

THE HASHEMITE KINGDOM OF JORDAN

ANNUAL
of the
DEPARTMENT OF ANTIQUITIES

XXVII

TEXT

AMMAN
1983

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5. 000 Jordanian Dinars (Jordan and Middle East)
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Dead line for Submission of Articles is November Ist of each year, and to be mailed to the following address :

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Amman
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THE 1982 EXCAVATIONS AT 'AIN GHAZAL: PRELIMINARY REPORT

by
Gary O. Rollefson

Introduction

The Department of Antiquities of Jordan conducted nine weeks of excavations at the PPNB village of 'Ain Ghazal from January through mid-April, interrupted during February by inclement weather.

'Ain Ghazal is an extensive site located in the Wadi Zarqa in the municipality of 'Alya near the eastern limits of Amman.[1] The hillside on which the site is situated has been cut by highway and commercial construction, revealing plaster floors, stone walls, and other architectural features which extend 600 metres in a north-south direction (Fig. 1). Although flint artefacts are found throughout the area from the 'Amman-Zarqa highway west to the top of the hill *(ca.* 275 metres E-W), the density of flakes, blades, and cores drops off sharply in the vicinity of the limestone escarpments and outcrops approximately 200 metres west of the highway. *In situ* plaster floors occur 80 metres west of the road near the northern roadcut, and chips of plaster with red ochre have been found approximately 150 metres west of the highway near the northernmost modern house on the hillslope. The area of the site is nearly 12 hectares *(ca.* 30 acres) in extent, ranking in size with Tell Abu Hureyra in northern Syria (Moore, *et al.* 1975: 52) and roughly three times the size of contemporary Jericho (Kenyon, 1960: 39).

Site Setting

The Zarqa River valley, the longest drainage in Jordan, contains a permanent stream fed by numerous springs in the 'Amman area and others farther downstream. Steep-sided in much of the upstream sections near 'Amman, the area around 'Ain Ghazal (Spring of the Gazelle) opens into a relatively shallow basin on the western side of the valley near the junction of two large tributary *awdiyah* (wadis) that originate from the west and southwest. This area constitutes an ecotone between the high *jibal* (mountains) and deep *awdiyah* (wadis) to the west and southwest and the rolling hills and plains to the east and northeast. The area receives sufficient rainfall today for dry-farming on the tops and slopes of nearby hills, although the sides of the Wadi Zarqa are generally too steep for effective agriculture. Aerial photos of the region, taken in 1952, reveal that the bottomlands along the river bed were highly productive areas for farming in the past.

Excavation Goals And Procedures

The construction of the 'Amman-Zarqa highway in 1974 removed the easternmost fringes of the PPNB village, and the removal of large sections of the southern and northern sectors of the site for commercial and other highway construction, destroyed even larger areas in subsequent years. Bulldozer sections left by these activities were quite steep, some being vertical and even undercut in some places. All of these sections represented a continued threat in the future due to erosion.[2]

[1] Dr. M. Khair Yassine of the University of Jordan first brought the site to our attention in late 1981. We would like to thank him for his interest, and we hope that soon he may become a partner in the 'Ain Ghazal Project.

[2] It is to Dr. Adnan Hadidi's credit that potential damage in the future by commercial development on the site has been prevented by his rapid and forceful intervention.

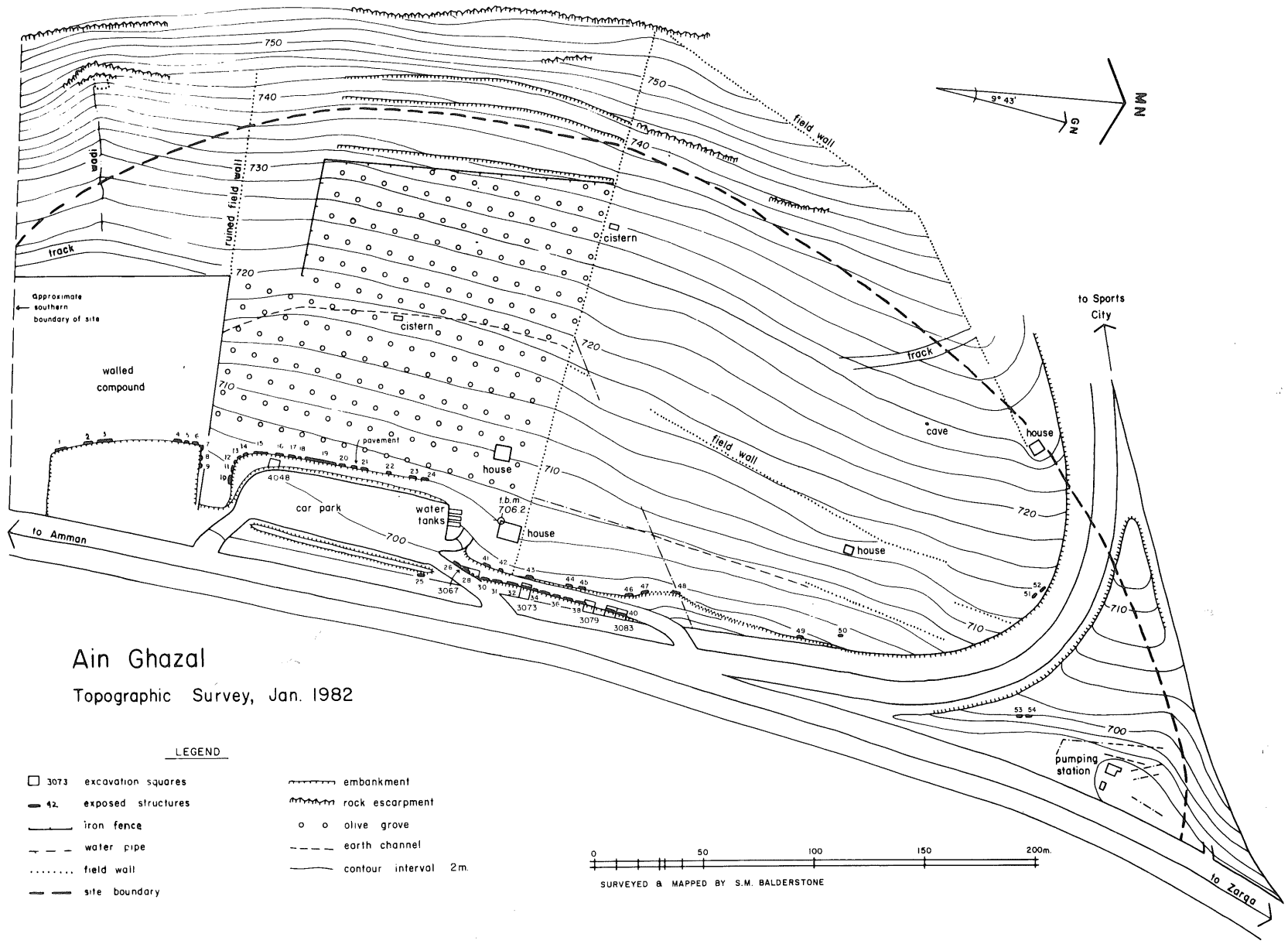

Fig. 1: Site map of 'Ain Ghazal.

One of the primary goals of the 1982 season, therefore, was to mount a salvage operation to retrieve as much information as possible in the threatened areas of the site. At the same time, a step trench in the east-central portion of the site would provide detailed information on the chrono-stratigraphic history of the site through some three metres of accumulated archaeological deposits. In addition, an unexcavated section adjacent to the west and upslope from the Step Trench provided another two metres of visible stratigraphy. A number of sub-floor burial pits was noticed early in the season, and a considerable effort was expended to salvage this crucial information. A series of three superimposed plaster floors in one area was selected for excavation in hopes of learning about domestic arrangements and construction in a limited amount of time. Finally, two adjacent plaster floors were selected for relatively broad exposure.

An imaginary 5.00 x 5.00 m. grid 1 km. on a side (Squares 0001-40,000) was placed over the site fixed to a series of datum points, and all excavation areas were located according to this grid. The northwest corner of each square was selected as the local elevation datum, all of which were measured in to a fixed datum near the center of the site.

Excavation proceeded according to natural strata, using 0.10 m. horizontal levels in natural layers more than 0.15 m. thick. All excavated sediment was dry-sieved through half-centimetre mesh screen to retrieve as much faunal and archaeological material as was possible. Sediment from particular features, such as burial pits, hearths, and house floors, was saved for flotation to recover charred paleobotanical material from the water surface and small artefacts from the heavy fraction that did not pass through the *ca.* 0.001 m. mesh screen.

Preliminary Results

An abundant array of information concerning the occupation of 'Ain Ghazal resulted from the short period of time spent at the site. The following sections provide a summary of the preliminary analyses of the data.

1) Artefacts

a). Chipped stone artefacts (Fig. 2). The 1982 season produced a total of 22,871 chipped stone artefacts (Table 1). Discounting debris, tools comprised nearly 12% of the material, a healthy relative frequency for a permanent settled village. In contrast, cores occurred at a surprisingly low level of only 1.6%, suggesting either that the primary location of tool manufacture was outside the areas sampled by the excavatations or, alternatively, that the flintworkers at 'Ain Ghazal were skillful users of this raw material (cf. Rollefson and Abu Ghaneima, this volume).

Table 1. Major Chipped Stone Artefact Classes From The Excavations At 'Ain Ghazal

	n	%	%'	%"
Flakes	8302	36.3	46.4	47.2
Blades	9303	40.7	52.0	52.8
Cores	277	1.2	1.5	
Debris	4989	21.8		
(Tools)	(2119)		(11.8)	
Total	22,871	100.0	99.9	100.0

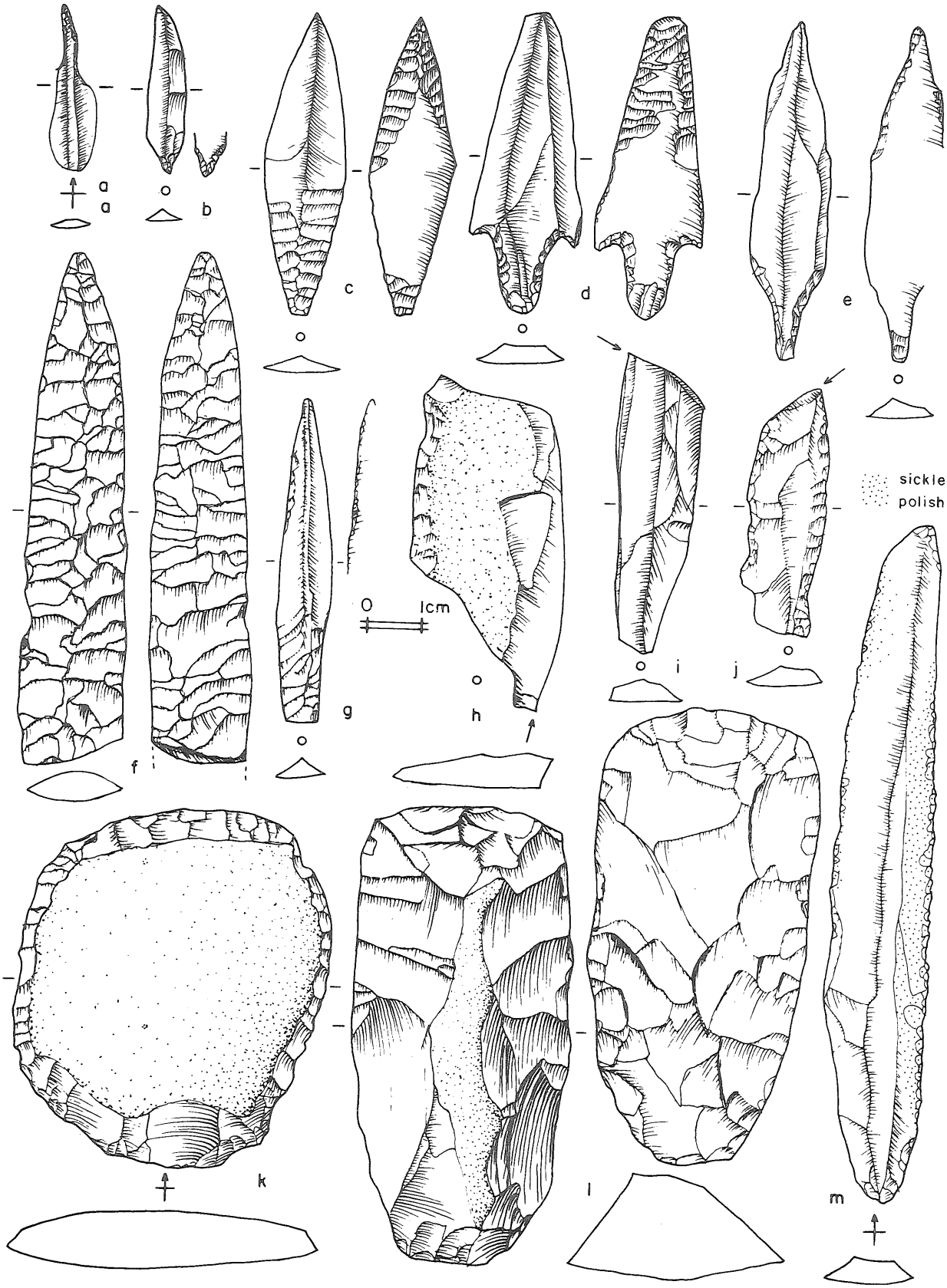

Fig. 2: Chipped stone tools from 'Ain Ghazal. a) bead drill; b) arrowhead; c-g) spear points; h) obsidian knife; i-j) transverse burins; k) cortical scraper; l) axe; m) sickle blade.

In terms of the tools, the surprising result of the analysis centers on the relatively high numbers of burins (Table 2).[3] At 42%, tool use in the excavated areas indicates a high degree of bone tool manufacture and/or the shaping of wood for implements and utensils. If the burins were used primarily for bone tool fashioning, the low numbers of bone tools recovered from the excavations do not bear this out (Table 4): either the bulk of the bone tools made with the burins was used elsewhere on the site (or off it), or the use of burins for shaping wood has heretofore been underestimated. Comparative figures of tool percentages are rare, but at Beidha burins account for only 4.2% of the chipped stone tools (Mortensen, 1970: 5-6), a figure that suggests a major difference in the domestic economies of the two social groups.

Table 2. Absolute And Relative Frequencies Of Chipped Stone Tools From 'Ain Ghazal. %' Refers to the total, less "common" utilized flakes and blades. See Note 3.

Class	*n*	%	%'
Axes	33	1.6	1.9
Burins	724	34.2	42.2
Scrapers	182	8.6	10.6
D/Notches	284	13.4	16.6
Truncations	11	0.5	0.6
Awls/Drills	60	2.8	3.5
Choppers	92	4.3	5.4
Utilized blades	420	19.8	2.7
Sickles	160	7.6	9.3
Points	91	4.3	5.3
Knives	19	0.9	1.1
Diverse	11	0.5	0.6
Indeterminate	32	1.5	—
Total	2119	100.0	99.8

Larger woodworking tools (axes, adzes, and chisels) were relatively rare at 1.9%. While superficially this might mean that a major woodworking industry was absent at 'Ain Ghazal, it is necessary to stress that the excavated areas represent less than 1% of the total site area. It is possible that other parts of the site may reveal a focus on tree-chopping and wood shaping.

Scrapers, choppers, and denticulates and notches, all of which may have been used for processing animal skins, plant remains, and for butchering, represent a combined total of nearly a third of the chipped stone tools. Utilized flakes and blades accounted for nearly a fifth of the overall total, but it is difficult to determine if the "utilization" is real or if the edge alteration was caused by accidental trampling or other damage after being discarded. Sickles represent a healthy 9%, reflecting a moderate emphasis on cutting grasses and other plant resources.

The ninety-one projectile points are well-fashioned and indicate continued reliance to some degree on the hunting of wild game. Surprisingly, the projectile points comprise only 5.3% of the chipped stone inventory, much less than the 24% figure for Beidha (Mortensen, 1970). At first glance this suggests that the Beidha people relied far more heavily on game, while the 'Ain Ghazal population may have enjoyed more stable meat protein from domestic animals. But this is not the case, probably, for the possible sampling error at 'Ain Ghazal must be taken into account. Certainly, at this preliminary stage of analysis, the animal bones from 'Ain Ghazal are testimony to a high contribution of wild game to the diet (see below).

[3] Table 2 is an abbreviated typelist of a more detailed typology used during the anlysis. Axes, for example, include axes, chisels, picks, and celts; scrapers iclude end- and sidescrapers; "D/Notch" refers to all denticulates and notches, 'Awl/drill" includes awls, drills, perforators, and borers; and utilized blades includes utilized blades and flakes, retouched blades and flakes, and tanged blades. We would like to point out that the status of the last category is somewhat suspect, since edge damage to many of the pieces is not necessarily due to utilization, but could have developed as the result of trampling or other damage after being discarded. Further intensive analysis is necessary to confirm whether the artefacts in this category were, in fact, used at all.

One other point should be made at this stage concerning the projectile points at 'Ain Ghazal. Compared to incomplete reports from Jericho, it would seem that there, hunters used true arrowheads more frequently than at 'Ain Ghazal. At 'Ain Ghazal the vast majority of the points probably served as spear or dart points, since their size and weight would make their use as arrowheads very problematical. Only a few true arrowheads have been found so far at 'Ain Ghazal.

b). Ground stone artefacts. The ground stone objects found at 'Ain Ghazal are listed in Table 3, and only a few remarks are appropriate here. The amount of basalt used at 'Ain Ghazal is notable, especially for use as hand-held mullers. (It should be pointed out that the closest source of basalt outcrops are in the Mafraq vicinity, some 50 kms. to the northeast). Two of the mullers had evidently changed their function from the processing of grain to the finishing stages of spear and arrow shafts: a groove down the center of each muller fragment conforms to the "shaft straighteners" commonly found at sites in southwestern North America which are roughly contemporary with the Near East Neolithic. One rim fragment of a basalt stone bowl or palette is slightly more than a centimetre thick, attesting to the delicate hand and skill of the maker. Of the four pestles found this season, three are of basalt, with only one made of limestone.

Limestone was the predominant resource for the manufacture of stone bowls and mortars. Two of the mortars are relatively small in interior diameter and could conceivably be door sockets, although this interpretation is suspect in view of the lack of corroborating architectural evidence. One mortar fragment was heavily coated with red ochre. While two of the stone bowls are complete, the evidence of the other eleven pieces is fragmentary, and it is possible they could represent querns.

Two discoidal sections of a coarse pinkish mottled limestone (?) were found on the surface near the eastern edge of the parking lot. In cross-section they resemble a "stone donut", and it is probable that these are failed attempts in the production of polished stone bracelets (see "ornaments" below).

One piece of cylindrical limestone was (Pl. I; 2) found, which was covered over most of the surface with striations. In addition, a small but noticeable bulge juts out near one end, set off with curvilinear scoring at the base of this small prominence. It is probable that this is a highly stylized figurine (human?), but other similar pieces will have to be found in the future to confirm this status.

A singular tapered cylindrical piece, listed as a "plaster cylinder" in Table 4, may in fact be fashioned in soft limestone, outcrops of which occur in the vicinity of 'Ain Ghazal. Like the limestone piece mentioned above, heavy scoring in parallel patterns converges near the tapered end of the piece, athough no projecting features characterize the object. If the piece is indeed plaster, it may be a cast from a peculiar mold, although what function it may have served is very speculative.

Two pieces of pecked limestone are sections of tapering crescents. (If these pieces had been fashioned in clay, they could easily be confused with stout handles of some large storage vessel). The role of these stone crescent sections is difficult to interpret in the absence of other data, but it is possible that they are pieces of the horns of large stone animal figurines.

Finally, three cobbles which may bear evidence of grinding are covered over most of their surfaces with heavy black organic stains. Further analysis is necessary, but it appears that this stain may be asphalt, obtainable from the Dead Sea. The use of these stones remains conjectural, if they were used at all: it is possible that the black material spilled onto these stones accidentally.

Table 3. Ground Stone Summary

Description	*n*	*Comments*
Stone bowl, limestone	13	Ten are fragmentary, and some may be quern fragments
Stone bowl, basalt	1	Rim fragment
Stone mortar	5	One is coated with red ochre
Pestle	4	Three basalt, one limestone
Quern	11	Fragments only. 6 sandstone (one with red ochre), 3 limestone, 2 uncertain.
Muller	14	10 basalt, 1 quartzite, 3 indeterminate
Basalt grinders, discoidal	8	One with heavy red ochre stain on edge
Palettes	2	Limestone
Hammerstones/pounders	6	4 quartzite, 1 flint, 1 basalt
Rubbing stone	1	Limestone
Shaft Straightener	2	Deep grove in each basalt muller fragment
Stained stone	3	Black stain: asphalt?
Perforated discs	2	Initial states of bracelet production
Crescents	2	Pecked limestone; possibly pieces of horns of large animal figurines?
Figurine	1	Limestone. Highly stylized, cylindrical, heavily striated, with one prominence at one end.
Basalt fragments	2	One possibly used, the other not used.
Total	77	

c). Small finds and objects. (Fig. 3,, Pl. I). One small plaster figurine was found on the surface of Sq. 4048, and it is probable that it is a stylized human statuette. Another broken piece of plaster may be the head of another humanoid statuette, although the fragment is so small that its status is questionable.

At least thirteen animal figurines fashioned in clay have been recovered, four of which were baked, possibly accidentally. Of the nine which were not fired, one bears some red ochre stains. The material appears to be a mixture of fine clay and plaster which formed a yellowish malleable product; in at least one case a small pebble was incorporated into the matrix that coincides with the abdominal section of the animal. Five other lumps of similar material, all unbaked, may also be animal figurines, but the crumbly state of preservation makes conclusive determination impossible. Wild cattle are represented in at least two cases, and sheep/goat has been modeled in another, but the rest of the figurines are too stylized or fragmentary to identify. Two small horns of baked clay were also discovered, as well as one small "crescent" that may have been the horns of a bull.

Clay objects. Several small flat discs, cylinders, cones, and a small baked clay ball were also found (similarities to the last two kinds of objects have been reported from Jarmo; see Braidwood and Howe, 1960: 44; cf. Fig. 35 in Mellaart, 1975: 81). Their roles are speculative, ranging from gaming pieces to objects of ceremonial significance. One of the unbaked clay discs has reed impressions on one side, and it may have originally served as part of a water-proof covering of a reed basket. Finally, one thin piece of baked clay takes the form of a marine bivalve shell or "walnut shell". Evidently formed over the pad of the thumb, the convex surface was repeatedly rocker-stamped with either a finely toothed bone or wooden tool or the

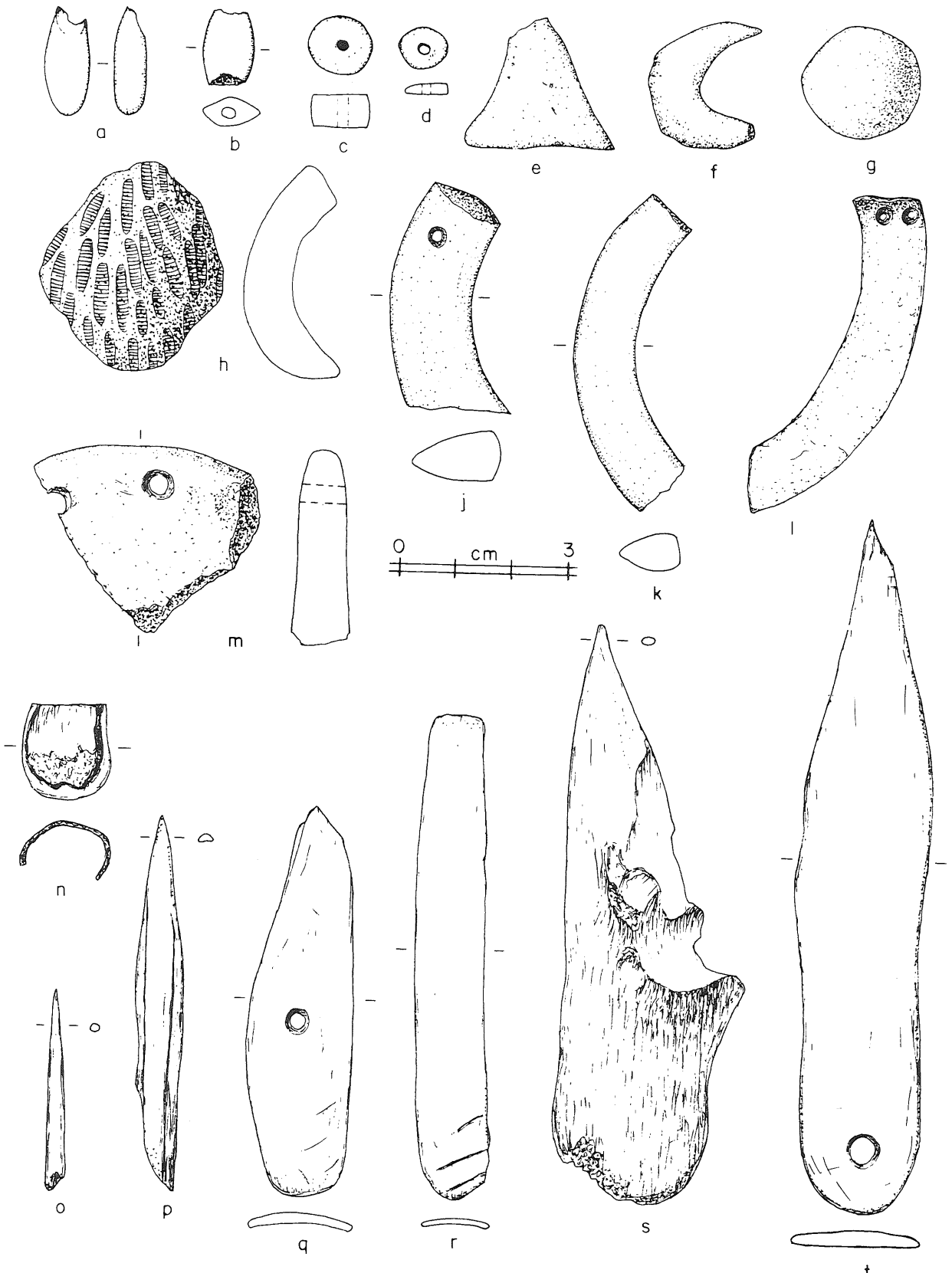

Fig. 3: Small objects and bone tools from 'Ain Ghazal. a) polished tooth bead pendant; b) carnelian bead; c-d) greenstone beads; e) fired clay cone; f) fired clay crescent; g) fired clay ball; h) fired clay object, rocker-stamped; j-k) polished stone bracelet fragments; l) mother-of-pearl pendant; m) perforated plaster pendant; n) bone "thimble"; o) bone needle; p,s) bone awls; q-r,t) bone spatulas.

edge of a marine shell.

Bone tools. Only twenty bone tools and objects were found this season, underscoring the curious attention to burin production at 'Ain Ghazal. One very thin and sharp fragment of bone, highly polished, is apparently the pointed end of a needle, although the "eye" is broken off. Only one bone spatula is pointed; the others resemble tools used in weaving. Together with the bone awls probably used to perforate leather, the bone industry at 'Ain Ghazal seems restricted to use in the production of cloth, mats, and skin coverings. The small bone "thimble" might be part of such a sewing kit.

Ornaments. A total of twenty polished stone bracelet or circular pendant fragments was recovered, a plurality of which came from the surface in Sq. 4048. Two pieces of rough pinkish limestone, evidently broken in the initial stages of bracelet manufacture, have been discussed in the Ground Stone section. Similar shapes of stone material have been found at Jericho (cf. Fig. 35 in Mellaart, 1975: 81). One bracelet or pendant fragment, bearing two drilled holes, was made of plaster. There is also a small section of a limestone ring, perhaps intended to be worn on the finger, which broke before final polishing began.

A total of seven beads was found this season. Three are small flat discs made of a green stone (malachite?), one is a tubular barrel-shaped bead of carnelian, another is a thick disc of red material (coral?), a bead pendant was made of a perforated and polished animal tooth, and finally there is a small spherical bead of rough limestone. Notably, both red beads came from burials, and the possible association of the red color with burial rituals is one that needs further exploration in the future. Three small plaster lumps, roughly spherical, have holes through them, but whether these are "bead preforms" or simply pieces of "plaster slag" with air holes cannot be definitely stated at this time.

