of the interdental fricatives with the dental plosives yet another sound change is rather remarkable for the makeup of the South Safaitic phonological system, i.e., the palatalization of *g*. This sound has changed neither to *y* [*j*]<sup>22</sup> nor to *ǰ* [*dž*], but to *ž*. If *g* had been pronounced as *ǰ*, one would have to explain why a new character should have been invented only to designate a palatalized variant. If *g* had been merged totally with *y*, we should expect some writings of *y* for etymological *g* and *y* are usually kept apart could not be explained by historical orthography. Historical orthography is based on the assumption that characters which are widely used tend to be preserved. In our case, another character has been used to indicate a new sound develop-

	(Voiceless)	(Voiced)	
(dental)	<i>t</i> <i>ṭ</i>	<i>d</i> <i>ḍ</i>	
	↑	↑    ↑	
(interdental)	<i>t̥</i>	<i>z</i> <i>d̥</i>	}
		(fricative)	
(alveolar)	<i>š/</i> <i>s</i> <i>š</i>	<i>z</i>	}
		(‘emphatic’)	
			}
			(coronal)

ment from Proto-Arabic to South Safaitic:

It is striking that this development has its analogy in many modern Arabic dialects, e.g., the Meccan<sup>19</sup> and some Mesopotamian dialects.<sup>20</sup> For other dialects with a four-term sibilant system (*s š z ẓ*) this development represents a necessary stage

ment.

The evolution of *g* to *ž* fits well into the phonological system of South Safaitic. One of its characteristics is a strong relevance of voice. With due regard to this we are able to present the resulting consonantal system as follows:

<sup>18</sup> Cf. the remark in *TIJ* 494 that *d* has here a “curious form” that may be accounted for by the fact that it is rarely used.

<sup>19</sup> G. Schreiber, *Der arabische Dialekt von Mekka*, Freiburg i.Br., 1971, p. 6.

<sup>20</sup> O. Jastrow, *Die mesopotamisch-arabischen q’l-tu-*

*Dialekte*, vol. 1, Wiesbaden, 1978, p. 34.

<sup>21</sup> I. Garbell, Remarks on the Historical Phonology of an East Mediterranean Arabic Dialect, *Word* 14 (1958), p. 313.

<sup>22</sup> E. A. Knauf, *Südsafaitisch* § 2.3.3.



	(voiceless) (voiced)		
(labial)	<i>f</i>	<i>b</i>	
(dental)	<i>f</i>	<i>t</i>	<i>d</i> } <i>d</i> }
(alveolar)	<i>f</i> }	<i>s</i> <i>š</i>	<i>z</i> } — } <i>ž</i> ←
(palato-alveolar)	<i>š</i>	<i>ž</i>	
(velar)	<i>k</i>	<i>q</i> ( <i>g</i> )	
(uvular)	<i>ħ</i>	<i>ġ</i>	
(pharyngal)	<i>ħ</i>	<i>c</i>	

As can be seen from this chart, *g* has changed its position from the voiced member of the velar series to the voiced member of a new-arising palatal series. i.e., the isolated palato-alveolar *š* has been extended to a two-term series (*š ž*) by

providing its voiced counterpart from another series (cf. arrow).

A further argument for rendering the North Safaitic character *t* in South Safaitic as *ž* may be derived from its shape. South Safaitic *ž* resembles a *z* modified on the model of *y*.<sup>23</sup>



These observations would be particularly rewarding if they would help to stimulate further research, with the tendency to go beyond the merely factual information that can be obtained from inscriptions such as the ones discussed above.

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<sup>23</sup> Cf. the modification of *z* in Persian, Turkish etc. to designate the *ž* sound.

# PRELIMINARY REPORT OF THE 1981 PETRA EXCAVATIONS

by  
Nabil I. Khairy

## Introduction

The 1981 Petra Excavations were carried out at el-Katuteh area (Fig. 1), south-east of Qasr el-Bint and at the foot of Umm el-Bayyarah, by the University of Jordan with the cooperation of the Department of Antiquities under the direction of the author. Excavations began on 4 May and ended on 5 July 1981.

The aims of the excavations were the following:

(a) To obtain, as far as possible, clearly stratified data in order to establish the sequence of the site's different habitations and to correlate the different phases in the three opened areas; (b) to collect information related to the Nabataean progress in the field of hydrology; and, (c) to assemble an idea of the Nabataeans' ordinary houses and social life. Therefore, the excavation site selected was far from visible temples, except for some remains of one or two coarses above the top soil and a few scattered ashlar blocks of different sizes.

Three areas were opened (B, C, D) and one area (A) left for future investigation (Fig. 2).

### Area B

Nineteen squares were opened in area B (Fig. 2). They varied in depth from 0.25 to 1.10 m. above a paved terrace. Each square consisted of six to eight different loci, except for squares 14 and 16 which consisted of twenty-two and eighteen loci respectively.

The terrace pavement is in good condition except for some destroyed patches. This terrace is in the same orientation as Qasr el-Bint and is almost square (15.00 x 15.00 m.). The slabs used for paving the terrace are comparatively thin (0.04-0.11

m. in thickness) and well-dressed with smooth surfaces. They were carefully arranged over a foundation which consists of irregular slab fragments.

The paved terrace is supported by a podium which includes a net of channels. Three channels were found: Channel A is the largest, and runs along the same orientation as the paved terrace (Fig. 3). This channel was investigated in its northern part. Unfortunately, unstratified deposits were found in channel A which consists merely of rubble mixed with silt and accompanied by very few unpainted Nabataean pottery sherds. The real depth of this channel is not obvious; the observable depth is about 3.20 m. in the northern part and about 1.50 m. in the southern part. This channel has uneven natural sandstone sides, and its width varies from 0.90 m. in the upper part to about 2.20 m. below. A defined groove specially cut, on each side of the upper part of this channel, served to support a vaulted roof which would have run the whole length of the channel. The vault diameter is 0.90 m., which includes a keystone surrounded by three coarses on either side.

Channel B is located at the east side of channel A and is connected at a right angle (Fig. 3). This channel is smaller in size than channel A. No investigation has been made in this channel. The present depth from the upper surface of the accumulated deposit to the upper level of the pavement is about 2.20 m. This channel has uneven natural sandstone sides varying in width from 0.80 m. in the upper part to about 1.80 m. below. The channel is covered in a manner similar to channel A; the diameter of the vault is 0.90 m. but consists of eight coarses separated in the middle by a thin keystone. The vault is carried by a defined ridge cut specially on each side of the upper part of the channel. A Byzantine

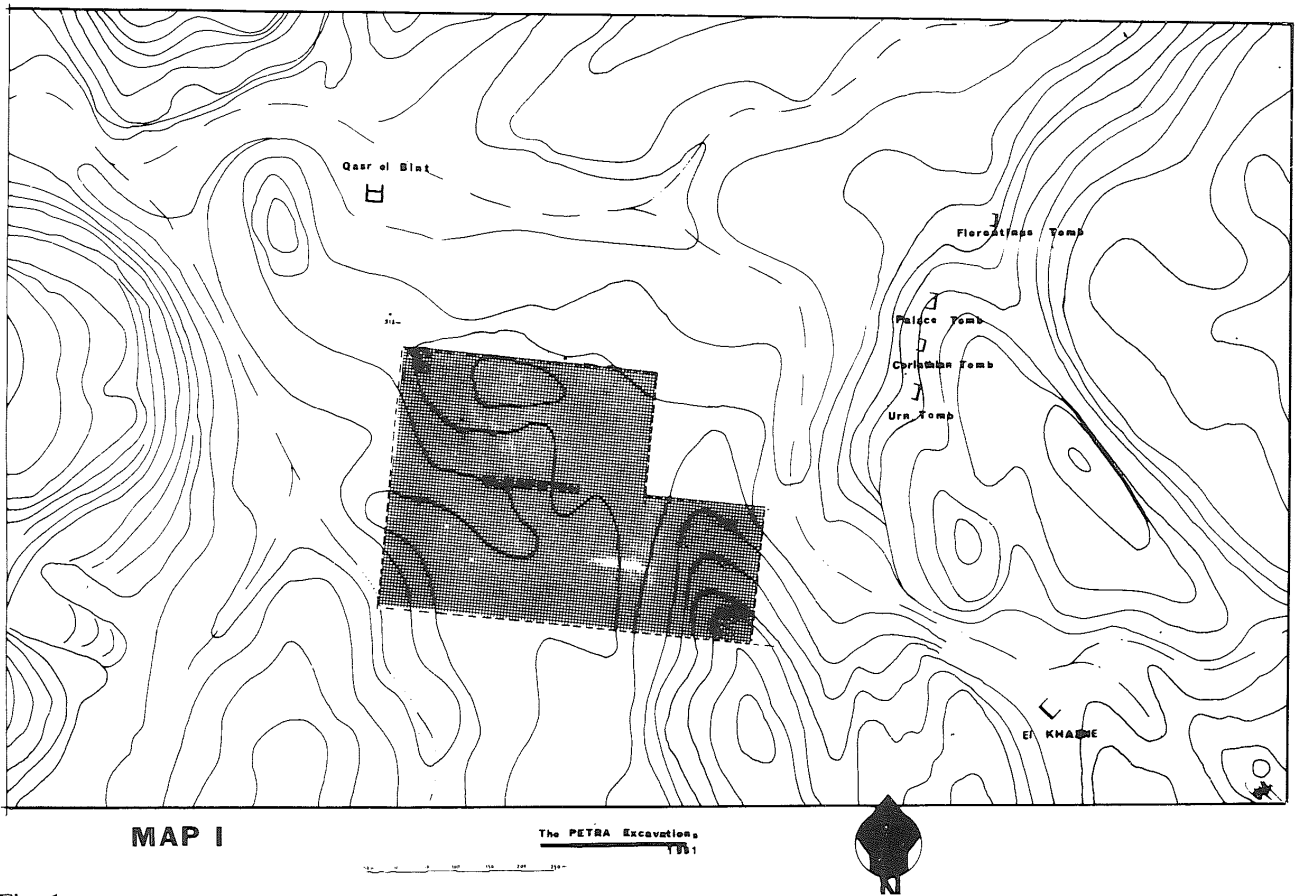


Fig. 1

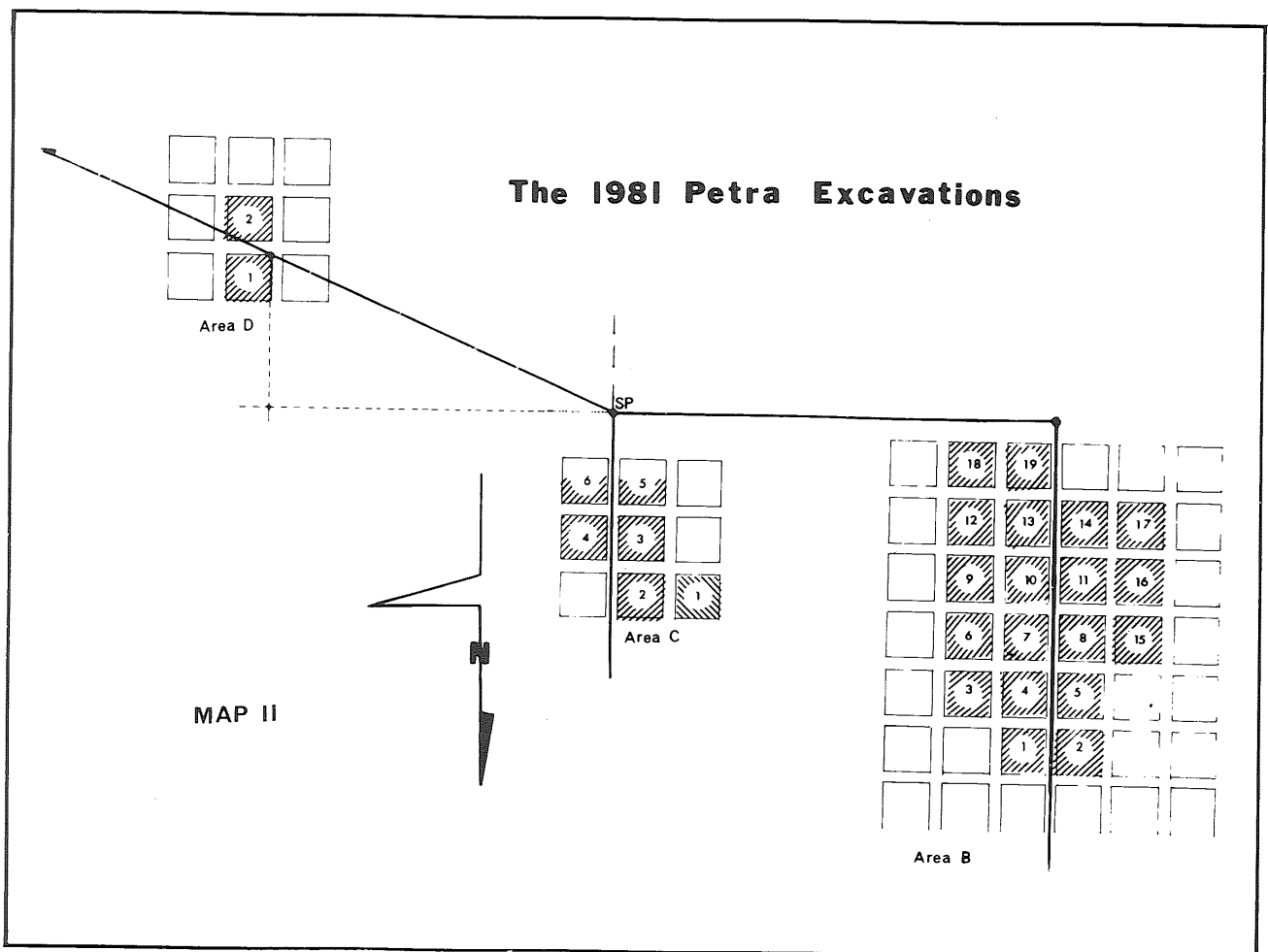


Fig. 2

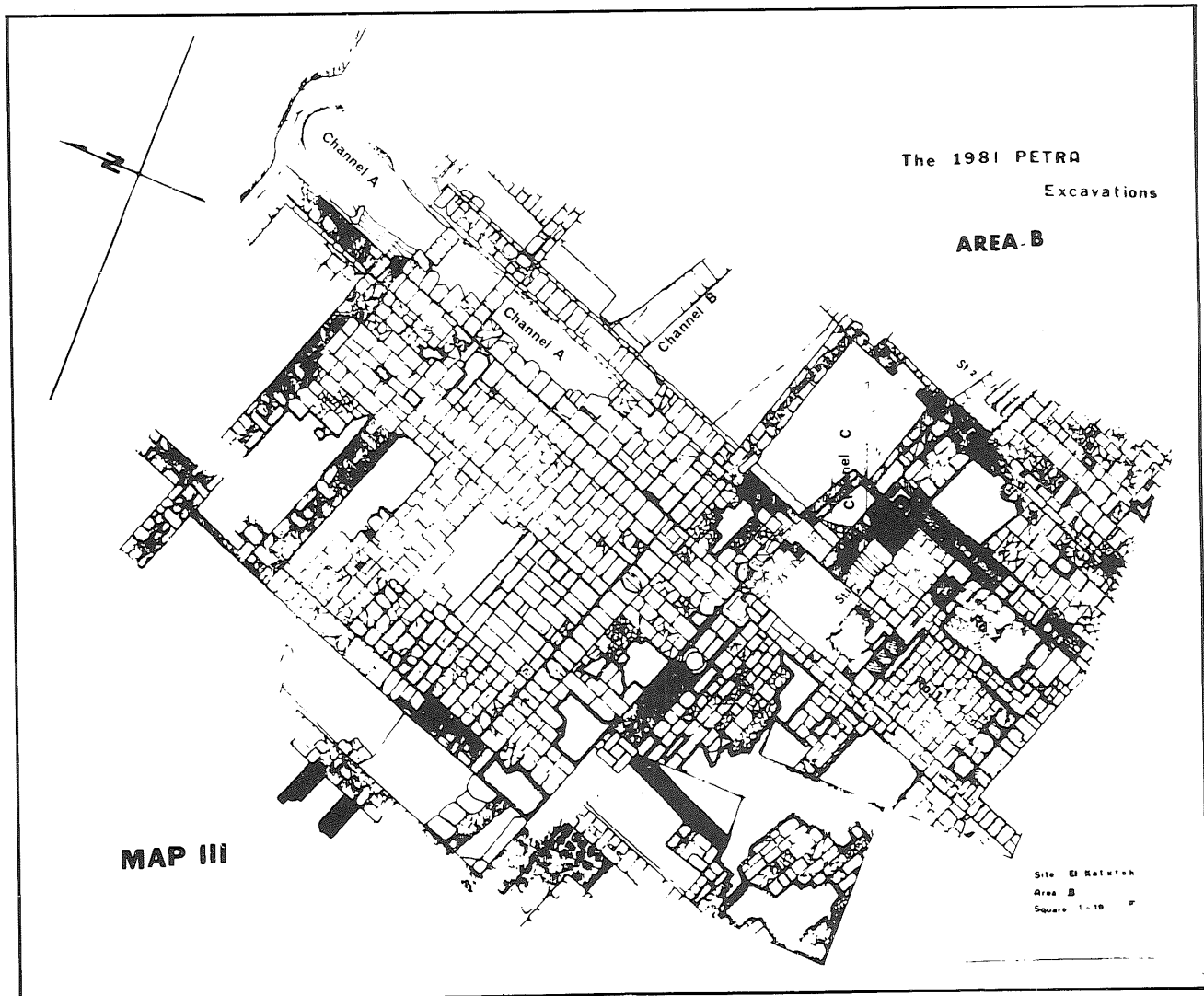


Fig. 3

follis of Justinian I (527-565 A.D.) and seven column drums, all in good condition, were found in the channel. The diameter of the drums is uniformly 0.64 m. No solid explanation can be found for the occurrence of such scattered drums in channel B, but it seems likely that they were merely hidden for later use. This probably happened just during or after the second and the third quarters of the sixth century A.D. which represents Phase V. During this period some architectural activities occurred in this area. Many Nabataean drums and ashlar blocks of different sizes were re-used in building walls and partitions above the paved terrace.

Channel C is a channel with vertical sides, located east of channel A and is connected at an angle of about 45 degrees (Fig. 3). The internal surfaces of this channel are covered with notches made using a mallet and chisel. The excavated length of the channel is about 2.5 m. The

height is about 1.00-1.10 m. only. The width is regular at about 1.15 m. There are no similar ridges to those occurring in channels A and B to carry a vault. Most probably this channel was covered with large and thick regular sandstone slabs.

The process of sealing the top of channels A and B was as follows: the top of the vaults was covered with a layer of rubble about 0.35 m. in thickness. Next, the mason laid down irregular slab fragments above the rubble which functioned as the foundation for the regular pavement. Finally, the surface was sealed with thin regular slabs of different sizes and with a thickness varying from 0.04-.07 m. The thickness from the inner edge of the vault to the top of the regular pavement is about 0.90 m.

Regarding the function of the three channels, and whether they had been used as subterranean chambers for storing goods or merely represent reservoirs, one

may offer the following:

- (a) The occurrence of open basins cut in the top rock. A good example can be seen at the east side of channel A. This basin's dimensions are 1.00 x 2.22 m. with a draining spout of 0.06 m. in diameter at the southwest corner of the basin. This spout connects the basin with channel B.
- (b) A small channel (0.35 x 1.20 m.) was found at the bottom of the southwest corner of the large paved terrace. It is most probable that this channel intended to distribute the collected water in channels A, B and C to some parts of Petra. This channel is covered with four large irregular sandstone slabs, about 0.14 m. thick.
- (c) The three channels are comparatively narrow, partially filled with accumulated rubble and a thick layer of silt.
- (d) No natural light and air would seem to be available to these channels. Therefore, the second proposal seems to be more acceptable.

An architectural complex adjacent to the southern side of the paved terrace (Fig. 3) was partially discovered during the 1981 Petra excavations. It consists of the following:

- (a) Room 1 which is rectangular (2.50 x 4.50 m.) and has two doors; the first is to the north, 1.35 m. wide. It has well dressed jambs which open outward. The second door is to the south, opposite the first one, 1.70 m. wide with jambs opening inward. The floor is regularly paved with thin sandstone slabs. The level of the floor is lower than the terrace pavement by about 0.25 m. The surrounding walls stand about 1.40 m. high and mainly consist of six courses built from well dressed sandstone blocks of irregular sizes. The majority of these blocks are dressed with diagonal groovings, enclosed by a 0.02 m. smoothed margin.

- (b) Room 2 (1.95 x 3.50 m.) is located to the east of Room 1, but with no connecting access. It has one entrance, 1.15 m. wide, in the north wall. The jambs of this door are carefully dressed and open inward. The floor pavement of this room is in bad condition and is almost destroyed. The walls' thickness is almost the same, 0.70 m.

Two staircases connect the paved ter-

race with another level (1.30 m. high) of pavement which is located to the east of the architectural complex:

- (a) Staircase 1 is in good condition (Fig. 3) and consists of six steps. The width of the staircase is 1.20 m. The height of the steps varies from 0.20 to 0.28 m. and the width is about 0.19 to 0.20 m. only.

- (b) Staircase 2 is located in the southeast corner of the excavated area (Fig. 3). This staircase is wider (1.60 m.), but is damaged except for two-thirds of the second step which is still *in situ*.

The remains of the base foundation, column base and square plinth are *in situ* and in the same alignment. They are located between the paved terrace and the adjacent architectural complex. They probably represent the main entrance for the paved terrace. The base foundation represents the west corner of the entrance and consists of four rectangular well-dressed sandstone blocks (0.27 x 0.65 m.) surrounding a square stone (0.35 x 0.35 m.) The second bearing is a column base which was intended to receive a column of 0.64 m. in diameter. The third bearing is a square plinth (0.90 m. x 0.90 m.) and the fourth bearing does not occur in its proper place. The distances between the mentioned bearings from east to west are 1.40 m. and 3.60 m. respectively.

It is probable that the paved terrace represents a *temenos* enclosure and that the adjacent architectural complex was intended for the service of the enclosure.

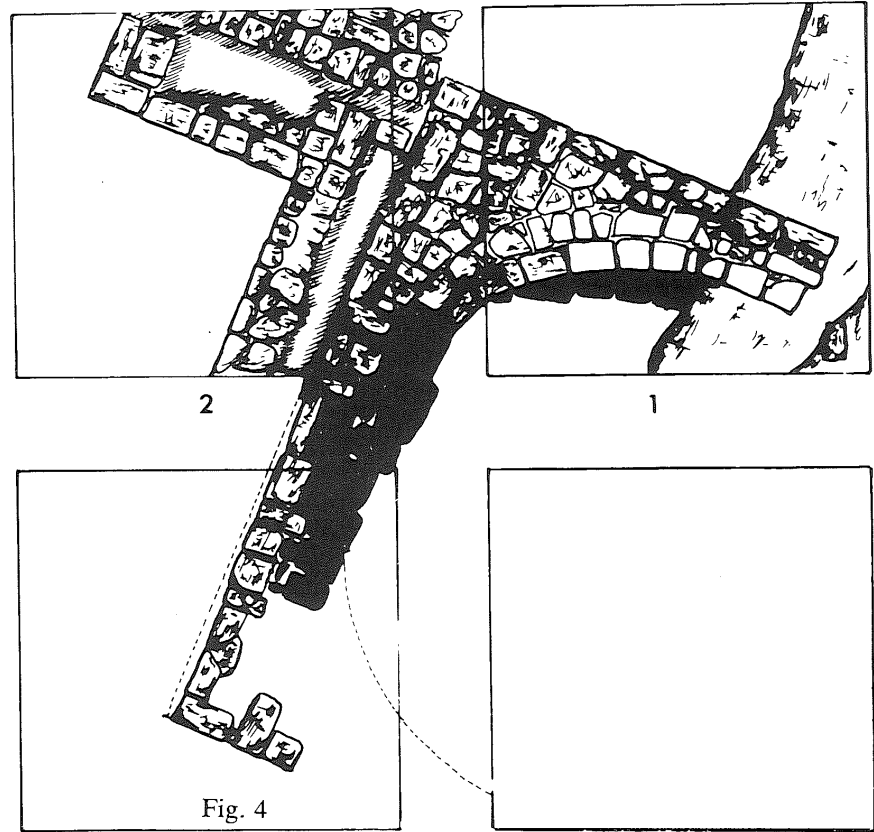
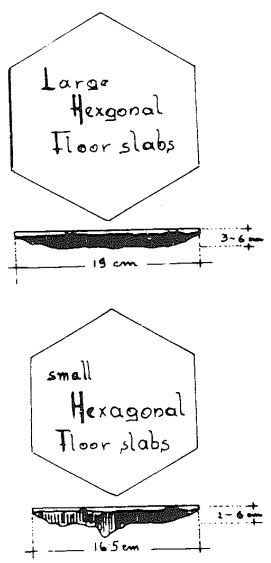
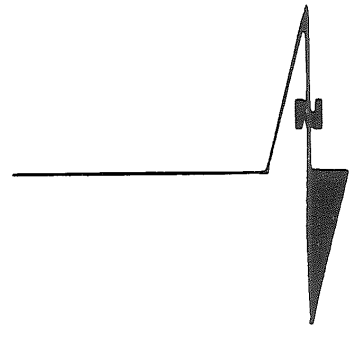
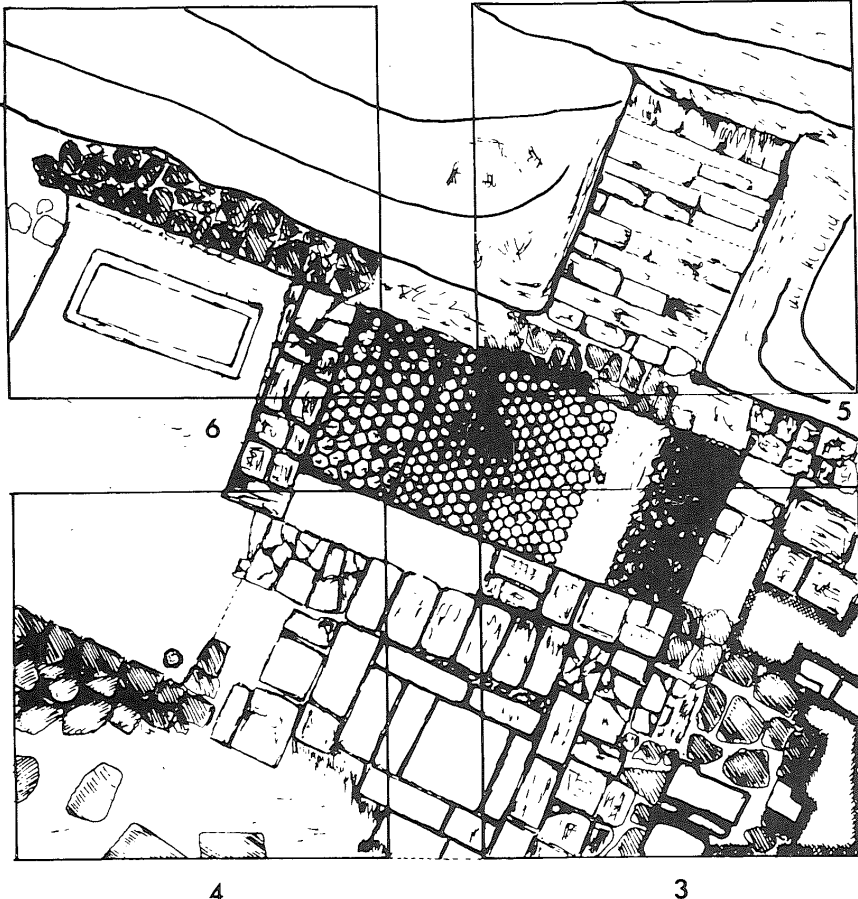
The earliest dating evidence is a Nabataean coin of Aretas IV and his second wife Shaqilat II (A.D. 18-40). This coin was found in the foundation trench of the west wall of the podium which carries the paved terrace described above.

### Area C

Six squares were opened (Figs. 2, 4). The most interesting and prominent architectural finds in this area are the apse in squares 1 and 2, and the paved area with the small hexagonal slabs in squares 3-6:

1. The apse: Squares 1 and 2 in area C revealed an apse of a church (Fig. 4) which is related to Phase V. The diameter of this

The 1981 PETRA Excavations.



MAP IV

Fig. 4

apse is 6.00 m., with a north-west orientation. An interesting architectural feature should be noted in the ashlar blocks of the apse. Each stone was formerly a quarter of

a Nabataean capital which was decorated with floral motifs. The apse consists now of only two coarses. The lower coarse has ten quarters of Nabataean capitals (0.38 x 0.38

m.) and the three quarters in the upper coarse are of the same dimensions. Decoration on the rounded sides of the quarters was faced by the stone mason and the plain flattened surfaces are external. One might think that the mason intended to hide the beautiful decorative elements in order to conceal any evidence of an earlier pagan worship which would be in conflict with Christian belief. One Byzantine coin of the tenth year of the reign of Justin II (A.D. 574) and two Byzantine lamp sherds were found in the foundation trench of the apse. The apse corresponds to loci 1-3 in areas B and D which are assigned to Phase V.

2. A paved area with small hexagonal slabs was discovered in squares 3-6. This beautiful pavement belongs to Phase Ia, Locus 24, which is dated by a coin of Aretas IV before his appearance with his second wife Shaqilat II (9 B.C.-A.D. 18). The length of this pavement is 4.15 m. with an east-west orientation. The width is approximately 1.70 m. This rectangular pavement contains two different types of hexagonal slabs which are divided by a straight border joint. The first type covered 1.70 x 0.90 m. and is located to the east. The measurement of this type of hexagonal slabs is around 0.19 m. The second type is located to the west, covering 1.70 x 3.20 m. The hexagonal slab of the second type is approximately 16.5 cm. The only parallel to this kind of slab was found in the vicinity of a Nabataean temple at Wadi Rumm. A staircase connects with this pavement at right angles on the south side of the pavement (Fig. 4). The width of the staircase is about 1.80 m. and consists of eleven steps leading to the top of a naked sandstone rock. This staircase is almost completely damaged except for the remains of some parts of steps which are still *in situ*. The staircase belongs to Phase Ia and was closed by some ashlar blocks, drums and dark brown mortar during the second and the third quarters of the sixth century A.D. This wall was found at a height of about 1.20 m.

A small basin was found under the

balk which divided squares 3 and 4. The dimensions of the basin are 0.85 x 0.85 m. and 0.30 m. in depth. The four internal sides and the floor are coated with a thick dark greyish mortar. It is most likely that this basin was used to hold water for some ritual purposes and I believe that there is a direct relation between the basin, the paved area with hexagonal slabs and the staircase which leads to the naked high rocks. It is probable that religious ceremonies used to take place in this place.

#### Area D

Two squares were opened (Fig. 2), in Area D. The majority of the intact and semi-intact objects were found in these two squares. A dwelling room was found (2.25 x 4.45 m.) with a north-south orientation. The thickness of the walls is almost the same (0.70 m.). The walls are built from irregular sandstone blocks fixed with a brownish mortar. The majority of the blocks are dressed with the typically Nabataean diagonal grooving, and some other blocks are dressed with notches. Two entrances were found in this room. The first is in the east wall, about 0.55 m. far from the southeast corner. The width of this entrance is only 0.60 m. It has well-dressed jambs which open inward. The second entrance is in the north wall and is about 0.35 m. from the northwest corner, with jambs opening inward. The floor of this room is covered with a thick layer of light greyish mortar which includes some small fragments of limestone and sandstone of less than 2 cm<sup>3</sup>. The dating of this room is fixed by two coins of Aretas IV before his appearance with his second wife Shaqilat II (9 B.C.-A.D. 18). Therefore, this dwelling room corresponds in date to the rectangular paved area with hexagonal slabs, and both are assigned to Phase Ia which represents the earliest habitation found in the 1981 Petra excavations.

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ARCHAEOLOGICAL EXPLORATIONS  
ON THE ROMAN FRONTIER IN NORTH  
EAST JORDAN: SOME FURTHER  
NOTES

by  
D. L. Kennedy and R. Cowie

### Introduction

In the course of a ten day stay at Azraq Druze in July 1982 to carry out a pilot study of the ancient environment, the opportunity was taken to revisit some of the sites discussed by the first author in his recent publication.<sup>1</sup> The results of the former work are to be published separately,<sup>2</sup> the present note offers some additional information specifically relevant to the earlier explorations together with a contribution by the second author on the results of thin-sectioning of a sample of pottery collected by Kennedy from several sites in 1978. Sections 1-4 are by Kennedy; section 6 by Cowie. The work in the field was carried out by Kennedy, Dr. D.D. Gilbertson and Mr. D.A. Wilson; the figures are the work of Ms. Carolyn Hanman, B.A., and Ms. Gillian Woolrich, B.A. Special thanks are due to Dr. P. J. Cattermole of the Department of Geology at Sheffield University for checking the thin-sectioning results. Funds were provided by the British Academy, the Craven Committee, Meyerstein Fund, University of Sheffield Research Fund, and Mr. Wilson. Permission for the work was kindly granted by Dr. Adnan Hadidi and support was provided by the British Institute at Amman for Archaeology and History.

### Sites

#### 1. Qasr Ain es-Sol<sup>3</sup>

To the plan of the main structure prepared in 1978 may now be added

those of foundation walls on the south and west, (Fig. 2). The relatively poor state of preservation is probably to be attributed to those structures having been of a much more flimsy construction: there were no significant traces of collapsed material and it was not evident that it had been removed for inclusion in the few modern buildings in the vicinity.

The internal arrangements are no more than provisional: excavation would certainly reveal more dividing walls, especially in the long-building to the north-east of the *qasr*.

The buildings on the north and the east lie on the remaining raised ground beside the *qasr* together forming a courtyard outside its entrance. The function of the buildings is unknown: storebuildings and for stabling are the obvious possibilities.

The north and east ranges of rooms were clearly broadly contemporary; equally, the southwards extension of the north range abuts the *qasr* and, consequently, is of a later date. No clear date was obtained for any part. I remain of the opinion, however, that the structures around the *qasr* are the remains of an early Islamic development of an abandoned Roman fortlet at a roadside spring.

The low lines of stones on the west and south are apparently part of the water-harvesting activities of the inhabitants.<sup>4</sup> I envisage the land between these walls and the *qasr* forming

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<sup>1</sup> D.L. Kennedy, *Archaeological Explorations on the Roman Frontier in North-East Jordan*, BAR., Oxford, 1982.

<sup>2</sup> D.D. Gilbertson and D.L. Kennedy, an archaeological reconnaissance of water harvesting

structures and wadi walls in the Jordan desert north of Azraq Oasis, *ADAJ*, forthcoming.

<sup>3</sup> Kennedy, *ibid.*, p. 128-132.

<sup>4</sup> Gilbertson and Kennedy, *ibid.*



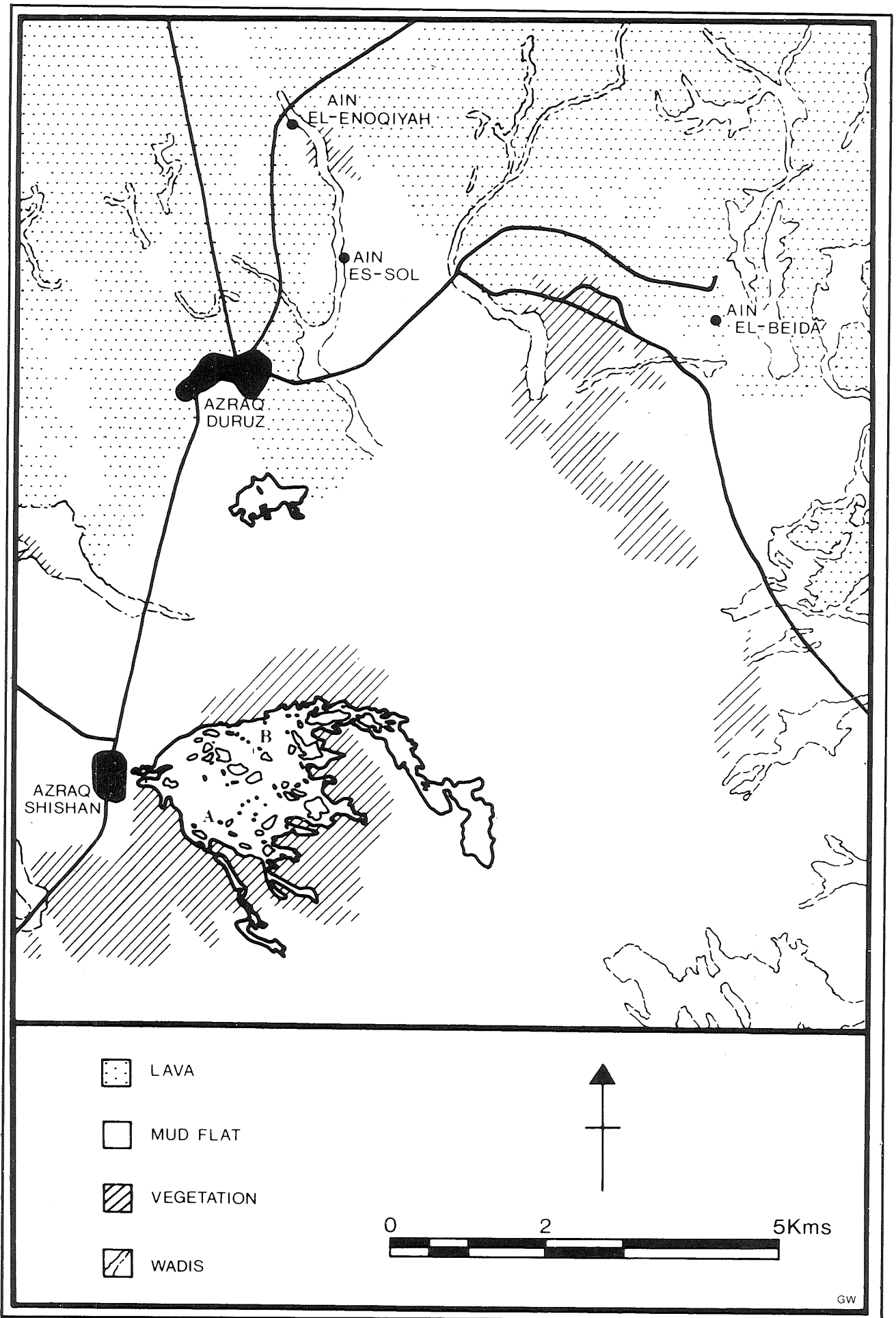


Fig. 1

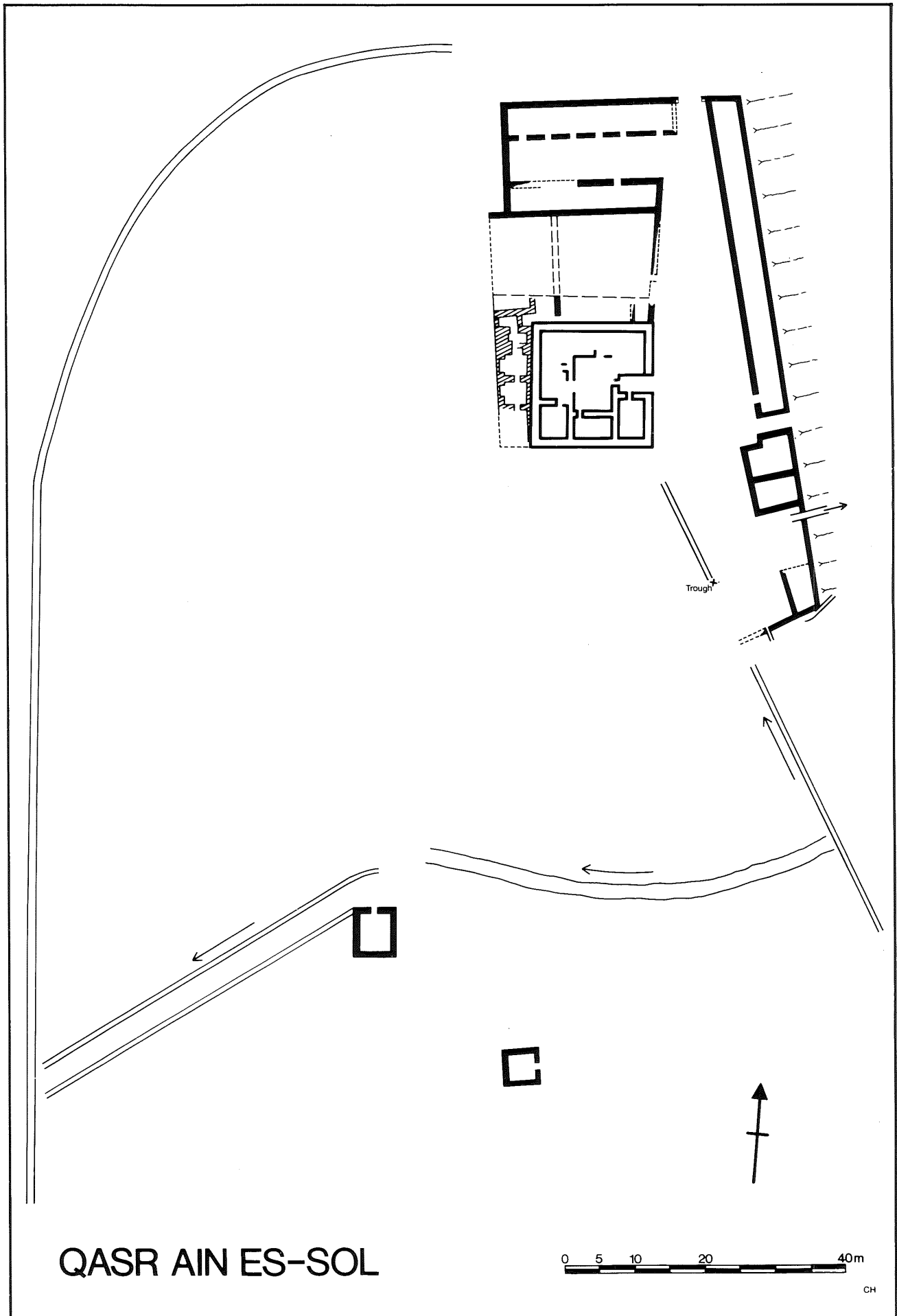


Fig. 2: Qasr Ain Es-Sol

an irrigated garden with water from the wadi on the west.

2. Roman road north from Azraq Druze<sup>5</sup>

While re-examining a stretch of this road several miles beyond Ain el-Enoqiyah, Mr. David Wilson observed the base of a Roman milestone on the right side of the road at a point approximately 5 kms. north of Rujm Mudawer (Pl. LXIII: 1). The squared base and part of the cylindrical drum of the black basalt stone were all that survived and there were no traces of lettering. The overall height including the base was 0.49 m.; the circumference of the drum ca. 0.63 m. The inscribed part of the drum may well be amongst those recorded in Azraq fort and patently removed from this road.<sup>6</sup>

About 500 m. beyond the milestone base was found half of a basalt quern lying in the roadway (Pl. LXIII: 2). No associated structures were noted in the vicinity of the road at either point.

3. Wadi el-Baida grafitti

During a brief visit to Qasr Ain el-Beida,<sup>7</sup> a group of bedouin offered to show us some grafitti. At a spot in a recessed bay of the Wadi el-Beida (CRO13317) we photographed both ancient and modern drawings and lettering on a number of rocks. Some others, fainter, were shown to us nearby. The ancient texts have been identified as Safaitic by Mr. Michael MacDonald who is to include them in his corpus of the Safaitic inscriptions of Jordan.

4. Wadi el-Beida causeway

At the lower end of the wadi, to the north east of the *qasr*,<sup>8</sup> the foundation course of a causeway curves across the

wadi bed linking tracks over the high ground on either side (Pl. LXIII: 3). Age could not be determined, it could be quite recent though the surface was rutted.

**Analysis of twenty sherds of "Roman" coarse ware**

From several hundred sherds collected at random from sites in north-east Jordan in 1978<sup>9</sup> were selected for detailed macroscopic and thin-section analyses. These analyses were undertaken with the intention of gaining further information about the ceramic technology used in North-East Jordan during the Roman period, and the provenance of the sherds in question. The latter was regarded as especially interesting in view of Kennedy's<sup>10</sup> suggestion that every-day coarse wares were likely to have been the produce of a highly local pottery industry". He supports this statement with the observation that at one site, Aseikhin, the pottery has a "purplish tinge" similar to that of the local volcanic rock, basalt. It is interesting to note that similar observations have been made concerning fine Nabataean pottery from Petra, which has a red-pinkish colour "strikingly reminiscent of the geology of the Petra district."<sup>11</sup>

The sample and its chronology

The sample of Roman coarse ware consisted of: eight sherds from Qasr el-Uweinid, eight sherds from Qasr el-Aseikhin and four sherds from Azraq Druze. At present the dating of this pottery remains uncertain.<sup>12</sup> Therefore the dates given for the sample in Table 1 must be considered only as provisional. Kennedy<sup>13</sup> has questioned the reliability of the current typological chronology of ceramics in this area, pointing out, for example, that while the probable single period fort at Uweinid is dated by two inscriptions

<sup>5</sup> *Ibid.*

<sup>6</sup> Kennedy, *ibid.*, p. 170.

<sup>7</sup> *Ibid.*, p. 186.

<sup>8</sup> *Ibid.*

<sup>9</sup> *Ibid.*, p. 313-25.

<sup>10</sup> *Ibid.*, p. 325.

<sup>11</sup> Khairy, N.I. Technical aspects of fine Nabataean Pottery *Bulletin of the American Schools of Oriental Research*, No. 250, 17-40.

<sup>12</sup> Kennedy, Personal communication.

<sup>13</sup> Kennedy, *Ibid.*, p. 313-314.

to the early third century (201 and 200/2 respectively) paradoxically all dateable pottery from the site has been assigned to the Late Roman IV period (A.D. 284-324).<sup>14</sup>

#### Macroscopic analysis

In this study macroscopic analysis is regarded as a preliminary stage to record such attributes of pottery that will not be observed during thin-section analysis such as hardness and colour, and if possible to obtain a preview of some of the fabrics inclusions. These attributes can provide useful information about ceramic technology, and methods of production (Table 1).

Each sherd was inspected in the hand, assisted by a hand lens (magnification x 8), and the presence of any visible voids and non-plastic inclusions in the fabrics was noted. When possible, inclusions were quantified using four categories: present (one or two inclusions only), sparse, moderate, and common. These terms are only used to express relative quantities. All sherds in the sample have relatively fine fabrics. Most mineral and rock inclusions observed in the sherds are less than 1.0 mm. in diameter. Similarly grog (crushed pottery), which occurs in six sherds, and voids are generally less than 1.0 mm. in diameter. The sample demonstrates that the use of the term coarse ware for lower quality, utilitarian pottery can sometimes be misleading.

Hardness may be defined as various things, but for the purpose of this analysis I have taken it to mean the resistance of a pottery fabric to penetration and abrasion. To test their hardness the sherds were scratched with a set of graded minerals and their hardness recorded according to Mohs' scale. It should be stressed that this is a rough test, for there is no uniformity in the pressure applied in making the scratch. The sherds display considerable variation in their hardness, ranging from those which are fairly soft with a hardness of 3 in Mohs' scale to very hard pottery with a hardness

of 7. This attribute is dependant on the properties of the potting clay (principally its composition), and firing temperature. The variation of hardness, even between sherds that have similar pastes when viewed in the hand and through a microscope (for example sherds UW 1 and UW 7) suggests that the pottery was fired in a wide range of temperatures, and that the hardest sherds in the sample were probably fired at a temperature higher than the rest.

Because the colour of pottery is largely dependent on the technological processes involved in its manufacture, and the composition of the paste used, an examination of this attribute may often provide useful information about methods of pottery production. In the case of each sherd, a complete cross-section of pot wall was examined (cross-sections were conveniently created by the preparation of thin-sections), and the colours of the surfaces and core were matched to corresponding colours in a Munsell Soil Colour Chart. This information, presented in Table 1, was then converted into a numerical code (Table 2). The code represents the colour of the sherds, and the firing conditions that these may indicate.

Most sherds (UW 5, UW 8, AS 1, AS 3, AS 6, AS 7, AS 8, AZ 2, AZ 4) have reddish yellow to brown walls, indicating oxidation throughout, although there are slight colour differences between the outer areas and cores in some cases. Three sherds (UW 1, UW 3 and UW 7) have walls that are brownish to pinkish grey throughout, which may indicate partial oxidation. Several sherds (UW 2, UW 4, AS 2, AS 4, AS 5, and AZ 3) have grey non-oxidized cores, with lighter outer areas which are mainly reddish yellow to reddish brown resulting from varying degrees of oxidation. Most of these sherds display some oxidation to a depth of at least 1.0 mm. from the surface. The borders between the residual carbon in the dark core, and the lighter coloured oxidized outer zones are fairly well defined.

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<sup>14</sup> S.J. Parker, archaeological survey of the limes Arabicus: a preliminary report, *ADAJ*, XXI (1976), p. 19-31.

**Table 1: Results of Macroscopic Analysis**

RD	Site	Chronology (of sample)	Composition (Measurements in mm.)	Hardness (Mohs' scale)	Wall Thickness (mm.)	Colour Thickness of areas in brackets (mm.)	Remarks
1.	Qasr el-Uweimid (1978)	3rd Century	Moderate limestone and grog <1.0 Moderate-common voids ≤2.0	7	2-3 Up to 6 at rim	Light brownish grey 10 YR 6/2 throughout, dark grey 10 YR 4/1 patches on interior surface.	Rim sherd. Ribbed exterior surface.
2	"	"	Moderate quartz, limestone and grog <1.0, sparse-moderate voids mostly <1.0	7	5	Pinkish grey 7.5 YR 6/2 exterior and interior areas (1.0), but reddish yellow 5 YR 6/6 at surface, grey 10 YR 6/1 core.	Rim sherd. 2 shallow incised bands parallel to rim on exterior surface.
3	"	"	Sparse inclusions <1.0 including grog, moderate voids ≤2.0 mainly in ext. surface.	4	3 up to 6 at rim	Pinkish grey 7.5 YR 6/2 throughout.	Rim sherd.
4.	"	"	Moderate limestone <0.5, moderate common voids ≤1.0 mainly in surfaces.	4	4	Light red 2.5 YR 6/6 exterior (1.0) and interior (superficial) areas, grey 10 YR 6/1 core.	Rim sherd.
5.	"	"	Sparse basalt ≤1.0	3	19-23	Reddish yellow 5 YR 6/8 throughout	Handle
6	"	"	Sparse quartz, limestone, and grog ≤1.0, moderate voids ≤1.0 in surfaces.	5	5	Dark grey 7.5 YR 6/0 throughout.	Ribbed exterior surface.
7.	"	"	Moderate-common limestone, and grog <1.0 sparse voids ≤1.0	3	5	Pinkish grey 7.5 YR 6/2 throughout.	Ribbed exterior surface.
8.	"	"	Basalt present c. 1.0, sparse voids <0.5 in core.	5	4-6	Red 2.5 YR 5/6 throughout.	

1.	Qasr el-Aseikhin (1978)	2nd-3rd Century	Sparse quartz? and basalt <1.0 Sparse voids <1.0	4	4-5	Reddish brown 2.5 YR 4/4 exterior (1.0) and interior (1.5) areas reddish brown 5 YR 5/3 core.
2.	"	"	Moderate basalt <0.5, moderate voids <1.0 in core.	3	6-8	Yellowish red 5 YR 5/6 exterior (2.0) and interior (1.5) areas, grey 5 YR 5/1 core.
3.	"	"	Limestone, and grog <0.5 present, sparse voids mainly <1.0	3	6-8 Up to 10 at rim	Pink 7.5 YR 7/4 throughout. Rim sherd.
4.	"	"	Moderate quartz <0.5, sparse limestone <0.5, moderate voids <0.5.	5	8-9	Reddish yellow 7.5 YR 6/6 exterior area (0.5) light brown 7.5 YR 6/4 interior area (superficial), light grey 10 YR 7/1 core.
5.	"	"	Sparse basalt ≤1.0, sparse voids <1.0 in core.	5	6-9	Yellowish red 5 YR 5/8 exterior (1.5-2.0), and interior (1.0) areas, grey 7.5 YR 6/0 core.
6.	"	"	Sparse voids <1.0.	3	5-7	Yellowish red 5 YR 5/6 throughout.
7.	"	"	Sparse basalt ≤1.0, sparse voids <0.5.	4	5-6	Light red 2.5 YR 6/6 exterior (2.0) and interior (≤1.0) areas, brown 7.5 YR 5/4 core.
8.	"	"	Sparse basalt ≤1.0	3	6	Reddish yellow 5 YR 6/8 throughout.
1.	Azraq Druz (1978)	2nd-4th century	Sparse quartz/quartzite ≤1.0	6	4-5	Grey 7.5 YR 6/0 exterior area (2.0) grey 10 YR 5/1 interior area (3.0).
2.	"	"	Common limestone ≤1.0 (concentrated in exterior area), common voids ≤1.0 (mainly in interior area).	3	7-9	Red 2.5 YR 5/6 exterior area (3.0) brown 10 YR 5/3 interior area (3.0-6.0).
3.	"	"	Sparse basalt <1.0	3	4-6	Dark reddish brown 2.5 YR 3/4 exterior area (1.0-2.0), red 2.5 YR 4/6 interior area (1.0-2.0), grey 5 YR 5/1 core.
4.	"	"	Moderate quartz ≤0.5, moderate-common limestone <0.5.	3	8-10	Brown 7.5 YR 5/4 exterior (2.0), and interior (3.0) areas, reddish brown 5 YR 5/4 core.

**Table 2: The degree of oxidation (as indicated by colour)**

Sherd No.	Group <sup>1</sup>	Colour		
		Exterior area	Core	Interior area
UW1	A	4	4	4
UW2	—	4 <sup>2</sup>	2	4 <sup>2</sup>
UW3	A	4	4	4
UW4	A	7	2	7
UW5	B	7	7	7
UW6	A	2	2	2
UW7	A	4	4	4
UW8	B	7	7	7
AS1	B	5	5	5
AS2	B	7	1	7
AS3	—	6	6	6
AS4	—	7	2	6
AS5	B	7	2	7
AS6	B	7	7	7
AS7	B	7	5	7
AS8	B	7	7	7
AZ1	—	2	1	1
AZ2	—	7	5	5
AZ3	B	5	1	7
AZ4	A	5	5	5

Colour: 1 = Dark non oxidized  
 2 = Light non oxidized  
 3 = Dark uncertain  
 4 = Light uncertain  
 5 = Dark partly-fully oxidized  
 6 = Light partly - fully oxidized  
 7 = Oxidized

(Colours based on the Munsell System  
 Dark = Values 2-5  
 Light = Values 6-8  
 Non oxidized = Chroma 1  
 Uncertain = Chroma 2  
 Partly - fully oxidized = Chroma 3-5  
 Oxidized = Chroma 6-8  
 Hue yellower than 2.5 YR

<sup>1</sup> Groups defined during thin-section analysis  
<sup>2</sup> 7 at surface

Two sherds (AZ 1, and UW 6) have entirely grey non-oxidized walls, suggesting that they may have been fired in a reducing atmosphere.

Many sherds have slightly darker, dirtier colouring at their surfaces and old fractures than that observed at the freshly made cross-sections. When such differences are apparent, the colouring of the surfaces and old fractures are attributed to post depositional processes, and are therefore, generally ignored. However, it is interesting to note that many of the sherds in group B (sherds that thin-section analy-

sis showed to contain basalt fragments and/or basalt derived minerals]) weather to the 'purplish' colour described by Kennedy.

The fine parallel striations present on the exterior and interior surfaces of many of the sherds were probably created while the vessels were thrown on the wheel.

#### Thin-section analysis

Thin-sections were prepared from each sherd in the sample, and were then viewed through a petrological (polarizing) microscope at a magnification of X 15 and

X 50. The inclusions observed in the pastes were identified and then quantified by visual comparison of the thin-sections, and placed into four categories: present, sparse, moderate, and common (see Table 3). A graticule was used to measure the diameter of inclusions, and quartz grains (the most frequent type of inclusion) were divided into size categories. The analysis results allowed two fabric groups to be defined within the sample. These groups were given the code letters A and B.

The sherds of group A have a yellowish to greyish brown clay matrix with moderate inclusions of quartz less than 0.05 mm. in diameter, sparse to moderate quartz grains of 0.05 to 0.1 mm., and

present to moderate quartz grains greater than 0.1 mm. While the quartz grains vary from angular to sub-rounded most are sub-angular. The sherds also contain moderate to common limestone fragments that are mainly 0.2 mm. or less, although fragments up to 2.0 mm. can be seen in some thin-sections. Apart from a few grains of hematite (an iron oxide) most sherds contain little iron. The exception is sherd AZ 4 which has a brown clay matrix that is relatively rich in iron. Therefore, although AZ 4 is similar to the sherds of group A in other respects, strictly speaking it should be regarded separately. Four group A sherds contain sparse to moderate grog, mainly with a diameter of 1.0 mm. or

**Table 3: Results of thin-section analysis**

Sherd No.	Group	Quartz (mm.)			Quartzite/ Strained Quartz	Feldspar	Olivine	Pyroxene	Basalt Frag- ments	Carbonate (Lime- stone)	Grog
		<0.05	0.05-0.1	>0.1							
UW 1	A	M	S	X	—	—	—	—	C	M	
UW 2	—	M	M	M	X	X	—	—	X?	S	M
UW 3	A	M	S	—	—	—	—	—	—	C	S
UW 4	A	M	S	—	—	—	—	—	—	C	—
UW 5	B	C	S	—	—	—	S	—	M	—	—
UW 6	A	M	M	M	X	—	—	—	—	C	M
UW 7	A	M	S	S	—	—	—	—	—	M	M
UW 8	B	C	S	—	—	—	X	—	X	—	—
AS 1	B	C	S	—	—	S	X	—	S	—	—
AS 2	B	C	S	—	—	S	S	—	S	—	—
AS 3	—	S	X	—	—	—	—	—	—	X	X
AS 4	—	M	M	M	S	—	—	—	—	S	S
AS 5	B	C	S	—	—	S	S	—	S	—	—
AS 6	B	C	S	X	—	S	X	—	—	—	—
AS 7	B	C	S	—	—	S	S	S	S	—	—
AS 8	B	C	S	X	—	S	—	S	S	—	—
AZ 1	—	M	M	S	S	—	—	—	—	—	S
AZ 2	—	C	S	—	—	S	S?	—	—	C	—
AZ 3	B	C	S	—	S	S	S?	S	X	—	—
AZ 4	A	M	M	M	—	—	—	—	—	C	—

- ? = Identification uncertain
- X = Present (one or two grains only)
- S = Sparse
- M = Moderate
- C = Common



less.

The sherds of group B have a reddish brown clay matrix, with common quartz grains less than 0.05 mm. and sparse quartz grains of 0.05 to 0.1 mm. So in granulometric terms the quartz is fine and well sorted, that is to say the grains are fairly uniform in size, mostly silt (particles less than 0.06 mm.). As in group A most quartz grains are sub-angular. Group B sherds also contain sparse basalt fragments and/or basalt derived minerals, namely feldspar, olivine, and pyroxene. These inclusions are the most distinctive feature of group B. The basalt fragments, which are rarely larger than 1.0 mm., consist of olivine phenocrysts in a ground mass of plagioclase feldspar, and pyroxene, although olivine is absent from some of the smaller fragments. However, the groundmass of the basalt inclusions in sherds UW 5 and UW 8 is isotropic and vesicular. Basalt derived minerals also occur separately in the clay matrix as individual grains. Cracks can be seen clearly on some olivine phenocrysts, which are marked by networks of iron oxide where alteration has occurred. Group B sherds are relatively rich in iron oxide. It occurs as distinct grains, and as part of the matrix giving the clay a reddish tinge. Iron-ores almost certainly make a significant contribution to the distinctive purplish colour of both basalt and pottery containing basaltic inclusions.

In addition, thin-sections were prepared from a basalt fragment from Qasr el-/Aseikhin, and a basalt quern found at Hallabat for comparison with the basalt inclusions observed in group B sherds. The rock from Aseikhin is composed of dark, very altered olivine phenocrysts in a vitrified isotropic groundmass, with some feldspar laths, which is similar to the basalt inclusions observed in sherds UW 5 and UW 8. The quern from Hallabat is composed of olivine phenocrysts in a groundmass of plagioclase feldspar, and pyroxene. Grains of magnetite (iron) are also present. Indeed much of the iron in

group B sherds probably has a basaltic origin. Magnetite fired in an oxidising atmosphere will be converted to hematite. Similarly, magnetite may sometimes be converted to hematite under naturally occurring oxidising conditions which may occur, for example, close to the vesicles found in basalt, or as the rock weathers.

#### Ceramic technology

In his survey of pottery and other artefacts from Pella, in the Jordan Valley, Smith<sup>15</sup> implies that the late Roman provincial pottery of Jordan is "well levigated usually to the extent that it shows no inclusions to the naked eye". Similarly, all twenty sherds in the sample from North-East Jordan have fine fabrics. There is, however, no evidence to suggest that they were made from clays refined by elutriation (levigation), a process which removes the larger, heavier particles from clay. Thin-section analysis shows that the pottery, fine as it is, contains rock and mineral particles that are a little too coarse and frequent for levigated clays. Therefore the potters probably used naturally occurring fine clays to produce this pottery.

Among the inclusions observed in the pottery grog is the only material that could be positively identified as a filler (temper). Several sherds contain crushed pottery, including four in Group A. However, grog is absent from sherds in Group B. It is possible that some of the mineral inclusions observed in the sherds are also additives introduced to the clays by the potters. Nevertheless, it seems likely that most mineral inclusions in the pottery are natural constituents of the clays rather than fillers.

The regularity and evenness of the sherd walls, together with the presence of fine parallel striations on the interior and exterior surfaces of many of the sherds, suggest that the pottery is wheel-made.

With the exception of an oven found in the fort at Azraq, Kennedy<sup>16</sup> has discovered no evidence of ovens or kilns during

<sup>15</sup> R.H. Smith, *Pella of the Decapolis*, Ohio, 1971, p. 217.

<sup>16</sup> Kennedy, personal communication.

his fieldwork in North-East Jordan. Nevertheless, the attributes of the sherds themselves provide useful information about the conditions in which they were fired. The hardness and colour of the sherds show that the firing temperature, duration, and atmosphere, the pastes were subjected to, varied considerably, although it seems that most sherds were fired in an oxidizing atmosphere. Ten sherds were well fired in an oxidizing atmosphere so that the entire thickness of their walls is oxidized. Six sherds have grey non-oxidized cores with lighter oxidized outer areas. The presence of a dark core indicates incomplete combustion of carbonaceous matter in the paste, which in turn suggests that either the firing temperature was too low, and/or the firing duration was too brief to burn out all the carbon.<sup>17</sup> The hardness of sherds UW 2, AS 4 and AS 5 makes the low temperature explanation unlikely, so that their non-oxidized cores are probably due to rapid firing.

#### Provenance

Thin-section analysis of the sample was undertaken principally for the purpose of pottery characterization. By matching the mineral suite observed in a paste to regional geology it is possible to establish the source of the raw material used to make the pottery, which may in turn lead to the identification of the production source itself. The precision of characterization depends on the geology of the area in which the pottery is produced.<sup>18</sup> For example, if pottery is made in a region where the geology is similar over a wide area its provenance cannot be defined by thin-section analysis within that area. To a certain extent this is the situation with which we are faced in North-East Jordan. The sites from which the sample was taken, Qasr el-Uweinid, Qasr el-Aseikhin, and Azraq Druze, are located in the Azraq depression. Large volcanic fields of basalt

cover the northern part of the depression, while the southern and western parts are mainly limestone desert. Aseikhin, and Azraq lie on the edge of the main basalt field. Uweinid, less than fifteen kilometres south-east of Azraq, has to its north an area of basalt, /and to the south, east, and west, areas of limestone, and fluviatile deposits.<sup>19</sup> The mineral suites in the sherds reflect the geology described above. Unfortunately, from thin-section analysis alone we can say little more about the provenance of sherds in groups A and B than that the former were probably made in or near a limestone area, while the latter were probably made in or near a basalt field. In order to increase the precision of characterization by thin-section analysis, it is also necessary to analyse the composition of the ceramic assemblages of sites in North-East Jordan, and establish distribution patterns for coarse ware fabric groups. For example, most of the ceramic assemblage at Qasr el-Aseikhin appears to consist of purplish pottery,<sup>20</sup> an observation that alone suggests local production. Furthermore, the fact that thin-section analysis has shown purplish sherds to contain basaltic inclusions, together with Aseikhin's position on the edge of a large basalt field, lends further support to the view that the purplish pottery at this site was produced locally, however, it must be said that the assessment of the composition of Aseikhin's pottery assemblage was based on the casual observation of scatters, rather than on the analysis of a representative sample from the site. Indeed, at present distribution patterns of coarse ware fabric groups in North-East Jordan, based on the analysis of representative pottery samples, are urgently required.

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<sup>17</sup> F.R. Matson, some aspects of ceramic technology, *Science in archaeology*, London, 1963, p. 595; A.O. Shepard. *Ceramics for the archaeologist*, Washington, 1956, p. 104.

<sup>18</sup> D.P.S. Peacock, the scientific analysis of ancient

ceramics, a review, *World archaeology*, I (1970) p. 375-386.

<sup>19</sup> Kennedy, *ibid.*, p. 70.

<sup>20</sup> Kennedy, personal communications.

## Bibliography

- Gilbertson, D.D. and Kennedy, D.L. 'An archaeological reconnaissance of water harvesting structures and wadi walls in the Jordanian desert north of Azraq oasis', *ADAJ*, 1983, forthcoming.
- Gilbertson, D.D., Hunt, C.O. and Bradley, S. forthcoming 'Micropalaeontology and palaeoecological studies of recent sediments from the Azraq marshes in the Jordanian desert', in Hadidi, A (ed.), *Studies in the History and Archaeology of Jordan*, II, forthcoming.
- Kennedy, D.L. *Archaeological Explorations on the Roman Frontier in North-East Jordan*, Oxford, 1982, (BAR S134).
- Khairy, N.I. 1983 Technical aspects of fine Nabataean pottery *Bulletin of the American Schools of Oriental Research*, No. 250, 17-40.
- Matson, F.R. Some aspects of ceramic technology. *In Science in Archaeology*. eds. D. Brothwell and E. Higgs, 590-602 London, 1963.
- Parker, S.T. Archaeological survey of the Limes Arabicus: a preliminary report. *ADAJ* 21, 1976, 19-31.
- Peacock, D.P.S. The Scientific analysis of ancient ceramics, a review, *World Archaeology* 1, 1970, 375-86.
- Shepard, A.O. *Ceramics for the Archaeologist*. Washington D.C., 1956.
- Smith, R.H. Pella of the Decapolis - Volume I. *The 1967 Season of the College of Wooster Expedition to Pella*. 1971.

# THE Umayyad Churches of Jordan

by  
Michele Piccirillo

## Introduction

The aim of this paper is to collect the archaeological evidence which sheds some light on the life of the Christian community of Jordan during the Umayyad Period.<sup>1</sup>

The discovery of churches and mosaic-floors dated to the Umayyad period in Jordan constitutes historical evidence emphasizing the conciliatory attitude of tolerance prevalent toward the Christian community on the part of the public authority. This discovery shows the continuity of presence in the region of masons and mosaicists who built and decorated the sacred edifices both of Christians and Muslims along with the palaces of the Caliphs spread throughout Jordan. The traces of the iconoclastic movement found in the mosaics of Jordan pose a religious and historical problem of an uneasy solution, although it helps to focus the research.

The French scholar Clermont-Ganneau, who was the first to point out the existence of Christian monuments during the Umayyad period, discussing the dating of the church of the Virgin at Madaba in 1898, suggested reading the strange sign which in the dedicatory inscription stands for the hundreds as a *sampi* worth 900. On the basis of the Seleucid era, the church would have been terminated in February 662/3, the forty-second of the Umayyad era.<sup>2</sup> Let us read what the scholar wrote in order to respond to the possible objections that could be raised to his dating: "...until now it has always been repugnant to admit that such work could have been executed under Arab domination. But it is a mistake to lose sight on the fact that this domina-

tion was, initially, very mild with respect to the Christian population, who were left all of their religious liberties... We do not see why suddenly, from one day to the next, the Christians of Syria who had accepted, at times willingly, the light yoke of primitive Islam, would have ceased to decorate and even build churches".

Archaeological research in Jordan during the last century has proven that the scholar was right. Until now we have excavated the following Christian monuments built during the Umayyad Period in Jordan:

- The church of the Virgin at Madaba.
- The lower church in the village of el-Quweismeh, Amman.
- The church on the acropolis of Ma'in, Madaba.
- Part of the mosaic-floor of the church found at Shuneh el-Janubiyeh in the Jordan Valley.
- The unknown edifice built at Rabbat Moba, Kerak in 685/6.

This archaeological evidence therefore parallels the literary texts of the same epoch that deal with the relations between the Christian subjects and the Muslim authority.

## The Oil Lamps of Jerash

One of the first proofs of the Christian presence in Jordan during the Umayyad period was published by Clermont-Ganneau in 1898. It is an oil lamp type with a cross on the bottom together with an Arabic inscription which reads: *صنعه داود بن مصطفى بجرش سنة خمسة وعشرين ومئة* "Work of David the son of Mustafa at Jerash in the

<sup>1</sup> For a first attempt at this particular problem, see M. Piccirillo, *I Mosaici di Giordania dal I all'VIII secolo d.c.*, Il Veltro Editrice, Roma 1982, p.

24-28.

<sup>2</sup> Ch. Clermont-Ganneau, "La mosaïque de Madaba", *RAO* II, 1898, p. 52-55.

year 125 of the Hejira".<sup>3</sup>

### The Church on the Acropolis of Ma'in

In 1934 Mufaddy Mousa el-Haddadin, while building his new house on the acropolis of Ma'in, to the south-west of Madaba, brought to light the mosaic-floor of a church which was later studied and published by Fr. Roland De Vaux of the Ecole Biblique in Jerusalem.<sup>4</sup>

In the main hall which is about 10.00 m. broad by 17.00 m. long, were visible traces of the central carpet closed in a double border. The internal one was decorated with hunting scenes. The external with a series of ecclesiastical edifices spaced with trees and identified by label inscriptions in Greek with cities and villages of the region to the east and to the west of the Jordan river. At the moment of the discovery, were still visible the following edifices: Nicopolis, Ascalon, Maiuumas, Gaza, Odora, Cherachmoba, Areopolis, Gadoron, Esboun, Belémounim... (Fig. 1).

Those edifices interpreted as bishops of the Patriarchate of Jerusalem and studied from the view point of historical geography, misled the archaeologist in the dating of the mosaic-floor. In the *tabula ansata* with the dedicatory inscription survived the letters of the dating. The work was finished "in the third indiction of the year 614". With the era of the Provincia Arabia the above mentioned year corresponds to 719/720 at the time of Umar II (717-720). According to Fr. De Vaux such a dating would refer to the restoration after the iconoclastic destruction, while the original pavement has to be dated to the end of the sixth century or even before the

middle of the seventh century.

The discovery of the contemporary pavement at el-Quweismeh dated without doubt to 717/718 and a careful study of the mosaic during the recent restoration carried out by my team, has convinced me of the artistic unity of the work. The *tabula ansata* with its inscription is certainly part of the original work. The new motifs added during the restoration can easily be defined.<sup>5</sup> Moreover, based on technical considerations, I would go on to affirm that the same team of mosaicists who worked out the original mosaic could be responsible for the restoration. It is sufficient to compare the trees among the edifices with the similar trees of a restored area.

The house built by the Haddadin family prevented Fr. De Vaux from drawing a complete plan of the church which seemed rather singular with the central and unique nave in direct communication with the sides.

### The Lower Church at El-Quweismeh

At el-Quweismeh (Fig. 2,3), 500 m. north of the known Roman mausoleum, Fr. Saller and Bagatti of the Franciscan Institute, from 1940 on paid several visits to the house of Mr. Haddid where remains of a mosaic floor of a church were uncovered.<sup>6</sup> In 1948 Mr. Ibrahim Abu Jabir, then inspector of Antiquities, handed over to Fr. Saller a copy of the dedicatory inscription of the church that he quickly published for its historical importance.<sup>7</sup> "By the providence of God, by the diligence and care of the most holy priest and economos Tzobeos Khobeos, the entire fabric of this most holy church

<sup>3</sup> RAO II, 1898, 47-51. The reading was rectified by Fr. Antonio Battista on a second specimen of the same type in *PAM* No. 38-187 (in B. Bagatti, *I Monumenti di Emmaus el-Qubeibeh e dei dintorni*, Jerusalem 1947, 141; M. Piccirillo, *Chiese e Mosaici di Giordania, I*, Jerusalem, 1981, p. 46f.). See also B. Bagatti, "Lucerne fittili a testa di cavallo in Palestina (secc. VII-VIII)" in *RAC*, 46 (1970), p. 87-95; "Un 'inedita lucerna bronzea a testa di cavallo", *RAC* 58 (1982) p. 127-130; *ADAJ* XXVI (1982) p. 134, Pl. XXXVII.

<sup>4</sup> R. De Vaux, "Une mosaïque Byzantine à Ma'in",

*RB*, 1938, p. 227-258, pls. XI-XVI.

<sup>5</sup> We worked at Ma'in during the summers 1981 and 1982 (see *LA*, 1981, p. 350, no. 5, tav. 109, foto 2, and *LA*, 1982, p. 510).

Fr. Saller reached the same conclusions in 1949 (cfr. S. Saller-B. Bagatti, *The Town of Nebo*, Jerusalem, 1949, p. 134, fn. 1 and p. 256).

<sup>6</sup> "The Christian Remains at el-Quweismeh" in *Town of Nebo*, p. 251-268, pls. 42-44.

<sup>7</sup> In a lecture at a meeting of the Palestine Oriental Society later published in *JPOS*, 21 (1948) p. 138-147.