Shell.[4] Two *Cardium* sp. ("cockleshell") and two *Glycimer sp.* ("sweet clam") shells were recovered from surface and subsurface contexts at 'Ain Ghazal; these shells indicate contact with the Mediterranean. Two cowrie shell fragments (one *Cypraea annulus,* the other *Cypraea* sp. indet.), which may have had some relationship with the ritual of plastered skull imagery, demonstrate a southern maritime contact with the Red Sea, as does a fragment of a large shell known popularly as "helmet shell". Two *Dentalium* sp. fragments appear to be fossilized and are evidently derived from the limestone matrix in the 'Ain Ghazal vicinity.

Plaster utensils. The use of plaster for the manufacture of bowls, platters, palettes, and troughs is indicated by nine fragments. Several of the platter fragments are heavily scored, and it appears that this treatment occurred before discard. The use of plaster in this way is relatively common in Syria and Lebanon, but it is absent at Beidha and Jericho. This suggests an intermediate position for 'Ain Ghazal between the northern and southern spheres of the PPNB. Plaster was also used for non-portable containers, as evidenced by a plaster-lined pit visible in the bulldozer section in the southern parking lot area (see Rollefson and Suleiman, this volume).

Pigments and associated artefacts. Two small lumps of clayey red ochre (*ca.* 0.05-0.06 m. in maximum dimension) were recovered from *in situ* deposits, both of them bearing several smooth angular facets that would have resulted from rubbing the pieces against other hard objects. One flint blade had obviously been used to cut through red ochre, for red stains occurred along the medial portion of both surfaces of one sharp edge. Another flint blade, found in a burial pit, bore "dribbled liquid" red ochre stains. One piece of clayey pigment is unique: although it has the consistency of the red ochre rubbers mentioned above, the color

[4] We would like to thank Ms. Patricia Crawford for the identification and determination of provenances for the shells.

is a dark aqua or greenish tourquoise. No artefacts bearing this color were found during this season.

Miscellaneous objects. Nearly forty other pieces are miscellaneous in nature, and little amplification is necessary for the list in Table 4. The "micropestle" is a small (*ca.* 0.05 m. in length) tapered tubular piece of banded stone with evident use at the narrow end. The flint blade comes from the same burial pit as the one stained with red ochre. The four flakes of exotic stone are singular: they are made of a dark green material, coarser in texture than flint, and they seem to be trimming flakes from a larger chipped stone artefact. No such raw material has been noticed in the vicinity of the site nor has any similar material been noted in any other lithic collections from Jordan. Finally, there are numerous cylindrical fossils (belemnites?) and water-worn smooth pebbles that appear to have been brought purposefully to the site, but for what purpose is impossible to tell.

Obsidian. A knife made of obsidian (Fig. 2: h) was recovered from Sq. 3082, demonstrating some form of trade relations with (probably) Anatolia.

Blade Cache. A cache of flint blades was noticed eroding out of the road cut from beneath a plaster floor in Sq. 2871. All of the blades were aligned in a north-south direction, and the compactness of the collection of artefacts suggests that they had originally been wrapped in a tight bundle. Eighty-three blades came from this cache, and four more were discovered on the slope immediately below the cache. None of the artefacts had been retouched to form tools. The bundle of blades may have served as some sort of dedication offering before the house was constructed.

2) Animal Remains[5]

Some sixteen mammalian species have been identified among the more than 4000 classifiable bones recovered during the 1982 season. In addition, numerous remains of unidentified carnivores, rodents, and birds, as well as a *Testudo* tortoise, were also present. Although additional research is necessary, goat *(Capra aegagrus hircus)* appears to be the dominant faunal element, with sheep *(Ovis* sp.) much rarer. Gazelle is also quite numerous as is, surprisingly, fox *(Vulpes vulpes* and/or *V. rupelli)*. Many of the fragments of fox bones are charred with numerous butchering marks, indicating the use of this carnivore as a food resource.

Also present, but in relatively smaller amounts, are the following: lagomorphs, aurochs, wild boar, deer, and equid, caracal lynx, jackal and/or wolf, fennek, badger, beech marten, and hedgehog.

The determination of the status of domestication of goats and other animals must await further metric and morphological analysis. Among the wild animals present, especially the carnivores, Dr. Köhler notes the remarkably wide range of species that included typical Palearctic as well as true desert species. The heavy contribution to the diet of the inhabitants of the site by wild animals adapted to mutually antagonistic environments demonstrates the uniquely beneficial location of 'Ain Ghazal at an ecotonal crossroads.

3) Human Remains[6]

So far, fifteen separate burial pits have been located beneath house floors at 'Ain Ghazal (Sqs. 2875, 2877, 3067, 3079 (four), 3080, 3082 (two), 3083, 3120, 3279, 4450, and 4454). Three of these were discovered on the last day of excavation and remain to be excavated in the near future; another is protected by approximately three metres of overburden. In addition, surface remains of at least four other indivduals (not necessarily all Neolithic in age) have been found in various areas of the site.

To date, extensive analysis has been carried out on thirteen individuals from nine burials (double and multiple interments are not uncommon). Briefly, three people were adult males ranging in age from under 30 years to more than 50 years; five females ranged from the late teens to early 40's; two children were between 6

[5] The following section is the author's summary of a preliminary report written by Dr. Ilse Köhler. Any mistaken inferences are mine.

[6] The following is a summary of a report submitted by Mr. Scott Rolston and Mr. Dani Petocz. The caveat in Note 5 also applies here.

Table 4. List of Small Finds and Objects From 'Ain Ghazal

Item	*n*	*Comments*
Figurine, plaster	1	Anthropomorphic
Figurine (?), plaster	1	Anthropomorphic?
Figurine, clay, animal	13	Four baked, nine not baked
Figurine horns, animal	2	Both baked clay
Crescent, clay	1	Baked
Cone, clay	4	Three baked, one unbaked
Ball, clay	2	One baked, *ca.* 2.5 cm. diameter
Disc, clay	4	Two baked, one with reed impressions
"Shell", clay	1	Baked, rocker stamped
"Objects", clay	6	Possible animals: one flat piece with reed impressions
Cylinders, clay	3	One baked
Bone awls	11	
Bone spatula	7	Two perforated, one pointed
Bone needle	1	"Eye" missing
Bone "thimble"	1	Function speculative
Polished stone bracelets	20	Fragmentary; two drilled
Polished stone ring	1	Fragment, unfinished
Greenstone beads	3	Malachite? Flat discs
Carnelian bead	1	Tubular barrel. From burial
Redstone bead	1	Coral? Discoidal. From burial
Limestone bead	1	Rough. Spherical
Bead pendant	1	Polished animal tooth, perforated
Plaster cylinder	1	
Plaster pendant	1	Circular fragment, two drill holes
Plaster lumps, perforated	3	Possibly natural, rolled plaster
Bivalve shells, perforated	4	Mediterranean proveniance
Large shell fragment	1	Red Sea provenance
Cowrie shell	2	Red Sea provenance; fragmentary
Dentalium shell	2	Fragmentary, fossilized
Plaster palette	3	One possibily soft limestone
Plaster trough/pit lining	1	Thin, fragmentary
Plaster bowl fragments	5	
Ochre-stained flint blade	2	One cut red ochre, the other stained
Red ochre rubber	2	Angular rubbing facets
Green pigment	1	Material unknown
Carnelian chunk	1	Not worked
Flint blade	1	From burial pit. Not a tool.
Ball, limestone	1	*Ca.* 2.5 cm. diameter
"Micropestle"	1	Tapered tubular stone, *ca.* 5 cm. long
Fossile bivalve shell	1	From Tertiary limestone
Paleolithic flints	8	All heavily rolled
Flakes of exotic stone	4	Dark green color, not native to area
Cylindrical fossil	12	Belemnites? All fragmentary
Smooth pebbles	9	One may be a small hammerstone
Total	150	

and 13 years old at death; and there were three infants. In one burial, a woman in her late teens, suffering from congenital hip problems, was accompanied by a new-born infant. Evidently both died in childbirth.

4) Plant Remains [7]

Although more than a metric ton of flotation samples was collected during the 1982 season, little time (and water) was available for processing and subsequent analysis. Several samples from burial pits and house floors were processed and found to be relatively rich in charred remains. To date lentils, peas, barley, fig, and possibly wheat and chickpea (roughly in order of abundance) have been identifed. Additional morphological and metric analysis is necessary to establish the state of domestication of the species.

5) Architecture

The Step Trench in Sq. 3073 has revealed six major occupational levels at 'Ain Ghazal. The lowest floor in the trench was cut by the southern wall and floor of a slightly later house; the walls of this second phase were used in the third phase after some 0.70 m. or more of debris and eroded sediment had accumulated. After this building was abandoned, nearly a metre and a half of soil and rubble built up before a fourth floor was laid. Above and behind the Step Trench (upslope to the west), in the bulldozer cut, two more building phases can be seen.

Except for the oldest floors at the site (seen, for example, in Sqs. 3073, 3082, and 3083), the remainder of the house floors underwent at least one later phase of replastering. This is especially evident in the three superimposed floors (and hearths) in Sq. 3067. The phases of replastering can be easily detected by the existence of separate layers of red ochre finish in many of the floors.

Sunken plastered hearths appear to be a consistent feature in the 'Ain Ghazal houses. Often the hearths are colored with red ochre, but this is not always the case. A curbed feature in the fourth phase floor in the Step Trench may be a hearth, but there is no evidence of ash or burned plaster here; in fact, the curb around the feature resembles a drain more than a hearth. Not all of the floors visible in the road cut have sunken hearths, but this is probably due to the damage to the floors during highway construction. Only about 0.50 m. of floor width were found in Sq. 3073 (Occupation Phases I, II, and III), for example.

The location of sunken hearths in house floors has proved to be extremely significant. In every case where enough of the house floor remained to include a sunken hearth, a sub-floor human burial was found within several centimetres to slightly more than 1.50 metres to the south. This correlation of hearth-and-burial pit should prove very beneficial in subsequent seasons of excavation at the site. The most notable demonstration of this correlation was revealed in Sq. 3079, where four sunken hearths were exposed during the excavation, and separate burial pits lay just to the south in each case.

Details of house construction proved to be rather redundant from structure to structure (see Rollefson and Suleiman, this volume). Walls were made of natural stones set in mud mortar, which were then coated with a layer of mud plaster (on the interior, at least), which was subsequently finished with a thin application of white plaster. Red ochre was applied to at least the lower portions of some of the house walls. Along the western edge of the floor-walls joins in the second and third occupation phases in Sq. 3073, three post-holes were located in the southern and northern ends as well as at the centre. (Not only did these two phases share the same wall, they may also have shared the same posts). The posts, approximately 0.20 m. in diameter, evidently rose along the height of the wall to support primary roof beams.

[7] We would like to thank Dr. David McCreery for taking some of his valuable time to analyze the samples. The caveat in Note 5 also applies here.

The house in Sq. 3083 is the most complete one sampled in our excavations. It consists of at least two rooms divided by a thick wall 0.40-0.60 m. which is penetrated by a metre-wide doorway. In the eastern room, which has a sunken plastered hearth and associated sub-floor burial, there is a small alcove in the northwestern corner, possible a cupboard installation. The western room has a plaster floor of inferior quality compared to that of the eastern room; it is also evident that when the eastern floor was replastered following the intramural burial, the replastering stopped at the doorway. On the floor of the western room, directly opposite the doorway, an apsidal wall was constructed. Rather than providing structural support, this semicircular wall may simply be a low bench on which domestic utensils and containers rested. Within the space between the curved wall and the doorway, eleven grinding stones (one stained with red ochre) on the floor attest to the domestic nature of this room. In the northeastern corner of the western room was a stone lined storage pit, and another stone lined feature exists behind the bench to the northwest. Although the northern and southern walls of both rooms have been located, the western wall of the western room remains hidden in the baulk.

Summary

The inhabitants of 'Ain Ghazal shared many of the elements of the PPNB culture with contemporary populations in Syria, Lebanon, Palestine, and Jordan. Except for occasional differences of detail, this cultural similarity is expressed throughout the domestic repertoire. Projectile point styles at 'Ain Ghazal would fit well into the hunting implement inventories at Beidha, Jericho, Ramad, and Tell Abu Hureyra, although the number of arrowheads at 'Ain Ghazal is relatively small. Like Jericho, heavy-duty woodworking tools are rare but well-fashioned. Burins, which figure so prominently at 'Ain Ghazal, were probably used extensively as light-duty woodworking tools since the bone tool industry was so limited.

The rectangular structures at 'Ain Ghazal were multiroomed and characterized by the use of plaster floors finished with a highly sophisticated technique. The use of red ochre on floors varied from house to house (and probably through time). Some floors appear to have been completely coated with the mineral, while others displayed virtually no use of the red material. Interpretations of any designs are very limited in view of the restricted areas of most of the excavated floors. On some floors "polka dot" patterns occur, and plaster fragments from other houses suggest alternating rectilinear fields of red-stained and unstained areas. The Phase III floor in Sq. 3073 revealed a melange of patterns, ranging from curving narrow swaths of red ochre to rectilinear stippling and sporadic blotches.

Subfloor burials occur within 1.50 metres of sunken plastered hearths. Primary single, double, and multiple flexed burials occur, with individuals ranging in age from new born infants to middle-aged women and elderly men. Although two red beads are associated with two individuals, other grave goods are scarce and possibly accidental. In most cases, bulldozers removed the upper torso, so little definitive information concerning decapitation and possible plastering of skulls is available at this stage of the investigation.

While domesticated goat probably constituted a large part of the animal protein eaten by the 'Ain Ghazal people, the hunting of wild species of animals remained an important part of the economy. The exploitation of diverse ecozones is particularly noticeable at 'Ain Ghazal.

In terms of agriculture and plant collecting, the analyzed plant samples are so few in number that firm conclusions are not possible at this time. Lentils and peas are relatively numerous in contrast to other identified plants, possibly suggesting a reliance on pulses not seen at other sites in other environmental zones in the Near East.

Human and animal figurines provide a small glimpse into the ceremonial sphere

of the social groups at 'Ain Ghazal, although the picture remains obscure. Baked clay animal figurines are in the minority, suggesting that this ceramic treatment is accidental and not purposeful. Other clay objects, of speculative function, seem to be routinely fired, so this technique of preservation may have been well known to the inhabitants.

The possibility of economic specialization at 'Ain Ghazal is suggested by two factors. First, although polished stone bracelets were found in many areas of the site, the cluster from the vicinity of Sq. 4048 points to a possible bracelet shop in the area. Second, the heavy accumulation of ash and burned debris between the southern and central clusters of houses (see Rollefson and Suleiman, this volume) indicates a localization of some industrial activity.

Regarding implement typology, 'Ain Ghazal follows patterns of permanent villages to the south and north. The sharing of techniques of lithic manufacture remains to be tested, however. Certainly it is evident that contemporary transhumant groups in the eastern deserts of Jordan produced their tools according to methods widely different than those used at 'Ain Ghazal (Rollefson and Abu Ghaneima, this volume).

It must be stressed, however, that all of the conclusions expressed above are preliminary and tentative. After all, excavations this season sampled far less than 1% of the site area, and considerable diversity is to be expected across the spaces occupied by the inhabitants in both contemporary and diachronic times. Plans are underway to expand the scope of investigations at 'Ain Ghazal in a multi-season effort to learn more about the people who lived there, to study the changing ways they interacted with their environment, and to understand the factors that influenced their social life in this critical period of human cultural development.

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Acknowledgements

We would like to express our deep and sincere appreciation to Dr. Adnan Hadidi for his interest in the work at'Ain Ghazal. The staff of the Department of Antiquities was also very efficient and responsive to our needs as they arose, and we wish to thank them for their concern. Although the Department of Antiquities of Jordan funded the bulk of the operations this season, we would also like to express our gratitude to an anonymous donor from the United States for a grant of 5,000 to carry on our work; the appreciation this person has expressed in the archaeological heritage of Jordan is warmly acknowledged. We would also like to thank Mrs. C.-M. Bennett, Director of the British Institute at Amman for Archaeology and History for the loan of critical equipment on short notice, and for her expressed interest and kind suggestions. To Dr. David McCreery, ACOR Director, we would also like to express our profound thanks for putting the research facilities of ACOR at our disposal during and after the excavation season. Finally, we would like to apologize to the residents of ACOR for having to face occasional impediments to the normally quiet and scholarly atmosphere of the institute which arose from our in-house processing and analytic procedures; we would like to thank them for understanding our plight and for pitching in to help reduce the workload.

The staff of the 'Ain Ghazal project included the following: Drs. Gary Rollefson and Albert Leonard, Jr. (U. Missouri-Columbia) were co-directors for the first phase of operations, with Dr. Leonard acting as Field Director during the month of January. Square supervisors included Ms. Cynthia Johnson-Leonard, Mr. Edward Banning, Ms. Linda Villiers, Mr. Brian Bryd, Mr. Dani Petocz, Mr. Emsaytif Suleiman, and Mr. Khaled Abu Ghaneima. Mr. Emsaytif Suleiman and Mr. Khaled Abu Ghaneima were also Assistant Directors of the project. Specialists included Dr. David McCreery, paleoethnobotanist; Dr. Ilse Köhler, zooarchaeologist; Mrs. Susan Balderstone, surveyor/topographer; Mr. Scott Rolston, human osteologist; and Dr. Gary Rollefson, lithics analysis. The excellent illustrations were executed by Mr. Brian Byrd and Mr. Dani Petocz. Volunteers from the Friends of Archaeology, too numerous to name here, provided much of their time in the field operations and in artefact processing. The dedication of several, however, deserve special mention, and we would like to thank Mrs. Olga Brady, Dr. Adriana Hopper, Mrs. Barbara Hartmann, Mr. Be Moore, and Mrs. Hildegard Wolter for their excellent work in the field; Mrs. Carol McCarthy put in many hours at ACOR working on the often monotonous task involved with artefact processing, and her devotion is warmly appreciated. Mmes. Hanan Azar and Hilda 'Ayoub of the Department of Antiquities contributed much valuable help in the excavations, as did two students from the University of Jordan: Basma and Hanna.

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THE EPIPALEOLITHIC SITE OF EL HUNA, NORTH-CENTRAL JORDAN

by
Linda E. Villiers

Introduction

This site was located during Phase I of the 'Ajlun Mountain Iron Survey conducted during August-September 1981. It is situated on a remnant second terrace just above the Zarqa River below the King Talal Dam, between 20 m.a.s.l. and -20 m.b.s.l. The area has an unusual geomorphology: two ancient alluvial fans have been laid down directly opposite each other, by the Wadi el Huna and the Wadi el 'Azab as they meet the Zarqa (Fig.1). On the north side of the Zarqa remnants of three terraces are discernable, cut into the fan. They are only fragmentarily preserved, being subject to massive slope-slips, and down-slumping due to undercutting by the Zarqa. The Wadi el Ḥuna is now deeply incised through the sequence, and as it rarely flows, its bed is choked with debris and thick stands of oleander and bamboo. The whole fan area is bounded by a high scarp, part of the southern edge of the 'Ajlun dome anticline.

The area presently receives approximatly 0.0300 m. of rainfall per annum, and while the soils of the Zarqa region are generally classified as red Mediterranean (Bender, 1974), zones of yellow steppe soils and rendzinas of alluvial origin occur. The Zarqa River region encompasses the transition from the Irano-Turanian to Mediterranean plantgeographical territories (Zohary, 1962). In the el Huna area much of the remaining area of terraces is now under open and hothouse cultivation of peppers, eggplant, beans and cucumbers. An orchard of lemons, grapefruit and olives is located on an upper terrace, next to one of the many fresh-water springs that occur in this area. Above the scarp, remnants of the *Quercus calliprinos-pistacea palaestina* association can be seen.

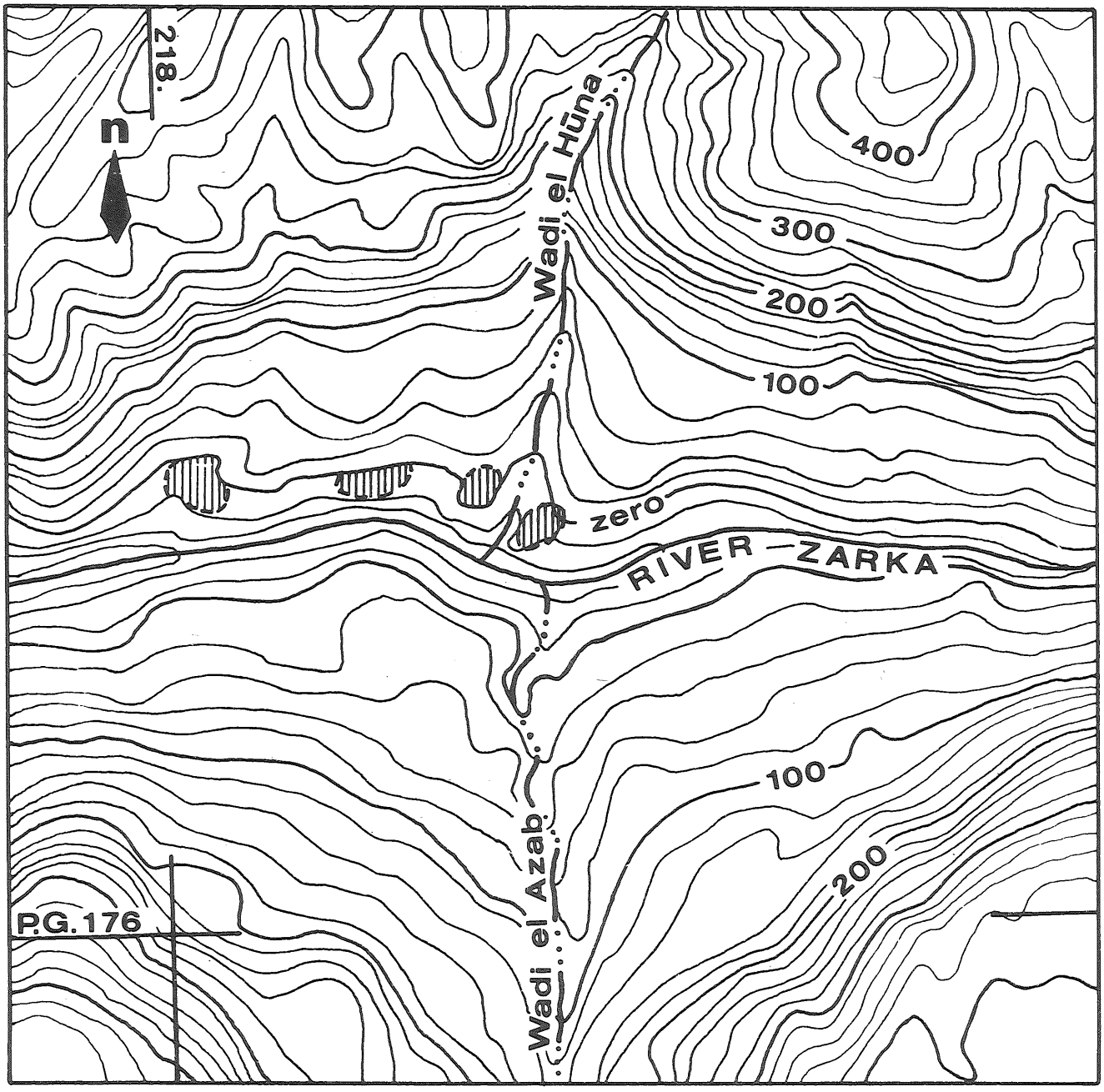
Artefactual material occurs on the remains of the second terrace, on both the east and west sides of the Wadi el Huna. This scatter is discontinuous, covering an area approximately 1,020 m. in length by 120.00 m. wide. Artefacts were collected in four areas (basically the only areas of the terrace left intact) which together totalled some 3460 m. sq. One of these areas on the east side of the Wadi el Huna showed a comparative concentration of artefacts, together with grinding stones, and attention was focused on this zone. A commpass-rose transect sample was taken here, as well as selective surface collections.

Artefact studies were carried out by specific collection area of the site, and since a high degree of homogeneity occurred in all collection arreas, the results were pooled for presentation. Detailed analysis of the technological and typological features of the assemblage were carried out and the information presented here is an abbreviated summary of the results of this analysis. The complete study will be published shortly.

The Artefacts

Flint of variable quality is readily available in the form of river pebbles and cobbles from the bed of the Zarqa. This resource was supplemented by importation of high quality, fine-grained coloured flint from some presently unknown source. This fine quality material was preferred for tool manufacture, with nearly half of the tools being made from it.

The el Ḥuna assemblage is characterized by a low proportional occurence of cores, core flaking debris, crested blades and primary flakes. Production of flakes exceeds that of blades, although blades were preferred for tool manufacture. Seventy-six bladelets are included in the blade class, comprising 24% of this category. The proportional occurrence of artefact classes indicates that secondary reduction and tool manufacture were carried out on site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EL HŪNA - artifact scatters

Fig. 1

(Table 1). The flake and blade to core ratio is intermediate at 17.2:1, while the primary flake to core ratio is low at 1:5. It is apparent that little primary reduction occurred on site and that the bulk of material was quarried and prepared elsewhere.

Table 1. Artefact Type

	n	%
Flakes	471	53.5
Blades	315	35.8
Crested blades	5	0.6
Cores	46	5.2
Core flaking debris	39	4.4
Natural/thermal flake	1	0.1
Chunk/cobble	1	0.1
Flake used as core	2	0.2
Subtotal	880	99.9
Debris	197	(17.8)
Indeterminate	18	(1.6)
Groundstone	6	(0.5)
Basalt fragments	4	(0.4)
Total	1105	

Reduced and exhausted cores formed 30% of all cores, suggesting a tendency towards core curation. Prismatic blade and bladelet cores (with all but one being single platform) predominate at 17%, followed by single face flake cores at 9%. Other core types present included multiple platform, globular, disc and radial flake cores; single platform blade and single-face flake and blade cores (Pl. III). Occasional, formless and indeterminate cores comprised 13% of core types.

The flaking technology utilised at el Ḥuna showed a clear difference between fake and blade production. Platform types indicative of direct percussion (Table 2, Class 1-2) account for 84% of the flake class. Of these approximately 10% were struck by hard hammer. About 16% of flakes showed evidence of indirect percussion (punch technique). In the blade class, nearly half were produced by the punch technique, with the remainder being struck by direct percussion. The rather high proportion of missing blade platforms is an anomaly and is discussed below.

When blade and flake forms were combined (including blade flakes showing prior blade removal on their exterior surface but failing to conform to true blade definition), for the purpose of distinguishing specific flaking technique trends, it was found that the blade technique slightly outweighed the normal, undifferentiated flake production technique (37% to 31% respectively). The punch technique accounts for 15%, prepared core for 13%, and disc/radial core methods for 4%.

Blade production was strongly uni-directional with only 16% showing bidirectionality. These bidirectional examples give an impression of poor technological control over bipolar blade production.

Flaking (skew) angles were measured for flakes and blades complete enough to determine platform orientation and termination morphology. The sample was small: 179 flakes and 75 blades. Flake to blade ratio was 2.3, similar enough to that at the PPNB site of 'Ain Ghazal, 2.5, to

Table 2. Platform Type Summary

	Flakes		*Blades*	
	n	%	*n*	%
1. Plain, dihedral, transverse, dihedral with 1 transverse facet	223	69.9	69	40.4
2. Facetted	46	14.4	18	10.5
3. Punch, crushed, point	50	15.7	84	49.9
Subtotal	319	100.0	171	100.0
4. Absent	152	(32.3)	149	(46.6)
Total	471		320	

allow some technological comparison.

The flake class at el Huna shows a bimodal pattern of distribution with two distinct peaks at Class 4 and Class 6 (Fig.1: A,B). This virtually mirrors the situation at 'Ain Ghazal, which was interpreted as resulting from the mixture of direct and indirect percussion techniques, with some possible connection with the cortical state (Villiers, n.d.). Skew angles of blades at 'Ain Ghazal were evenly distributed around the orthogonal class (Class 5) forming a normal distribution curve and reflecting a high degree of proficiency with the punch technique. At el Huna however the blade class shows a marked right-hand skew, with a peak at Class 6. This uneven distribution results from the mixture of direct and indirect percussion techniques, as well as the lack of skilled control in using the punch technique.

Of flake forms 24% were angular, indicating little attention to morphological regularity. Hinge terminations, interpreted as reflecting flaking error (i.e., the application of excess outward force; Cotterell, Kamminga, 1979) comprised 7% of the sample. About 13% of blade forms showed angularity, and hinge fractures accounted for 4%. Approximately 3% were overshot and 6% showed platform reduction, indicative of careful preparation of the striking platform for use of the punch technique. This figure is quite low, adding further weight to the observation that use of the punch technique had not yet reached a habitually proficient level.

An interesting feature emerged from monitoring the condition (i.e., wholeness) of artefacts. Of blades with absent platforms, fully 44% were tools. This preference for removing platforms of blanks selected as tools is also present among flakes: 31% of flakes without platforms were tools. Platforms do not normally break off as a result of flaking error, and usually being the most robust section of a flake are more resistant to post-depositional damage. As can be seen from Table 3, rates for absent platforms are generally low. At el Ḥuna, however, flakes and blades with absent platforms (Class 2 and 4 combined) comprise the absolute majority of tools: 61% of flake tools, 62% of blade tools. The similar rates suggest a non-functional (stylistic) reason for this phenomenon.

Observations on the cortical state of artefacts showed that flakes with cortical platforms accounted for 9% suggesting some limited initial reduction activity on site. However, as Table 4 shows, the rather low value for minimal cortex flakes and comparatively high value for partly cortical flakes appears to go against the expected trend in a site where only limited primary reduction is occurring. To check this apparent selection for partly cortical flakes, the cortical states of tools were included. The same pattern is repeated with 33% of flake tools being partly cortical. Clearly at el Ḥuna partly cortical flakes were selected for tool production at only a slightly lower rate than cortex fre flakes. Tool types do not appear to be an influencing factor, although this needs further investigation.

The blade class shows an expected progression of cortical states, from 70%

Table 3. Condition

	Fl.		*Fl. Tools*		*Bl.*		*Bl. Tools*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
1. Complete	182	38.6	15	30.6	72	22.5	13	18.3
2. Platform absent	59	12.5	18	36.7	32	10.0	14	19.7
3. Other edges absent	127	27.0	4	8.2	95	29.7	12	16.9
4 .Platform other edges absent	75	15.9	12	24.5	97	30.3	30	42.3
5. Burnt (incomplete)	28	5.9	—	—	24	7.5	2	2.8
Total	471	99.9	49	100.0	320	100.0	71	100.0

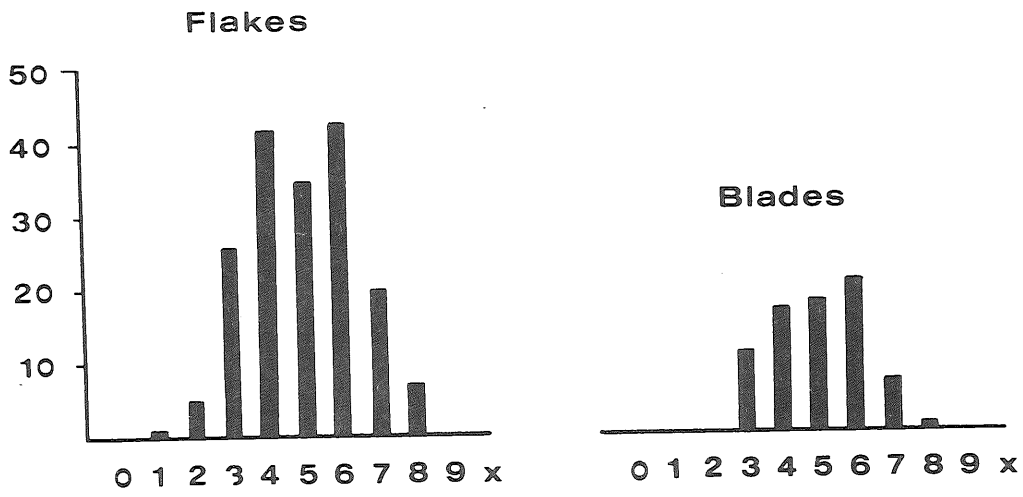

FIG. 1A: Histogram of Skew Angle Classes.
El Huna

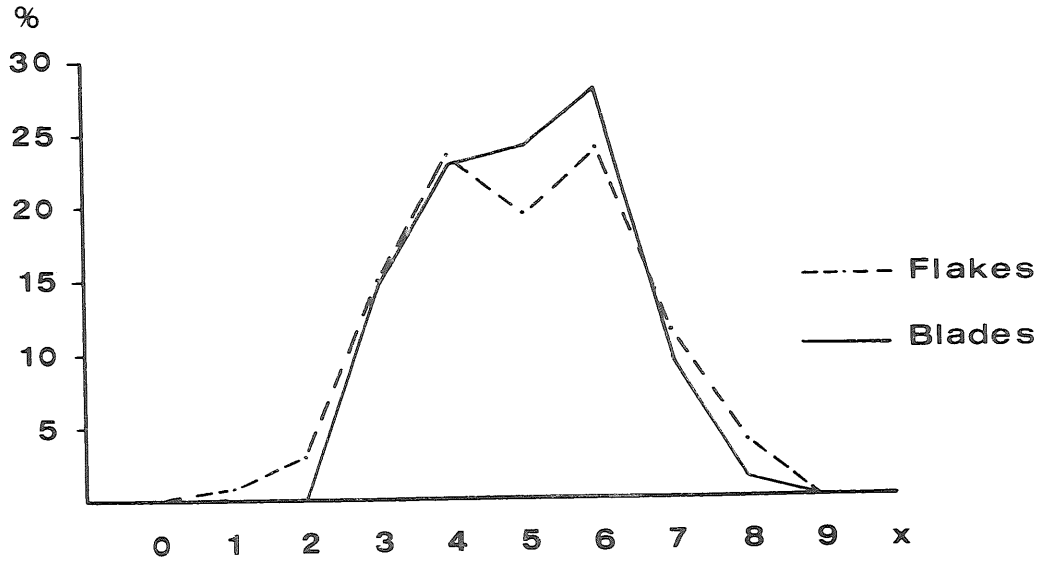

FIG. 1B: Graph of Skew Angle Percentages.
El Huna

Table 4. Cortex Categories

	Fl. *n*	%	*Fl. Tools* *n*	%	*Bl.* *n*	%	*Bl. Tools* *n*	%
Cortical (50%)	58	12.3	7	14.3	—	—	—	—
Partly cortical (10-50%)	109	23.1	16	32.7	16	5.0	2	2.8
Minimal cortex (1-10%)	49	10.4	5	10.2	46	14.4	12	16.9
No cortex (0%)	183	38.9	18	36.7	214	66.9	48	67.6
Natural back	29	6.2	3	6.1	31	9.7	9	12.7
Cortical cortical plat.	9	1.9	—	—	—	—	—	—
Partly corticalcort. plat.	8	1.7	—	—	1	0.3	—	—
Minimal cortexcort. plat.	3	0.6	—	—	2	0.6	—	—
No cortexcort. plat.	20	4.3	—	—	9	2.8	—	—
Natural backcort. plat.	3	0.6	—	—	1	0.3	—	—
Total	471	100.0	49	100.0	320	100.0	71	100.0

non-cortical to 6% partly cortical. Natural backing at 10% of blanks suggests a functional selectivity, and not simply the presence of primary reduction by-products. This is borne out in the tool class where 13% of blade tools are naturally backed.

The majority of flakes from el Ḥuna exhibit either a partial light patina or an overall white patina. The substantial proportion without patina (14% of flakes, 19% of blades) appears to indicate recently exposed material, and hence the likelihood of some subsurface material remaining on the site. The fresh, unabraded edges of 91% of flakes and 94% of blades further suggests that the assemblage has not been significantly affected by the redepositional agents of soil movement, wind or water action, and is essentially *in situ*.

Typology

There are already a number of type-lists in use for the Epipaleolithic period (Hours, 1974) all of which have been developed in areas surrounding Jordan. The el Ḥuna assemblage however does not fit easily into these standard typologies and certain accomodations had to be made. Typologies at best form a shorthand summary of a variable situation, and where there is an obvious "lack of fit" between defined types and actual tools much of the comparative value of typing is lost. Nevertheless, a standard type-list was used here as it enabled areas of similarity and difference to be pinpointed. Also no new list can be formulated on the basis of an uncontrolled surface sample and it remains to be seen if the situation at el Ḥuna is aberrant or is repeated at other Epipaleolithic sites elsewhere in Jordan.

At el Ḥuna tools were produced on blanks from most artefact classes, although blade forms account for over half the tools manufactured (Table 5).

Table 5. Artefact Classes Used In Tool Production

	n	*Tools*	%
Flakes	413	42	10.2
Blades	320	71	22.2
Primary elements	58	7	12.1
Cores	46	2	4.4
Core	39	1	2.6
Chunk/cobble	1	1	
Total	877	124	100.0

Flakes were converted into tools at an average of somewhat less than one out of ten, blades however were used intensively, with an average of over one in four being so modified. The rather high rate of use of primary flakes (as compared to some other

Kebaran sites; Marks & Simmons, 1977: 244) is curious. These tools include 3 notches, 3 burins, and a denticulate. The association between burins and cortex is unclear, although for notches its presence can provide a more robust working edge.

Tools made on bladelets comprise 27% of blade tools and 15% of all tools. Microliths (including geometrics) form only 12.4% of the tool group. This is a rather low proportion for Epipaleolithic sites, at least as they are presently understood.

Notes On The Typology

After notches and denticulates, burins are the second most common category of tools at el Huna. Six burins were made on flakes but the majority were on blades. Burins on natural pan and dihedral déjeté examples account for over 45% of burin types. A new sub-category was added to accommodate multiple blow, diverse burins. Both examples are double, opposing burins.

A second new sub-category was inserted in the retouched and backed blade group to include retouched sickle blades. These include truncated, backed and nibbled retouch examples (Pl. II: 14, 15).

All truncations were located distally, with retouch varying from nibbled to steep, and one concave, one straight, three convex and four canted (oblique) examples.

Most of the bladelet tools were made on fine quality coloured flint with nibbling retouch or steep sub-parallel backing. Only three geometric microliths were found at el Huna and their retouch was normal abrupt and carefully executed. The proto-lunate appears to be simply an incomplete lunate with partial retouch on the back. The one microburin found is best regarded as a by-product of abrupt retouch.

Notches and denticulates form the largest group of tools and show considerable morphological variety. Eighteen are on flakes, six are on blades and one is on a bladelet. About half of the notches were formed by exterior compound retouch, and the rest by compound interior or single-blow notching. Notched flakes exhibit variable amounts of cortex (nine are cortical or partly cortical) and retouch is irregularly placed. Denticulates are generally rough and irregular. The removal of the striking platform by notching on various other tools suggests the possibility that a number of notches may represent a phase of tool preparation and are simply incomplete tools.

The "varia" category is disproportionately large and the result of two factors. Firstly, a marked tendancy to re-use and re-modify tools, and secondly the occurrence of tools outside the standard typology, particularly wedges and compound tools. The "Unclassifiable" tools are all broken fragments of larger tools.

Typological Discussion

Table 7. Typological Indices

IG	Scrapers on flakes and blades	9.1
IB	Burin Index	18.2
IM	Microlith Index	9.9
IMG	Geometric Microlith Index	2.5
ITmb	Microburin Technique	0.8
Restricted Indices		
IBd^r	Dihedral burins	40.9
IBn^r	Burins on natural pan	22.7
IBt^r	Truncated burins	13.6
IMt^r	Backed & unbacked obliquely Truncated blades	28.6

The el Huna tool complement is composed primarily of notches and denticulates, burins and various tools. The index for notches and denticulates is very high and this may be due to either or both of the following:

— the possibility that notching represents an initial stage of tool manufacture here, and part of this group represents unfinished tools.
— the possibility that at el Huna woodworking activity was emphasized.

Comparison of the el Huna indices with the general ranges of Epipaleolithic cultures (Bar-Yosef, 1970: 179) shows that for all major tool groups its range is closest to that of the Natufian. However, the assemblage shows no sign of Helwan retouch, the microburin technique is not established and lunates and geometrics are rare. The lack of these characteristic Natufian traits, together with the presence of features taken to be indicative of a late phase of the Kebaran (tools with inverse or alternate retouch, the broad micropoint, and numbers of awls, borers, notches and denticulates) suggests placement of the el Ḥuna industry in the Late Kebaran period, approximately 12,000 to 10,000 years ago.

Conclusions

The el Ḥuna assemblage may be seen as transitional in the sense that technological emphasis appears to be shifting from direct percussion, soft- hammer methods of blade production to increased use of the punch technique for producing blade and bladelet forms. As can be seen from the data on skew angles, directionality and platform preparation full mastery over this technique had not yet been achieved.

The inhabitants of el Huna showed two distinct traits in the preparation of their tool kit: a preference for removing the striking platforms of tools beford final retouch, and a preference for selecting partly cortical flake blanks for transformation into tools.

The large number of tool types present at el Ḥuna reflect an unspecialized tool kit and suggests that a wide range of activities were carried out there. The numerous notches, denticulates and burins indicate that woodworking and/or boneworking were important. Some harvesting or cutting of silicious plants such as wild grains or rushes is attested by the presence of sickle blades. The grinding stones found here further suggest the domestic activity of grinding seeds or grains. Scrapers, awls and borers may be seen as indicating skin-working tasks. The presence of some partly fossilized fragments of an indeterminate horn core and the first phalange of an immature *sus scrofa* (Dr. A. Garrard, pers. comm.) may be related to the occupation. Fresh water would have been readily available from the numerous springs in the area as well as the Zarqa River.

The el Ḥuna site appears to have functioned as a seasonal base camp, with a diffuse zone of activity stretching along the now mostly destroyed second terrace of the Zarqa. Despite the overall poor preservation of the site, a salvage excavation is certainly warranted as information from this period is still scarce in Jordan.

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Acknowledgements

This study was part of a project sponsored by the Centre for Jordanian Studies, Yarmouk University. I am indebted to the Director of the Ajlun Mountain Iron Project, Dr. R. Gordon of Yarmouk University, for his invitation to participate in the project, his enthusiastic interest in prehistory, and his constant support throughout. My thanks go also to Mr. A. Al Omari, student of Yarmouk University, who as special field assistant gave unstintingly of his energies; and to the rest of the field crew: Mr. H. Taha, Miss S. Abu Hudieb, Mr. A. Abdul Qadr, Mr. E. Akasheh, Mr. J. Hadidi, and the Director of the Salt District (Department of Antiquities) Mr. S. Hadidi.

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FINAL REPORT ON PALEOLITHIC SAMPLING AT ABU EL KHAS, NORTH N.

by
Linda E. Villiers

Introduction

Abu el Khas is a Lower Paleolithic site located 1.3 km. north-east of ancient Pella of the Decapolis (Smith, Hennessy, McNicoll, 1980). The first report on Abu el Khas (Villiers, 1980) dealt briefly with the site setting, sampling methodology, and ancillary work carried out during the 1980 field season. This final report summarizes the results of artefactual analysis, and investigations into the geology and environment of the site area. Certain limited Levantine site comparisons have also been made. Complete details of the research may be found in "Exploration of the Lower Paleolithic Period in Jordan: The Abu el Khas Site" (Villiers, 1981).

Both Pella and Abu el Khas are located within an area known as Tabaqat Fahl. This area forms a natural physiographic unit consisting of an alluvial plain bordered by the 'Ajlun highlands in the east, the Wadi Jirm drainage system in the south, and the Wadi Hammeh in the north. Tabaqat Fahl is separated from the Jordan Valley in the west by a steep drop of some 120 metres, and constitutes a transitional terrain between the valley and Eastern Highlands.

Abu el Khas is located in the north-east corner of the Tabaqat Fahl area, at an elevation of between 0-45 metres A.S.L. It consists of the Tell el Baab hill spurs and the Tell abu Ramileh ridge which partially enclose a small plain lying some 50 metres above the large Tabaqat Fahl fan terrace (Fig.1).

Although artefacts may be found throughout the Abu el Khas area (60,000 sq.m. plus), erosion and slopewash (due primarily to cultivation during winter, the period of maximum erosion) have been the primary agents of this spreading. Scatters of artefacts are concentrated immediatly below the south facing crests of the Ramileh ridge and the Tell el Baab hill. In this latitude these south-facing slopes are constantly in sunlight and, as a consequence, are noticeably drier, less vegetated and exposed to active erosion. On the el Baab hill erosion has exposed sections of a conglomerate formation along the south face which excavation subsequently showed to be closely connected with the surrounding artefact concentration.

The size of the present site area, together with the limited field resources available, precluded intensive sampling over the whole area. A form of stratified random sampling was selected in order to test what relationships existed between topographic variation and artefact density and distribution (Villiers, 1981: 62-3). This was supplemented by a "selective sample" of artefacts haphazardly collected from the rest of the site. Further material was also recovered from the test excavation. Investigation focused on the Tell el Baab hill spurs where the excavation and random sample were located (see Villiers, 1980: 164 for selection criteria and site map).

Test Excavation

According to local informants a flat-topped spur of the el Baab hill, in the western section of the sample grid, had not been ploughed in living memory, the owners preferring to use it as a harvest collection area. In the hope of minimal disturbance on this level, grassed area (as compared to the rest of the site which was sporadically cultivated on the fallow system) a 1.00 m. x 1.00 m. test trench was dug here to attempt to clarify the depositional events of the site.

Excavation was by trowel and handpick, following natural stratigraphy. Facilities were not available to sieve the material so each handful of soil removed was "hand- sieved" for artefacts. Level depths given are approximate only as

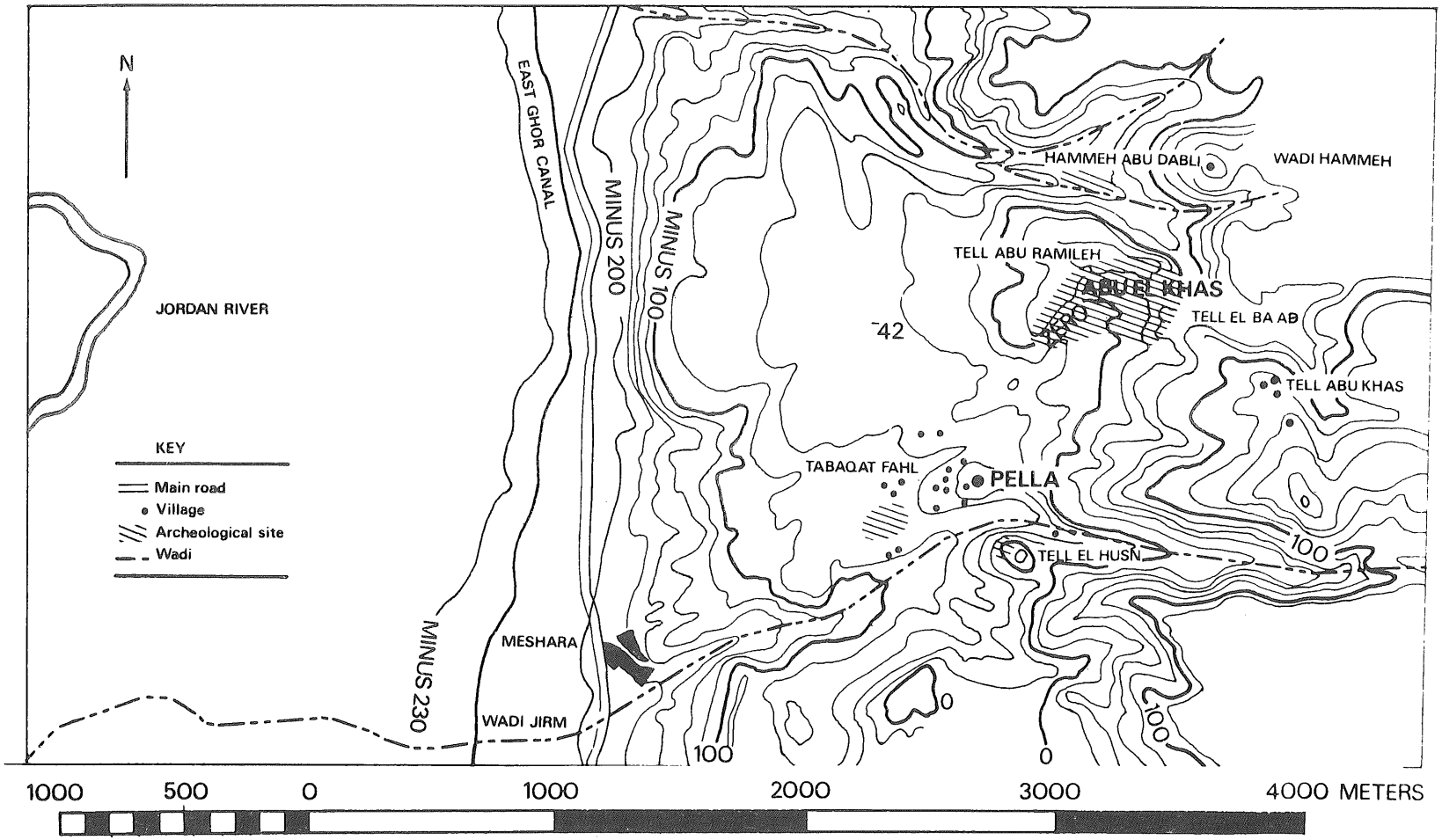

Fig. 1: Topographic map of Pella - Abu el Khas Region.

excavation followed the uneven stratigraphy which rose towards the west.

Levels 1 and 2 (0-0.12 m.) form a shallow reworked soil lying unconformably on a conglomerate unit. The soil was alkali (Ph 8.5-9) with an increasing number of rocks with depth. Artefacts included four Roman-Byzantine sherds as well as small (less than 0.05 m. diameter) non- cortical flakes and chips. Levels 3 and 4 (0.12-0.30 m.) comprised of conglomerate with soil filling the upper depressions and interstices. Some sorting, of the disassociated conglomerate components was noted. The artefacts from these levels were cemented into the conglomerate, with a brittle calcareous cementing matrix, and included flake and pebble tools ranging in size from 0.04 m. to 0.12 m. in length. They were roughly worked and most displayed a heavy white patina with evidence of crushing.

Lenses containing a higher proportion of clay were discernable in the south section above the conglomerate, and appear to represent remains of a weathering surface. No sorting of the constituent components of the conglomerate was noted, with material ranging in size from 0.01-0.02 m. to over 0.12 m. subrounded and subangular in shape. The conglomerate rises from east to west, but whether this is a result of an initial dip of deposition or a structurally controlled tilt, associated with tectonic activity, is unclear.

The conglomerate is part of a formation exposed on the southern face of the el Baab spur, and appears to overlie the Cenomanian limestone base. The formation is well over a metre thick and lying so close to the surface it explains why the hilltop was not ploughed. Fragments of conglomerate were found in collection squares of the sample grid around the hill, and inspection of sections in the military trenches on the adjoining hill showed conglomerate at an equivalent level. The formation is subject to constant erosion and the areas located appear to represent remnants of a formerly more extensive formation.

Analysis of conglomerate samples (kindly undertaken by Dr. Paul Goldberg, during a visit to Australia) indicated that the original deposit was either fluvial with a likely admixture of slopewash sediments, or a slopewash with fluvially worked chalk clasts rounded by a previous phase of transport. After deposition it was cemented by a fine grained calcite and voids filled with a coarser calcite. It is not clear whether cementation was from the soil downward or from groundwater upward.

Artefact Analysis

Sampling methodology and sorting procedures are discussed in the first report on Abu el Khas (Villiers, 1980: 164-5). A 10. sample was collected from randomly selected squares in a 3,000 sq. metre sample grid laid over the el Baab spur (Villiers, 1981: 70-3; 78-81). After preliminary sorting and division with the Department of Antiquities a group of 442 artefacts from the Random Sample, and 28 from the Selective Sample, were available for analysis. The artefacts remaining with the Department of Antiquities were finally analysed in 1982 but the results did not alter the overall picture of the industries represented at Abu el Khas. The Excavation Sample was kept intact and analysed as a whole.

The Abu el Khas site has, at various times during its history, been exposed to denudation, fluvial action, erosion, trampling by man and animals, and disturbance through agriculture and military activity. It is not surprising therefore that many of the artefacts exhibited signs of rolling and crushing. This led to considerable difficulty in distinguishing natural edge damage from intentional edge modification (by retouch and/or utilization). Consequently, for the sake of logical consistency as well as for reliability of results, the unmodified category as used here includes only artefacts with fresh, whole edges. All artefacts with edge alteration (resulting from deliberate modification, utilization, or natural causes) were classed as "edge damaged". This cautious approach clearly leads to under-representation of the "utilized" category, and the figures given

must be viewed with this in mind.

The following technological attributes were recorded: striking platform type, flaking technique, flake form, amount of cortex, flake condition (i.e., "wholeness"), artefact alteration (i.e., patina and freshness), flake length, width and weight (Rollefson, 1980: 136-9).

The significance of the observed technological variations between Groups A and B in the samples was tested by the use of chi-square analysis. The small size of many of the technological subcategories required their pooling in order to produce two major variables for each charecteristic e.g.: "plain platforms" included plain and transversely prepared variants; "facetted platforms" included dihedral, multiple facet, and dihedral with one transverse flake variants, and so on. With one degree of freedom the level of significance was set at 0.001. Although there are problems associated with this method, it proved useful in view of the nature of the samples (see Doran, Hodson, 1975: 54-6; Villiers, 1981: 119).

The composition of the samples is given in Table 1.

Both nodular and tabular flint from the local limestone are used for artefacts, as well as cobbles from the *wadi* beds. The exact source of the brecciated chert is at present unknown although the geological makeup of the area indicates it should occur locally.

Random Sample

The length-width frequencies and weight distribution of whole flakes were graphed and compared and while there is a curious hint of a bimodal size distribution in Group B, the results are inconclusive due to the low ratio of complete flakes in the sample. It is possible that this may be a reflection of the age of these artefacts, with greater damage and breakage being more likely over long periods of exposure.

While both, Group A and B of the random sample represent flake based industries, there are a number of (statistically) significant differences between them. These include striking platform type, flaking technique, amount of cortex present and incidence of patina. Also, while no Group A artefacts show any sign of carbonate concretions nearly 10% of Group B artefacts exhibit this, indicating a close association with the conglomerate unit present on the site.

Table 1. Composition Of Sample Groups

	Random Sample		*Excavation*	*Selective*
I (a) Artefact Form	A n=148	B n=294	n=76	n=28
Bifaces	0	1	0	3
Flakes	128	220	43	17
Cores	5	5	3	1
Chunks/Fragments	12	27	14	2
Natural Flakes	3	39	16	3
Hammerstones	0	0	0	2
(b) Artefact Class				
Implements	58	106	15	20
Cores	5	7	3	1
Artefacts (debitage and utilized)	85	181	46	7
Non-artefactual debris	0	0	12	0
(c) Modification				
Cores	5	7	5	1
Modified/edge damaged	128	284	73	27
Unmodified edge	15	3	0	0
II. Raw Material				
Flint	137	173	60	25
Brecciated chert	0	8	12	2
Other (limestone, chert etc.)	11	13	4	1

With platform type, the difference between Group A and B in the incidence of "facetted" and "plain" platforms respectively resulted in a chi-square of 33.8, with the probability that both groups were drawn from the same population being less than one in a thousand (0.001). Comparison of flaking technique indicated a similarly highly significant difference. The incidence of the use of "normal" (normal, angular) and "prepared" techniques (Levallois flake and blade, normal blade, and non-Levallois prepared core) resulted in a chi-square of 39.1 with p being greater than 0.001. While these differences between the two groups centre on the use of techniques for preparing cores for flake production, there is no evidence for the consistent production of predetermined flake forms (e.g., blades, points, Levallois flakes, etc.) in either group.

The groups vary significantly in the presence of cortex on artefacts (chi-square= 14.9, p = 0.001) with Group B being consistently more cortical. This suggests that either substantially different approaches to core reduction and preparation existed between the two groups, or that Group B was manufactured on site while Group A artefacts were made elsewhere and brought to Abu el Khas before being discarded.