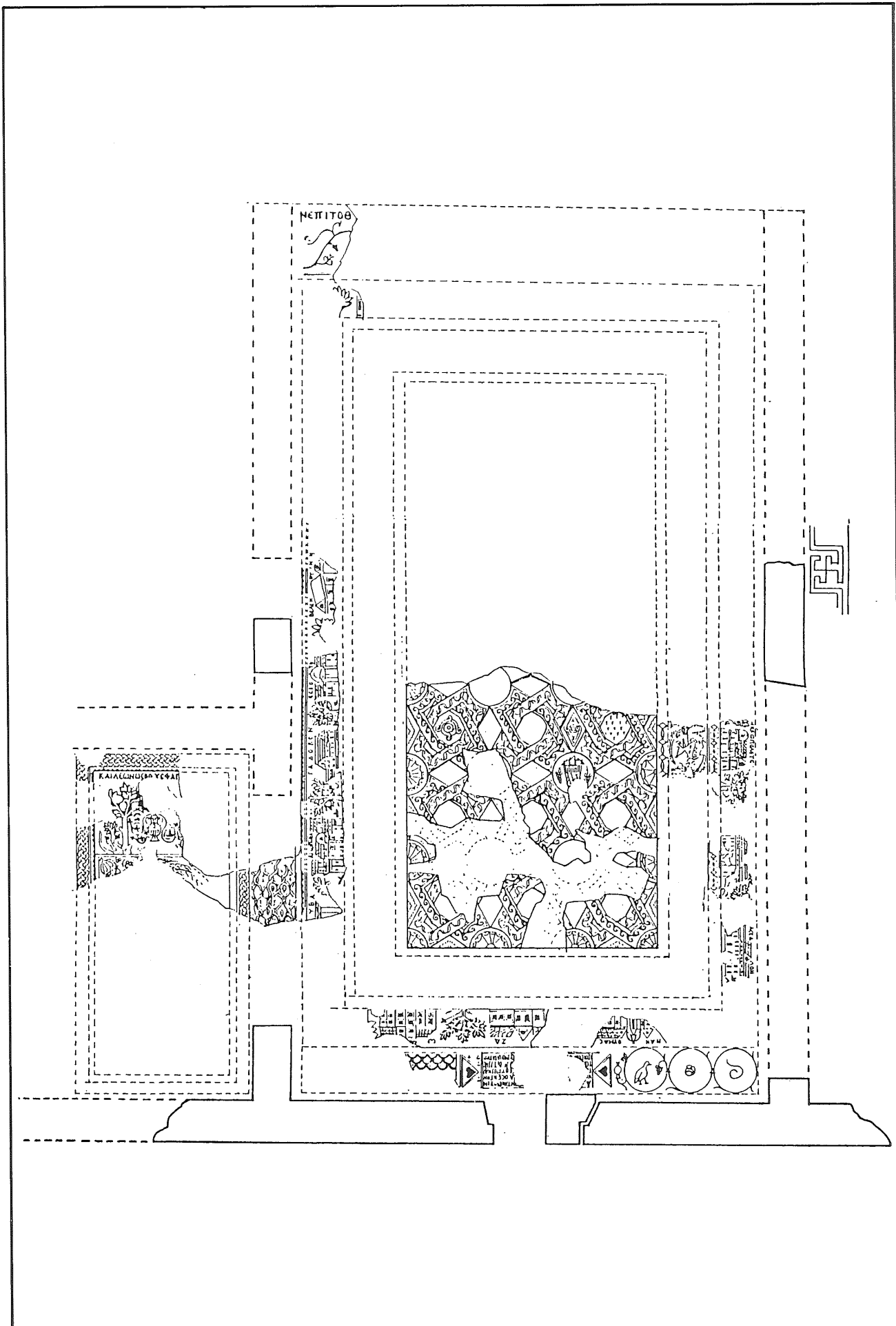


Fig. 1: Ma'in: The Church on the acropolis. (By Fr. Eugenio Alliata, Studium Biblicum Franciscanum).

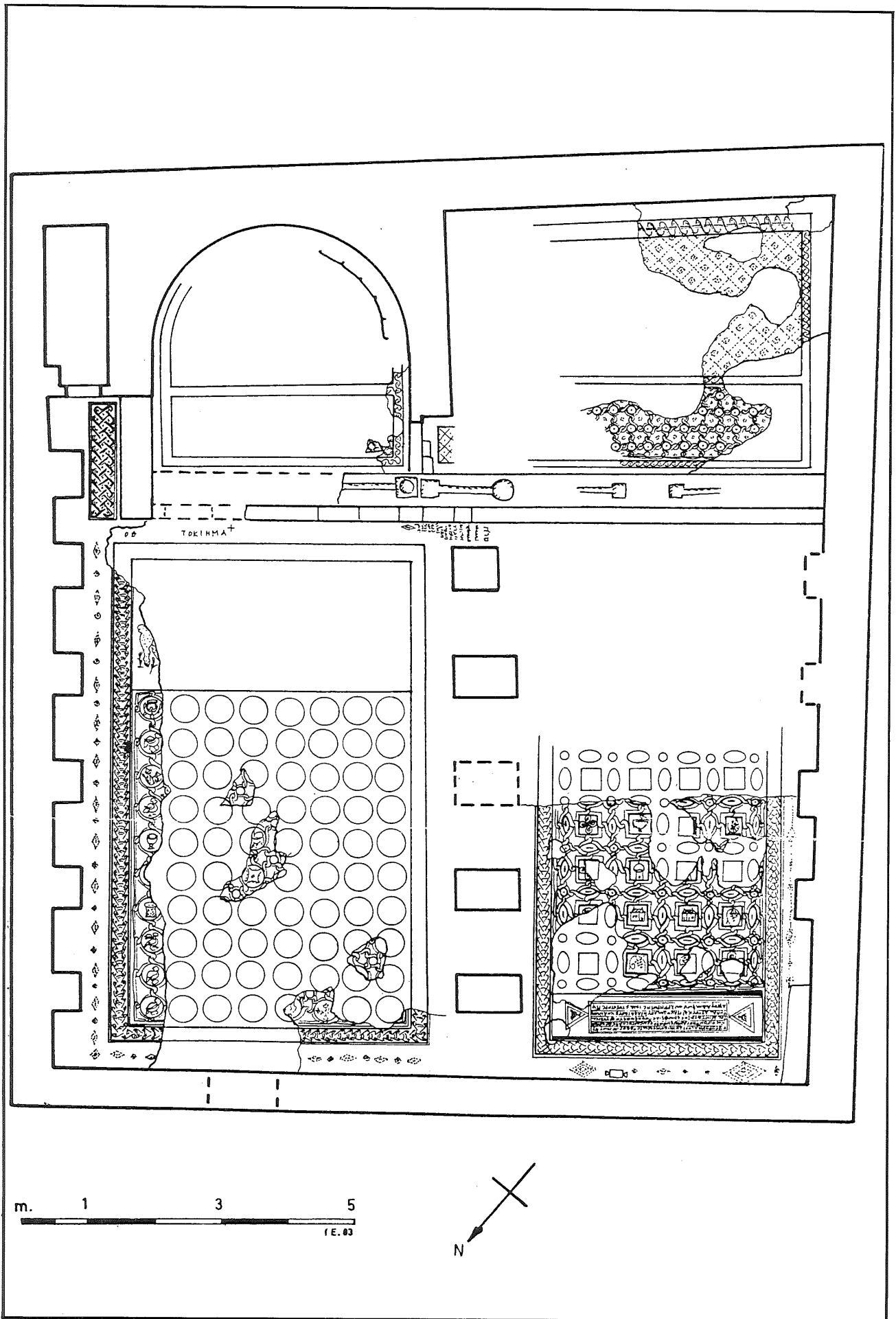


Fig. 2: Quweismeh: The lower Church. (By Fr. Eugenio Alliata, Studium Biblicum Franciscanum).

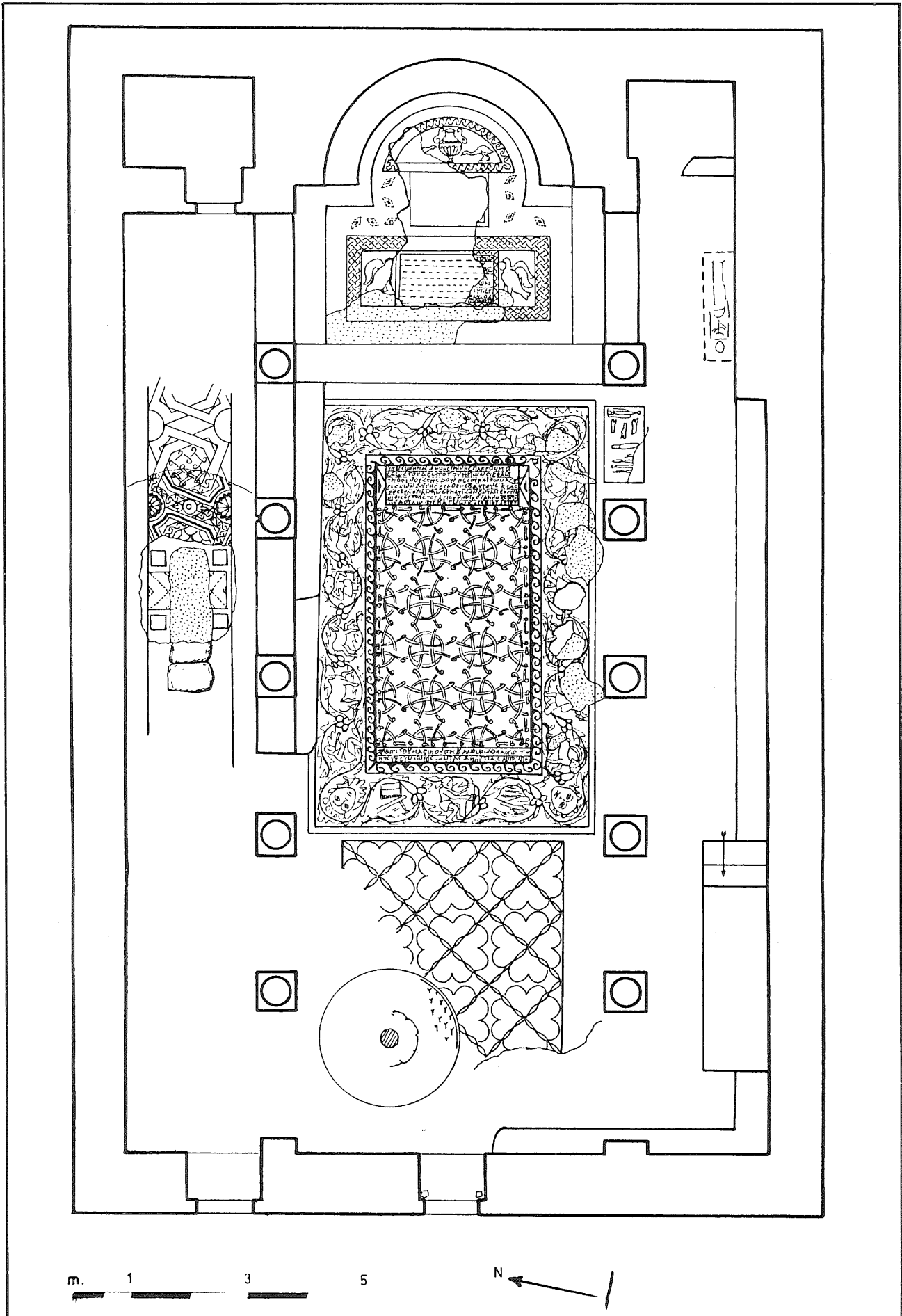


Fig. 3: Quweismeh: The upper Church of Saint Kiricos. (By Fr. Eugenio Alliata, Studium Biblicum Franciscanum).



was restored from the foundations and paved with mosaics for his own welfare, and that of Macedonius and Habbibas and John, his brethren in Christ, during the first indiction of the year 780”.

Such a year corresponds with the Pompeian era of Philadelphia Amman to 717/718, at the time of Umar II. With that inscription Fr. Saller published later a second Greek inscription and a Syriac inscription from the same mosaic. However he could give only a summary description of the edifice that resulted anomalous with respect to the plans of the churches of the region. “If the western wall of the rooms stands on the foundations of the old wall of the south as it seems to do, then the church would have been rather short and wide...” wrote Fr. Saller.

The excavation work conducted during the summer of 1982 among the ruins of the house abandoned and reduced to a dug pit, has produced results of great historical value for the Christian architecture of Jordan during the Umayyad period.<sup>8</sup> The plan of the church is truly singular. We have a main apsidal hall, flanked on the southern side by a second surrounding of the same length which for the lack of a separating wall is to be considered properly as an aisle rather than a chapel. The unity of the edifice is further on strengthened by the double step of the balustrade that runs continuously from north to south throughout the width of the church.

Such anomalies prevent us from cataloguing this church as a double church, a type of building already known in the region. The two surroundings are separated by the mosaic-floor of the pavement which are differently decorated. A setting of interlaced circles with flowers, birds, cups and baskets decorates the main hall closed to the east by a rectangular panel with animals and plants. A setting of interlaced lozenges and squares with edifices, flowers and geometric motifs deco-

rated the southern room.

As a mark of difference between the two compositions, we note the lack of animal motifs in the decoration of the southern room. This difference however does not seem to me a sufficient element to distinguish two periods in the decoration. In my opinion the church was conceived as a single unit of building and decoration.

This plan which could have its origin and functional explanation in the liturgy, could clarify the anomalies of the church on the acropolis of Ma'in and other singularities which we have noted in other churches of the region. In the church of St. Mary in the village of Rihab Bene Hasan, dated to 582, the central hall in a successive restoration, was closed by a continuous wall that separated it from the northern aisle reduced to a chapel<sup>9</sup>. The same has occurred at Samra in the central church, recently excavated by the archaeologists of the Ecole Biblique.<sup>10</sup> The same reduction with the addition of a plastered bench along the partition wall, is visible at Quweismeh in the upper church excavated during the summer 1982 by the Department of Antiquities.<sup>11</sup>

We can conclude that the lower church of Quweismeh with its singular plan dated to the Umayyad period situates architecturally such reductions of the sacred edifices, albeit their liturgical functional explanation is still not clear to us. Later on such a plan may help in an architectural and functional reexamination of the double churches until now found in Jordan such as at Umm el Jimal and Umm er-Rasas.<sup>12</sup>

### The Church at Shuneh el-Janubiyeh

By chance during the summer of 1980 a bulldozer digging on the western slope of the Tell Nimrin in the village of Shuneh el-Janubiyeh, brought to light traces of a mosaic floor which proved to be part of a three nave church.<sup>13</sup>

<sup>8</sup> M. Piccirillo, “Le chiese di Quweismeh-Amman,” in *LA* 1984, 329-346, tav. 33-49.

<sup>9</sup> M. Piccirillo, *Chiese e Mosaici di Giordania*, I, p. 82 ss, tav. 72.

<sup>10</sup> *LA*, 1982, p. 498-501, tav. 122.

<sup>11</sup> *LA*, 1982, tav. 126, foto 3.

<sup>12</sup> For the double church of Sabha and Um el-Jimal, see *AAES* II, A, 2, p. 112-115; II, A, 3, p. 179-182; for that of Um er-Rasas, *Town of Nebo*, p. 247.

<sup>13</sup> M. Piccirillo, “A Church at Shunat Nimrin”, *ADAJ*, 1982, p. 335-342, Pls. CIII-CX.

On careful examination of the mosaic from the technical point of view, we concluded that the mosaic shows traces of two different periods juxtaposed to each other. I believe, in fact, that the decoration of both side-chapels, the motif on the eastern borders of the side naves and the corresponding intercolumn areas, are contemporary with the interlacing design fragments of the central nave, to be dated to the second half of the sixth century.

To the later phase of the mosaic floor belongs the decoration of the central nave of the church divided in three panels enclosed in a guilloche border and the decoration of the juxtaposed octagons decorated with diamonds of the southern nave.

This phase technically and stylistically is related to mosaic floors of the seventh through eighth centuries so far discovered in Jordan. The preference of geometric motifs with knotted interlaced decoration, the richness of accessory decorative elements, such as florets or diamond and the position of the inscriptions, point to a late dating of the mosaic in the Umayyad Period.

### **The Inscription of Rabbat Moba, Kerak**

In 1968, Dr. Fawzi Zayadine recovered two lintels with Greek inscriptions probably originating from ecclesiastical buildings.<sup>14</sup> Both have in fact the name of the bishop of the town. The first inscription is dated to "the year 492 after the earthquake", that is to the year 597/598.

In the second he read: "At the time of Stephen our most holy metropolitan has occurred the construction, at the time of the 15th indiction of the year 585". This year with the era of the Provincia Arabia corresponds to 687 of our era that is to the time of Abd el-Malik Ibn Marwan (685-705).

### **The Church of the Virgin at Madaba**

The last building we present is the

complex of the church of the Virgin at Madaba.<sup>15</sup> The mosaic floor of this church was the first mosaic of Jordan to be known to scholars. Since 1887 many scholars have studied the three inscriptions of the mosaic visible in the house of the Sunna' family on the Roman Road of Madaba, but little interest was given to the history of the monument, for the dating of the mosaic and of the church.

The Department of Antiquities acquired the site in 1972. In 1973-74 the area was partially cleaned. In 1979 to provide the Department with a suitable plan of the edifice in order to restore the building for the preservation of the mosaic, we began systematic excavations. After removing the ruins of the house built on the spot in the last century, we succeeded in defining the complete plan of the church and in reading the dedicatory inscription until then partly hidden under a wall.

We could also see the evidence that the mosaic floor with the inscriptions has been added in a later stage to the first mosaic floor of the church. The traces of the sixth century mosaic are still visible in the main nave of the church and in the narthex of the church along the southern wall. In the course of the work, further evidence gave me the opportunity to locate under the narthex of the church a public hall of the town of Madaba decorated with a beautiful mosaic floor with the myth of Phaedra and Hippolytus. This hall and the church were built on a monument of the Roman period.

From the last excavation campaign we can define the history of the monument in this way:

1. In the second and third centuries A.D. an exedra was built on the northern side of the paved road stretching East-West in the Middle of the town.
2. In the middle of the Sixth century a broad room with entrance on the northern wall, was built and decorated with mosaics on the western wall of the exedra.
3. Later, at the end of the same century

<sup>14</sup> F. Zayadine, "Deux Inscriptions Grecques de Rabbat Moab (Areopolis)" *ADAJ*, 1971, p. 71-76.

<sup>15</sup> M. Piccirillo, "La Chiesa della Vergine a Madaba", *LA*, 1982, p. 373-408, tav. 39-82.

the room was covered and the church of the Virgin Mary built and decorated with mosaics.

4. The church was paved anew during the Umayyad Period in 662/3 at the time of bishop Theophanes with whom ends the list of the bishops of Madaba.

The reading of the dating in the dedicatory inscription suggested in 1898 by Clermont-Ganneau is archaeologically, stylistically and epigraphically well based.

### Conclusion

From this short review of the principal archaeological evidence that sheds light on the life of the Christian community during the Umayyad period in Jordan, we shall draw some historical conclusions.

1. From the dedicatory inscription of the church of the Virgin we are informed that at Madaba in the second half of the seventh century there existed an organized Christian community under a bishop and that this community had the possibility of decorating with care a sacred place. The same information is found on the lintel found at Rabba for the southern region.
2. From the central inscription in the church of the Virgin in which one can read: "Looking to the Virgin Mary, Mother of God, and to whom she bore Christ, supreme king, only son of the only God, purify the mind, flesh and deeds, so that you may purify with prayers the divine people", we should conclude that in the apsidal wall which stands in front of the main door visible to those entering the church, existed in 662/3 an icon of the Mother of God in paint or in mosaic.
3. The churches of Ma'in and Quweismeh demonstrate that already in the begin-

ning of the eighth century Christian edifices were built and decorated. From the decoration of the mosaic floors of the two churches with birds and human figures we can affirm that the order to destroy them is to be put to sometime after 719/20, the date of the construction and decoration of the church of Ma'in.

4. The life of the Christian community continued also after the execution of that ordinance. The mosaic floors were restored and the churches officiated, as evidenced by the restoration of the mosaic all over the towns and villages of Jordan, and by the humble oil lamps made at Jerash.

This archaeological evidence integrates sufficiently the contemporary literary sources. Let us recall a few of them.

1. On the juridical and normative plan the conciliatory attitude of the Umayyad authority was codified in the so-called Covenant of Umar.<sup>16</sup> In practice the action inspired by these principles varied from place to place, from caliph to caliph, from one governor to another. Therefore acts of persecution also are to be recalled.
2. At the time of Walid I (705-715) the unpleasant event of the martyrdom of St. Peter of Capitolias occurred in which, besides the cruelty of the final execution, the conciliatory attitude of the authority is highlighted.<sup>17</sup>
3. On the plan of the ecclesiastical organization we have the letters sent by Pope Martin after the council held at the Lateran in Rome in 649 to the bishops of Jordan, to John of Philadelphia-Amman, to Theodore of Esbus and Anthony of Bacatha. The Pope authorized John of Philadelphia-Amman to organize anew the ecclesias-

<sup>16</sup> A. S. Tritton, *The Caliphs and their non Muslim Subjects, A Critical Study of the Covenant of Umar*, 1970.

<sup>17</sup> J. T. Milik, "Saint Pierre de Capitolias", in *LA*, 1960, 170-173. "Libre à toi de reconnaître comme

Dieu Jésus qui est un homme et un esclave du Créateur. Mais pourquoi blasphémer notre religion et appeler notre pacifique prophète maître d'erreur et père du mensonge?" said the Caliph to Peter.

tical hierarchy of the region.<sup>18</sup>

4. The dates of the mosaics of Ma'in and Quweismeh are important chronological data to give credit to the Christian sources that attribute the order of destroying the images of the region to Yazid II who, as is written in a Syriac Chronicle, "ordered to destroy in his

empire all the images and figures be they of bronze or of wood or of stone as those painted in colours".<sup>19</sup>

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<sup>18</sup> Migne, *PL*, 87, 154-167.

<sup>19</sup> See A. Grabar, *L'iconoclasme Byzantin. Dossier Archéologique*, 1957, 105. S. Gerö, *Byzantine*

*Iconoclasm during the reign of Leo III*, Louvain, 1973, p. 59-84; V. F. Fazzo, *La giustificazione delle immagini religiose*, Napoli, 1977, p. 343-364.



# RECHERCHES ARCHEOLOGIQUES AU CHATEAU DE QASTAL (Jordanie)

par  
Patricia Carlier, avec une contribution de  
Frédéric Morin

## Introduction

Inquiété par la dégradation de plus en plus rapide du château de Qaştal (construction d'une maison en béton sur une partie des vestiges), le Département des Antiquités de Jordanie a cherché à mieux connaître ce site jusqu'à présent peu étudié. Mentionnés par les voyageurs du XIXe siècle<sup>1</sup>, les vestiges de Qaştal ont été étudiés pour la première fois par Brünnow et Domaszewski<sup>2</sup> qui ont attribué les ruines à l'époque romaine tout en signalant les difficultés soulevées par une telle datation. A l'occasion d'un complément à l'ouvrage *Provincia Arabia*, N. Glueck a noté à Qaştal la présence de mosaïques byzantines et de tessons tous postérieurs à la période romaine<sup>3</sup>. Par la suite, K.A.C. Creswell<sup>4</sup> a intégré Qaştal parmi les châteaux ghassanides, alors que J. Sauvaget, H. Stern et D. Schlumberger y virent un édifice umayyade.<sup>5</sup> L'étude récente de Heinz Gaube<sup>6</sup> attribue la construction de Qaştal aux Umayyades, sans

pour autant fournir des arguments irréfutables, aucune fouille archéologique permettant de vérifier cette attribution n'ayant jusqu'alors été effectuée.

Entre 1979 et 1981, nous avons entrepris une recherche sur l'ensemble des châteaux umayyades ayant pour base les publications, les comptes-rendus de fouilles et nos observations sur les vestiges, pour mieux cerner leurs aménagements et leurs techniques de construction.<sup>7</sup> Au vu de ce travail, le Département des Antiquités, confronté à l'urgence d'une intervention à Qaştal, nous a proposé de nous confier l'étude archéologique du château. Une première mission a donc été organisée durant l'été 1983. Ces travaux ont été entrepris dans le cadre d'une collaboration entre le Département des Antiquités de Jordanie et le Groupe de Recherche et d'Etude du Proche-Orient (GREPO/CNRS) d'Aix en Provence<sup>8</sup> à l'occasion d'une Thèse de 3e Cycle, soutenue le 7/12/1984 à Aix en Provence.<sup>9</sup>

<sup>1</sup> Buckingham J.S.: *Travel among the Arab Tribes inhabiting the countries east of Syria and Palestine*, London, 1825, p. 89.

Tristram H.B.: *Land of Moab*, London, 1874, p. 218.

Hill G.: *A Journey East of the Jordan and the Dead Sea*, in *Quarterly Statement of the Palestine Exploration Fund*, 1896, p. 45.

<sup>2</sup> Brünnow R., Domaszewski A.: *Die Provincia Arabia II*, Strassbourg, 1905, p. 95 à 103.

<sup>3</sup> Glueck N.: *Exploration in Eastern Palestine*, in *A.A.S.O.R.*, XIV, 1934, p. 5.

<sup>4</sup> Creswell K.A.C.: *Early Muslim Architecture, Part 1,2* 2ème ed., Oxford, 1969, p. 517.

<sup>5</sup> Sauvaget J.: *Remarques sur les monuments umayyades, châteaux de Syrie*, in *J.A.*, CCXXXI, 1939, p. 18 à 20.

Stern H.: *Notes sur l'architecture des châteaux umayyades*, in *A.I.*, XI, XII, 1946, p. 77 à 82.

Schlumberger D.: *Les fouilles de Qaşr el-Heir, 1936-1938, rapport préliminaire*, in *Syria*, XX, 1939, p. 337.

Gaube H.: *'Amman, Harāne und Qaştal, Vier*

*Frühislamische Bauwerke in Mittel Jordanien*, in *Z.D.P.V.*, XCIII, 1967, p.67 à 86.

<sup>7</sup> Carlier P.: *Les châteaux umayyades de Syrie-Palestine, aménagements et techniques de construction*, mémoire de Maîtrise, Aix en Provence, 1981, non édité.

<sup>8</sup> Sous la direction de Patricia Carlier, archéologue, l'équipe était composée de Frédéric Morin, architecte, de Lucien Ifrah et Stéphane Metz, étudiants en architecture, de Vincent Morin, technicien agricole et Yves Billaud, docteur en géologie. Nous tenons à remercier tout particulièrement le Dr. Adnan Hadidi, Directeur du Département des Antiquités de Jordanie, et l'ensemble des membres du Département, pour leur accueil, leurs conseils et leur collaboration. Nous tenons également à remercier Antonio Almagro, Directeur du Centre Archéologique Espagnol à Amman, pour la confiance qu'il nous a témoignée.

<sup>9</sup> Carlier P.: *Qaştal, château umayyade?*, Thèse de 3 e Cycle, Aix en Provence, 1984, non édité.

# I. L'Étude Archéologique

par Patricia Carlier

## A. Description du site (Voir fig. 1)

Qasṭal est situé à proximité immédiate de l'aéroport international Queen Alia, à 25 km au Sud de 'Ammān sur la route du désert. Le site comporte de nombreux vestiges dont les plus anciens connus, remontant à l'Age du Fer, sont localisés au Tell de Zabāyir al-Qasṭal<sup>10</sup> au Sud-Ouest du château. De plan carré, le château de Qasṭal est implanté au sommet d'une croupe. Un édifice lui est accolé au Nord: le *mihrab* de sa salle transversale autrefois ouverte sur une cour et sa tour y font reconnaître une mosquée.<sup>11</sup> Un barrage en pierre long d'environ 400 m barre le *wādī* al-Qasṭal à l'Est du château, et une des carrières d'où proviennent les blocs de construction a été aménagée en réservoir. Le château, la mosquée, le barrage et le réservoir présentent des techniques de construction rigoureusement identiques. Nous avons cru pouvoir reconnaître parmi les maisons du village contemporain les vestiges de la chaufferie d'un bain, à l'Ouest du château, et de larges murs qui correspondraient à une ancienne agglomération de constructions rurales. L'approvisionnement en eau de cet ensemble était assuré par un réseau de citernes. Plus de 70 d'entre-elles ont été retrouvées sur 2km<sup>2</sup>. Enfin, les photographies aériennes ont permis de repérer une ancienne piste rectiligne à proximité immédiate du Tell de Zabāyir al-Qasṭal, le seul lieu où nous ayons pu retrouver du matériel pré-islamique.

## B. Les principaux résultats de la campagne 1983

### 1. Description des vestiges du château

(voir fig. 2, 3, 56, 58, 60, 61, 63, 65)

Les parties les plus anciennes de l'édifice sont construites en grand appareil irrégulier en carreaux et boutisses. Des constructions plus tardives réoccupent cet ensemble. Le château est construit sur un plan presque carré, mesurant en moyenne 67, 84 m de côté. L'enceinte est cantonnée de tours hémicylindriques pleines. Les corps de bâtiment sont organisés autour d'une cour centrale entourée d'un portique. Les appartements présentent une distribution type: seule ouverte sur la cour, une grande pièce centrale distribue quatre autres petites pièces latérales, un groupe de pièces annexes (comprenant une latrine) étant aménagé à une extrémité, un couloir permettant d'y accéder directement depuis la cour. Au centre du château, une citerne assure l'alimentation en eau.

### 2. Les structures architecturales du bloc d'entrée (Voir fig. 4)

Les châteaux umayyades se distinguent généralement par les dispositions particulières de leur bloc d'entrée. Compte tenu des travaux de Sauvaget et de Gaube proposant une datation umayyade de Qasṭal, c'est dans cette zone que l'effort de fouilles a été concentré.

Située au milieu de la façade est, l'entrée du château est percée au milieu d'une grosse tour (Pl. LXIV: 1). Un système d'arcs divise le vestibule en deux compartiments carrés aménagés de banquettes à accoudoirs, Au Nord et au Sud du vestibule, deux larges escaliers donnent accès à un étage. Sous ces escaliers, deux petites salles voûtées, aux sols ornés de mosaïques, s'ouvrent sur le vestibule dallé. Les dispositions du bloc d'entrée sont caractérisées par la difficulté de défendre la porte du château et par la présence de deux escaliers conduisant directement à un étage.

<sup>10</sup> Glueck N.: *op. cit.*, p. 7.

<sup>11</sup> Sauvaget J.: *op. cit.* p. 18-20; Stern M., *op. cit.*, p. 80-81; Gaube H., *op. cit.*, p. 69-73.

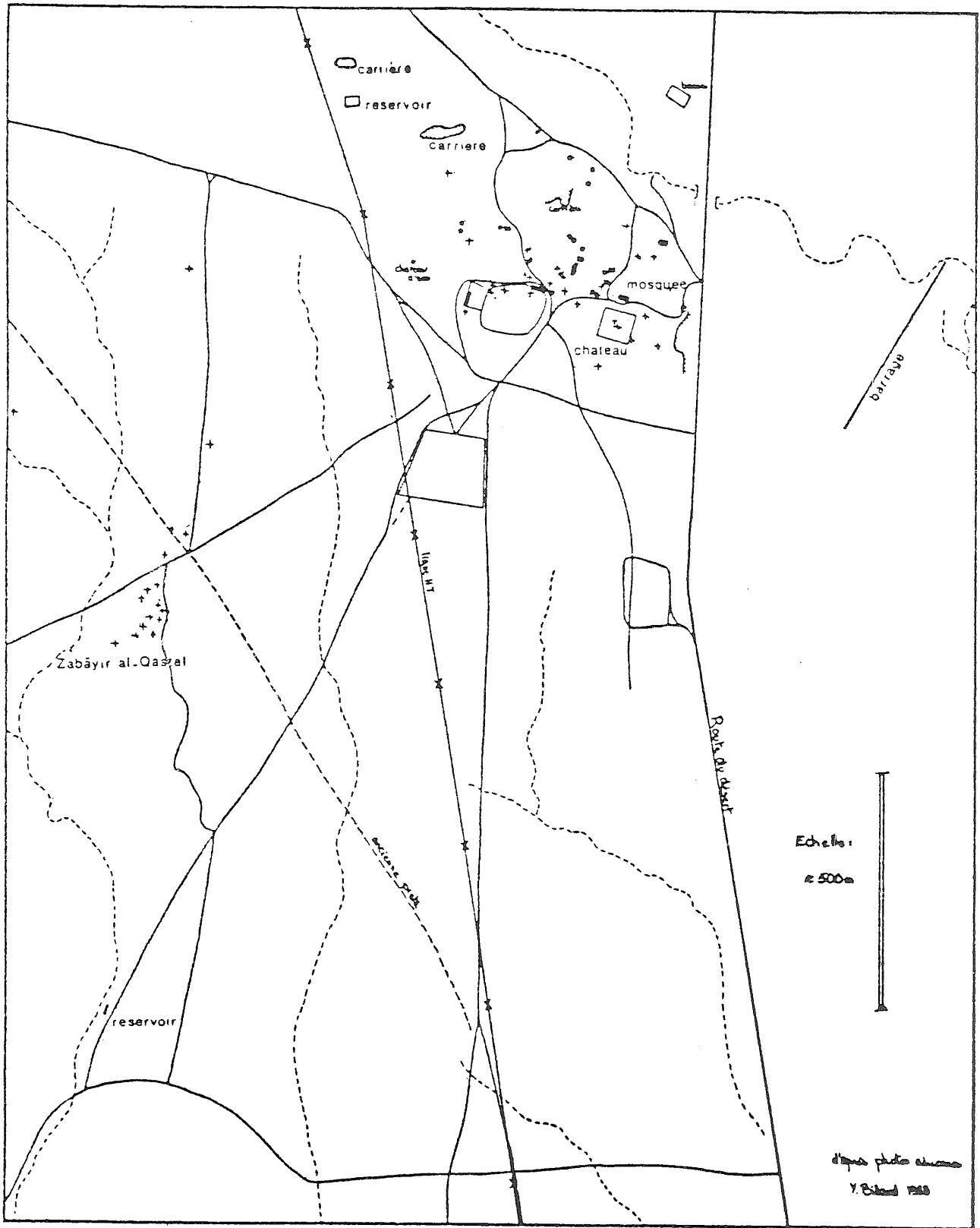


Fig. 1: Carte 1



### 3. *L'analyse stratigraphique*<sup>12</sup> (Voir fig. 5)

Les nombreux sondages entrepris dans le bloc d'entrée ont tous montré que cette zone avait fait l'objet de récents bouleversements liés à la poursuite des réoccupations temporaires des vestiges par la population locale qui y entrepose ses récoltes ou y parque ses troupeaux. Dans l'état actuel des fouilles, nos sondages ont livré une proportion importante de matériel céramique des périodes ayyoubide-mamelouke (XIIIe-XVIe siècles) mélangé à du matériel umayyade (céramique et cubes de mosaïques). Des constructions tardives comportant de nombreux remplois ont été édifiées directement sur les sols dallés ou recouverts de mosaïques associés aux murs les plus anciens en grand appareil de carreaux et boutisses. Dans l'état actuel de nos sondages, nous n'avons pas retrouvé de couche contemporaine d'une occupation umayyade. Une seule couche a livré du matériel presque exclusivement de cette période: le remplissage du petit canal entourant la margelle du puits de la citerne centrale (sondage SQ, couche SQ C2N1) a livré 55 tessons umayyades dont 14 peints, 25 cubes de mosaïque et un seul tesson abbasside, retrouvé à la surface de cette couche. Il semblerait donc que l'abandon du château et les premières destructions de mosaïques puissent être placés dès la fin de la période umayyade: ils sont obligatoirement postérieurs aux dates des séjours du calife al-Walīd II puis de son cousin al-'Abbās en 126/744-5 (voir plus loin).

Dans l'état actuel de nos recherches, les sondages de fondation n'ont pas permis de mettre à jour une construction antérieure à celle en grand appareil irrégulier. Celle-ci est peu ou pas fondée sur un sol qui semble être vierge, très dur (*huwwār*). Les tranchées de fondations sont comblées

par un mortier identique à celui de la construction, dans lequel nous n'avons pas pu retrouver de matériel. Jusqu'à présent, l'ensemble de nos sondages n'a pas livré un seul tesson indiscutablement anté-islamique.

### 4. *Les sols de mosaïque* (voir fig. 4 et 6)

Les petites salles des appartements de part et d'autre du bloc d'entrée (DI et SJ) présentent des vestiges de sols en mosaïque à motifs géométriques sur fond blanc, composés de tresses de bandeaux noirs, rouges, roses, oranges ou gris., Le Département des Antiquités a déposé des panneaux de mosaïque de l'appartement nord-est, actuellement entreposés au Musée de Mādabā. Par ailleurs, la partie abritée par le portique autour de la cour présente également un sol de mosaïque à décor géométrique, retrouvé en plusieurs endroits (SG, DK et DL).

Ces mosaïques ont certainement été exécutées par les artisans de la ville voisine de Mādabā, célèbre pour son école de mosaïstes des VIe-VIIIe siècles, les mosaïques de Qaṣṭal étant très semblables à la production la plus tardive de ce centre<sup>13</sup>.

### 5. *Les blocs décorés* (Voir fig. 7 à 44)

Les sondages et l'examen des murs tardifs ont permis de retrouver un ensemble comptant plus de 80 blocs décorés, dont aucun n'a été trouvé en remploi dans les murs les plus anciens en grand appareil irrégulier. Tous ces blocs sont sculptés dans le même calcaire utilisé pour la construction du château; leurs dimensions font appel aux mêmes unités de mesure (0,45; 0,53m et 0,63m) déjà relevées pour les hauteurs d'assises et dans les différentes parties dallées.

Des éléments de la structure du porti-

<sup>12</sup> N'ayant encore pu disposer des publications du Jerash International Project, notre analyse est basée sur:

Thompson: *The second campaign at Tell Hesban*, Andrew University Seminary Studies, 11, 1973  
Sauer J.: *The Pottery of Jordan in the Early Islamic Periods*, apud *Congrès d'Oxford 1980*, Amman 1982.

Lawlor J.: *The 1978 excavations of the Hesban North Church, introduction*, in *A.D.A.J.*, XXIV,

1980.

Suleiman E., Betts A.: *Rescue Excavations at Tell Sahl es-Sarabet, 1978-1979*, in *A.D.A.J.*, XXV, 1981;

MacNicoll, Smith, Hennessy: *Pella in Jordan*, 2 vol., Canberra, 1982.

<sup>13</sup> Piccirillo M.: *Forty years of Archaeological Work at Mount Nebo, Siyagha in Late Roman, Byzantine Jordan*, apud *Congrès d'Oxford 1980*, Amman, 1982.

que ont été retrouvés en place, dont une colonne d'angle fasciculée (A1, fig. 7) et une colonne simple (A2, fig. 8) avec plinthe et base. La hauteur sur chapiteau s'élève à 4,00m au-dessus du stylobate, une arcade (sept arcs par façade) couronnant l'ensemble. Le bloc d'entrée est marqué par deux colonnes doubles dont le chapiteau a été retrouvé (B4, fig. 12). Un chapiteau de section rectangulaire (B5, fig. 13) appartenant vraisemblablement à la galerie a été également découvert. Les pilastres D1 et D3 (fig. 16 et 17) doivent être replacés de part et d'autre du porche d'entrée; les montants de la porte d'entrée en place (I1, fig. 32) sont décorés de palmettes alternées.

Les pilastres (série C, fig. 14 à 17), les colonnettes (série E, fig. 18 à 23), les claveaux d'arcs, de voûtes et de coupes (séries G et H, fig. 24 à 31), les corniches (série J, fig. 35 à 35) et les niches (série L, fig. 33 et 34) témoignent de la diversité des influences stylistiques subies par les sculpteurs. Malgré d'importantes déformations, on y reconnaît l'influence du monde occidental gréco-romain puis byzantin (acanthes, grappes, rinceaux, pirouettes, tresses, cornes d'abondance etc..) à laquelle se mélange une influence orientale perse et sassanide, voire plus ancienne, (dents de scie, chevrons, arcs outrepassés aveugles, merlons etc..), dans une conception du décor qui a perdu sa rationalité antique: des fleurons et modillons sont coplanaires (J9, fig. 37), des colonnettes à chapiteaux se superposent (pilastres de la série D, fig. 16 et 17) etc... Par ailleurs, chaque bloc offre une originalité par rapport à sa série (voir les séries D, G et H).

En conclusion, la sculpture de Qasṭal présente une filiation indiscutable avec les arts gréco-romain, perse et sassanide, mais cette filiation apparaît être assez lointaine. La richesse du décor de Qasṭal (sols de mosaïque et sculpture) aussi bien que les aberrations de la conception de la défense

de l'édifice (porte indéfendable, tours pleines, mur d'enceinte peu épais affaibli par des latrines, etc...) interdisent de voir ici un édifice militaire du type des *castra* romains ou byzantins: quelle qu'en soit la datation, Qasṭal doit être classé parmi les résidences palatiales.

## II. L'Approche Architecturale par Frédéric Morin

### A. Le système de mesure employé à Qasṭal<sup>14</sup>

Nous avons eu la curiosité de comparer les mesures du château de Qasṭal avec la mesure de la coudée umayyade de 0,45m donnée par la jauge hydrométrique du réservoir de Muwaqqar, à laquelle est associée une inscription de dédicace du calife umayyade Yazīd II datée de 104/722-3<sup>15</sup>. Exprimées en coudées umayyades de 0,45m (CU), les mesures de l'enceinte de Qasṭal sont les suivantes: côté sud = 150,66 CU, côté ouest = 150,66 CU, côté nord = 149,84 CU et côté est = 152,24 CU (en moyenne, 150,84 CU). En poursuivant ce type de calcul, l'ensemble des vestiges les plus anciens, construits en grand appareil irrégulier, a pu être coté en coudée umayyade de 0,45m (voir fig. 53).

Un examen plus attentif des vestiges et des blocs décorés a permis de mettre en évidence deux autres unités de mesure, 0,53m et 0,63m, observées en association avec la coudée umayyade pour le dallage de la cour ou les mesures du bloc d'entrée. Nous avons pu établir les relations entre ces trois mesures (voir fig. 49):

— coudée noire = 0,53m =  
(CN)

$$0,45\text{m} \times \frac{2}{\sqrt{3}} = \frac{0,45\text{m}}{\text{Cos } 30^\circ} = 0,5196\text{m}^{16}$$

— grande coudée = 0,63m =  
(GC)

$$0,45\text{m} \times \sqrt{2} = \frac{0,45\text{m}}{\text{Cos } 45^\circ} = 0,6363\text{m}$$

<sup>14</sup> Morin F.: *Le système de mesure du château umayyade de Qasṭal, à paraître.*

<sup>15</sup> Creswell K.A.C.: *Op. cit.*, p. 496.

<sup>16</sup> Voir Morin F., *op. cit.*: cette appellation est provisoire, nous avons donné le nom de coudée

noire à l'unité de mesure dérivée de la coudée de base par le rapport  $\frac{1}{\text{Cos } 30^\circ}$  par analogie à cette relation que nous avons pu établir avec la Coudée Noire de 0,4933 m sous les Abbassides (voir Nallino, *Il valore metrico del grado di meridiano secondo i geografi arabi*, Turin, 1893, p. 34).

La découverte de ces relations trigonométriques entre ces trois unités de mesures simultanément employées jette un éclairage nouveau sur le problème des unités de mesure, elle permet également de préciser la manière dont le château de Qaṣṭal a été implanté (voir fig. 50, 51 et 52):

— construction du côté sud long de 150,66 CU (ou mieux de 150 coudées de 0,452m);  
— implantation de l'angle nord-ouest à 150,66 CU de l'angle sud-ouest et à 150,79 GC (0,63m) de l'angle sud-est, ce qui donne une valeur mesurée de 89° à l'angle sud-ouest;

— implantation de l'angle nord-est par triangulation simple à partir des angles sud-est et nord-ouest, le bloc d'entrée allongeant le côté est au détriment du côté nord,

La déformation du plan de l'enceinte est liée à l'imperfection de l'étalonnage de la grande coudée de 0,63m (GC) par rapport à la coudée umayyade de 0,45m (CU).

Les plans des appartements sont basés sur des angles proches de 30° et ont donc été tracés en utilisant la coudée noire de 0,53m (CN) pour établir les diagonales en obtenant une mesure exprimée en coudées noires identique à celle de la longueur des rectangles exprimée en coudées umayyades de 0,45m.

D'après le plan donné par H. Gaube<sup>17</sup>, la mosquée de Qaṣṭal semble avoir été construite avec le même système de mesure. Le mur sud mesure 40,00 CU hors-oeuvre. La salle de prière est un rectangle déformé de 36,55 CU X 18,88 CU dont la diagonale sud-ouest/nord-est mesure 36,50 CN et la cour est un rectangle déformé de 37,55 CU X 25,33 CU dont la diagonale sud-est/nord-ouest mesure 37,73 CN.

L'étude des mesures des châteaux umayyades de Qasr al-Ḳharāna, Djabal Uṣays et Ḳhirbat al-Mafdjar, ainsi que d'autres édifices pour lequel une inscription semble prouver la datation umayyade (Ḳhirbat al-Minya et la Coupole du Rocher à Jérusalem entre autres) montre que

l'usage du système de mesure découvert à Qaṣṭal n'est pas étranger aux constructeurs umayyades, Au niveau de la conception des édifices, ce système est basé sur l'emploi des équerres à 30° et 45°. Nous avons pu vérifier leur emploi au château de Qaṣṭal dans les parties en grand appareil irrégulier où des proportions des portes, des hauteurs de corniches ou d'arcs encore en place sont indiscutablement composées à l'aide de ces équerres.

B. La restitution de l'état originel du château de Qaṣṭal<sup>18</sup>

(voir fig. 45 à 48 et 54, 55, 57, 59, 62, 64 et 66).

Telle que l'on peut la proposer après quatre mois de fouilles et un semestre de recherches couronnées par la construction d'une maquette de restitution au 1/20 sur laquelle les dessins des blocs décorés ont retrouvé leur place, notre restitution présente une construction à deux niveaux, les dispositions des appartements et du portique de l'étage reprenant celles du rez-de-chaussée. Les corps de bâtiment sont aussi larges que hauts, leur construction utilise des poutres et non des voûtes, Le portique de l'étage semble être attesté par le chapiteau B5 (fig. 13), son sol se trouve à +7,30m alors que le sol des appartements s'établit à +7,50 m. La hauteur du mur d'enceinte doit vraisemblablement être fixée à +15,35m, des merlons (blocs N1 et N2) venant couronner l'ensemble.

La grosse tour d'entrée est percée d'un porche dont l'ouverture est décorée des blocs D1 et D3 (fig. 16 et 17). Le vestibule d'entrée est couvert par deux coupes dont les claveaux lisses ont été retrouvés en remploi dans cette zone. L'escalier sud donne accès à la galerie de l'étage alors que l'escalier nord dessert également une salle d'audience située au-dessus du vestibule, à +8,55m.

La salle d'audience de Qaṣṭal présente la forme d'un triconque organisé autour d'un espace central carré couvert d'une

<sup>17</sup> Gaube H., *op. cit.*, p. 70.

<sup>18</sup> Morin F.: *La restitution du château umayyade de Qaṣṭal*, à paraître.

grosse coupole de 6,30m de diamètre (10,00 GC) culminant à +22,31m (soit 49,57 CU, le tiers de la longueur du château). Les blocs H2 et H3 (fig. 28 et 29) trouvent place dans cette coupole portée par un tambour ajouré percé de huit fenêtres encadrées par les colonnettes E2 et E3 (Fig. 20 et 21). Les claveaux G5 et G6 (voit fig. 25) prennent place à la tête de ces arcs au Nord et au Sud, ces absides étant profondes de 3,75m (5,95 GC) et couvertes de coupoles en cul-de-four.

A l'Est, l'abside axiale présente une section voûtée accueillant les claveaux G7 et G9 (fig. et 27). Celle-ci précède la demi-coupole un peu plus large (5,40m soit 12,00 CU) dans laquelle les claveaux H5 et H6 (fig. 30) prennent place. L'abside axiale est encadrée par deux petites salles couvertes de coupoles (bloc H1) de 3,15m de diamètre (5,00 GC).

L'accès à la salle d'audience se fait par une antichambre disposée à l'Ouest, le claveau G4 (fig. 24) qui trouve ici sa place donne la largeur de l'ouverture : 3,15m (5,00 GC). Les montants de pilastre C1 et C2 (fig. 14 et 15 larges de 0,90m (2 CU) et hauts de 0,45m (1 CU) trouvent ici leur place. Les mesures de l'ensemble de la salle d'audience étant toutes exprimées en grandes coudées de 0,63m, les niches L1 et L2 (fig. 33 et 34), qui ont cette largeur unitaire, peuvent trouver place pour décorer l'ensemble des murs au Nord et au Sud de l'abside axiale.

Notre restitution s'intègre dans l'analyse comparative détaillée de l'architecture des châteaux umayyades. Elles s'appuie sur l'analyse des vestiges soigneusement relevés. Elle tente de retrouver une place à l'ensemble des blocs trouvés en fouilles ou en remploi. Elle est enfin vérifiée par deux systèmes indépendants: l'usage des proportions basées sur les angles à 30° et 45° déjà observées dans les vestiges et l'emploi du système de mesure utilisant la coudée umayyade de 0,45m, la

coudée noire de 0,53m et la grande coudée de 0,63m dont nous avons démontré l'usage par les constructeurs de Qaṣṭal et de sa mosquée. En cherchant à donner simultanément satisfaction dans ces cinq secteurs d'investigation, notre méthode de travail se donne les outils de sa fiabilité pour restituer ce qu'a pu être le projet du château de Qaṣṭal.

### III. Le Probleme de la Datation du Chateau de Qaṣṭal

par P. Carlier

#### A. Les sources historiques

Qaṣṭal est un mot d'origine latine, il vient de *castellum* qui désigne un camp fortifié, un château-fort, une redoute, ou encore un château-d'eau ou un réservoir, notamment d'après Vitruve.<sup>19</sup> En araméen, puis en arabe, Qaṣṭal (قنسطل) désigne un château d'eau, une fontaine, un édifice destiné à fournir de l'eau, une conduite d'eau ou un tuyau.<sup>20</sup>

Les sources que nous avons consultées ne donnent aucun renseignement sur la région ou le site de Qaṣṭal à l'époque romaine.

A l'époque byzantine, et plus précisément sous Justinien, le nom du site voisin de Ziziā' figure dans la liste des fortins du *limes arabicus* que fournit la *Noticia Dignitatum*.<sup>21</sup> Ce document précise qu' "une enceinte y avait été construite en 409 A.D. par Pierre, sous le Duc F1. Paulus et le Proconsul Christogone."

Durant les VI<sup>e</sup> et début du VII<sup>e</sup> siècles, les successeurs de Justinien confient cette province aux Ghassanides, Arabes jacobites. Dans ses *Annales*, Hamza al-Hassān al-Isfahānī (qui écrit au Xe s.) rapporte que "Djabala ibn Harith, roi des Ghassanides, fit construire Adradj, Canathir et Casthal".<sup>22</sup>

Qaṣṭal est en fait mentionné pour la première fois dans un vers de Kuthayyir 'Azzā, panégyriste des Umayyades mort en 105/723:<sup>23</sup>

<sup>19</sup> Gaffiot F.: *Dictionnaire Latin-Français*, Paris, 1966, p. 271.

<sup>20</sup> Dozy: *Supplément aux dictionnaires arabes*, 2 vol. 3 e éd., Paris, 1967, p. 344.

<sup>21</sup> Abel F.M.: *Histoire de la Palestine*, Paris, 1952, p. 189.

<sup>22</sup> Al-Isfahānī Hamza al-Ḥassan: *Annales*, Petropoli, 1844, t.I p. 117; t. II, VII, p. 92: traduction allemande de Brünnow R. et Domaszewski A.: "...baute el-Kanatir, Odruh und el-Kastal" (Die Provincia Arabia, p. 100).

<sup>23</sup> Kuthayyir 'Azzā: *Diwān*, éd. H. Pérès, II, 130.

سقى الله حياً بالموقر دارهم الى قسطل البلقاء ذات المحارب.  
 Sauvaget propose la traduction suivante<sup>24</sup>:  
 “Que Dieu bénisse cette famille qui habite  
 à al-Muwakkar, jusqu’à Kastal du Balka’,  
 là où est la salle d’audience”. D’après  
 Blachère<sup>25</sup>, il semble que ces vers aient été  
 écrits dans les dernières années de la vie de  
 Kuthayyir ‘Azzā, au moment où il séjour-  
 nait à la cour de Yazīd II (101-10/720-724)  
 à al-Muwaqqar.

Plus tardivement, Ṭabarī donne deux  
 autres renseignements sur la région à la  
 période umayyade:

— al-walīd II, alors qu’il n’était encore que  
 prince héritier, avait coutume de recevoir  
 les pèlerins pendant trois jours en un lieu  
 appelé Ziziā<sup>26</sup>;

— en 126/744-745, al-‘Abbās, fils de al-  
 Walīd I et cousin de al-Walīd II, habitait à  
 Qaṣṭal. Ṭabarī ajoute que Yazīd, le frère  
 de al-‘Abbās, résidait dans un château  
 distant de quelques kilomètres dans le  
 désert<sup>27</sup>.

Enfin, Abū’l Faradj al-Iṣfahānī rap-  
 porte dans son *Kitāb al-Aghānī* que al-  
 Walīd II (125/743-744) a habité à Qaṣṭal.<sup>28</sup>  
 Ce sont là les seules allusions à notre site et  
 à ses environs que nous ont fournies les  
 sources que nous avons consultées. La  
 localisation des vestiges cités par ces  
 sources pose déjà un problème: les vestiges  
 antiques (réservoir) et umayyades décrits  
 par Sauvaget à Ziziā<sup>29</sup> ne nous obligent pas  
 à localiser à Qaṣṭal des constructions men-  
 tionnées à Ziziā’ par la *Noticia Dignitatum*  
 ou par Ṭabarī.

## B. Discussion des hypothèses

### 1. L’hypothèse d’une datation romaine:

L’hypothèse qui ferait de Qaṣṭal un  
*castrum* du *limes arabicus* n’est étayée par  
 aucune mention historique. Par ailleurs, la  
 faiblesse défensive de Qaṣṭal et la richesse  
 de son décor interdisent de voir ici une  
 caserne ou un édifice militaire romain.

### 2. L’hypothèse d’une datation byzantine:

Une telle datation reposerait exclu-  
 sivement sur la mention de Ziziā’ dans la

*Noticia Dignitatum*. Aucune étude  
 archéologique n’a encore prouvé l’absence  
 de vestiges byzantins à Ziziā’, et aucun  
 indice ne permet de localiser à Qaṣṭal un  
 édifice qui pourrait être à Ziziā’.

### 3. L’hypothèse d’une datation ghassanide

L’attribution de la construction du  
 château de Qaṣṭal au phylarque ghassanide  
 Djabala ibn Ḥarīth repose sur la mention  
 tardive de Ḥamza al-Ḥassān al-Iṣfahānī qui  
 cite “Casthal” parmi les constructions  
 ghassanides. Ethymologiquement, il est  
 possible d’envisager que l’édifice de  
 Djabala ibn Ḥarīth puisse être un ouvrage  
 destiné à fournir de l’eau (le barrage, un  
 des réservoirs, les citernes,...). Il est par  
 contre malaisé de l’identifier à l’édifice  
 dont l’étude de Gaube a prouvé qu’ils  
 s’agissait d’une mosquée. Peut-on l’identi-  
 fier au château de Qaṣṭal?

Les techniques de construction du  
 château, du barrage, du réservoir et de la  
 mosquée sont rigoureusement identiques:  
 même provenance des blocs, même type de  
 taille, même appareillage en carreaux et  
 boutisses, même type de remplissage in-  
 terne des murs avec des mortiers visible-  
 ment semblables. De plus, Frédéric Morin  
 a observé le même emploi des mesures de  
 la coudée umayyade de 0,45m et des  
 coudées de 0,53m et de 0,63m associées  
 dans les mêmes procédés d’implantation des  
 édifices. On peut donc présumer que ces  
 constructions appartiennent à la même  
 époque. La présence parmi elles l’une  
 mosquée rend improbable l’identification  
 de l’une des autres à la construction de  
 Djabala ibn Ḥarīth. Il est difficile d’envisa-  
 ger un hiatus d’un siècle et demi, peu  
 compatible avec la perdurance des techni-  
 ques de construction et d’implantation des  
 édifices.

En 1982, K.A.C. Creswell<sup>30</sup> compte  
 quatre édifices ghassanides. Le plus ancien  
 est la tour d’un monastère construit par le  
 phylarque Ḥarīth ibn Djabala en 559 A.D.  
 Cette tour a été incorporée dans la con-

<sup>24</sup> Sauvaget J., *op. cit.*, p. 20, n. 2.

<sup>25</sup> Blachère R.: *Histoire de la littérature arabe des  
 origines à nos jours*, t. III, Paris, 1980, p. 609.

<sup>26</sup> Al-Ṭabarī: *Tarikh at-Ṭabarī*, t. II, Le Caire, 1972,  
 1754.

<sup>27</sup> Al-Ṭabarī: *op. cit.*, II, 1784.

<sup>28</sup> Al-Iṣfahānī Abū’l Faradj: *Kitāb al-Aghānī*, t. VII,  
 le Caire, 1952, 25.

<sup>29</sup> Sauvaget J.: *op. cit.*, p. 40.

<sup>30</sup> Creswell K.A.C.: *op. cit.*, p. 636-637.

struction umayyade du château de Qaşr al-Ḥayr al-Gharbī par le calife Hishām en 110/729. Les trois autres constructions sont attribuées, par des inscriptions, au règne de al-Mundhir (569-582 A.D.): une église (ou *praeterium*?) au Nord des ruines de Ruṣāfa-Sergiopolis en Syrie du Nord, une grande enceinte oblongue, épaisse de 4m, située près de Dumayr à l'Est de Damas et une maison à al-Hayāt dans le Nord du Ḥawrān.

Les dispositions de ces édifices permettent-elles d'établir des comparaisons avec celles de Qaşṭal? Telle que la restituée F. Morin, la salle d'audience de Qaşṭal offre un plan cruciforme proche de celui de la construction de al-Mundhir à Ruṣāfa. En revanche l'enceinte de Qaşṭal n'a par contre rien de commun avec celle proche de Dumayr, dont une des tours mesure 10m de diamètre. Si la présence de deux niveaux, de la cour centrale à arcade de la maison de al-Hayāt peut évoquer Qaşṭal, les différences de dimensions et de fonctions rendent difficiles les comparaisons. Enfin, la construction ghassanide de Qaşr al-Ḥayr al-Gharbī est un exemple du sort de ces constructions ghassanides: leur emploi par les Umayyades a dû être cause de leur destruction, au moins partielle.

Creswell envisageait enfin l'hypothèse d'un cinquième édifice ghassanide à la citadelle de 'Ammān. Les fouilles archéologiques de Almagro et Olavarri<sup>31</sup> ont mis à jour une évidence stratigraphique de la datation umayyade du vestibule de plan cruciforme. Or c'est précisément cet édifice qui présente le plus de ressemblances avec Qaşṭal sur le plan des techniques de construction et surtout du décor.

Dans l'état actuel de nos recherches, l'hypothèse d'une datation ghassanide du château de Qaşṭal nous semble peu vraisemblable.

#### 4. L'hypothèse d'une datation umayyade

Au contraire des constructions ghassanides, les édifices umayyades sont mieux connus. La typologie des sites et des châteaux umayyades que nous avons déjà étudiée<sup>32</sup> offre un cadre comparatif pour l'étude des vestiges de Qaşṭal. Nous avons recensé huit critères caractérisant les quatorze sites dont la datation umayyade est généralement admise<sup>33</sup> (voir fig. 67):

- implantation en site de plaine (13/14);
- reprise d'un site pré-islamique (10-14);
- présence d'une exploitation agricole (10/14);
- construction d'un château (13/14);
- construction d'ouvrages hydrauliques (13/14);
- construction d'une mosquée (10/14);
- construction d'une petite agglomération rurale (9/14);
- construction d'un bain (8/14).

La description du site de Qaşṭal s'intègre donc parfaitement dans cette typologie des sites umayyades.

Nous avons également pu établir une typologie des châteaux umayyades sur la base de dix critères représentatifs de dix châteaux (voir fig. 68, 69, 70 et 71):

- enceinte à tours rondes (9/10);
- plan irrégulier (vérifié dans 6/10);
- emploi des mesures umayyades (9/10);
- cour centrale (10/10);
- portique (8/10);
- présence d'un étage (7/10);
- présence de *bayt* (10/10);
- présence d'un appartement de réception (7/10);
- fondation sur un terrain vierge (9/10).
- présence de latrines (8/10).

La description des aménagements du château de Qaşṭal s'intègre parfaitement dans cette typologie des châteaux umayyades.

<sup>31</sup> Almagro A.-Olavarri E.: *A New Umayyad Palace at the Citadel of 'Ammān*, apud *Congrès d'Oxford 1980*. Amman, 1982, p. 320.

<sup>32</sup> Carlier P.: *Les châteaux umayyades de Syrie-Palestine, aménagements et techniques de construction*, Aix en Provence, 1981.

<sup>33</sup> L'ordre des sites et châteaux umayyades est l'ordre chronologique généralement admis par les auteurs (voir par exemple Miquel A.: *L'Islam et*

*sa civilisation, VIIe-XXe*, Paris, 1968, p. 83). Les partisans d'une datation umayyade situent généralement la datation de Qaşṭal à la fin du règne de al-Walīd Ier (86-96/705-715) ou au début du règne de Hishām (105-123/724-743) (voir par exemple Gaube H.: *op. cit.*, p. 85-86). C'est également à cette place qu'il figure dans nos tableaux (fig. 67 et 68) ainsi que dans notre planche comparative des plans des châteaux umayyades (fig. 69, 70 et 71).

D'autres observations de détails permettent de mettre en relation le château de Qaştal avec un sous-groupe de châteaux umayyades:

— l'entrée précède au milieu d'une tour (comme à Qaşr al-Kharāna, Djabal Uşays, Kħirbat al-Mafjar, soit 4/10);

— la présence de banquettes dans le vestibule (comme à Djabal Usays, Qaşr al-Ĥayr al-Gharbī et Kħirbat al-Mafjar, soit 3/10);

— la présence d'une citerne centrale (comme à Qaşr al-Kħarāna, Djabal Usays, Qaşr al-Ĥayr al-Gharbī et Qaşr al-Ĥayr al-Sharqī, soit 4/10);

— la présence d'un appartement de réception ou d'une salle d'audience disposée au-dessus du vestibule d'entrée (comme à Qaşr al-Kħarāna, Djabal Usays, Qaşr al-Ĥayr al-Gharbī et Kħirbat al-Mafjar, soit 4/10);

— la présence de coupoles dans le bloc d'entrée (comme à Qaşr al-Kħarāna, Djabal Usays, Kħirbat al-Minya et Kħirbat al-Mafjar, soit 4/10).

Nous avons également pu rassembler les observations suivantes:

— l'étude comparative du décor sculpté de Qaştal a permis de mettre en évidence -des antécédents très proches à la Coupole du Rocher et à la Mosquée al-Aqşā à Jérusalem;

— un parallèle indiscutable à la citadelle umayyade de 'Ammān;

— une interprétation tardive à Kħirbat al-Mafjar.

— le décor mélange des influences perses et sassanides à des survivances très déformées de l'art gréco-romain oriental;

— nos recherches ne nous ont pas encore permis de retrouver de décor figuratif ou de symboles chrétiens;

— l'identité des techniques de construction du château et de la mosquée nous font envisager une seule campagne de construction;

— dans l'état actuel des fouilles, nous n'avons pas identifié de matériel pré-islamique, et nos sondages de fondation semblent montrer que le château est fondé sur un terrain vierge;

— dans leur état actuel, nos sondages indiqueraient l'occupation du château ou de ses abords immédiats pendant la période umayyade: aucune couche contemporaine de cette occupation n'a pu encore être retrouvée;

— deux auteurs arabes mentionnent les séjours du calife al-Walid II et de son cousin al-'Abbās à Qaştal;

— enfin, Frédéric Morin a pu prouver que le système de mesure employé à Qaştal, basé sur la coudée umayyade de 0,45m associée à une inscription de Yazid II, a également été employé à la mosquée de Qaştal, à Qaşr al-Kħarāna, à Djabal Usays et à sa mosquée, à Kħirbat al-Minya et à sa mosquée ainsi qu'à la Coupole du Rocher à Jérusalem et à la Grande Mosquée de Cordoue.<sup>34</sup>

Dans l'état actuel de nos recherches, l'hypothèse d'une datation umayyade du château de Qaştal nous semble la plus vraisemblable.

Patricia Carlier  
Frédéric Morin

<sup>34</sup> Morin F.: *Le système de mesure du château umayyade de Qaştal*.



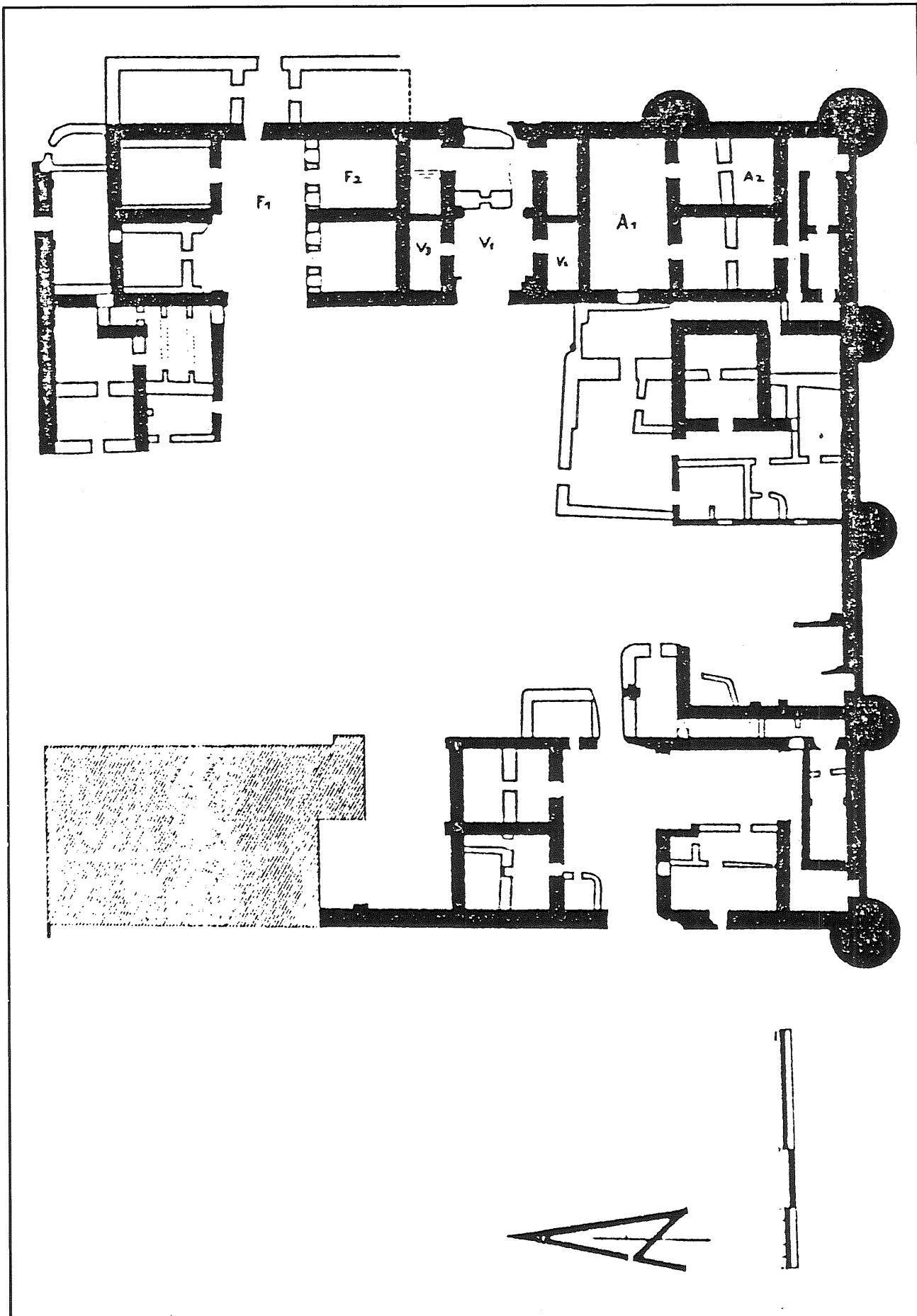


Fig. 2: Qaştal 83: le palais; état existant, plan au niveau du sol. Les murs en grand appareil. Relevé: F. Morin, P. Carlier. Dessin: S. Metz.



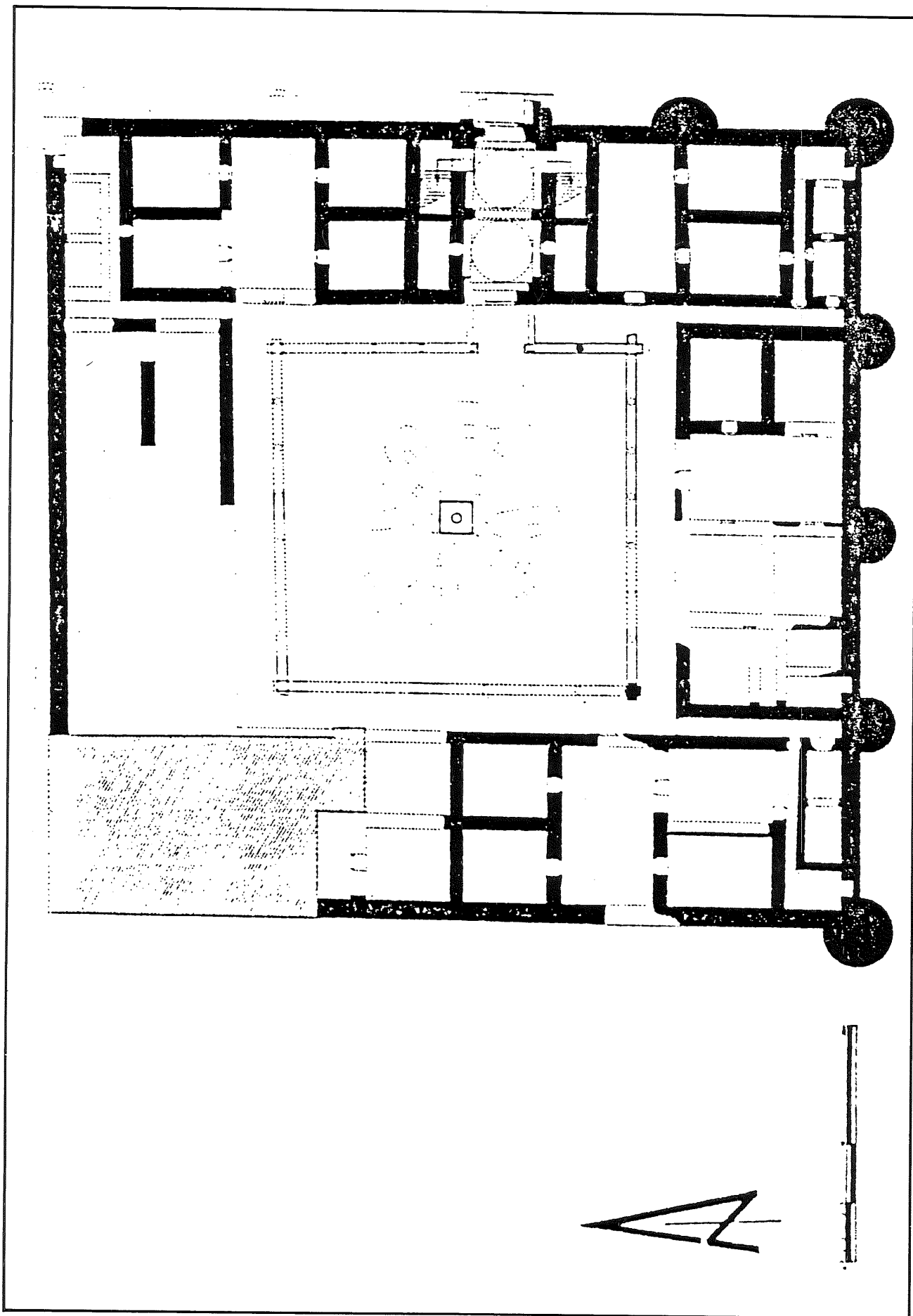


Fig. 3: Qasr 83: le palais: état Umayyade. Plan du-rez-de Chaussée. En pointillé, les parties restituées.  
Relevé: F. Morin et l'équipe Dessin: S. Metz.

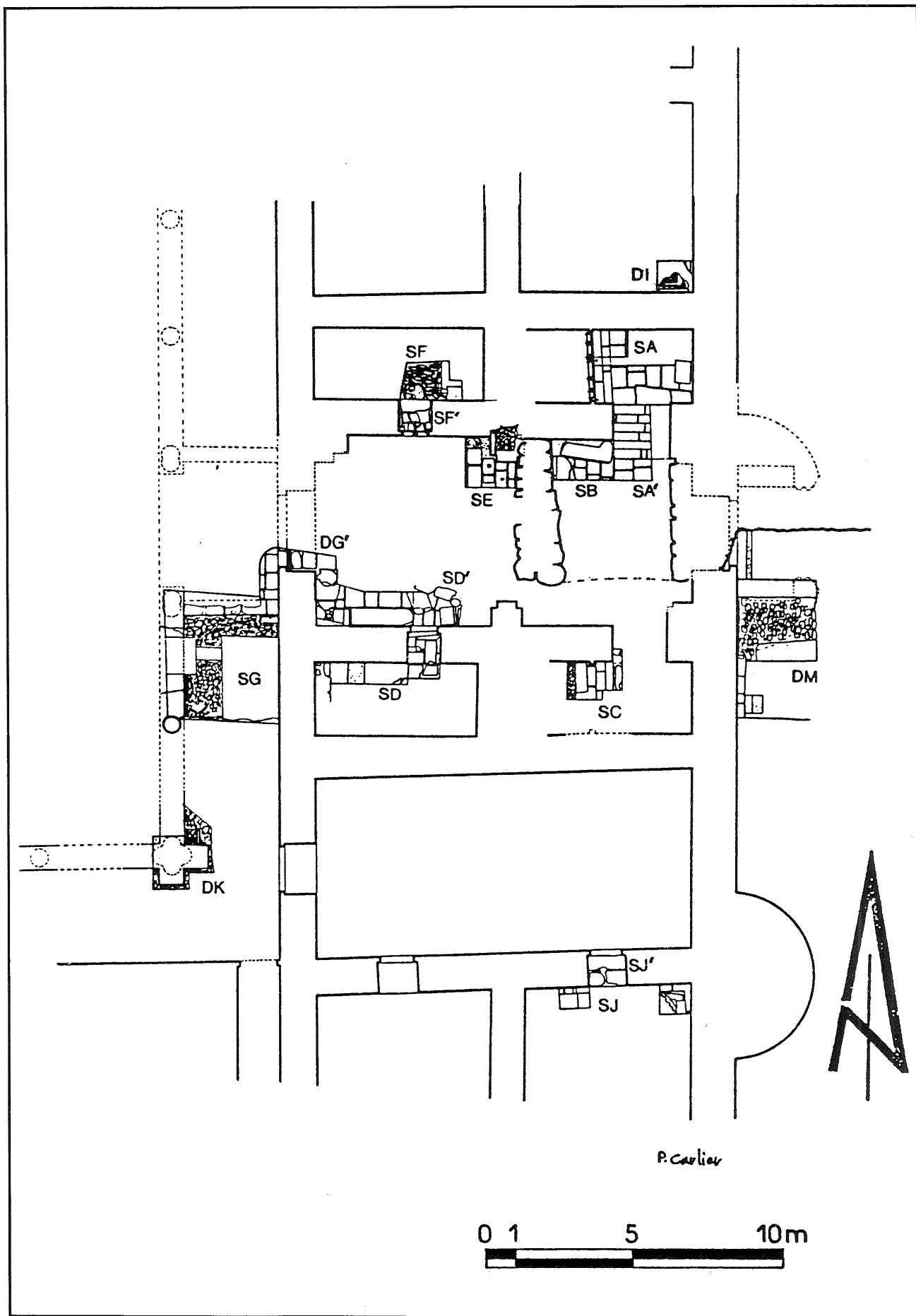


Fig. 4: Qastal 83: le palais: Bloc d'entrée, plan d'ensemble des sondages de la campagne 1983.