Although clearly observable patination is difficult to quantify and control, especially for borderline cases (e.g., light overall patina, heavy partial patina, etc.). Patination processes are as yet incompletely understood and research remains inconclusive (Schmalz, 1960). However, a highly significant difference (chi-square = 20.1, p = 0.001) was found between artefacts with zero or light patina (Group A) and those with overall or differential patina, i.e., two periods of patination (Group B).

An interesting difference between the two groups which warrants further investigation involves the use of chunks and natural flakes as artefacts/implements, as against the use of struck flakes. The difference between Groups A and B is less marked statistically than those discussed above (chi-square = 9.7, p = between 0.01 and 0.001) but the evidence indicates that this feature would be better explored with larger samples.

Comparison of other features of the assemblages was restricted by either the difficulty in establishing objective criteria for assignment to the relevant subcategories (as in the case of artefact freshness), or by the lack of sufficient relevant items (e.g., transverse platform preparation, hinge flakes, blades). Differences in the use of various types of raw material (flint and the pooled values for the other two types) proved insignificant (chi-square = 0.012, p = 0.90). This suggests that the lack of artefacts made on the more robust brecciated chert in Group A may be due to chance.

Table 2. Summary Of Random Sample Technological Features: Relative Percentages

Platform Type	*A*	*B*
Plain	37.5	59.5
Facetted	32.0	8.6
Absent	26.6	27.5
Crushed	3.9	4.5
Flake Form	*A*	*B*
Normal	40.6	22.5
Angular	34.4	61.3
Blade	8.6	1.8
Hinge	4.7	11.3
Cortex	*A*	*B*
Cortical	34.3	54.1
Non-cortical	65.7	46.1

Flake Condition	*A*	*B*
Complete	25.8	22.5
Platform absent	26.6	27.5
Other edges absent	47.7	50.0
Artefact Alteration	*A*	*B*
Differential Patina	13.3	13.9
Partial/Light patina	32.9	53.7
Overall patina	9.8	31.5
No patina	44.1	1.1
Fresh	92.4	12.2
Slightly rolled	7.7	62.4
Very rolled	0	25.6

Core Type	*A*	*B*
Levallois Flake core	1	0
Proto-Levallois	2	0
Single platform	1	0
Formless	1	0
Discarded	0	4
Core frag./chunk	0	3

Flaking Technique	*A*	*B*
Normal; "Clactonian"	61.7	86.9
Levallois; Prepared Core; Blade	35.9	8.6

As may be seen from the comparison of typological indices (Table 5) Mousterian elements (Bordes, 1950; Bordes, Bourgon, 1951) are moderatly well represented in Group B but relatively low in Group A. The composition of the scraper class in Group B is brought out in the Charentian and Yabrudian indices, with Group A lacking the canted convergent scrapers typical of the latter. The Denticulate group value of Group A is almost twice as high as that of Group B. While the absence of backed knives (Group A) has been taken as a characteristic of Late Acheulian assemblages in the Near East (Rollefson, 1980: 135), Group A's low Levallois index suggests a variation to the usual Late Acheulian, where this feature is usually better represented. No Levallois items occur in Group B.

There are clear differences between core types of the two groups. Specialized core types are found only in Group A (Levallois, proto-Levallois, single platform), and the average number of flake scars on the cores is 8.8. In Group B only amorphous, casually utilized cores were found, and the overall impression was one of irregular use of suitable cobbles or chunks to strike off one or two flakes when required. The average number of flake scars is 3.8. This difference in core types correlates well with the lack of specialized flaking techniques notable in Group B (Table 2).

Excavation Sample

As discussed earlier the artefacts from Levels 1-2 derive from a substantially later, reworked soil now covering the artefactual conglomerate. Re-analysis of the sample, keeping material from the first two levels separate is underway, but the information presented here is based on the excavated sample as a whole.

The majority of flakes exhibit plain platforms (65%) and normal flaking technique predominates. Angular and "normal" flake forms constitute 72% of all forms. Over 42% of items were cortical or had cortical platforms, and the rather high value for non-cortical artefacts is attributable to the higher incidence of chronologically later small flakes in the upper two mixed levels. There was an equal division between complete flakes and those with absent platforms (23% each). Other edges were missing on 53% of the sample. Over 60% of flakes, and 76% of chunks/ natural flakes, showed evidence of concretion. No artefacts were without patina and 47% had a heavy, overall patina. The large size of many of the artefacts recovered from the conglomerate is reflected in the length-width frequency of whole flakes (up to 0.00110 m. width, 0.00100 m. length) and in the weight distribution (up to 345 gms.).

Only fifteen recognizeable implements were found and indices were not calculated. Tools include one scraper, two awls, two naturally-backed knives, nine irregularly retouched pieces, two choppers, and one "diverse" implement. With the exception of the scraper and awls (from Levels 1-2) none of the tools could be called typical examples of their class, being minimally and crudely worked.

Artefacts from Levels 3-4 were originally associated with Group B, Random Sample, which also showed varying degrees of abrasion and conglomeratic adhesions. Although there were differences, (i.e., size, patination colour, and an extremely basic technology evident in the excavated material, the sample was too small to permit comparative quantification. While the excavated artefacts do appear to have certain similarities to some

pre-Acheulian material found at Abu Habil in a similar geological context to Abu el Khas (Bender, 1968: plates; Huckreide, 1964,) this possibility of a third, even earlier, pre-Acheulian assemblage existing at Abu el Khas will certainly require further investigation and collection of larger samples.

Selective Sample

The significance of this group lies primarily in indicating the range of artefact types to be found at Abu el Khas. Being selectively collected they (unsurprisingly) show a finer degree of workmanship to most of the other samples. The small size and selectivity of the group rules out any statistical treatment, and only the implement class was divided into A and B types. Group A comprised of two Levallois flakes, a convex transverse scraper, two denticulates, and one item with fine alternating retouch (Type 49). Group B included a convergent sidescraper, a naturally backed knife, three chopping tools, three bifaces, four implements with crude retouch (Types 46-47) and two "divers" items. Two Chalcolithic chisels were also found on the site.

Artefact Density And Distribution

A subsidiary goal of the Abu el Khas research was to determine the origin of the artefacts, were they surface scatters now eroding down-slope from a high point of the site, or did they originate from a stratigraphic context now being broken up and eroded? The use of probability sampling enabled investigation of the relationship between topographic variation and artefact distribution and, within the limits of the stratified random sampling procedure used, allowed some conclusions to be drawn.

Table 3 shows a marked difference in the distribution patterns of the two groups. While Group A shows a comparatively even weight distribution across both sectors of the sample grid, the average weight of Group B per m^2 is nearly twice as heavy in the south sector. This difference is not dependent on the number of artefacts occurring, which remains proportionally constant, rather it illustrates the difference suggested in the comparison of whole flake weights—Group B artefacts are, as a whole, larger (heavier) than the Group A material. A slight majority of Group A artefacts are found in the higher north sector of the grid, while the Group distribution reverses this pattern — the majority of artefacts are found in the south sector, and the average weight/m^2 there is more than twice as heavy as in the north sector.

Erosion may provide an explanation for the distribution of Group B artefacts, if heavier artefacts are more likely to erode downslope than smaller, lighter ones (cf. Rick, 1976). But this does not explain Group A distribution which, although with a lower density per m^2 in the higher north sector of the grid, has a higher average weight per m^2 there. This pattern suggests

Table 3. Artefact Density And Distribution

	Total Sample		*Group A*		*Group B*	
	North Sector	South Sector	North Sector	South Sector	North Sector	South Sector
No. of squares sampled *	44	31	32	24	37	23
No. of artefacts	220	222	76	72	144	150
Overall weight (grams)	4970.2	6199.4	1552.4	1062.8	3417.8	5136.6
Average density/m^2	1.3	1.8	0.6	0.8	1.0	1.6
Average weight/m^2 (gms)	28.2	50.0	12.1	11.1	23.1	55.8

* In the Group A and B columns the number of squares sampled refers to the number of squares in which artefacts of the relevant type occurred.

that the material was probably discarded on the upper north sector and has not yet eroded significantly downslope.

The sample grid was divided into four equal quadrants running from east to west, and the relative percentages of artefacts in each was calculated. This showed a concentration of Group B artefacts surrounding the flat-topped hill in the west where the conglomerate outcrops. If Group B derives from a unit within the conglomerate, which appears likely, then their occurrence further upslope in the northeast sectors of the grid suggests that the conglomerate formation may have once extended over this area but has since been destroyed.

The Group A pattern of distribution appears to be independent of that of Group B. It is also independent of the prevailing drainage direction, a factor influencing erosion patterns, which is from north to south.This suggests that Group A represents a later episode of site use, with artefacts experiencing only limited downslope movement since their deposit on the higher and flatter north sector of the site.

Site Comparisons

Inter-assemblage comparisons highlight the inadequacies of the various systems of lithic analysis in use in the Levant. Until recently the emphasis has been on tool typologies (usually classified according to Bordes' system, variants thereof, or site-specific systems such as 'Ubeidiya) and little data is available on the technological features of assemblages (Rollefson, 1980: 130). Clear comparisons are further limited by the lack of comparative quantitative data, variations in criteria for ascription to artefact type classes, non-equivalence of sampling procedures and sample sizes, and differences in the nature of assemblages due to depositional contexts.

Given these problems it was only possible to highlight general similarities and differences between Abu el Khas and other selected sites (e.g., 'Ubeidiya and Latamne). These sites are discussed in detail in Villiers (1980: 132-145) and on the present evidence it appears that Group B may probably be placed at the end of the 'Ubeidiya sequence but preceeding Latamne (Fig. 2). Until recently Paleolithic investigations in Jordan have been sketchy and unsystemmatic. At the time of this analysis comparative data was available from only two sites. 'Ain el Assad and Fjaje, both kindly made available to the author by Dr. G. Rollefson. Comparison of both Abu el Khas groups with 'Ain el Asad is presented here, while comparison with the Fjaje site may be found in Villiers (1980: 145-150).

'Ain el Assad is a spring at Azraq oasis in the eastern desert area of Jordan. The existence of Paleolithic artefacts there has been known since 1958, but the collection derived by Dr. Rollefson from backdirt piles left by sump excavation is the first to be analyzed in detail (Rollefson, 1980: 129). This collection consists of 538 artefacts, including 62 bifaces, 71 cores, 112 flake implements and 293 other flakes.

Technologically, this collection showed little effort at platform preparation on cores, with the majority of flakes and blades being produced by either the non-specialized "normal" technique or by the high-angle ("Clactonian") method, itself a variant of "normal" technique. Normal flake form predominates and the low incidence of cortex on flakes is taken to indicate that much of the lithic manufacturing process occurred elsewhere (Rollefson, 1980: 139). Although the Levallois technique is not utilized extensively at this site, the "recognizable techniques of flake production, based primarily on patterns of flake scars observed on the exterior surfaces of flakes conform... to what would be anticipated in a Late Acheulian assemblage" (*Ibid:* 136).

Comparison with Abu el Khas indicates that Group A exhibits the closest technological similarity with 'Ain el Assad (Table 4) further supporting its Middle to Late Acheulian identification.

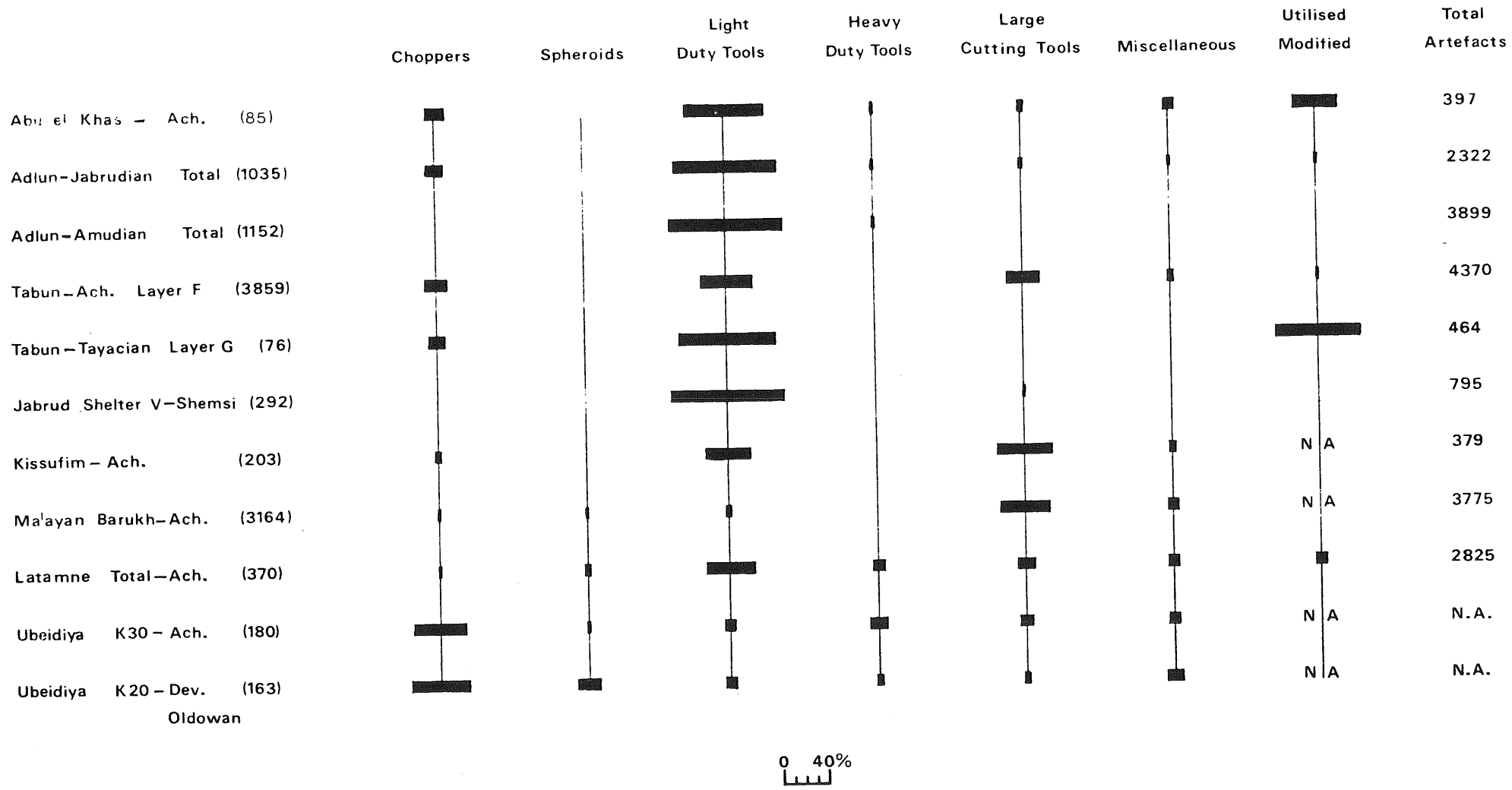

Fig. 2 Comparison of Acheulian and Related Middle-Upper Pleistocene Industries : Variability. (After Clark 1975)

Table 4. Technological Features From Jordanian Sites

		'Ain el Assad	*Abu el Khas*	
			Group A	*Group B*
		n = 405	*n = 128*	*n = 222*
Platform:	Plain	48.2%	37.0%	59.9%
	Facetted	22.5	32.0	8.6
	Cortical	9.1	11.2	8.4
		n341		
Technique:	Normal	32.8	59.4	82.0
	High-angle	29.0	203	5.0
	Levallois	1.8	3.1	—
	Blade	7.6	7.8	1.8
	Prepared Core	22.6	25.0	6.8
Form:	Normal	79.0	40.6	22.5
	Angular	8.9	34.4	61.3
	Blade	6.2	8.6	1.8
	Hinge	—	4.7	11.3
	Debris	0.5	10.2	1.8
			n = 143	*n= 289*
Cortex:	Cortical	41.4	34.3	54.5
	Non-cortical	58.5	65.7	46.0

Group A diverges in the lower incidence of use of the high-angle (Clactonian) technique, larger numbers of flakes with angular form and greater proportion of debris. The non-equivalence of sampling methods used at both sites, and the possiblity that two periods of occupation may be represented in the 'Ain el Assad sample (Rollefson, 1980: 142), means that the significance of such differences remains unclear. It is worth noting though that while Group A and 'Ain el Assad are similar in their ratios of cortical and non-cortical artefacts (suggesting manufacture elsewhere), the high proportion of debris in Group A seems to indicate that post-decortication reduction was carried out at Abu el Khas.

Group B artefacts exhibit substantial differences to the 'Ain el Assad material: a very low percentage of facetted platforms, little use of blade-production and prepared core techniques, a very high proportion of angular flake forms, and a low number of blade forms. The majority of artefacts are cortical, indicating manufacture on-site, but the extremely low percentage for debris suggests that little secondary reduction occurred.

Of classifiable tools at 'Ain el Assad (Rollefson, 1980: 130- 132) 46.9% are bifaces, and 53.1% are flake tools. An unusual feature of this assemblage is that cleavers form 30.2% of the total biface class (14.2% of all tool types) and none are made on flakes. Customarily in Late Acheulian assemblages of the Levant cleavers account for only 2-4% of the bifaces, and they are commonly made on flakes. There is also a relatively high proportion of bifaces of the "diverse" type (24.5%) and as this also occurs at other Levantine sites, Rollefson suggests that Bordes' biface typology is not entirely appropriate for classification of bifaces in this area (*Ibid,* 1980: 130).

Table 5 presents the essential typological indices for flake implements from both sites:

Fig. 3

1 . Single platform core (Grp. A. Random Sample)
2 . Failed Levallois core (Grp. A. R.S.)
3 . Double notch on thick flake (Grp. A. R.S.)
4 . Naturally backed knife (Grp. A. R.S.)
5 . Denticulate (Grp. A. R.S.)
6 . Convergent scraper (Grp. A. R.S.)
7 . Levallois flake (Grp. A. R.S.)
8 . Denticulate (Grp. A. R.S.)
9 . Denticulate (Grp. A. R.S.)
10. Compound notch (Grp. A. R.S.)
11. A Typical Levallois blade (Grp. A. R.S.)
12. Microdenticulate (Grp. A. R.S.)
13. Awl/borer on natural flake (Grp. A. R.S.)
14. Utilized flake (Grp. A. R.S.)
15. Retouched Levallois flake (Grp. A. Selective Sample)
16. Trihedral pick (Grp. B. S.S.)
17. Distal truncation on Levallois flake (Grp. A. R.S.)

fig. 4

1 . Diverse-bifacially retouched primary flake, a type of "bec". interior. (Grp. B. Random Sample)
2 . Chopping tool (Grp. B. R.S.)
3 . Chopping tool (Grp. B. R.S.)
4 . Concave sidescraper (Grp. B. R.S.)
5 . Concave sidescraper on primary flake (Grp. B. R.S.)
6 . Convergent sidescraper (Grp. B. R.S.)
7 . Steepscraper on angular chunk (Grp. B. R.S.)
8 . Convex transverse scraper (Grp. B. R.S.)
9 . Large denticulate on primary flake (Grp. B. R.S.)
10. Sidescraper on natural flake (Grp. B. R.S.)
11. Denticulate (Grp. B. R.S)
12. Denticulate (Grp. B. R.S.)
13. Denticulate on primary flake (Grp. B. R.S.)
14. Naturally backed knife (Grp. B. Selective Sample)
15. Notched flake (Grp. B. R.S.)
16. Notched flade (Grp. B. R.S.)
17. Abbevillian- style handaxe (Grp. B. S.S.)
18. Levallois blade, interior retouch (Grp. A. S.S.)
19. Chopping tool (Grp. B. S.S.)

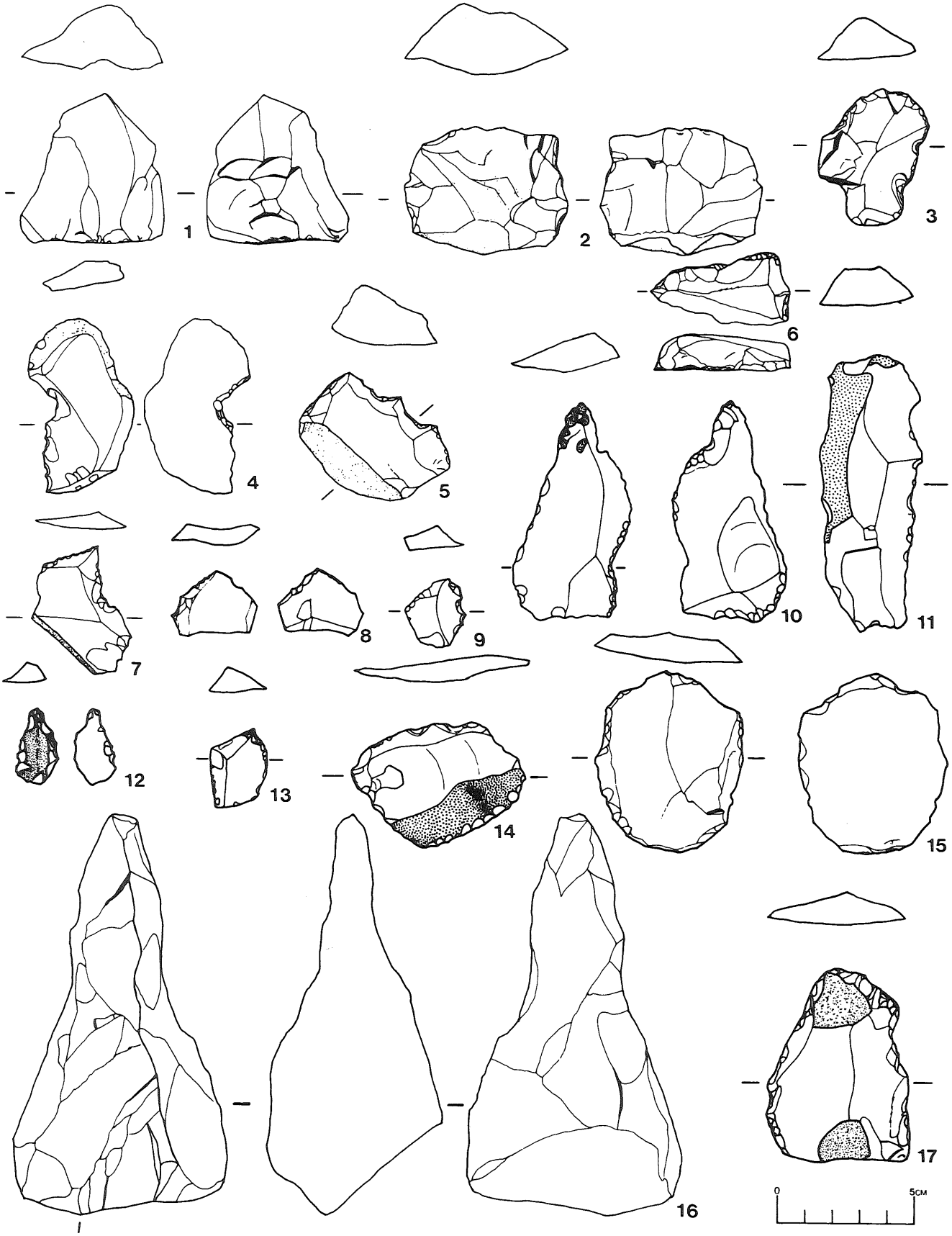

Fig.3. Tools from Abu el Khas

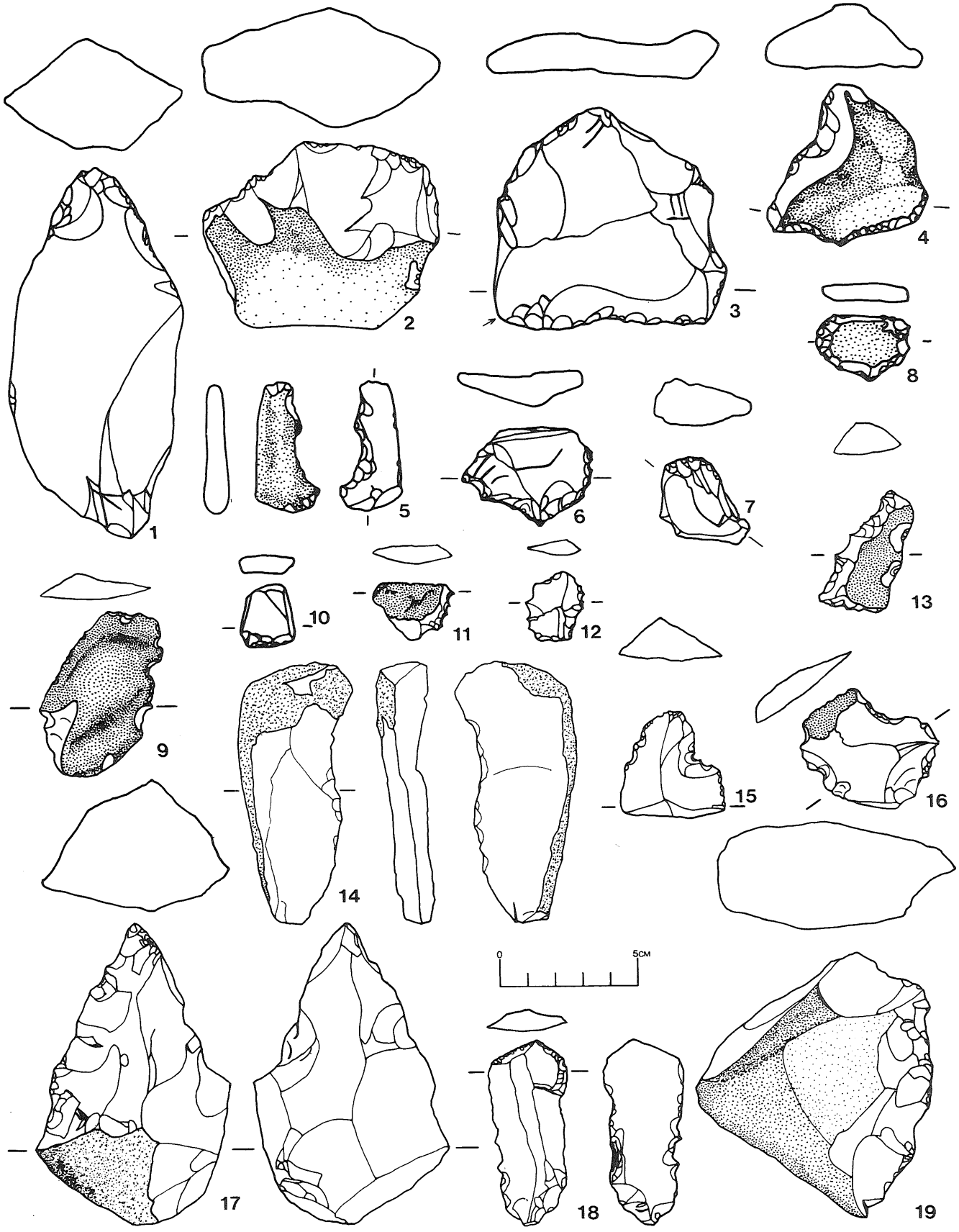

Fig.4. Tools from Abu el Khas

Table 5. Essential Typological Indices for Jordanian Sites

	'Ain el Assad	*Abu el Khas*	
		Group A	*Group B*
Scraper Index	51.7	16.7	32.3
Charentian Index	25.0	5.5	15.4
Yabrudian Index	28.3	—	16.9
Backed knife Index	—	—	3.1
Group I-Levallois	13.8	5.6	—
Group II-Mousterian	55.0	16.7	32.3
Group III-Upper Pal.	16.7	11.1	9.2
Group IV- Denticulate	10.0	44.4	24.6

This method of summarizing typological characteristics of assemblages tends to obscure the degree of similarity or difference between them, and is further hampered by varying criteria used by workers in the inclusion of tool types in the indice groupings (cf. Wendorf, 1968: 198; Rollefson, 1980: 134). In this table it would appear that Group I characteristics are better represented at 'Ain el Assad, yet the technological evidence would seem to belie this. The actual incidence of the use of Levallois flaking technique is only 1.8%, and only one Levallois flake core was found. At Abu el Khas (Group A) the incidence is 3.1% and four of the five cores in this group are either Levallois or proto-Levallois.

Variations in the nature of the samples and sampling methods used may explain many of these differences, but the point here has been to show, mainly through technological comparisons, that Abu el Khas, Group A, would not be out of place being grouped with Middle to Late Acheulian industries as they are presently known from Jordan. Nevertheless if one accepts that associations of artefact types may be repeated in innumerable variations throughout the Acheulian (Clark, 1976: 461) then diversity may be expected.

Geology Of The Site

Certain geological and pedological investigations were carried out in an attempt to date the site independently of artefact analysis. Subsequent research enabled a picture of the formation of the site to be pieced together which later professional investigation of the Pella-Tabaqat Fahl area has generally confirmed.

The Eastern Highlands and scarp area is mostly composed of Cenomanian-Turonian limestone with small areas of Neogene deposits (Bender, 1974: 177-178). At Abu el Khas the basal limestone includes shales, marls, gypsum and dolomite. The establishment of the geological sequence in the study area focuses on the Wadi Hammeh. Abu el Khas with its conglomerate appears to be a remnant formation above the general level of the surrounding area, and above the now deeply entrenched *wadi,* having been isolated by changes in the prehistoric drainage pattern.

Bender (1974:93-4) recorded sediments in the *wadi* similar to the Plio-Pleistocene Shagur Formation, overlain with an angular unconformity by the Ghor el Katar series. Approximately 9 km. to the south, at Abu Habil, conglomeratic limestones unconformably overlie the Ghor el Katar series. In the upper part of this Abu Habil formation, artefacts of a supposedly "Oldowan" type occur, and the formation was ascribed an early Middle Pleistocene age (Huckreide, 1964: 211-212). Although considerable uncertainty exists regarding the chronological relationships of the units, Dr. N. Schulman (geological advisor on the 'Ubeidiya excavations 1960) has suggested that the upper artefactual levels of Abu Habil may be tentatively correlated with the 'Ubeidiya Formation. Similarly, the artefactual conglomerate of Abu el Khas may be regarded as correlative to the 'Ubeidiya Formation, and of assumed Middle Pleistocene age (Dr. N. Schulman, pers. comm. 1980). Horowitz (1979: 335) also correlates the 'Ubeidiya Formation and

the corresponding upper part of the Abu Habil series and assigns them an Early/ Middle Pleistocene age (between 1.2 million years-600,000 years).

An alternative correlation for the Abu el Khas formation may be with the succeeding Naharayim Formation. At 'Ubeidiya and Banat Ya'cub this is marked by a distinct angular unconformity, and is ascribed to the transition between the Early and Middle Pleistocene (Picard, 1965: 351-2). Prior to the deposition of the Naharayim Formation the 'Ubeidiya beds were deformed in a phase of tectonic activity that resulted in the conglomerates of Layers K29, K30 being tilted 45 degrees to the north-west (Stekelis, 1969). If the tilting of the Abu el Khas formation towards the west is indeed structural, and not a depositional dip, this would correlate well with the last phase of the 'Ubeidiya Formation. The Naharayim Formation consisting of fluvial and colluvial sediments has been correlated with poorly consolidated gravels with a red, argillaceous matrix, containing early Paleolithic artefacts in the Wadi Kufringa—Wadi Yabis area, approximately 7-20 km. from Abu el Khas (Bender, 1974: 95). These sediments overlie the Abu Habil series, and are themselves overlain by the Lisan marls, deposition of which ceased between 12,000-18,000 years ago (Bender, 1974: 97; Horowitz, 1979: 342).

Although there had been no geological investigation of the Pella-Tabaqat Faḥl area prior to this research, P. Macumber (a professional geologist) surveyed the area for the Pella project in early 1981. In his unpublished report he notes the problem of repetition of fluvio-lacustrine sediments along the eastern graben, complicated by tectonic activity, which makes geological identification and correlation very difficult. These formations have been deposited from Plio-Pleistocene time onwards, and in the present absence of means of directly dating them their clear identification is going to require much work. A start on this project is scheduled for the 1982/3 Australian Pella field season.

Paleoenvironment Of The Site Area

The botanical profile of the Pella-Tabaqat Faḥl area was investigated and together with other environmental and geomorphological data this allowed tentative reconstruction of the paleoenvironment of the study area. This information is briefly summarized here and more detailed discussions may be found in Villiers (1980; 1982).

Tabaqat Faḥl is located in a specifically (microclimatically) favourable area within the general semi-arid, Mediterranean type climatic pattern of the Levant (Smith, 1973: 91-107). Its water resources are substantially augmented by spring flows which geological evidence indicates have existed throughout the Pleistocene (Bender, 1974:177). The present flora of the area clearly indicates that the former climax vegetation of the area was an ecotone of park forest of *Quercus ithaburensis* and savanna grasslands, including *Zizyphus* spp. Botanical evidence shows little, if any, change in the distribution of plant territories since the Plio-Pleistocene (Zohary, 1973) and a vegetation similar to the former climax is inferred for the Middle Pleistocene period at Tabaqat Faḥl. The Abu el Khas site would have then been situated in a biotype of savanna grassland margins, adjacent to open oak forest covering the higher slopes of the eastern Jordan Valley graben. The work of Ronen (1975) and Gilead (1975) indicates that this was a common preferred pattern for Acheulian site location in the Levant. These areas supported a mixed fauna of European and African elements, with elephant, deer, horse and other grassland species being the most common (i.e., a fauna very similar to that recorded at 'Ubeidiya).

The oldest sites in the Middle East are located in or adjacent to the Rift Valley (e.g., 'Ubeidiya at -200 metres, Jisr Banat Ya'cub at +75 metres). Abu el Khas at approximately +45 metres appears to fit well into this pattern, both environmentally and situationally. A

pollen sample taken at Pella, although lacking chronostratigraphic profile (Smith, 1973: 136), indicates that the plant species recorded there are at least congruent with those found at other Pleistocene sites in the Valley. The size and density of the Abu el Khas site suggests a probable pattern of repeated visits, possibly connected with seasonal herd migrations between the valley and highlands.

Summary and Conclusions

Abu el Khas is the first paleolithic site in Jordan to have been systematically sampled and test excavated. While the use of explicit sampling strategies is still uncommon in the Levant, the stratified random sampling approach designed for Abu el Khas proved responsive to feedback at various stages of the project and constituted a straight forward strategy for field use.

The analysis of the Abu el Khas assemblages was guided by the need to establish clearly its technological and typological characteristics. It was also concerned with establishing quantifiable criteria for distinguishing between the cultural elements of a mixed site. This met with a certain amount of success. The artefacts from the controlled random sample originally sorted into two groups on impressionistic criteria (fresher edges, less patina), were shown to have less than one chance in a thousand of originating from the same "population". Testing for the significance of technological variations between the two groups by use of the chi-square method showed the existance of highly significant differences between Groups A and B in terms of platform types, flaking techniques, presence of cortex and the use of struck flakes as artefact blanks.

Group B may be characterized by a significantly greater incidence of plain platforms, the use of normal flaking technique (simple hard hammer flaking), a large number of cortical items and items with overall or differentiated patina. The Group B assemblage indicates a preference for utilization of a rudimentary reduction sequence in association with minimal core preparation techniques. An early Acheulian origin is indicated for Group B, while Group A represents a Middle to Late Acheulian assemblage.

The nature of the samples limited the utility of the comparisons of length/width frequencies and weight distributions but differences in flake size production between the two groups are indicated. The use of size factors in providing discriminatory data on mixed Lower Paleolithic assemblages warrants further exploration to test its apparent applicability.

Mapping of artefact densities and distribution across the sample grid indicated that Group A was discarded on the flatter, north section of the site and, while limited downslope movement seems to have occurred, the assemblage is at least partially in position of its original discard. This is further substantiated by the generally fresh condition of the artefacts. The low density may reflect either a shorter or less intense period of site use. Group B artefacts have evidently eroded out of a conglomerate unit but whether they derive from the same unit of conglomerate and the excavated sample, or a now destroyed upper unit which once extended across the upper sections of the site, is still to be determined.

The investigation of the Abu el Khas site suggests that along the graben rim there is an association between conglomerate formations and early Paleolithic occurrences. Further research in the Wadi Hammeh-Abu el Khas area will provide an excellent opportunity to clarify the local cultural and geological sequence and provide a basic model of cultural succession for the area.

The analysis of technological features of the Abu el Khas assemblages, using a slightly modified version of the system adopted by Rollefson (1980), proved an efficient method for describing the technological characteristics of the samples and for distinguishing between its mixed Lower Paleolithic elements. Typological information was of only limited value in this respect.

Jelinek (1977: 18-19) has already questioned whether the European derived

typologies in use are either adequate or suitably formulated to cope with the task of distinguishing related culturally or functional units in the Levant. Clearly there is a need to move away from this typological emphasis and expand the scope of technologically oriented studies, a subject barely touched upon in this region.

Much of the confusion in Levantine prehistory is due to the partial recovery of assemblages and the selectivity evident in the retention of artefacts for analysis. Uncontrolled sampling of sites had also led to distortion of expectations of what constitutes a "characteristic" assemblage of a particular period. The lack of comparative technological and typological data obtained under controlled conditions remains a major obstacle to clarification of these problems and to the development of appropriate techniques of lithic analysis and cultural interpretation.

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Acknowledgements

This research was undertaken with the assistance of a grant from the Australian National Unversity, and I would like to express my gratitude to Professor John Mulvaney, Chairman of the Department of Prehistory, A.N.U., for making this project a reality. My grateful thanks for support and assistance are due also to Professor Basil Hennessy and Dr. Anthony McNicoll co-directors of the Australian Pella Expedition; and to Dr. Adnan Hadidi, Director-General of the Department of Antiquities.

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REPORT ON THE 1982 SEASON OF EXCAVATIONS AT KHIRBET ISKANDER

by
Suzanne Richard

Introduction

Between June 1-July 13, 1982, the second season of excavations took place at the site of Khirbet Iskander in the Wadi Wala. The site lies 24 km. south of Madaba, some 400 metres northwest of the bridge where the Madaba-Dhiban road crosses the *wadi* (Fig. 1, 2). This expedition took place under the auspices of the American Schools of Oriental Research and Drew University and was funded by a grant from the National Endowment for the Humanities (grant no. RO-20386-82). Additional funds were obtained from student camp fees and private donors. The writer would like to express her gratitude to all for their support. A permit for this expedition was kindly granted by the Department of Antiquities of Jordan. With a staff of twenty-four, Dr. Roger Boraas of Upsala College as field director and myself as director, the expedition set out to investigate more thoroughly the domestic EB IV occupation which was discovered in two soundings from the preliminary season in 1981. The preliminary season indicated through a sherd survey that occupation on the mound was densest in the EB III-EB IV periods; two soundings revealed evidence for what appeared to be substantial and permanent installations for the EB IV period (Richard, 1982).

The research goals of this project are specifically: 1) to identify and document the processes of change occurring at the Early Bronze III-IV transition, *ca.* 2400 B.C. in Palestine-Transjordan; and, 2) to investigate the little-known sedentary component of EB IV society. The problem-orientation of the research design for this expedition must be set against the background of late third millennium B.C. studies generally.

For the better part of this century, scholars have explained the disturbances in the archaeological record *ca.* 2400 B.C. by positing a sweeping movement from Syria of Amorite nomads into Palestine, nomads who left destruction of the EB III city-states in their wake. This movement then is said to have culminated in a period of complete nomadic control in EB IV. Until recently, the archaeological evidence appeared to corroborate these views since the materials uncovered from Palestine-Transjordan were virtually all from grave contexts rather than from occupational deposits. New insights into the period over the last decade, derived both from the excavation of village sites and from studies which show continuity in the material culture of the EB III-EB IV peoples, suggest that explanations predicated on nomadic invasions/destructions must inevitably be put to rest (Richard, 1978, 1980).

The current working hypothesis for the EB IV period—the model of pastoral nomadism—characterizes the socio-economic organization of the population as partly nomadic/partly sedentary. This view reflects newer anthropological insights into the nature of West Semitic nomadism as documented in the Mesopotamian Ur III period and later at Mari (late third-early second millennia B.C.) Though it is true that the model of pastoral nomadism may include permanent villages, the question we are seeking to answer is: Is this model comprehensive enough to explain the archaeological record at the site of Iskander? Only continued excavation and a thorough comparative study of the EB III-EB IV levels on the mound will shed light on this question. The results of the expedition thus far suggest to the writer that continued excavation at the site of Iskander will offer significant insights into critical EB III-EB IV problems.

The 1982 Season

Our goals this season were: 1) to

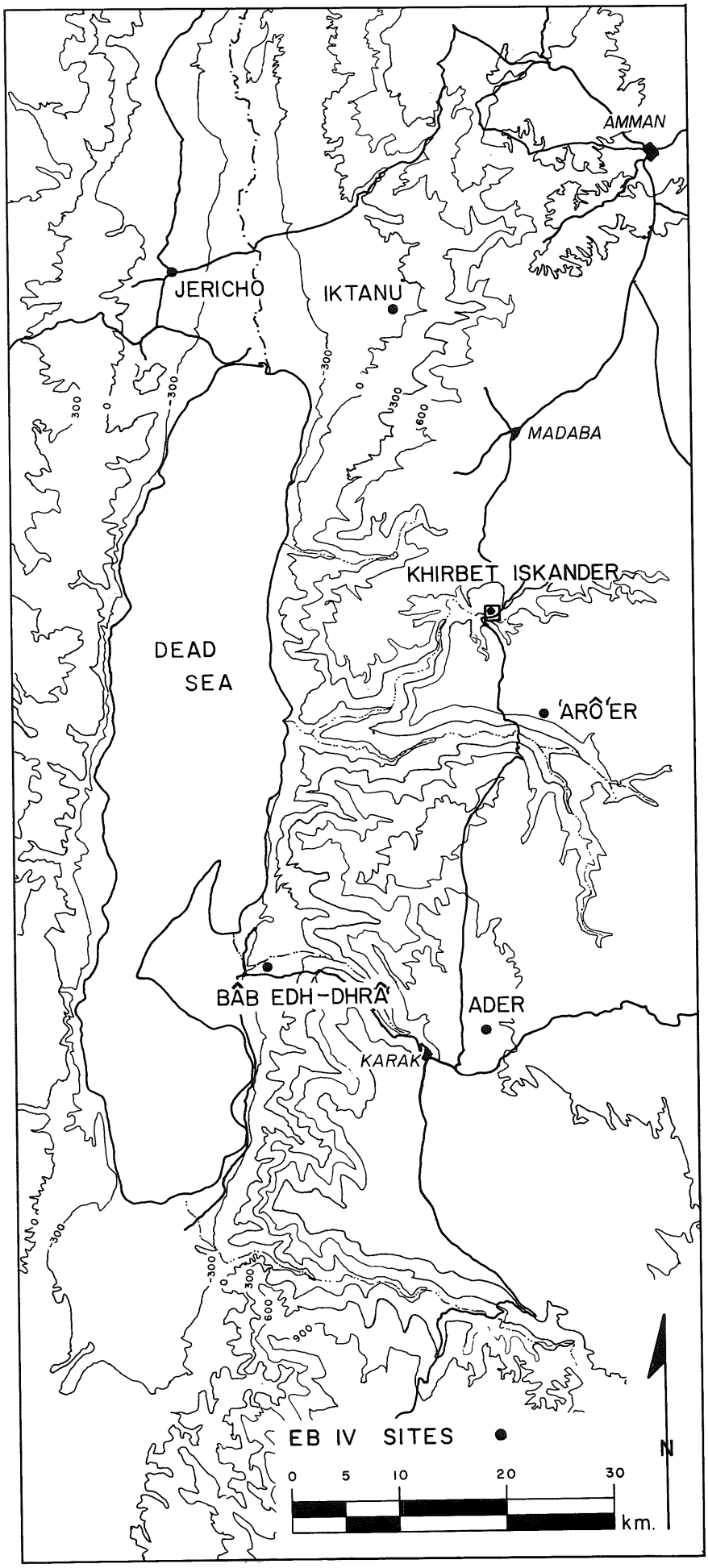


Fig. 1 Map of Jordan with EB IV sites

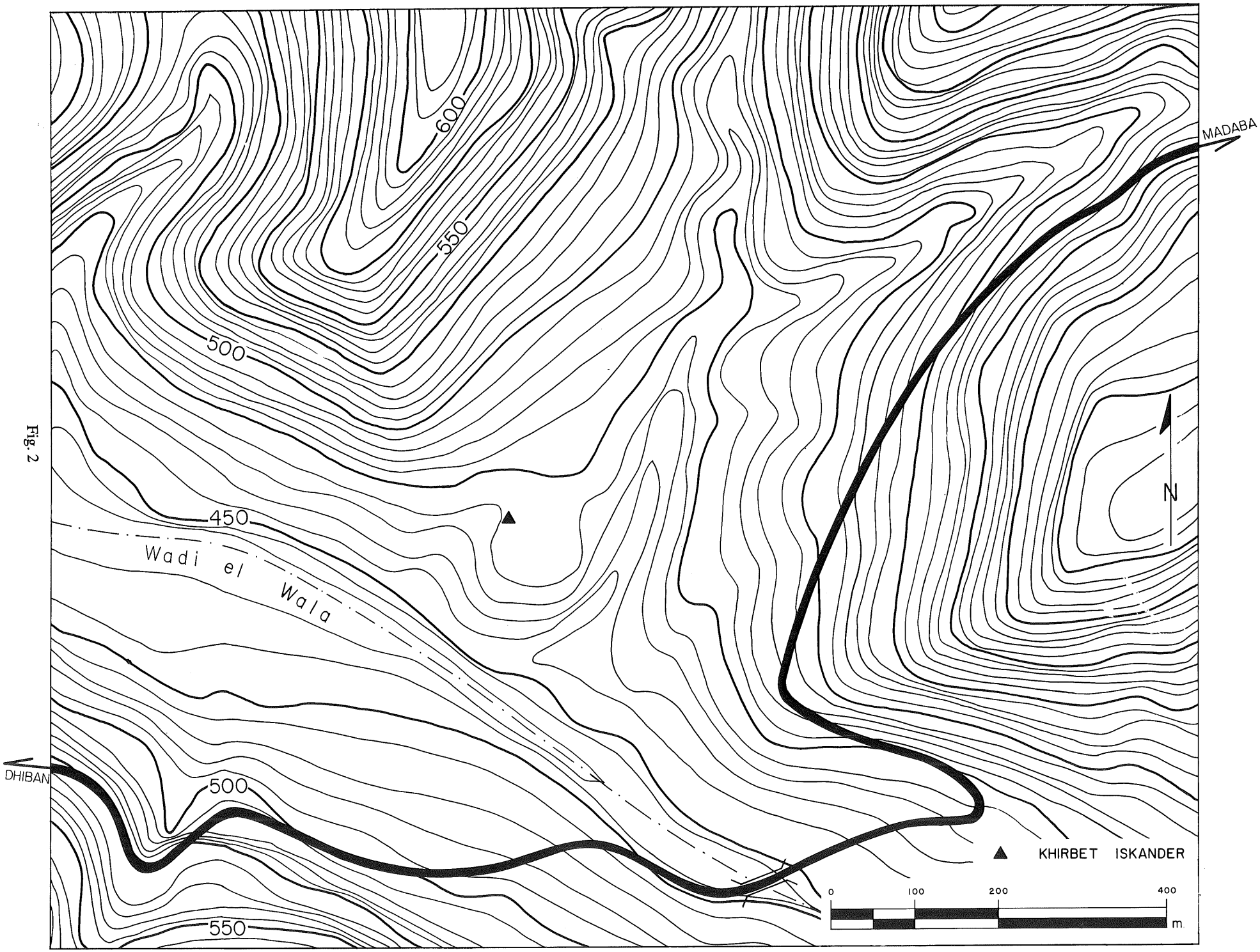

600
550
500
450
Wadi el Wala
500
550
MADABA
DHIBAN
N
KHIRBET ISKANDER
0
100
200
400
m

Fig. 2

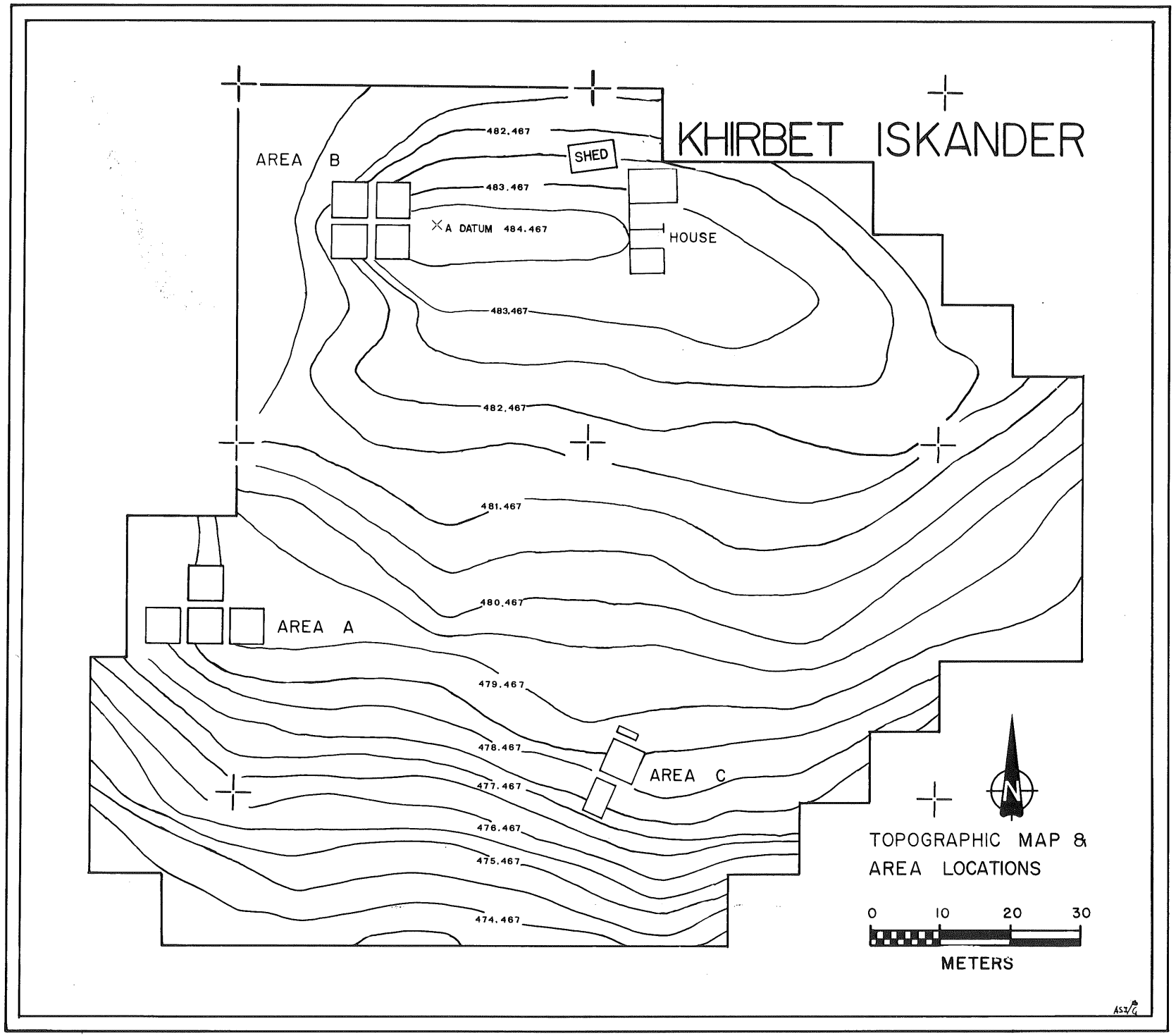
expand Sounding A1 at the SW corner of the mound in order to trace laterally the substantial wall line and possible tower uncovered last year; and to clear larger areas of what appeared to be a domestic complex; 2) to expand Sounding B1 at the NW corner of the mound in order to expose what appeared to be the outer fortifications, and to investigate further the heavy mudbrick debris encountered last year in this area; 3) to open a new area (C) at the SE corner of the mound where a 2.00 m. wide opening in a substantial east-west wall had been noted; and, 4) to begin a systematic regional survey within a two-kilometre radius of the site (Fig. 3).

Sounding A1 was enlarged to a 5.00 m. square and contiguous 5.00 m. squares A2, A3, and A4 were opened to the east, north, and west of A1 respectively. The major architectural feature uncovered in A1 last year, east-west wall 1004-1047, was traced across the corners of A2, A3, and A4. The nature of this substantial wall (1.20 m. in depth, 0.80 m. in width) and its correct phasing have not yet been determined; the probability now exists that it is not a spine wall of a domestic complex but is rather a fortification or terrace wall. In each section uncovered there is a clear line of abutment discernible, thus suggesting perhaps the technique employed in its construction, i.e., short stretches of wall were built, each abutting the last. Likewise, further excavation is needed to determine whether or not wall 1047 is a tower.

What did become clear, however, is that this entire area was used as a domestic area in the EB IV period. As was discovered in Sounding A1 last year to the south and north of wall 1004-1047, house walls were encountered in contiguous squares below heavy wall tumble. In particular, in A4 two phases of domestic rooms were excavated, with new wall lines and an apparent third phase beginning to appear at the end of the season. Rough field stones of varying sizes comprised the walls of these rooms. In A2 one room was uncovered whose wall construction was superior to that of the A4 houses, more akin to the regular two-row, three to four course house walls encountered in Area B. In A3 to the north of east-west wall 1004-1047, the area appeared to be an open courtyard, for three pits were found, one being encircled by small cobble stones. Thus in the greater horizontal exposure in Area A this year we have so far uncovered two major EB IV occupational phases. On the basis of additonal architectural phasing revealed in last year's sounding, we expect to continue the exposure of earlier EB IV levels in a future season. It does not appear that we are very close to EB III levels, since some 3.00 m. down in the A1 deep probe EB IV pottery continues to appear.

In the northwest corner of the mound, Sounding B1 was enlarged to a 5.00 m. square and contiguous squares to the west (B2), to the north (B3), and to the northwest (B4) were opened. Excellent evidence was uncovered this season for the extensive domestic use of this area immediately within the northern perimeter wall. Further excavation showed that the major north-south wall shown last year to bisect B1 was but the western wall of a well-built and very typical Early Bronze Age broad-room house having dimensions of 4.00 m. in width and at least 7.00 m. in length. A socket in the southernmost stone of the east wall may indicate the presence of the doorway. Last season a *tabun* had been found constructed against the western wall in the interior of the house. The presence of the broad-room house in EB IV is significant in that it further strengthens the argument of cultural continuity between EB III and EB IV.

Additional information concerning the nature of EB IV domestic occupation came to light in B2, just west of B1. Here another typical EB broad-room house was uncovered although not on a north-south orientation as in B1. This house showed two later additions of abutting transverse walls, one against the north and the east faces. Another *tabun* was found built up against the main house wall. The *tabun* itself consisted of an outer lining of limestone fragments and ceramic fragments, and an interior lining of mudbrick; its construction differed from the *tabun* uncovered in B1 in that the latter did not have the ceramic/limestone outer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0 10 20 30
METERS

Fig. 3

shell. Both, however, rested on a foundation of small cobbles. Lying nearby on an associated surface were pounding stones, undoubtedly evidence pointing to a domestic work area. Numerous querns and grinding implements were found throughout Area B. The area west of the main wall consisted of a series of three small rooms or "bins" built up against the wall. These three unusual rooms were built of elongated stones mostly, with walls usually of one course and one row. The size of the partitions in these rooms plus the tiny entrances suggest that these rooms were used as pens for small animals; however, in the largest room, we did uncover a fine beaten earth surface. No materials were found besides pottery which might have suggested storage or work areas, although we do not rule out these possibilities.