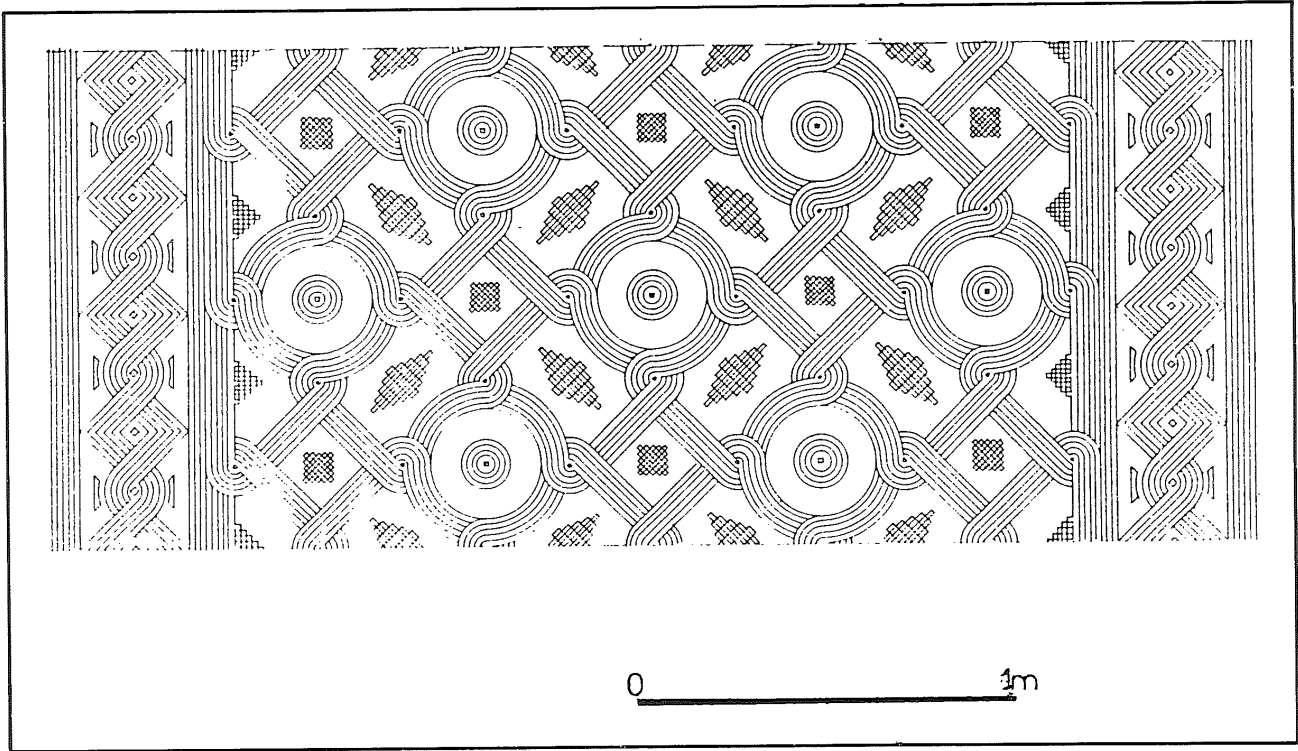


Fig. 6: Qastal 83: portique sud: angle ouest. Dégagement D.L. Sol de mosaïque. Motif idéalisé. Echelle 1/20.  
Relevé: F. Morin; Dessin: S. Metz.

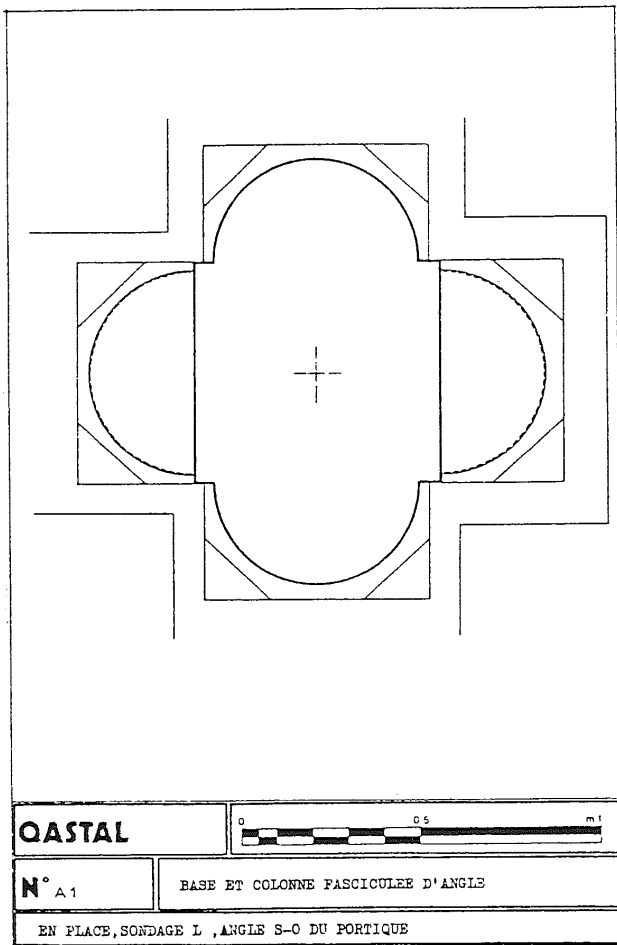


Fig. 7a.

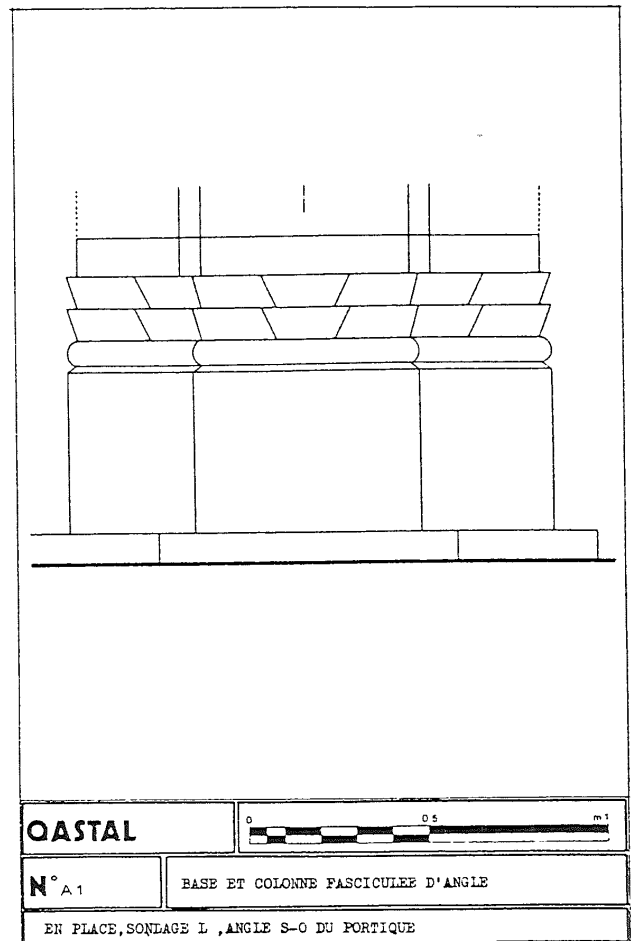
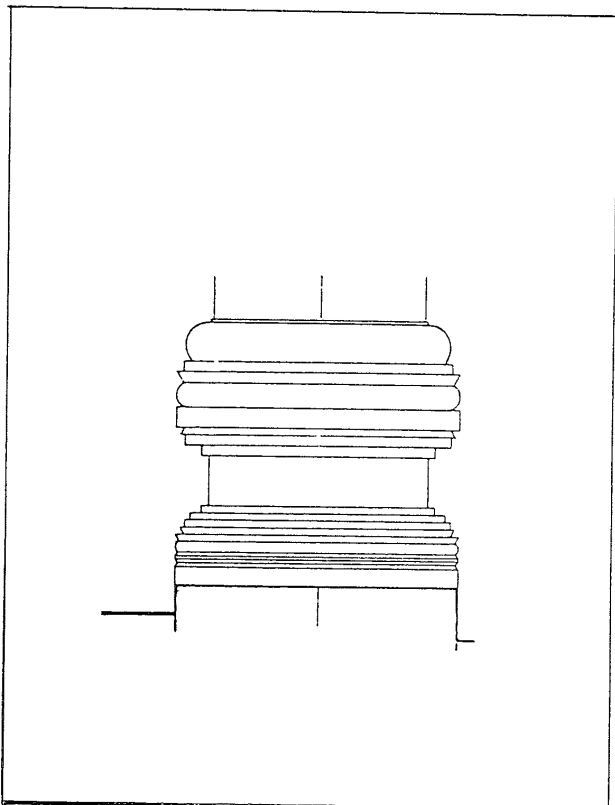


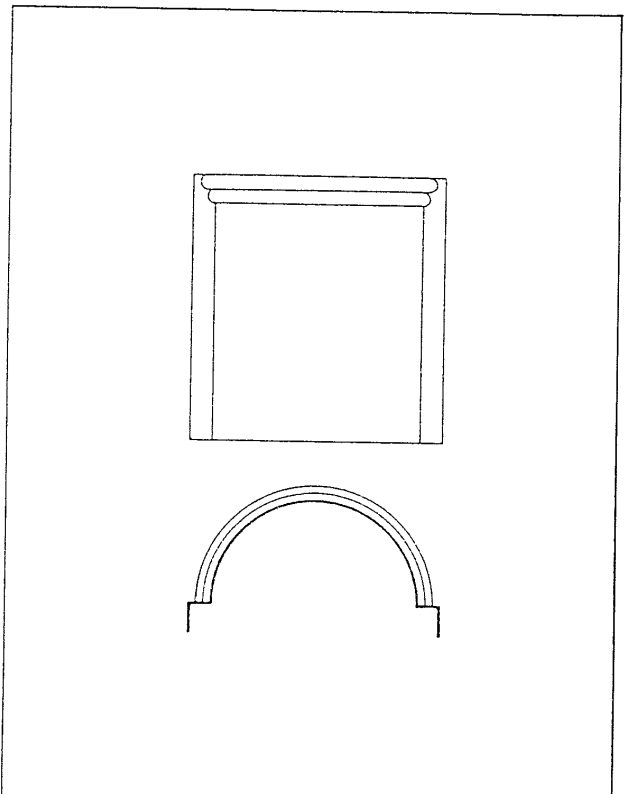
Fig. 7.

Fig. 7b.



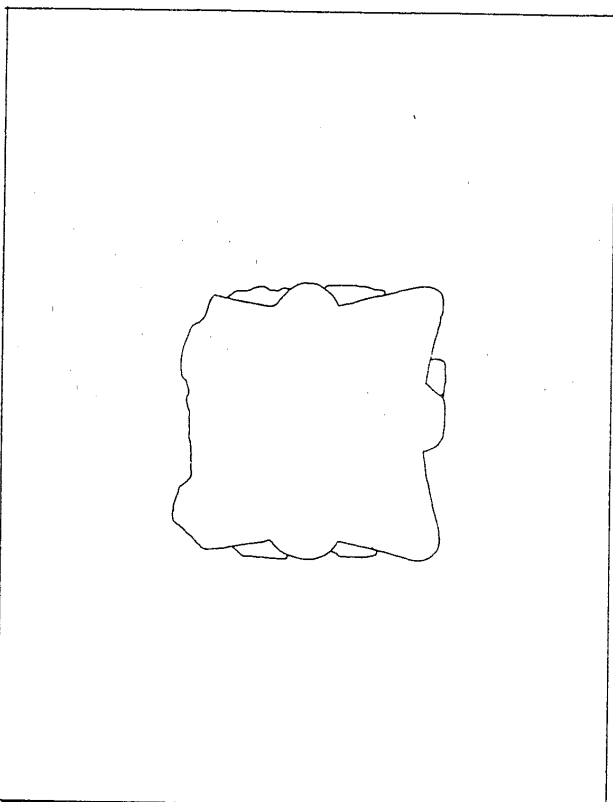
<b>QASTAL</b>		0 0.5 m.1
<b>N° A2</b>	PLINTHE, BASE ET COLONNE SIMPLE	
EN PLACE, SONDAGE G, PORTIQUE EST		

Fig. 8.



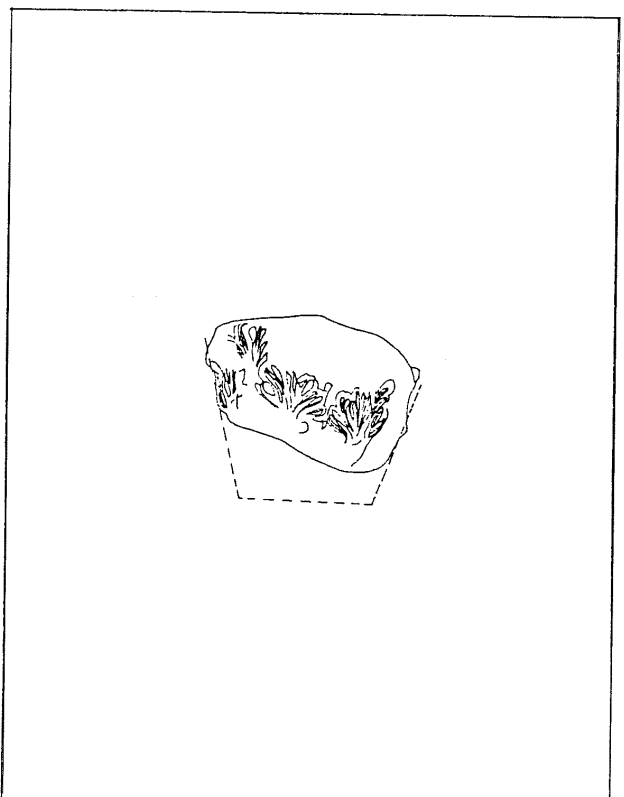
<b>QASTAL</b>		0 0.5 m.1
<b>N° A4</b>	DEMI-COLONNE ENGAGEE POUR COLONNE D'ANGLE AVEC ASTRAGALE	
REMPLOI DANS PORTIQUE SUD		

Fig. 9.



<b>QASTAL</b>		0 0.5 m.1
<b>N° B1</b>	CHAPITEAU SIMPLE POUR PORTIQUE	
REMPLOI DANS COUR		

Fig. 10.



<b>QASTAL</b>		0 0.5 m.1
<b>N° B2</b>	CHAPITEAU SIMPLE	
SURFACE DANS COUR		

Fig. 11.

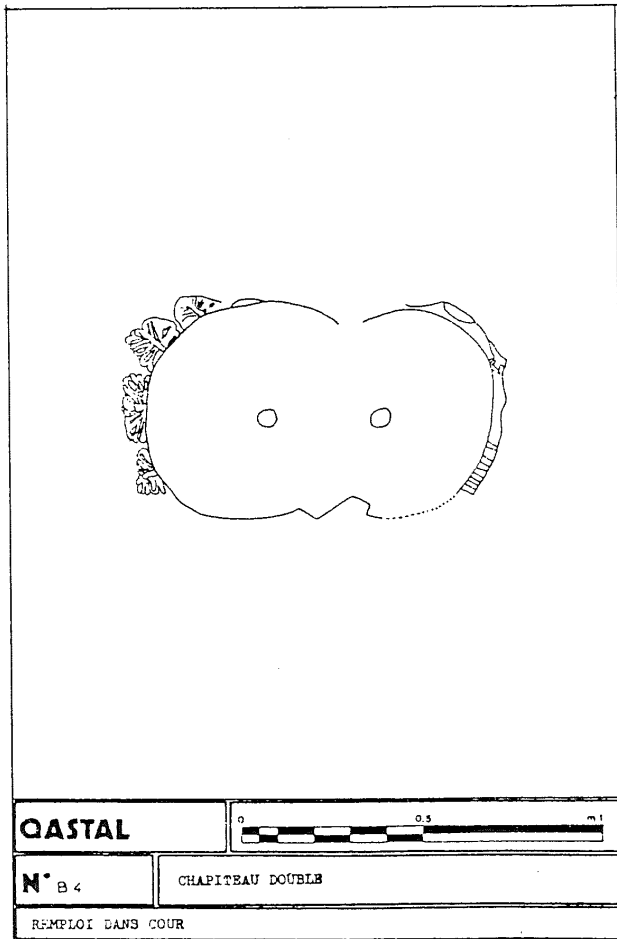


Fig. 12.

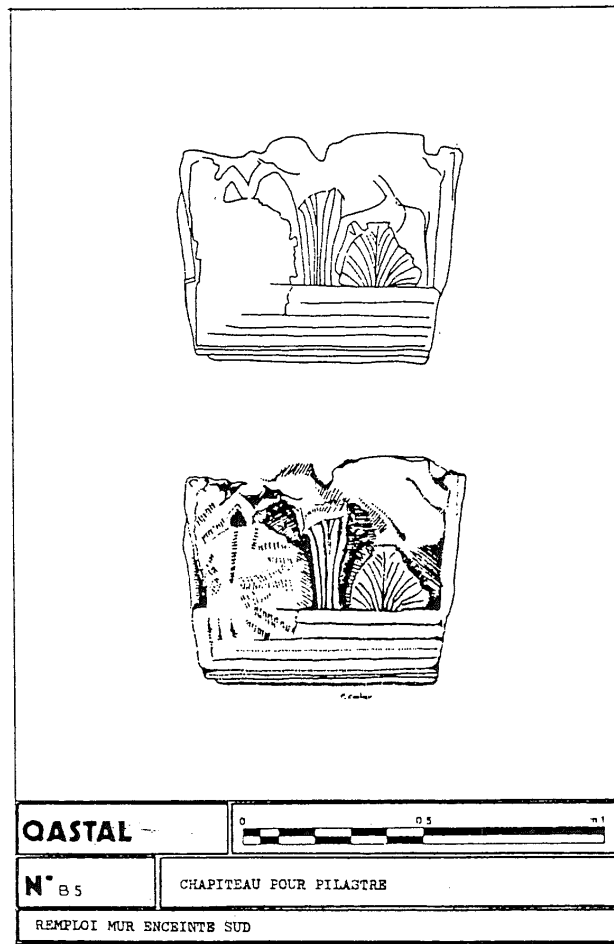


Fig. 13.

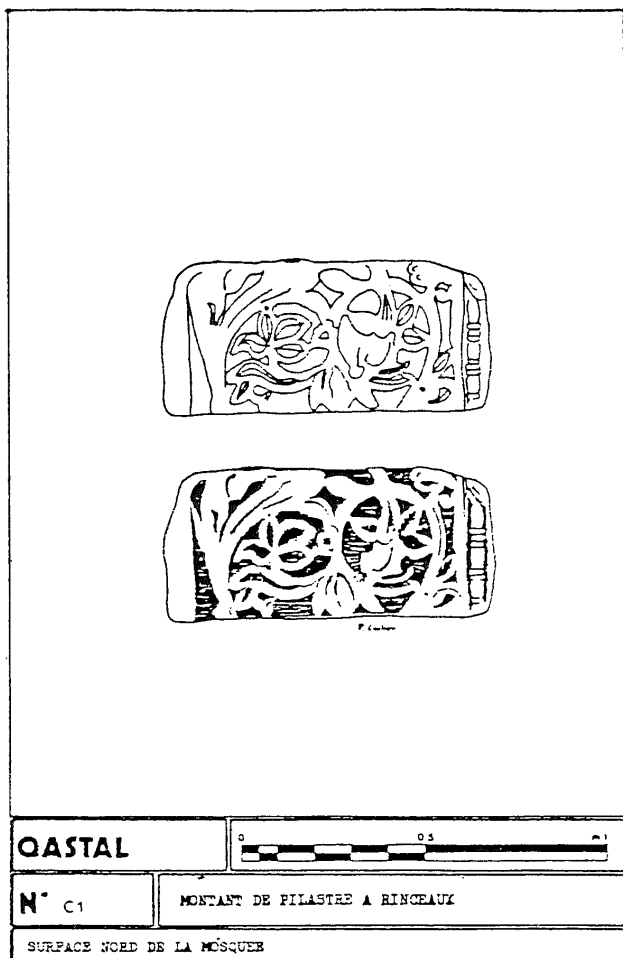


Fig. 14.

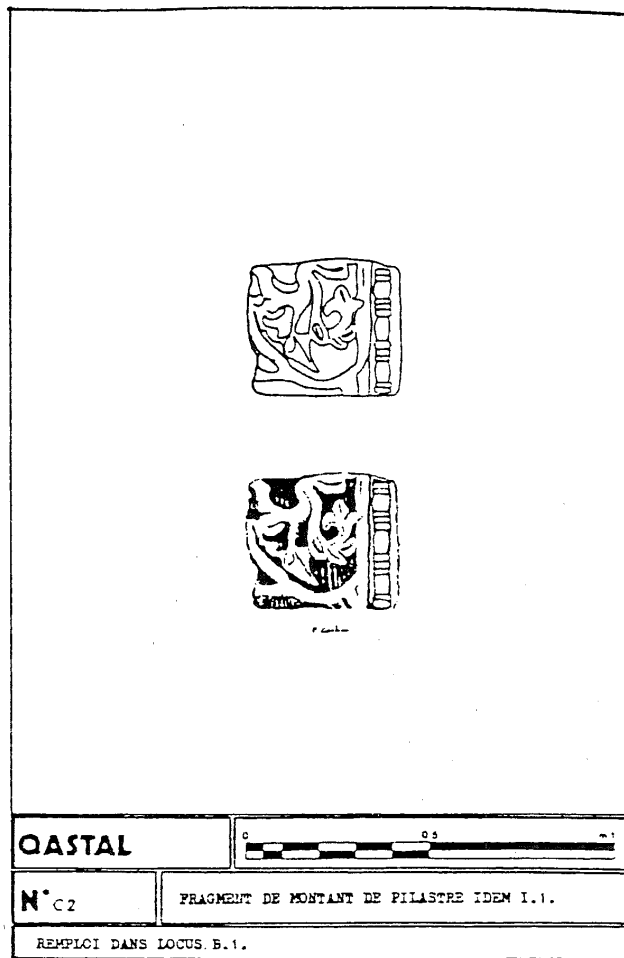


Fig. 15.

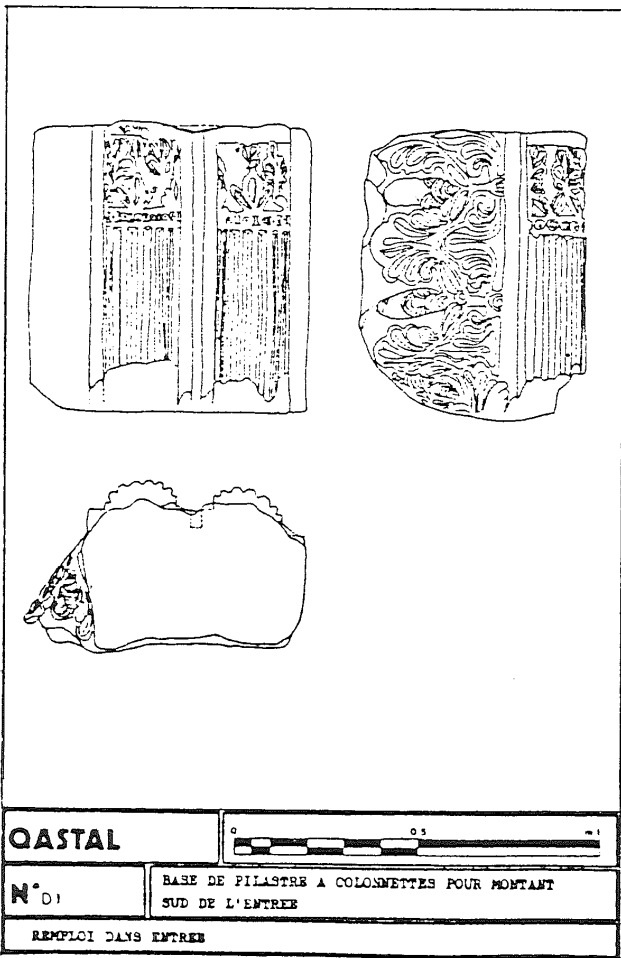


Fig. 16a.

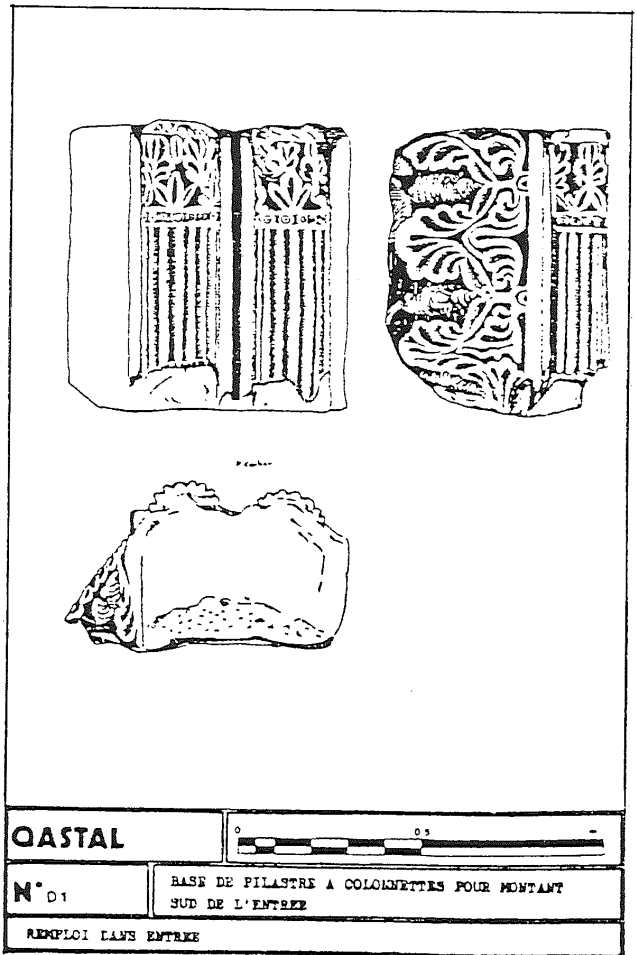


Fig. 16.

Fig. 16b.

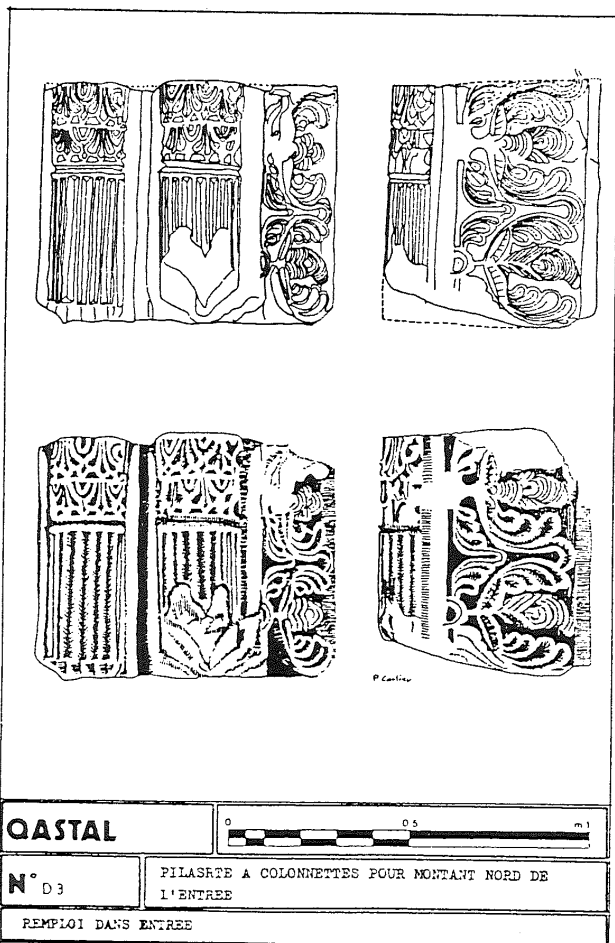


Fig. 17.

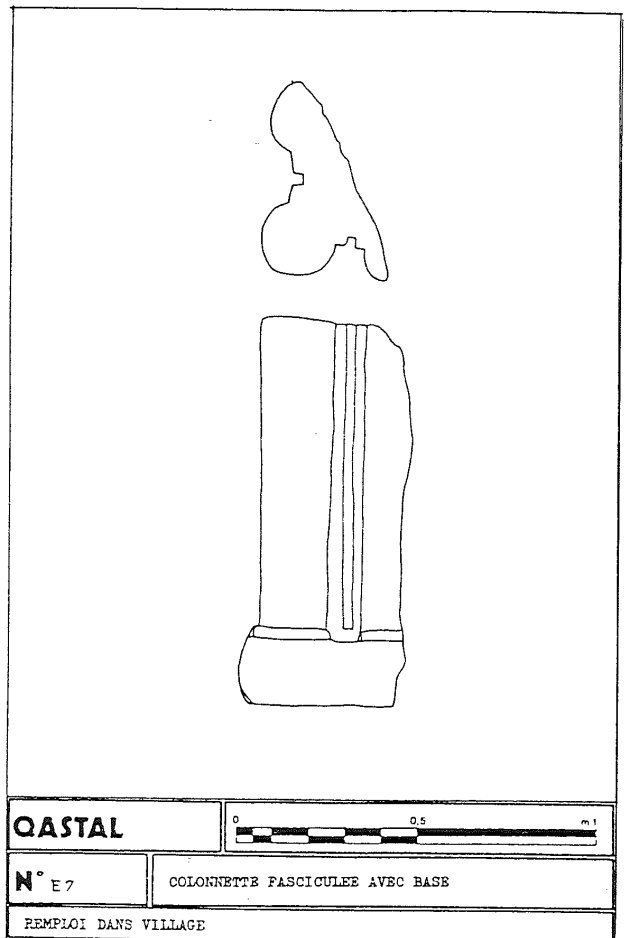


Fig. 18.

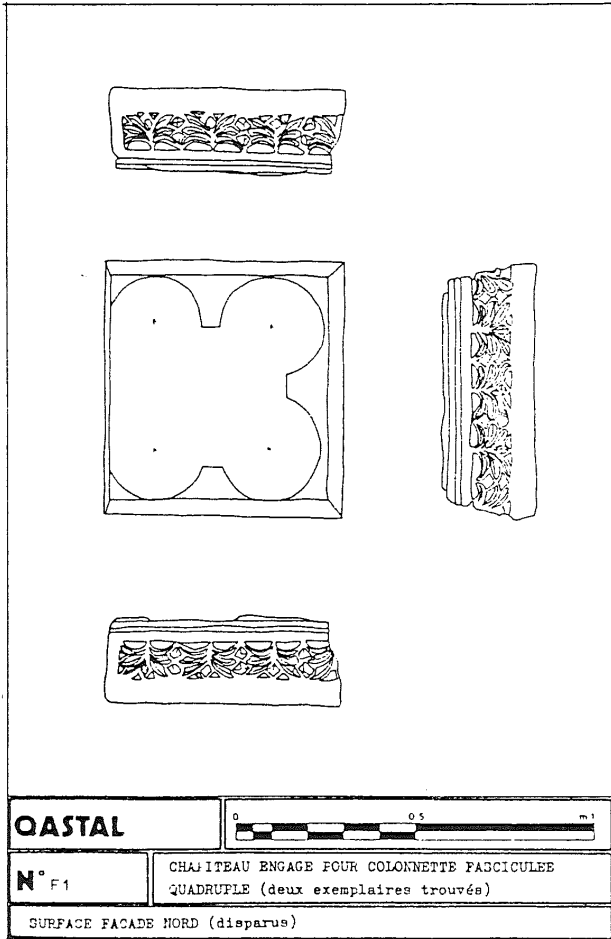


Fig. 19a.

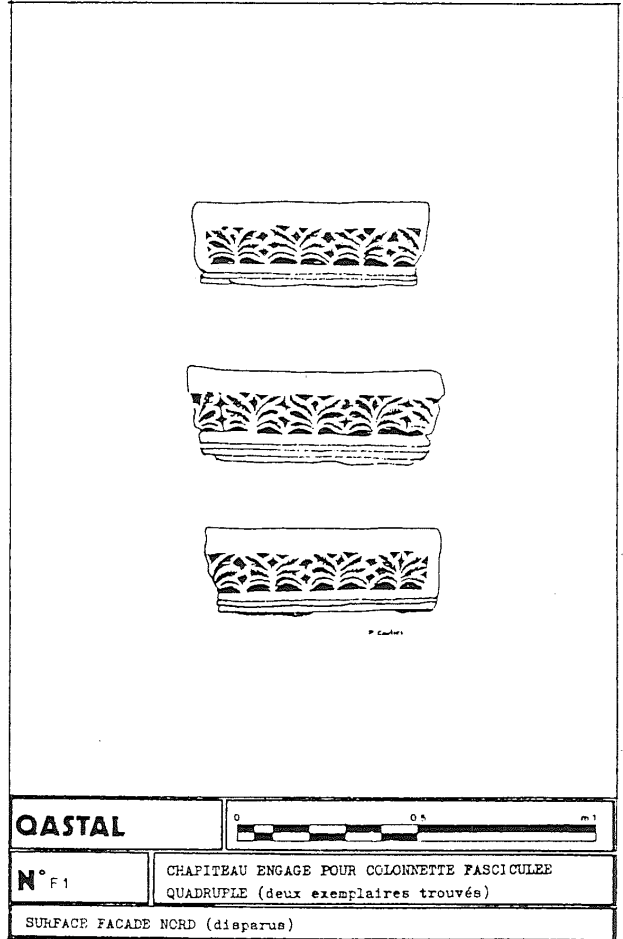


Fig. 19.

Fig. 19b.

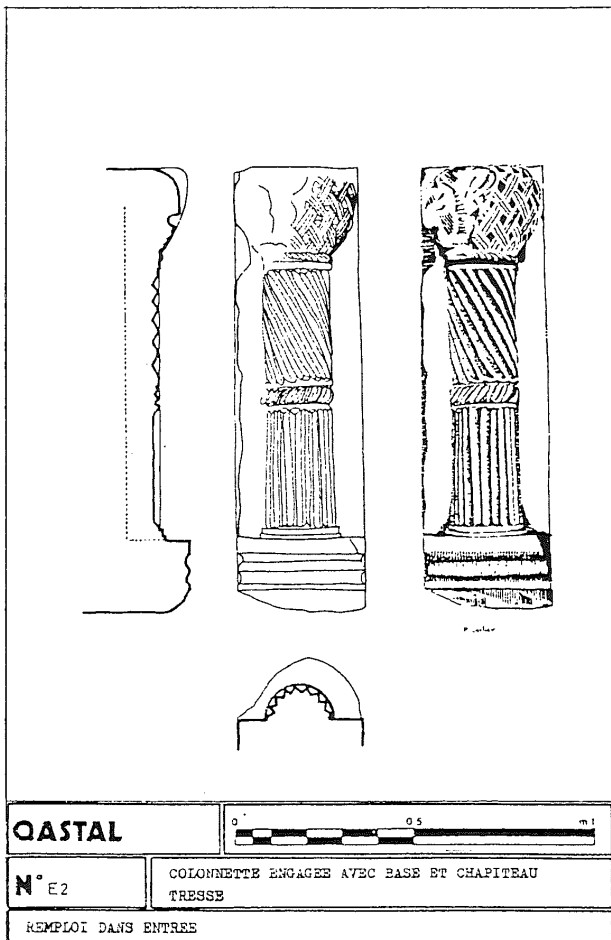


Fig. 20.

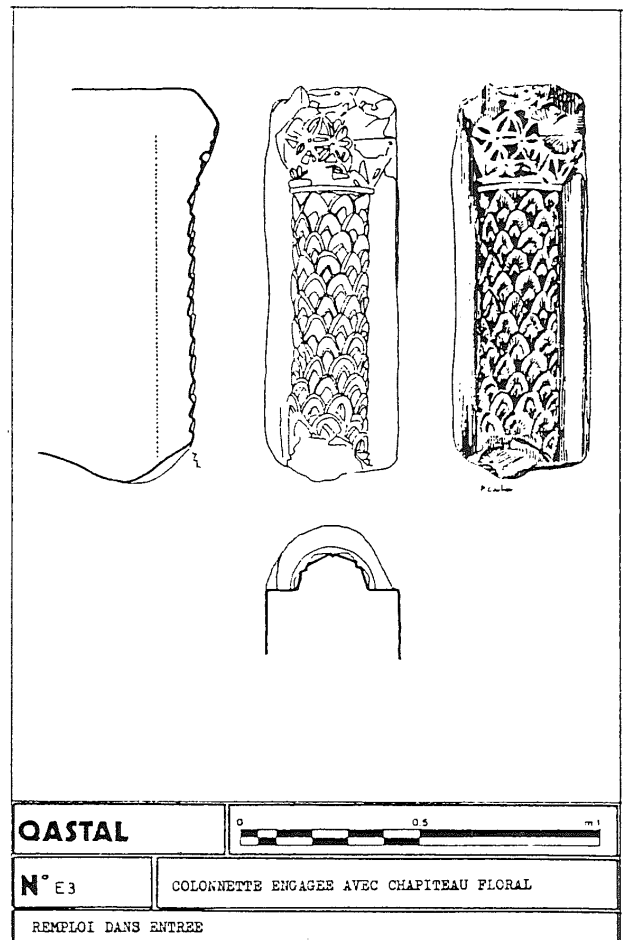


Fig. 21.



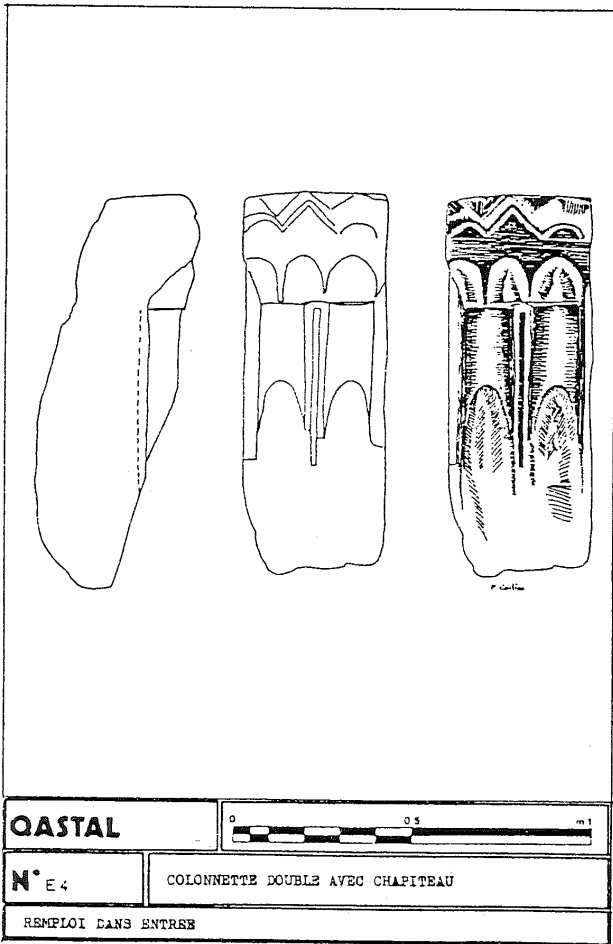


Fig. 22.

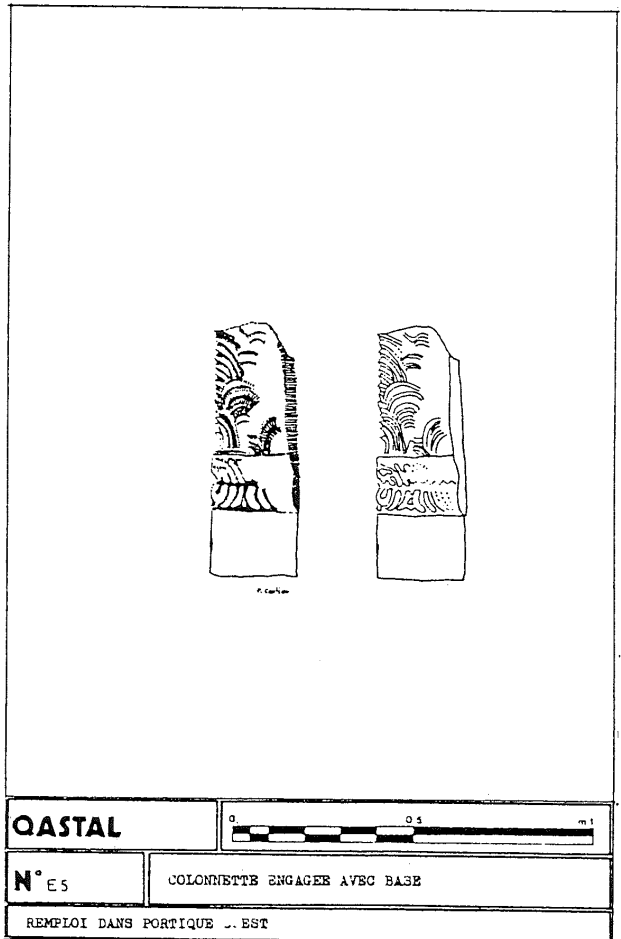


Fig. 23.

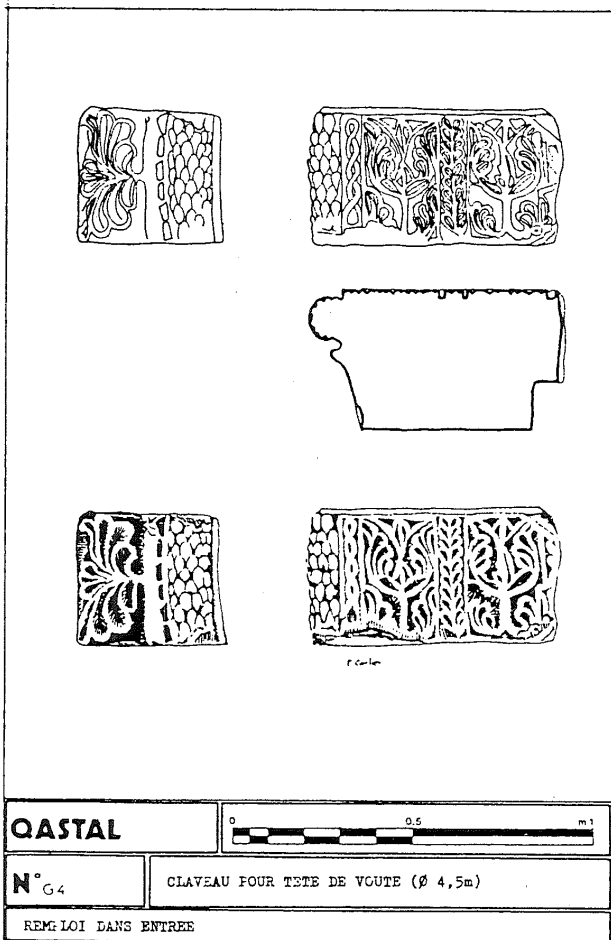


Fig. 24.

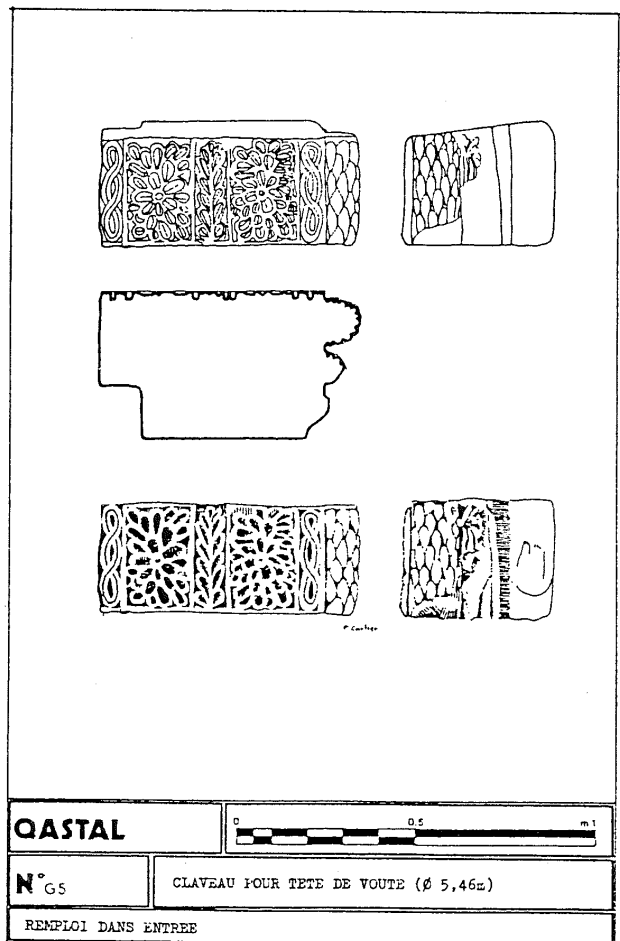


Fig. 25.

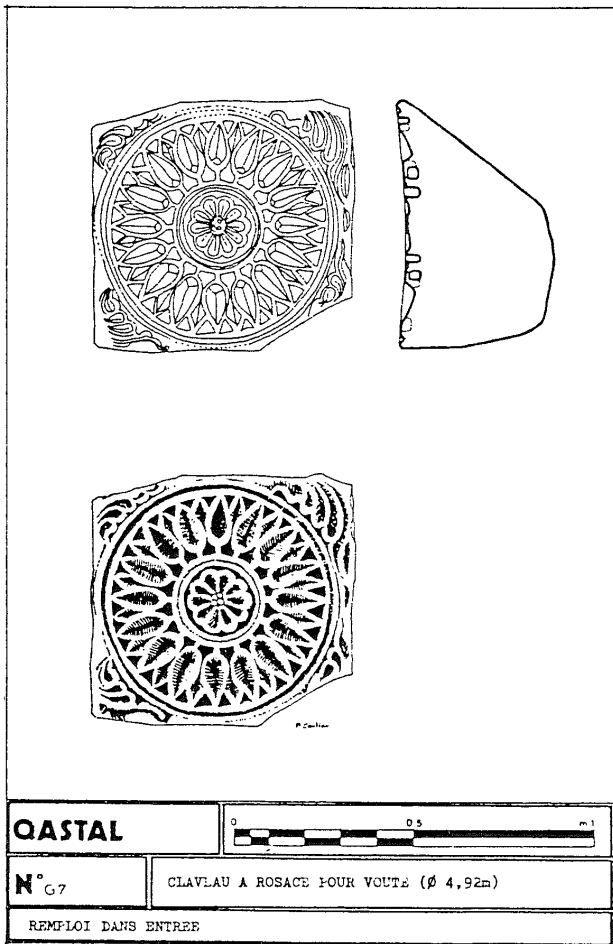


Fig. 26.

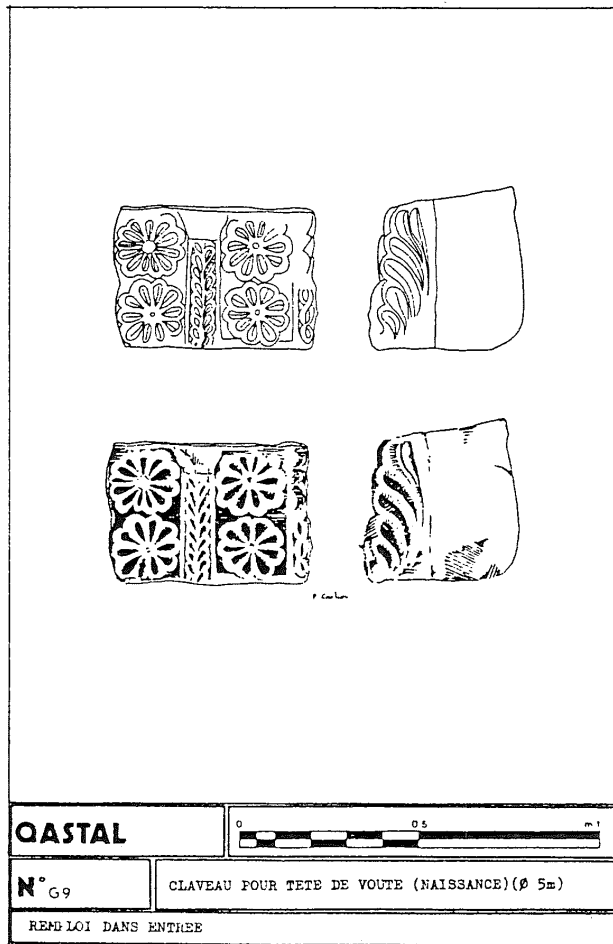


Fig. 27.

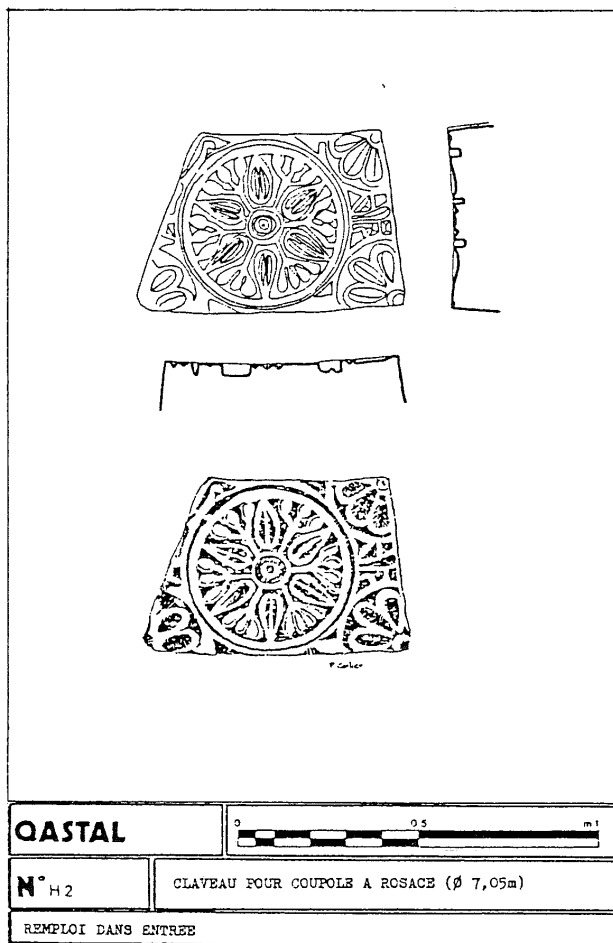


Fig. 28.

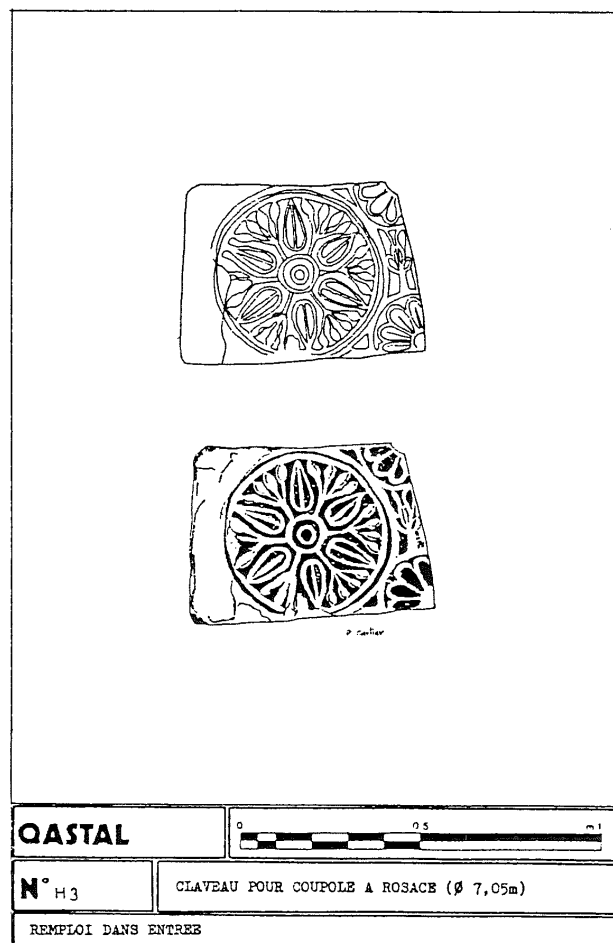


Fig. 29.

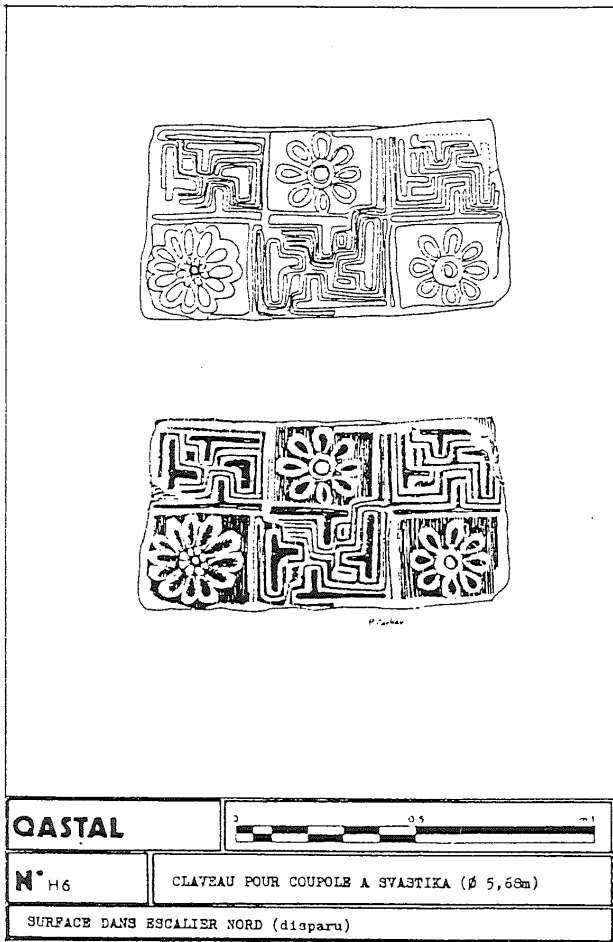


Fig. 30.

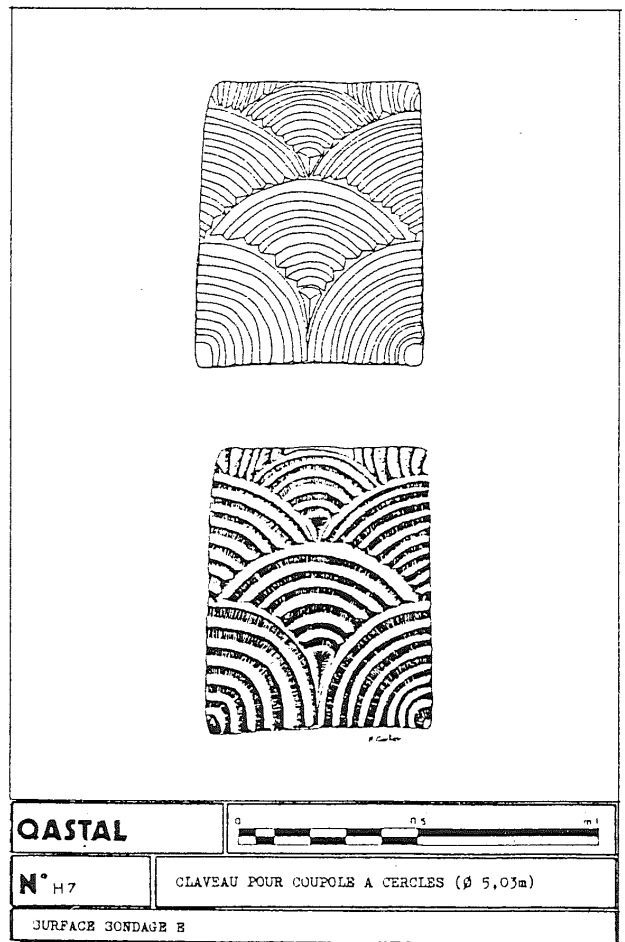


Fig. 31.

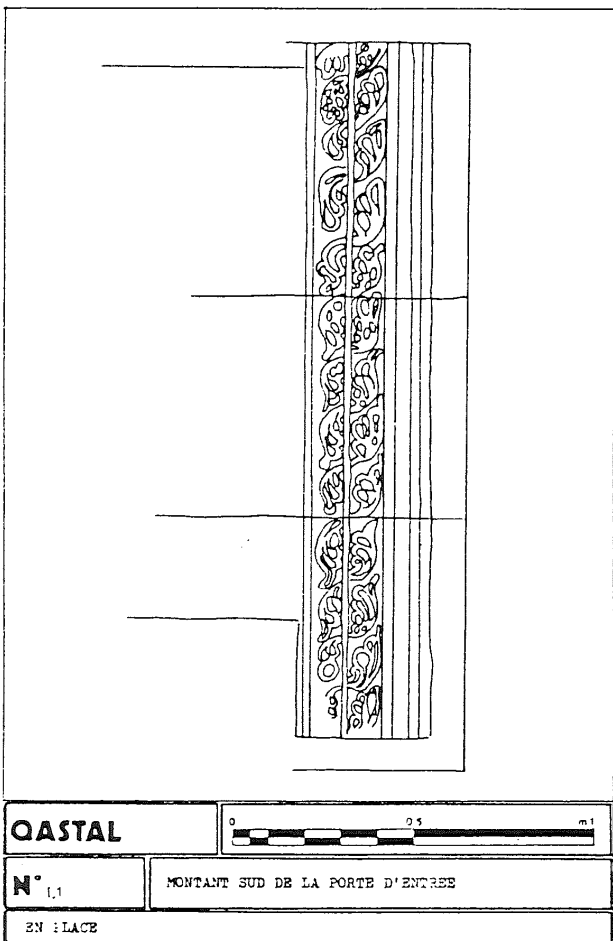


Fig. 32a.

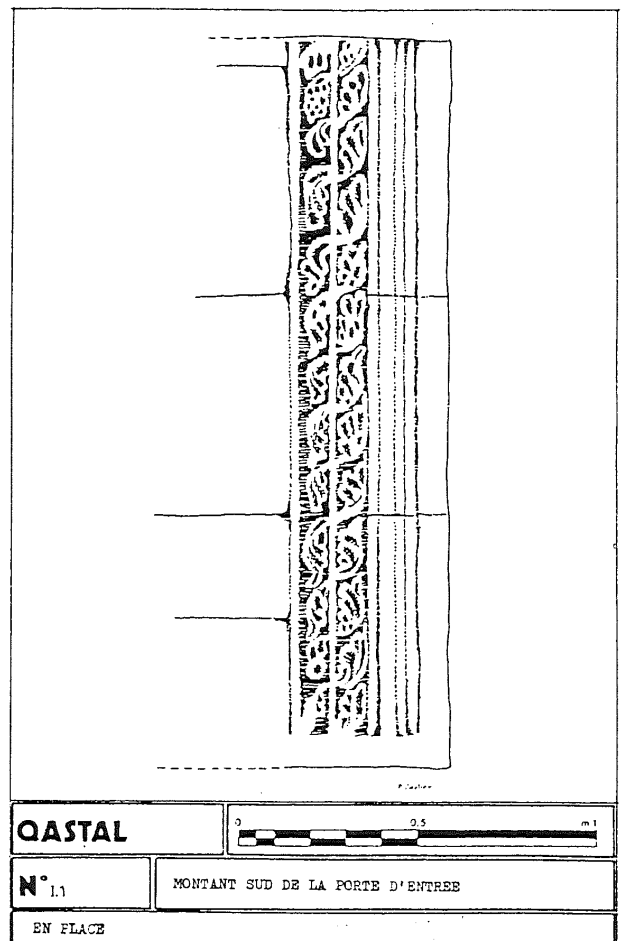


Fig. 32.

Fig. 32b.

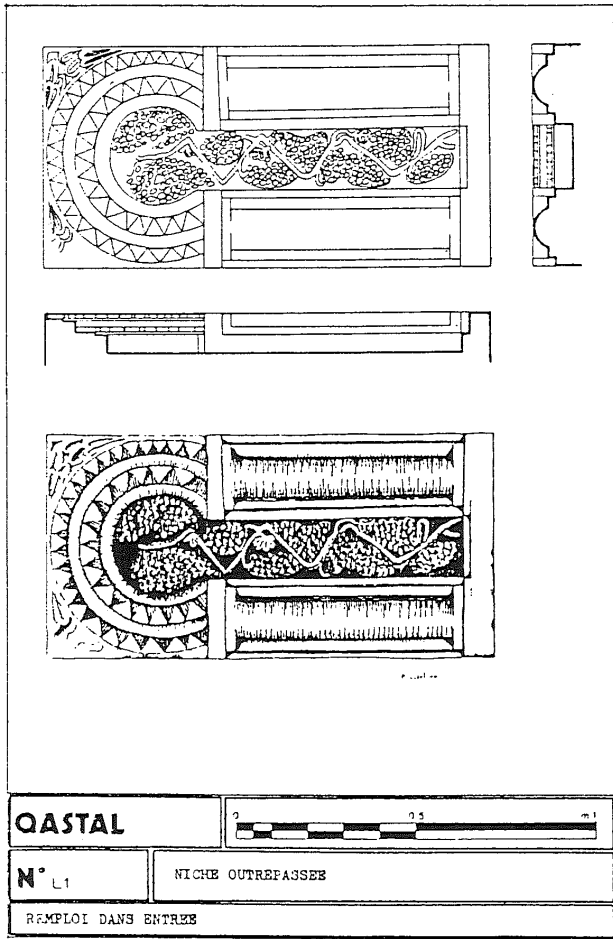


Fig. 33.

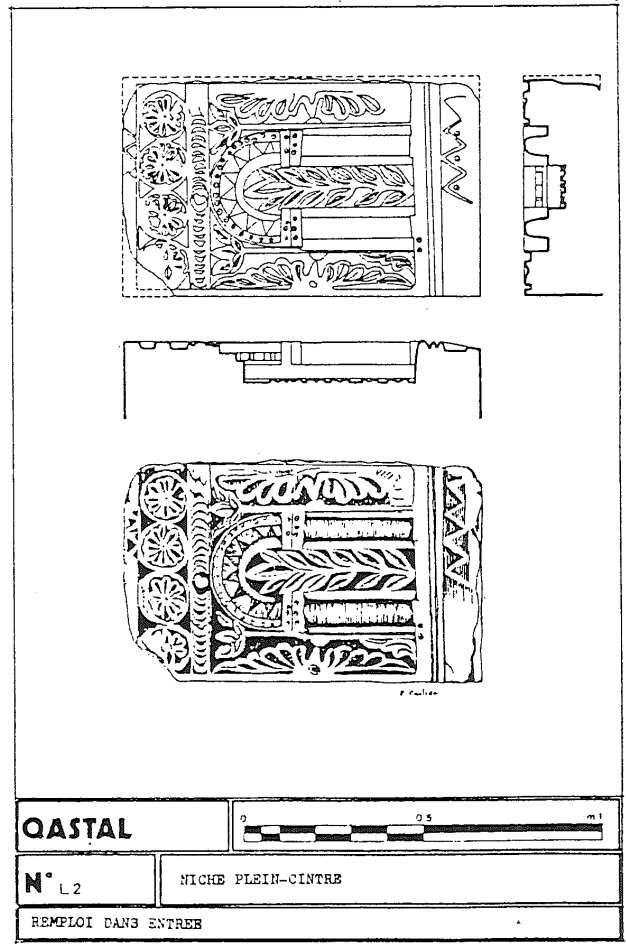


Fig. 34.

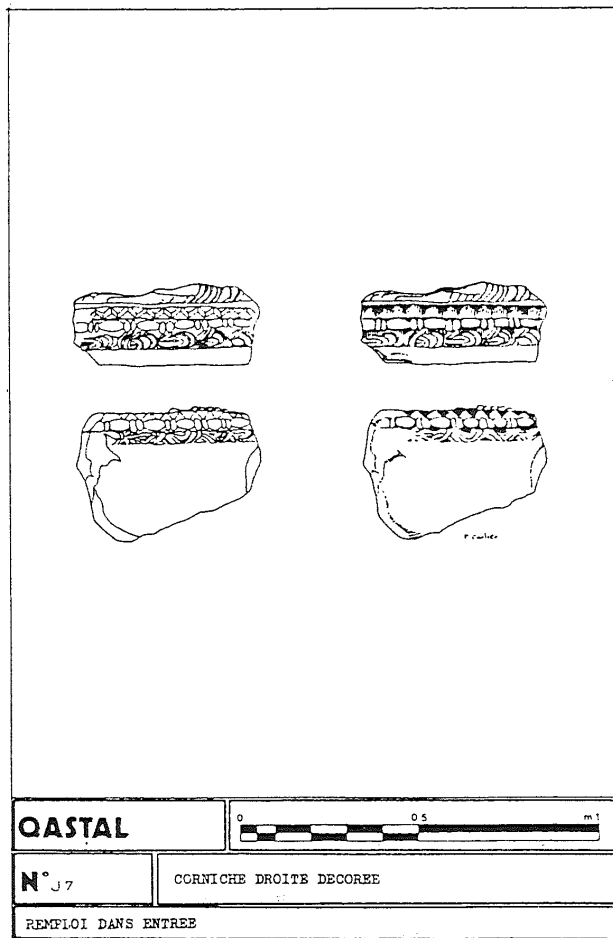


Fig. 35.

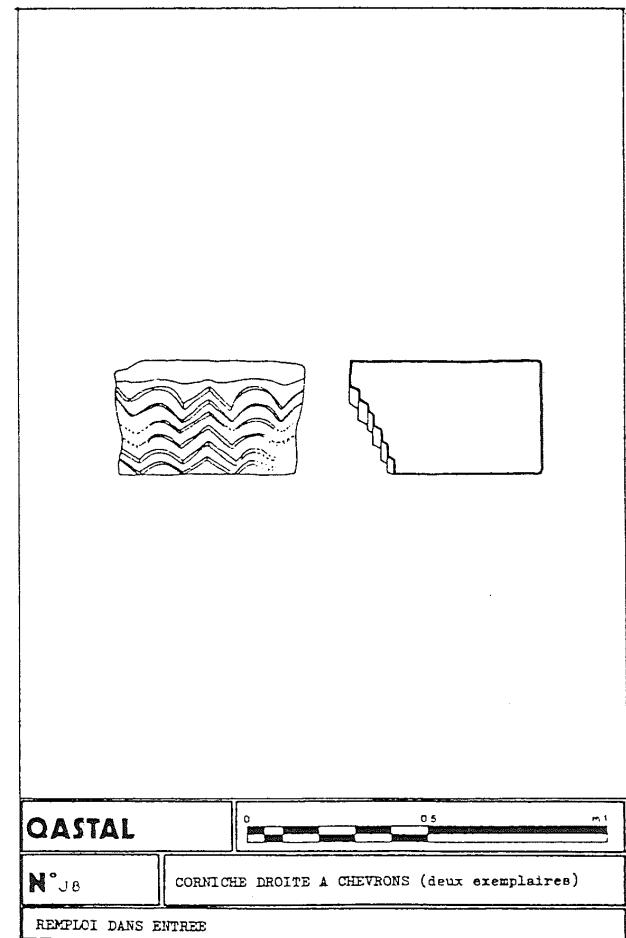


Fig. 36.

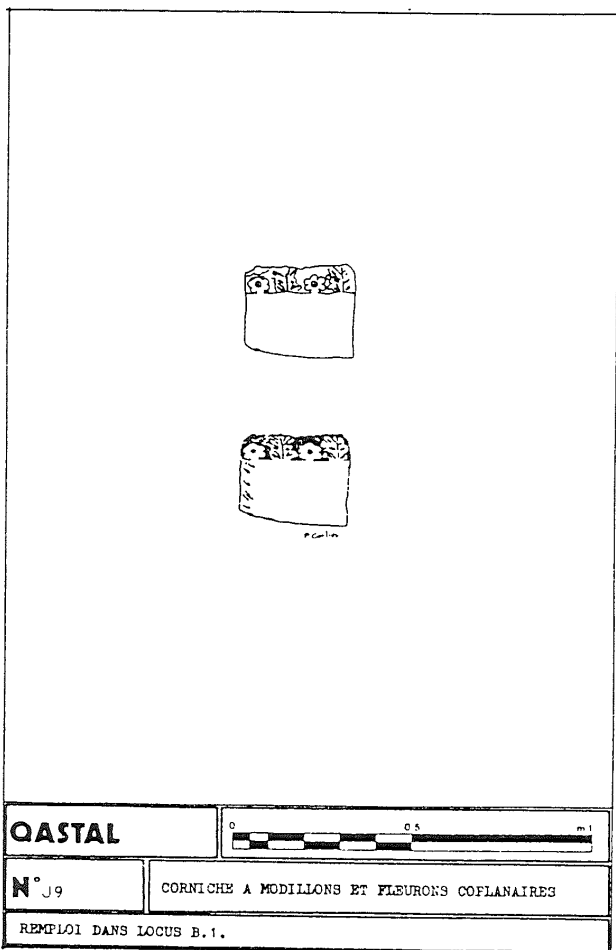


Fig. 37.

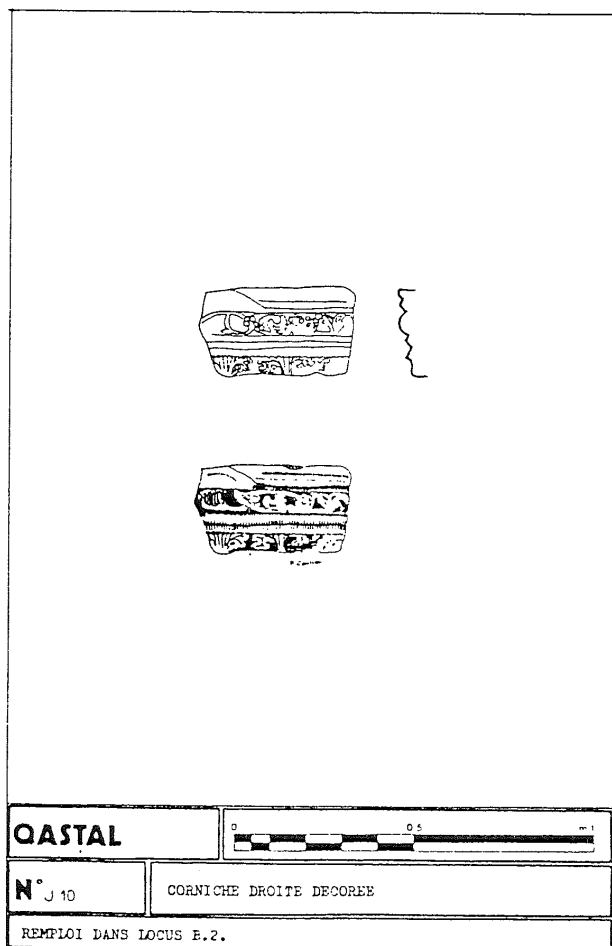


Fig. 38.

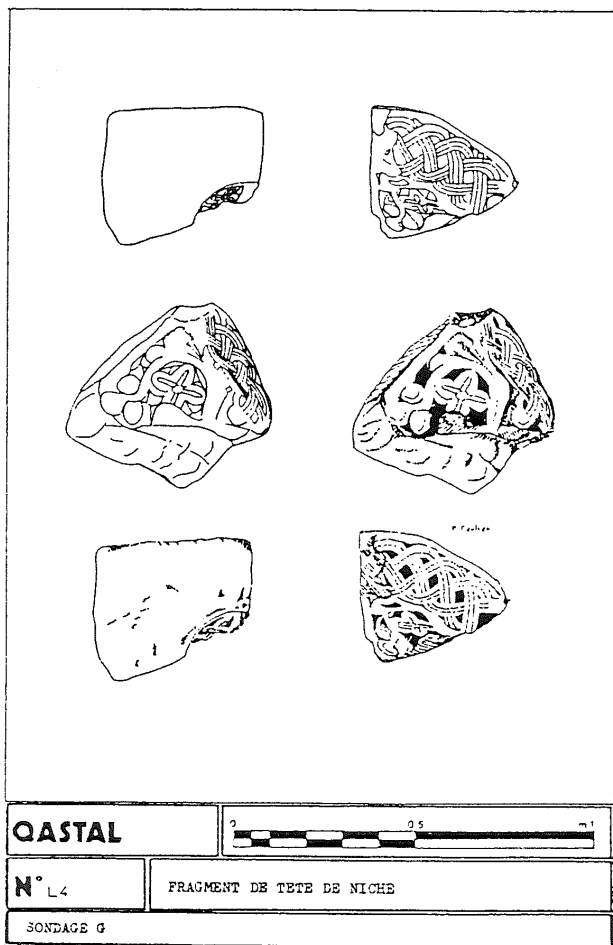


Fig. 39.

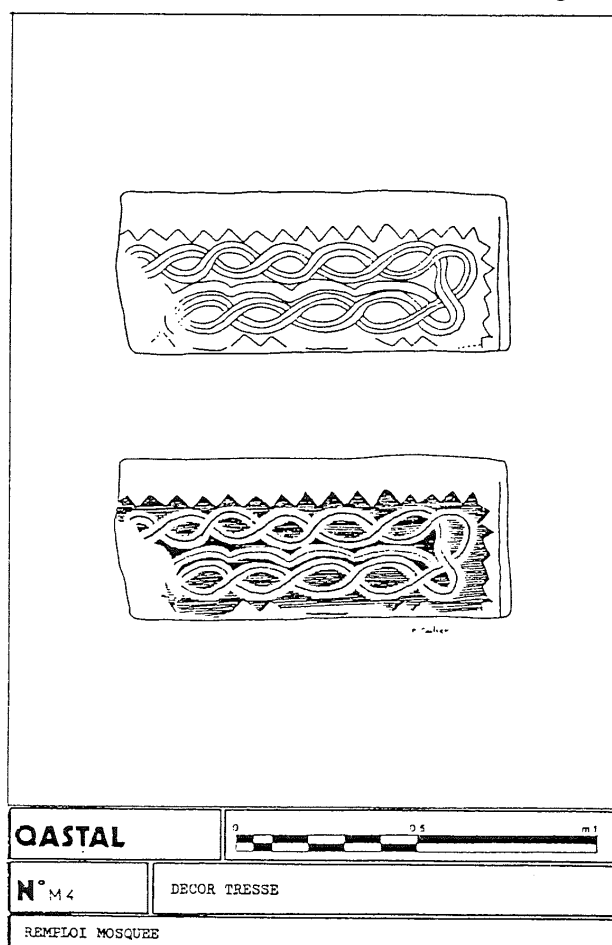


Fig. 40.

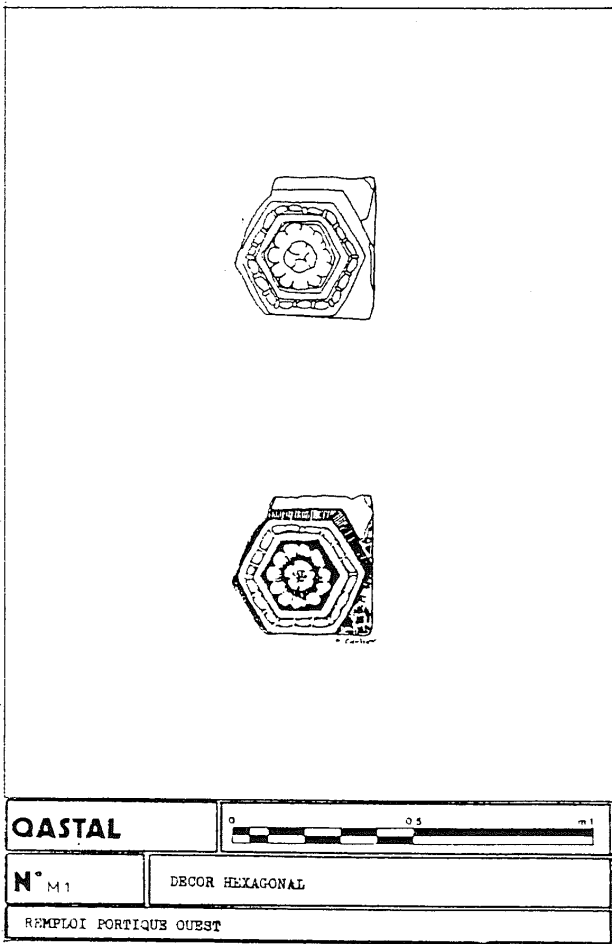


Fig. 41.