As significant as these discoveries are for expanding our knowledge of the little-known domestic side of this enigmatic period, they are overshadowed by the fortifications uncovered, fortifications which seem to have been used or reused in the EB IV period. In B4, situated at the northwest corner of the mound, excavation uncovered a corner bastion, obviously one of the square towers that Glueck had noted at the corners and at intervals in the outer fortifications (Pl. IV). Extending to the east of the tower in B3, the northern perimeter wall was found to be 1.60 metres wide and at least seven courses (Pl. V, 1). At some later time the perimeter wall, as evident in B3, was reinforced with a 1.00 metre wide wall. The southern half of square B3 was spanned by a mudbrick wall (Pl. V,1). The presence of this mudbrick wall does provide some explanation to the extensive mudbrick debris found in Sounding B1 last year. By the end of the season we were able to determine that there were at least three phases of outer fortifications in the following stratigraphic sequence: mudbrick wall appears to be the earliest; next the outer perimeter wall was constructed; and finally a reinforcing wall was built up against the northern perimeter wall, effectively doubling its width. Upon removal of the reinforcing segment of wall, we discovered a wall face bonding and cornering with the perimeter wall (as seen in Pl. V, 1). The foundation levels for these fortifications had not been reached by the end of the season and only one surface (in B4) had been uncovered, unfortunately yielding no pottery. The most that one can say presently, based on pottery from the lowest levels, is that these fortifications appear to have been used in the EB IV period; whether they were founded in the EB III, as seems likely, or EB IV is yet to be determined.

At the southeast corner of the mound, a new field (C) was opened comprising three squares on a northeast-southwest axis, where further conformation for the existence of EB IV fortifications emerged. Surface indications of a 2.00 m. wide break in a substantial east-west wall determined the location of this field. It was decided to excavate the eastern half of this area, including half of the presumed entrance. Upon excavation, the surface wall line mentioned above merged as the major architectural feature in the southernmost square: an east-west perimeter wall 1.40 m. in width and having two courses but made up of massive stones; it cornered at the west end of the square, effectively forming a face to the gateway. On virtually the same northeast-southwest alignment in C2 to the north appeared a multi-phased structure, of somewhat less massive construction, which we believe is a gate (Pl. V, 2). The structure included a bench running along its west face. It is clear that construction of this guard chamber incorporated an earlier domestic structure, part of which served as the threshold across the gateway. The eastern wall of this chamber appeared in the east baulk. Examination of the gateway surface by our geologist, Dr. Frank Koucky, led to the discovery that what appeared to be a plaster-like surface was really weathered mudbrick, and in fact a small probe in the gateway near the north baulk uncovered a mudbrick *in situ*. The size of the mudbrick was 0.35 x 0.35 m. Whether this evidence reflects the collapse of a mudbrick superstructure or an earlier mudbrick fortification (as in B3) will have to await further excavation. The mudbrick spans the 5.00

m. of the gateway. What must also await clarification from further excavation is the relationship between the structures in C1 and C2, for no soil layers connected them upon removal of the baulk in-between. Possibly the construction of a later wall discovered in the baulk had destroyed all connections. Tentatively, the phasing of the gate is the following: a domestic structure first occupied the area, represented by wall 2009, the southern wall of the guardroom; later a simple gate was constructed which incorporated the earlier domestic walls, forming a room about 2.50 x 2.75 m. having an entrance presumably in the southern wall (although what appears to be a blocked doorway exists in the western wall). At some later point (when the gate went out of use?) the outer perimetre wall was constructed.

Except for the deep probe in A1, where EB IV diagnostic sherds are becoming less frequent, all occupational phases thus far excavated on the site date to EB IV. We are finding many new forms and it is clear that the pottery from Iskander will certainly expand the corpus of known forms. We have the typical beveled rim, round-based holemouth cooking pots alongside the cooking pots with everted rim and moulding, the latter being the first examples of this form attested in Jordan (Richard, 1982). Work is now proceeding on a study of the important stratigraphically controlled pottery sequences for the EB IV period. We found the typical Early Bronze Age sickle blades of the characteristic trapezoidal shape. A wide range of grinding and pounding implements as well as numerous fragments of querns were found on the site, attesting to intensive cultivation; the usual stone and ceramic spindle whorls came to light, as well as the larger stone digging weights. One exciting find occurred literally on the last day and that was the discovery of a gaming stone, of the type known from Bâb edh-Dhrâ', Arad, and numerous other sites, especially in Cyprus. This particular example is probably what may be called the classic type, that is three rows of ten cup marks, also known as the 3 x 10 pattern. It is a surface find so we cannot be sure of its exact date, except to say the Early Bronze Age. Thanks go to Dr. David McCreery, director of the American Center for Oriental Research, for noticing this important artefact on his visit to the site.

One other new piece of information concerning the occupation span of the site did come to light this year and that is that there are later materials on the mound. In each of the three areas excavated, sherds dating to the Late Bronze/Iron Age plus a few Roman sherds, and possibly several from the Middle Bronze Age, were found in the uppermost tumble layers. The total number did not exceed a dozen or so examples and none of these later pieces was stratified. Our preliminary regional survey showed fifteen sites within the immediate vicinity of Iskander, seven of which had been visited by Glueck. The materials collected suggest dense occupation in the Wadi Wala during the Iron Age and the Roman/Byzantine periods. On the basis of the sherds collected, one can suggest tentatively that Iskander was the major Early Bronze Age site in the immediate area.

Conclusion

The significance of the Khirbet Iskander excavation lies in the fact that to date it appears to be a *tell* site evidencing quite substantial and permanent remains from the EB IV period. Apart from one-period sites in the Negev which seem to portray the seasonal occupation of pastoralists (Cohen and Dever,1978, 1979, 1981), the bulk of our information concerning the sedentary side of this culture derives from sites in Transjordan, namely, 'Aîo'er (Olávarri, 1969), Ikhtanu (Prag, 1974), Ader (Cleveland, 1960), Bâb edh-Dhrâ' (Rast and Schaub, 1976, 1979), and a new site presently under excavation, Tell el-Hayyat in the Jordan Valley. The best evidence so far for EB IV domestic occupation comes from Bâb edh-Dhrâ'. Thus far it appears that the EB IV settlement existed primarily in various areas outside the town proper. Except for a recent discovery showing EB IV remains superimposed on a portion of the EB III city wall (Rast, 1979: 33), there does not yet appear to be stratigraphic continuity

between EB III and EB IV in the town proper.

At Iskander we already know that EB IV occupation does continue in the town proper, although until further excavation, it will not be known if there is a stratigraphic break or uninterrupted continuity at the EB III-EB IV transition. Given the presence of EB III sherds on the mound and now the considerable fortifications, we have little doubt that significant EB III occupation exists at Iskander. Thus, future excavation at the site should provide evidence sufficient to describe and, hopefully, to explain the factors bearing on the cultural transition which everywhere in Palestine-Transjordan appears to have been so abrupt. An interesting new thrust to EB IV scholarship will be the investigation into the reasons for the seeming disparity in settlement patterns and levels of subsistence to the west and to the east of the Jordan River.

What this past season of excavation and Parr's earlier work (1960) have made clear, however, is that substantial EB IV domestic remains are found along the perimeter of the site at each corner within the bounds of considerable fortifications. Glueck had already noted this in his survey (1939: 127-129). Having only protruded into the later EB IV layers on the site, we can only comment on the state of the settlement in its latest phases. In these latest levels was discovered at the southeast corner of the mound a gateway with one guardroom, a structure of significant proportions whose associated surfaces contained clear EB IV pottery. In the northwest the latest phases witness to a period of well-built and substantial broad-room houses with associated domestic equipment (*tawabeen* [ovens], bins or work areas, agricultural implements). Included in this area were a square corner tower and at least three phases of fortifications (perimeter wall, reinforcing wall, mudbrick wall). If, as seems to be the case, some phase of these defensive structures proves to have been used, if not erected, in the EB IV, our overall evaluation of this culture must be reconsidered, at least for Transjordan. Finally, at the southwest corner of the mound, excavation uncovered several phases of houses on either side of a subtantial wall, a wall which includes a possible tower. Following the last EB IV settlement, the site was abandoned.

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Acknowledgements

The expedition would like especially to thank Dr. Adnan Hadidi, Director-General of the Department of Antiquities, for extending financial help, equipment, assistance, and a great deal of support to us. The expedition likewise appreciates the kindness of members of the Department of Archaeology, the University of Jordan for the loan of dig equipment. And special thanks go to Mr. Omar Unis, Department of Antiquities, Madaba, for always being there when we needed him.

Senior staff members included Ms. Suzanne Kane (Area A); Mssrs. Andrew Dearman (Area B), Glen Peterman (Area C), Kevin Klein (Photographer); Ms. JoAnn Long (Camp Manager/Pottery Registrar); Drs. Gerald Mattingly (Survey Leader), Suzanne Richard (Architect), and Frank L. Koucky was our geological consultant. Mr. Shahir Abu Alghanam served as the representative of the Department of Antiquities. Square supervisors and assistant staff members included: Mssrs. Randall C. Bailey, Terry Brensinger, John L. DeGisi, Ms. Kathleen Fonseca, Mr. Salam H. Hijjawi, Dr. Herbert B. Huffmon, Ms. Hala Hyassat, Mr. Jesse Long, Mrs. Pamela K. Mattingly, Mr. Stephen Reid, Mr. Abdulrehim Saleh, Ms. Caroline Spark, Mr. C. Marlin White, Ms. Cynthia Winrow, Ms. Bonnie Wisthoff.

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THE EB IV (EB-MB) CEMETERY AT TIWAL ESH-SHARQI IN THE JORDAN VALLEY, 1983

by
S.W.Helms

Introduction

During the first season of excavations at Umm Hammad esh-Sharqiya in the Jordan Valley (Figs. 1: 1; 2: 1; 3: TUHe) under the auspices of the British Institute at Amman for Archaeology and History (BIAAH), a number of EB IV (EB/MB) tombs was rescued from modern road building activity in the area (Figs. 3: TS; 4). Further investigation led to the discovery of a large cemetery, Tiwal esh-Sharqi (Fig. 2:5), whose full extent is still not established. It is likely that it curves about the adjacent occupation site, from south of Umm Hammad esh-Sharqiya (Fig. 2:1), south and east of Umm Hammad el-Gharbiya (Fig. 2:2 to 4), along the heavily dissected "lisan marls" beside Wadi Zarqa in the east and the Jordan River to the west. Tell Umm Hammad, east and west, is a text book example in terms of settlement pattern or, rather, site choice. Agricultural land lies to the north and along the flood plains of the two rivers. The occupation site is located between this and the dissected marls. The cemetery lies beyond this, portraying a logical progression of land use: the least useful land being preserved for the dead. Further work at Umm Hammad will concentrate on the occupation sites (Fig. 2:1 to 4).

Following the excavations of 1982 at Umm Hammad esh-Sharqiya, the project continued in the cemetery area of Tiwal esh-Sharqi as a Department of Antiquities rescue mission. I am most grateful to Dr. Adnan Hadidi, Director of Antiquities, for offering this opportunity and for his constant interest in and concern for the rapidly vanishing archaeological heritage of Jordan, particularly in the Jordan Valley which is now the most intensively developing sub-region of the land. It is hoped that we will be able to establish shortly a permanent rescue facility within the Department of Antiquities in cooperation with Jordanian Universities and foreign archaeological missions.

The five weeks of work from January 15th to February 15th were conducted by Mr. Muhammad Jamra and Mr. Muhammad Darwish of the Department of Antiquities, A. V. G. Betts and the writer. We were comfortably accommodated in the new archaeological station at Deir 'Alla through the kindness of Yarmouk University and Dr. M. Ibrahim, the Department of Antiquities and Leiden University represented by Dr. G. van der Kooij. Surveying equipment was lent by BIAAH and work space was offered by Dr. D. McCreery at the American Center for Oriental Research (ACOR) in Amman.

Additional studies are in progress and include work on the human skeletal remains by Mr. S. L. Rolston (Yarmouk University), study of botanical material by Dr. D. McCreery, soil conductivity exploration by Dr. B. Frølich (Smithsonian Institution) and examination of the chipped stone industry by A. V. G. Betts.

EB IV (EB-MB) In The Jordan Valley

For Palestine the late third millennium B.C. has been a problematical period whose definition and interpretation represents one of the great debates in Syro-Palestinian archaeology. Like so many such establishments, it goes back to Albright and Tell Beit Mirsim (Albright, 1932; 1933: 55; 1938) and traces its development via Kenyon's reinterpretation (i.e., 1952, 1957; 1966), Prag's excavations at Tell Iktanu and her international survey (1974), Lapp's alternative terminology and even broader international survey (1966) and numerous divisions of funeral ceramics into families (Amiran, 1960; 1969), reorganized by Albright (1962), all of which was documented and further catego-

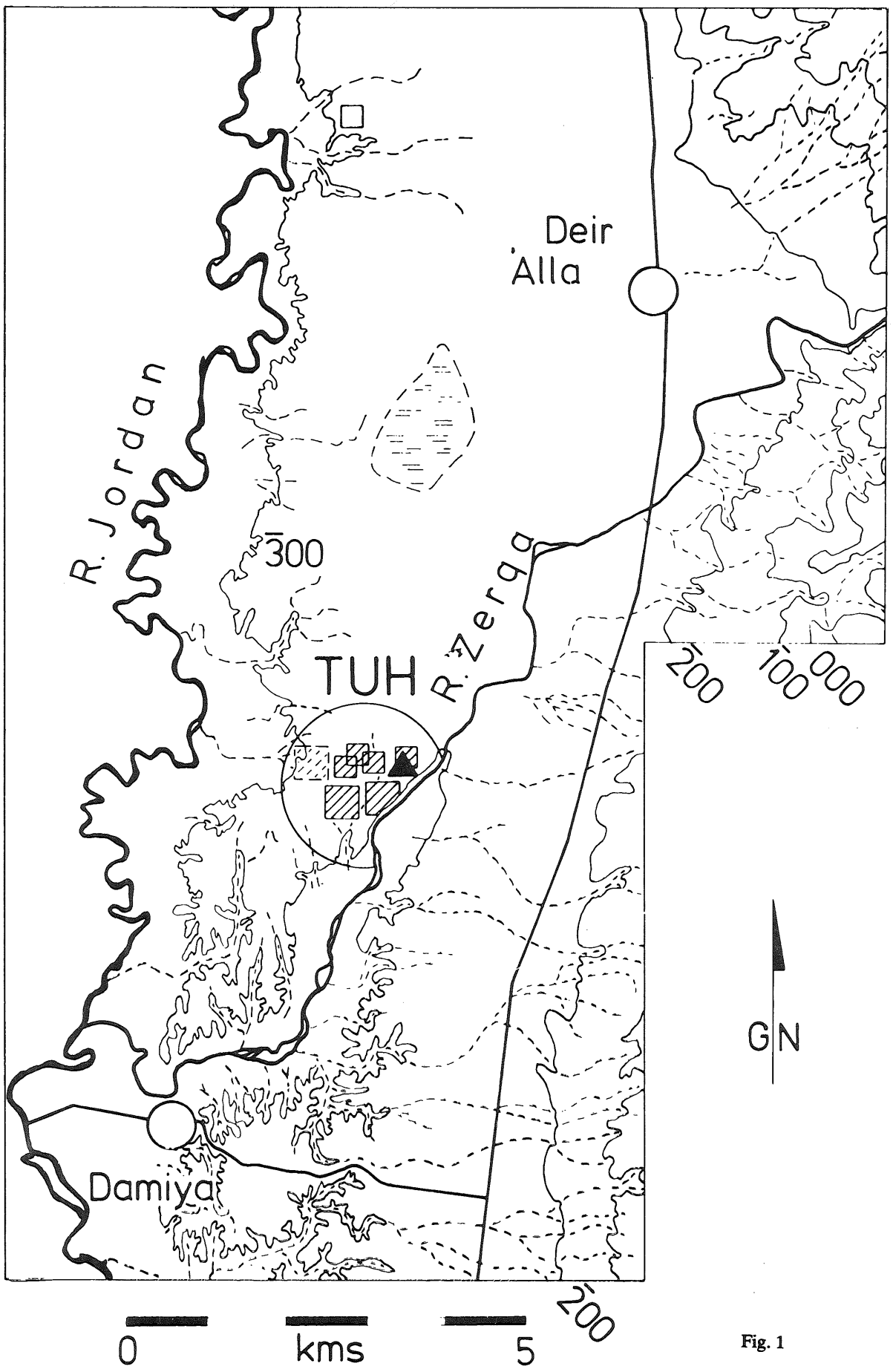
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Fig. 1

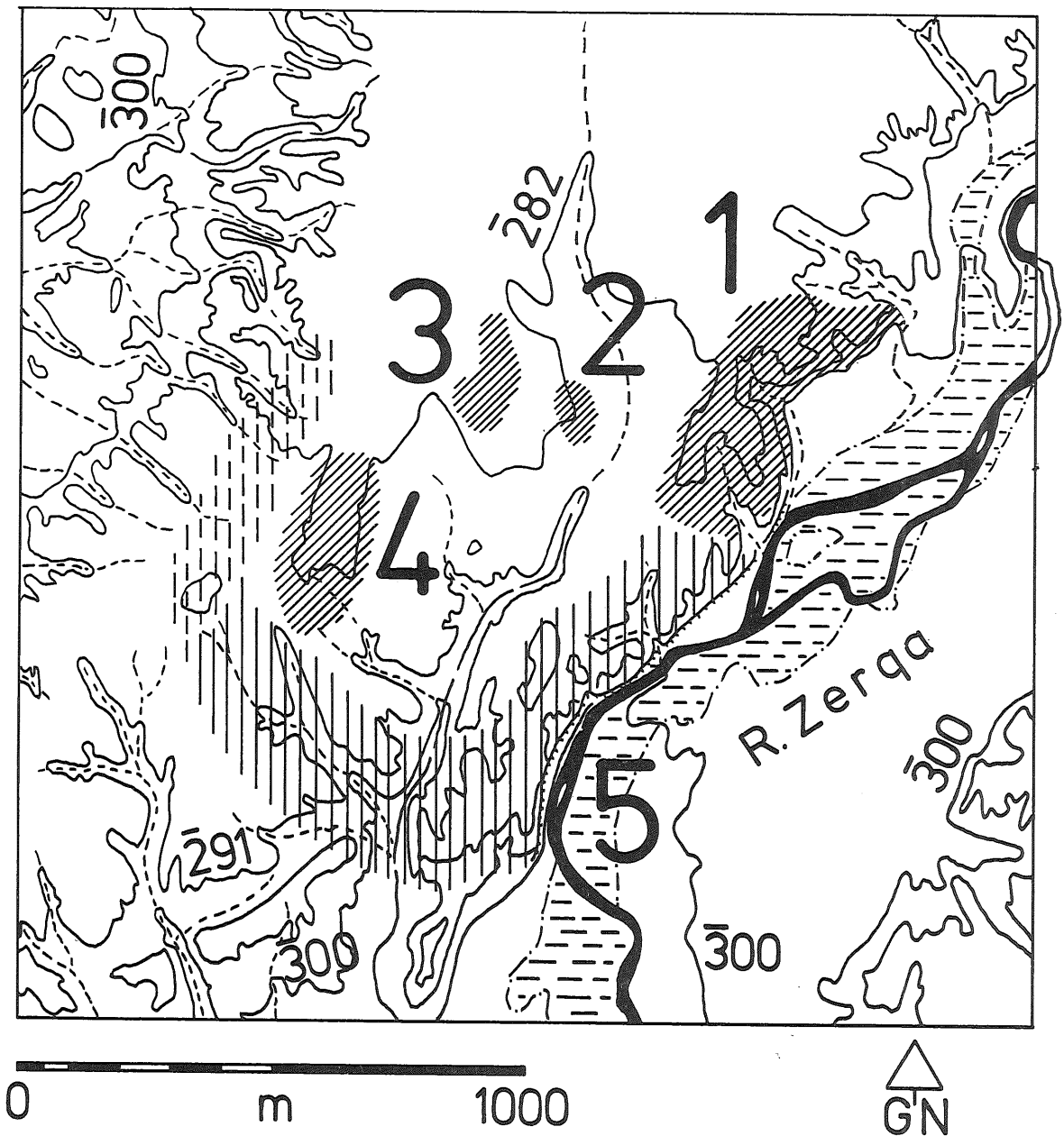

Fig. 2

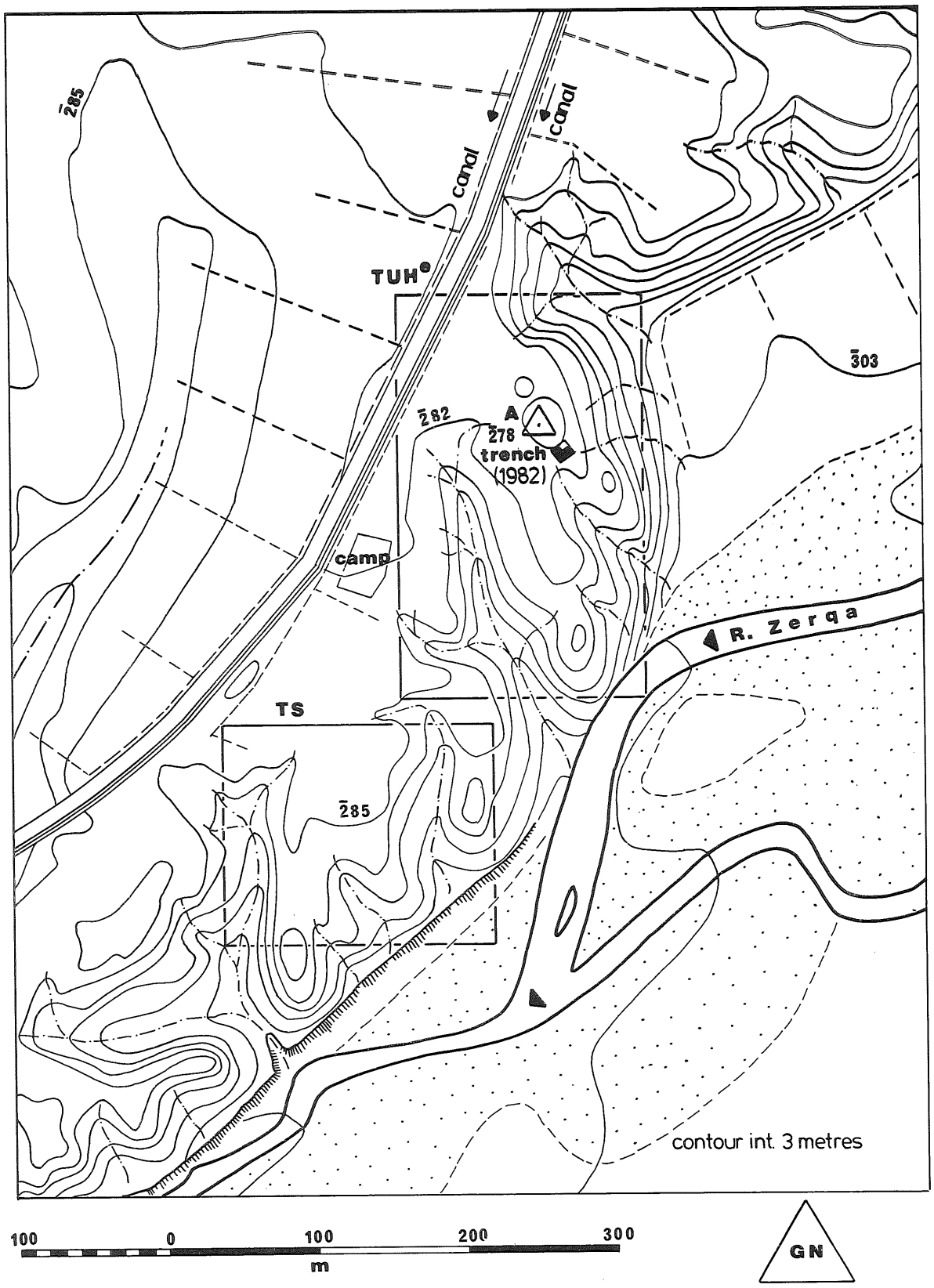
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Fig. 3

rized thoroughly by Dever since about 1970 (Dever, 1980). The bulk of evidence, mostly unpublished, comes from Palestine and the Sinai peninsula; very little from Transjordan. A survey of the "current" ideology still gives the impression that we are far from the truth everywhere.

The occupation site of Umm Hammad el- Gharbiya has been known since Nelson Glueck surveyed the area in the 1940's. He placed the site within MB I (1945b). Since then Umm Hammad el-Gharbiya has entered the still limited typological discussion regarding EB IV (EB-MB), notably at one of the few excavated occupation sites of the period in the eastern Jordan Valley, Tell Iktanu (Prag, 1974) and related to Jericho (Kenyon, 1960; 1965). Prag tabulated various Transjordanian pottery types in comparison with her two phases at Iktanu in a necessarily preliminary way that will have to be revised upon further excavations in the subregion. More general interpretations have been attempted by Dever (1980) for the areas west as well as east of the Jordan River: his families 'J' for Jericho *and* the Jordan Valley and 'TR' for Transjordan, an area as large as Palestine. Of particular interest is his "gap" in this one-family land for his EB IVC (*idem.* Fig.1). During this period he describes an occupation in southwestern Palestine (family 'S') suggesting that the earlier occupation in the east (family 'TR') was the *Vorlage* for the west. Ceramic types quite possibly contemporary with this subdivision of the period (EB IVC) (cf. also Amiran, 1960; 1969) have been found at Tell Umm Hammad el-Gharbiya and Tiwal esh-Sharqi (see below). That such a qualification of the "current" interpretations is possible is due to the lack of comparable material available to scholars abroad. Before the present work in the Jordan Valley very little pottery of the period was found or published with the exception of Jericho (Kenyon, 1960; 1965) and Beth Shan (Oren, 1973a; 1973b). All that we had from Transjordan, apart from Glueck's survey (1951) and that of Mittmann (1970) was Khirbet Iskander (Parr, 1960; Richard, 1982), Bâb edh-Dhrâ' (Schaub, 1973), Ader (Albright, 1924; 1943; Cleveland, 1960), 'Arô'er (Olávarri, 1965; 1969) and Amman (Dajani, 1967/8; Zayadine, 1978). In the Jordan Valley several new occupation sites have been identified recently (Ibrahim, *et. al,* 1976), including Tell el-Hayyat in the north of the Jordan Valley. Tell el-Hayyat is being excavated and is beginning to produce some stratified occupational material of the period, perhaps contemporary with phase 2 of Tell Iktanu (Falconer and Magness-Gardiner, pers comm). Thus there is very little useful evidence at hand at the moment and for that reason the fortunate recovery of complete vessels from the tombs at Tiwal esh-Sharqi is a welcome addition. Work on the occupation site of Umm Hammad el-Gharbiya will commence in 1984 and will complement this and perhaps form part of the basis for further studies and interpretations. The present work is an effort to present information without expansive speculation.

The Tombs

Since the area chosen for burials lies for the most part along the steep bluffs of Wadi Zarqa the chances of soil disturbances throughout time have been great. Whether we will be able to blame the often drastic shifting of whole blocks of marls on erosion or earthquakes or a combination of both remains to be seen. The results are the same. Nearly all chambers opened during the 1982/3 season were damaged in this way. We have begun to calibrate soil conductivity instrumentation (Frohlich: Simthsonian Institution) in two areas (Fig. 4: EM31) with good preliminary results in determining soil disturbances. It remains to be seen whether Frøhlich's success at Bâb edh-Dhrâ' can be duplicated at Tiwal esh-Sharqi (Frøhlich and Ortner, 1982) in differentiating collapsed and open burial chambers. We will also see whether field computing systems and be implemented. Such mechanical aids are essential in terms of strategy in view of the extreme depth of some of the shafts. Note for example the six metre deep shaft of Tomb 3 below.

In addition to natural causes we have begun, like many other "scientific" tomb robbers before us, to understand a human factor that is often understated. One takes

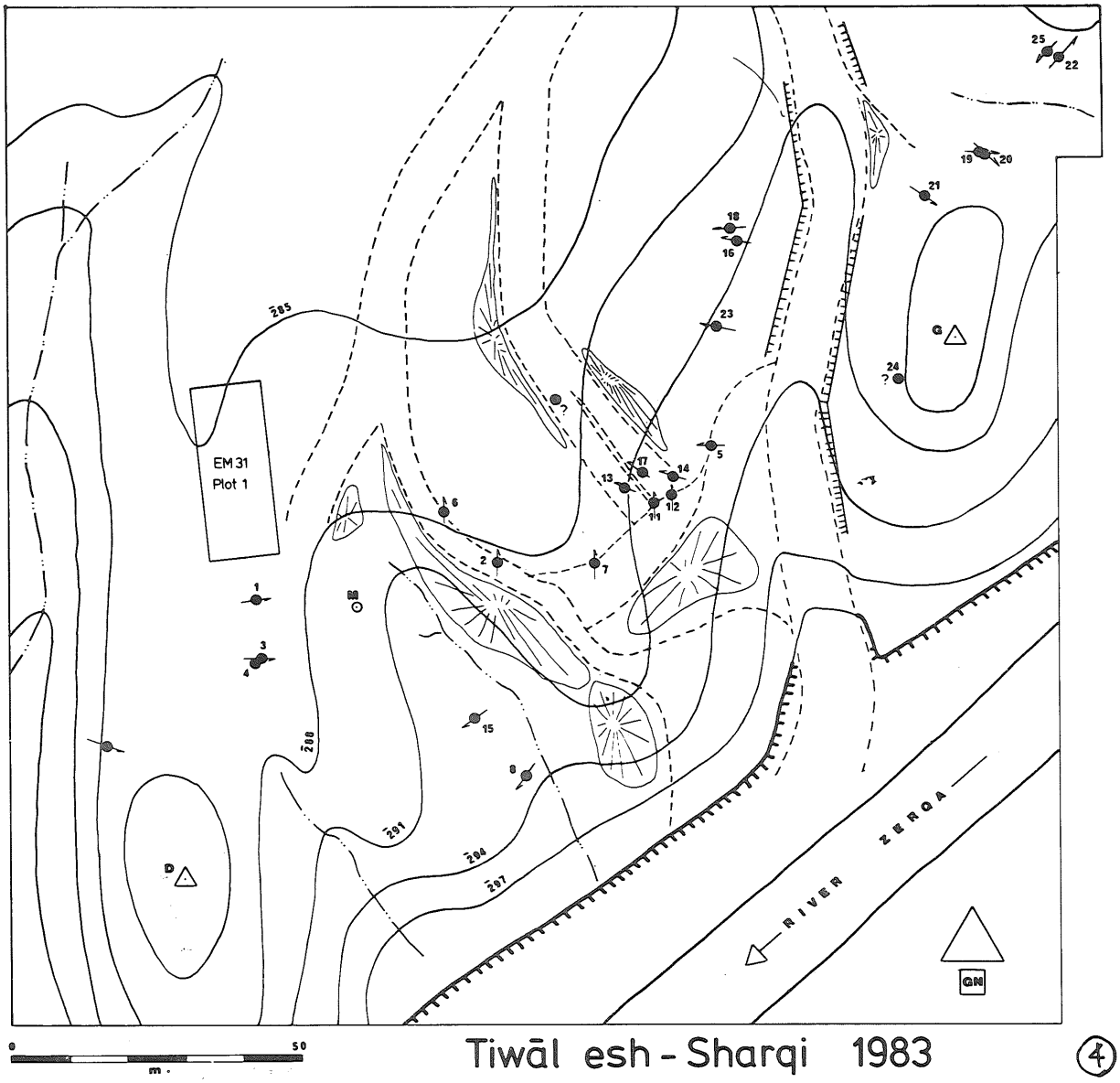
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Fig. 4

heart in Dever's admonition that it "...is a well-known but deplorable fact that most of our relative phasing, as well as our absolute dating, rests heavily on typological analysis of tomb groups, which cover a very brief time-span and in any case are never reliably stratified" (Dever, 1980: 45). We recognize the practice of re-burial and the disturbing notion of either ancient respect for the near-recent dead or simply expediency where tomb offerings may have been left in the chambers along with new depositions (see below). Such a notion introduces a note of caution regarding uncritical acceptance of tomb groups as typologically and chronologically closed. Perhaps the only constructive way of resolving this is the concurrent excavation of the adjacent related occupation sites when these can be found. This too has been said often but rarely done.

Tomb 1 (Fig. 15)
Small rounded shaft with irregular chamber. No blocking of access. Loose fill in chamber with a small human bone fragment. Possibly a baby burial.

Tomb 2 (Fig. 12)
No shaft left: chamber cut by bulldozer to within 0.20 m. at one end, through the floor at the other. Chamber had collapsed before this. Soil very compressed. Shattered bone fragments.

Tomb 3 (Fig. 5)
Rectangular shaft 6. 00 m. deep, cut in trapezoidal sections and provided with foot- holds. Chamber blocked by large flat stone slab. Chamber round, domed with small niche for lamp to right of access. Signs of re-burial attempt above blocking-pick marks and skeletons pushed aside followed by roof collapse. No re-burial.

Tomb 4 (not illustrated)
Circular shaft near Tomb 3. Unfinished.

Tomb 5 (Fig. 10)
Rectangular shaft (not cleared) and round chamber cut by bulldozer. Access blocked by large mudbricks (0.55 x ? x 0.11 m.).

Tomb 6 (Fig. 14)
Rectangular/square shaft, round chamber cut by bulldozer. Access blocked by stone slab. Small earth sill left between shaft and chamber.

Tomb 7 (not illustrated)
Small section of chamber left on side of bulldozer cut; all else gone.

Tomb 8 (Fig. 15)
Shaft eroded away. Access to small rounded chamber blocked by river pebbles.

Tomb 9 (Fig. 14)
Rectangular/square shaft and round chamber cut by erosion. Access blocked by stone slab on low earth sill. Some large mudbricks in shaft, perhaps left from previous blocking.

Tomb 10 (not illustrated)
Shaft and chamber almost completely removed by bulldozer. Small section of chamber floor remaining.

Tomb 11 (Fig. 13)

Shaft removed and chamber cut in half by bulldozer. Shattered bone fragments.

Tomb 12 (Fig. 13)
Shaft removed and chamber almost completely cut away by bulldozer. Shattered bone fragments.

Tomb 13 (Fig. 9)
Rectangular, trapezoidal shaft with footholds. Access blocked by field stones. Signs of re-use. Chamber collapsed and not excavated.

Tomb 14 (Figs. 7, 8)
Rectangular/trapezoidal shaft with footholds. Access blocked by field stones and pottery deposition. Very complicated stratigraphy due to collapse of Tomb 17 shaft and part of chamber. Signs of re-burial.

Tomb 15 (Fig. 15)
Shaft eroded away. Chamber small, round. No blocking found. Child burial (?). Small bone fragments.

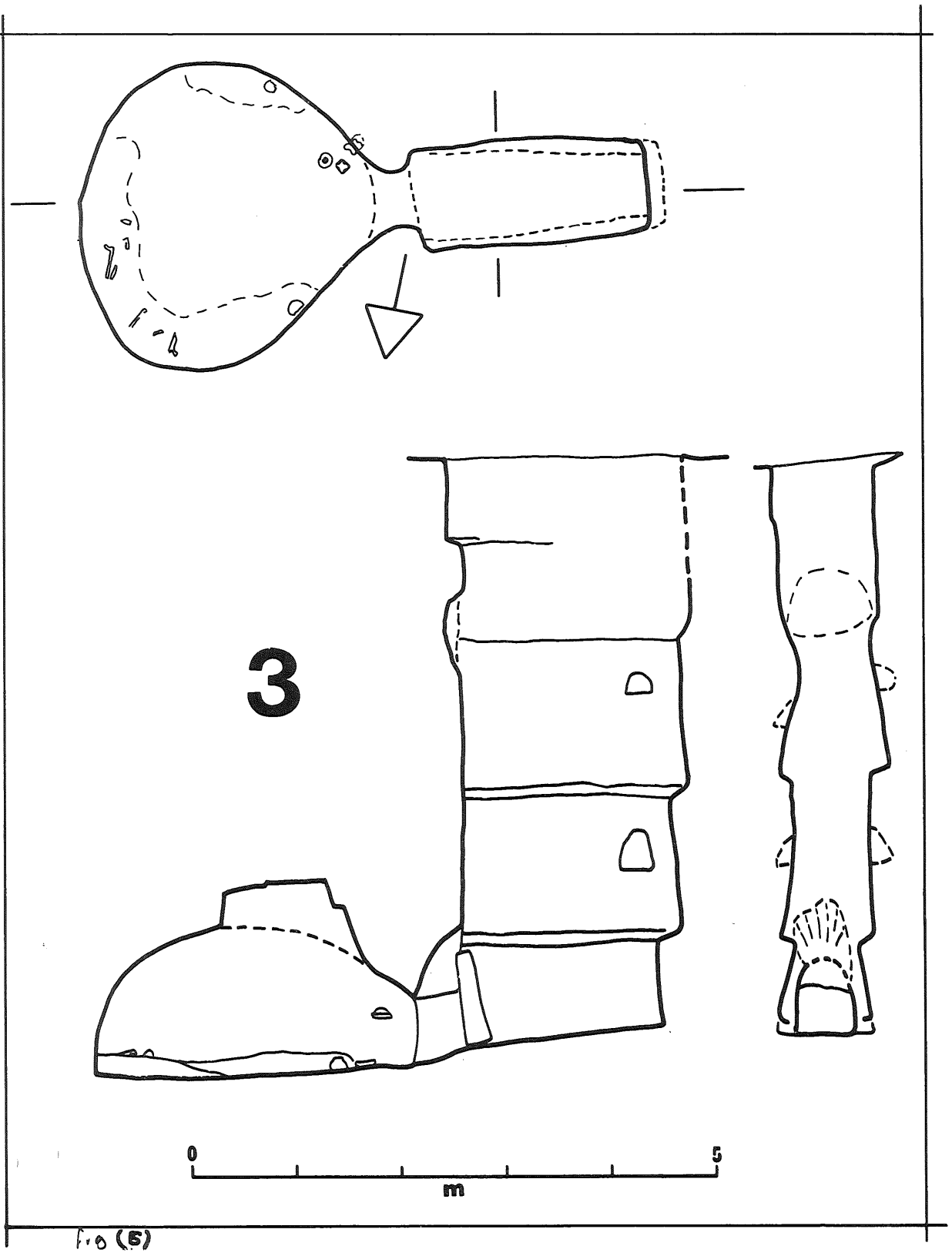

Fig. 5

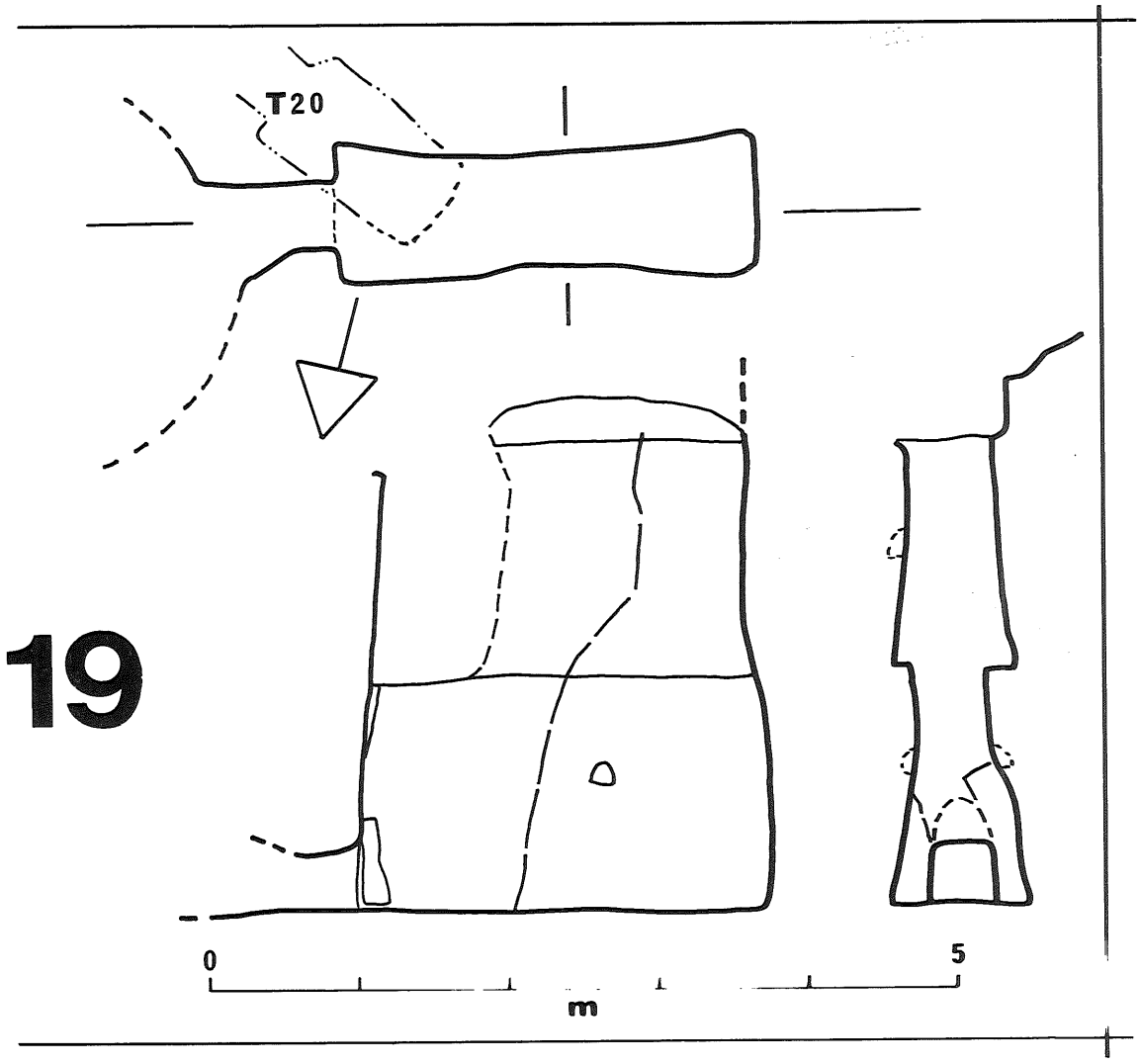

Fig. 6

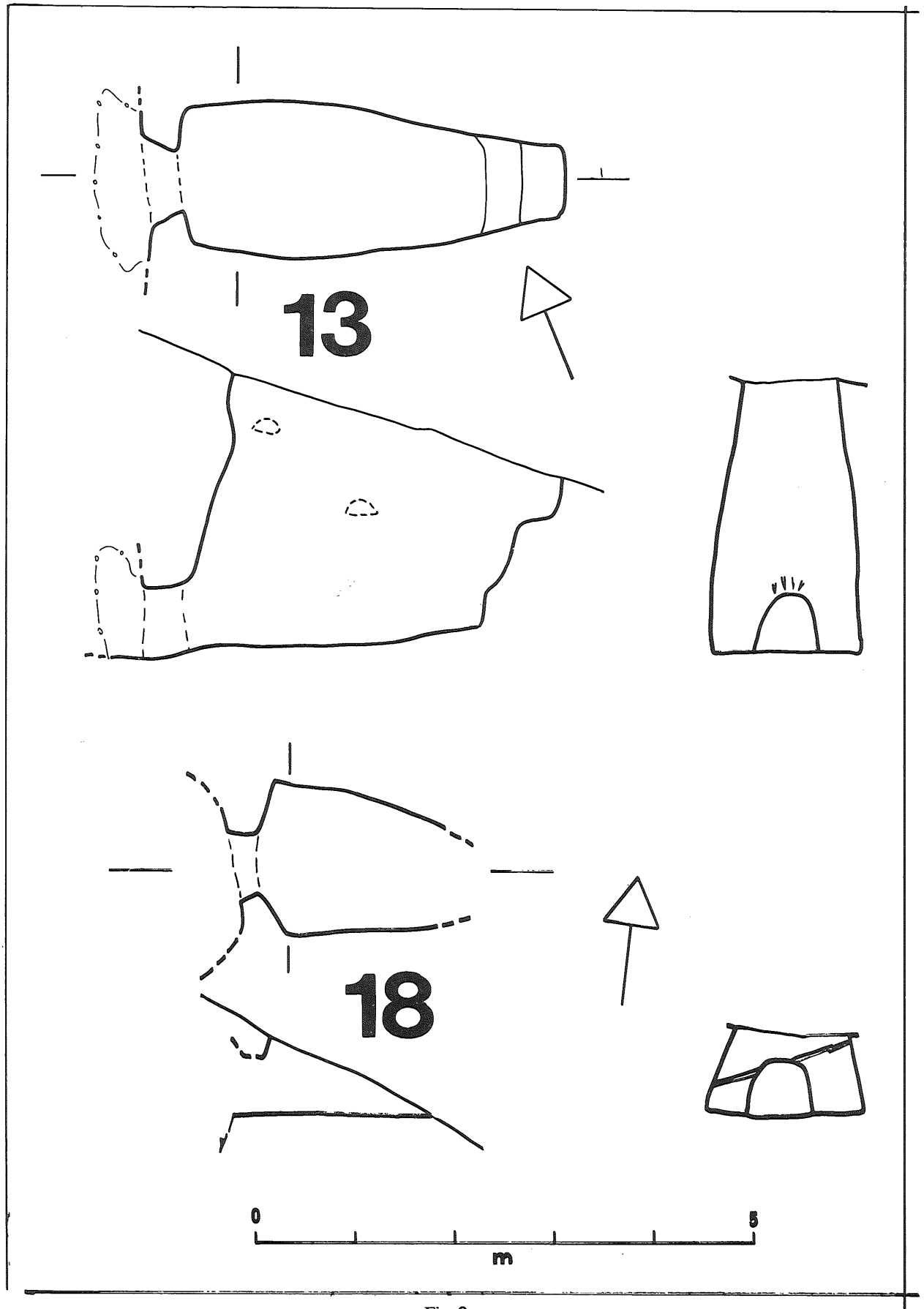

Fig. 9

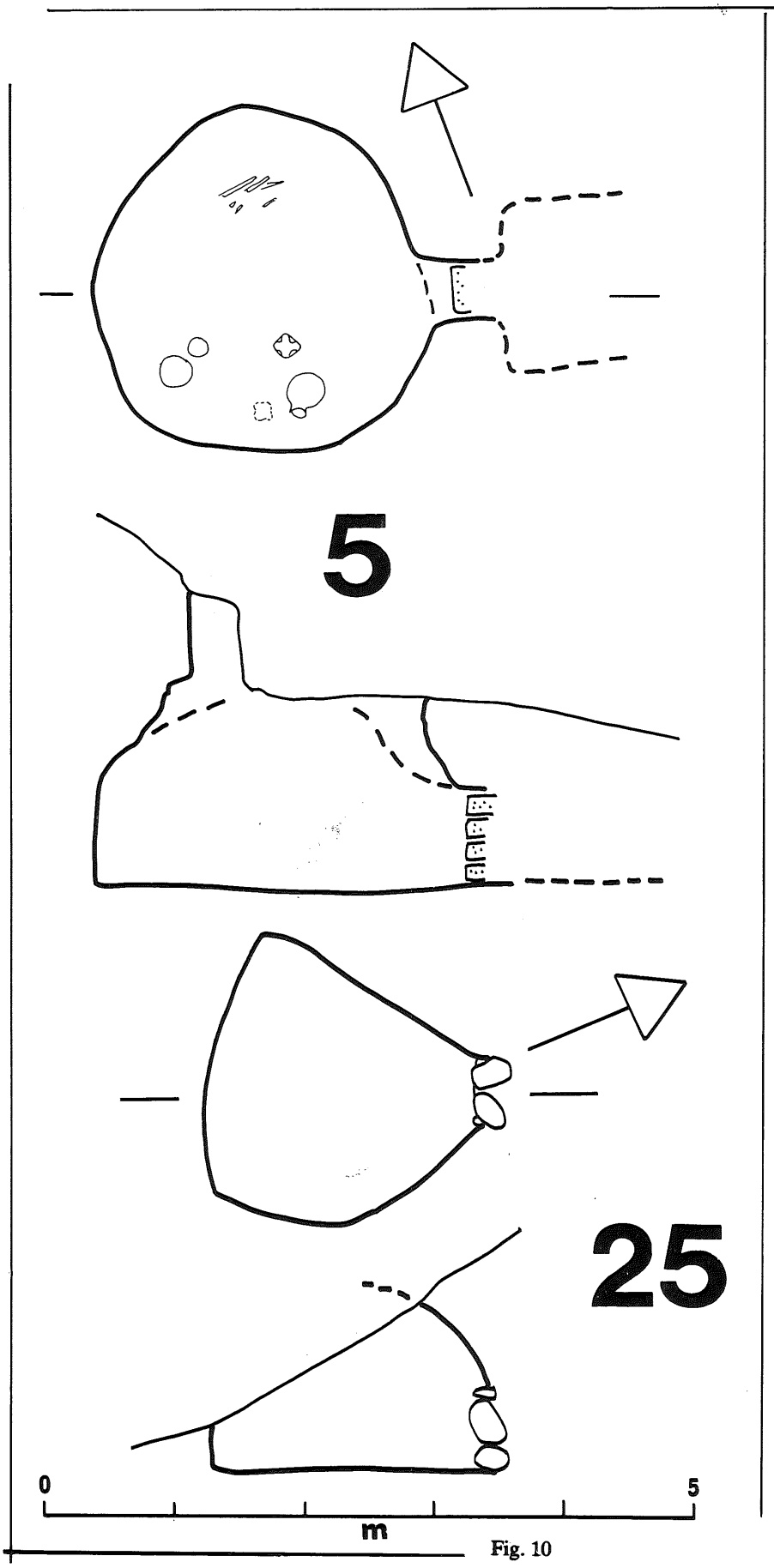

Fig. 10

Tomb 16 (Fig. 13)
Rectangular shaft, partly eroded. Very small rounded chamber, collapsed roof. Crushed human bones scattered over shaft floor. No blocking found.

Tomb 17 (Fig. 7)
Rectangular/trapezoidal shaft. Stone blocking. Chamber not excavated.

Tomb 18 (Fig. 9)
Rectangular/trapezoidal shaft. Chamber blocked by river pebbles. Shaft cut by erosion. Earth shift completely blocked chamber. Some shattered bone fragments.

Tomb 19 (Fig. 6)
Rectangular/trapezoidal shaft with footholds. Chamber blocked by stone slab. Roof collapsed. Crushed bone fragments and one pot near entrance. Signs of re-burial attempt: pick marks above blocking.

Tomb 20 (Fig. 6)
Rectangular/square shaft cut by shaft of Tomb 19. Access blocked with large mudbricks. Collapsed chamber. Not excavated.

Tomb 21 (Fig. 15)
Rectangular/square shaft. Access to small rounded chamber blocked by one and one half mudbricks (0.56 × 0.36 × 0.11 m.). Child's disarticulated skeleton on top of a layer of roof collapse.

Tomb 22 (Fig. 13)
Shaft eroded away. Rounded chamber badly disturbed by earth shift. Bone fragments. Loose stones near access.

Tomb 23 (Fig. 13)
Rectangular/trapezoidal (?) shaft, eroded. Access blocked by stones. Chamber sheered off *ca.* 40-50 centimetres displacement. Not excavated.

Tomb 24 (not illustrated)
Shaft (?) and chamber badly disturbed by soil shift. Not excavated.

Tomb 25 (Figs. 10, 11)
Shaft not excavated. Access blocked by field stones. Chamber badly disfigured by soil shift. Articulated skeleton in flexed position.

Far too few burials have been recorded to describe tomb "architecture" in anything but a preliminary way. We appear to be dealing with two general types of single chambered shaft graves, one of which might be further sub-divided. The criterion is size, related to the size of the corpse. Thus we have small rounded chambers with very few grave goods, if any, for children or babies (Figs. 15; 13: Tomb 16?) and almost but not quite uniform burial chambers with deep rectilinear shafts and rounded chamber. Blocking methods might be significant, the use of stone being a later choice over mudbrick (i.e., Tomb 6: Fig. 14). These larger burials might be divided according to the shaft type, one type being rectangular/trapezoidal (Figs. 5, 6, 7, 9, and probably also 10, 12, 13), the other square/rounded with an earth sill between the shaft and chamber (Fig. 14).

In very general comparative terms the EB IV (EB-MB) shaft graves at Tiwal esh-Sharqi are normal and probably more detailed subdivision according to "architectural" style is either meaningless or premature at this stage. Only the astonishing depth of Tomb 3 (Fig. 5) is new but may simply be a function of topography and soil mechanics. At Tiwal esh-Sharqi the more stable layers of marls tend to lie deep beneath topsoil. Similar structural idiosyncrasies can be observed at other sites such as Bâb edh-Dhrâ' (Schaub, 1973: figs. 2, 3), there related to repeated re-use of the shaft according to the excavators.

The orientation of the burials (shaft-chamber) is noted in Figure 4, the arrow pointing towards the chamber. Nothing has been made of general tomb alignment throughout the cemetery. This could become a valid investigation when more tombs are located. It may also then be possible to derive some geomorphological information from the alignment and relative depth of the shafts, although in the present work no patterns could be discerned.

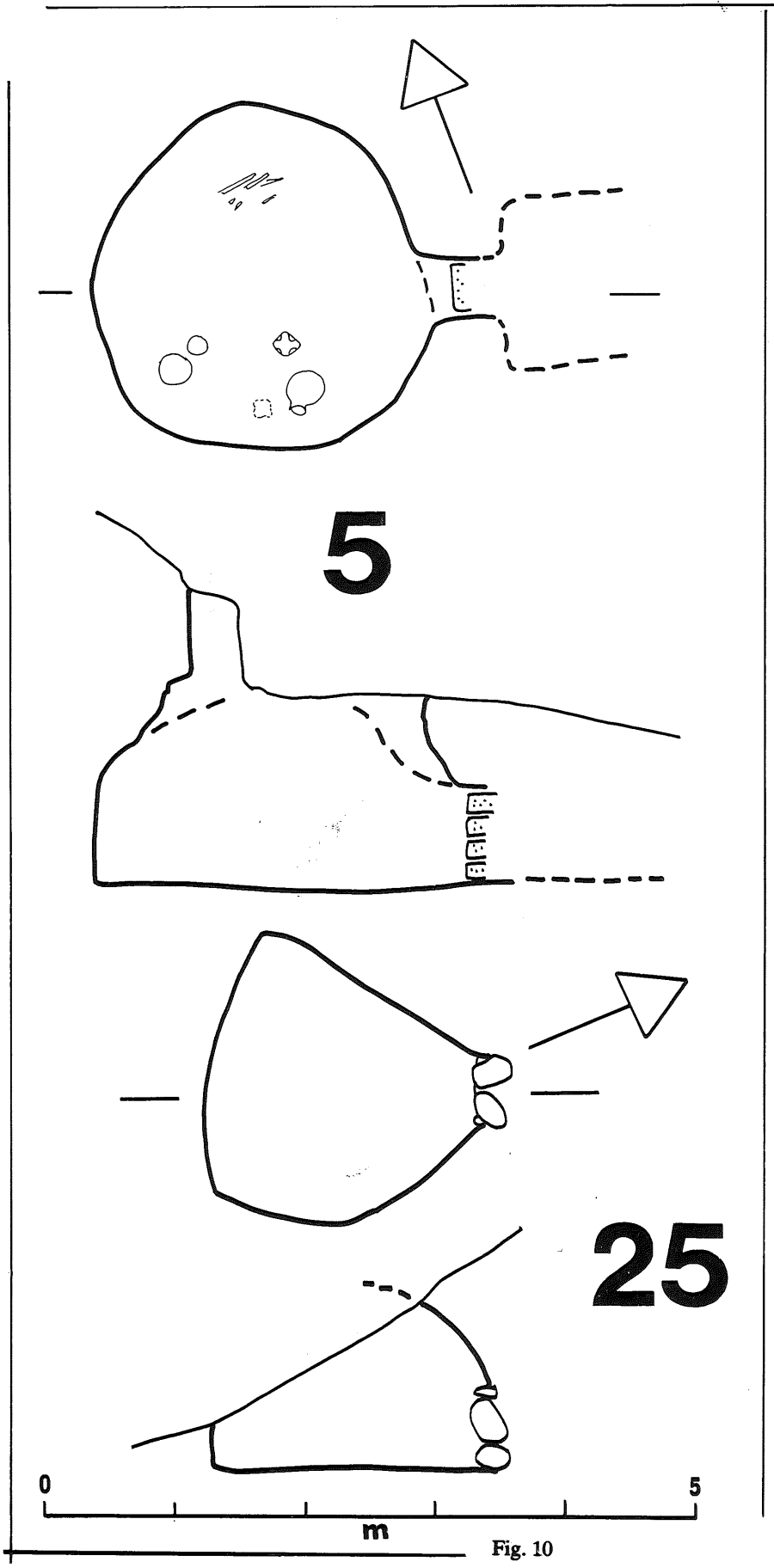

Fig. 10

Tomb 16 (Fig. 13)
Rectangular shaft, partly eroded. Very small rounded chamber, collapsed roof. Crushed human bones scattered over shaft floor. No blocking found.