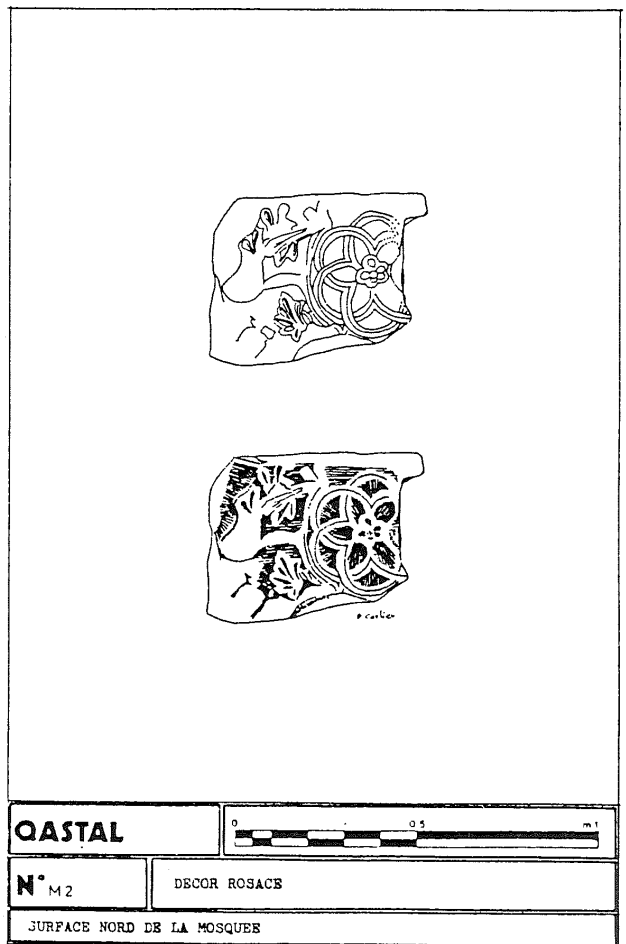


Fig. 42.

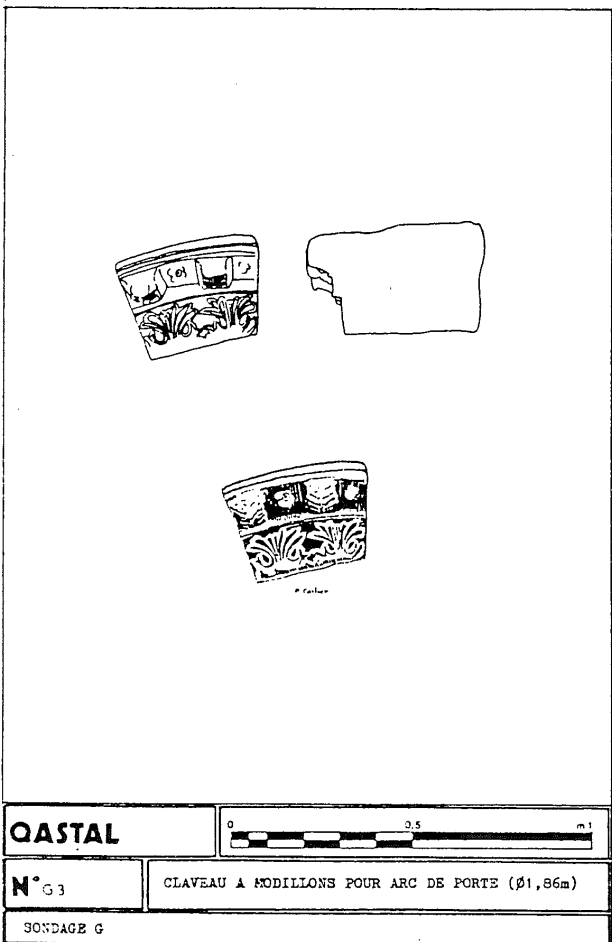


Fig. 43.

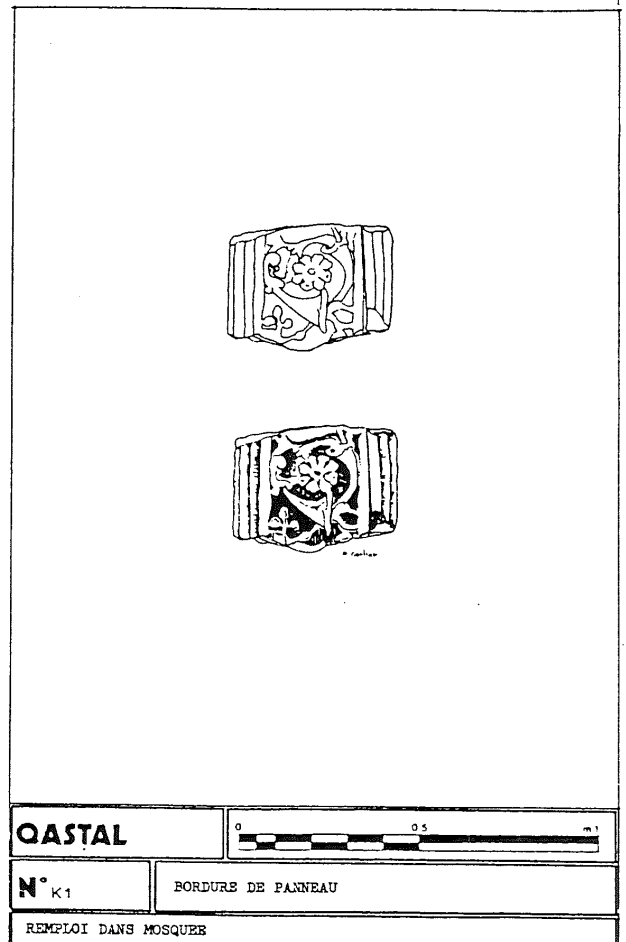


Fig. 44.

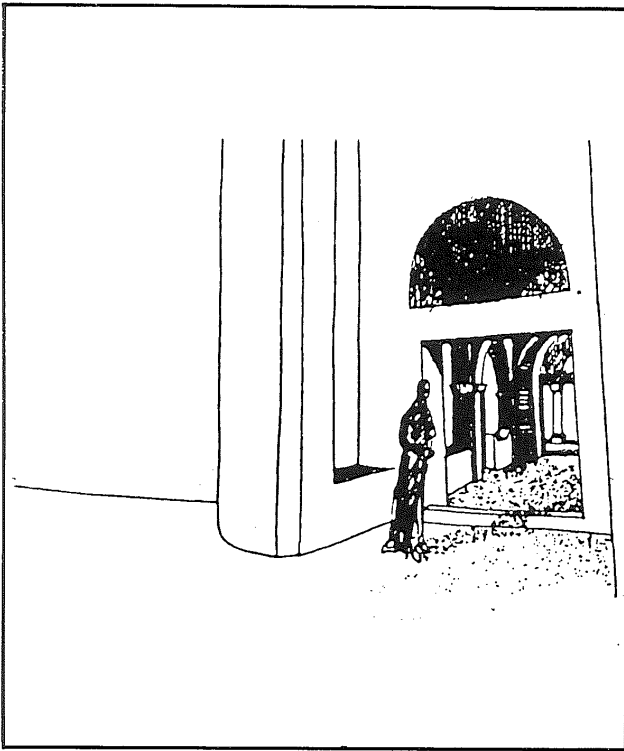


Fig. 45: Qasṭal 83: façade est, tour et porche d'entrée, restitution archéologique.

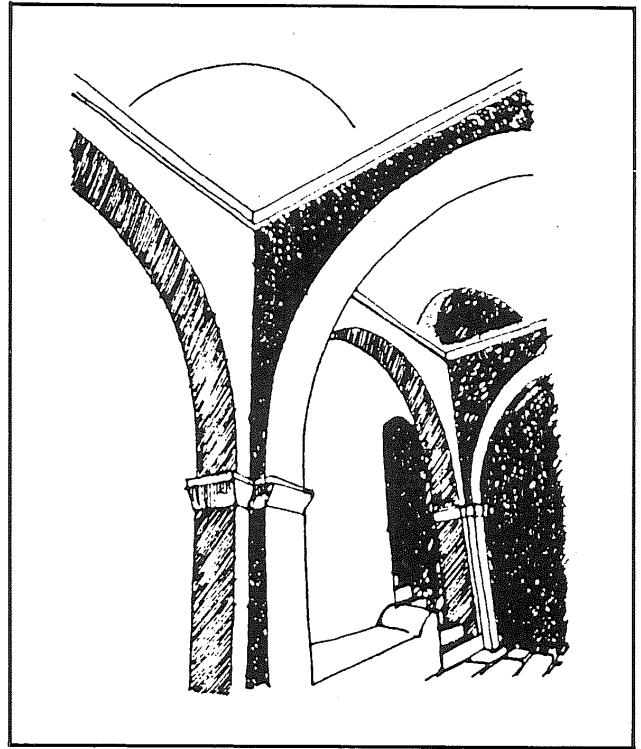


Fig. 46: Qasṭal 83: bloc d'entrée, partie nord du vestibule, restitution archéologique.

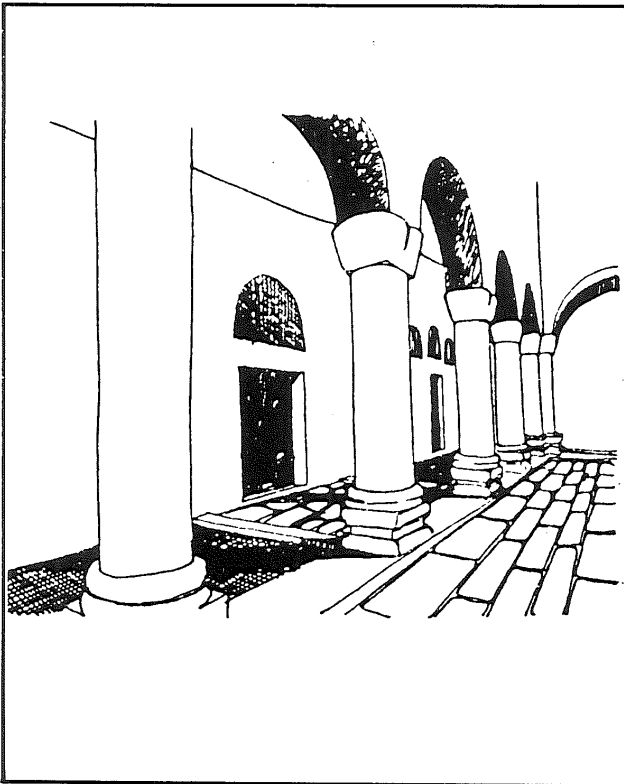


Fig. 47: Qasṭal 83: cour, portique est, porte du vestibule, restitution archéologique.

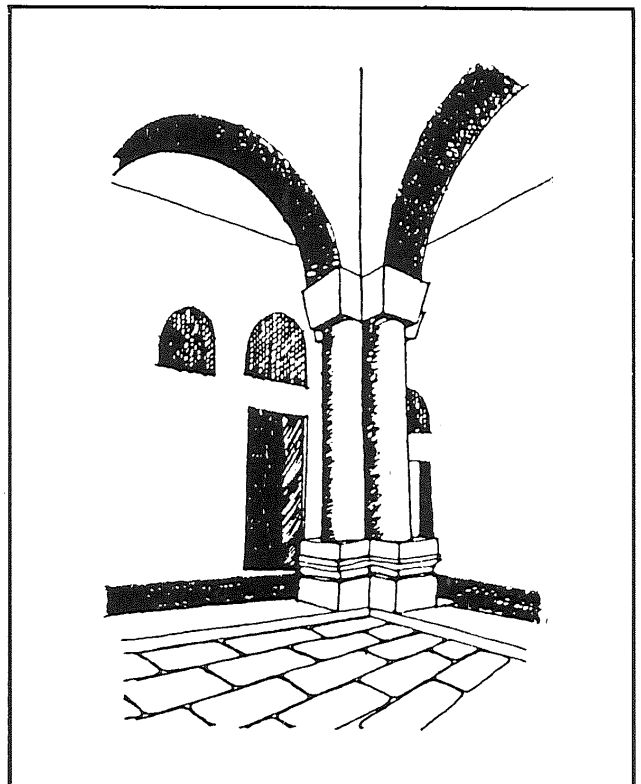


Fig. 48: Qasṭal 83: cour, angle sud-est du portique. Façade de l'appartement sud-est, restitution archéologique.

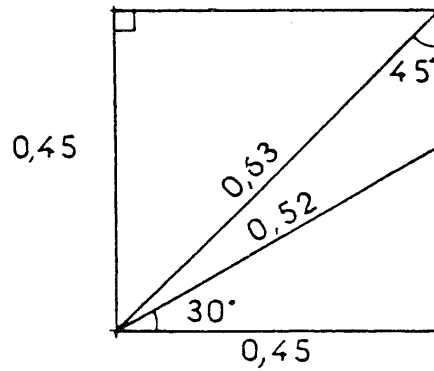
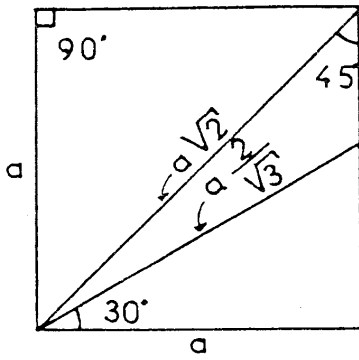


Fig. 49: Qaṣṭal 83: les relations trigonometriques entre: la coudée umayyade de 0,45m, la coudée de 0,53m  $\approx$  0,52 m, la grande coudée de 0,63 m.

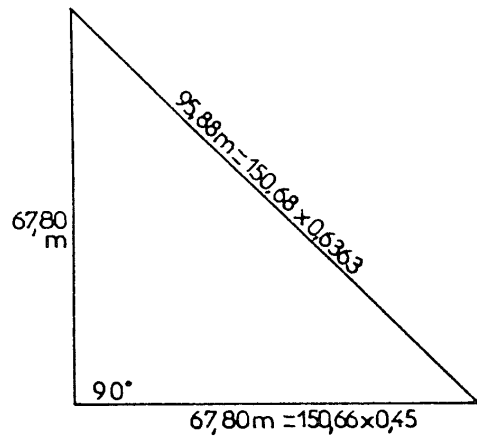
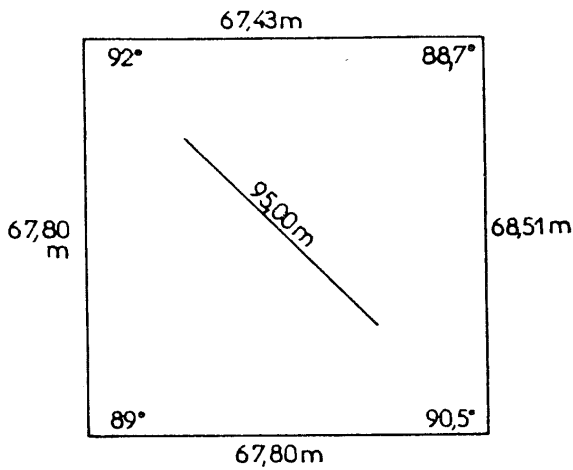


Fig. 50: Qaṣṭal 83: Relevé du palais mesures metriques et angulaires

Fig. 51: Qaṣṭal 83: construction d'un angle droit, coudée umayyade de 0,45m, Grande coudée de 0,6363m.

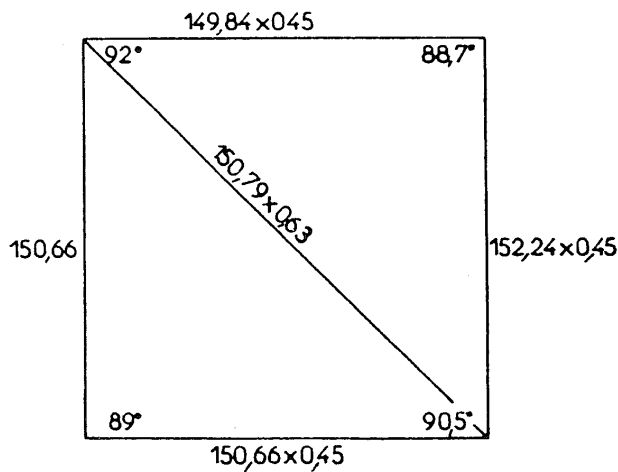


Fig. 52: Qaṣṭal 83: Relevé du Palais. Coudée umayyade de 0,45 m. Grande coudée de 0,63 m.



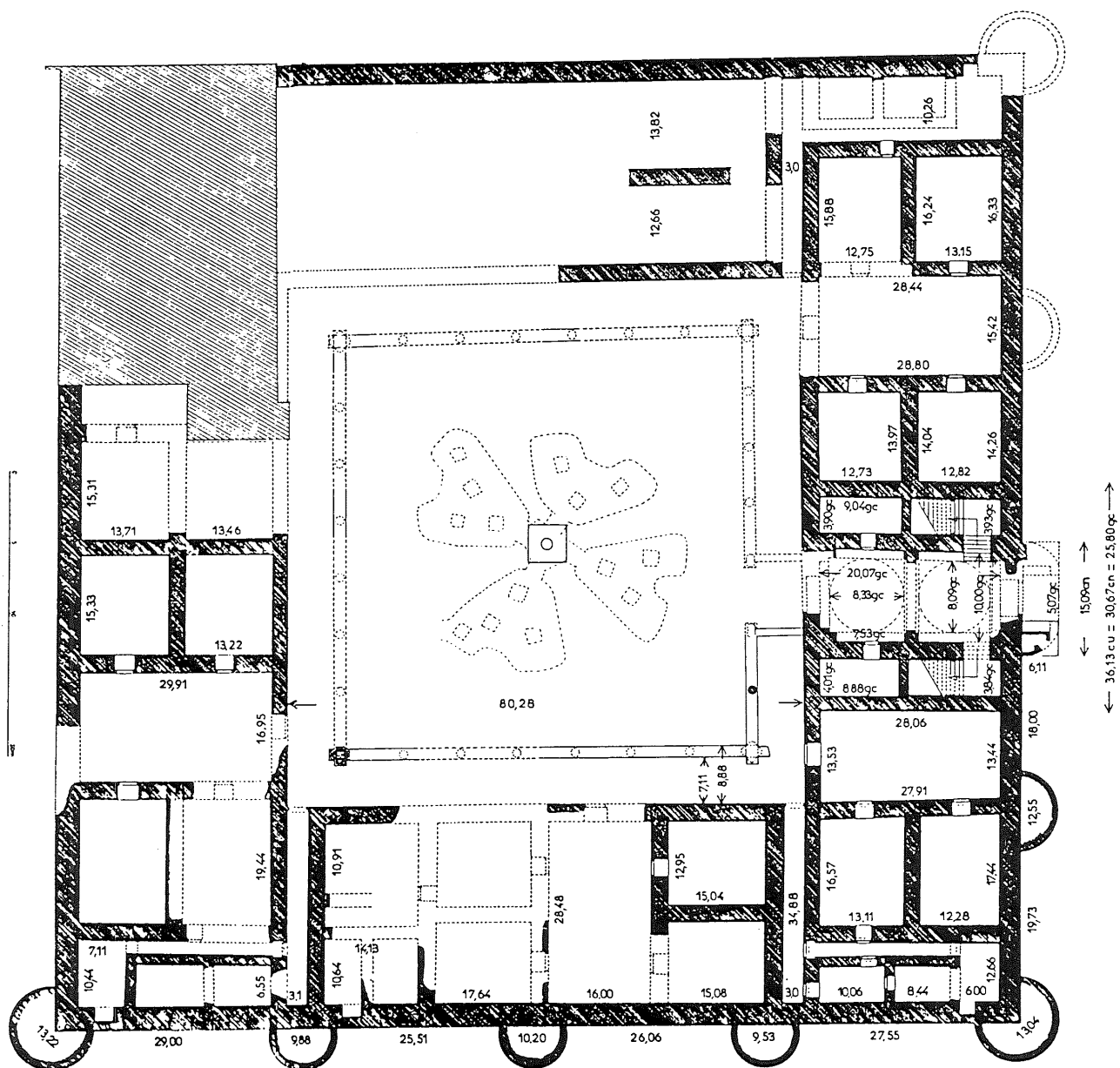


Fig. 53: Qasṭal 83: Plan côté du château de Qasṭal

CU = 0,45m

CN = 0,53m

GC = 0,63m

Relevé: S. Metz, V. Morin, F. Morin; Dessin: S. Metz, F. Morin.

Les mesures dont l'unité n'est pas précisée sont données en coudées umayyades (CU) de 0,45 m.

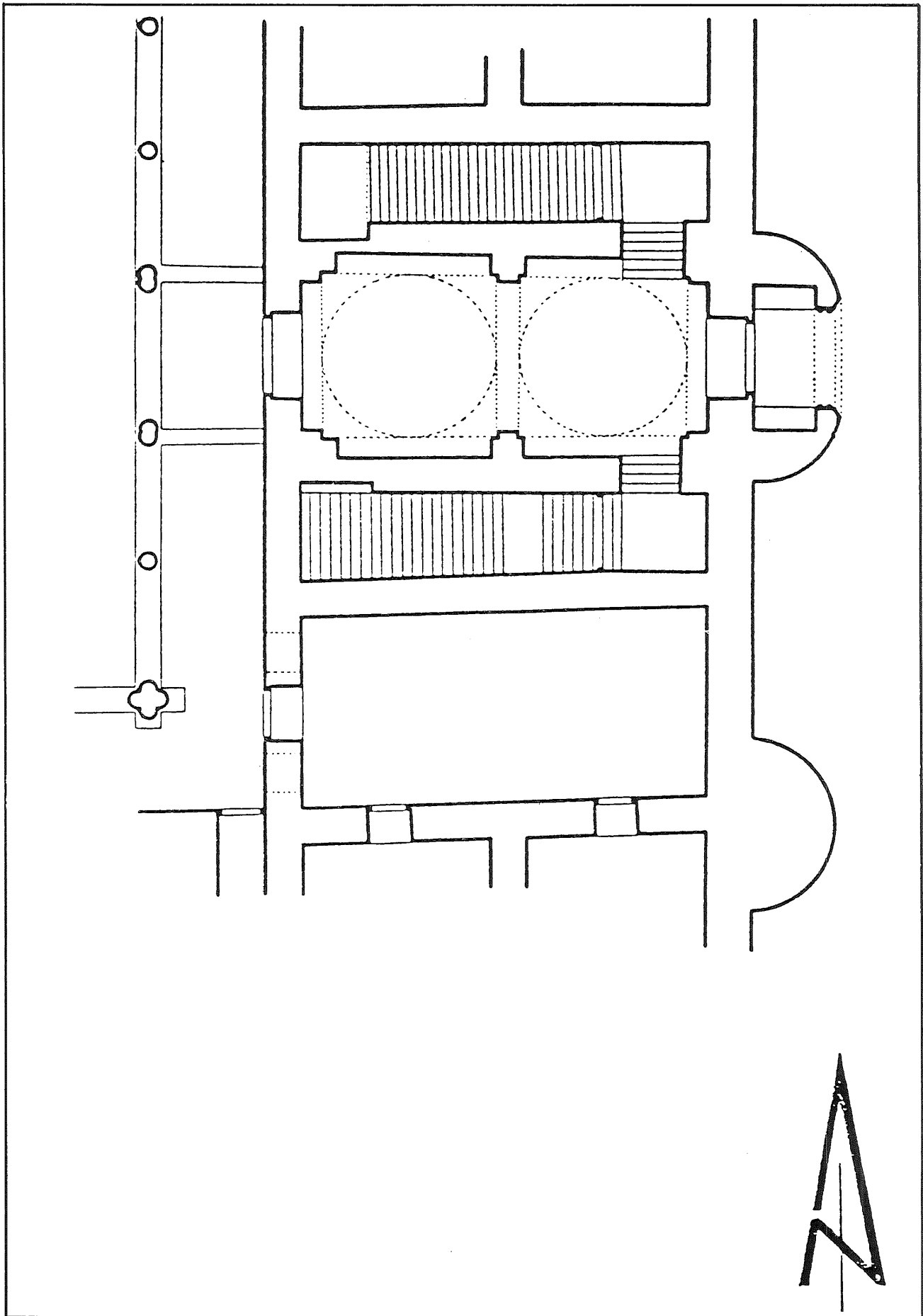


Fig. 54: Qasṭal 83: le palais: bloc d'entrée. Plan du rez-de chaussee. Restitution archéologique de l'état umayyade, restitution et dessin: Frédéric Morin.

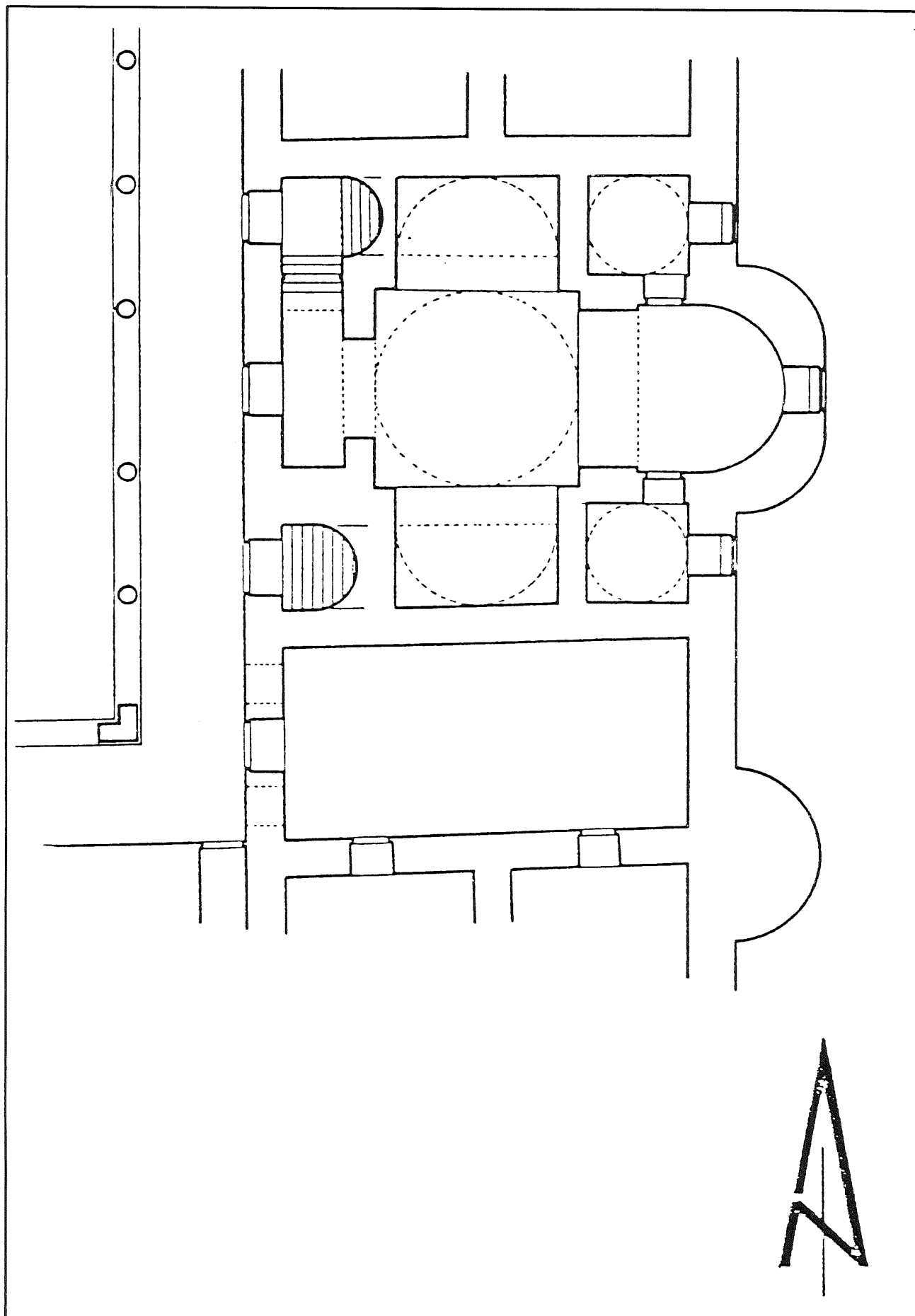


Fig. 55: Qasṭal 83: le palais: Bloc d'entrée: Plan de l'étage Restitution architecturale de l'état umayyade.  
Restitution et dessin: Frédéric Morin.

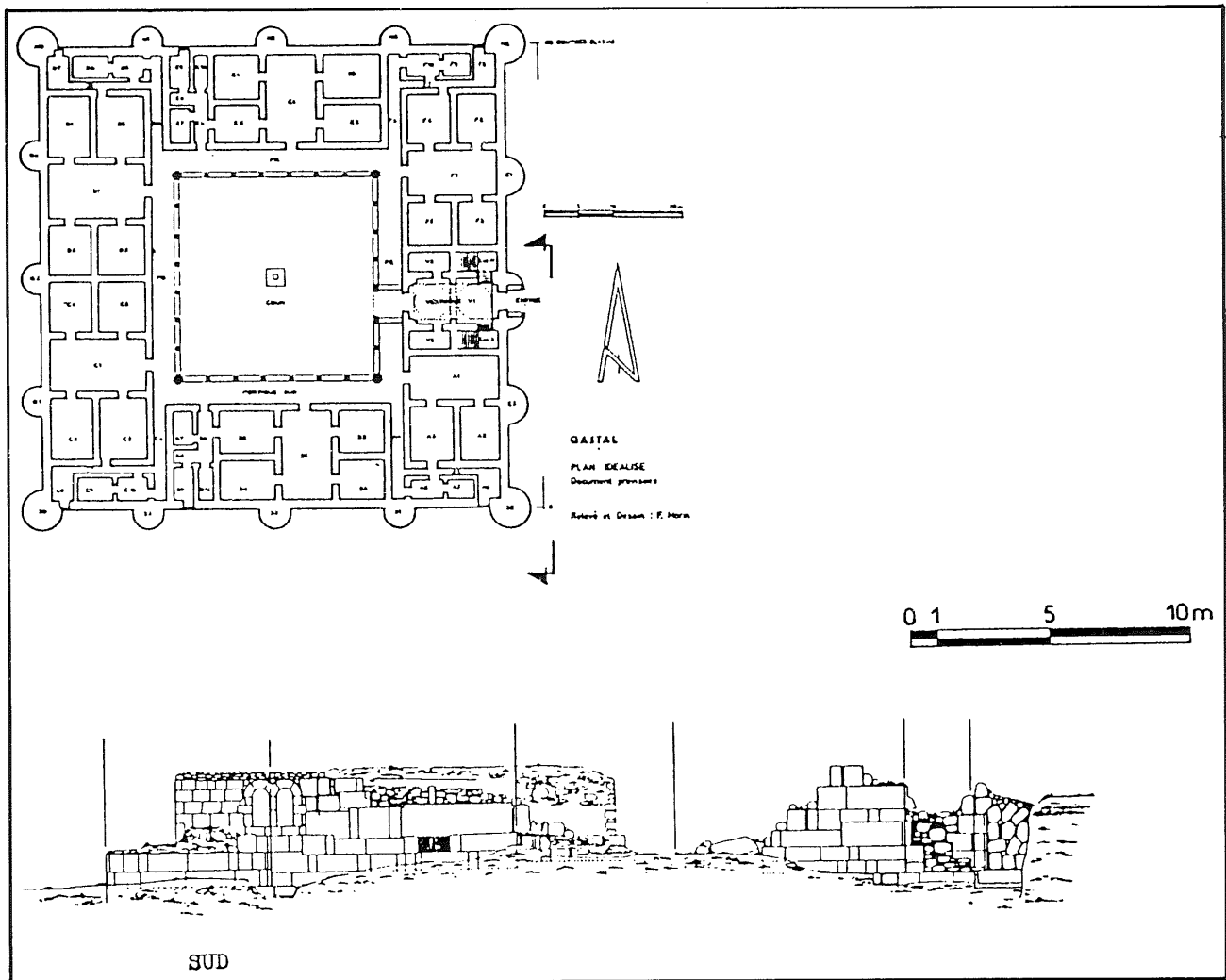


Fig. 56: Qasṭal 83: le palais: Facade est. Etat existant. Relevé : F. Morin, L. Ifrah; Dessin: L. Ifrah, P. Carlier.

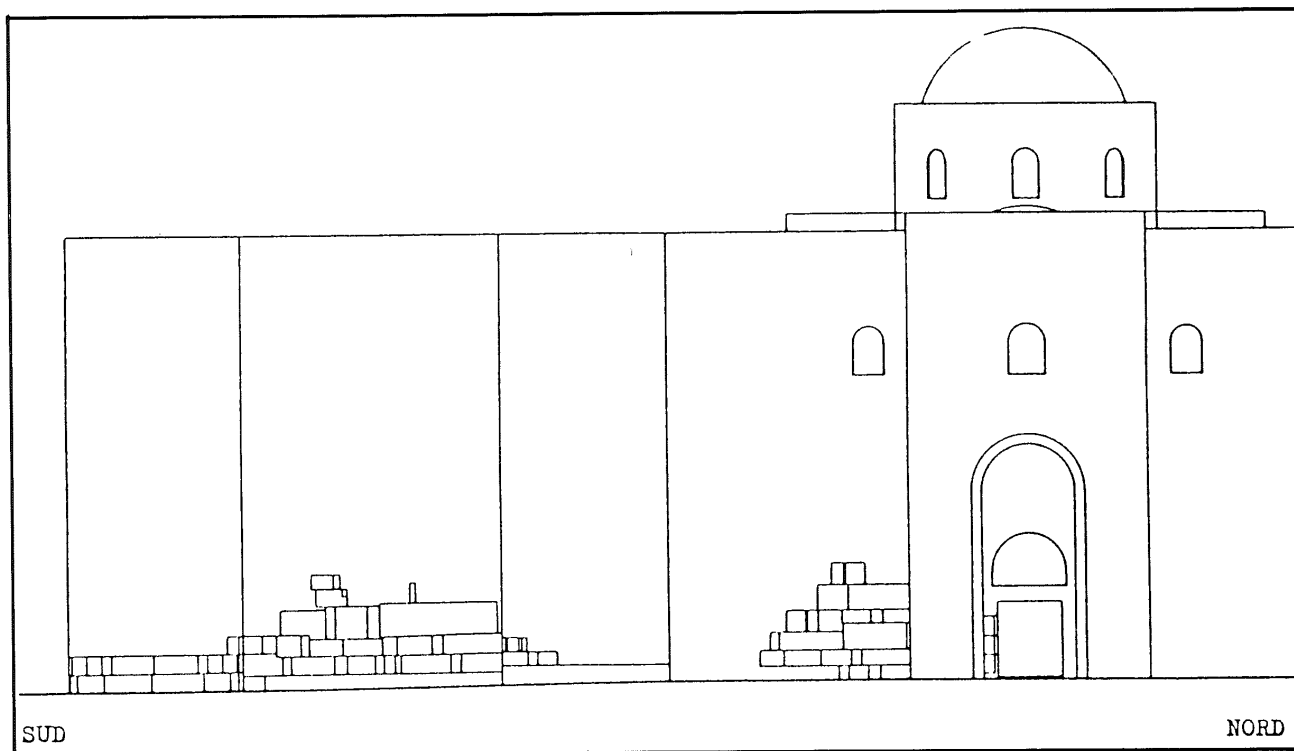


Fig. 57: Qasṭal 83: le palais: facade est. Restitution de l'état umayyade.  
 Restitution et dessin: Frédéric Morin.

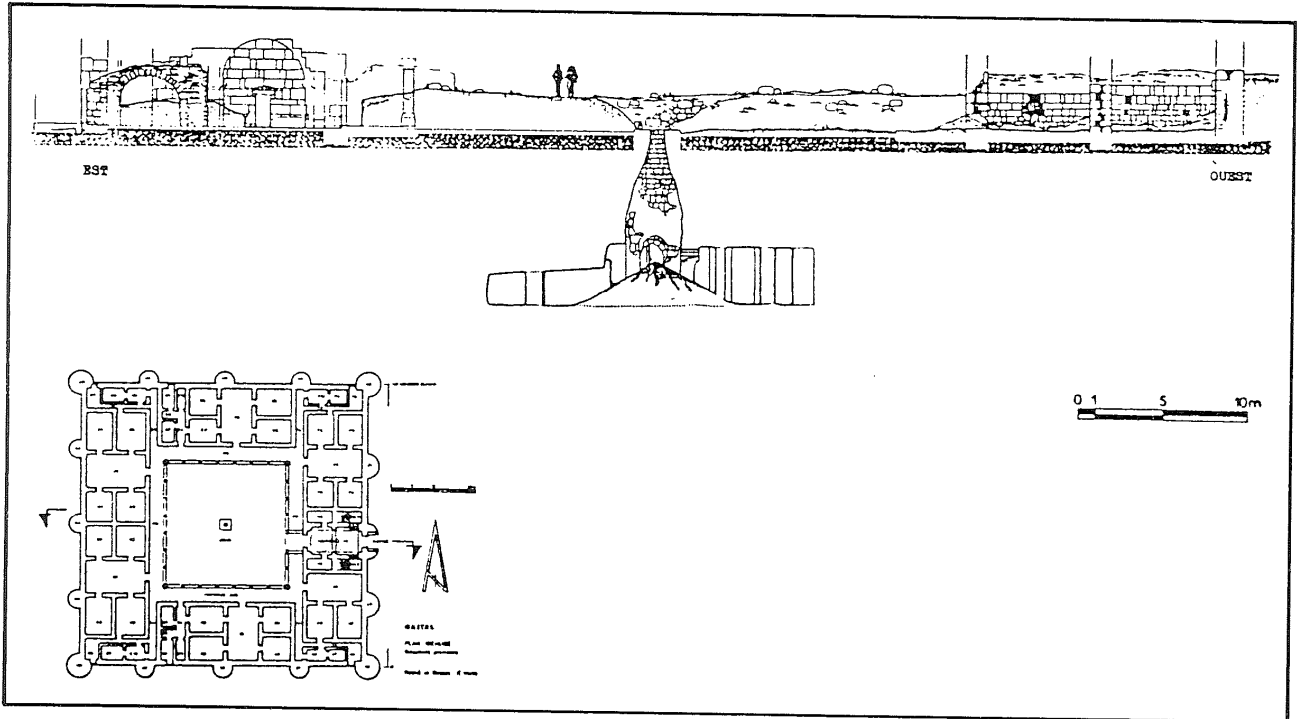


Fig. 58: Qasṭal 83: le palais: coupe générale est-ouest. Etat existant.  
 Relevé: F. Morin, L. Ifrah, Y. Billaud; Dessin: L. Ifrah, P. Carlier

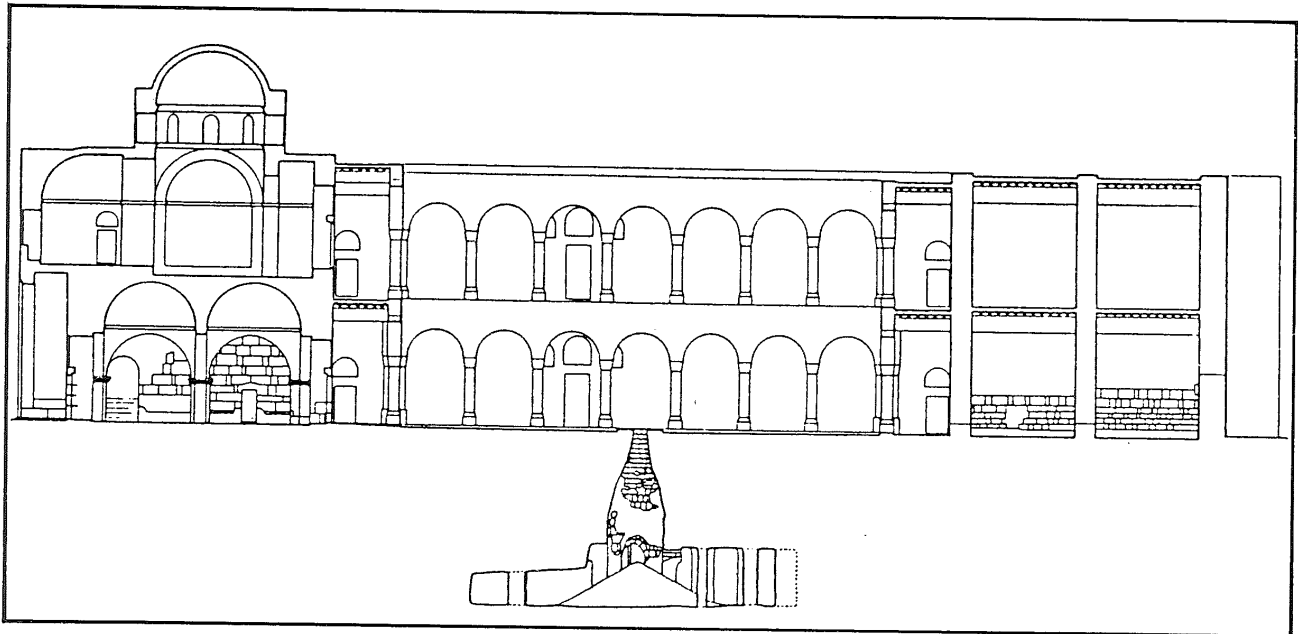


Fig. 59: Qasṭal 83: le palais. Coupe générale est-ouest. Restitution de l'état umayyade  
 Restitution et dessin: Frédéric Morin.

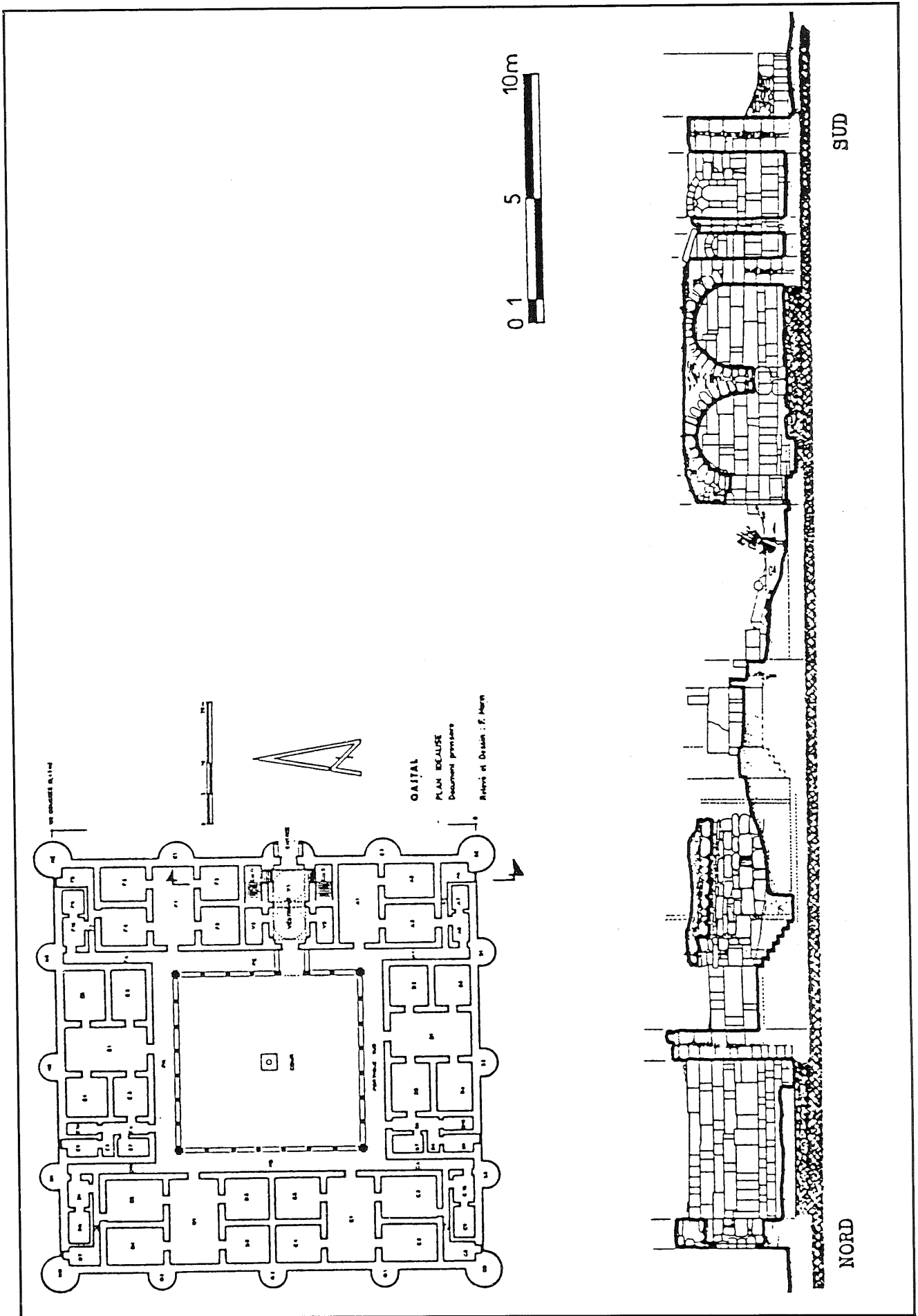


Fig. 60: Qasṭal 83: Le Palais: Mur d'enceinte est. Coupe et élévation de sa face intérieure. Etat existant  
 Relevé: F. Morin, L. Ifrah; Dessin: L. Ifrah, P. Carlier.

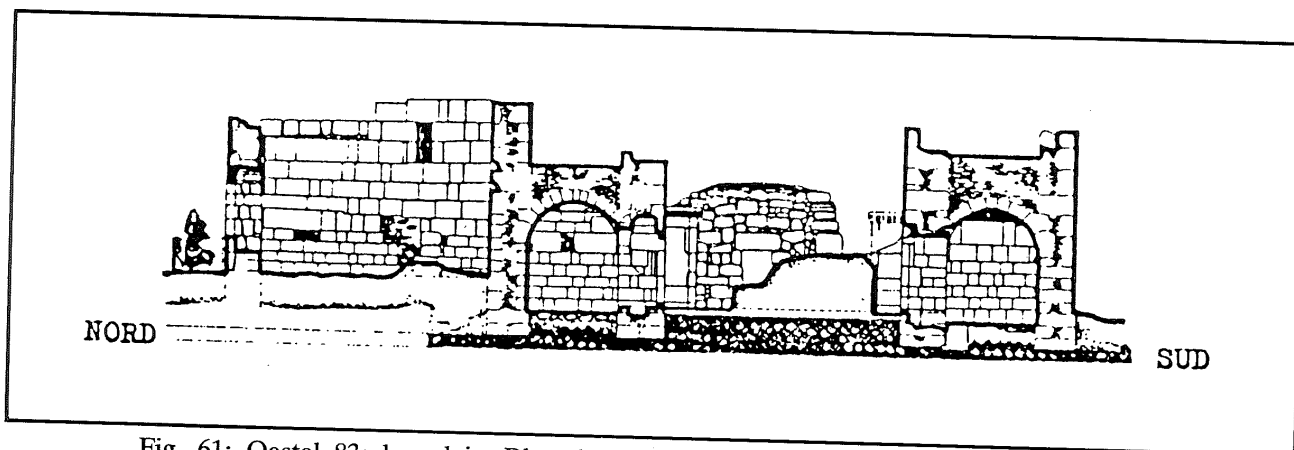


Fig. 61: Qasṭal 83: le palais: Bloc d'entrée coupe transversale nord-sud. Etat existant.  
 Relevé: F. Morin, L. Ifrah; Dessin: L. Ifrah, P. Carlier

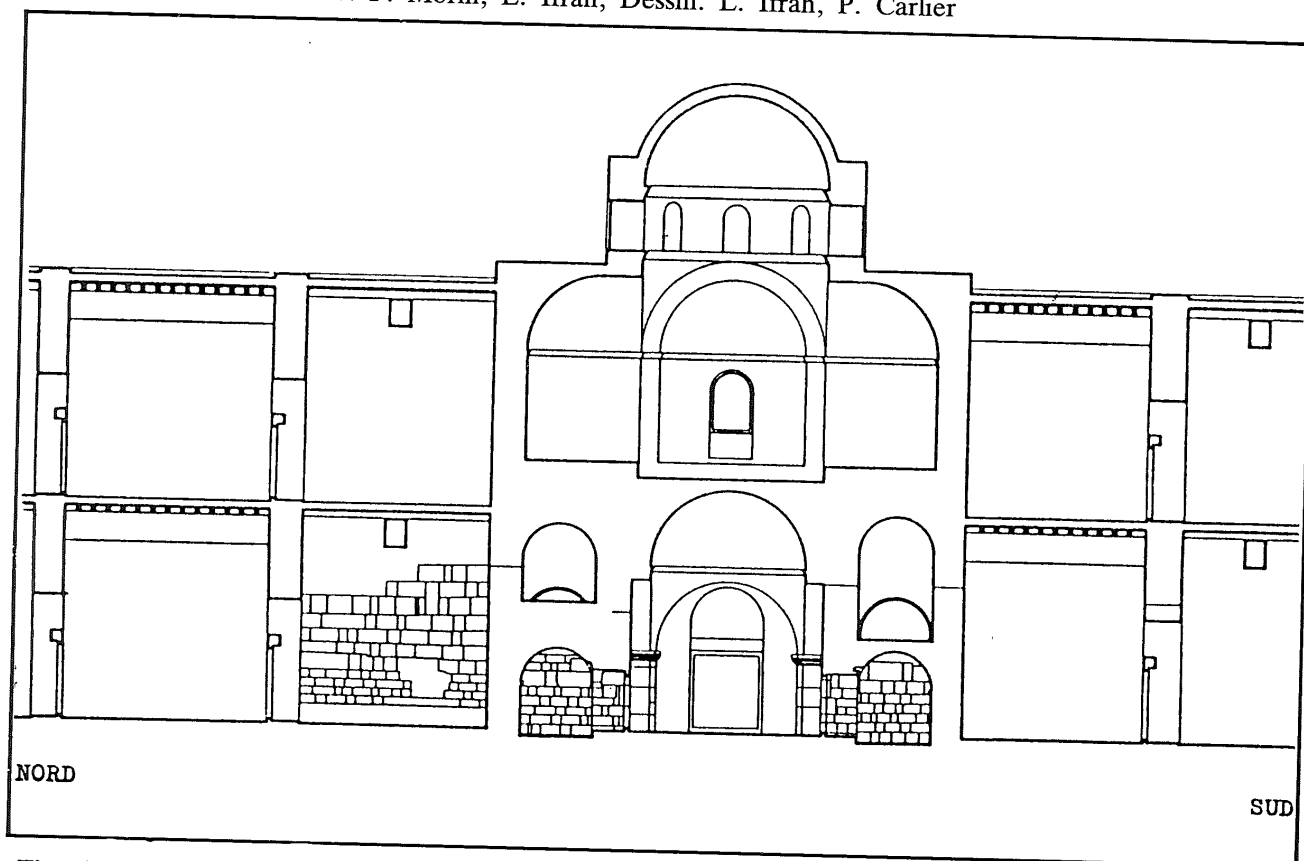


Fig. 62: Qasṭal 83: le palais: bloc d'entrée, coupe transversale nord-sud, restitution de l'état umayyade.  
 Restitution et dessin: Frédéric Morin.

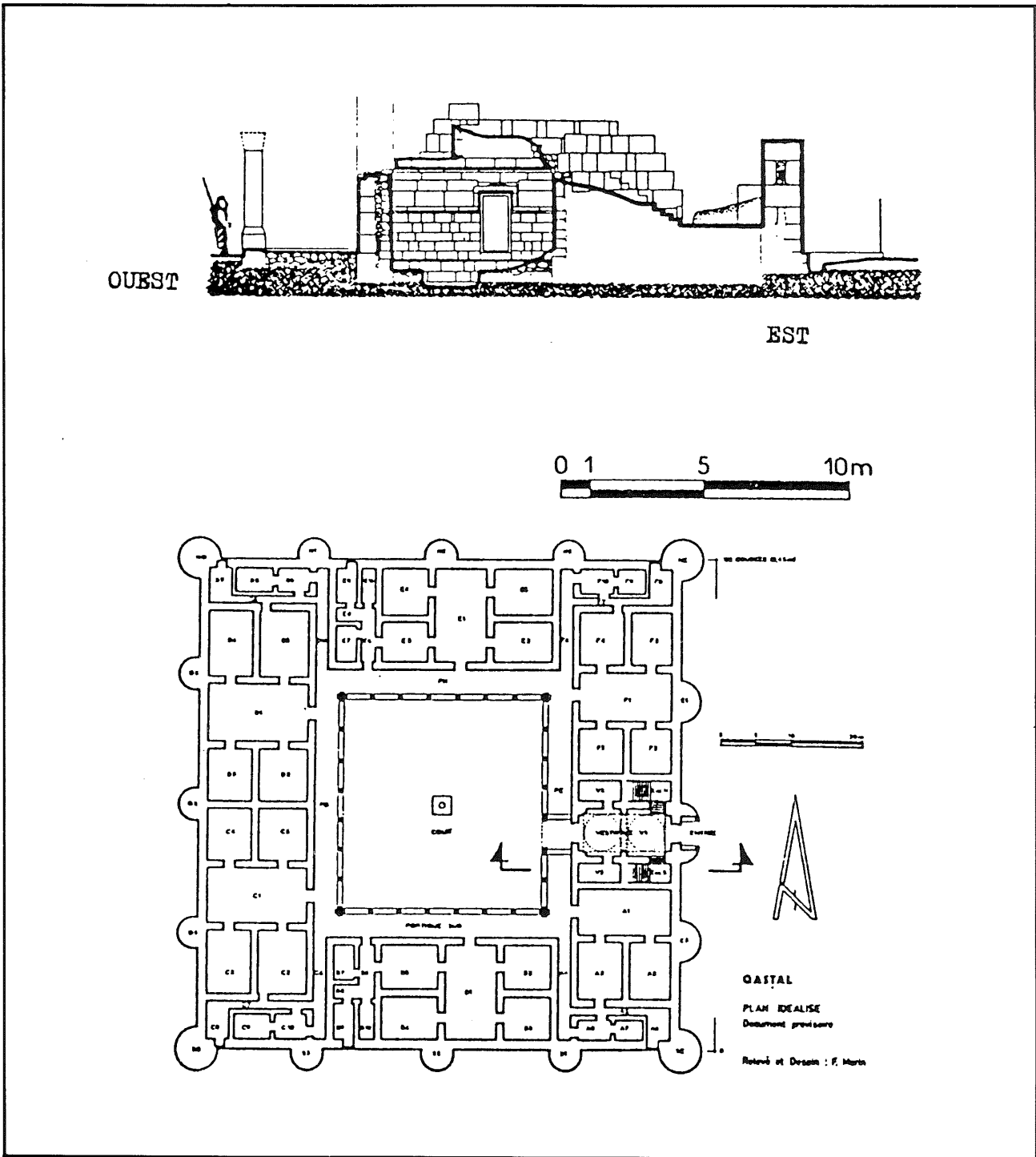


Fig. 63: Qaṣṭal 83: Le palais: Bloc d'entrée. Coupe sur l'escalier sud. Etat existant.  
 Relevé F. Morin, L. Ifrah; Dessin: L. Ifrah, P. Carlier



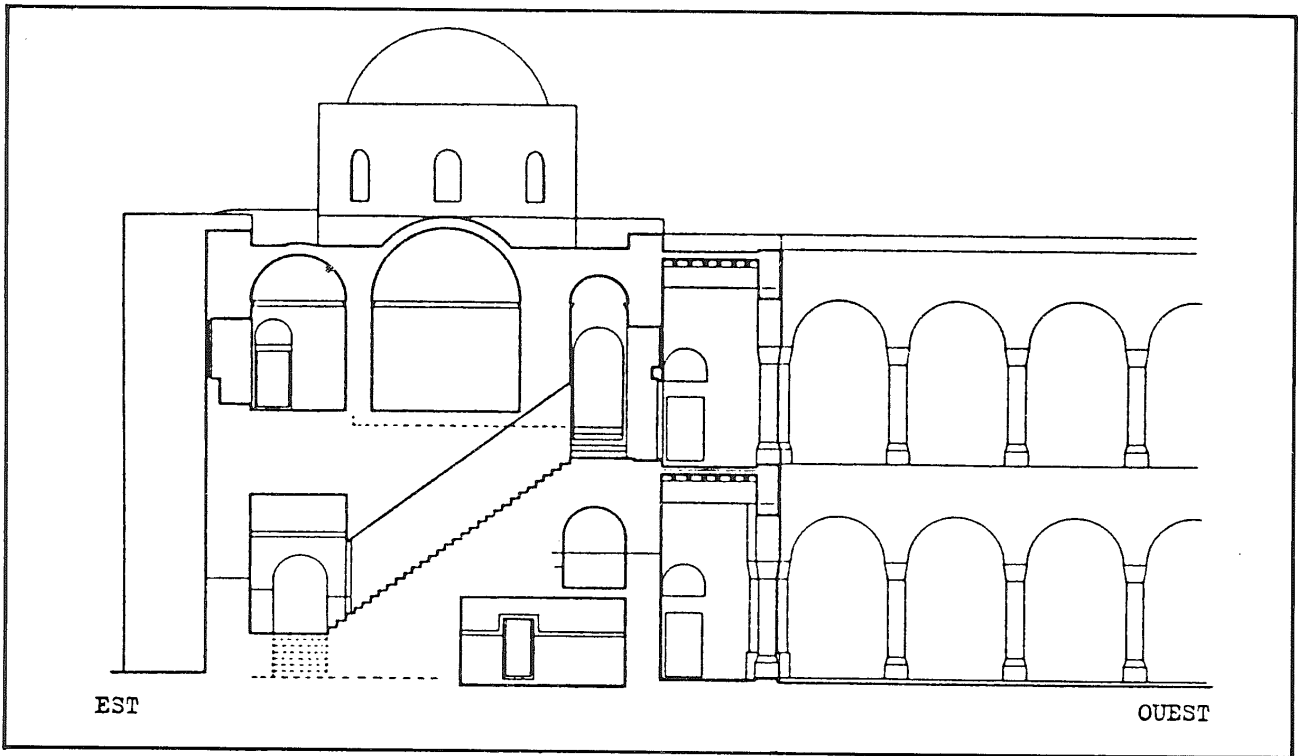


Fig. 64: Qasṭal 83: le palais: bloc d'entrée. coupe sur l'escalier nord, restitution de l'état umayyade.  
Restitution et dessin: Frédéric Morin.

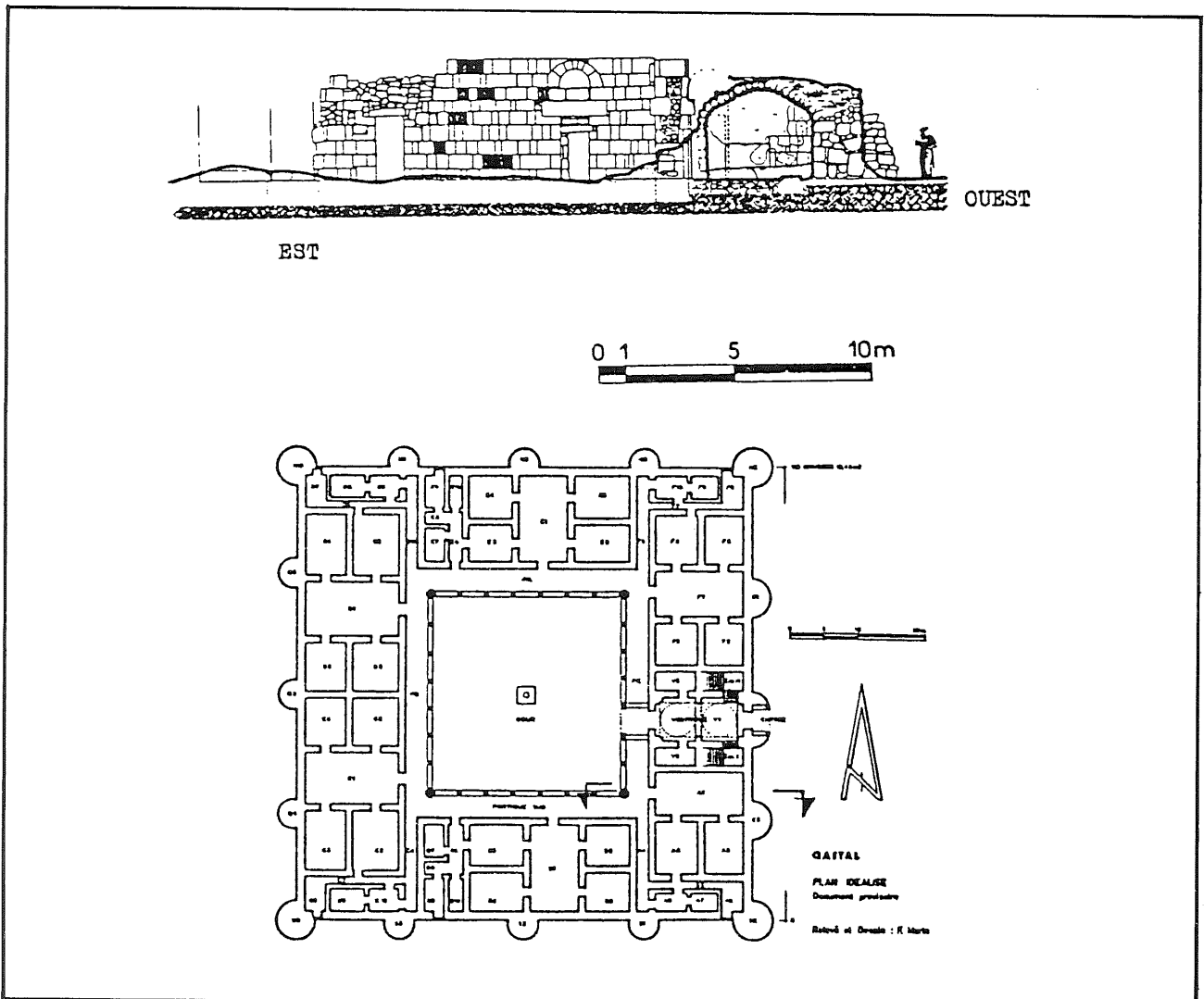


Fig. 65: Qasṭal 83: le palais: Appartement "A", pièce centrale, coupe-élévation est-ouest, Etat existant.  
Relevé: F. Morin, P. Carlier; Dessin: L. Ifrah, P. Carlier.

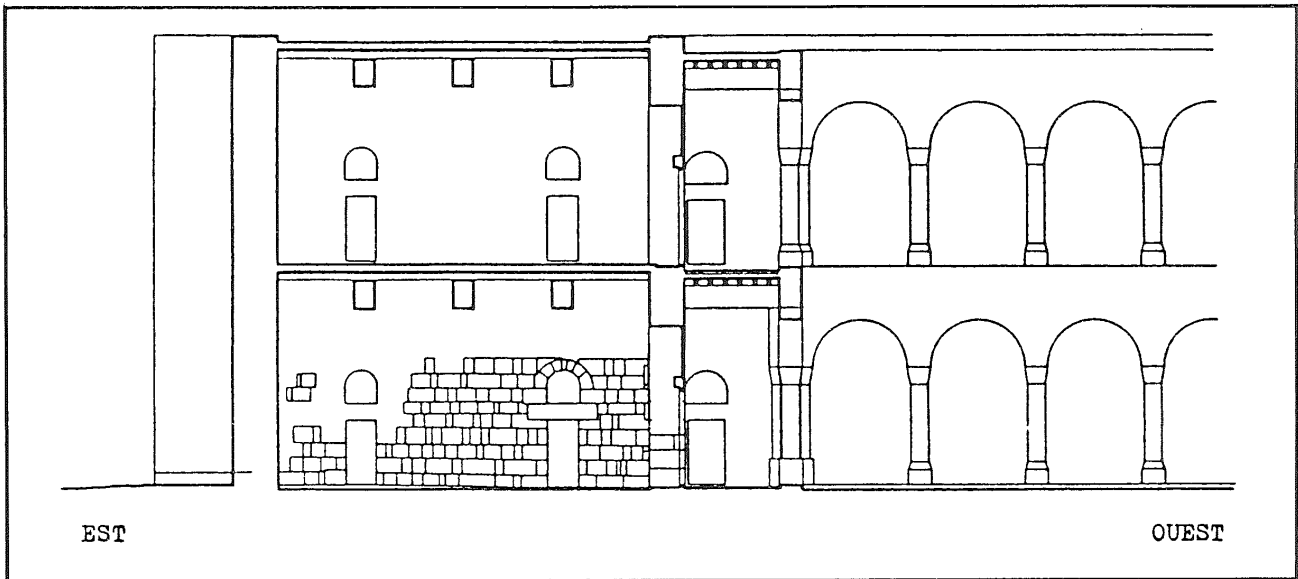


Fig. 66: Qasṭal 83: le palais: Appartement "A", pièce centrale, coupe-elevation est-ouest, restitution de l'état umayyade.  
Restitution et dessin: Frédéric Morin.

	CHATEAU	SITE DE PLAINE	OUVRAGES HYDRAULIQUES	EXPLOITATION AGRICOLE	MOSQUEE	REPRISE SITE ANTE-ISLAMIQUE	CONSTRUCTION SUR SOL VIERGE	AGGLOMERATION	BAIN	TOTAL
QAṢR BURQU'	X	X	X	?		X				4
QAṢR AL-ḤARĀNA	X	X	X	?		X	X			5
QUṢAYR 'AMRA	?	X	X	X		X	X		X	6
ĠABAL USAYS	X	X	X	X	X		X	X	X	8
ḤIRBAT AL-MINYA	X	X	X	X	X	X	X	X	X	9
'AYN AL-ĠARR	X	X	X	X	X	X	X	X	X	9
QASṬAL	X	X	X	X	X	X	X	X	?	8
'AMMAN	X		X		?	X		X	?	4
QAṢR AL-ḤALLABĀT	X	X	X	X	X	X		X	X	8
QAṢR AL-ḤAYR AL-ṢARQĪ	X	X	X	X	X		X	X	X	8
QAṢR AL-ḤAYR AL-ĠARBĪ	X	X	X	X	X	X		X	X	8
RUSĀFA-HIṢĀM	X	X	X	X	X	X	X	X		8
ḤIRBAT AL-MAĠĠAR	X	X	X	X	X	X	X	X	X	9
MISĀTTĀ	X	X	?	X	X		X			5
QAṢR AL-ṬŪBA	X	X	X	?	X		X			5
ENSEMBLE DES CHATEAUX	14	14	14	11	11	11	11	10	8	

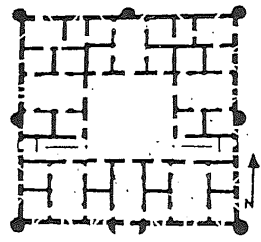
Fig. 67: le groupe des sites umayyades étudiés: description comparative des sites.

Note: les sites sont classés par ordre chronologique et les critères par représentativité décroissante.

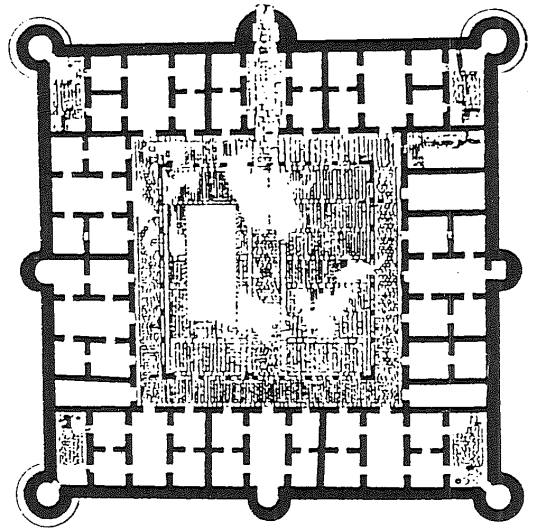
	COUR CENTRALE	PRESENCE DE BAYT	ENCEINTE A TOURS RONDES	MESURES UMAYYADES	PORTIQUE	LATRINES	ETAGE	APPARTEMENT DE RECEPTION	PLAN IRRÉGULIER	ENTRÉE DANS TOUR PERCÉE	TOTAL
QAṢR AL-ḤARĀNA	X	X	X	X	X		X	X	X	X	9
ĠĀBAL USAYS	X	X	X	X	X	X	X	X	X	X	10
ḤIRBAT AL-MINYA	X	X	X	X	X	X	X	X	X	X	10
'AYN AL-ĠARR	X	X		X	X	?	X	X	?	0	6
QAṢṬAL	X	X	X	X	X	X	X	X	X	X	10
QAṢR AL-ḤAYR AL-ŠARQĪ	X	X	X	X	X	X	X		X		8
QAṢR AL-ḤAYR AL-ĠARBĪ	X	X	X	X	X	X	X	X	X		9
RUṢĀFA-HIŠĀM	X	X	X	?	X	X	?	?	?		5
ḤIRBAT AL-MAFĠAR	X	X	X	X	X	X	X	X	X	X	10
MIŠATTĀ	X	X	X	X	?	X	?	X	?		6
QAṢR AL-ṬŪBA	X	X	X	X	?	X			?		5
ENSEMBLE DES CHATEAUX	11	11	10	10	9	9	8	8	7	5	

Fig. 68: le groupe des châteaux umayyades: comparaison des aménagements.

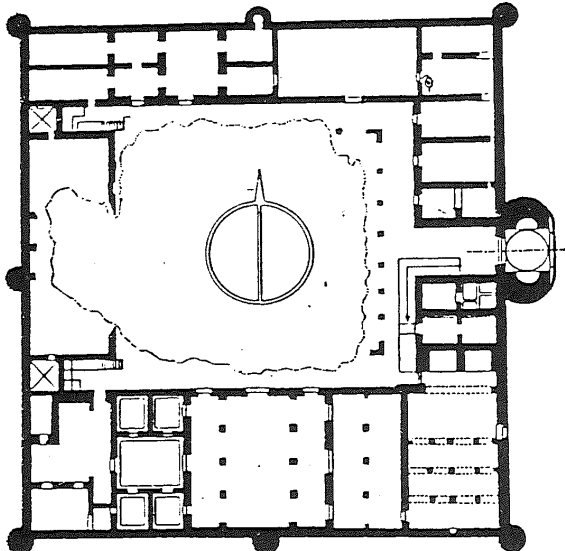
Note: les châteaux sont classés par ordre chronologique et les critères par représentativité décroissante.



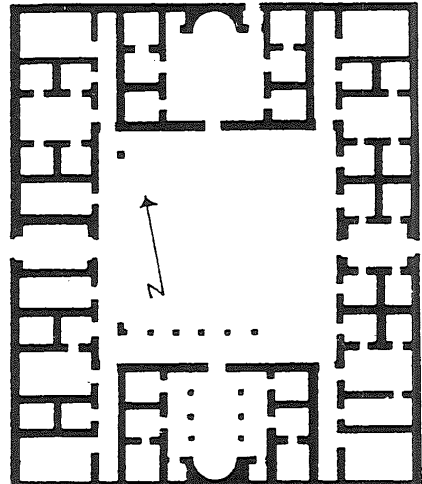
Qaṣr al-Ḥarāna



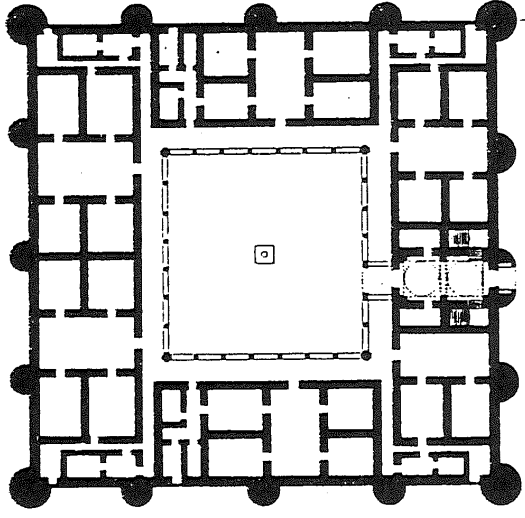
Ḡabal Usays



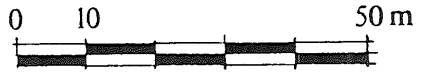
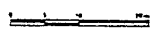
Hirbat-Minya



'Ayn al-Ḡarr

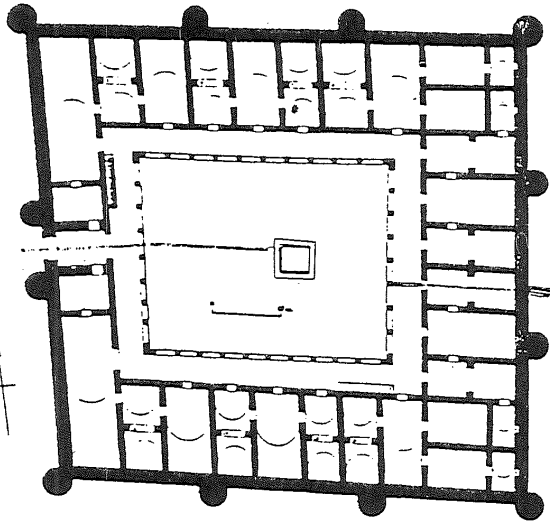


Qaṣṭal

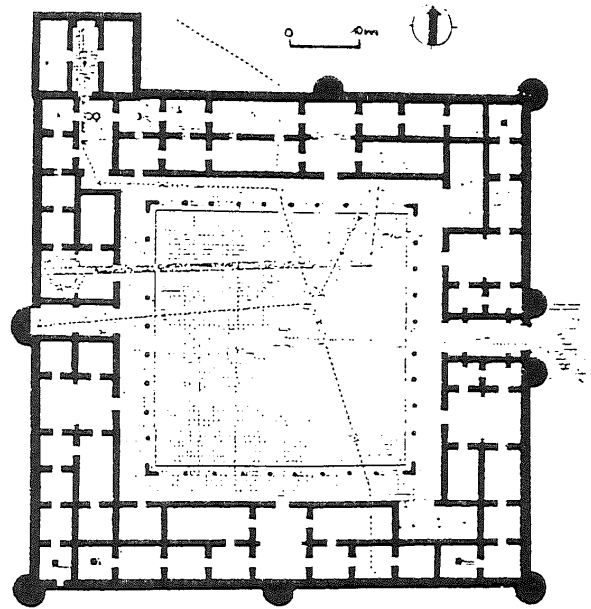


Qaṣṭal  
 PLAN IDEALISE  
 Dessiné par  
 René et Dorette : F. Maré

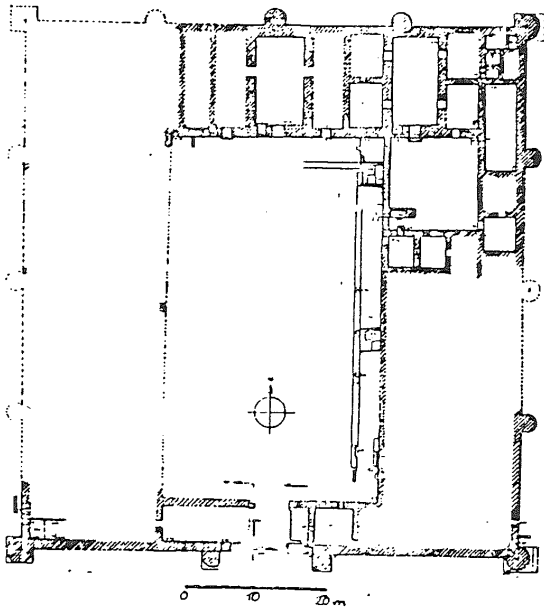
Fig. 69: 'Ayn al-Ḡarr, Hirbat-Minya, Qaṣr al-Kharāna; Qaṣṭal; Ḡabal Usays.



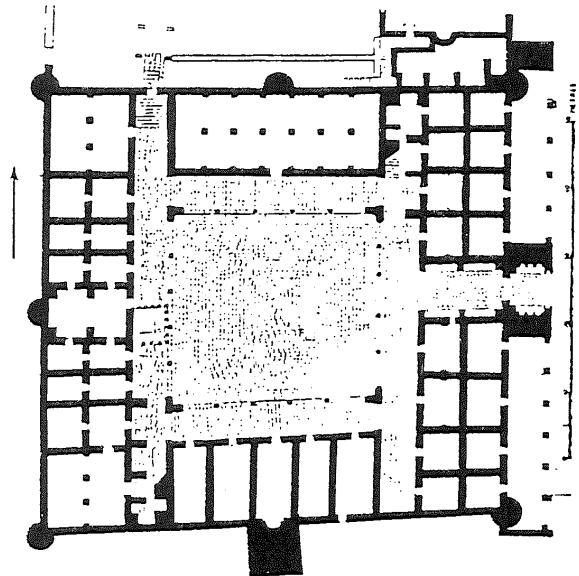
Qasr al-Ḥayr al-Šarqī



Qasr al-Ḥayr al-Garbī



Rušāfa-Hišām



Khirbat al-Mafḡar

Fig. 70: Qasr al-Ḥayr al-Šarqī; Qasr al-Ḥayr al-Garbī; Rušāfa-Hišām; Khirbat al-Mafḡar.

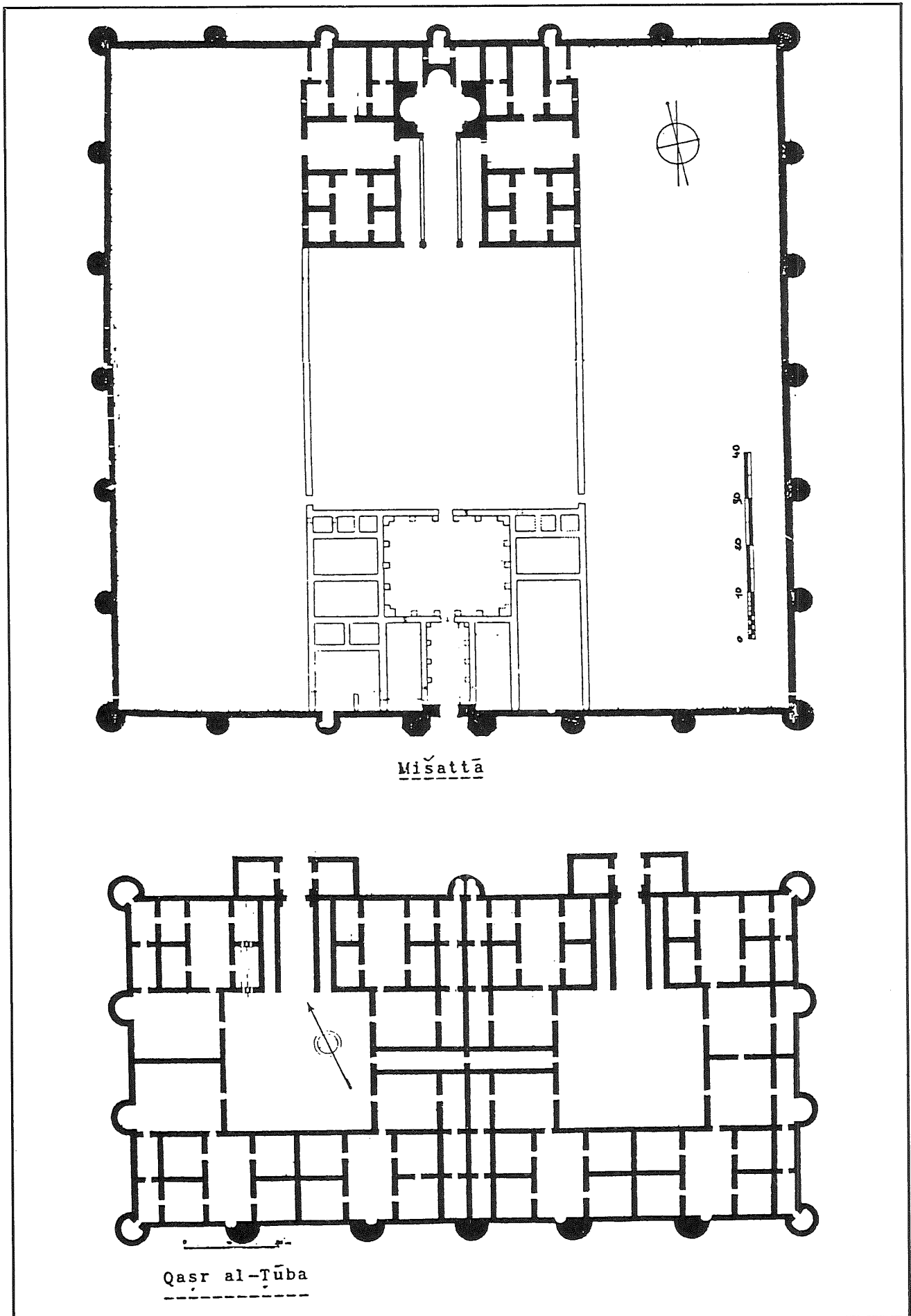


Fig. 71: Qaṣr al-Ṭūba; Mišattā.



# WADI ARAB SURVEY 1983

by

J.W. Hanbury-Tenison

with contributions by Stephen Hart,

P.M. Watson, and R.K. Falkner

## Introduction

A first season of archaeological survey in the Wadi Arab, northern Jordan, took place in September 1983. The team members were Ms. Alison McQuitty, Mr. Mark Gardiner, Ms. Françoise Cambron (geologist) Mr. Jack Hanbury-Tenison, and Mr. Nasser Khasauneh representing the Department of Antiquities of Jordan. Funding for the project came from the Society of Antiquaries of London, the Wainwright Foundation, the Palestine Exploration Society, the University of Edinburgh Monro Fund, the British Institute at Amman for Archaeology and History, and the Royal Geographical Society. Eighteen days were spent in the field, and twenty five square kilometres were thoroughly surveyed with one hundred and two sites recorded.

The areas surveyed were deliberately chosen to represent the total potential of the *wadi*, whose geophysical and demographic variations are quite considerable. Eleven square kilometres took a section across the whole mouth of the *wadi*, at the same time covering the area most threatened by the works supplying water to the city of Irbid. Eight square kilometres covered both highland and lowland in the middle *wadi*, along the Umm Qeis ridge, and six covered the upper *wadi* around the modern village of Som. The plateau around Irbid was not surveyed, being covered by the Beit Ras Survey, and the Jordan Valley has already been surveyed.<sup>1</sup>

Retrieval procedure varied according to the site, but tended to be total pick-up at the poor sites, purposive at the middling, and purposive and total pick-up in random metre-diameter circles at the large. This first season was intended as an overview, and there was neither the time nor the equipment to make detailed surveys of the monuments discovered. The plans of Figure 5 are therefore intended only as measured sketches. More attention was given to the water mills and rock-cut presses in the wadi, and these will be considered later in some detail.<sup>2</sup> The material from the sixteen Paleolithic sites will also be published separately.

The Wadi Arab had first been surveyed by Nelson Glueck in 1942, Siegfried Mittmann from 1963-1966, and more recently by T. L. Thompson,<sup>3</sup> although the ambitious nature of their research prevented all three from a detailed examination of more than the major sites. Prior to the commencement of works, the small area directly affected by the Wadi Arab dam flooding was briefly checked,<sup>4</sup> though the ancillary works have subsequently far exceeded that area.

The Wadi Arab drainage system runs from the highlands around the modern city of Irbid, and joins the Jordan River just south of its confluence with the Yarmuk. There are numerous springs along the whole lower half of the *wadi*, becoming increasingly sulphurous further west; all are heavily exploited, and the *wadi* is now dry for much of its course. The alluvial

<sup>1</sup> H. de Contenson, Three soundings in the Jordan Valley, *ADAJ*, IV-V (1960) p. 12-98; J. Mellaart, Preliminary report of the Archaeological Survey in the Yarmouk and Jordan Valley, *ADAJ*, VI-VII (1962) p. 126-158; M. Ibrahim, J. Sauer, K. Yassine, The East Jordan Valley Survey, 1975, *BASOR*, 222 (1975) p. 41-66.

<sup>2</sup> A. McQuitty and M. Gardiner, Water mills in the Wadi Arab, Jordan, in preparation: J. W.

Hanbury-Tenison, Rock-cut presses in the Wadi Arab, Jordan, in preparation.

<sup>3</sup> T. L. Thompson, *The Settlement of Palestine in the Bronze Age*, Weisbaden, 1979.

<sup>4</sup> T. M. Kerestes, J. J. Lundquist, B. G. Wood, K. Yassine, An Archaeological Survey of three reservoir areas in Northern Jordan, 1978, *ADAJ*, XXII (1978) p. 108-135.



deposits of the Jordan Valley sharply border the limestone highlands, with outcrops of basalt to the north-east of Irbid, and on the plateau to the west of Umm Qeis overlooking the Jordan Valley. Altitudes range from - 267 m. on the Jordan Valley floor to + 612 m. at Beit Ras; temperatures in the Valley range from 15°C in the winter to 33°C in the summer, relative humidity from 45% to 75%, and around Irbid from 4°C in the winter to 28°C in the summer, with humidity from 50% to 70%. Average annual rainfall is approximately 380 mm., peaking from late December to mid-February, with the summer months entirely dry.

At present, corn is extensively grown throughout the Wadi Arab on all suffi-

ciently horizontal land. The tropical winters of the Jordan Valley permit intensive vegetable cultivation under plastic, and several harvests a year, while the lower Wadi Arab has sufficient water for large and very profitable citrus orchards. In the central section of the Wadi, along the Umm Qeis and around Saidur, Kufr Asad, and Doqara, the extensive limestone outcrops prevent large-scale arable farming, and additional crops are grown, in particular olives, grapes, and maize. The high plateau at the eastern end of the wadi is extremely fertile arable land.

Map references in this report are taken from the 1:25,000 Transjordan Series.

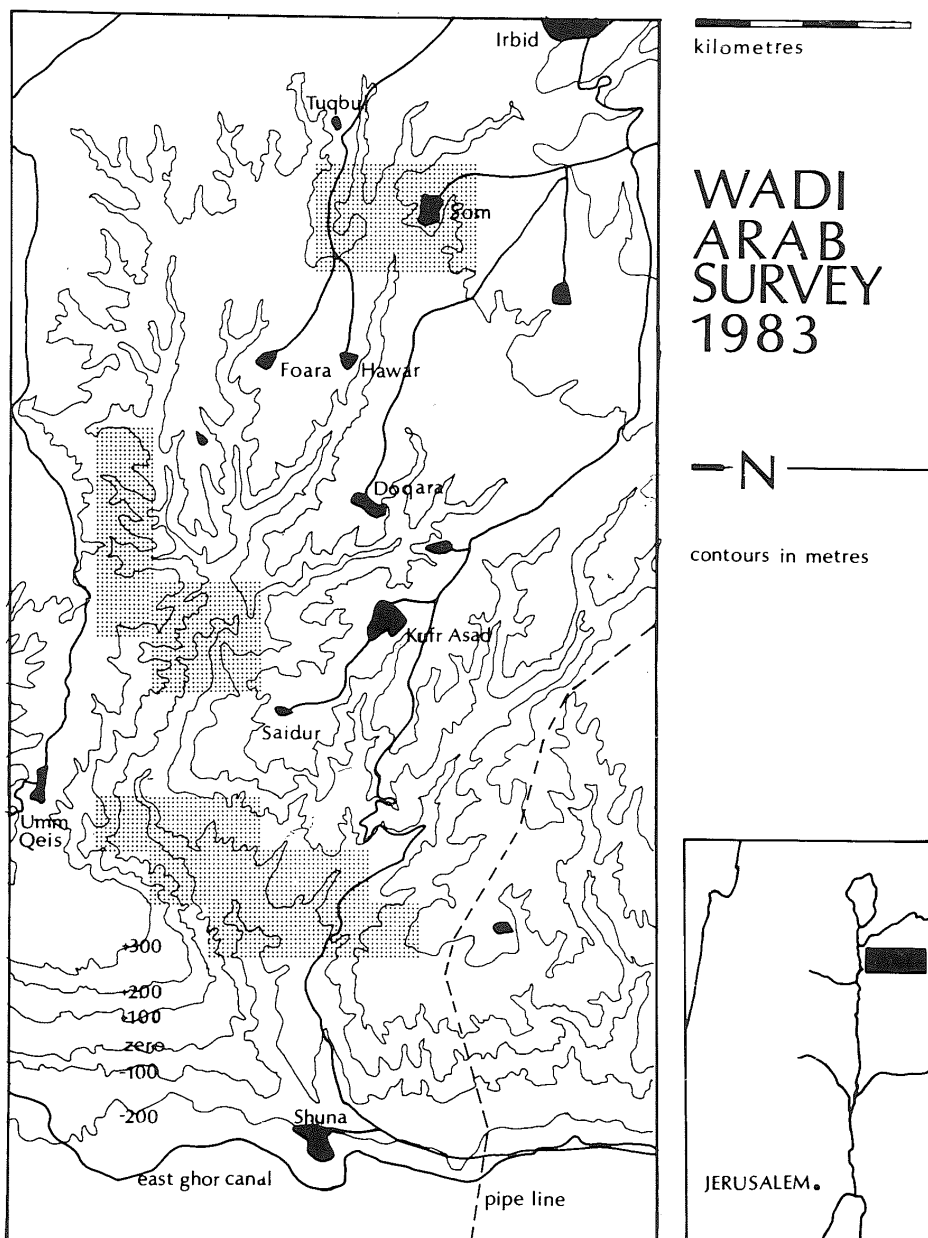


Fig. 1: The Wadi Arab; areas surveyed are hatched.

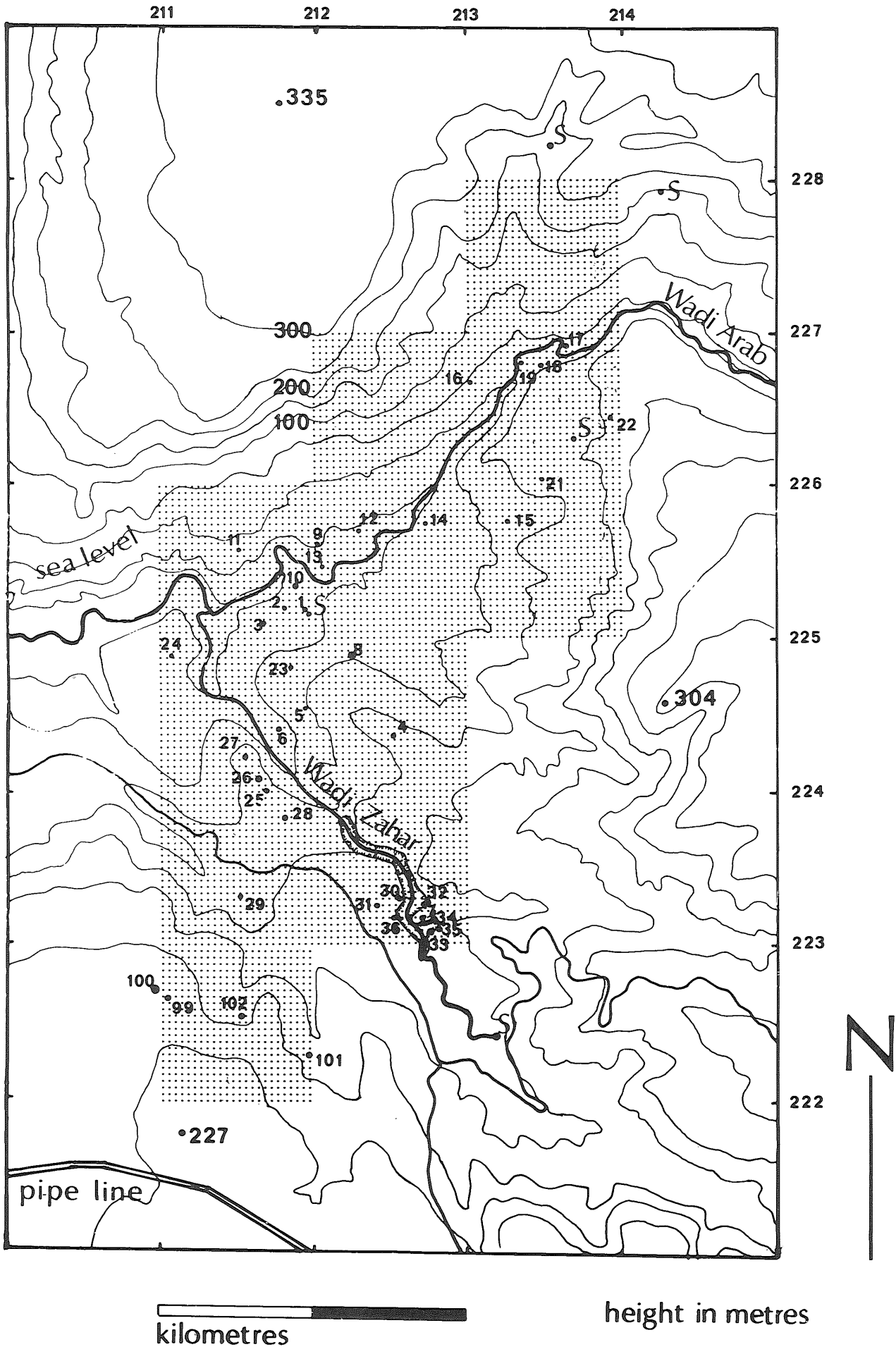


Fig. 2: Wadi Arab western sector; area surveyed is hatched. S marks a spring.

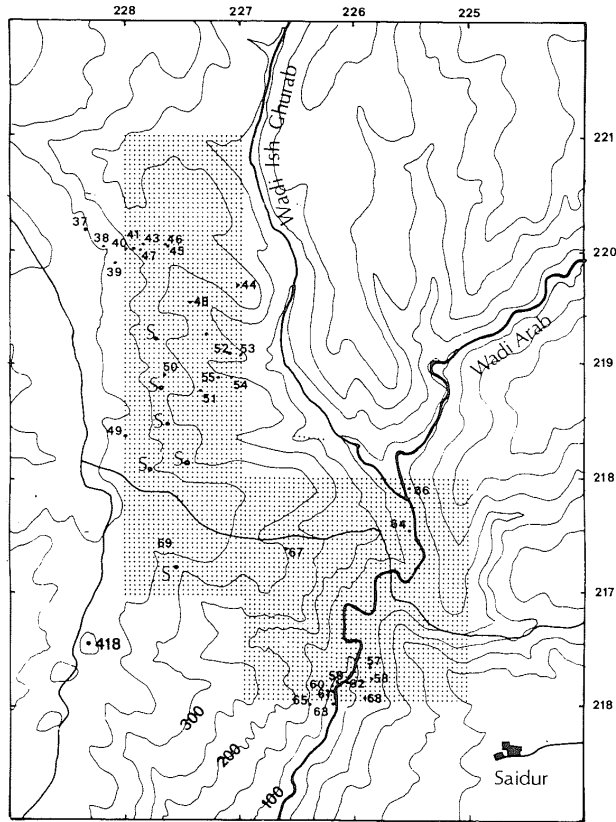


Fig. 3: Wadi Arab central sector; area surveyed is hatched. S marks a spring.

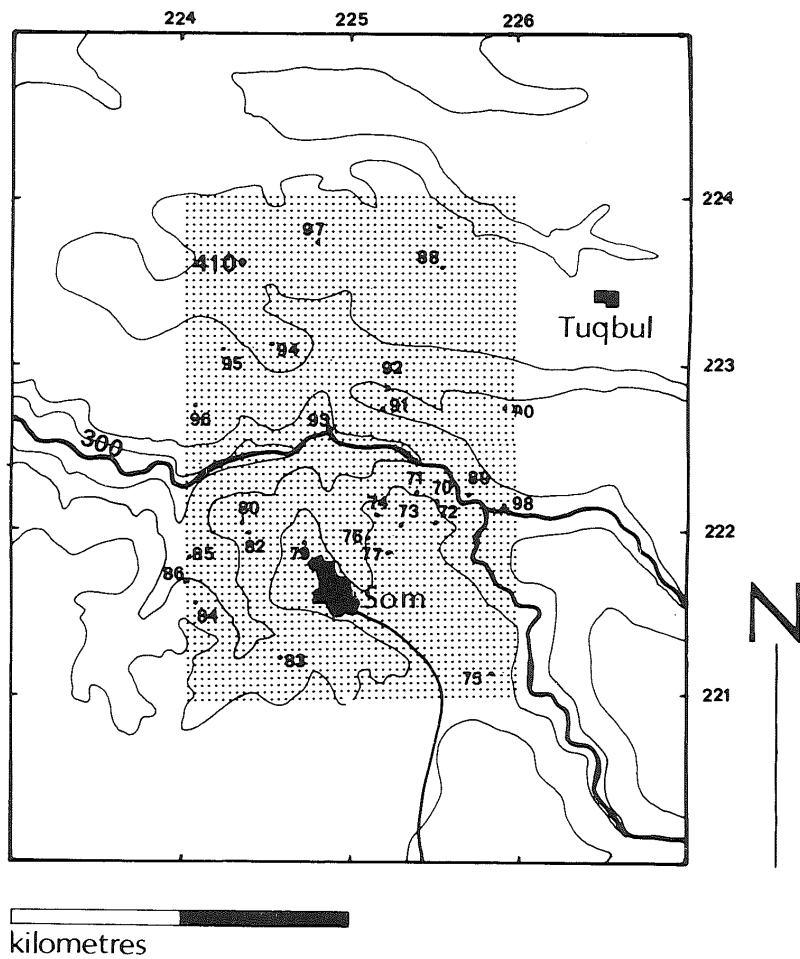


Fig. 4: Wadi Arab eastern sector; area surveyed is hatched.

## Sites

001. Tell Zira'a, grid reference 2119-2252, height sea level -20.00 m. Large tell 150.00 m. (n/s) x 100 m. (e/w) on top of steep-sided natural crag above Wadi Arab. Strong natural spring in the centre of the top of hill. Occupation of all periods, Chalco/EB to mediaeval. Cisterns, casemate walls (?), and mediaeval structures. The early material is mainly on the west slope. Fig. 7: 1-7, 22-24; Fig. 8: 8, 12, 20; Fig. 9: 23; Fig. 11: 1-3; Fig. 14: 7; Fig. 17: 1.
002. 2118-2252, -50.00 m. sherd scatter over one hectare at base of 001. Iron Age to Umayyad. Fig. 14: 3, 9; Fig. 17: 2.
003. 2116-2251, -70.00 m. Small sherd scatter near 001. Fig. 9: 21; Fig. 15: 18.
004. 2125-2245, +60.00 m. One hectare of limestone outcrop used extensively for quarrying and rock-cut industrial installations. Some very worn Byzantine sherds.
005. 2120-2245, at sea level. Small settlement on cliff above Wadi Zahar; rough stone construction: Byzantine.
006. 2118-2244, -70.00 m. small sherd scatter on east bank of Wadi Zahar, possibly erosion from site 005 on cliff above.
007. Khirbet Bond, 2128-2233, +80.00 m. Large tell 150.00 x 100.00 m. on spur above bend in Wadi Zahar. Considerable sherd scatter over three hectares around base of tell, and numerous rock-cut tombs in vicinity. Occupation Chalco/EB to Umayyad; early material on south slope. Fig. 7:8, 25, 26; Fig. 9:1-12; Fig. 11: 4-15.
008. 2122-2249, -10.00 m. Small sherd scatter in ploughed field: Roman and Byzantine.
009. 2120-2257, -60.00 m. Small abandoned modern hamlet, pise and libn structures, ovens, outhouses and threshing floor. Considerable remains of earlier (Byzantine?) walls used as foundations for modern houses.
010. 2119-2254, -80.00 m. Small sherd scatter on knoll under 001. Byzantine and Umayyad. Fig. 14: 8.
011. 2115-2257, -20.00 m. Terracing walls across shallow depression.
012. 2123-2257, -80.00 m. Sherd scatter in ploughed field over five hectares along *wadi*. Byzantine to Mediaeval. Fig. 17: 3, 4. (Pl. LXVII: 2).
013. 2120-2256, -90.00 m. Lithic scatter over one hectare, on terrace in loop of Wadi Arab. Upper Paleolithic. Fig. 10: 8-10. (Pl. LXVII: 2).
014. 2128-2258, -60.00 m. Small sherd scatter in ploughed field. Byzantine.
015. 2132-2258, +20.00 m. Small settlement on spur well away from terraces. Square ashlar structure to south-east, with rough stone walls built on to north and west. Small building away to west. Slightly to the north is an animal pen of very rough construction; one would assume this was unassociated with the southern buildings. No immediate water sources. Byzantine. Fig. 14: 5; 6; Fig. 15: 19.
016. 2130-2268, +40.00 m. Sparse lithic scatter over three hectares on terrace of north bank of Wadi Arab.
017. 2136-2269, +30.00 m. Aruba penstock water mill, multi-phase.
018. 2135-2268, +50.00 m. sherd scatter over two hectares on terrace south of Wadi Arab. No structures visible; occupation Late Chalcolithic to EB2. Fig. 7: 9-11, 27-31, 34-37; Fig. 8: 1, 9, 10, 13-16, 22, 25; Fig. 10: 1, 2.
019. 2134-2269, +20.00 m. Aruba penstock water mill, multi phase.
020. 2134-2252, +50.00 m. Very sparse sherd scatter, Roman and Byzantine.
021. 2135-2260, + 80.00 m. Simple rock-cut press on spur above Wadi Arab.
022. 2139-2265, +110.00 m. Sherd scatter over two hectares on open hill side; Hellenistic to Mediaeval.
023. 2118-2249, - 20.00 m. Sparse sherd scatter over slope; erosion from 005? Roman to Mediaeval.
024. 2110-2249, -70.00 m. Modern dwelling and threshing floors on rocky knoll above confluence of Wadi Arab

- and Wadi Zahar. Heavy Byzantine sherd scatter where soil is exposed near house, and numerous limestone ashlar blocks over area. 50.00 m. long stretch of ashlar wall foundations to south of house. Fig. 14: 2; Fig. 16: 23.
025. 2115-2239, at sea level. Thick scatter of very worn sherds at base of 026, probably eroded from *tell*. Roman to Mediaeval; also glass, tesserae, and basalt fragments. Fig. 14: 10.
026. 2115-2240, +20.00 m. Large *tell* 140.00 x 90.00 m. on spur above Wadi Zahar; basalt and limestone ashlar blocks, but no structures visible. Occupation Roman to Mediaeval. Fig. 16: 21, 25; Fig. 17: 5-12.
027. 2116-2243, at sea level. Modern dwelling and threshing floor on rocky knoll at end of spur 026. Sparse pottery scatter. but thick in spoil from libn pit. Cuttings in rock outcrop beside house. Occupation Roman to Mediaeval.
028. 2117-2238, +30.00 m. Monocelular rock-cut tomb reused as animal pen. Squared ante-dromos 2.60 m. wide, rectangular dromos 1.15 m. wide at exterior, 1.60 m. at interior, oval chamber 3.40 m. x 2.90 m.
029. 2115-2234, +20.00 m. Sparse sherd scatter over one hectare: Byzantine.
030. 2125-2233, + 75.00 m. Levallois flake, Ottoman pipe.
031. 2123-2233; +80.00 m. Police post.
032. 2127-2232, +70.00 m. A series of interlinking passages hewn out of the rock, high on the cliff face above the Wadi Zahar. The passages are between 0.65 and 0.90 m. wide, and 1.41 to 1.90 m. high, and the pick marks clearly visible. Irregularly cut niches line the walls at uneven intervals; some have traces of burning, though there is not a sufficient ledge for a lamp. There are no chambers leading off the passages, though ceiling collapse prevented us from exploring two passages to their full length. Passages B and E are blocked at the mouth by low concreted walls. There was no clear indication of the use of these passages, though both sites 005 and 007, plus numerous rock-cut tombs, are near at hand. A few sherds of Byzantine ribbed ware were found sealed by ceiling collapse. Fig. 5. (Pl. LXVII: 2, LXIX: 1).
033. 2129-2232, +100.00 m. Large treble-chambered rock-cut tomb with loculi.
034. 2128-2232, at sea level. Shallow cave in south flank of 007. Plastered walls and niches as evidence of modern occupation, but the depth of deposit and eroded sherds suggest the possibility of EB use.
035. 2128-2232, +70.00 m. Single loculus 1.50 x 0.80 x 0.50 m. in eroded cliff face.
036. 2126-2233, +60.00 m. single chambered rock-cut tomb under north-west cliff face of 007. Squared dromos and chamber with sunken loculus on either side of dromos. Chamber dimensions 3.00 x 2.05 x 1.80 m.
037. 2202-2285, +420.00 m. Oval shaft cut into bedrock: 1.80 x 1.40 x 2.40 m. Cistern or tomb?
038. 2202-2282, +380.00 m. Associated rock-cut cisterns on hill side.
039. 2199-2282, +380.00 m. Five tombs, two rock-cut and three natural caves.
040. Hujaj. 2200-2278, +360.00 m. Sherd and lithic scatter over two hectares in modern village on spur; spring slightly to west. No architecture, basalt querns and grinders. Occupation Late Chalcolithic to EB II. Fig. 7: 12-19, 32, 33, 38, 39.
041. Hujaj. 2200-2278, +320.00 m. Very large double chamber cave tomb.
042. Square 2190-2270, +290.00 m.-+340.00 m. Large number of rock-cut tombs on spur south of Hujaj. A few worn Byzantine sherds.
043. Hujaj. 2201-2277, +310.00 m. Very thick scatter of worn Byzantine sherds beyond chicken hut south of village. Shallow depression over one hectare surrounded by rock outcrops; no architectural remains. Fig. 14: 4; fig. 15: 14.
044. 2197-2270, +320.00 m. Rock-cut press.
045. 2200-2275, +320.00 m. Interlinking

- rock-cut tombs, reused as well (?) with cup holes cut in surrounding rock.
046. 2200-2275, +320.00 m. Sherd scatter around 045: MB-LB? Fig. 7: 40; Fig. 9: 13-15.
047. Hujaj. 2220-2279, +360.00 m. Rock-cut press.
048. 2195-2275, +280.00 m. Sparse lithic scatter: Upper Paleolithic?
049. 2184-2280, +400.00 m. Rock-cut press.
050. 2189-2277, +330.00 m. Rock-cut sarcophagi, interior dimension 1.90 x 0.50 m. Two associated pairs.
051. 2188-2274, +300.00 m. Small sherd scatter: Byzantine.
052. Tell Ra'an or Kinise. 2191-2271, +260.00 m. Large tell over two hectares on spur well above Wadi Ish Ghurab, Spring at hand. Numerous recent stock walls; basalt capitals and bases, mortars, glass, and tesserae. Occupation EB to Mediaeval. Fig. 7: 20, 40, 41; Fig. 8: 7; Fig. 9: 16, 18, 19, 24-26; Fig. 12: 1-13; Fig. 17: 13, 14; Fig. 18: 15-31. (pl. LXVII: 1).
053. 2191-2270, +220.00 m. Rock-cut press.
054. 2189-2271, +230.00 m. Rock-cut cistern and reservoir.
055. 2191-2273, +280.00 m. Sherd scatter opposite 052. Fig. 9: 20.
056. 2165-2260, +120.00 m. Lithic scatter on terrace of Wadi 'Arab: Upper Paleolithic.
057. 2162-2259, +110.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic. (Pl. LXIX: 2).
058. 2162-2259, +100.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic. Fig. 10: 11. (Pl. LXIX: 2).
059. 2162-2260, +100.00 m. Dam across Wadi Arab for 061 and 062.
060. 2162-2260, +100.00 m. Double loculus tomb (?) cut in rock of wadi bed.
061. 2162-2260, +100.00 m. Aruba penstock double shaft water mill.
062. 2162-2260, +100.00 m. Remains of double-chamber stone structure and associated water channels: abandoned water mill?
063. 2160-2261, +90.00 m. Aruba penstock double shaft water mill.
064. 2175-2255, +120.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic.
065. 2160-2263, +100.00 m. Small square-cut cave with niches: modern?
066. 2179-2255, +140.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic. Fig. 10: 12.
067. 2174-2266, +300.00 m. Sparse sherd scatter: Byzantine.
068. 2162-2257, +160.00 m. Rock-cut press.
069. Safin. 2174-2276, +370.00 m. Half-abandoned modern village on limestone ridge above spring. Thick sherd scatter on ridge and down south west slope, much re-use of squared stone blocks in modern structures; numerous cave tombs in area. Occupation Roman to Mediaeval. Fig. 16: 30; Fig. 19: 32-34.
070. 2255-2222, +400.00 m. Large complex of rock-cut presses, cisterns, and re-used rock-cut tombs.
071. 2255-2223, +400.00 m. Small sherd scatter: Mediaeval.
072. 2255-2220, +420.00 m. Two single chamber rectangular rock-cut tombs.
073. 2253-2220, +410.00 m. Cisterns and rock-cut channels.
074. 2251-2211, +450.00 m. Sherd scatter; Byzantine. Fig. 16: 29.
075. 2259-2211, +450.00 m. Sherd scatter; Byzantine to Mediaeval. Fig. 19: 35.
076. 2252-2229, +400.00 m. Sherd scatter; Roman to Mediaeval. Fig. 16: 24, 28. Fig. 19: 36.
077. 2252-2229, +400.00 m. Two single chambered rock-cut tombs, in 076.
078. Som. 2250-2219, +380.00 m. Thick sherd erosion at outlet of wadi through village rubbish dump; Byzantine to Mediaeval. Fig. 19: 37, 38.
079. Tell Muqa'am Abu Derda. 2248-2219, +412.00 m. Small, steep sided tell, covered by modern graves; no structures; EB to Mediaeval. Fig. 7: 21; Fig. 9: 17; Fig. 12: 14, 15; Fig. 14: 1, 12; Fig. 15: 20; Fig. 16: 27; Fig. 19: 39.
080. Som. 2243-2220, +390.00 m. Sherd

- scatter over six hectares; Hellenistic to Umayyad. Fig. 9: 22; Fig. 14: 13; Fig. 15: 16.
081. 2156-2266, +80.00 m. Penstock double shaft water mill.
082. Som. 2247-2220, +380.00 m. Double chambered rock-cut tomb with stair entrance; reused as cistern.
083. 2245-2213, +360.00 m. Rock cut press.
084. 2241-2216, +390.00 m. Sherd scatter: Byzantine.
085. 2240-2219, +360.00 m. Rock-cut press.
086. 2240-2227, +370.00 m. Rock-cut press.
087. Umm el-Jidael. 2259-2231, +370.00 m. Rock-cut press, cisterns, tombs, quarries.
088. 2255-2236, +420.00 m. Sherd scatter: Byzantine and Mediaeval.
089. 2257-2222, +320.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic. (LXVIII: 1).
090. Umm el-Ghazzalan. 2259-2228, +410.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic. Tabular chert outcrop nearby.
091. Umm el-Ghazzalan. 2252-2228, +400.00 m. Extensive industrial site: rock-cut presses, cisterns, cup holes, tunnels. Some Byzantine sherds.
092. Umm el-Ghazzalan. 2252-2229, +400.00 m. Rock-cuts presses and cisterns. Sherd and lithic scatter, Byzantine.
093. 2248-2226, +290.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic.
094. Delhem. 2245-2231, +410.00 m. Large spur extending over Wadi Arab. Lithic scatter over two hectares; sherds concentrated at north: Upper Paleolithic, Roman, and Byzantine. Fig. 10: 13-15; Fig. 14: 11; Fig. 16: 26.
095. 2243-2231, +390.00 m. Sherd scatter to west of 094: Mediaeval. Fig. 19: 40.
096. Batriakh. 2240-2228, +390.00 m. The owner, while a *Gastarbeiter* in

- Munich, read an eighteenth century Rosicrucian text claiming that 450 monks from Baalbek were buried at a place called Patriarch's or Jew's Hill near Irbid, and, having bought the land, has subsequently launched a ferocious tree-planting programme on the rocky knoll, in the hope of striking lucky. Numerous cisterns and rock cuttings. Some Byzantine sherds. Fig. 15: 17; fig. 16: 22.
097. 2248-2237, +400.00 m. Lithic scatter on rocky knoll in open field: Upper Paleolithic.
098. 2260-2222, +360.00 m. Lithic scatter on terrace of Wadi Arab: Upper Paleolithic.
099. 2110-2226, +180.00 m. Sherd scatter: Mediaeval and some Byzantine. Fig. 19: 41.
100. 2109-2227, +170.00 m. Sherd scatter: Mediaeval and some Roman. Fig. 15: 15; Fig. 19: 42.
101. 2120-2223, +170.00 m. sherd scatter: Mediaeval and some Byzantine. Fig. 19: 43.
102. 2115-2225, +170.00 m. Sherd scatter: Mediaeval and some Byzantine. Fig. 19: 44, 45.

### Chalcolithic and Early Bronze

Settlement was concentrated at the four tells (sites 001, 007, 052 and 079), and two field scatters (sites 018 and 040), with the Early Bronze II being most in evidence, and the pre-urban material mostly where it remained uncovered by later deposition. There was no evidence of any of the following material:

1. Neolithic or Early Chalcolithic
2. Golan Chalcolithic
3. Proto-Urban A or B wares, grey-burnished ware, or Proto-Urban D/Umm Hammad ware (including Jawa ware).

Since there are Proto-Urban wares at Shuneh and Arqub edh-Dhar,<sup>5</sup> the absence in the Wadi Arab suggests either a *lacuna* in occupation, or a regional-based typological preference. The preponderance of

<sup>5</sup> P. J. Parr, A Cave at Arqub edh-Dhar, *ADAJ*, III (1956) p. 16-73; and, de Contenson, *ibid.*

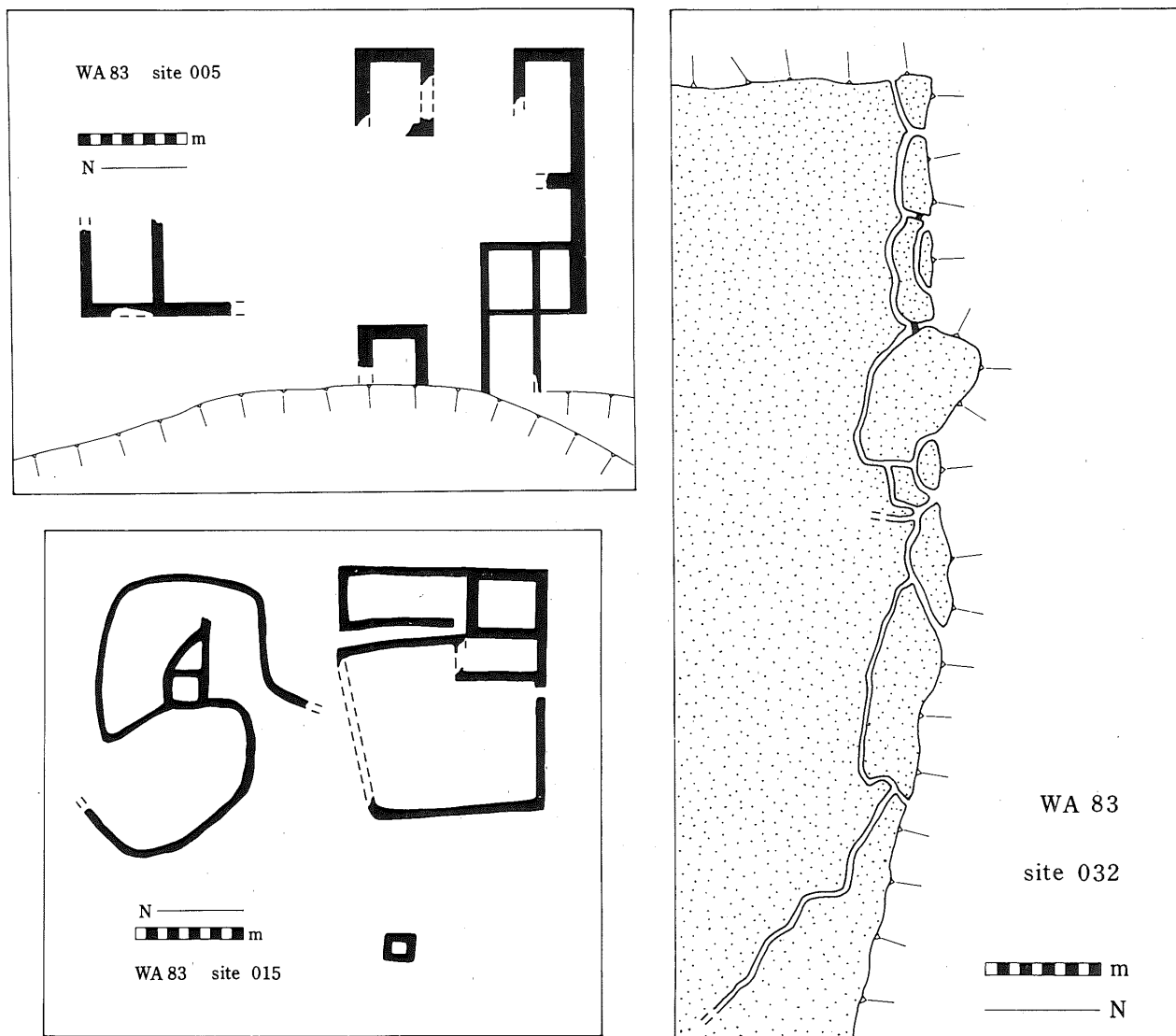


Fig. 5: Plans of sites 005, 015, and 032; in site 032 the hill is hatched.

holemouth jars over V-shaped bowls (Fig. 7: 25-28), and the knob handles (Fig. 8: 14, 15), in conjunction with the thumb-impressed decoration and the triangular section loop handles, and the sparse lithic evidence (Fig. 10: 1-7) points to a date at the very end of the Chalcolithic sequence, and is yet only paralleled at the ultimate, and post-Ghassulian, level at Pella Area XIV.<sup>6</sup> If the sites do continue uninterrupted from the Late Chalcolithic to the Early Bronze II (grain wash wares), there may be a division between highland and lowland in the ceramic assemblages, and we might be seeing an example of regional rather than chronological factors in typological variability.<sup>7</sup>

Of particular interest are the stamp seal impression on the neck of an EB jar

(Fig. 8: 11), and the clay nail or fish hook (?) (Fig. 8: 22). This latter is a gift for those seeking 'Ubaid parallels for the Palestinian Chalcolithic.

### Middle and Late Bronze

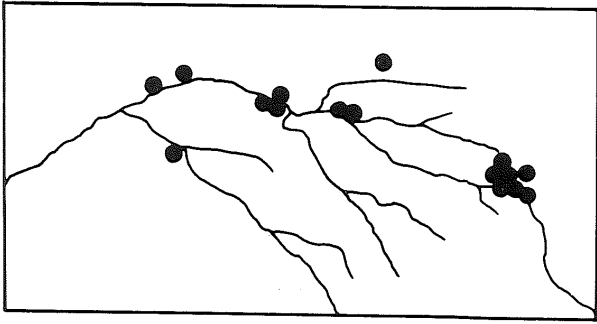
The sparse Middle and Late Bronze Age material is almost entirely concentrated at two tells, sites 007 and 052. The ware is mainly crude and undoubtedly local, and falls into the general range of late Middle Bronze to Late Bronze. There was no evidence of the following:

1. EB/MB (EB4) material.
2. Quality vessels — chocolate on white, white-slip, etc.
3. Cypriot or Mycenaean wares, or any other imports.

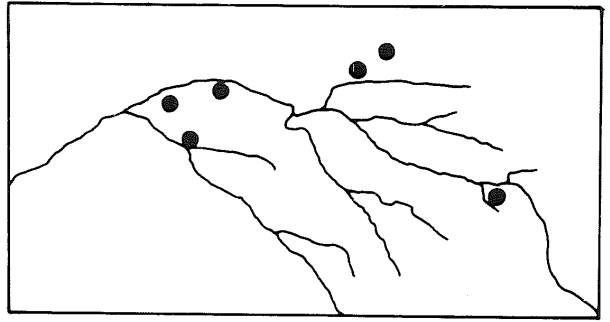
<sup>6</sup> A. McNicoll, *et. al.*, *Pella in Jordan 2*, Canberra, in preparation.

<sup>7</sup> J. W. Hanbury-Tenison, *Jerash Region Survey*, 1984, in preparation.

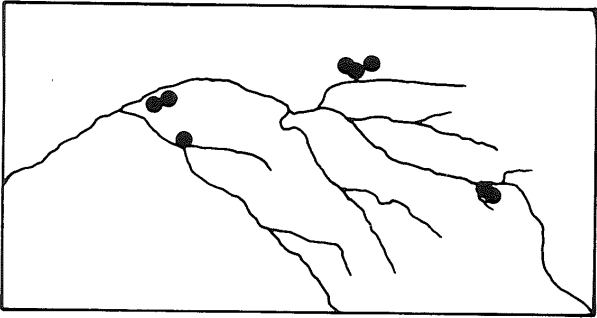




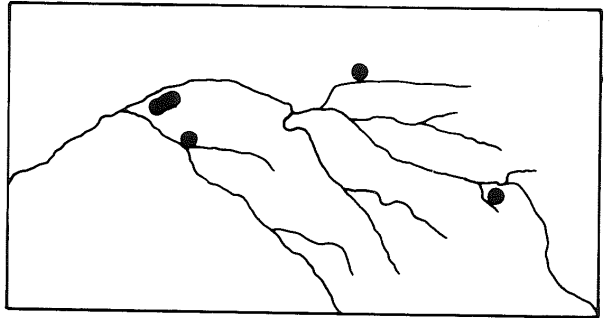
Upper Paleolithic



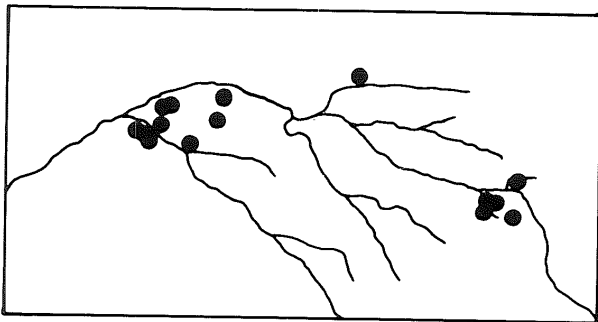
Chalcolithic - Early Bronze



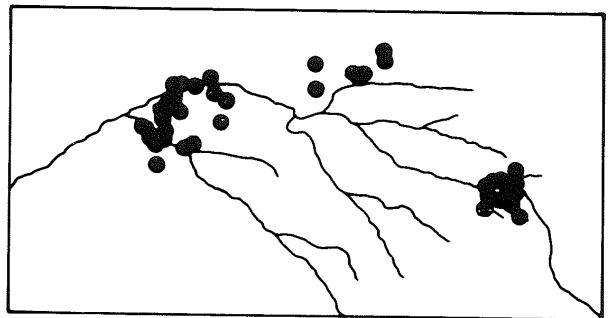
Middle - Late Bronze



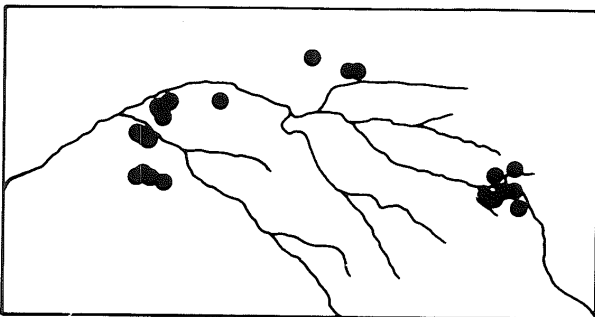
Iron Age



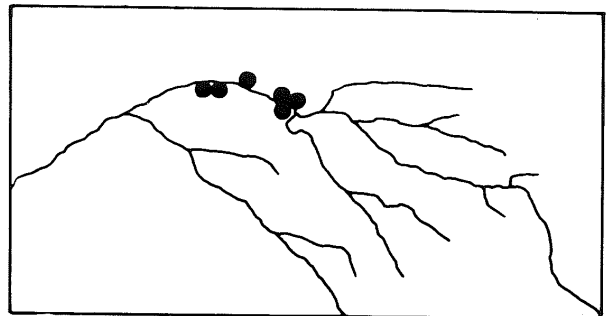
Classical



Byzantine - Ummayyad



Mediaeval



Ottoman water mills

# WADI ARAB: SITE DISTRIBUTION

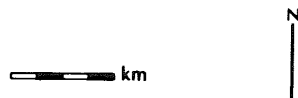


Fig. 6: Wadi Arab Site distributions.

The following abbreviations have been used: HMJ for holemouth jar; HM for hand-made; WH for wheel-made; unp for unpainted; diam for diametre; ext and int for exterior and interior; SF and MF for soft and medium fired.

Figure 7

1. HMJ (001-001); orange faces, pink core, even fired; chert, limestone, and basalt medium temper, HM, unp, diam. 16 cm?
2. HMJ (001-002); orange faces, pink core, even fired; chert, basalt, and limestone medium temper, wet smoothed ext, HM, diam. 12 cm.
3. HMJ (001-010); orange faces, grey core; medium grits, HM, unp, diam. 24 cm.?
4. HMJ (001-011); orange faces, grey core; medium grits, traces brown paint ext, HM, diam. 30 cm?
5. HMJ (001-009); medium orange faces; buff core; medium grits, HM, unp, diam. 17 cm.
6. HMJ (001-006); light buff faces, reduced core; large and small grit temper, wet smoothed ext, HM, unp, diam., 22 cm.
7. HMJ (001-007); medium orange faces, buff core; medium grits, HM, unp, diam. 14 cm.
8. HMJ (007-048); yellow brown throughout; much limestone temper, unsmoothed wet-slip ext, HM, SF, diam. 15 cm.
9. HMJ (018-008); pale buff throughout; numerous chert grits, traces of brown paint ext, incised notches ext, HM, SF, diam. 20 cm.
10. HMJ, (008-003); buff throughout; many grits, poor levigation, HM, SF, unp, diam. 32 cm.?
11. HMJ :018-016); dirty buff, brown ext; numerous medium and small chert grits, brown paint rim ext, HM, MF, diam. 19 cm.?
12. HMJ (040-025); buff, reduced core; very gritty, HM, MF, unp, diam. 19 cm.
13. HMJ (040-026); buff, reduced core; very gritty, HM, MF, unp, diam 29 cm.
14. HMJ (040-016); brown, slightly reduced core; many grits, HM, MF, unp, diam. 24 cm.?
15. HMJ (040-015); pale buff, slightly reduced core; many grits, HM, SF, unp., diam. 19 cm.
16. HMJ (040-020); pink faces, slightly reduced core; large grits, HM, SF, unp, diam. 27 cm.?
17. HMJ (040-021); pink faces, slightly reduced core; medium grits, HM, SF, unp, diam. 20 cm.
18. HMJ (040-035); orange- buff faces, dirty core; small grits, brown paint ext, HM, SF, diam. 29 cm.
19. HMJ (040-017); pink throughout; much grit temper, parallel incisions on rim ext, HM, MF, unp, diam. 20 cm.
20. HMJ (052-043); dark brown throughout; many quartz, limestone, and chert grits, HM, MF, unp, diam. 17 cm.
21. HMJ (079-001); buff faces, reduced core; very gritty, brown paint ext, HM, MF, diam. 25 cm.?
22. Jar (001-003); dark yellow faces, grey core; much grit temper, HM, MF, unp, diam. 28 cm.
23. Jar (001-005); coarse buff throughout; large chert temper, HM, SF, unp, diam. 20 cm.
24. Bowl (001-012); pale buff throughout, medium grits, HM, SF, unp, diam. 20 cm.?
25. Bowl (007-049); buff faces, reduced core; much limestone temper, HM, SF, unp, diam. 15 cm.
26. Bowl (007-047); orange faces, slightly reduced core; small grit temper, HM, SF, unp, diam. 20 cm.?
27. Bowl (018-019); pale buff face ext and core, burnt int, numerous chert grits, HM, SF, unp, diam. 18 cm.
28. Bowl (018-001); light buff, grey inner face; numerous basalt and chert small grits, traces of red paint on rim int, HM, SF, diam. 36 cm.
29. Bowl (018-012); pale buff, grey core; poor levigation, large chert and some organic temper, brown paint rim int and ext, HM, SF, diam. 14 cm.
30. Jar (018-018); pale buff, reduced core; numerous medium and large chert grits, brown paint rim ext, HM, SF,

- diam. 19 cm?
31. Jar (018-002); red-pink faces, slightly reduced core; large basalt and limestone grits, some organic temper, HM, SF, unsp, diam. 28 cm.
  32. Jar (040-011); dark brown faces, reduced core; much medium grit temper, HM, MF, unsp, diam. 25 cm.?
  33. Jar (040-012); pink throughout; many medium grits, poor levigation, HM, SF, unsp, diam. 20 cm.
  34. Tall-necked jar (018-020); grey buff; numerous grits, wet smoothed ext, brown paint rim ext, HM, SF, diam. 24 cm.?
  35. Tall-necked jar (018-021); orange faces, reduced core; numerous grits, wet-smoothed faces, brown paint rim int and ext and neck ext, HM, MF, diam. 25 cm.
  36. Tall necked jar (018-009); red-pink faces, buff core, very poor levigation, very large chert grits, HM, SF, unsp, diam. 23 cm.
  37. Tall necked jar (018-010); pale buff, many large and small chert grits, wet smoothed faces int and ext, some traces brown paint ext, HM, SF, diam. 23 cm.
  38. Tall necked jar (040-029); pink faces, buff core; many medium grits, brown paint rim ext, HM, MF, diam. 22 cm.
  39. Tall necked jar (040-124); pink faces, slightly reduced core, traces red paint int and ext, HM, MF, diam. 20 cm.
  40. Tall necked jar (046-004); brown faces, reduced core; very coarse, many large grits, brown paint ext, HM, SF, diam. 25 cm.
  41. Tall-necked jar (052-068); pink faces, reduced core; large chert grits, brown-orange paint ext, HM, SF, diam. 17 cm.
  42. Flaring rim jar (052-042); pink throughout; large chert grits, brown-orange paint ext, WM, SF, diam. 19 cm.
  2. Jar (040-013); pink faces, slightly reduced core; very gritty, poor levigation, HM, SF, brown paint on rim and ext, diam. 37 cm.
  3. Jar (040-014); buff throughout; many grits, poor levigation, HM, SF, brown paint rim and ext, applied band of impressed decoration below rim, diam. 27 cm.?
  4. Jar (040-030); orange faces, reduced core; many small grits, WM, HF, unsp, diam. 24 cm.
  5. Jar (040-031); orange faces, reduced core; many small grits, WM, HF, unsp, diam. 24 cm.
  6. Bowl (040-032); dark red throughout; many tiny grits, WM, HF, unsp, diam. 49 cm.
  7. Bowl (052-045); red throughout; numerous chert and quartz grits, WM, MF, red/brown slip int and ext, diam. 33 cm.
  8. Body sherd (001-014); crude yellow buff throughout; medium grits, HM, SF, applied band of impressed decoration ext, brown paint ext.
  9. Body sherd (018-015); brown face ext, reduced core and inner face; many chert grits, HM, SF, incised notches ext.
  10. Body sherd (018-014); buff throughout; much limestone temper, HM, SF, applied band of impressed decoration ext.
  11. Body sherd (040-010); orange faces, reduced core; numerous small grits, HM, MF, stamp seal impression on neck ext.
  12. Ledge handle (001-004); grey buff faces, light core; many medium grit inclusions, HM, SF, dark brown grain-wash paint on light brown slip.
  13. Triangular section loop handle (018-004); buff throughout; limestone and chert inclusions, wet-smoothed faces, HM, SF.
  14. Knob handle (018-006); pale buff throughout; very coarse chert grits, HM, SF, unsp.
  15. Knob handle (018-007); pale buff faces, reduced core; very coarse chert grits, HM, SF, unsp.
  16. Round section loop handle (018-023);

Figure 8

1. Bowl (018-011); pale buff throughout, many large and small chert grits, wet smoothed faces, some traces of brown paint ext, HM, SF, diam. 34 cm.

- grey buff throughout; large limestone grits, HM, SF, unsp.
17. Triangular section loop handle (040-008); dirty buff throughout; very gritty, HM, SF, unsp.
  18. Flat loop handle (040-007); light brown throughout; very gritty, wet smoothed, HM, SF, unsp.
  19. Ledge handle (040-006); orange faces, buff core; very gritty, HM, SF.
  20. Base (001-013); grey buff throughout; very coarse, many grits, HM, MF, brown paint ext, diam 28 cm.
  21. Base (040-005); orange faces and core ext, brown inner core; very gritty, poor levigation, HM, MF, traces of brown paint wash ext, diam. 23 cm.
  22. Clay hook or nail? (018-024); orange buff throughout; numerous small chert grits, HM, SF, unsp.
  23. Base (040-001); buff throughout very coarse, large chert grits, poor levigation, red and brown vertical grain wash decoration ext, SF.
  24. Base (040-002); orange face ext, reduced core and int; coarse, with much chert inclusion, HM, MF, parallel grooves lightly incised ext.
  25. Body sherd (018-022); brown throughout; many small and medium basalt grits, MF, HM, applied band of impressed decoration ext.

Figure 9

1. Bowl (007-022); pinkish faces, reduced core; coarse grit temper, poor levigation, HM, HF, unsp, applied band of impressed decoration below rim, diam. 34 cm.?
2. Bowl (007-043); medium brown throughout; much quartz and chert, and some chaff temper, HM, HF, unsp, applied band of impressed decoration below rim, diam. 50 cm.
3. Bowl (007-044); medium brown throughout; much quartz and chert, and some chaff temper, HM, HF, unsp, applied band of impressed decoration below rim, diam. 21 cm.
4. Bowl (007-045); medium brown throughout, reduced ext face; much quartz and cherts, and some chaff temper, HM, HF, unsp, applied band of impressed decoration below rim, diam. 47 cm.
5. Jar (007-024); buff faces, reduced core; coarse, with much grit temper, poor levigation, HM, HF, unsp, diam. 52 cm.
6. Loop handle (007-050); olive green throughout; well fired, medium fine, small grits, HM, HF, unsp.
7. Base (007-003); pink faces, dark core; grit and chaff temper, unsp, diam. 14 cm.
8. Base (007-004); buff faces, reduced core; heavy grit temper, diam 7 cm.
9. Base (007-042); pale buff throughout; much limestone and organic temper, SF, unsp, diam. 16 cm.
10. Base (007-046); brown throughout; very fine ware, well levigated, small grit inclusions, burnished ext, HF, WM.,
11. Body sherd (007-017); yellow buff throughout; small grit inclusions, incised parallel lines ext, HF, unsp.
12. Body sherd (007-038); pinkish face ext edging to reduced inner face; many large chert grit inclusions, poor levigation, shallow incisions ext.
13. Bowl (046-001); grey buff throughout; many small grits, SF, traces of red paint int, diam. rim 16 cm.
14. Base (046-002); grey buff throughout; many small grits, SF, diam. 20 cm.
15. Jar (046-003); grey buff throughout; some large and many small grit inclusions, MF, unsp, diam. 27 cm.
16. Base (052-069); orange faces, buff core; numerous chert (int) and limestone (ext) inclusions, HF, unsp, diam. 12 cm.
17. Base (079-007); buff faces, slightly reduced core; numerous small and some large grits, MF, unsp, diam. 9 cm.
18. Body sherd (052-053); dark brown faces, reduced core; numerous chert and quartz grits, HM, HF, unsp, applied band of impressed decoration ext.
19. Jar (052-047); buff faces, reduced core; limestone and chaff temper, WM, HF, unsp, diam. 39 cm.
20. Bowl (055-001); buff faces, reduced core; many limestone grits, HF, unsp,

diam. 29 cm.

21. Handle (003-004); pale buff throughout; coarse grit inclusions, MF, unprep.
22. Jar (080-013); light brown faces, reduced core; many grit inclusions, coarse, HF, unprep, diam. 25 cm.
23. Jar (001-038); creamy buff throughout; many tiny basalt grits, wet smoothed faces, WM, HF, unprep, diam. 9 cm.
24. Jar (052-076); creamy buff throughout; many tiny basalt grits, wet smoothed faces, WM, HF, diam. 12 cm.
25. Jar (052-075); creamy buff throughout; many tiny basalt grits, wet smoothed faces, WM, HF, unprep, diam. 10 cm.
26. Jar (052-074); creamy buff throughout; many tiny basalt grits, wet smoothed faces, WM, HF, unprep, diam. 17 cm.

#### Figure 10

1. Core scraper (018-013); tabular flake, unprepared platform, abrupt flake removal with some micro at distal end. Dark brown chert.
2. End scraper (018-005); triangular flake with removed midrib, distal end retouched on dorsal face (invasive). Dark grey chert, snapped.
3. Side scraper (040-040); triangular flake, unprepared platform, backed on dorsal face right side, retouched on ventral face right side, grey chert.
4. Core scraper (040-041); core with central platform removed, steep flaking all around, some retouch at distal end, brown chert.
5. Scraper (040-037); large thin flake, cortex on unprepared platform, slight bulb, retouched dorsal face left side, snapped right side, grey-brown chert.
6. Tabular scraper (040-038); chunky flake with prominent bulb, cortex on dorsal face, retouch along distal end, snapped across platform, dark brown chert.
7. Trapezoid blade (040-039); blade with midrib removed, prepared platform, cortex retained on dorsal face right side, retouch along opposite edge,

- snapped distal end, dark brown chert.
8. Chamfered blade (013-001); flake with flakes scars prior to removal from core, distal and obliquely struck to form burin edge, grey chert.
9. Nucleiform end scraper (013-003); steep retouch at distal end, crude striking at bulbular end, grey chert.
10. Convex scraper (013-002); triangular flake, prepared platform, retouched edges, grey chert.
11. Carinated end scraper on flake (058-005); removed platform, steep flaking at distal end, grey chert.
12. Scraper, (066-001); pyramidal flake with prepared platform, retouched.
13. Burin (094-001); flake with platform removed by invasive retouch, retouched edges and burin scar on dorsal face left side, grey chert.
14. Round scraper (094-002); thin scraper, retouched all round, bulb removed, grey chert.
15. End scraper (094-003); blade with unprepared platform. cortex retained on left side dorsal face, distal and steeply retouched, grey chert.

#### The Iron Age Material

During the course of the 1983 survey of the Wadi Arab a small quantity of Iron Age material was found. The material itself is published here but for descriptions of the sites involved the reader is referred to the main article.

#### Site 001-Tell Zira'a

This large, multi-period site seems to be a popular spot for surveyors of the region. Glueck<sup>8</sup> during his massive survey of Eastern Palestine visited it and mentions "a small quantity of Iron Age I-II sherds with those of Iron Age II predominating." Kerestes,<sup>9</sup> *et. al.*, record a single Iron Age sherd during the course of their reservoir survey but do not elaborate.

The cooking pot fragment (Fig. 11, 2) found in this survey appears to be of the

<sup>8</sup> N. Glueck, *Explorations in Eastern Palestine*, AASOR, New Haven, 1951.

<sup>9</sup> Kerestes, *ibid.*, p. 108-135.

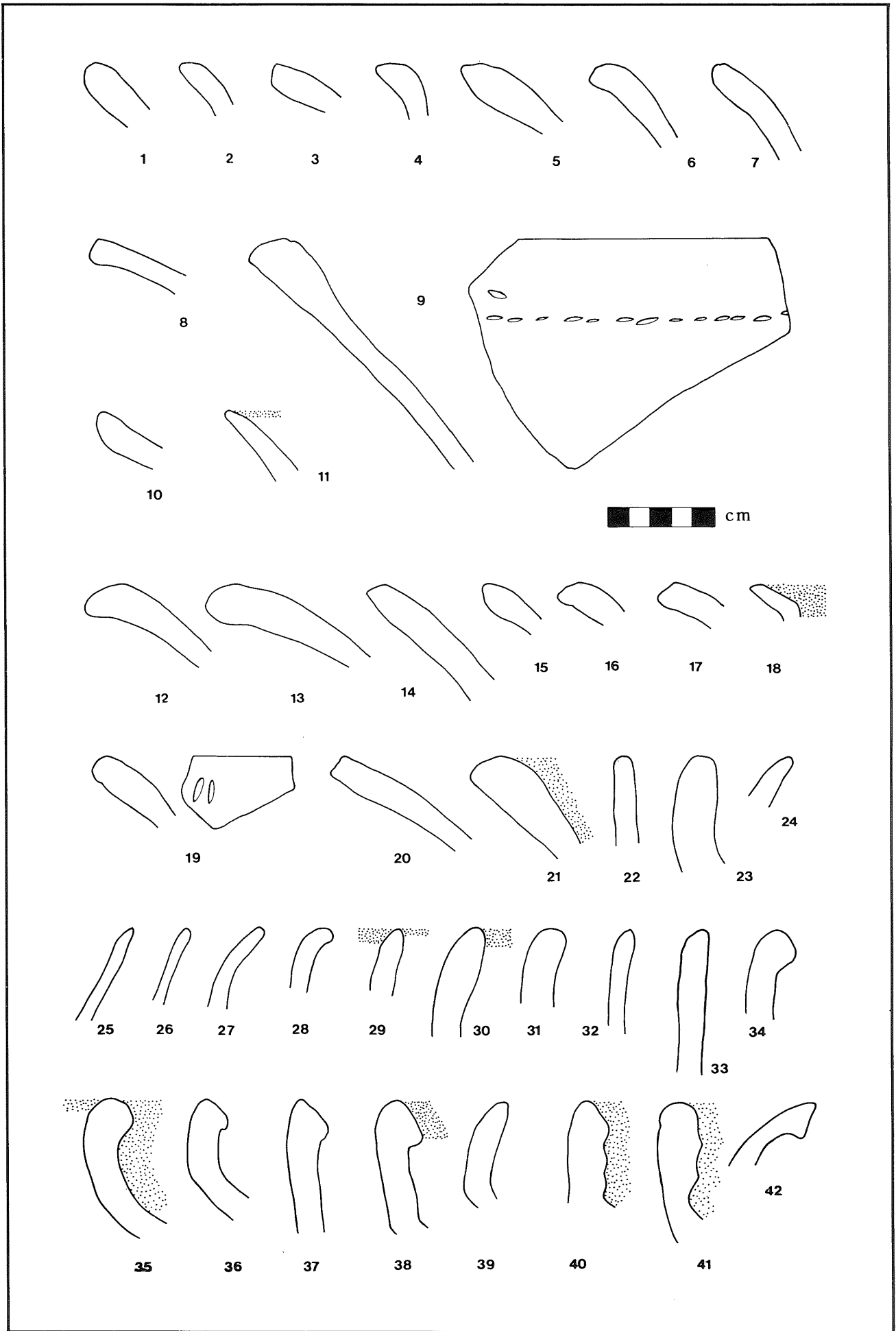


Fig. 7: Chalcolithic and Early Bronze pottery.

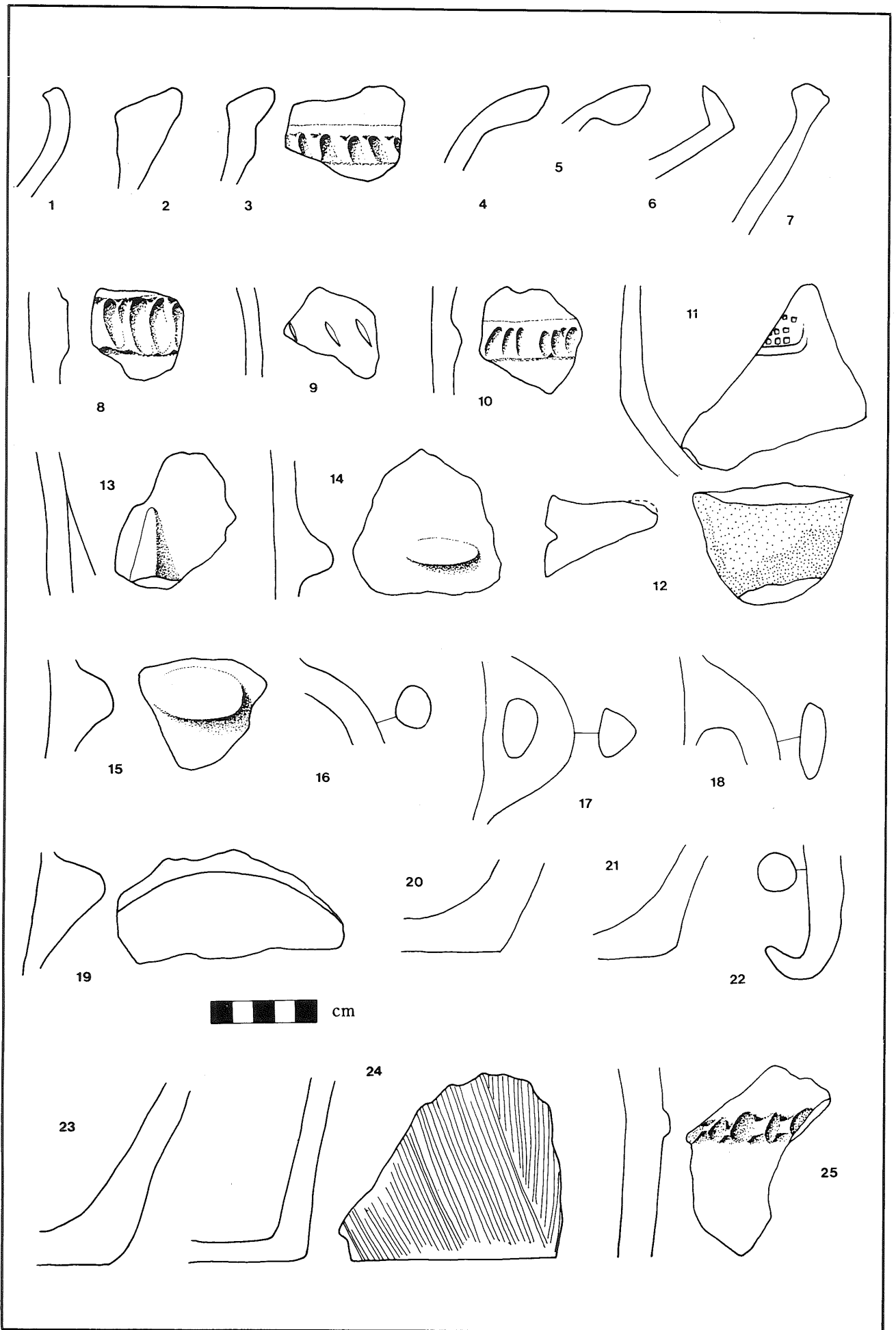


Fig. 8: Chalcolithic and Early Bronze pottery.

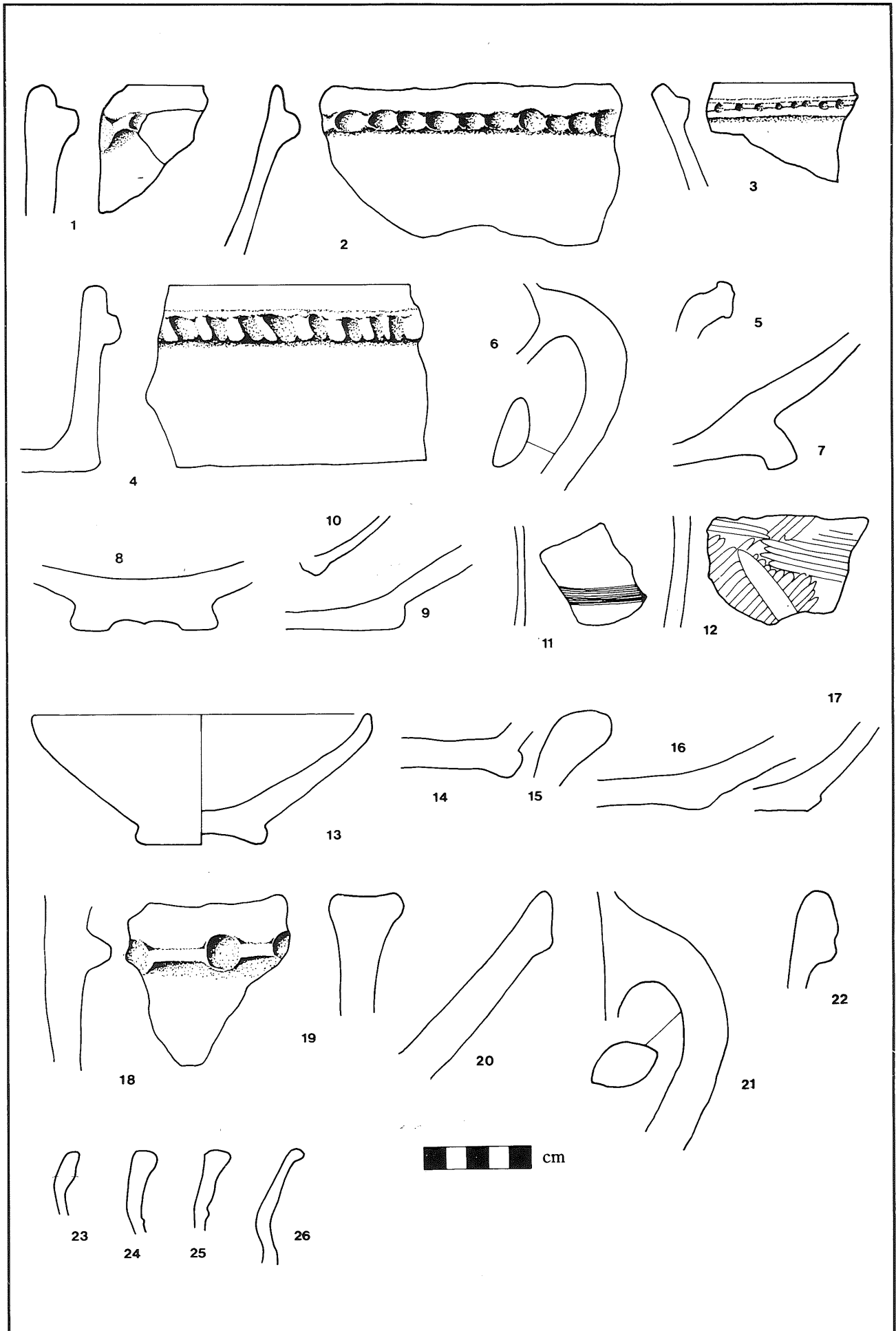


Fig. 9: Middle and Late Bronze, and Persian pottery.



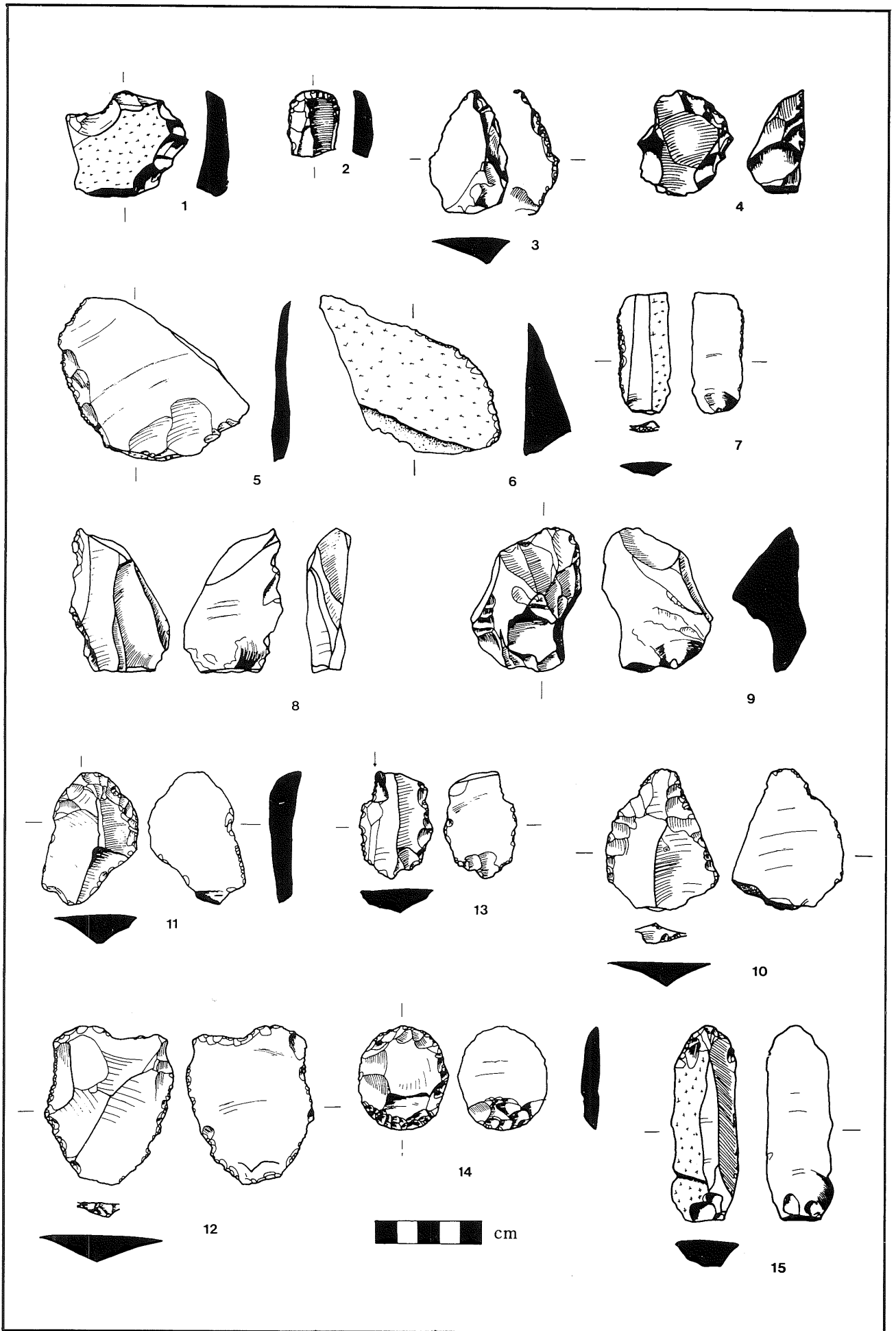


Fig. 10: Lithics; 1-7 are Chalcolithic/Early Bronze, 8-15 are Upper Paleolithic.

generic tenth-ninth century form. The large open vessel (Fig. 11: 3) is indeterminate although a similar vessel from Ta'anach Period VI A (450-425 B.C.)<sup>10</sup> suggests that this example may be very late.

#### Site 007-Khirbet Bond

Several Iron Age periods may well exist here. The cooking vessel Figure 11 No. 15 is of the transitional Late Bronze-Early Iron period. At Pella for instance,<sup>11</sup> the form occurs in Plot C in both Phase IV, Late Bronze and Phase III, Early Iron.<sup>12</sup> The Krater (Fig. 11 No. 13) is probably about tenth century as, for example, at Ta'anach Period II A (1020-960),<sup>13</sup> although insufficient of the vessel remains for certainty. Quite similar forms occur in other periods as for example at Beth Shan level VI (Iron I).<sup>14</sup> The jar figure 11 no. 11 relates in shape to an example from Ta'anach Period VI A (450-425).<sup>15</sup>

#### Site 052-Tell Ra'an

This large site produced a variety of Iron Age material, not all of which can be readily identified.

The cooking pots (Figure 12: 1-5) are all reasonably early in the Iron Age spectrum, probably not much later than the tenth century and perhaps earlier. The painted body sherd (Figure 12: 9) looks twelfth century but insufficient remains for certainty. The jar/jug rim (Figure 12: 8) is early Iron Age. A similar, albeit less upright, example occurs at Pella<sup>16</sup> from Plot C Phase III-twelfth century B.C. The bowl (Fig. 12: 6) is also of this general early period, similar examples occur at Pella<sup>17</sup> in Plot C, Phase IV, LB II and Ta'anach<sup>18</sup> Period IA, 1200-1150.

I am uncertain about the jar Figure 12: 7. It may be late Iron-Persian or may be of

a later period altogether. The three heavy bowls (Fig. 2: 10, 12, 13) are of clear Iron Age fabric but their exact date is unclear.

#### Site 079

Two fragments of Iron Age cooking pots were found. The one illustrated (Figure 12: 15) is probably to be reconstructed into a late iron age form. The jar, number 14, is not clearly an Iron Age fabric. Little more can be concluded at this site than a small Iron Age presence.

#### Description of Pottery

##### Site 001-Tell Zira'a - Fig. 11

1. Jar or Jug (001-036) Fired light brown in and red-brown out, with a thick greyish core and a few small lime grits. Well levigated.
2. Cooking Pot (001-030) Angle uncertain. Fired brown in and out with a grey core and a few lime and quartz grits. Diameter impossible.
3. Large open vessel (no number) Angle uncertain. Fired red-brown in and out with a thick greyish core and many small lime grits. Remains of buff slip ext. well levigated.

##### Site 007-Khirbet Bond - Fig. 11

4. Jar or Jug (007-035) Fired muddy brown throughout with a few small and medium lime grits. Well levigated. Sherd somewhat weathered.
5. Jar or jug (007-040) Fired orange-red at surfaces with a buff core and many small and medium lime and chert grits. Moderately well levigated.
6. Jar or jug (007-031) Fired medium brown in and out with greyish core and many small lime grits. Well levigated.
7. Jar (007-041) Fired buff throughout with small and medium lime, chert and basalt grits. Moderately well levigated.

<sup>10</sup> W. E. Rast, *Ta'anach: Studies in the Iron Age Pottery*, ASOR, 1978, Fig. 82: 1.

<sup>11</sup> A. McNicoll, R. H. Smith, J. B. Hennessy, *Pella in Jordan 1*, Canberra, 1982.

<sup>12</sup> *Ibid.*, Pl. 119: 16, Pl. 121: 2.

<sup>13</sup> Rast, *ibid.*, Fig. 22: 7.

<sup>14</sup> F. W. James, *The Iron Age at Beth Shan*,

Philadelphia, 1966, Fig. 52: 2

<sup>15</sup> Rast, *ibid.*, Fig. 77: 2.

<sup>16</sup> A. McNicoll, R.H. Smith, J.B. Hennessy, *ibid.*, Pl. 121, No. 8.

<sup>17</sup> *Op. Cit.*, Pl. 119, No. 1.

<sup>18</sup> Rast, *ibid.*, Fig. 8, No. 10.

8. Jar or jug (007-030) "Pepper and salt" ware. Fired buff throughout with small and medium lime, chert and basalt grits. Self-slipped in and out. Well levigated.
9. Jar (007-032) Fired red throughout but browner towards the centre with a few small and medium lime grits.
10. Bowl or lid (007-049) Fired buff in and out with a grey core. Wet-smoothed ext. leaving gritty surface. Small and medium lime and chert grits.
11. Jar (007-014) Buff surface with a smoothed red slip in and out and a light grey core. Few small chert grits with some grog(?)
12. Jar (007-009) Fired orange-brown at surfaces in and out with a light grey core and a few small and medium lime grits.
13. Krater (007-021) Fired reddish in and out with a light-grey core and a few small and medium lime grits. Red slipped in and out.
14. Open vessel (007-033) Diameter uncertain but large. Fired dark brown in and out with a medium grey core and a few small lime grits.
15. Cooking pot (?) (007-034) Fired buff in and out with a grey core and small lime and chert grits.

#### Site 052-Tell Ra'an - Fig. 12

1. Cooking Pot (052-051) Fired dark brown throughout with many small lime and quartz grits.
2. Cooking Pot (052-057) Fired dark brown in and out with thick grey core and many small lime and quartz grits.
3. Cooking Pot (052-072) Fired red-brown out and dark brown in with thick grey core and many small lime and quartz grits.
4. Cooking Pot (052-071) Fired red-brown in and out with a thick grey core and many small lime and some chert and quartz grits.
5. Cooking Pot (052-070) Fired orange-brown in and out with thick grey core and many small lime, chert and quartz grits.
6. Bowl (052-060) Hard fired light brown in and out with thick grey core and

- many small and medium lime grits. Very well levigated.
7. Jar (052-052) "Pepper and Salt" ware. Fired buff throughout with many small lime and basalt grits. Well levigated. Folded over rim.
8. Jar or Jug (052-050) Fired light brown in and out with grey core and a few small lime grits. Well levigated and hard fired.
9. Body sherd (no number) Fired orange in and out with an orange-buff core and many small and medium lime grits. Surfaces covered in a light, white wash and with a band of red paint externally.
10. Bowl (052-048) Fired light brown in and out with thick grey core and many small and medium lime grits. Three shallow groove bands on rim.
11. Base (052-056) Fired light brown in and out with grey core and many small and medium lime and chert grits. Hard fired.
12. Bowl (052-046) Fired buff in and out with thick grey core and medium lime and quartz with some organic temper.
13. Bowl (052-049) Fired light brown with reddish bloom in and out and a thick grey core with many medium lime and quartz grits and some organic temper.

#### Site 079-Fig. 12

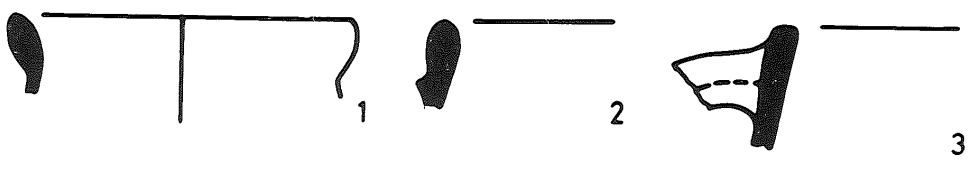
14. Jar (079-008) white ware with few medium lime and occasional quartz grits. Well levigated. Hand made on rim at least.
15. Cooking Pot (no number) Fired dark brown in and out with a dark grey core and mostly quartz temper.

Stephen Hart

#### **The Pottery From the Hellenistic to the Islamic Periods**

Material from these periods was found at a large number of the sites identified on the survey. The Byzantine and Mamlūk presence was particularly strong. The Table, Figure 13, indicates the broad chronological groupings represented at each site, from the Hellenistic period onwards.

SITE 001 - TELL ZIRA'A



SITE 007 - KHIRBET BOND

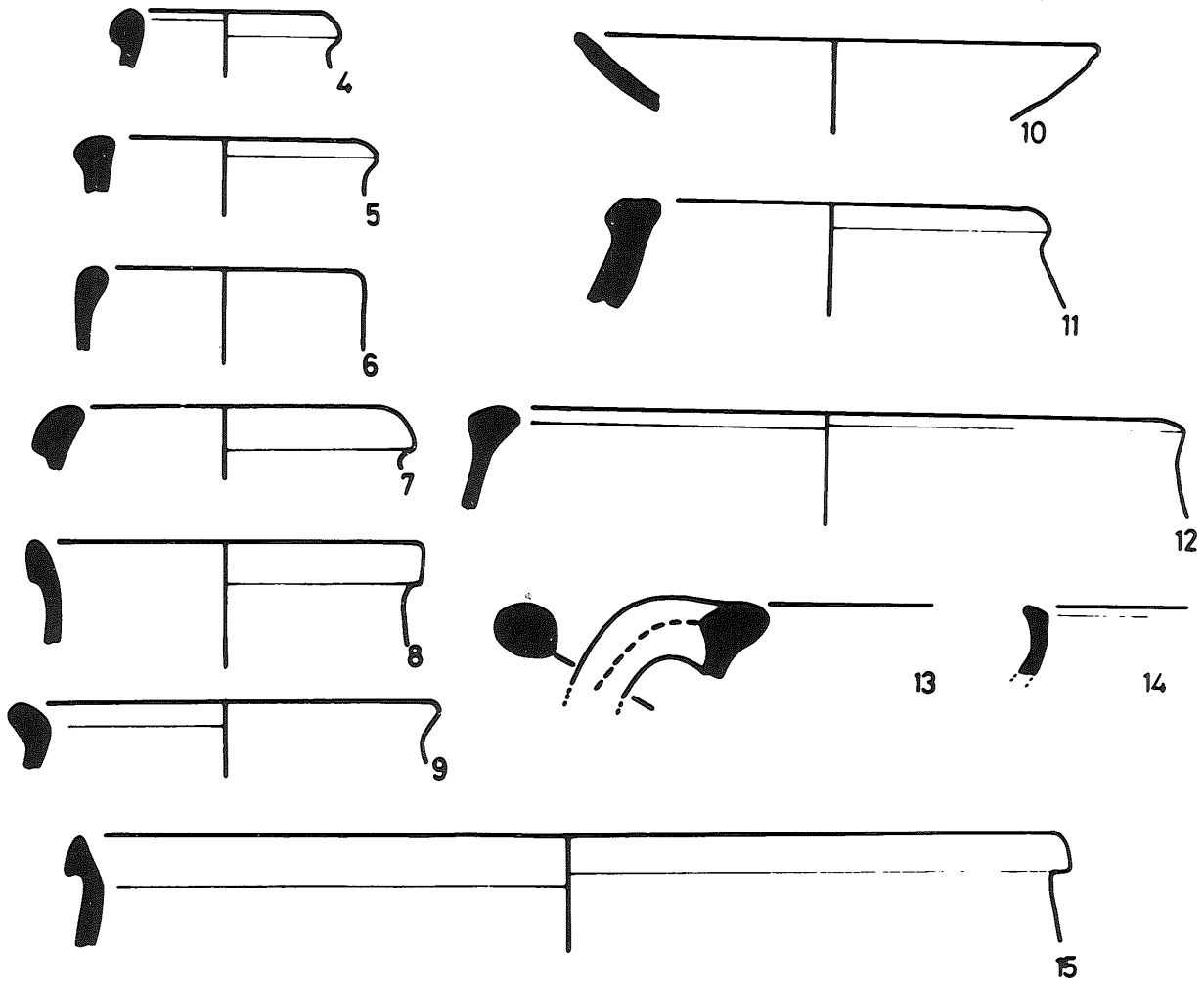
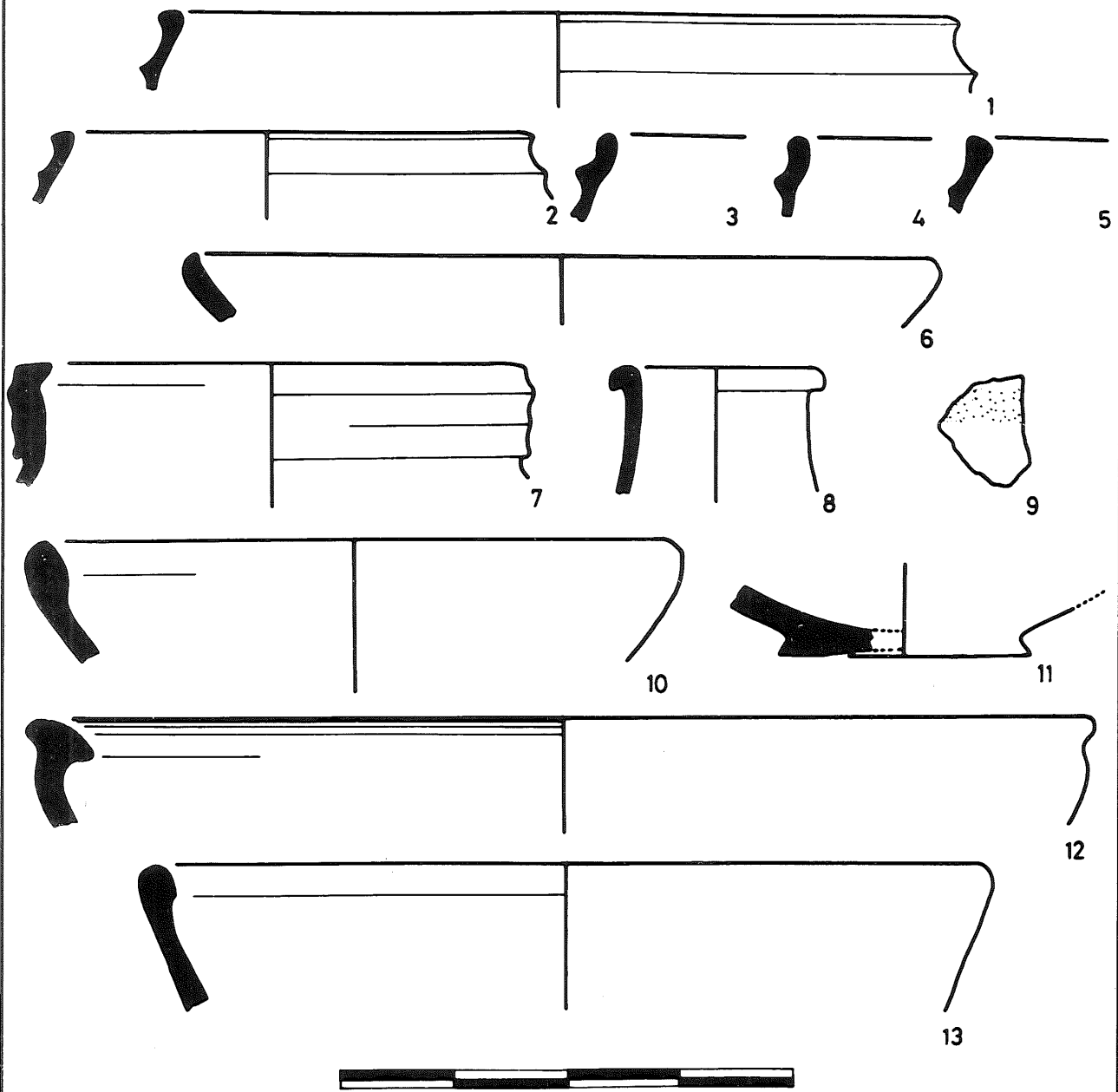


Fig. 11: Iron Age pottery.

SITE 052 - TELL RAAN



SITE 079

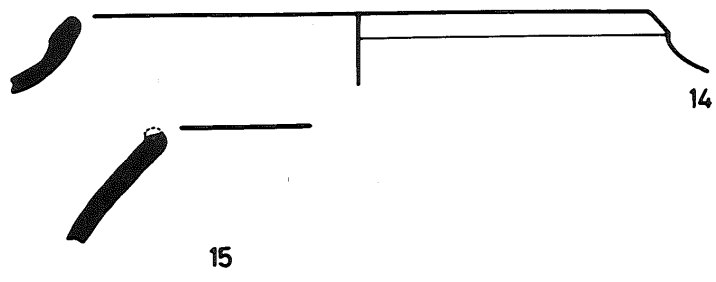


Fig. 12: Iron Age pottery.

Part I: The Hellenistic, Roman and Byzantine Pottery

The following section is an amplification of the Hellenistic to Byzantine information where further identification was possible and instructive. The sherds which have been illustrated and described in Figures 14-16, constitute the basic corpus of reference and are numbered from 1-30, in addition to their site and original sherd number. Sherds which have not been illustrated are identified merely by their site and original sherd number.

*Description and Interpretation, by site*

001 (Plot 1)

Sherd-034 Bowl, cf 18. Byzantine, 5th-6th C.

-037 Bowl, low incurving wall, simple rim. Pink ware, finely levigated with very fine grits, including lime and quartz. Overall slip of matte red mottling to dark grey. Hellenistic.

-039 Base, low ring, cf. Late Roman C Form 3, (Hayes 1972, 329 ff). Byzantine, 6th C.

(Plot 2)

-023 Jar, No. 7. The ware represented by this example can be creamy buff or pink with a buff surface. Nos. 1, 3 and 14 indicate the range within the general group. A common form in this ware is the large ribbed jar with two handles on the shoulder. The ware has a long life from the Hellenistic through to the early Byzantine period, and unless the forms are particularly characteristic of a certain period, close dating is difficult. Both colour varieties occur at this site.

-028 Bowl, cf. Late Roman C Form 3F, (Hayes 1972, 329ff). Byzantine, 6th C.

-Other Handle, horizontal, of cooking bowl. Yellow granular ware, well mixed with many fine and some medium quartz and dark grits, and the rare lime grit. Surface is typically a darker

pinkish-yellow with brown mottle. Cf Falkner, No. 313 (ware), 324 (rim). Roman, mid 3rd - mid 4th C. Body sherd, Eastern Sigillata A, cf Crowfoot et al, 283ff. Hellenistic/Roman.

002-009 Jar, No. 3. re-comments for 001-023.

-010 Jar, cf. 7. re 001-023.

-012 Bowl, cf Late Roman C Form 3F, (Hayes 1972, 329ff). Rouletted rim. Byzantine 6th C.

-013 Jar, No. 9. cf Falkner No. 353. Early Byzantine, late 4th - early 5th C.

-Other Eastern Sigillata A present.

003-014 Bowl, No. 18. Rim profile a variant - is more commonly three ridges between two grooves, cf 19. (015-001, a shorter-rimmed variant).

Cf Smith, Pl. 30, 1138; Pl. 43, C1304. Byzantine 5th-6th C.

-Other Eastern Sigillata A present.

Bowl, cooking, cf 22. Byzantine/Umayyad.

Body sherds of grey ribbed jar, cf 11, 12, 13. Byzantine/Umayyad.

007 (Plot 1)

-010 Bowl, Eastern Sigillata A, cf Form 1, Samaria, (Crowfoot et al, 309).

Late Hellenistic (dating, Gunneweg et al, 84ff).

-016 Body sherd, Cypriot Sigillata, (Hayes 1967).

-Other Amphora handle, Rhodian type, stamp area missing. Hellenistic.

(Plot 3)

-027 Base, ring, Imitation Sigillata. Roman, pre 3rd C.

-Other Body sherds of grey ribbed jar, cf 11, 12, 13. Byzantine/Umayyad.

008-

-Other Jar, notched rim of cooking pot. Dark brown, fine granular ware. Roman.

010-003 Jar, No. 8. Form cf 9. Early Byzantine.

- 015-001 Bowl, No. 19. cf 18. (003-014);  
Smith, Pl. 28 and 90, 1208; pl. 43,  
1313 and 1322. Byzantine 5th-6th  
C.
- 002 Jar, No. 5. re ware 001-023.  
The pottery collected at this site  
was predominantly of this ware,  
of the pink/buff variety.
- 002A Jar, No. 6, as above.
- 020-
- Other Handle, yellow ware, as 001,  
plot 2 (-Other). Roman, mid  
3rd-mid 4th C.
- 022-001 Jar, cooking, cf Falkner No. 348.  
Early Byzantine.
- Other Amphora handle, Rhodian  
type, stamp area missing. Hel-  
lenistic. Eastern Sigillata A  
present.
- 023-001 Bowl, cf 19. Byzantine, 5th-6th C.
- 024-001 Jar, No. 2. cf. Loffreda, Fig. 1, 1  
p. 26. Early Roman.
- 002 Bowl, cooking, No. 23. Cf  
Meyers et al, Pl. 8. 11, 23-29.  
Roman, 3rd C.
- Other Bowl, "Galilean", rim and  
handle stub. cf Meyers et al,  
Pl. 8.1 and p. 123. Late 3rd -  
early 5th C.  
Body sherds of ribbed jar,  
pink/buff ware, re 001-023.
- 025-001 Bowl, cf 19. with ribbed wall. Five  
other examples, one with lug on  
rim. Byzantine, 5th-6th C.
- 006 Bowl, cf. 16. Brownish-orange.  
Early - mid Roman.
- 008 Bowl, cf Late Roman C Form  
10A (Hayes 1972, 343ff). Late  
6th/early 7th C.
- 009 Bowl, cf Late Roman C Form  
3F/10A transitional (Hayes,  
ibid).  
Late 6th/early 7th C.
- 011 Bowl, cf Cypriot Red Slip Form  
9C (Hayes 1972, 379 ff). End  
6th-end 7th C.
- 012 Jar, No. 10. cf Falkner, Nos.  
350-354. Early Byzantine, Late  
4th-early 5th C.
- Other Jar, cf. 2. Early Roman.  
Jar, cf form, Sauer, 1973, Fig.  
3, 111. Ware pink/buff, re 001-  
023.
- 026-001 Bowl, No. 25. cf African Red Slip  
Form 104C (Hayes 1972, 160ff).  
550-625.
- 002 Base, vestigial ring foot, cf Late  
Roman C Form 10 (Hayes  
1972, 343ff).  
Late 6th - mid 7th C.
- 003 Base, foot closest to African  
Red Slip Form 104: (Hayes  
1972, 160ff).  
Two concentric grooves around  
stamp (edge only, visible). 6th-  
early 7th C.
- 004 Bowl, cf 19. with ribbed wall.  
Byzantine 5th-6th C.
- Other Body sherds of ribbed jar, buff  
ware as 001-023.  
Body sherds of grey ribbed jar,  
cf 11, 12, 13. Byzantine/  
Umayyad.
- 027-006 Bowl, cf Late Roman C Form 3F,  
rouletted rim, (Hayes 1972,  
329ff). Byzantine 6th C.
- 043-001 Jar, cf 8. in ware and form, but  
taller neck. Early Byzantine.
- 005 Base, flat string-cut, of small  
ribbed juglet. Ware cf 14. re  
001-023.
- 013 Jar, No. 4. re 001-023.
- 014 Bowl or jar, No. 14. re 001-023.
- 069-002 Krater, cf 28,. Mid 6th-7th C.
- 009 Jar, cf Sauer, 1973 Fig. 1, 25.  
Roman.
- Other Body sherds of ribbed jar, buff  
ware, re 001-023.
- 074-001 Bowl, cf 19. Thinner variant.  
Byzantine, 5th-6th C.
- 002 Krater, No. 29. Dating uncer-  
tain.
- 075-001 Bowl, cf 18. Two examples.  
Byzantine, 5th-6th C.
- 004 Bowl, cf Late Roman C Form  
10A, (Hayes 1972, 343ff). Late  
6th-early 7th C.
- 076-001 Bowl, No. 24. Treatment and  
ware close to 18. and 19. Perhaps  
contemporary — Byzantine.
- 002 Base, ring. cf African Red Slip  
Form 107 (Hayes 1972, 171ff).  
600-650.
- 003 Base, ring. Eastern Sigillata A.  
Hellenistic/Roman.
- 006 Jar, cf 6. but shorter neck and

- flatter rim top.
- 009 Krater, No. 28. cf McNicoll et al., pl. 139, 2. Mid 6th-7th C.
  - Other Body sherds of grey ribbed jar, cf 11, 12, 13. Byzantine/Umayyad.
- 078-
- Other Body sherds (thick), of grey ribbed jar, cf 11, 12, 13. Byzantine/Umayyad.
- 079-009 Bowl, cf 23. Roman, 3rd C.
- 010 Bowl, cf 18. Byzantine 5th-6th C.
  - 014 Krater, No. 27. Byzantine.
  - 015 Bowl, No. 20. Byzantine 5th-6th C.
  - 017 Jar, No. 12. cf Landgraf, Fig. 21, 5. He discusses, p. 67ff, this common Late Byzantine to Umayyad jar or amphora, which is characterized by its grey surface, ribbing and white painted decoration. cf 11 and 13.
  - 019 Krater, ware cf 28. with similar form, flat rim top, no incised decoration. Late Byzantine/early Umayyad, 7th C.
  - 021 Jar, No. 1. Ware re 001-023, (cfs from Pella, unpublished). Hellenistic.
- 080-001 Bowl, No. 16, cf Loffreda, A11, Fig. 5, p. 36. Early - mid Roman,
- 003 Amphora handle, Rhodian, with long rectangular stamp (illegible), Hellenistic.
  - 006 Jar, No. 13. cf 12. (079-017). Late Byzantine.
- 088-003 Jar, cf 12. Late Byzantine.
- 004 Bowl, cf 18. Byzantine, 5th-6th C.
  - 005 Bowl, cf 19. Byzantine, 5th-6th C.
- 092-001 Bowl, cf Late Roman C Form 3F or H (Hayes 1972, 329 ff). Byzantine, 6th C.
- 003 Handle of ribbed jar, pink/buff ware re 001-023.
- 094 (Plot 4)
- XI Bowl, No. 26, "Jerash" type, painted fine ware, Byzantine, 6th C.
- (Plot 5).
- 003 Jar, No. 11, cf 12. (079-017). Late Byzantine.
  - 005 Bowl, cf Cypriot Red Slip Form 9C (Hayes 1972, 379 ff). End 6th-end 7th C.
- 096-001 Bowl, No. 17. Date uncertain, ware indicates Byzantine.
- 004 Bowl, cooking, cf McNicoll et al. pl. 138, 3. Byzantine.
  - Other Body sherds, buff ware, re 001-023.
- 099-003 Krater, small, ware cf 28. Form similar, but without comb decoration on rim. Late Byzantine/early Umayyad, 7th C.
- 010 Jug. Ware and slip cf 001-037. Hellenistic.
- 100-X2 Bowl, No. 15. Ware cf 16. Type is similar to 16. but rim is triple-ridged rather than double. cf Meyers. Pl. 8.3, 3 and 4 (no commentary); Loffreda. A12, Fig. 5, 16-19, p. 38, Mid-Roman.

Figure 14

No.	Site No.	Sherd No.	Description
1.	079 - 021		Jar, diam. 16 cm. Creamy white throughout. Finely mixed homogeneous paste with many fine airholes. Chalky texture, angular fracture.
2.	024 - 001		Jar, diam. 9 cm. Brownish-grey core between pinkish-orange, pale grey surface ext. Slurried. Fairly well mixed with many fine and some medium lime and dark grits. Clean fracture.
3.	002 - 009		Jar, diam. 9 cm. Colour and ware as 1. but more compacted, with an occasional lime or dark grit.
4.	043 - 013		Jar, diam. 11 cm. Pinkish-buff with creamy buff surface. Ware similar to 3. but some very fine grey and red grits.
5.	015 - 002		Jar, diam. 10 cm.. Colour and ware as 3.
6.	015 - 002A		Jar, diam. 10 cm. Colour and ware as 3.
7.	001 - 023		Jar, diam. ? Colour and ware as 1.



8. 010 - 003 Jar, diam.? Dusky pink with pale grey surface ext. and creamy buff surface int. Well slurried. Very finely mixed and compact paste with no visible grits, occasional small elongated airholes. Chalky texture, clean fracture.
9. 002 - 013 Jar, diam. 14 cm. Pinkish-orange throughout, pale grey surface ext. Roughly mixed with a scatter of medium angular lime, grey and red grits, numerous elongated airholes. Angular fracture.
10. 025 - 012 Jar, Diam. 10 cm. Dark grey and orange sandwich core, pale grey surface. Very well mixed with many small and occasional medium lime and quartz grits. Hard fired, slightly uneven fracture.
11. 094 - 003 Jar, diam. 11 cm. Brown core between dark grey. Fairly roughly mixed with many small and some medium lime grits, occasional angular grey grits and small particles of red grog. Fine elongated airholes. Hard fired, metallic, fine gritty texture, clean fracture.
12. 079 - 017 Jar, diam. 11 cm. As 11.
13. 080-006 Jar, diam. 11 cm. Form of 12. but heavier. Pale orange throughout, pale grey surface. Very well mixed with very fine airholes. Hard fired, slightly crumbly fracture.

Figure 15

No.	Site No.	Sherd No.
14.	043 - 014	Bowl or jar, diam. 11 cm. Pinkish-buff with creamy buff surface. Extremely finely levigated ware as 3. but no airholes visible. Trace of handle attachment

- on wall below rim.
15. 100 - X2 Bowl, diam. 16 cm. but largely reduced grey.
16. 080 - 001 Bowl, diam. 22 cm. Deep brownish-red, mid-brown surface, slurried. A few very fine lime and dark grey grits, well mixed fine paste. Hard fired, crumbly fracture.
17. 096 - 001 Bowl, diam. 19 cm. Dark grey throughout, ware as 21.
18. 003 - 0114 Bowl, diam. 20 cm. Dark grey core between dark orange, brownish-orange surface. Roughly mixed with many small lime, rounded quartz and occasional dark grey grits. Numerous small airholes. Hard fired, brittle, gritty texture, crumbly fracture.
19. 015 - 001 Bowl, diam. 24 cm. Brownish-orange throughout, purplish-brown surface. Ware as 18.
20. 079 - 015 Bowl, diam. 27 cm. Pale grey thin core between mid-orange pinkish-buff surface mottling to greyish-brown on rim and ext. Well-mixed fine clay with a scatter of fine and medium lime grits and fine quartz grits.

Figure 16

No.	Site No.	Sherd No.
21.	026 - 013	Lid, diam. 26 cm. of cooking pot. Pale orange to grey, grey surface ext. Coarsely mixed with many fine and medium lime and angular grey grits and quartz pebbles. Hard fired, gritty texture, crumbly fracture.
22.	096 - 004	Open cooking pot, diam. 26 cm. Mid-orange throughout,

- pale grey surface ext. Ware as 21.
23. 024 - 002 Open cooking bowl, diam. 25 cm. Colour and ware as 16. but inclusions slightly larger and more frequent.
24. 076 - 001 Bowl, diam. 34 cm. Colour and ware as 18. Trace of handle attachment from rim to upper wall.
25. 026 - 001 Bowl, diam. ? Mid-orange throughout, thick semi-lustrous slip, same colour, tooling bands on rim. Well mixed granular ware containing some lime and grey grits and many small quartz grits. Hard fired, crumbly fracture.
26. 094 - XI Bowl, diam. 37 cm. Pale grey core at rim only, between mid-orange. Very well mixed with very fine quartz and some lime grits, fine airholes. Slightly crumbly fracture, hard fired.
27. 079 - 014 Krater, diam. 31 cm. Pinkish-brown throughout, pale greyish-brown surface ext. Very well mixed homogeneous clay with occasional small particles of brown grog and fine elongated airholes. Hard fired. smoothed fine gritty texture irregular fracture.
28. 076 - 009 Krater, diam. 48 cm. Pale grey throughout. Very well mixed with numerous small dark grits. Hard fired, smoothed fine gritty texture, irregular fracture.
29. 074 - 002 Krater, diam. 40 cm. Yellow throughout. Fairly well mixed with many small and medium grey grits, fine airholes and numerous particles of red grog. Gritty texture crumbly fracture.
30. 069 - 009 Large storage jar, diam. 24 cm. Thick grey core between pink, buff surface ext.

Very well mixed granular ware, with many small grey and quartz grits and occasional small, medium and large lime grits. Hard fired, crumbly fracture, smoothed gritty texture.

P. M. Watson

## Part II: The Islamic Pottery

This section is designed purely to show the existence of different types of Islamic pottery found in the Wadi Arab during the survey. Figure 13 shows the periods for which sherds are present, and Figure 20 shows, very loosely, the types of Islamic pottery that occur.

The drawings, (Figures 17-19) merely show the best examples of different types, and the absence of a ware, type, or period from the drawings does not signify an absence in the Wadi Arab.

It is hard to find close equivalents for pottery types in the Islamic period after the eighth century, so no definitive ones have been given. The reader is referred to the bibliography.

### *Notes on the Figures*

All diameters are in centimetres and refer to the rim unless otherwise stated.

The sets of numbers in the description of the drawings refer to the site, and the original sherd number respectively. A number in brackets refers to a plot number, (see main text).

In Figure 20 'Ayyūbid/Mamlūk fine ware painted' refers to the ware that smith calls "medieval group B" which he mistakenly calls 'Abbāsīd.<sup>19</sup>

### *Acknowledgements*

I would like to thank Dr. C. Lenzen for help in identifying some of the sherds.

### *Figure 17*

1. 001-032. (4). Hand-made bowl, 23 cms. Dull orange with grey core, cream slip with dark red paint. The ware is very crumbly and pock-marked, a few large black and red grits are visible in the section with many large white grits, 'Ayyūbid/Mamlūk.

Site/Plot.	Hellenistic.	Roman.	Byzantine.	Hell-Byz misc.	Umayyad.	Abbasid.	Ayyubid/ Mamluk.	Ottoman.
001/1.	1		1					
2.		1	1	1			1	
3.			1	1			1	
4.			1	1			1	
6.		1	1	1				
002.		1	1	1	1			
003.			1	1				
005.				1				
007/1.	1			1				
2.				1				
3.		1	1					
5.							1	
008.		1		1				
009.				1				
010.				1	1			
012.			1	1	1		1	
014.				1				
015.			1	1				
020.		1		1				
022.	1		1	1			1	
023.		1	1	1			1	
024.				1				
025.	1	1	1	1	1	?		
026.			1	1	1		1	
027.			1		1	?	1	
032.			1	1				

Fig. 13: Hellenistic to Ottoman site distributions.

Site/Plot.	Hellenistic.	Roman.	Byzantine.	Hell-Byz misc.	Umayyad.	Abbasid.	Ayyubid/ Mamluk.	Ottoman.
043.			1	1				
052/1.							1	?
2.							1	
4.							1	
5.					1		1	?
055.				1				
067.				1				
069.			1	1		1	1	?
071.							1	
074.			1	1				
075.			1				1	?
076.		1	1	1	1	?		
078.			1	1	1		1	
079.	1	1	1	1			1	?
080.	1	1	1	1	1			
084.			1					
088.				1			1	
091.				1				
092.			1					
094/4.		1	1	1				
5.		1	1		1			
095.						?	1	
096.			1					
099.			1	1			1	
100.		1					1	
101.				1		-	1	
102			1	1			1	?

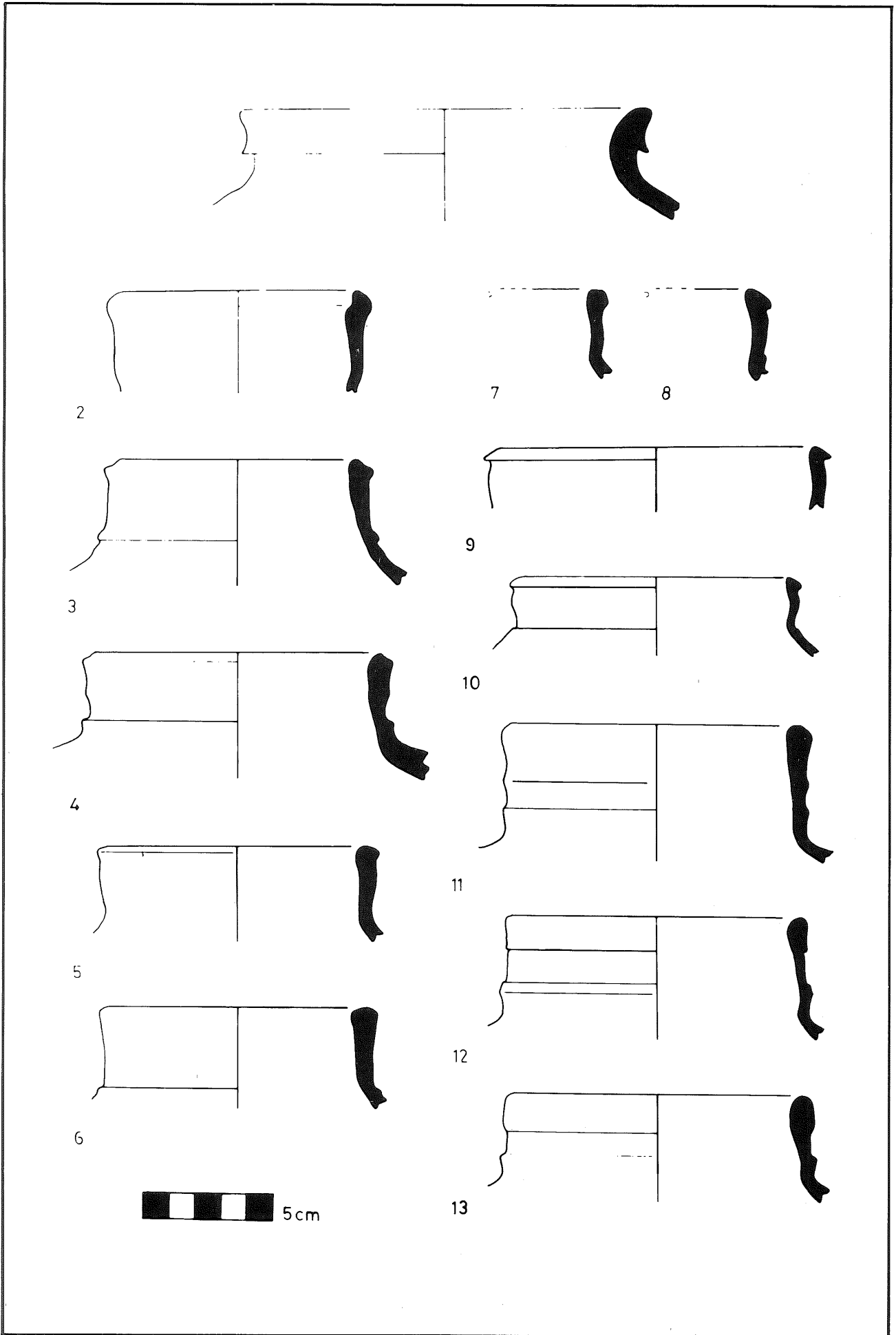


Fig. 14: Hellenistic to Byzantine pottery.

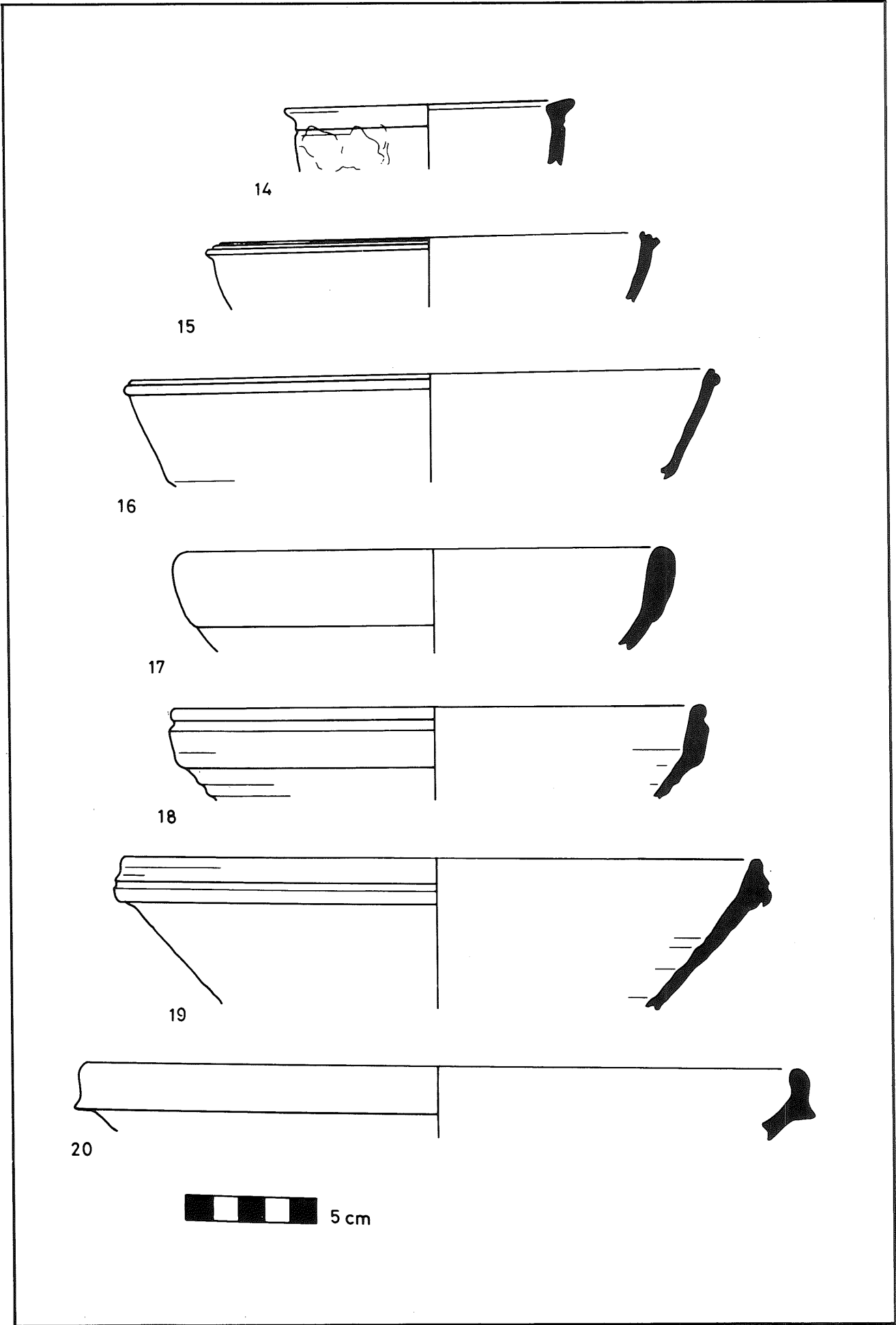


Fig. 15: Hellenistic to Byzantine pottery.

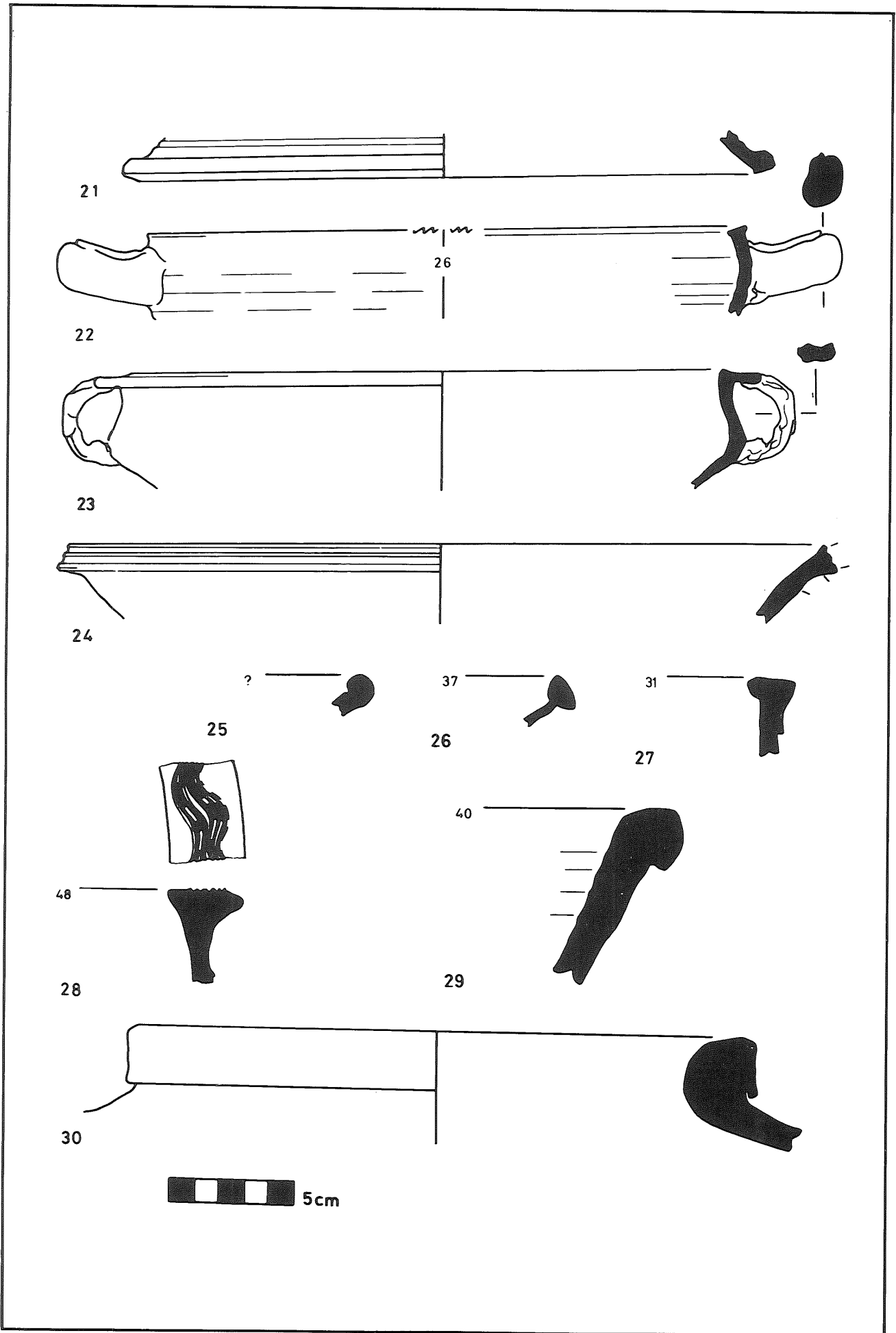


Fig. 16: Hellenistic to Byzantine pottery.

2. 002-001. Hand-made krater, ca. 60 cms. Grey. Rounded rim, The Ware is moderately hard with a clean fracture, inclusions are few. Umayyad.
3. 012-008. Hand-made Krater, 45 cms. Grey. Rounded rim, wavy line incision in body. Ware as 2. Umayyad.
4. 012-001. Small wheel-turned krater, sherd too small to determine rim diam. Grey. Rounded rim. Ware as 2. Umayyad.
5. 026-X1. Hand-made bowl, ca. 45 cms. Orange with slightly darker core, pinkish slip with dark red paint. Vertical strap handle, flattened rim. The ware has a very crumbly fracture, many large red and white grits are visible in the section with the occasional black grits. The exterior of the vessel is covered in plaster making the painted plaster impossible to discern. 'Ayyūbid/Mamlūk.
6. 026-018. Wheel-turned jar, 12 cms. Pinkish red. Flanged rim. The ware has a clean fracture, is well levigated with the occasional soft white grits visible in the section. 'Ayyūbid/Mamlūk.
7. 026-009. Wheel-turned jar, 12 cms. Dull orange. Rounded vertical rim. The ware has a moderately clean fracture showing many white and a few black grits. 'Ayyūbid/Mamlūk.
8. 026-008. Wheel-turned bowl, 19 cms. Dark orange, light grey slip inside. Carinated with thickened rounded rim. The ware has a moderately clean fracture showing a few white and translucent grits, also the occasional shiny particle. Umayyad.
9. 026-021. Wheel-turned bowl, 17 cms. Orange fabric, brown glaze with cream lines. Carinated, thickened rounded rim. The ware has a moderately clean fracture showing large red and grey grits and smaller translucent grits. 'Ayyūbid/Mamlūk.
10. 026-007. Wheel-turned jar, 10 cms. Red, brown slip on exterior. The ware has a clean fracture, with a few black, white and shiny grits. Umayyad.
11. 026-020. Base of bowl, (wheel-turned) base diam. 8 cms. Dark red fabric, green and yellow glaze with dark sgraffito line on white slip. Ring base with internal off-set above foot. The ware has a moderately clean fracture showing a few white and translucent grits in the section, also the occasional shiny particle. 'Ayyūbid/Mamlūk.
12. 026-019. Base of bowl, (wheel-turned), base diam. 8.5 cms. Red fabric, speckled brown and light green glaze on interior. The ware has a clean fracture showing a few soft white grits and a few translucent grits. 'Ayyūbid/Mamlūk.
13. 052-065. (4). Hand-made bowl, 40 cms. Dark grey to dull red fabric, dark painted pattern on white slip. The pattern and ware are impossible to discern as the sherd is a waster. 'Ayyūbid/Mamlūk.
14. 052-039. (2). Hand-made bowl, ca. 50 cms. Grey, white slip with dark red paint. The ware has a very crumbly fracture with many large black and white grits visible in the section. (Possibly the same ware as 5 but burnt). 'Ayyūbid/Mamlūk.

*Figure 18*

15. 052-081. (5). Large hand-made jar, 18 cms. Dull orange, dark core, white slip with dark red paint. The ware has a very crumbly fracture and contains many white grits. 'Ayyūbid/Mamlūk.
16. 052-063. (4). Hand-made jar, 37 cms. Dull red, darker core. Smoothed outside, plastered inside. Ware as 5. 'Ayyūbid/Mamlūk.
17. 052-040. (2). Hand-made jar, 17 cms. Dull red with large grey core, cream slip interior and exterior with dark red paint on exterior. Outsplayed neck and flattened rim. Ware as 14. 'Ayyūbid/Mamlūk.
18. 052-073. (5). Wheel-turned jar, 11 cms. Dark red. The ware has a moderately crumbly fracture and contains many black and white grits. 'Ayyūbid/Mamlūk?
19. 052-006. (1). Wheel-turned jar, 10 cms. Red, buff slip outside with a splash of dark red paint on the rim. Thickened (turned over), rim. Ware as



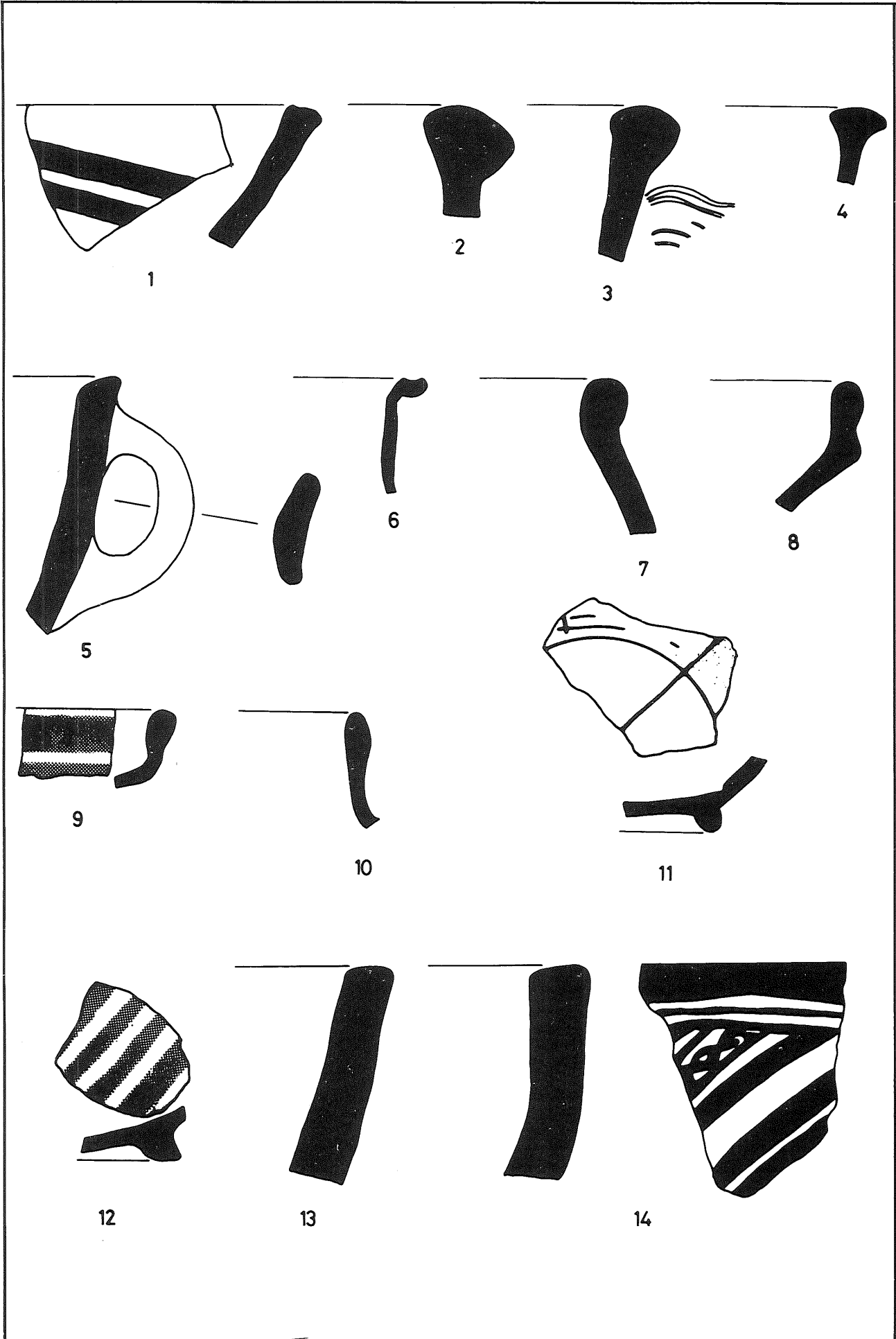


Fig. 17: Mediaeval pottery.

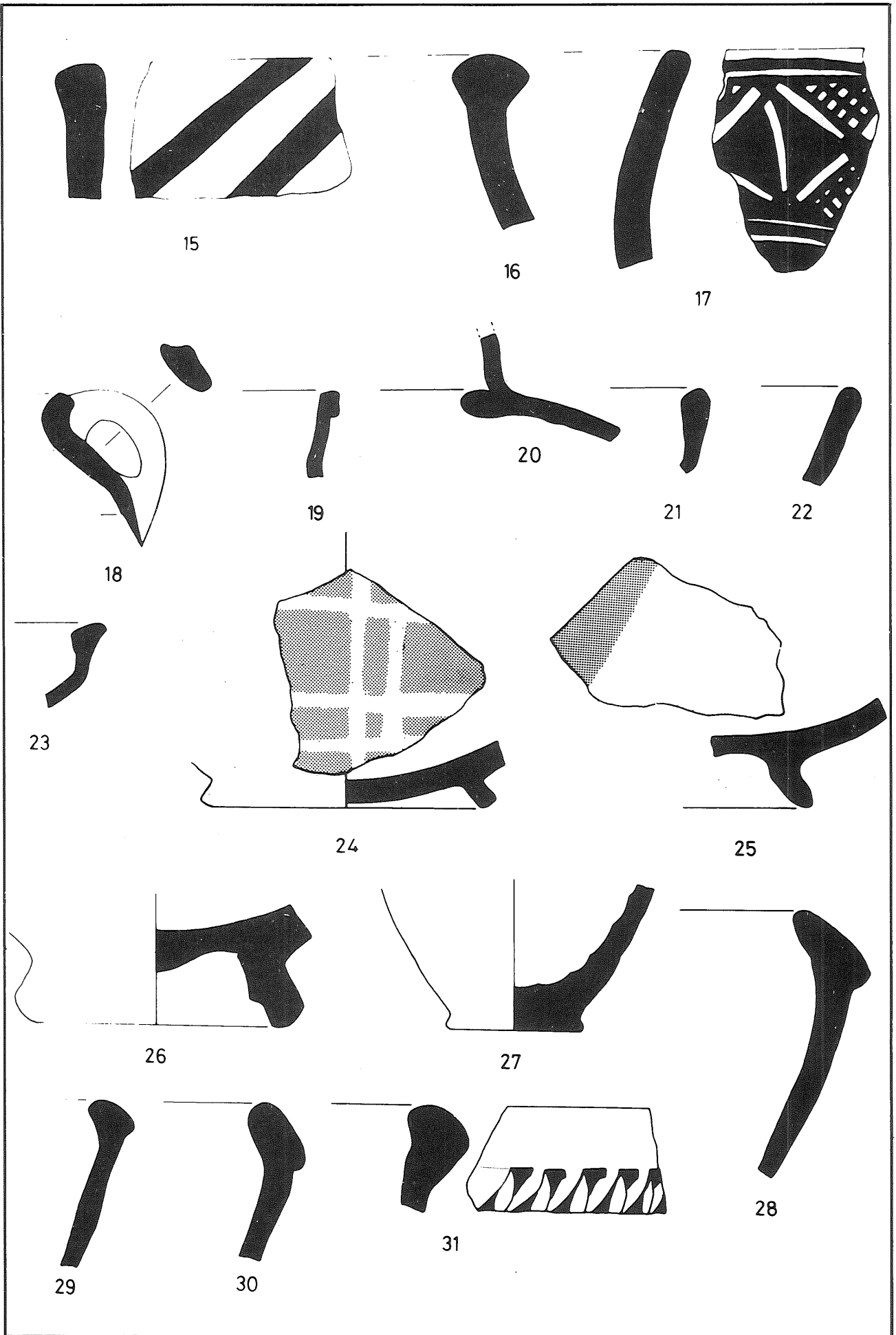


Fig. 18: Mediaeval pottery.

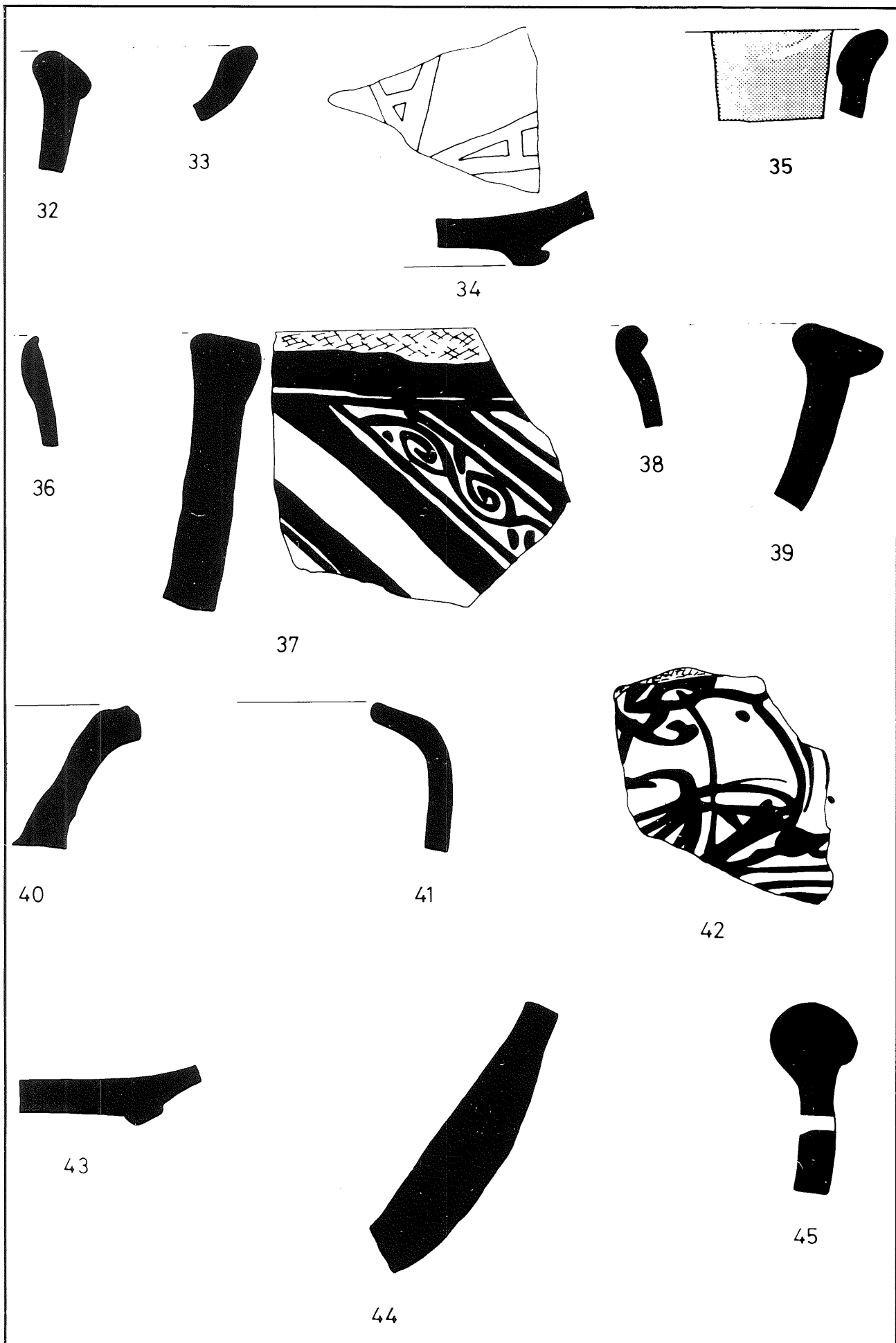


Fig. 19: Mediaeval pottery.

SITE	UMAYYAD		'ABBĀSID	'AYYŪB ID/MAMLŪK					OTTOMAN
	Grey ware	Other		Coarse painted	Coarse Unpainted	Fine ware Painted	Glazed	Sgraffito	
001				1	1				
002	1								
007				1					
010		1							
012	1					1			
022				1					
023							1		
025		1	?						
026	1	1		1	1	1	1	1	
027	1		?	1			1		
052	1			1	1	1	1		?
069			1	1		1	1	1	?
071					1		1		
075							1		?
076	1	1	?						
078	1			1	1	1	1		
079					1			1	?
080	1								
088					1				
094	1								
095			?	1	1		1		
099				1	1		1		
100				1				1	
101				1	1	1	1	1	
102				1	1		1		?

Fig. 20: Mediaeval and Ottoman site distributions.

6. 'Ayyūbid/Mamlūk?
20. 052-009. (1). Wheel-turned body sherd, orange. The ware has a moderately clean fracture, inclusions are black, white and translucent grits, 'Ayyūbid/Mamlūk?
21. 052-034. (2). Wheel-turned bowl, 22 cms. Red, flaky green glaze with streaks of brown in it. Ware as 20. 'Ayyūbid/Mamlūk.
22. 052-035. (2). Wheel-turned bowl, 29 cms. Dull orange fabric, cream slip with green glaze inside and over rim. Ware as 11. 'Ayyūbid/Mamlūk.
23. 052-036. (2). Wheel-turned bowl, 23 cms. Dull red, green glaze on white slip. Ware as 11. 'Ayyūbid/Mamlūk.
24. 052-018. (1). Base of bowl, (wheel-turned), base diam. 10 cms. Red, greenish brown glaze with light green stripes. Ware as 20. 'Ayyūbid/Mamlūk.
25. 052-037. (2). Base of bowl, (wheel-turned), base diam. 8 cms. Red fabric, brown, yellow and cream glaze on white slip. Ware as 20. 'Ayyūbid/Mamlūk.
26. 052-062. (4). Base of bowl, (wheel-turned), base diam. 10 cms. Red fabric, green glaze on white slip inside, smoothed outside. Ware as 12. 'Ayyūbid/Mamlūk.
27. 052-061. (4). Base of jar, (wheel-turned), base diam. 4.5 cms. Dark red. Self-slip. The ware is moderately crumbly with many white and a few black and shiny grits. 'Ayyūbid/Mamlūk.
28. 052-078. (5). wheel-turned krater, 40 cms. Orange. The ware has a clean fracture, inclusions are a few red, white, black and red translucent grits, and many quartz grains. Ottoman?
29. 052-001. (1). Wheel-turned krater, 28 cms. Dark red. Wet-smoothed. The ware has a crumbly fracture showing black, white, and shiny translucent grits in the section, also a small amount of grog. Ottoman?
30. 052-005. (1). Wheel-turned krater, ca. 50 cms. Light creamy brown. The ware has a very clean fracture and few inclusions: very small black and white grits. Ottoman?
31. 052-077. (5). Hand-made krater, 32 cms. Grey. Chisel decoration on exterior below rim. Ware as 2. Umayyad.

*Figure 19*

32. 069-005. Wheel-turned krater, 30 cms. Red, dark core, dark red slip. Rim slightly flattened. Ware as 29. Ottoman?
33. 069-021. Wheel-turned bowl, ca. 24 cms. Red fabric, green glaze on white slip inside. Ware as 20. 'Ayyūbid/Mamlūk.
34. 069-023. Base of bowl, (wheel-turned), base diam. 9 cms. Red fabric, very flaky green and yellow glaze on white slip. Heavy sgraffito. Ware as 20. 'Ayyūbid/Mamlūk.
35. 075-006. Wheel-turned bowl, 28 cms. Red fabric, flaky brown glaze with yellow line on inside, Everted folded-over rim. Ware as 9. 'Ayyūbid/Mamlūk.
36. 076-015. Wheel-turned jar, 11 cms. Orange, patch of red paint on exterior of rim. Ware as 12. 'Abbāsīd.
37. 078-014. Hand-made bowl, ca. 45 cms. Pinkish grey fabric, cream slip with dark painted decoration outside. Ware as 14. 'Ayyūbid/Mamlūk.
38. 078-011. Wheel-turned jar, 10 cms. Reddish brown. Self-slip on outside. The ware has a moderately clean fracture showing soft black, white and red grits in equal quantities. 'Ayyūbid/Mamlūk.
39. 079-018. Wheel-turned (?) krater, ca. 40 cms. Dark red. Wet-smoothed. Ware as 29. Ottoman?
40. 095-001. Wheel-turned jar, 18 cms. Pinkish grey fabric, orange slip on exterior, dark red on interior,. Out-turned rim with inner ledge. The ware has a moderately clean fracture and contains many translucent grits. 'Abbāsīd?
41. 099-008. Wheel-turned bowl, 19 cms. Pink fabric, buff surface, flaky green glaze on exterior. The ware has a moderately clean fracture and is relatively free from inclusions, shiny

particles are present. 'Ayyūbid/  
Mamlūk (?)

42. 100-X3. Hand-made body-sherd. Light grey, red paint on white slip. Ware as 5. 'Ayyūbid/Mamlūk.
43. 101-X5. Base of bowl, (wheel-turned), base diam. 9.5 cms. Dull red, green glaze on white slip inside, smoothed outside. Ware as 12. 'Ayyūbid/Mamlūk.
44. 102-X5. Hand-made bowl, ca. 32 cms. Dull orange with dark core. Ware as 14. 'Ayyūbid/Mamlūk.
45. 102-X7. Wheel-turned krater, 52 cms. Dark red with grey core. Hole bored in body after firing. The ware has a clean fracture, inclusions are many black, fewer white and the occasional red grit. The section appears pock-marked. Ottoman?

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## Bibliography

- Contenson, H. de, Three Soundings in the Jordan Valley, *ADAJ IV-V*, 1960, 12-98.
- Crowfoot, G.M. Crowfoot, J.W. and Kenyon, K., *Samaria-Sebaste III, The Objects*; London, 1957.
- Falkner, R.K. (in press) - The Pottery from the British Excavations at the Jerash North Theatre.
- Franken, H.J. and Kalsbeek, J. - *Potters of a Medieval Village in the Jordan Valley*; Amsterdam, 1975.
- Giueck, N. Explorations in Eastern Palestine, *AASOR 25-27*, 1951.
- Gunneweg, J. Perlman, I. and Yellin, J. The Provenance, Typology, and Chronology of Eastern Terra Sigillata, *Qedem XVII*, 1983.
- Hanbury-Tenison, J.W. (in preparation) - Rock-cut presses in the Wadi Arab, Jordan.
- Hanbury-Tenison, J.W. (in preparation) - Jerash Region Survey 1984.
- Hayes, J.W., *Late Roman Pottery*, London, 1972.
- Hayes, J.W. "Cypriot Sigillata", *Report of the Department of Antiquities, Cyprus*, 1967, 65-77.
- Ibrahim, M. Sauer, J. and Yassine, K. The East Jordan Valley Survey 1975, *BASOR 222*, 1976, 41-66.
- James F.W. *The Iron Age at Beth Shan*; 1966, University Museum, University of Pennsylvania.
- Kerestes, T.M. Lundquist, J.M. Wood, B.G. and Yassine, K. An Archaeological Survey of three reservoir areas in northern Jordan, 1978, *ADAJ XXII*, 1977-8, 108-135.
- Landgraf, J. "Keisan's Byzantine Pottery" in Briand, J. and Humbert, J.-B. *Tell Keisan (1971-1976) Une Cité Phénicienne en Galilée*; 1980, Paris, 51-99.
- Loffreda, S. *Cafarnao 11. La Ceramica*; Jerusalem, 1974.
- McQuitty, A. and Gardiner, M. (in preparation) - Water mills in the Wadi Arab, Jordan.
- McNicoll, A. Smith, R.H. and Hennessy, J.B. *Pella in Jordan 1*; Canberra, 1982.
- McNicoll, A. et al. (in preparation) - *Pella in Jordan 2*; Canberra.
- Mellaart, J. Preliminary report of the Archaeological Survey in the Yarmouk and Jordan Valley, *ADAJ VI-VII*, 1962, 126-158.
- Meyers, E.M. Strange, J.F. and Meyers, C.L. - *Excavations at Ancient Meiron, Upper Galilee*; Michigan, 1981.
- Mittman, S. *Beitrage zur Siedlungen und Territorialgeschichte des Nordlichen Ostjordanlandes*; DPV, 1970, Weisbaden: Harassowitz.
- Parr, P.J. A cave at Arqub edh-Dhar, *ADAJ III*, 1956, 16-73.
- Rast, W.E. *Ta'anach: studies in the Iron Age Pottery*; ASOR, 1978.
- Sauer, J.A. *Heshbon Pottery*; Michigan, 1973.
- Sauer, J.A. Review of R.H. Smith, *Pella of the Decapolis 1*, *ADAJ XIX*, 1971, 169-172.
- Sauer, J.A. Review of A.D. Tushingham, *The Excavations at Dibon (Dhiban) in Moab*, *ADAJ XX*, 1975, 103-109.
- Sauer, J.A. The Pottery of Jordan in the Early Islamic Periods, in A. Hadidi (ed.) *Studies in the History and Archaeology of Jordan 1*; Amman, 1982, 329-337.
- Schaeffer, J. (in press) An Umayyad Potter's Complex in the North Theatre, Jerash.
- Smith, R.H. *Pella of the Decapolis 1*; London, 1973.
- Thompson, T.L. *The Settlement of Palestine in the Bronze Age*; Beihafter zum Tubinger Atlas, 1979, Weisbaden: Reichert.
- Tushingham, A.D. The Excavations at Dibon (Dhiban) in Moab; *AASOR XL*, 1972.
- Walmsley, A.G. The Umayyad Pottery and its Antecedents, in McNicoll et al. *Pella in Jordan 1*; Canberra, 1982.





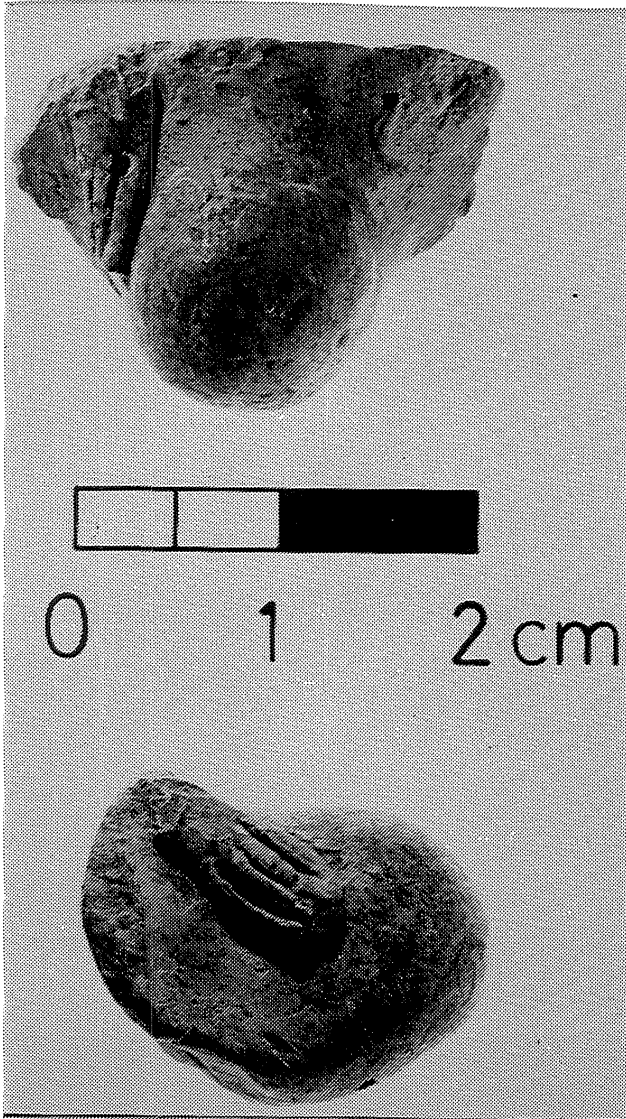
# **PLATES**



Pl. I: 1: Beidha, 1983. Large wall that appears to run from the sanctuary area to the village, sharing the corner with the probably later wall to the right.



Pl. I: 2: Beidha, 1983. House LX. Level IV.

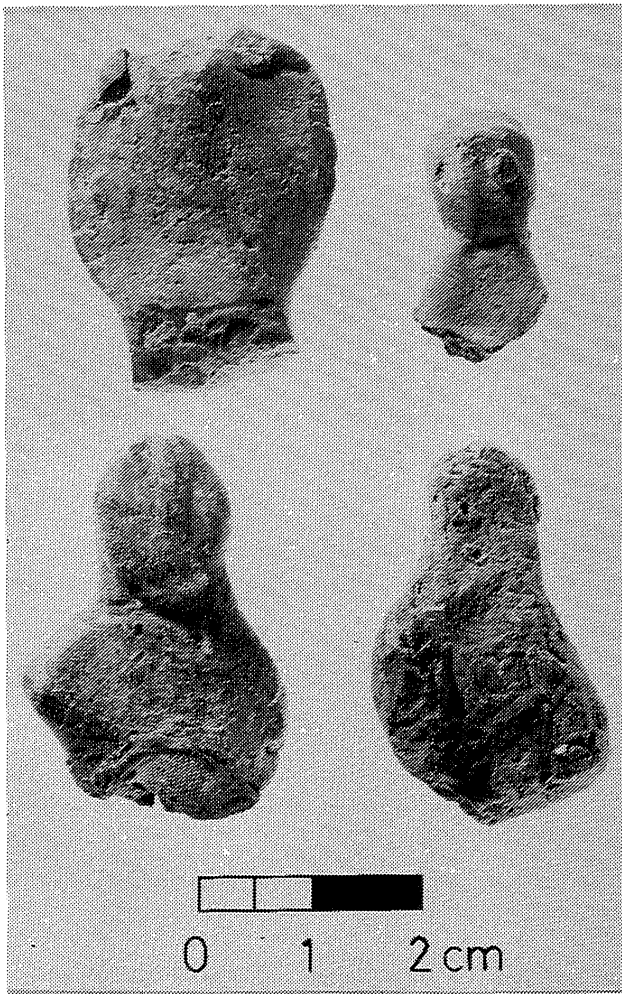


Pl. II: 1: Distended abdomen of a fertility figurine from 'Ain Ghazal. Note the hand on the left. (Photo: R. Henry Cowherd).

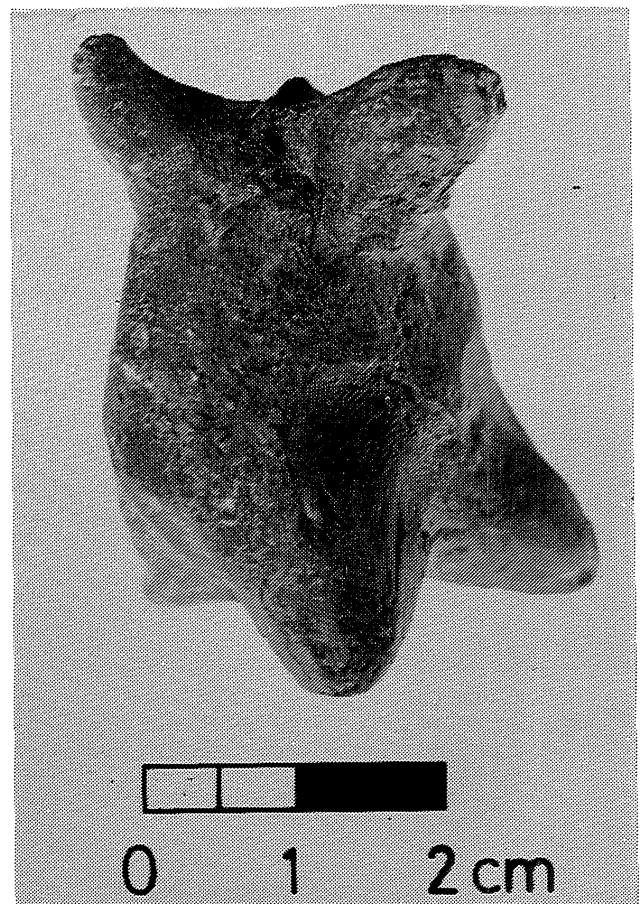


Pl. II: 2: The "nude" from 'Ain Ghazal. One leg has broken off, as have the head and arms. (Photo: R. Henry Cowherd).

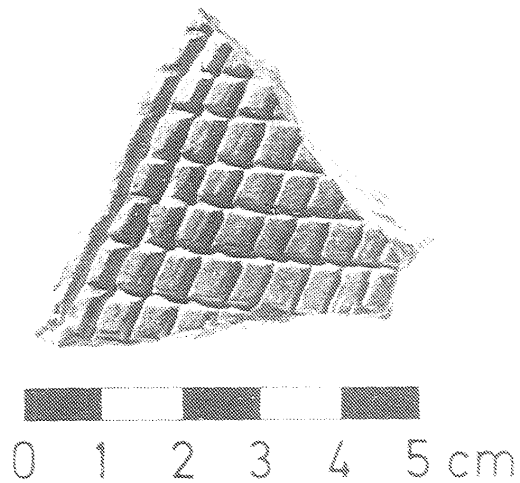




Pl. III: 1: Four human figurines from 'Ain Ghazal. Upper left: spatualte head. Upper right: "bald" head with nubble appliques eyes. Lower left: "button-face" bust. Lower right: damaged head and shoulders. (Photo: R. Henry Cowherd).



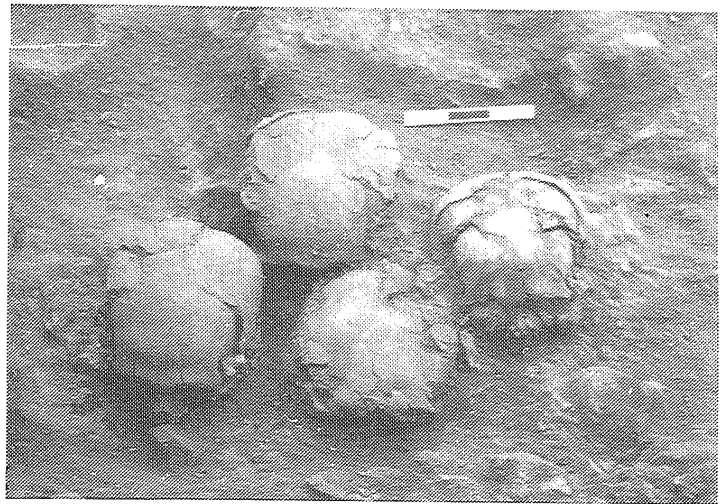
Pl. III: 2: Seated fox or canid animal figurine from 'Ain Ghazal. (Photo: R. Henry Cowherd).



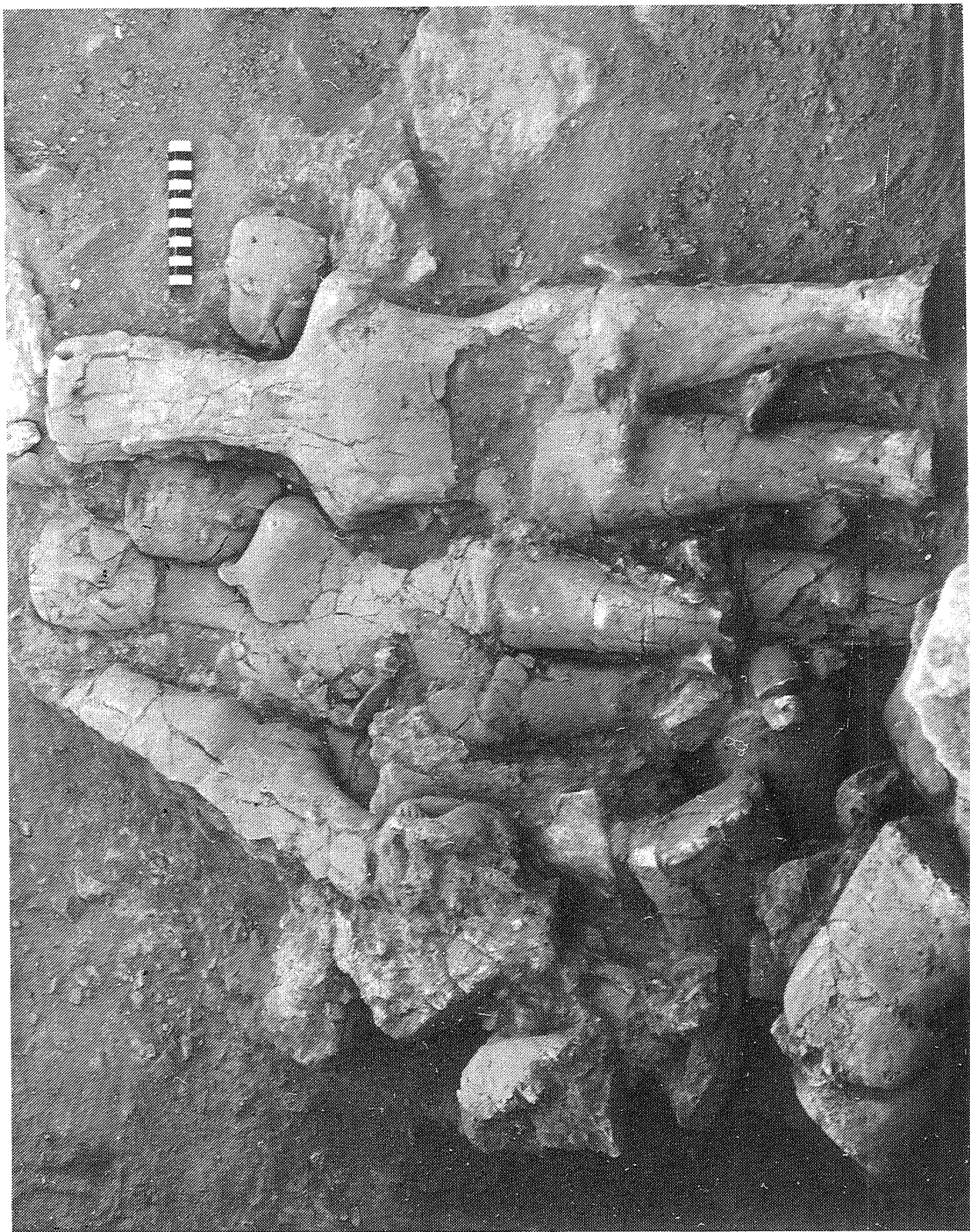
Pl. IV: 1: Incised decoration on white ware sherd from 'Ain Ghazal. (Photo: R. Henry Cowherd).



Pl. IV: 3: One of the 'Ain Ghazal plastered skulls. A thin line of asphalt occurs near the bottom of the plaster-lined eyesocket on the left. (Photo: Brian Byrd).

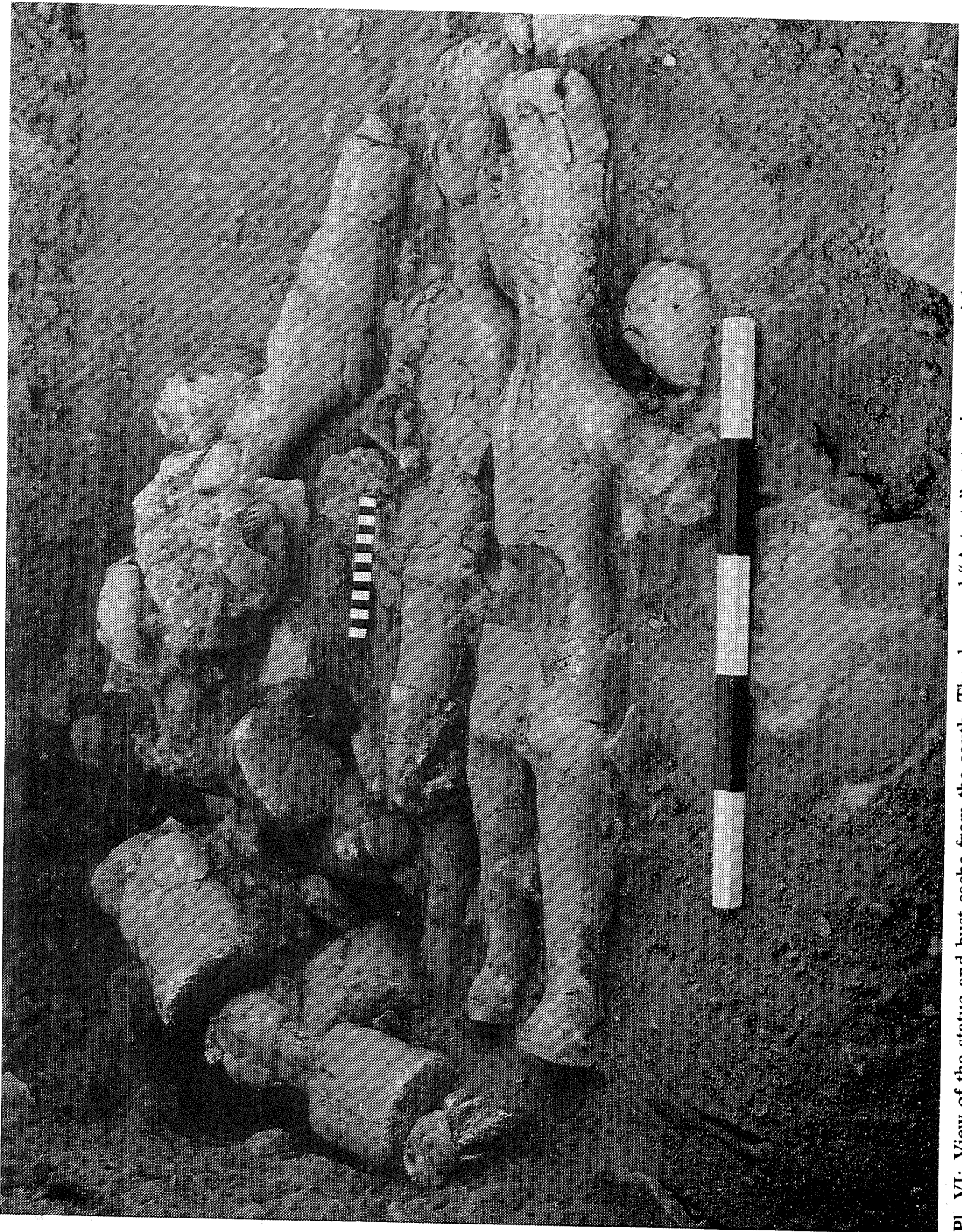


Pl. IV: 2: The "nest" of four adult skulls, two of which were plastered, from 'Ain Ghazal. (Photo: Brian Byrd).



Pl. V: The upper layer of the cache of plaster human statues and busts from 'Ain Ghazal. (Photo: R. Henry Cowherd).



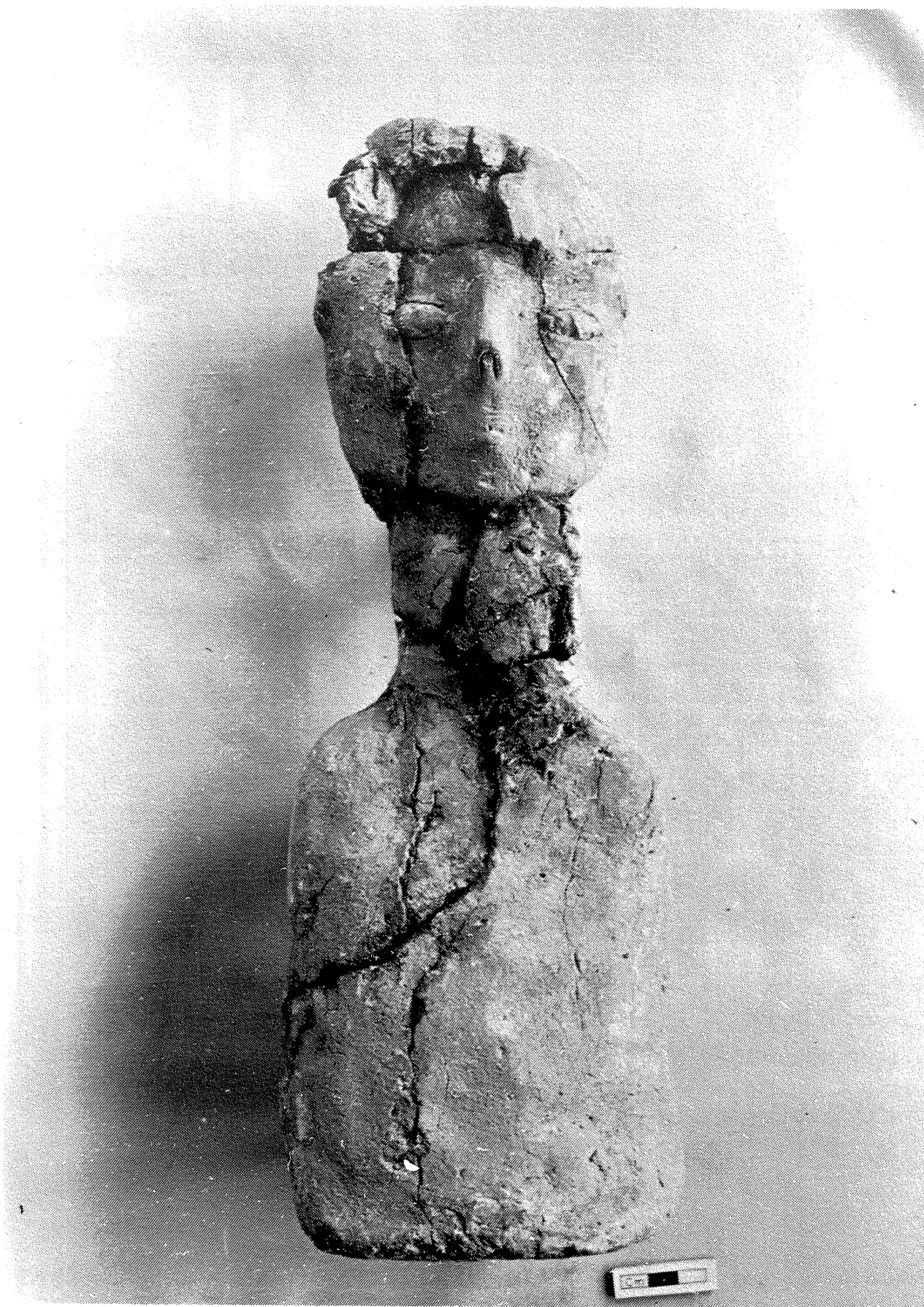


Pl. VI: View of the statue and bust cache from the south. The damaged "Astarte" statue is at upper right. (Photo: R. Henry Cowherd).

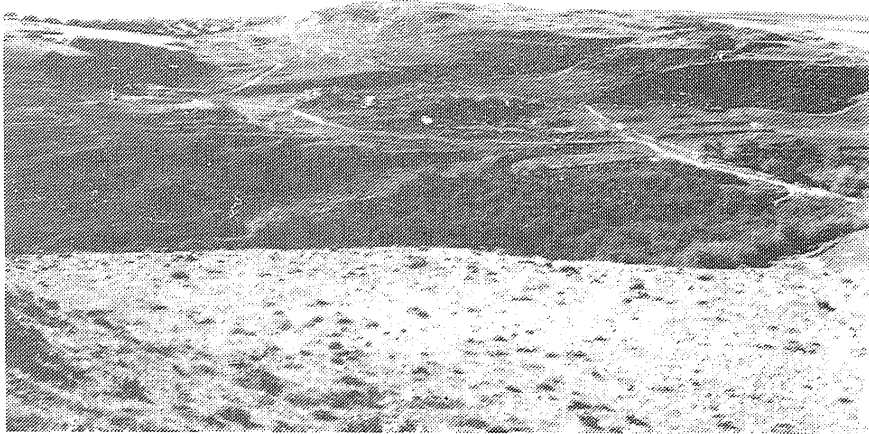


Pl. VII: 1: Detail of one of the statue heads showing the painted stripes on the brow and each cheek. (Photo: Brian Byrd).

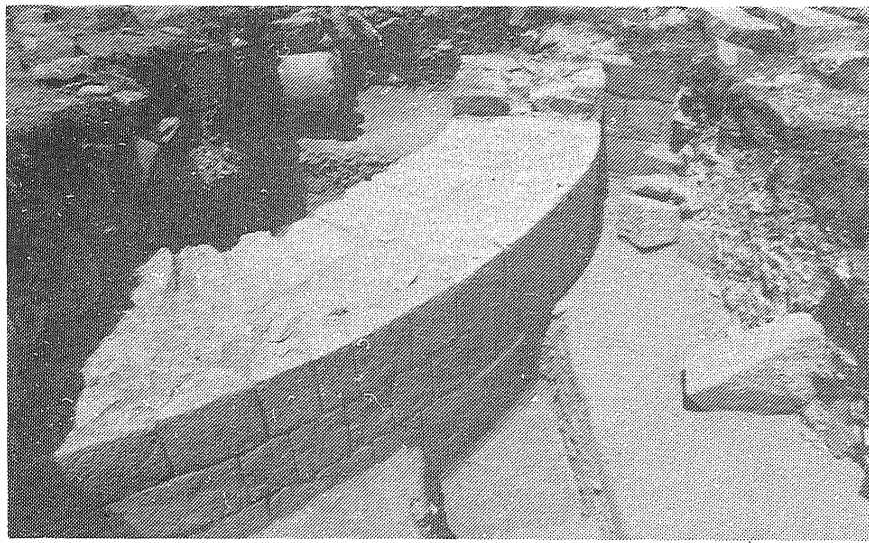




Pl. A VII: One of the busts from the 'Ain Ghazai cache. (Photo: Brian Byrd).



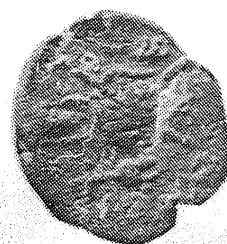
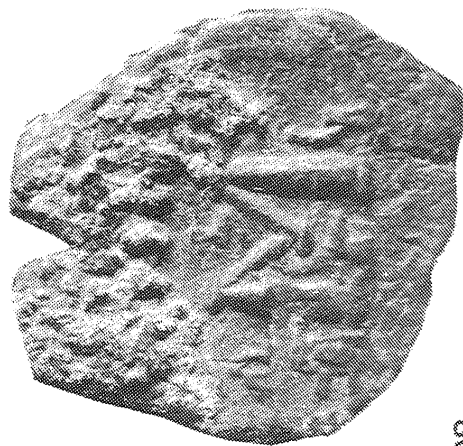
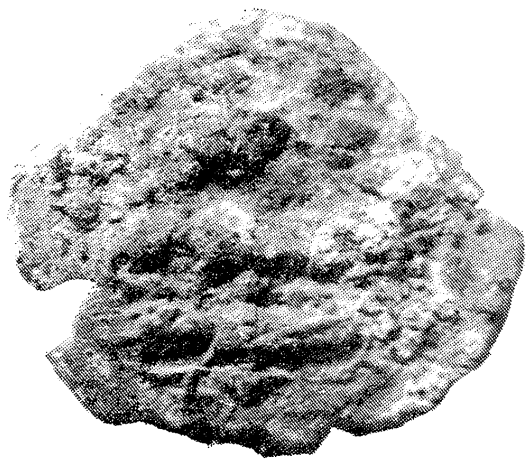
Pl. VIII: 1: Panorama of Abila of the Decapolis



Pl. VIII: 2: Apse of Basilica, Area A-3 and 4, Facing West



Pl. VIII: 3: Mud and Rubble Inside of Water Tunnel just inside of its ancient entrance



508

262

158

Pl. IX: Selected Finds: Coins from the Tombs, The Regional Survey and Area A.





Pl. X: 1: Area IIIN. Fragment of rectangular, blue composition box; exterior, showing relief decoration.



Pl. X 2: Area IIIN. Clay loom-weights *in situ* on floor 22.2.



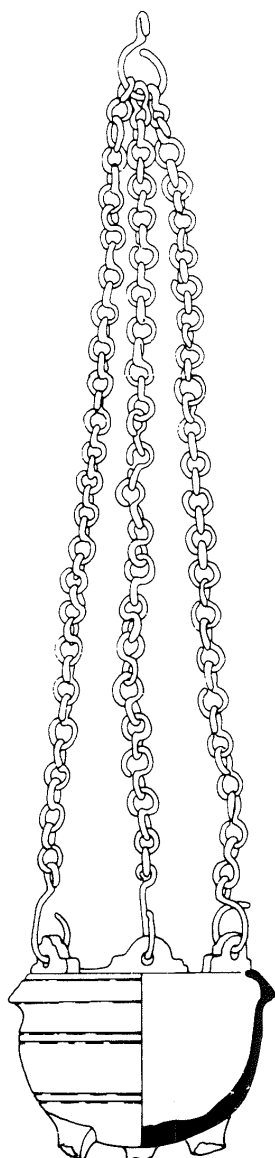
Pl. XI: 1: Area XIB. Wall 3. View east before removal of tumble.



Pl. XI 2: Area XIB. Wall 3. View SW after partial removal of tumble.



Pl. XII: 1: Area VQ. Stone reliquary.



Pl. XII 2: Area VQ. Incense burner.





Pl. XIII: 1: Umm Qēs, area III after the excavation. The northern part of the excavation site (foreground) has been filled up with earth again. View to the south.



Pl. XIII: 2: Umm Qēs, area III, northern part of the excavation site. Pavement, rocks, canals A - H. View to the north-west.



Pl. XIV: 1: Umm Qēs, area III, southern part, after the excavation. Pavement with cover-stones of canal E. View to the south.



Pl. XIV: 2: Umm Qēs, areas IV and V after the excavation; (The column-shafts on the southern sidewalk-left - and on the street - middle - were put there as a boundary by the expedition). View to the west.





Pl. XV: Umm Qēs, area IV after the excavation (S 1- S 8). View to the north-east.



Pl. XVI: 1: Tabaqa, looking from the south



Pl. XVI: 2: Stone mortar from Tabaqa.





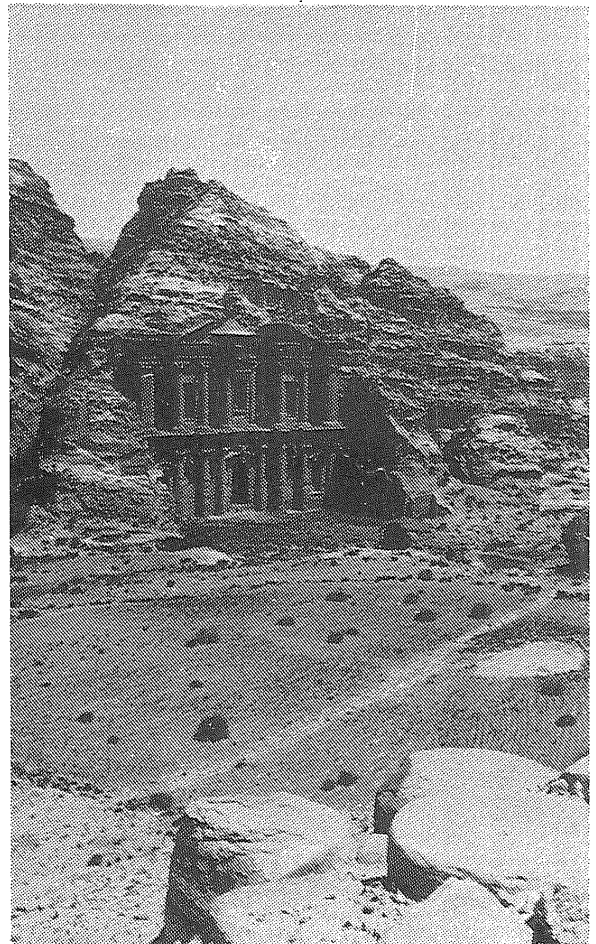
Pl. XVII: 1: Rock channel at 'Ain El-Enoqiyah.



Pl. XVII: 2: Wall at 'Ain Es-Sol.

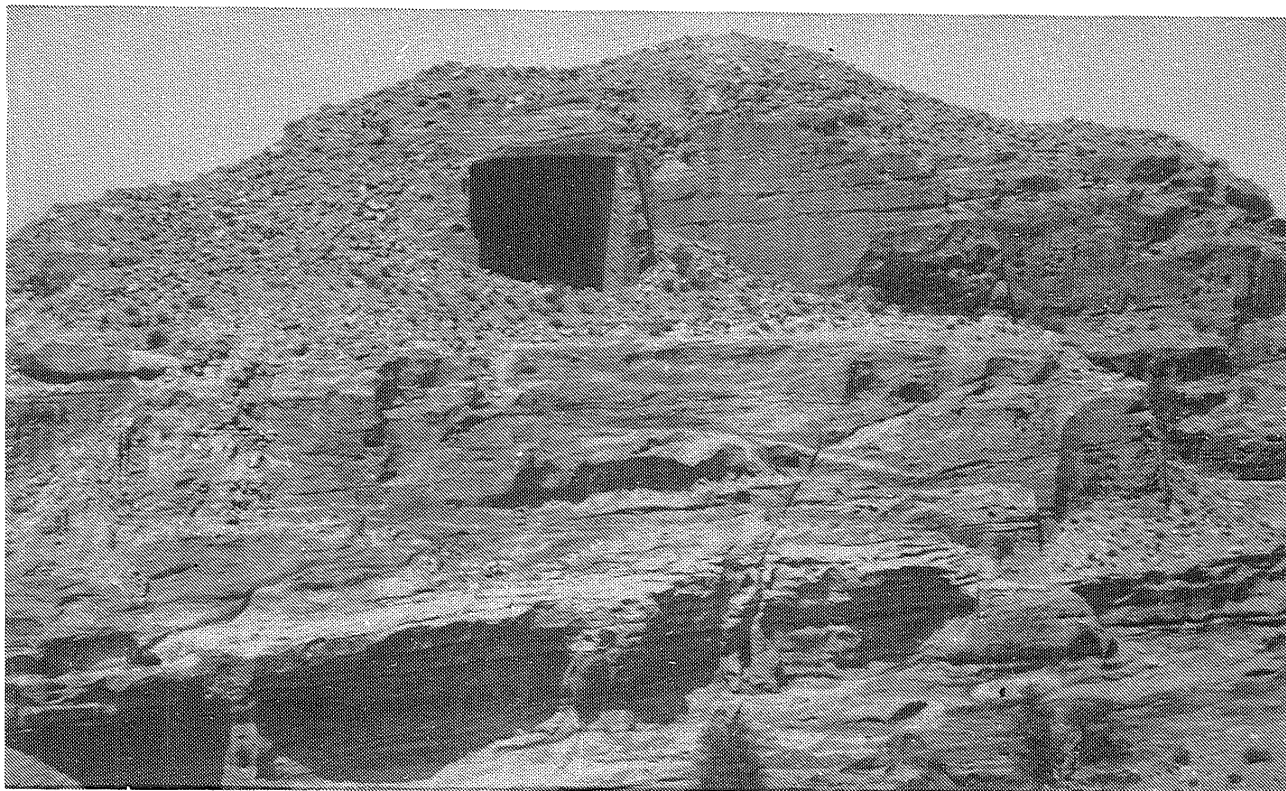


Pl. XVIII: 1: The rock temple ed-Deir



Pl. XVIII: 2: Ed-Deir with the column-bases and drums of the "Burgberg" - Sanctuary





Pl. XIX: 1: "Burgberg" - Sanctuary opposite ed-Deir



Pl. XIX: 2: Cistern D 489 with a carved Nabataean letter on boulder in foreground



Pl. XX: 1: Cistern (left) and staircase (right) leading up to the platform

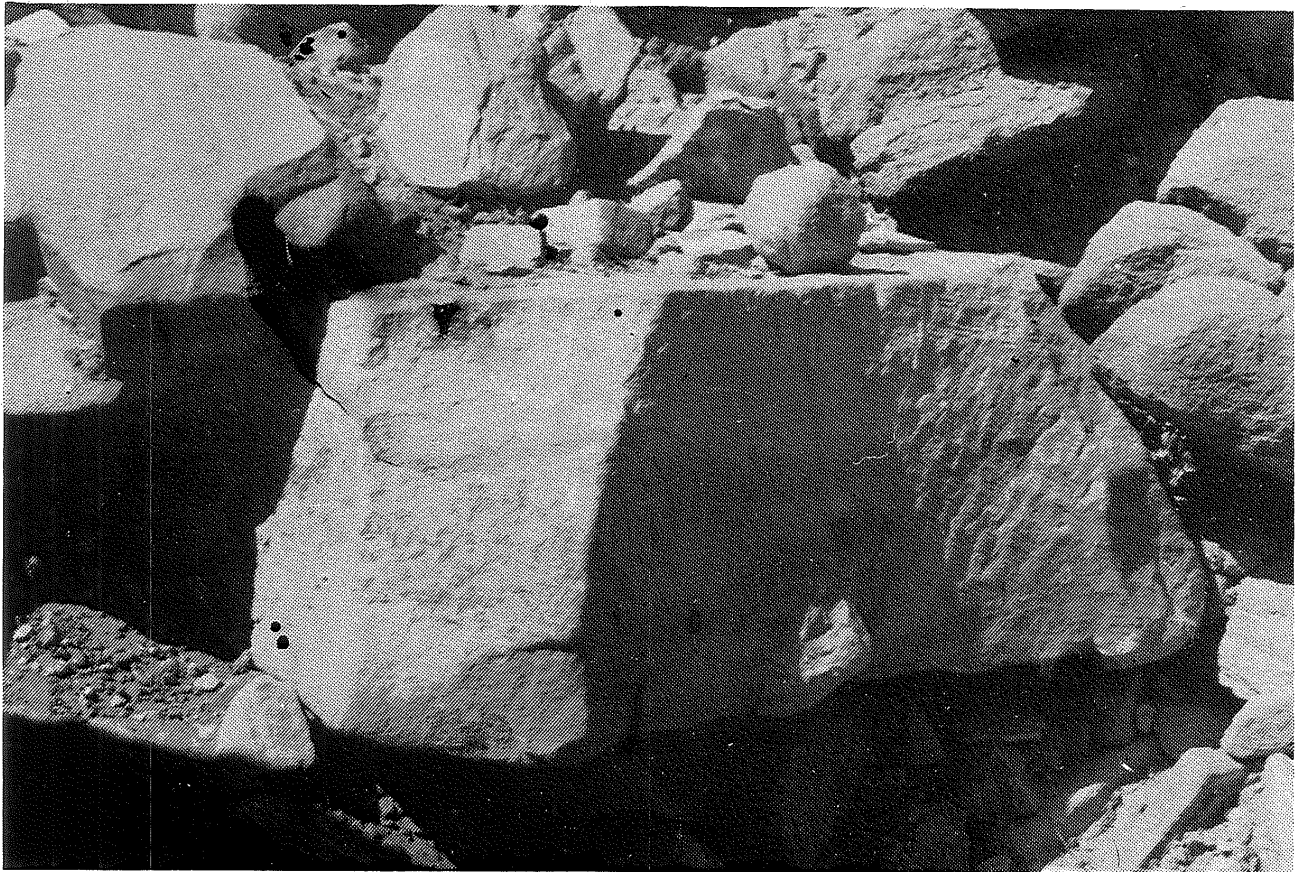


Pl. XX: 2: Detail of the staircase with thin slabs over water channel





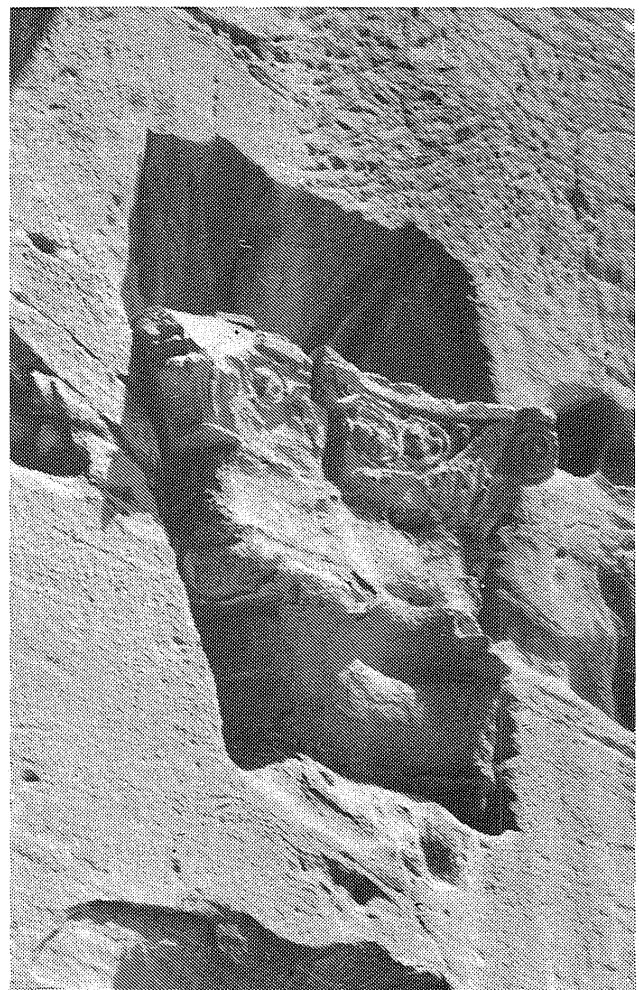
Pl. XXI: 1: Staircase with Nabataean capital, drum and architrave on staircase



Pl. XXI: 2: Nabataean capital on staircase

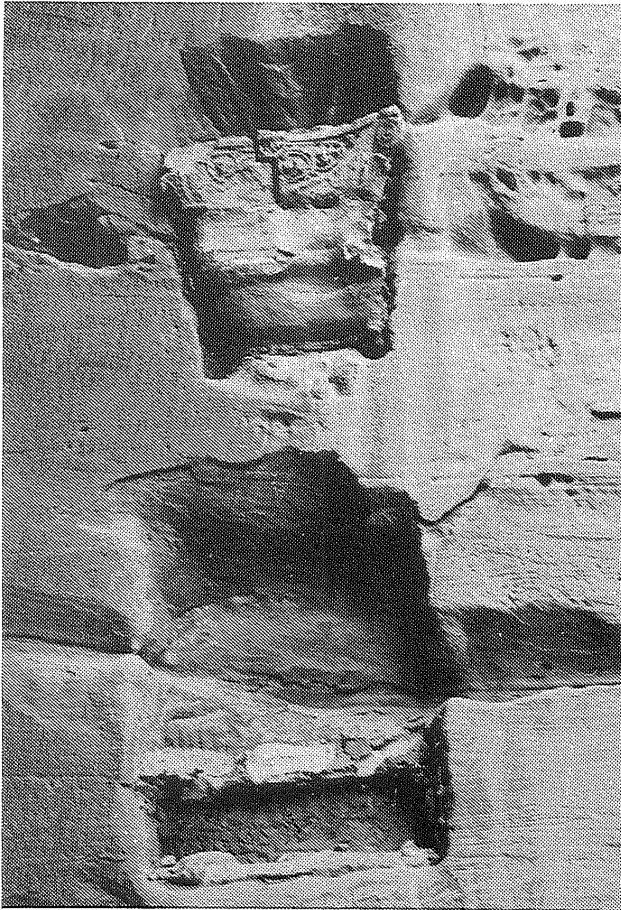


Pl. XXII: 1: Measuring of the peristyle opposite ed-Deir

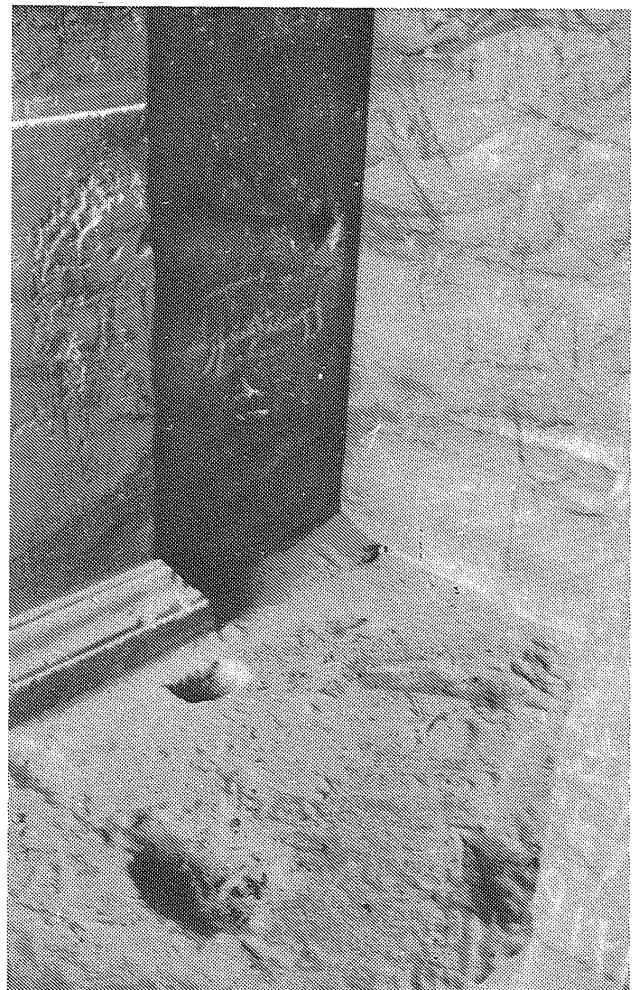


Pl. XXII: 2: "Rankenkapitell" inside the entrance of the cella

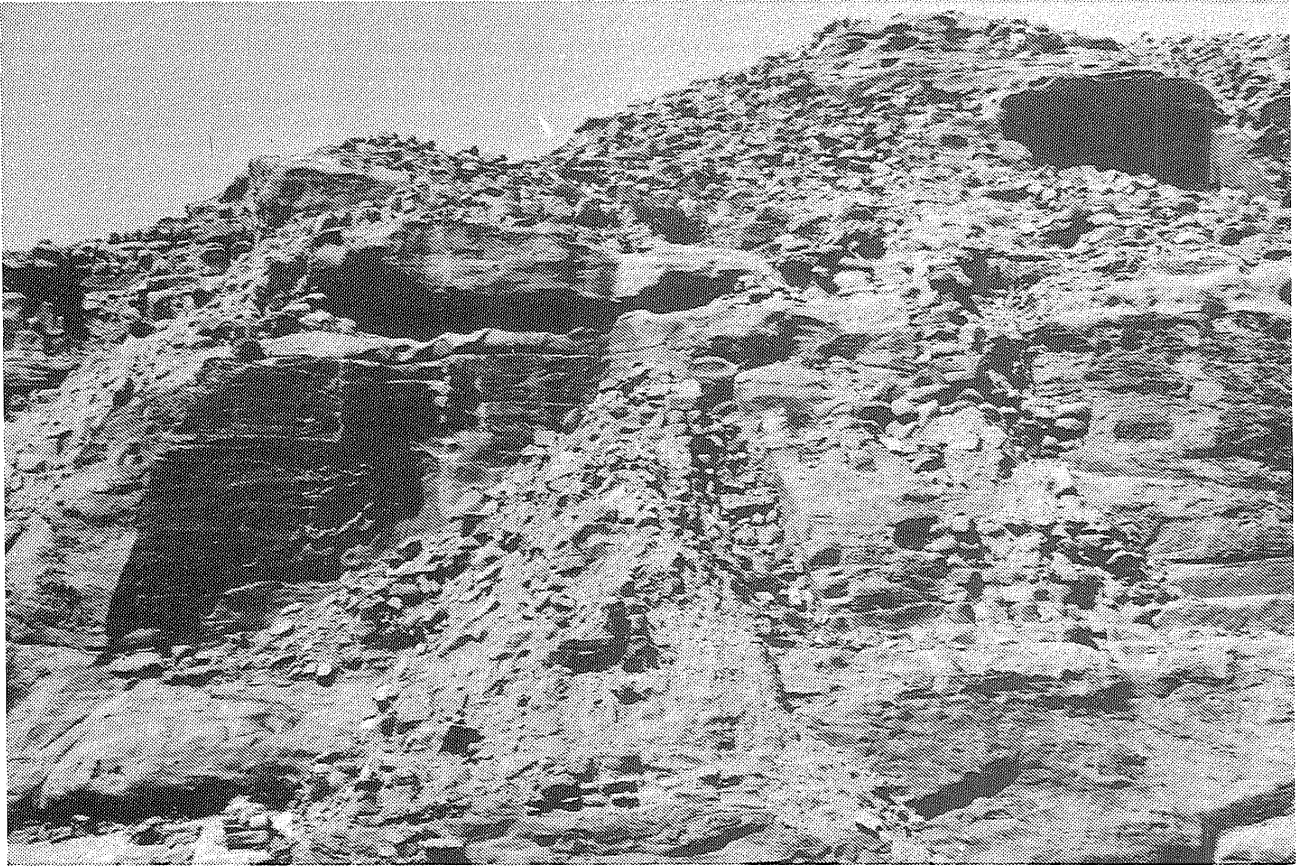




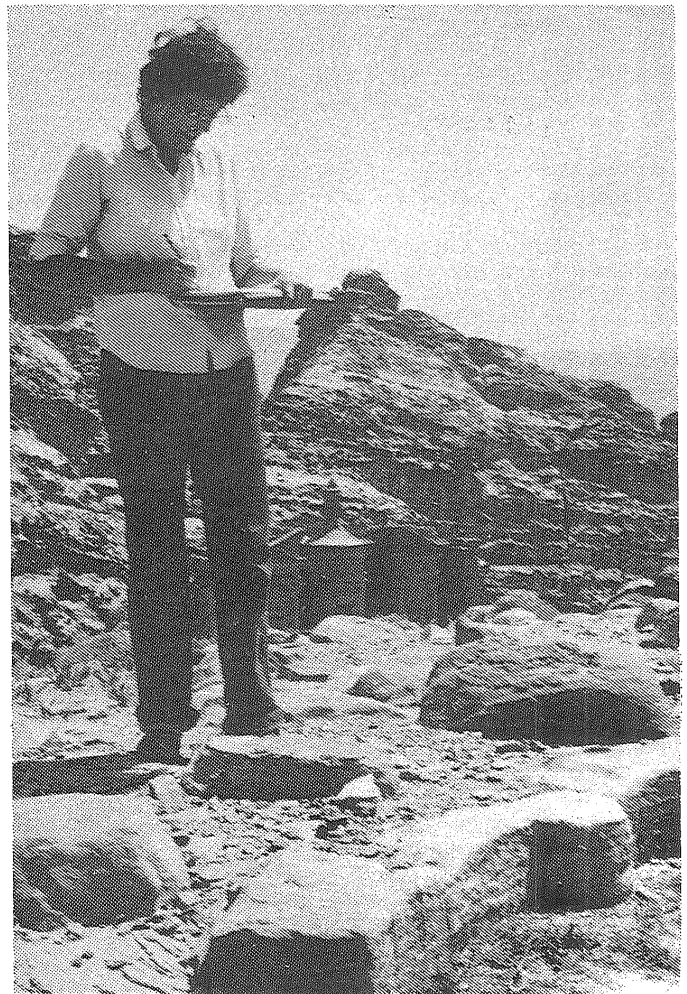
Pl. XXIII: 1: Remains of a portal or door under the  
"Rankenkapitell"



Pl. XXIII: 2: Back wall of the central niche  
in the cella



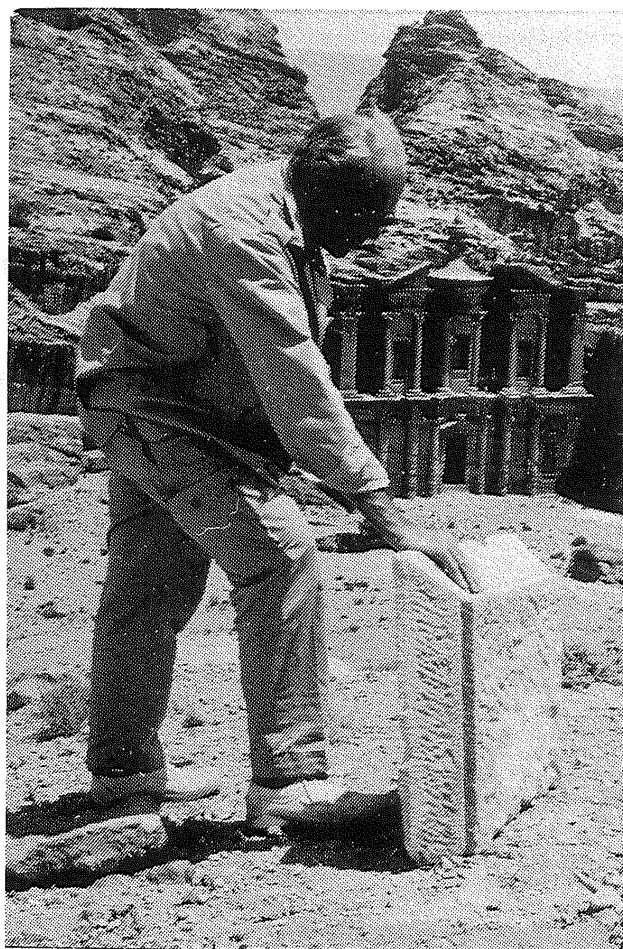
Pl. XXIV: 1: Blocked up southern end of the "Burgberg"



Pl. XXIV: 2: Measuring and drawing of a circular building on top of the "Burgberg"



Pl. XXV: 1: Floor and column base of a circular building

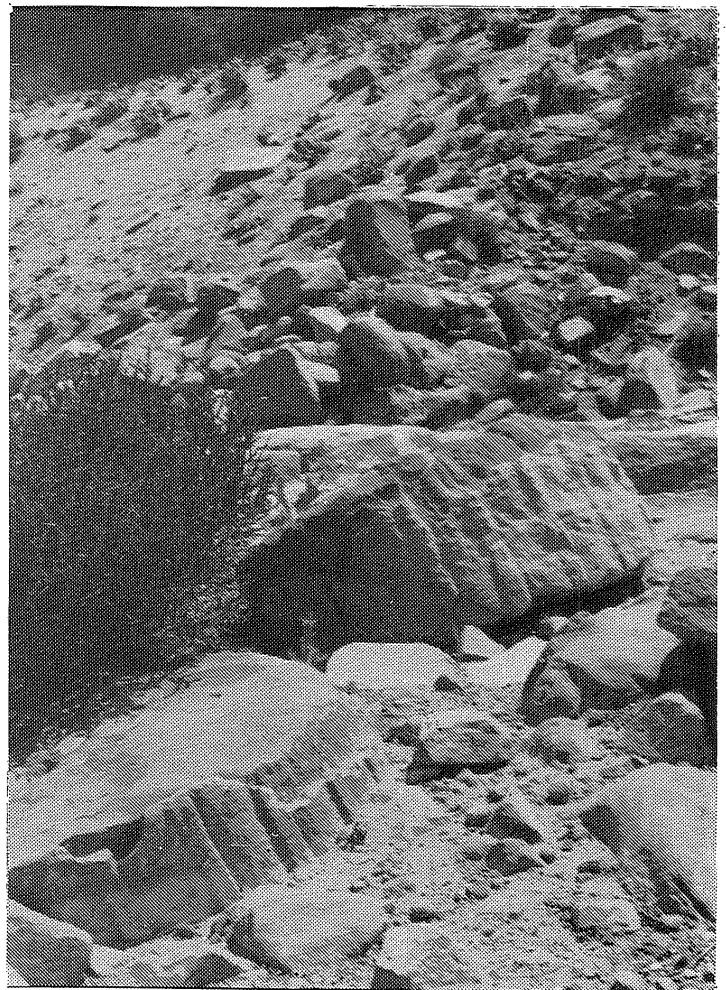


Pl. XXV: 2: Capital of a pillar on top of the "Burgberg"

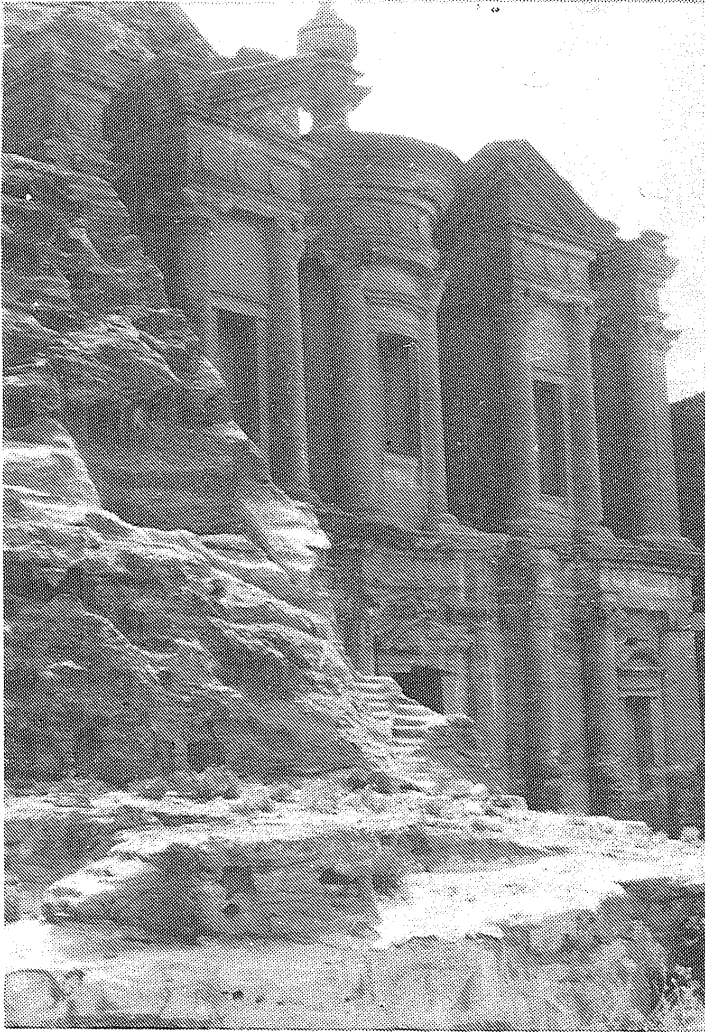




Pl. XXVI: 1: Protruding pavement of hexagonal slabs



Pl. XXVI: 2: Stuccoed drums of columns  
from the forecourt of ed-Deir



Pl. XXVII: 1: Rock altar of ed-Deir

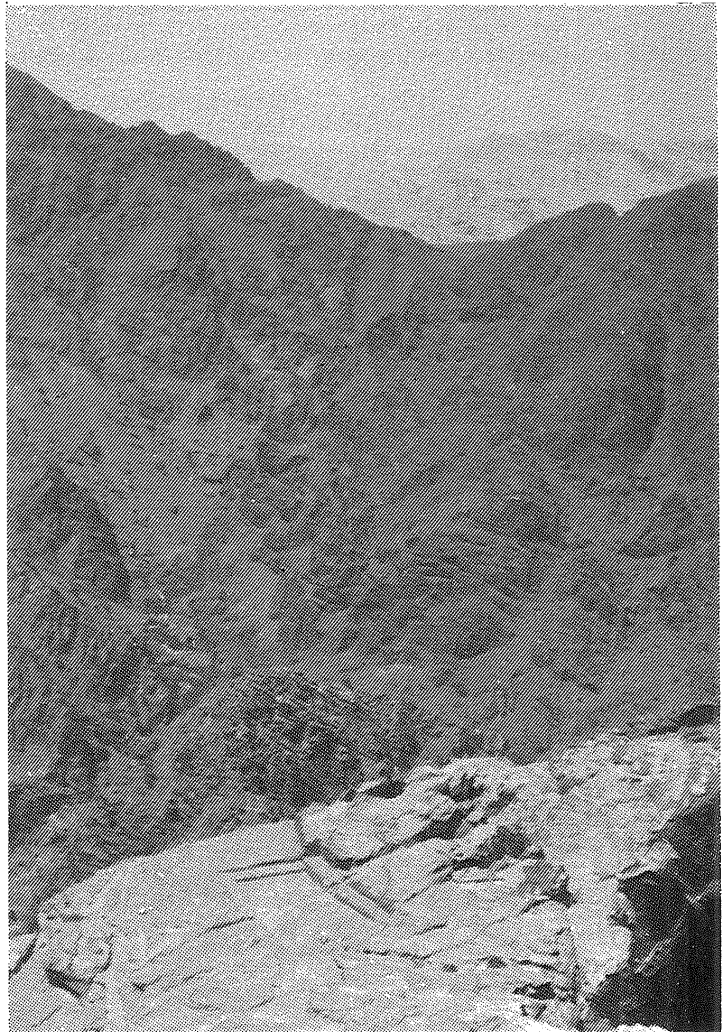


Pl. XXVII: 2: Geometrical design on the roof of ed-Deir





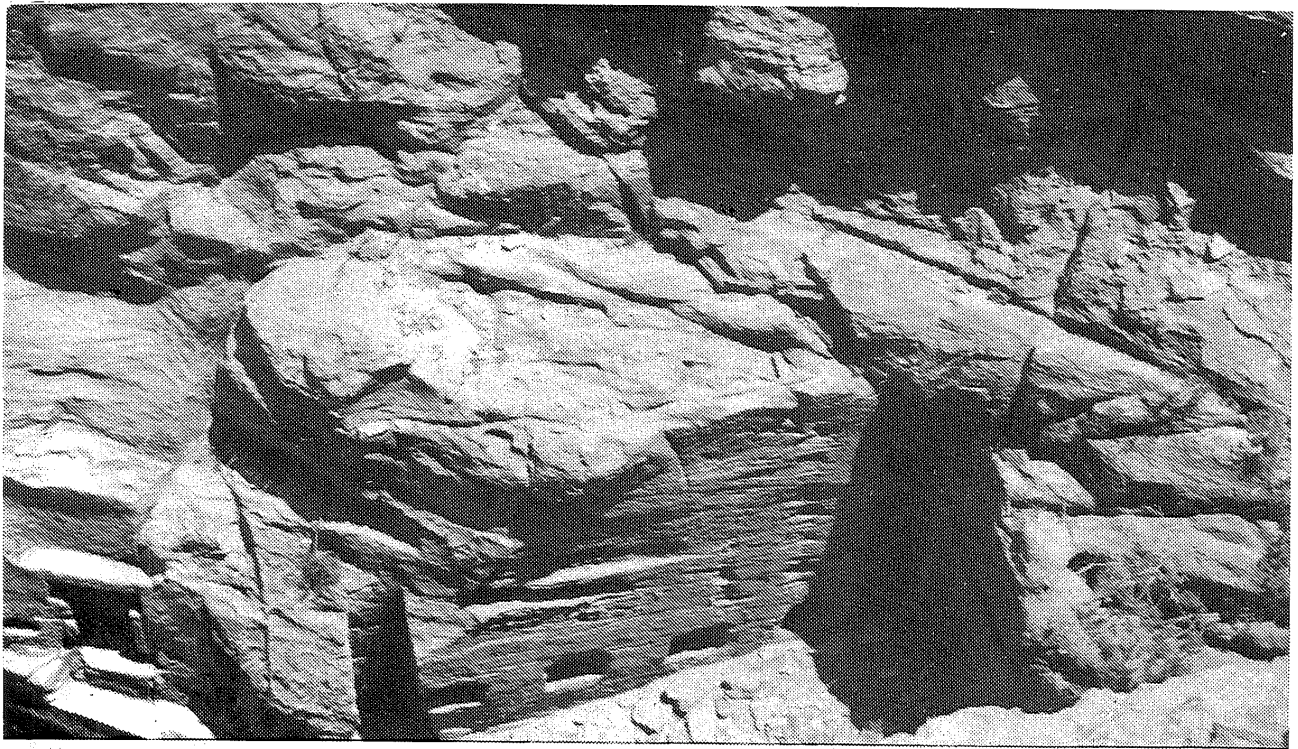
Pl. XXVIII: 1: Two idol niches near a flight of steps (left) leading to a dwelling with cisterns



Pl. XXVIII: 2 Triclinium in the north of the Deir-Plateau, also used for collecting water



Pl. XXIX: 1 Originally vaulted cistern

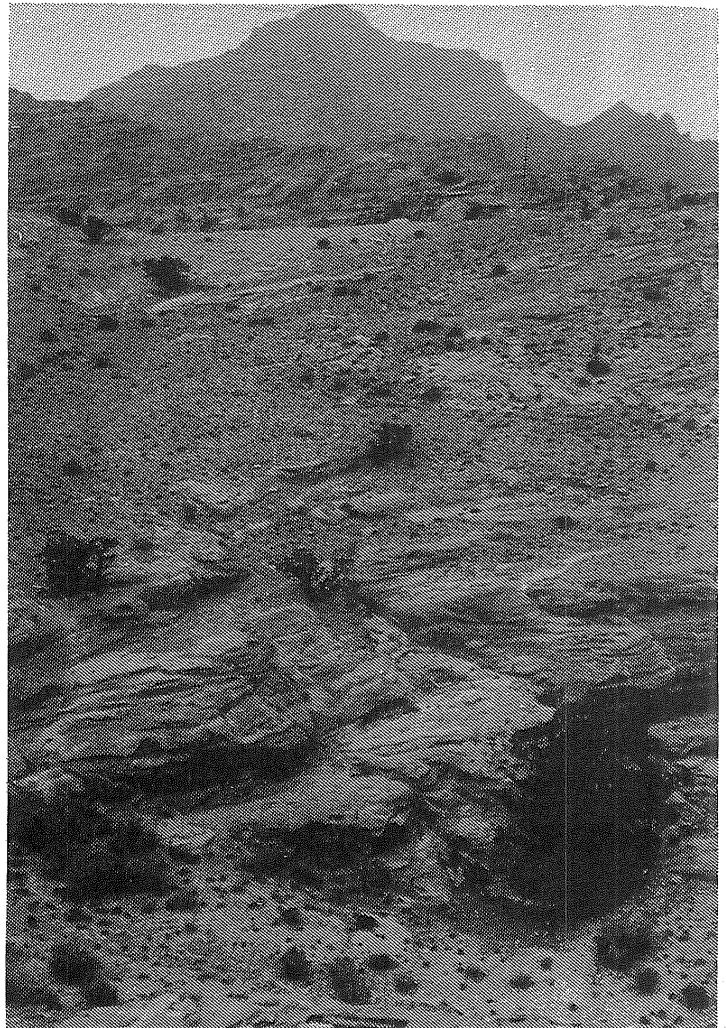


Pl. XXIX: 2: Originally vaulted cistern with the abutments for four arches, an incision for holding a wall and an idol niche





Pl. XXX: 1: Short Nabataean inscription near the cistern



Pl. XXX: 2: Location of the necropolis of rock graves

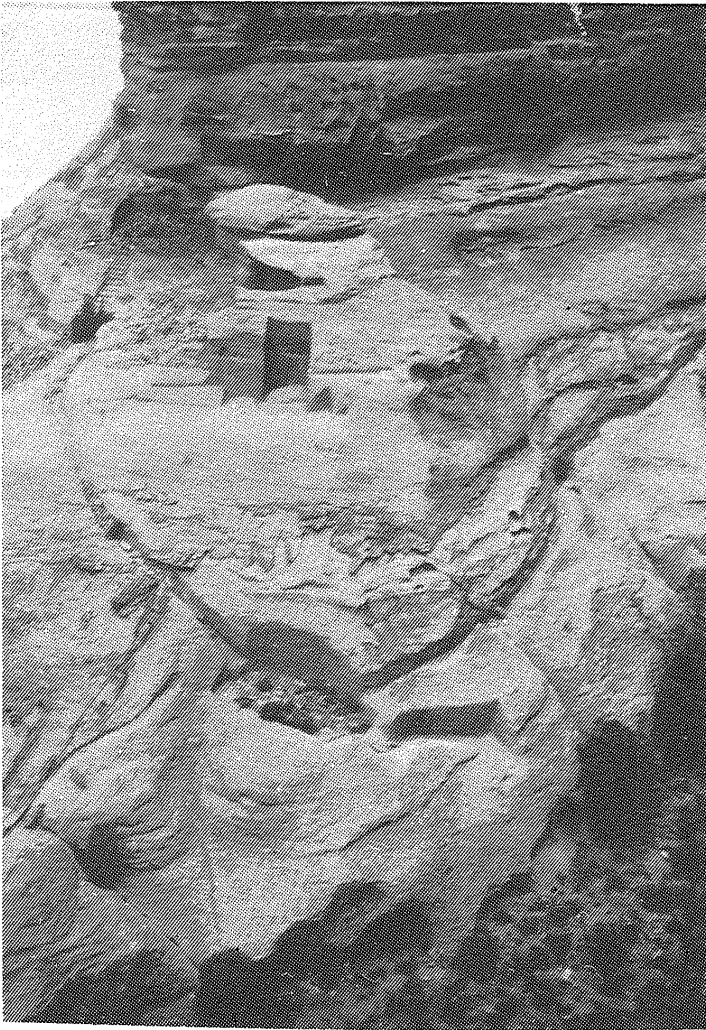




Pl. XXXI: 1: Detail of the rock graves with cup holes



Pl. XXXI: 2: Rock foundations of cliff dwellings



Pl. XXXII: 1: Water channels from the Deir-Massiv with the abutments for an aqueduct



Pl. XXXII: 2: Rock chambers with a cistern at the foot of a staircase leading to former cliff dwellings





Pl. XXXIII: 1: A newly described idol niche above the Camel Relief



Pl. XXXIII: 2: Ruin D 453, probably of a temple, on the Deir-Plateau

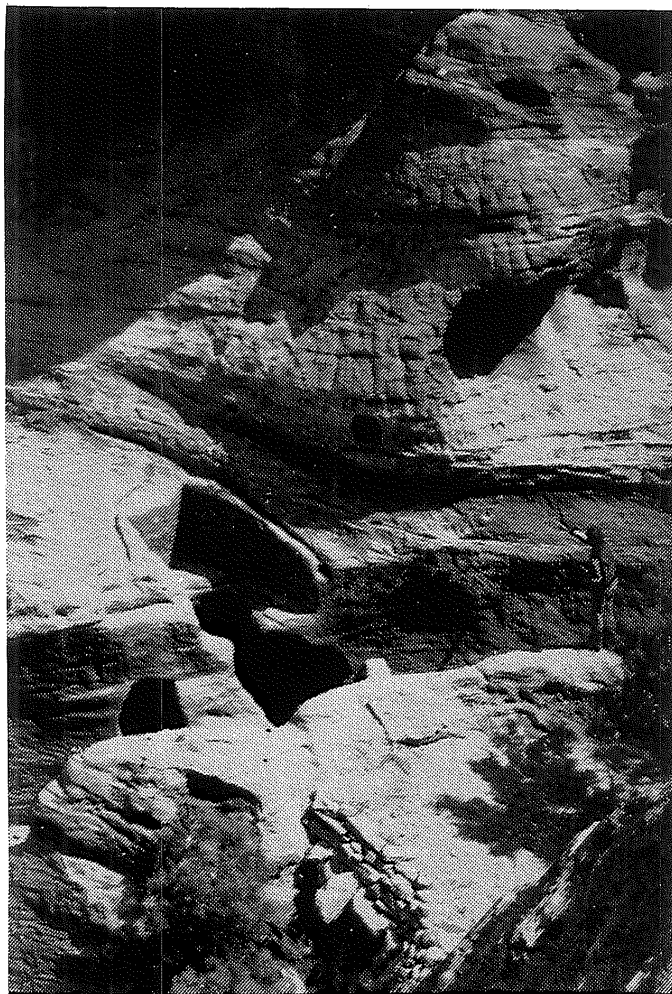


Pl. XXXIV: 1: Column base of the temple



Pl. XXXIV: 2: Detail of the ruin D 453 with the drum of an engaged column

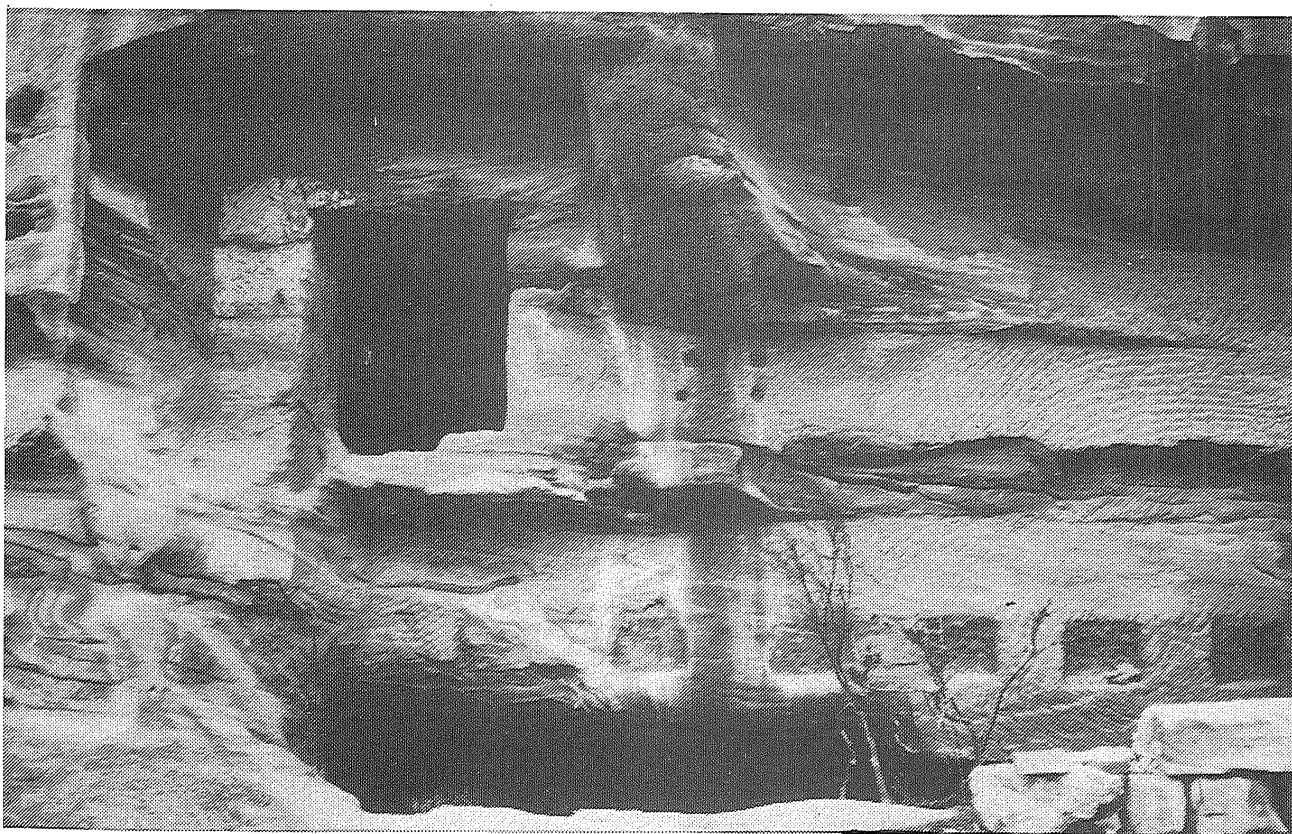




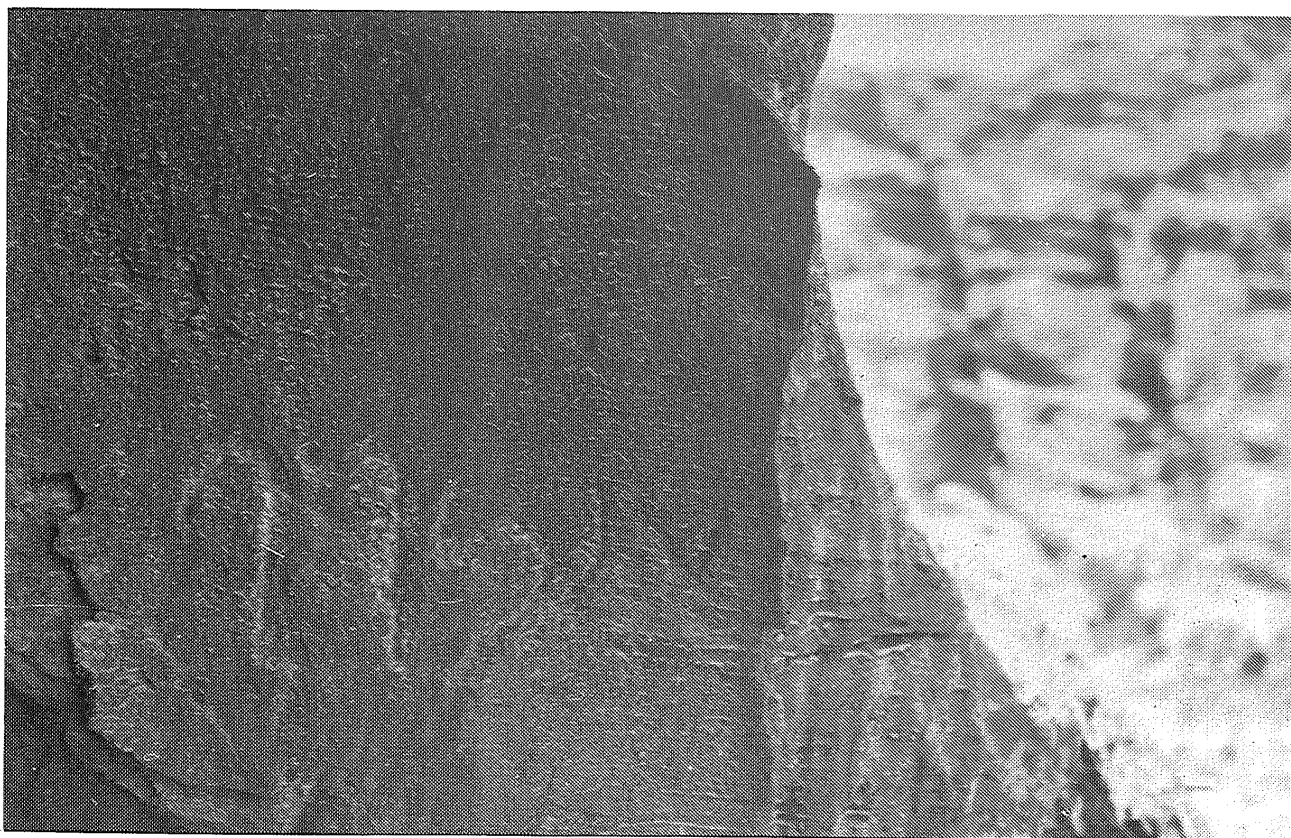
Pl. XXXV: 1: Re-used cistern near ed-Deir with a channel leading to more cisterns in the cliff of the Deir-Massiv



Pl. XXXV: 2: Water channel



Pl. XXXVI: 1: One of the big cisterns, originally vaulted, with abutments for arches, a block idol and rock chamber



Pl. XXXVI: 2: Nabataean inscription in a cave opposite ed-Deir



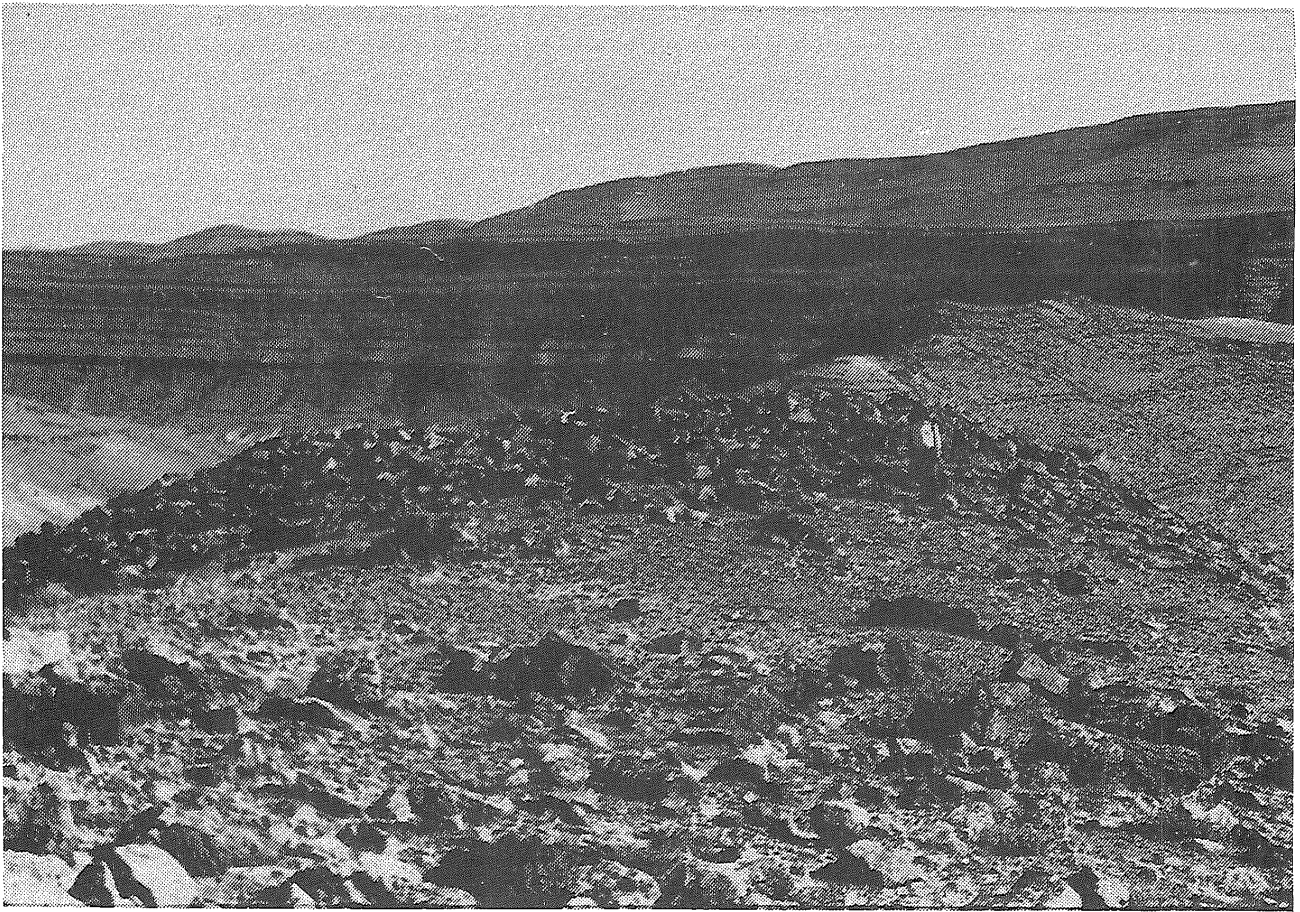


Pl. XXXVII: 1: Recently robbed tomb at southern end of upper segment of site; looking south.



Pl. XXXVII: 2: Umm Ubtūlah; looking north.





Pl. XXXVIII: 1: Northern tower (?) upper segment of site; looking south.



Pl. XXXVIII: 2: Indeterminate structures on east side of upper segment of site; looking south.





Pl. XXXIX: 1: Western side of upper segment of site; looking east.



Pl. XXXIX: 2: Lower segment of site; looking north.





Pl. XL: 1: Indeterminate structures on lower segment of site; looking north.



Pl. XL: 2: Erosion at southeast corner of site; looking northwest.





Pl. XLI: 1: AM84/48/28-29 Thamudic Inscription: The Old Edomite Escarpment



Pl. XLI: 2: AM84/54/11 Nabataean, Thamudic Inscriptions & Rock Art





Pl. XLII: 1: AM84/56/7 Icon & Prayer to 'Atrsm

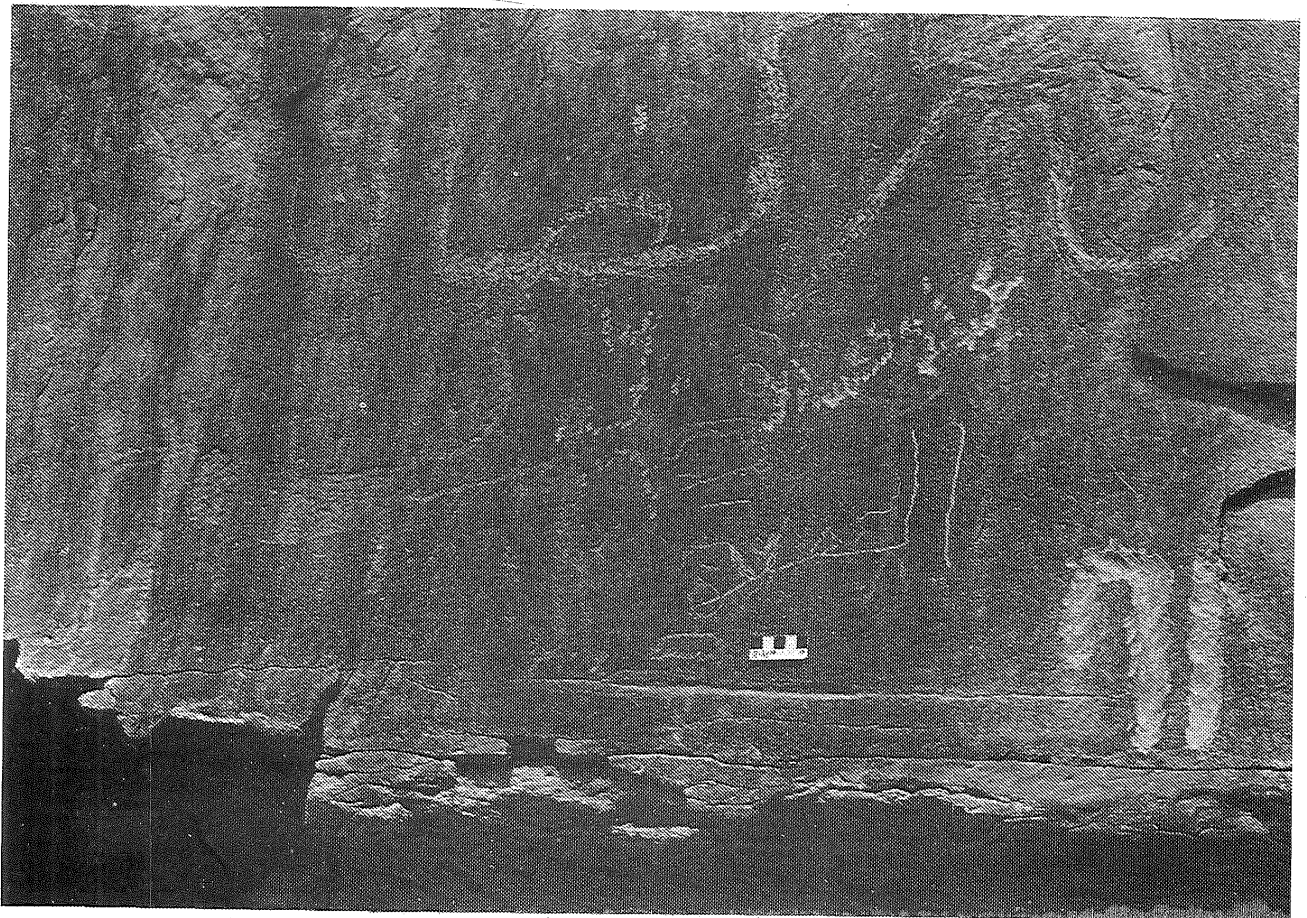


Pl. XLII: 2: AM84/52/30 Panel 1 - Thamudic Inscriptions & Rock Art



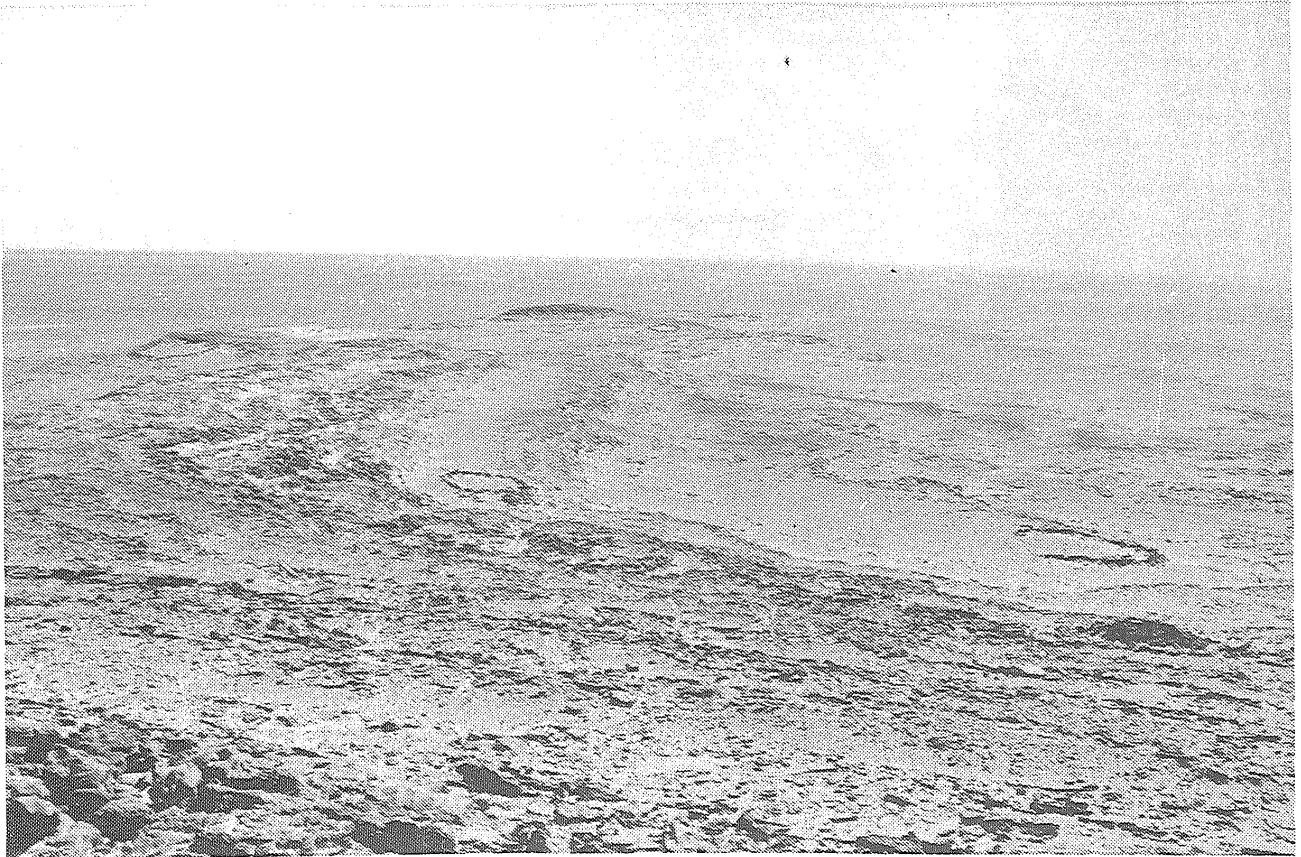


Pl. XLIII: 1: AM84/52/MB Panel 2 - Thamudic Inscriptions & Rock Art



Pl. XLIII: 2: AM 84/45/33 Thamudic Inscriptions & Rock Art





Pl. XLIV: 1: Teleilat Mehatat Mudawwara

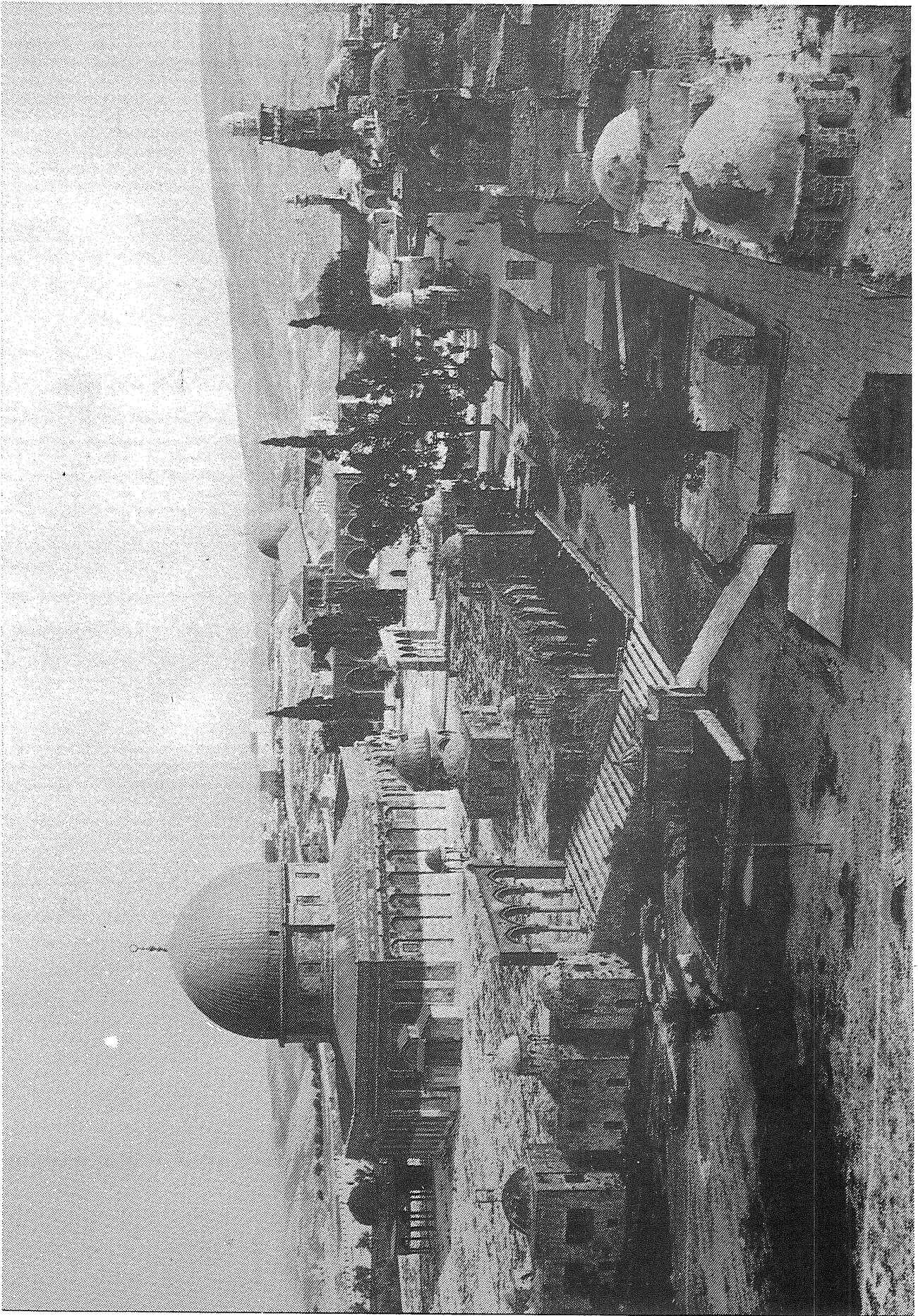


Pl. XLIV: 2: Teleilat Mehatat Mudawwara - Flint Assemblage



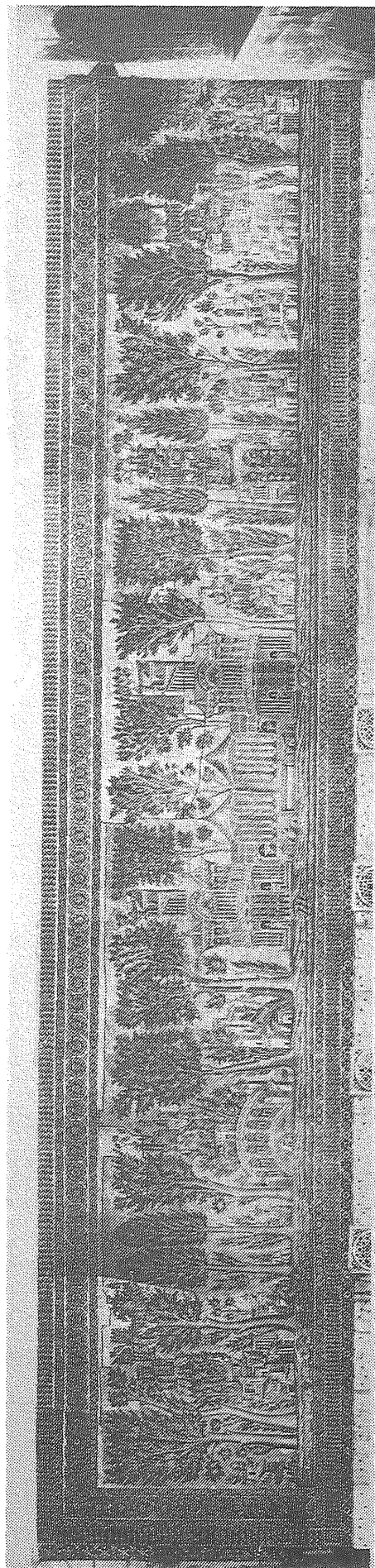
Pl. XLV: Teleilat Mehatat Mudawwara, Fan Scrapers & Polished Basalt Axe



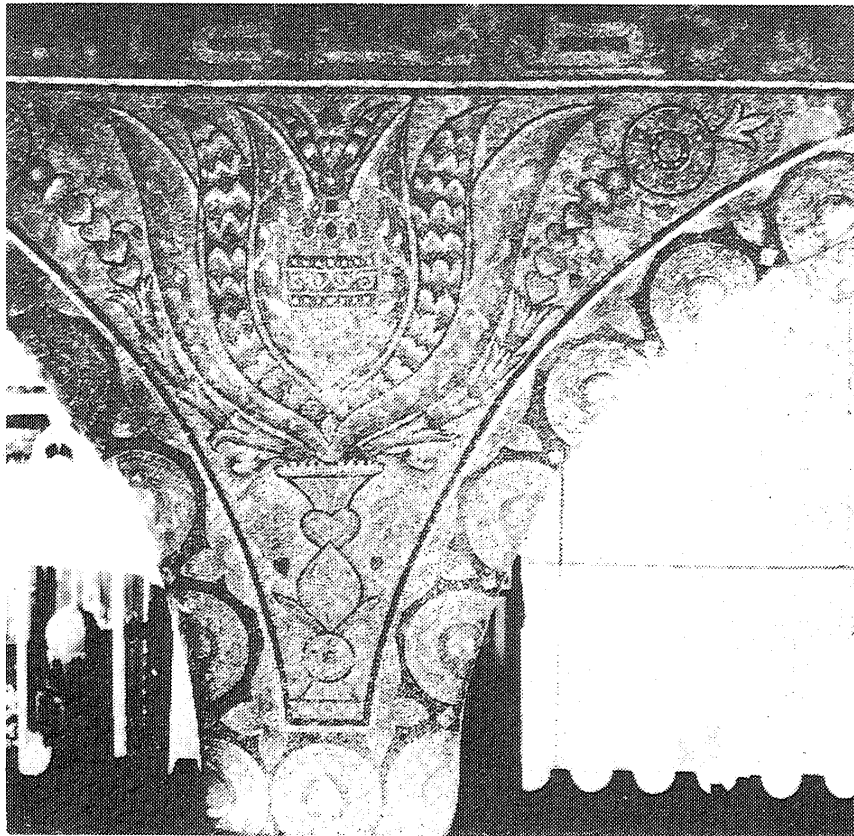
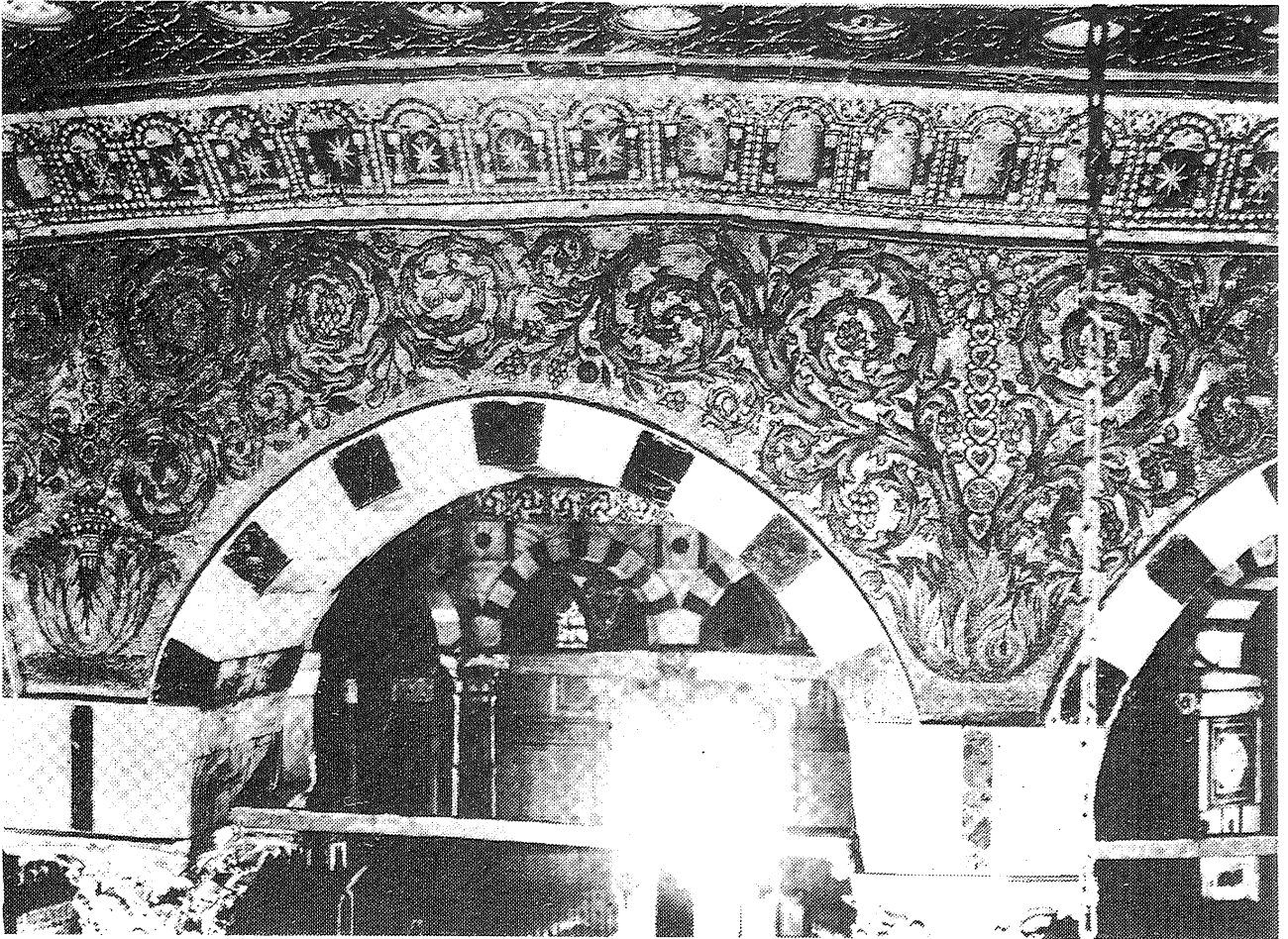


Pl. XLVI: Jerusalem, the Haram esplanade seen from the N-W. (Photo Foundation van Berchem)





Pl. XLVII: The Mosaics of the umayyad Mosque in Damascus (Photometry by I.G.N., Paris).

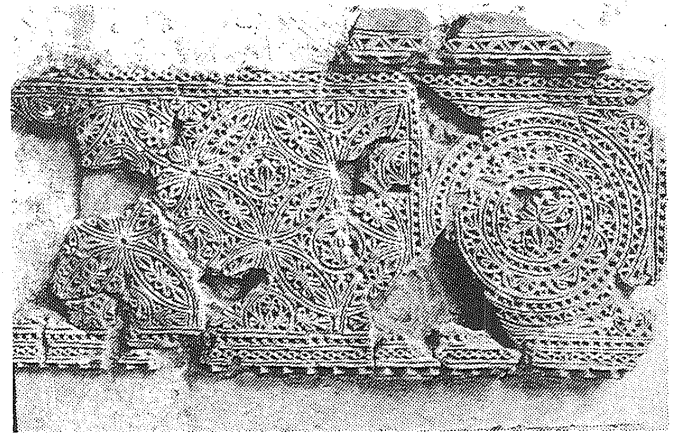
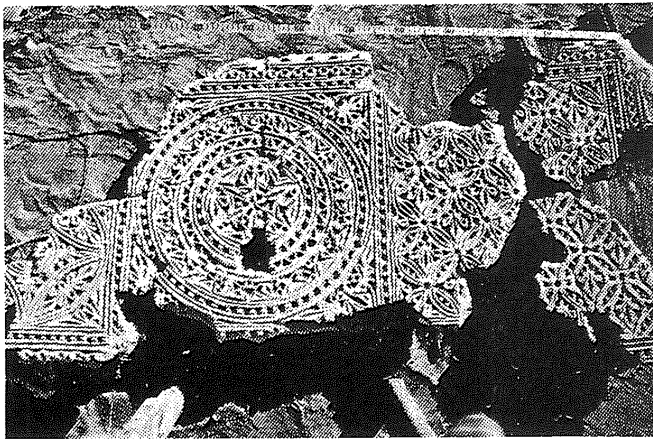
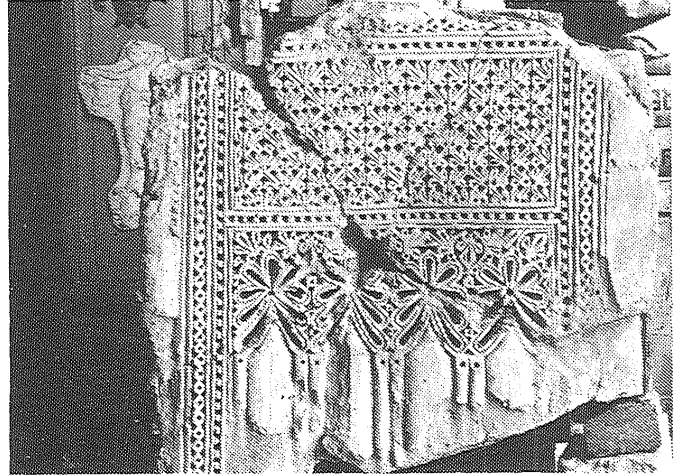


Pl. XLVIII: The Mosaics of the Dome of the Rock in Jerusalem; motif inspired by the lotus flower of Sassanid origin (Muslim Jerusalem, p. 53).



Pl. XLIX: Excavations of Marguerite van Bechem at Sadrata in Algeria in 1951 (Photo Foundation van Berchem).



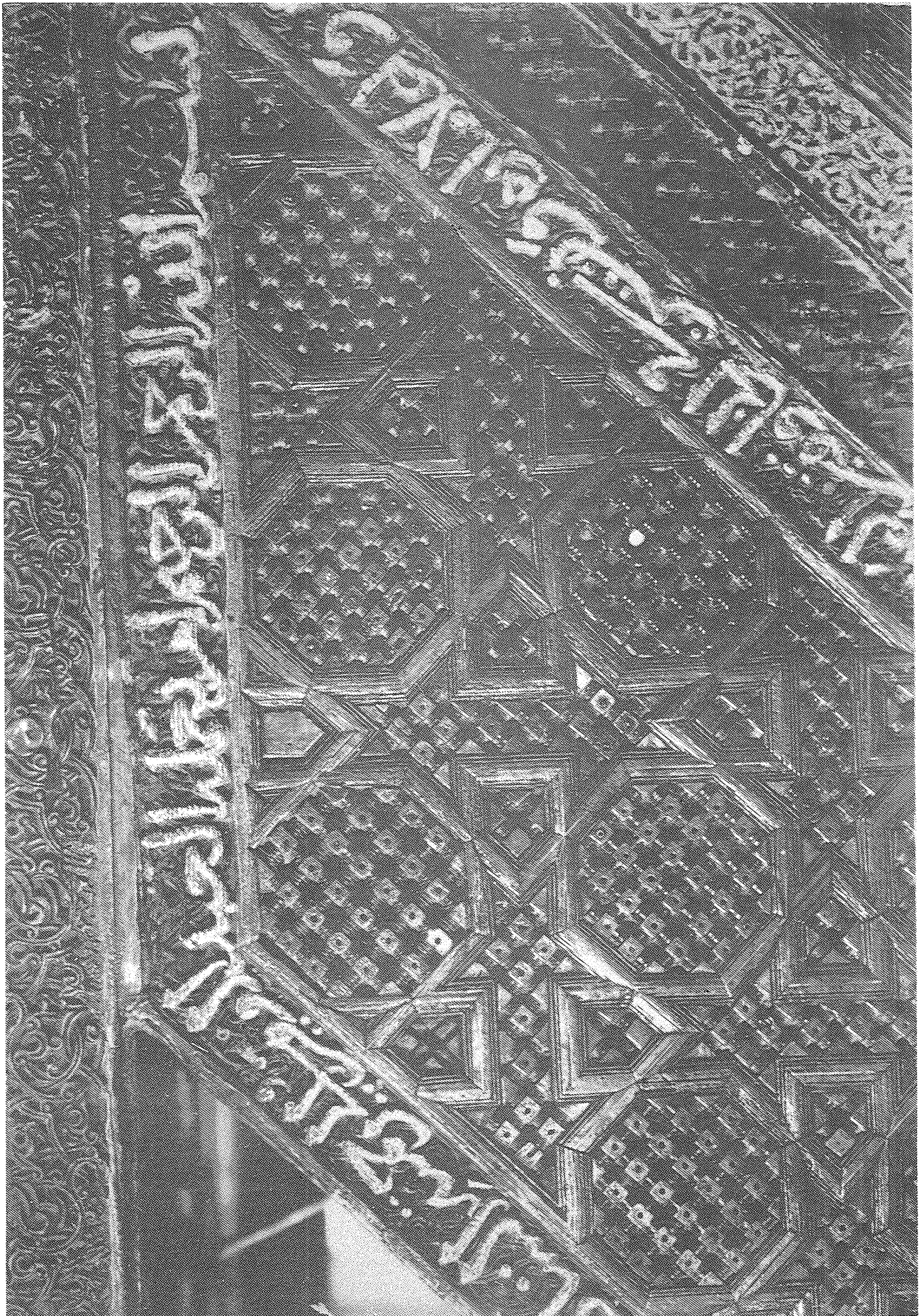


Pl. L: Stucco panels from the houses of Sedrata

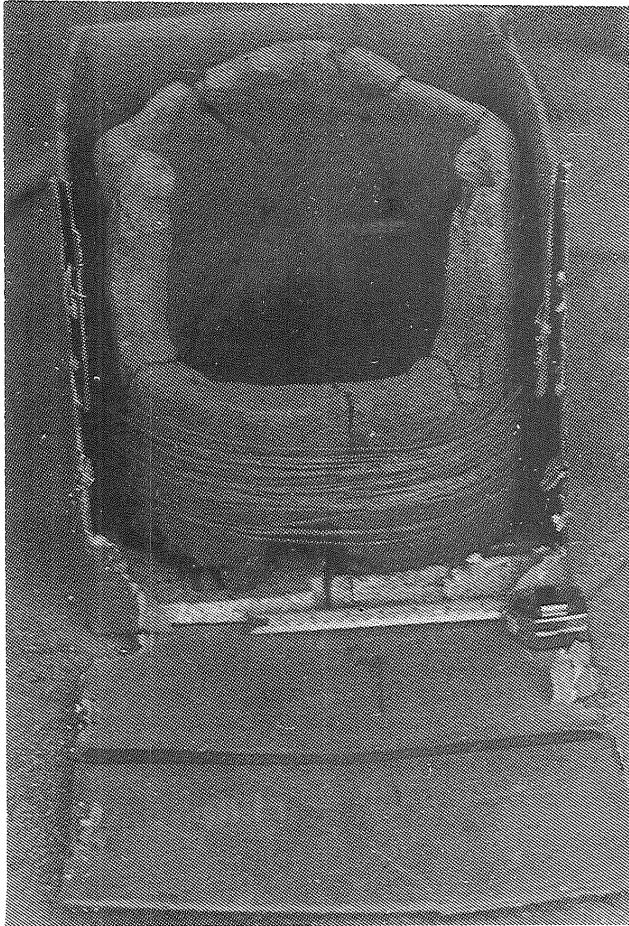


Pl. LI: Carved wood in the Haram Museum (Photo Foundation van Berchem).





Pl. LII: The Pulpit of Nur el-Dîn in the Aqsa Mosque before its destruction by fire in 1969. (Photo Foundation van Berchem, 2696).



Pl. LIII: 1: An Iron Age *wagdiah*, Deir Alla.



Pl. LIII: 2: An Umayyed *tabun*, Jerash.

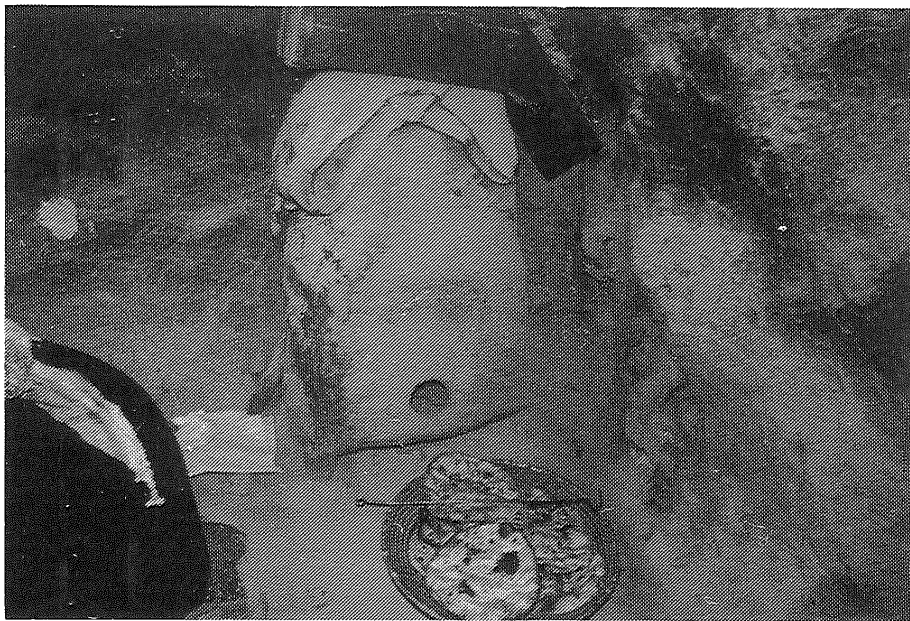


Pl. LIII: 3: A Late Bronze Age *tannur*, Tell Irbid.





Pl. LIV: 1: A *tabun* house, Hartha.



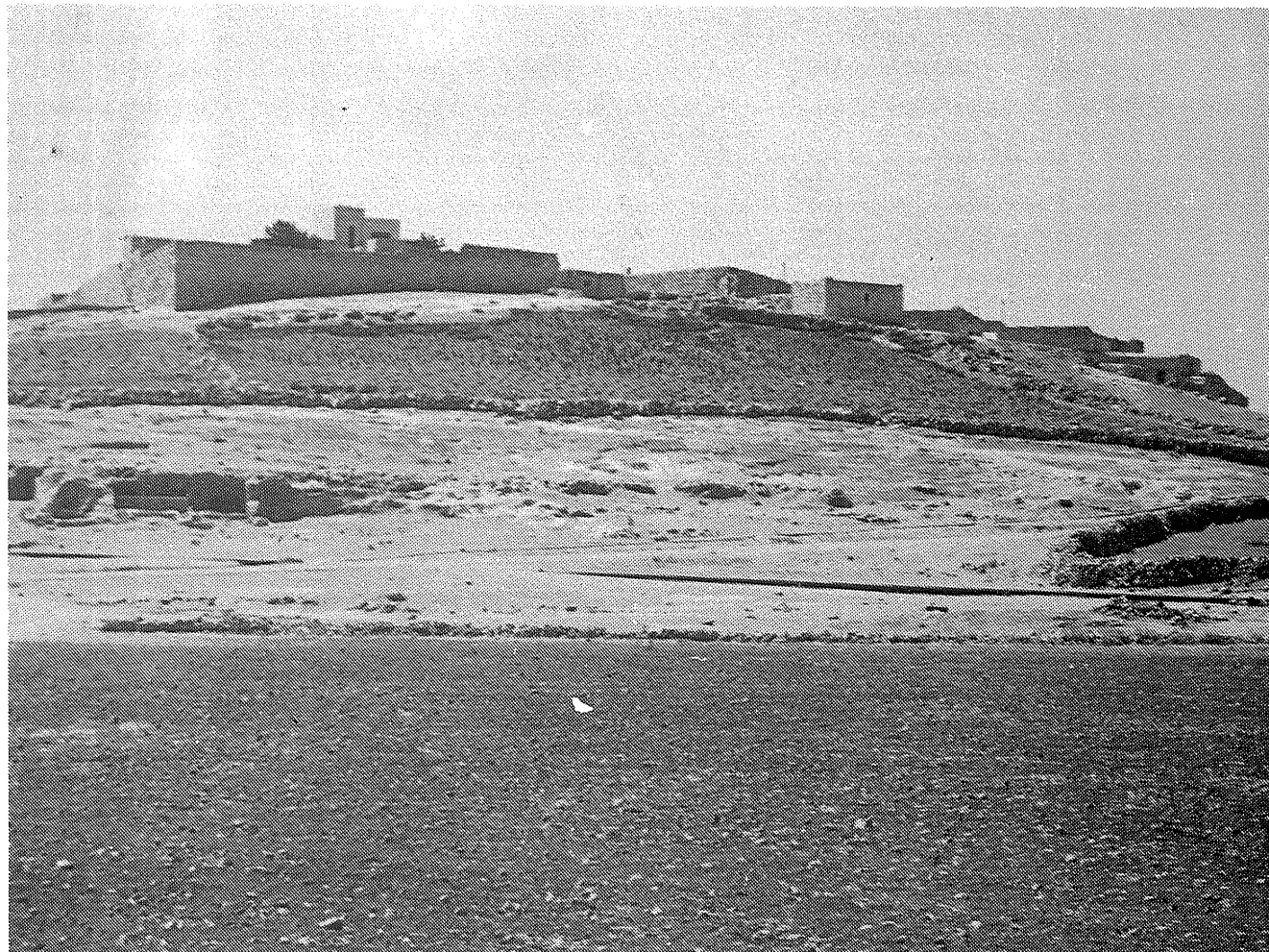
Pl. LIV: 2: A salt-bin in a *tabun* house, Hartha.



Pl. LIV: 3: The bread-making process using a *tabun*.



Pl. LV: 1: Fortified House at Mushaggar

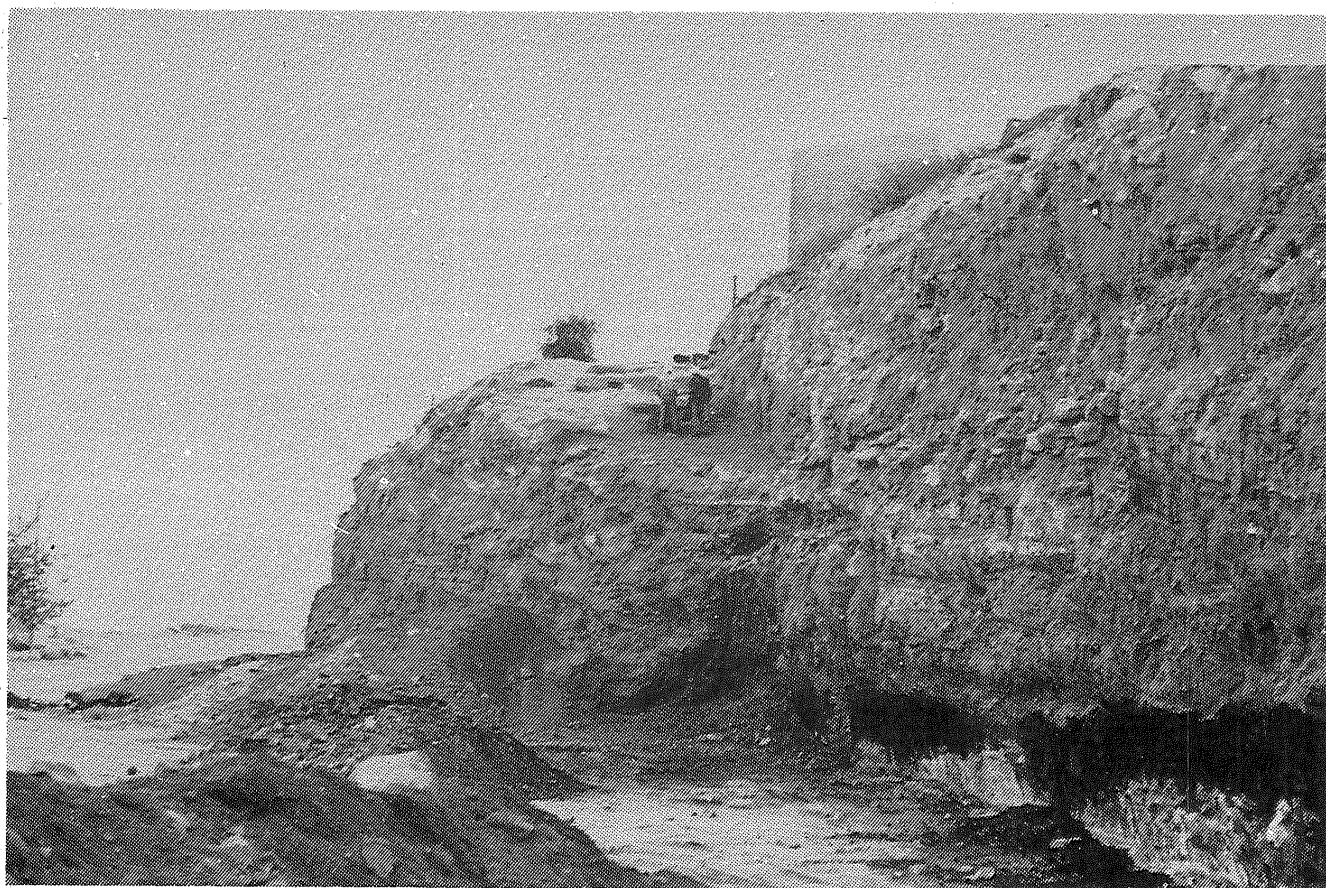


Pl. LV: 2: Fortified Village of Yadudah





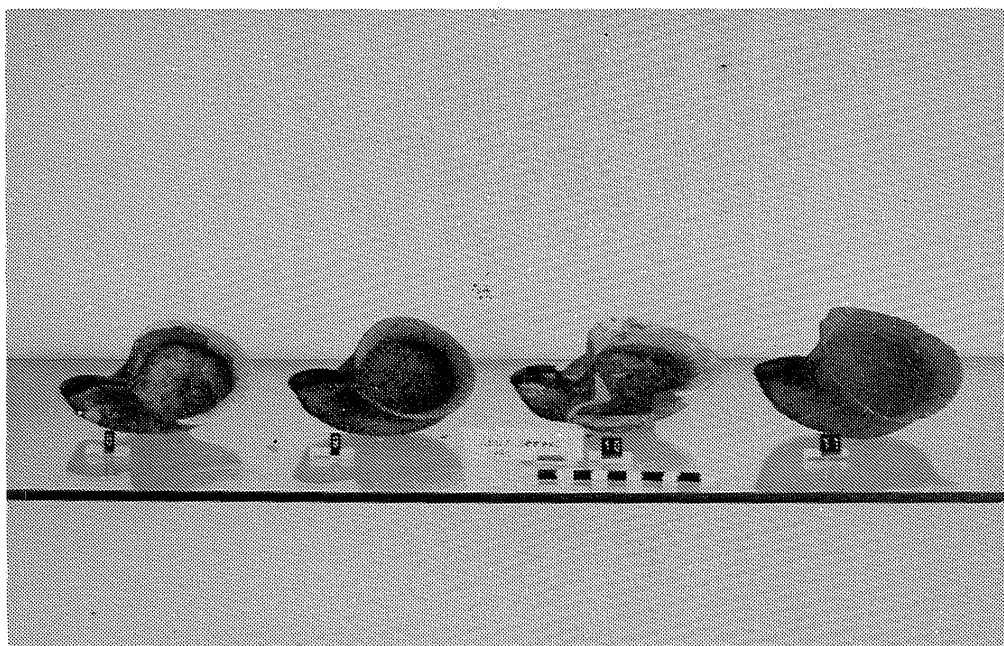
Pl. LVI: 1: Construction of installation wall at Khirbet Salameh



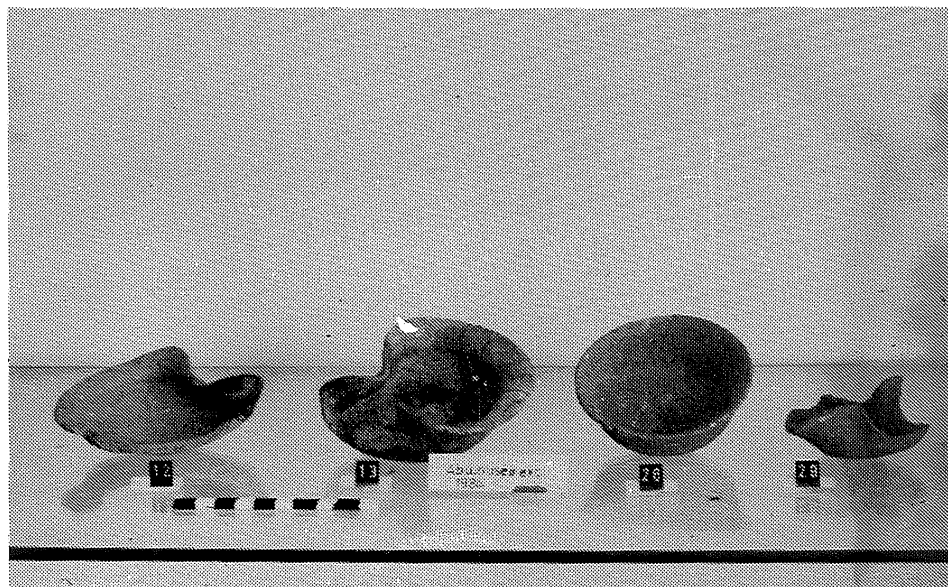
Pl. LVI: 2: Rescue excavation on the west side of Tell Irbid.



Pl. LIX: 1: 7, 34



Pl. LIX: 2: 8, 9, 10, 11



Pl. LIX: 3: 12, 13, 28, 29





Pl. LX: 1: 15, 16, 17, 18



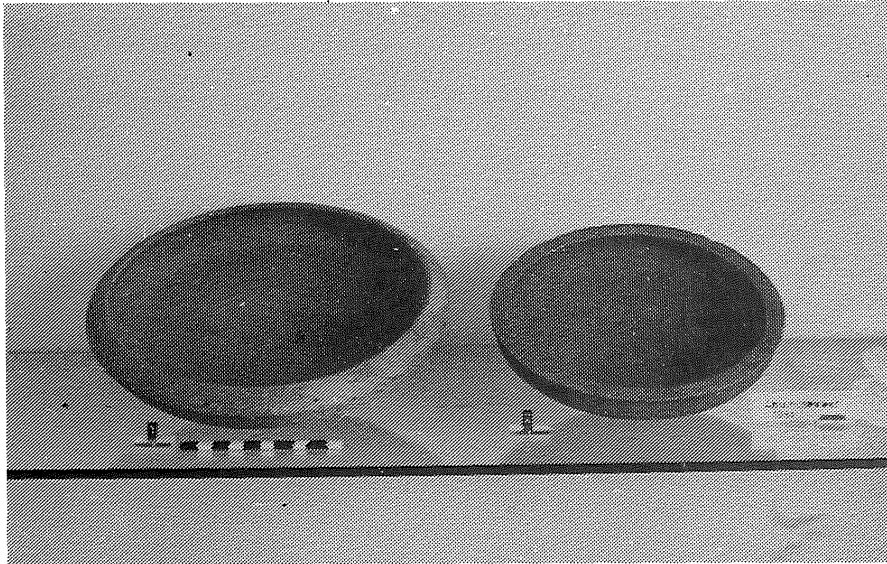
Pl. LX: 2: 19, 20, 21, 45



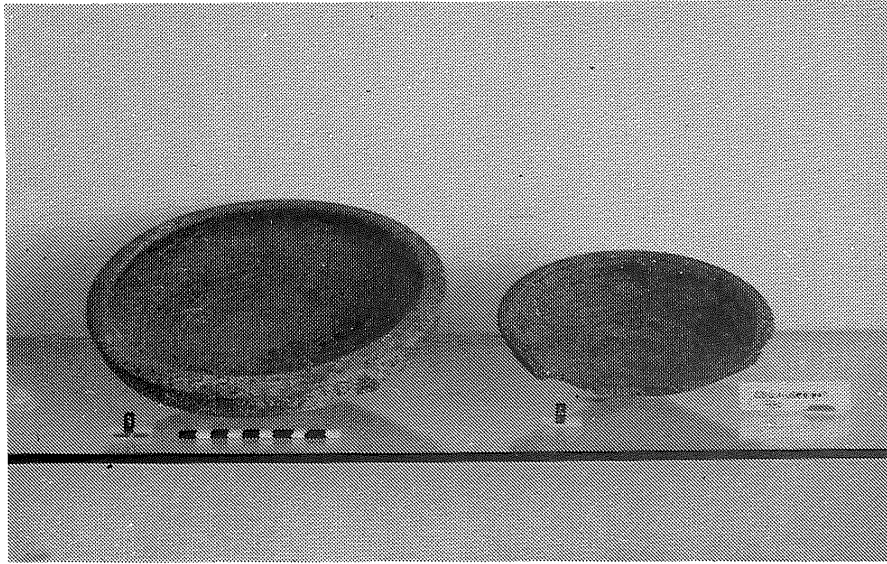
Pl. LX: 3: 22, 24, 25, 27, 35, 46



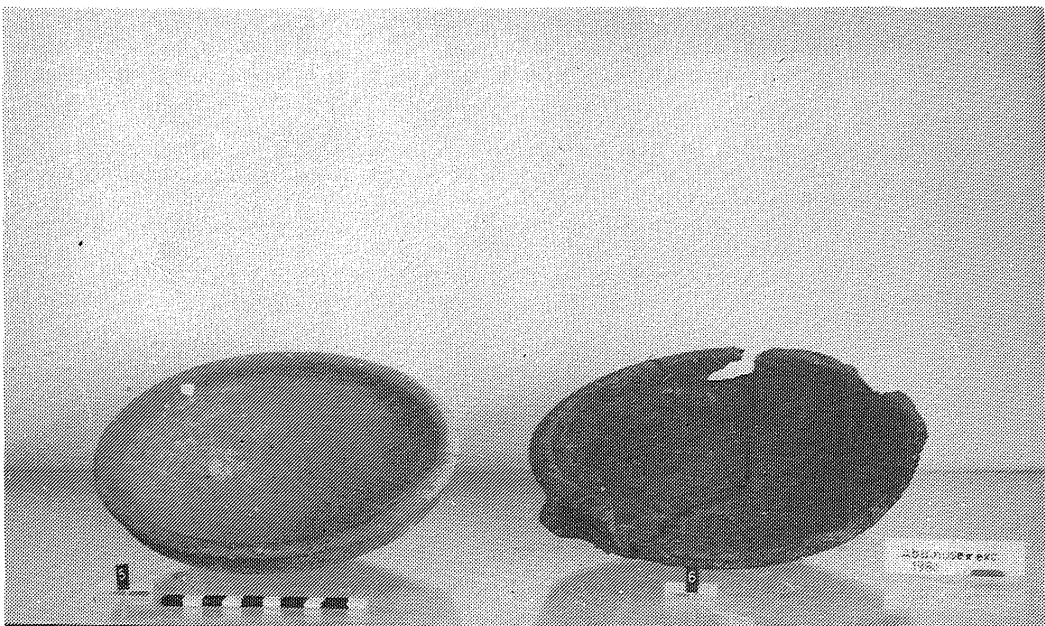
Pl. LVII: The facade of the tomb excavated in Ham.



Pl. LVIII: 1: 1, 2



Pl. LVIII: 2: 3, 4



Pl. LVIII: 3: 5, 6





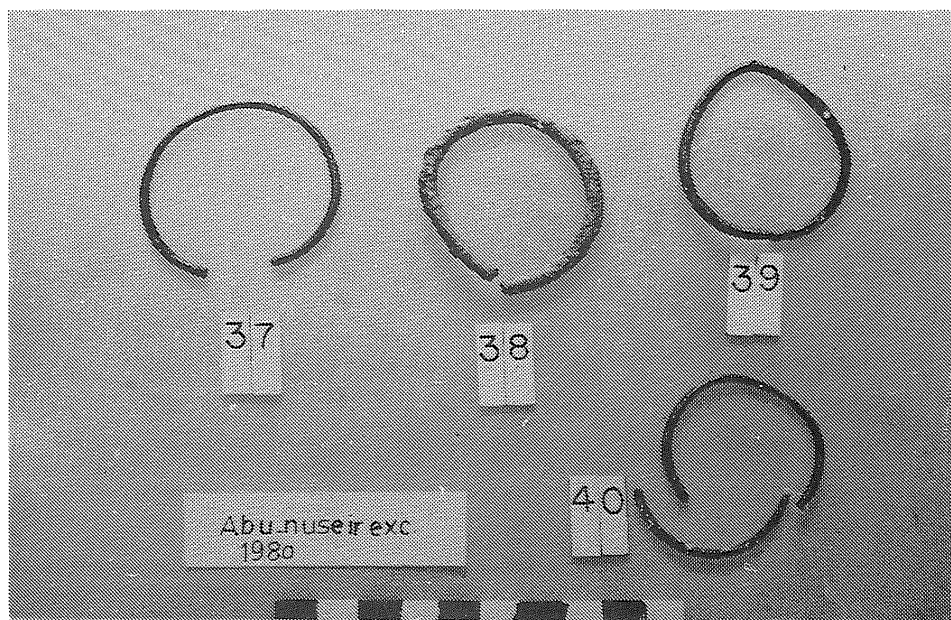
Pl. LXI: 1: 23, 26



Pl. LXI: 2: 30, 31, 32, 36



Pl. LXII: 1: 33, 47



Pl. LXII: 2: 37, 38, 39, 40

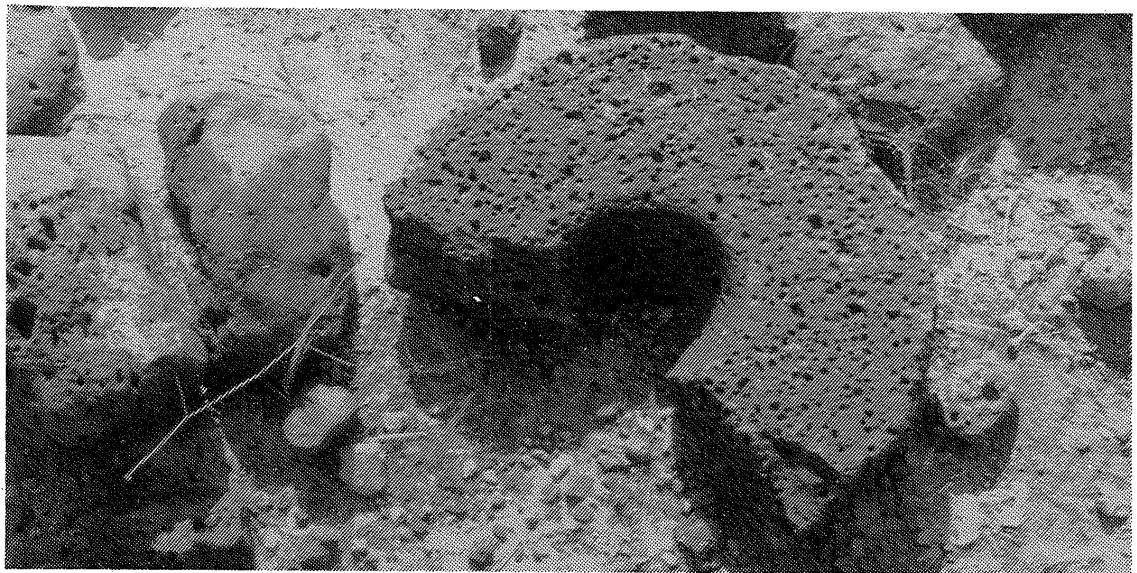


Pl. LXII: 3: 43, 44

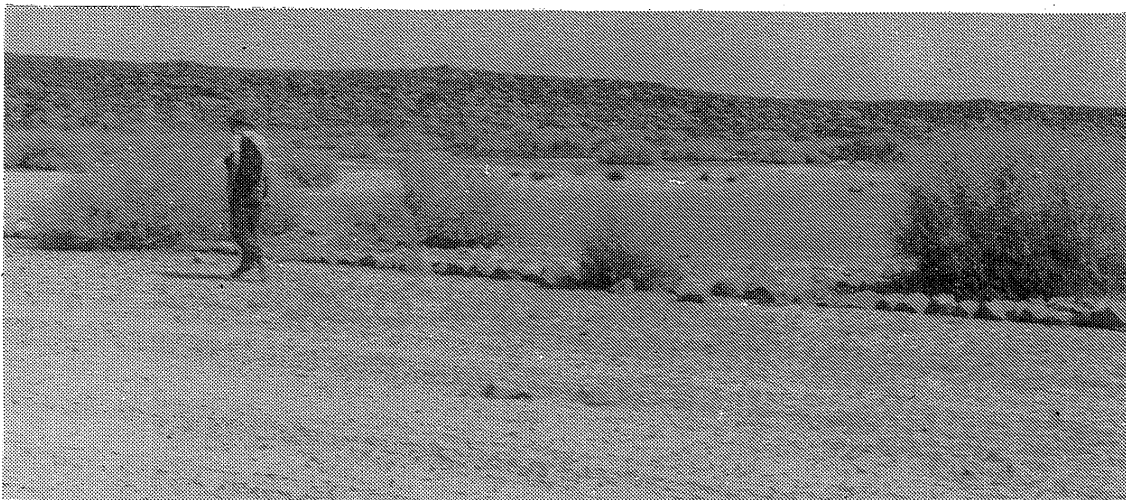




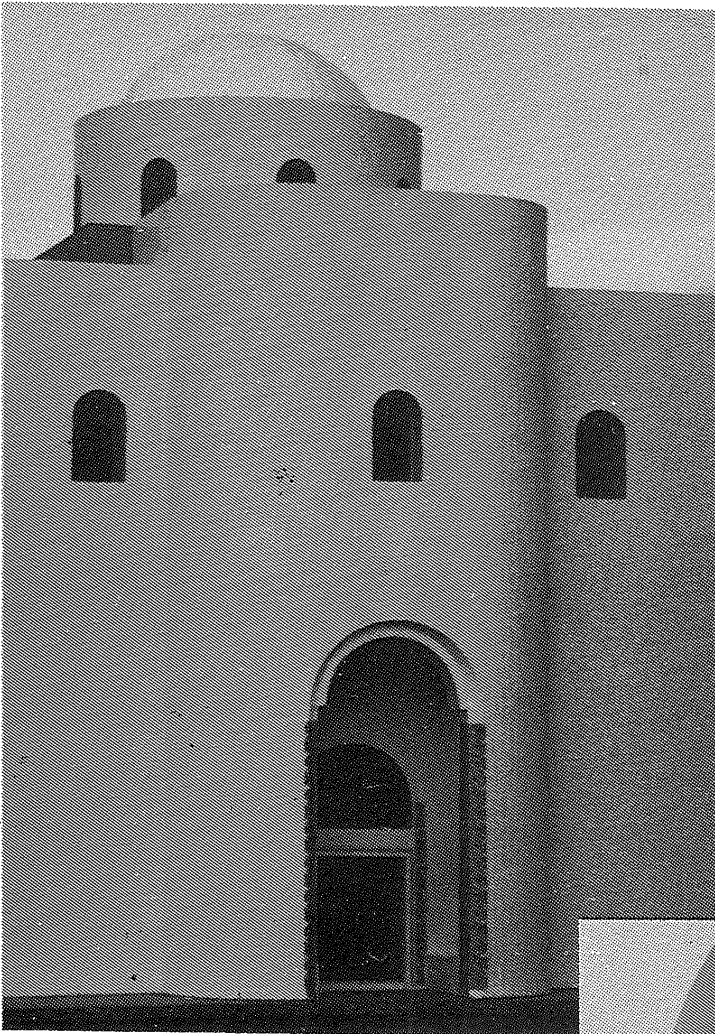
Pl. LXIII: 1: The base of a Roman milestone north of Rujm Mudawer



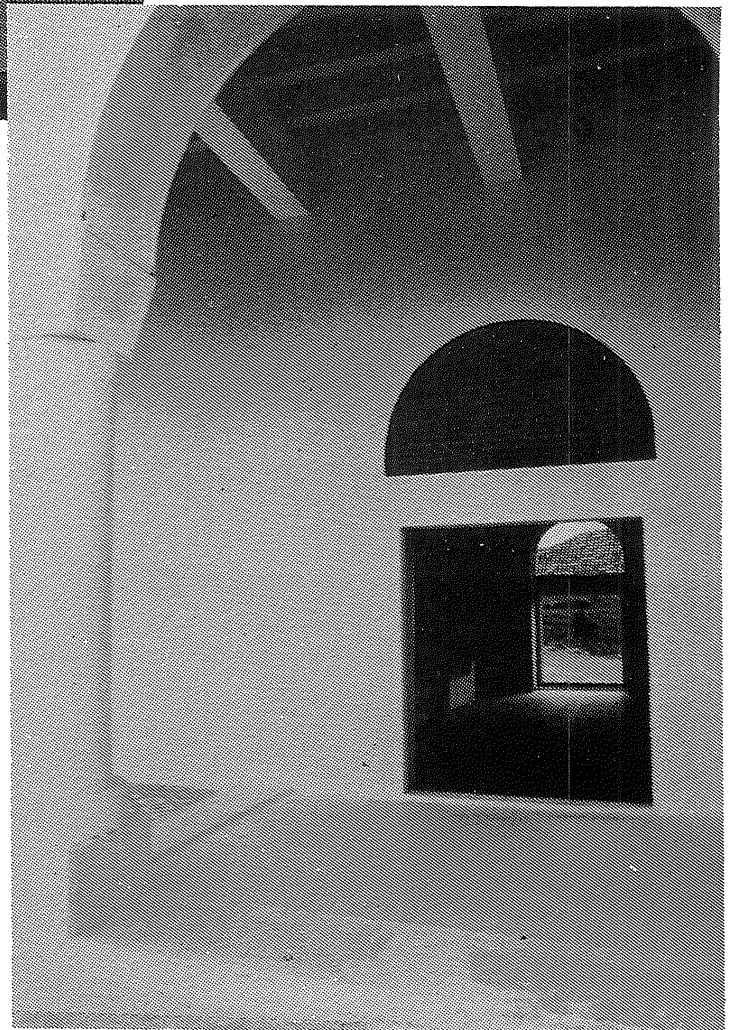
Pl. LXIII: 2: A basalt quern, with no associated structures.



Pl. LXIII: 3: The foundation course of a causway curving across the Wadi bed.

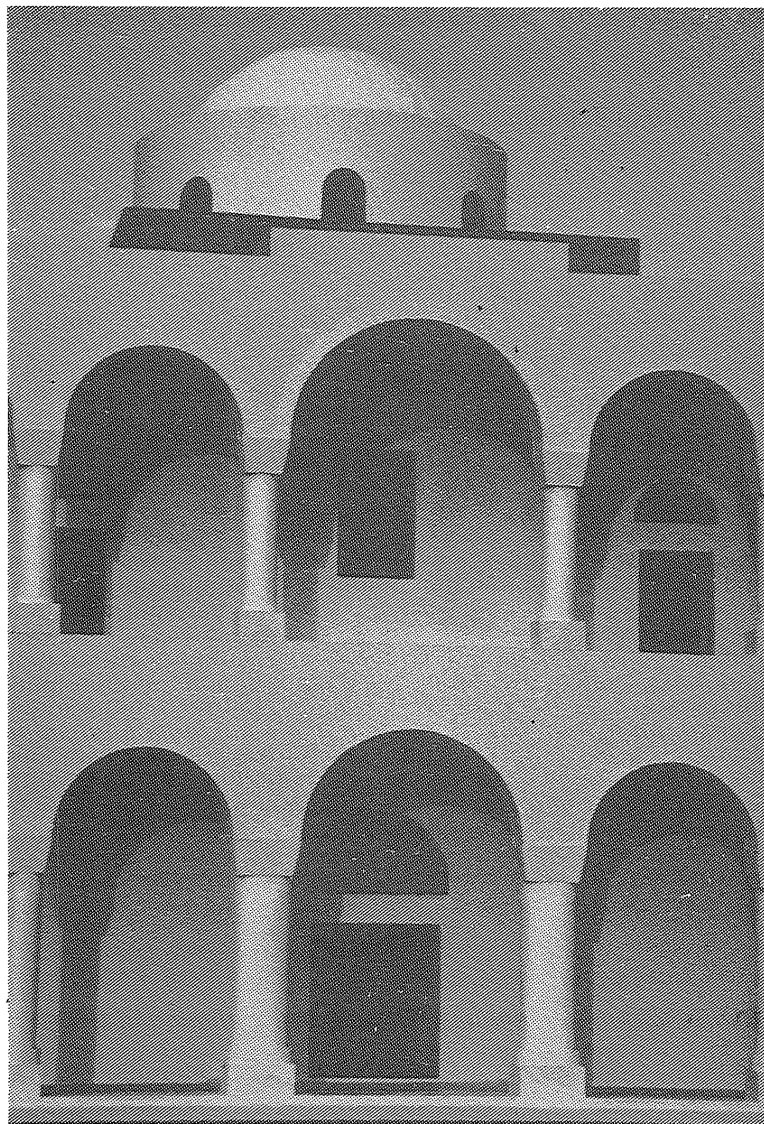


Pl. LXIV: 1: Qaştal, Maquette de Restitution, par Frédéric Morin. Le Bloc d'Entrée. Vue d'ensemble depuis l'extérieur.

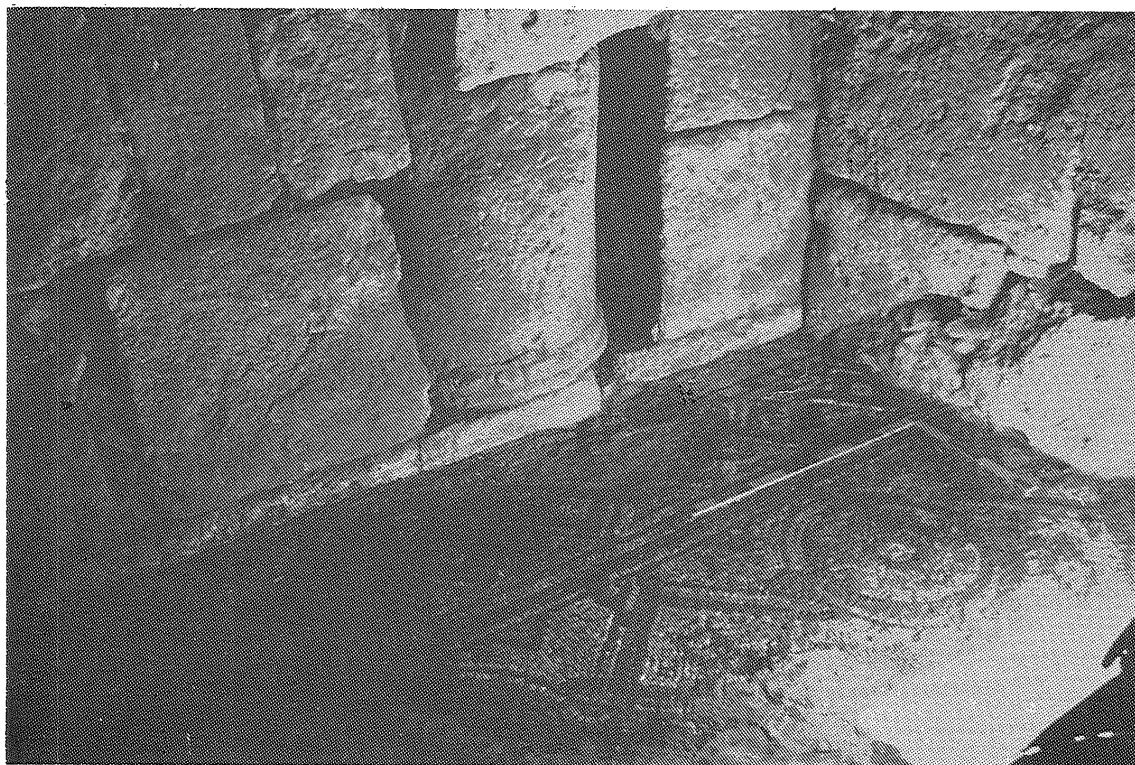


Pl. LXIV: 2: Qaştal, Maquette de Restitution, par Frédéric Morin. Porte Sur la Cour du Vestibule d'entrée.

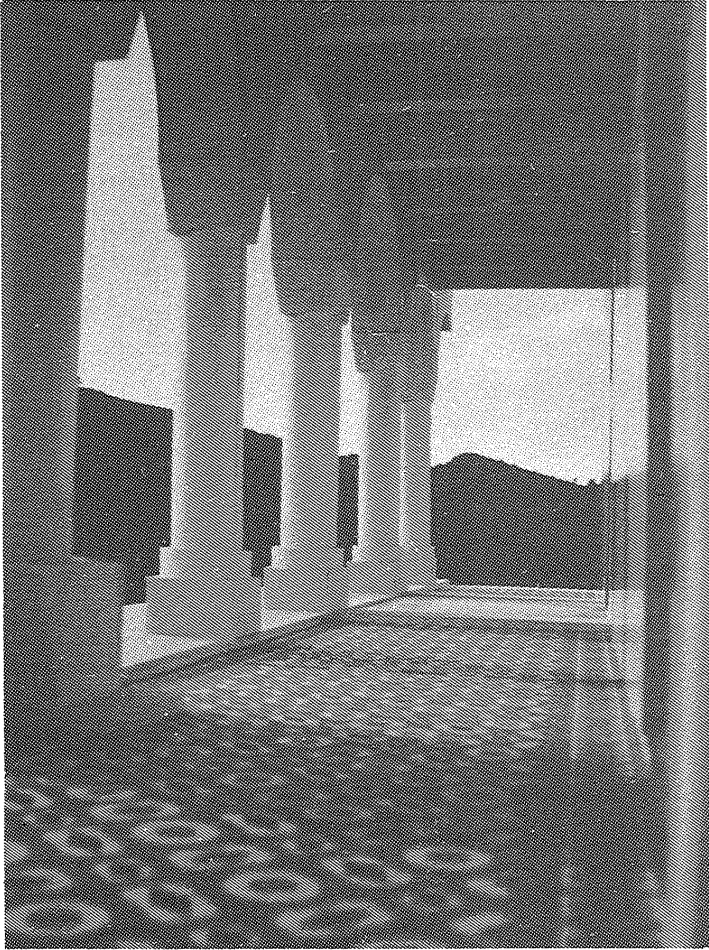




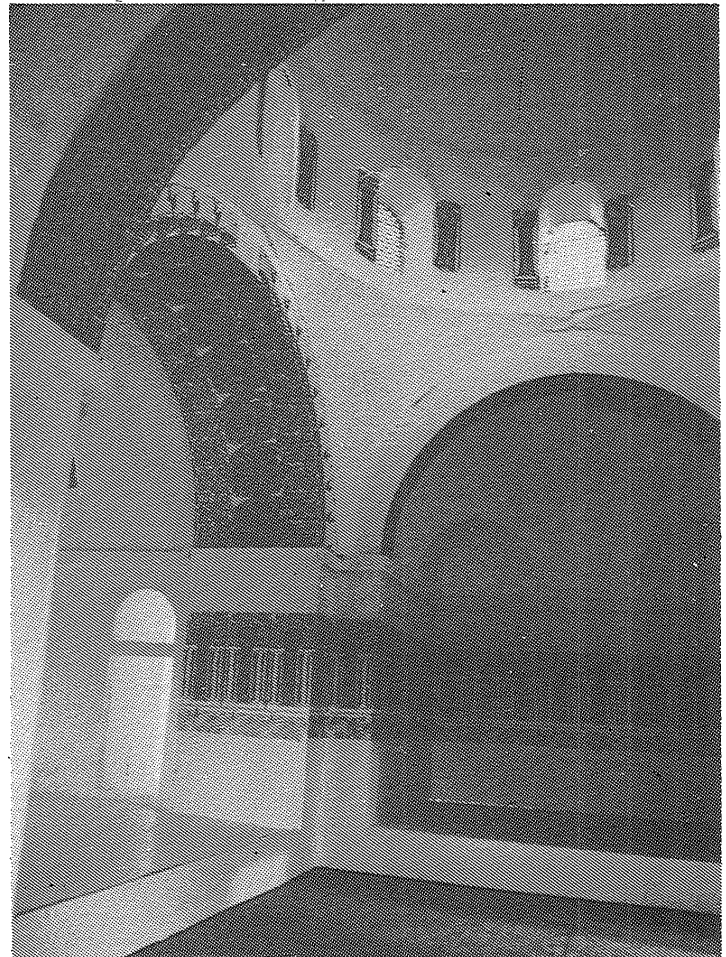
Pl. LXV: 1: Qasṭal, Maquette de Restitution, par Frédéric Morin.  
Bloc d'entrée, façade sur Cour.



Pl. LXV: 2: Angle Sud-Ouest du Portique, mosaïques Polychromes à décor géométrique. Photo F. Morin.



Pl. LXVI: 1: Qaştal, Maquette de Restitution, par Frédéric Morin. Le Portique du Rez-de-Chaussée à l'Est de la Cour.



Pl. LXVI: 2: Qaştal, Maquette de Restitution, par Frédéric Morin, Salle d'audience au dessus du vestibule, Coupole centrale, absides est et sud vues de l'abside nord.





Pl. LXVII: 1: Wadi Arab Site 052, Tell Ra'an, Looking South.



Pl. LXVII: 2: Wadi Arab Western Sector, looking north east from Tell Zira'a. Sites 013 and 012 are on the terraces to the north of the Wadi.





Pl. LXVIII: 1: Wadi Arab eastern sector, looking west. Site 089 is around the figure in the right foreground.



Pl. LXVIII: 2: Wadi Arab Site 032: Cliff face above the Wadi Zahar with tunnel entrances, looking South West.





Pl. LXIX: 2: Wadi Arab Central Sector, facing north. Sites 057 and 058 are on the terraces south of the wadi.



Pl. LXIX: 1: Wadi Arab site 032: Interior of one of the tunnels, showing tooling on the rock face.