Tomb 17 (Fig. 7)
Rectangular/trapezoidal shaft. Stone blocking. Chamber not excavated.

Tomb 18 (Fig. 9)
Rectangular/trapezoidal shaft. Chamber blocked by river pebbles. Shaft cut by erosion. Earth shift completely blocked chamber. Some shattered bone fragments.

Tomb 19 (Fig. 6)
Rectangular/trapezoidal shaft with footholds. Chamber blocked by stone slab. Roof collapsed. Crushed bone fragments and one pot near entrance. Signs of re-burial attempt: pick marks above blocking.

Tomb 20 (Fig. 6)
Rectangular/square shaft cut by shaft of Tomb 19. Access blocked with large mudbricks. Collapsed chamber. Not excavated.

Tomb 21 (Fig. 15)
Rectangular/square shaft. Access to small rounded chamber blocked by one and one half mudbricks (0.56 × 0.36 × 0.11 m.). Child's disarticulated skeleton on top of a layer of roof collapse.

Tomb 22 (Fig. 13)
Shaft eroded away. Rounded chamber badly disturbed by earth shift. Bone fragments. Loose stones near access.

Tomb 23 (Fig. 13)
Rectangular/trapezoidal (?) shaft, eroded. Access blocked by stones. Chamber sheered off *ca.* 40-50 centimetres displacement. Not excavated.

Tomb 24 (not illustrated)
Shaft (?) and chamber badly disturbed by soil shift. Not excavated.

Tomb 25 (Figs. 10, 11)
Shaft not excavated. Access blocked by field stones. Chamber badly disfigured by soil shift. Articulated skeleton in flexed position.

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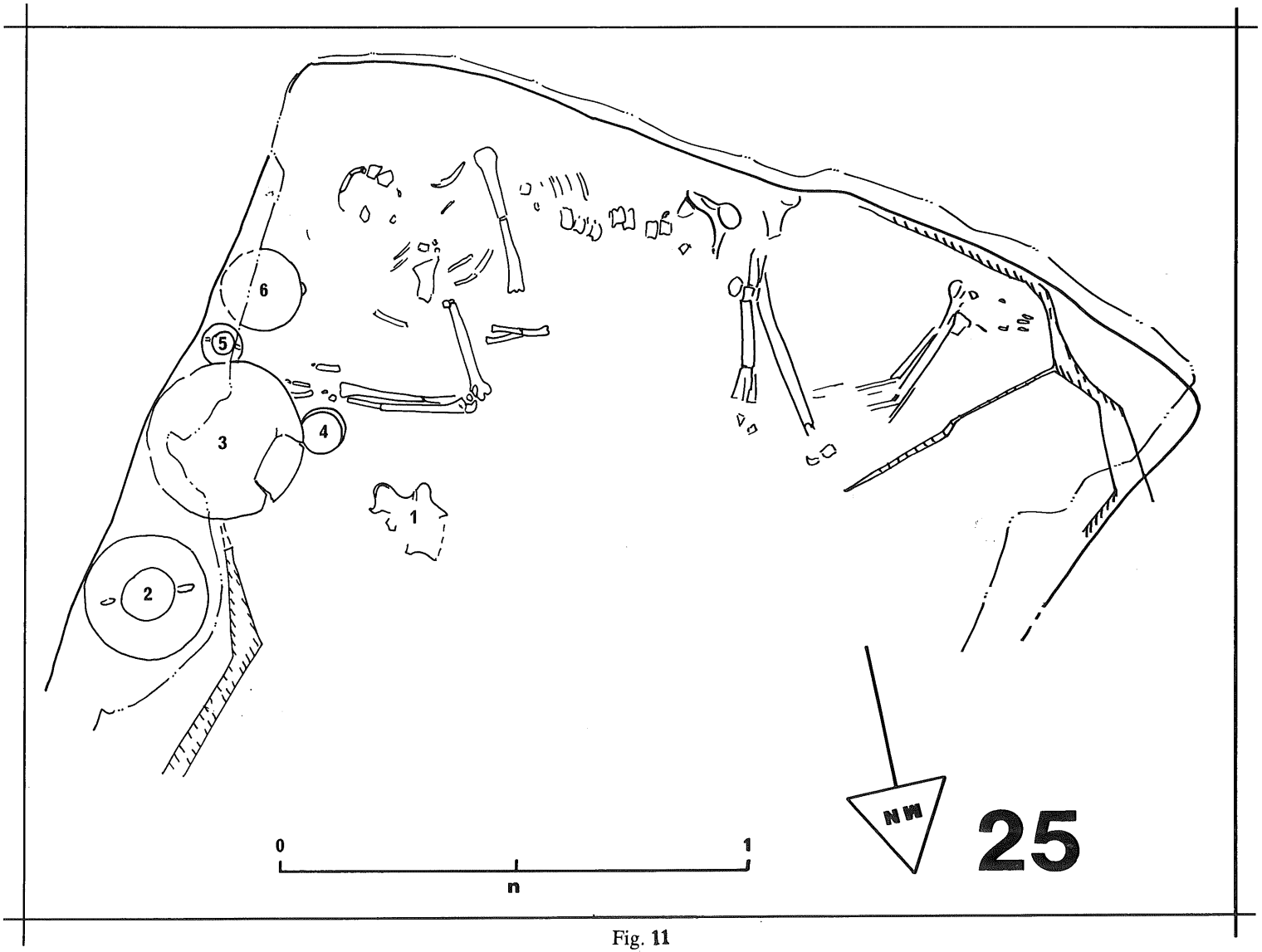


Fig. 11

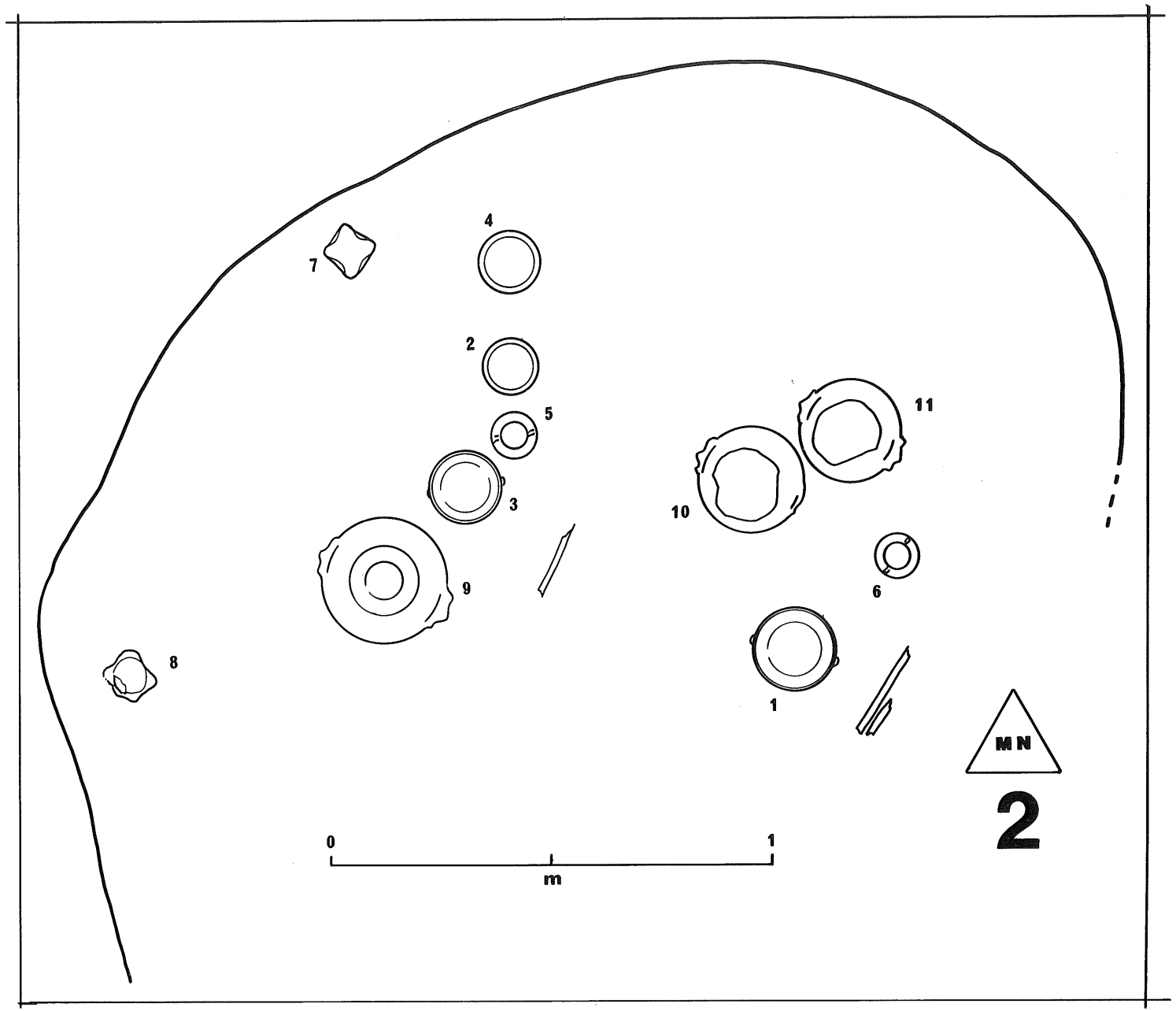


Fig. 12

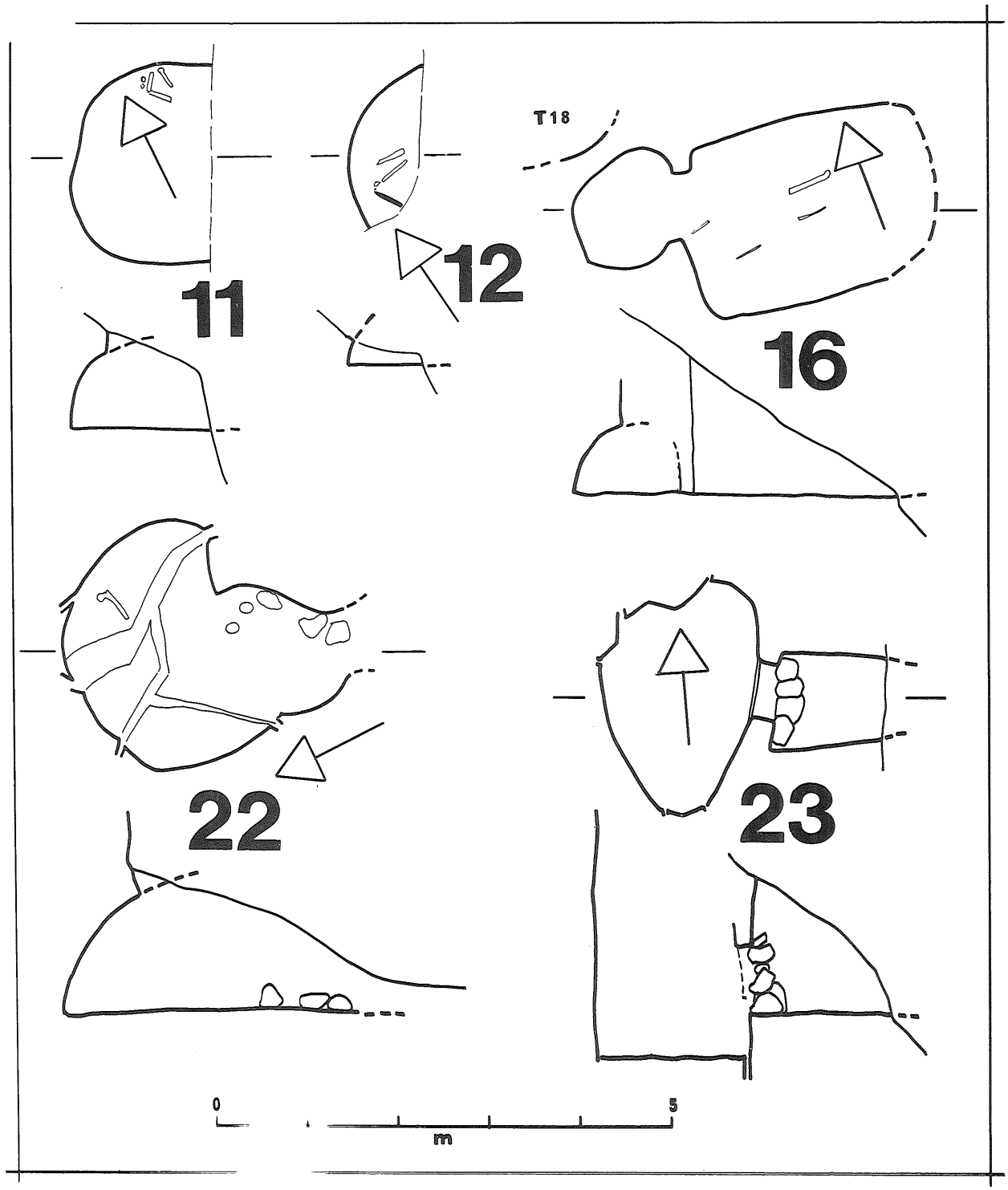


Fig. 13

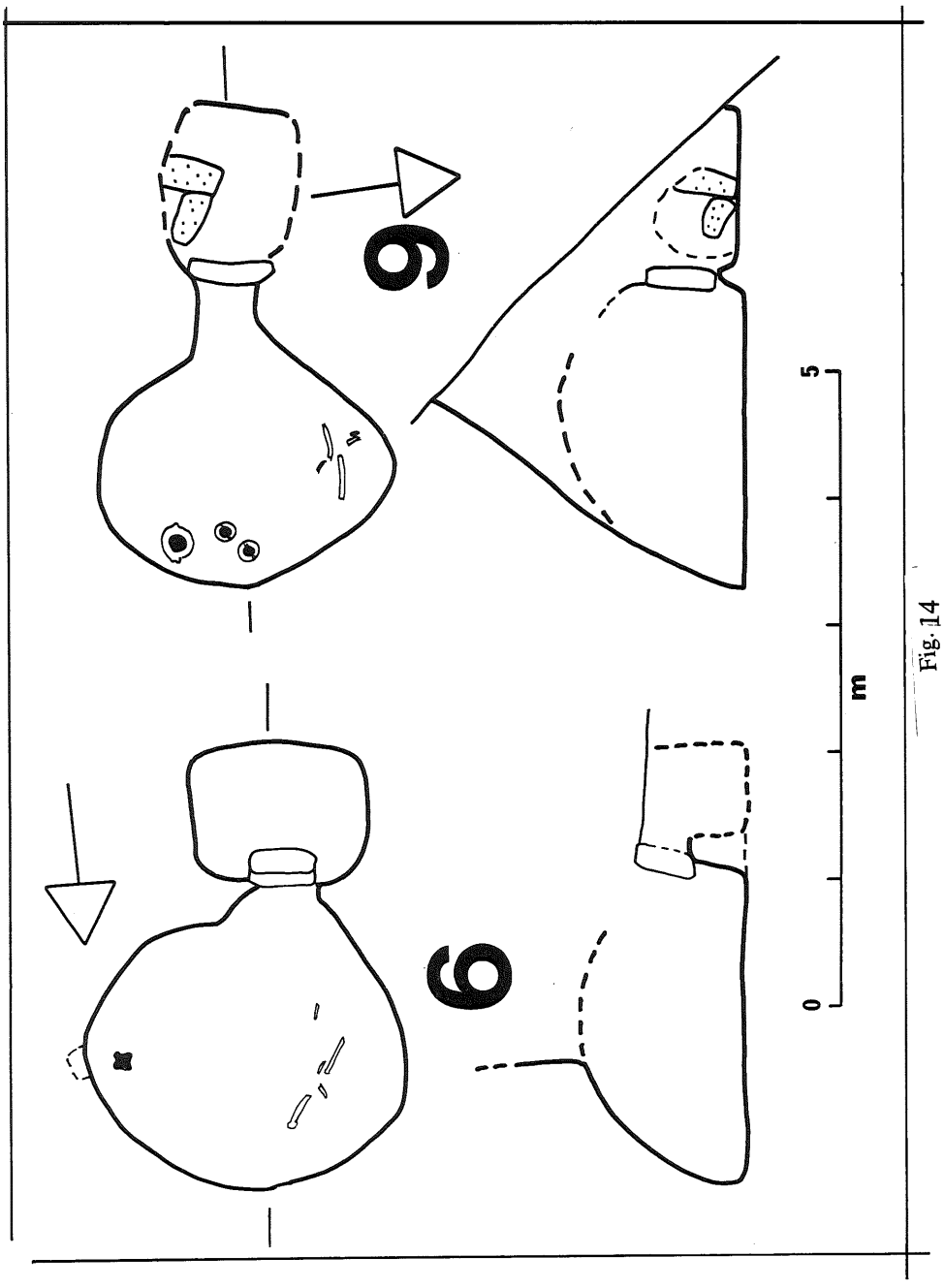


Fig. 14

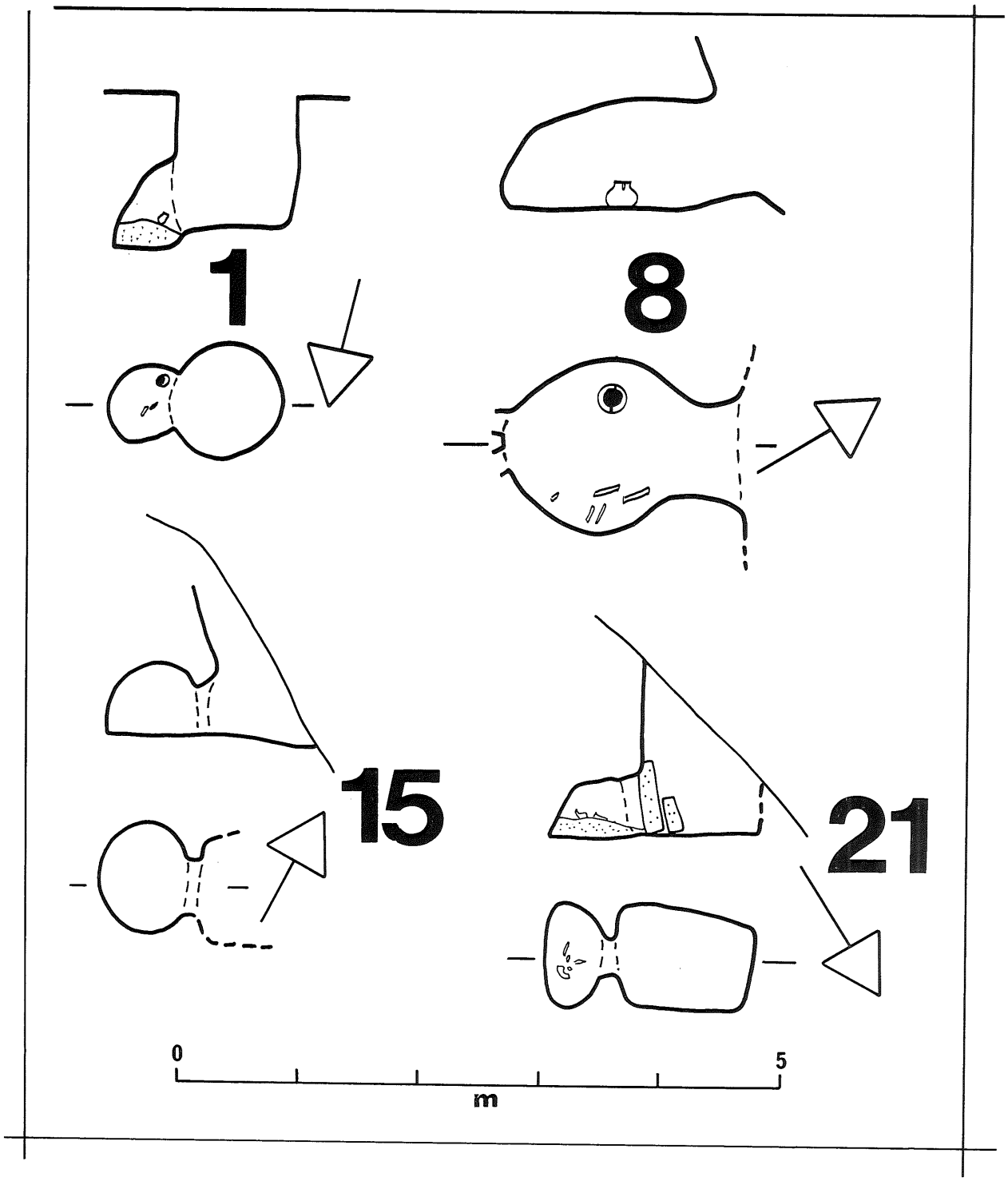


Fig. 15

The Objects

As I noted earlier, a full typological appraisal will be attempted elsewhere. Pottery from the shafts as well as from the occupation site of Umm Hammad el-Gharbiya (purposive intensive survey) will be incorporated. In this catalogue presentation only one stratigraphic matter must be discussed and that is the complex nature of Tomb 14, typically the richest in the group.

We are dealing with two depositions, one from Tomb 14, the other from Tomb 17 above whose floor collapsed into the lower chamber (Figs. 7,8). The two groups of pottery are stylistically close but show some diversity to make the division on these grounds. This was substantiated during the excavations. However, the transported pottery and metal objects and the earth slide from the upper tomb chamber came to a halt precisely on the line of the deposition in Tomb 14. Therefore there will always be some uncertainty as to attribution. The following is a preliminary sorting of the evidence.

Material almost certainly from Tomb 17 is shown in Figure 16: 1 to 9 and Figure 17:1 and 2. Figure 17:3 and 17:4 may belong here or with Tomb 14. Similarly, the metal objects in Figure 18:2 and 18:3 could belong to either assemblage. The amphoriskos-teapot (Fig. 18:1) is an interesting example of forensic archaeology pretaining to the relationship between the two burials. One half of the pot was found carefully placed beside the stone blocking at the entrance of Tomb 14 (Fig. 8:29) together with an amphoriskos (Fig. 18:4). The other half came from the problematical depositions within Tomb 14 (Fig. 8: 29). Three—or even more — interpretations are possible. The sherd in the chamber might have been placed in a similar way at the entrance of Tomb 17 and been washed down with the collapse; it might have come from the chamber of Tomb 17; or it might have come from the chamber of Tomb 14. In all cases we have a possible example of direct awareness of previous burials and/or a relationship between the final burials in Tombs 14 and 17. What is a little disturbing, typological arguments aside, is the siting of the two tombs, so close together, if a relationship did exist . In the end we are left with the note of caution expressed before, that tomb groups are never absolutely reliable.

Figures 18:5 to 16 and 19:1 to 4 belong to Tomb 14. The subsequent groups illustrated are self-explanatory as to locus.

Relative Chronology

Only a general statement can be made at this time. A little more will be added in due course when the study of the present excavations is completed. Further clarification will follow with the proposed excavations of the occupation site at Umm Hammad el-Gharbiya and the separate excavations at Tiwal esh-Sharqi. These will contribute to the study of the EB IV (EB-MB) period, particularly in relation to other current and planned work in Transjordan. An absolute resolution, excluding divine revelation, will never be achieved, no matter how categorically we format the meagre evidence.

There are several indications in the present assemblage that allow us to place the burials at Tiwal esh-Sharqi in the fragile and evolving relative chronology of the period. In doing so we must recognize that our repertoire may in the end only refer to the subregion of the Jordan Valley. Synchronisms farther abroad might be less precise.

The amphoriskos-teapot (Figs. 18: 1; 21: 6) has been placed late in the period by Amiran (1969). Similarly the painted amphoriskos (Fig. 22:3) was late in Amiran's families (1960) that were re-organized with some general consensus by Albright (1962). Bowls with two plain ledge- handles may be a little more indicative of relative chronology (Figs. 16: 6,7;17:4;20:10; 21:5,14 and 22: 4, 5). We can demonstrate that these bowls are later than shapes with similarly placed "envelope" ledge-handles which come from the shafts at Tiwal esh-Sharqi as well as the occupation site of Umm Hammad el-Gharbiya. These earlier forms appear in

number	tomb	catalogue	description
Figure 16			
01	14.33	252	lamp
02	14.26	189	goblet, slr rm
03	14.17	190	funnel (inside 14.13)
04	14.19	191	funnel
05	14.13	291	jug, strap hnd, slr rm
06	14.31	261	bowl, two pln hnds, slr
07	14.2	292	bowl, two pln hnds, imp dec bse
08	14.27	295	jar, two env hnds, slr rm, inc+comb dec
09	14.25	299	jar, slr rm
Figure 17			
01	14.12	300	jar, two env hnds, slr, imp+comb dec
02	14.28	293	jar, imp dec (bs)
03	14.11	255	lamp
04	14.8	251	bowl, two pln hnds
Figure 18			
01	14.29	035	amphoriskos-teapot
02	14.24		spearhead, copper alloy
03	14.30		spearhead, copper alloy
04	14.1	195	amphoriskos
05	14.23	254	lamp
06	14.32	253	lamp
07	14.15	188	goblet, slr rm, comb dec
08	14.7	187	goblet, slr rm, two inc lines
09	14.3	186	goblet, slr rm, three inc lines
10	14.10	194	goblet, slr rm, one hnd
11	14.22	193	cup, comb dec
12	14.18	249	amphoriskos, slr rm, imp dec bse
13	14.5	197	amphoriskos
14	14.16	196	amphoriskos
15	14.21	260	bowl, imp dec bse
16	14.9	(04)	pin, copper alloy
Figure 19			
01	14.14	294	jar, two env hnds, slr rm, comb dec
02	14.6	296	jar, two env hnds, slr rm
03	14.20	297	jar, two env hnds, slr rm, inc+comb dec
04	14.4	298	jar, two env hnds, slr rm, inc+comb dec
Figure 20			
01	01.1	262	amphoriskos, inc dec
02	08.1	263	amphoriskos, comb dec
03	02.7	264	lamp
04	02.8	265	lamp
05	02.2	266	goblet, slr rm
06	02.4	267	goblet slr rm
07	02.5	268	amphoriskos, pln
08	02.6	269	amphoriskos, slr rm, comb dec
09	02.1	270	bowl, slr rm
10	02.3	271	bowl, two pln hnds, inc dec, comb dec
11	02.11	272	jar, two env hnds, imp dec bse
12	02.9	273	jar, two env hnds, inc dec
13	02.10	274	jar

Figure 21

01	03.3	275	lamp
02	03.2	276	lamp
03	03.1	277	amphoriskos, pln
04	19.1	192	funnel
05	10.1	278	bowl, two pln hnds
06	07.1	279	amphoriskos- teapot
07	06.1	280	lamp
08	09.3	281	amphoriskos
09	09.2	282	amphoriskos
10	09.1	283	jar, two env hnds, inc dec, imp dec bse
11	05.4	284	lamp
12	05.5	285	lamp
13	05.3	286	amphoriskos
14	05.2	287	bowl, two pln hnds, comb dec
15	05.1	288	jar, two env hnds, inc dec

Figure 22

01	25.1	259	lamp
02	25.4	185	goblet, two hnds, inc dec
03	25.5	250	amphoriskos, slr rm, pnt
04	25.6	248	bowl, two pln hnds
05	25.3	247	bowl, two pln hnds,
06	25.2	289	amphoriskos, slr rm
07	16.1	257	lamp
08	16.2	052	cup
09	22.5	258	lamp
10	22.4	256	lamp
11	22.2	183	goblet, slr rm
12	22.1	184	goblet, inc dec
13	22.6	290	base, comb dec
14	12.1	(007)	copper alloy blade fragment

Abbreviations

bse	base
comb	combed
dec	decoration
env	envelope (handle)
hnd (s)	handle (s)
inc	incised (punctate)
pln	plain
pnt	painted
rm	rim
slr	slurred (wheel turned)

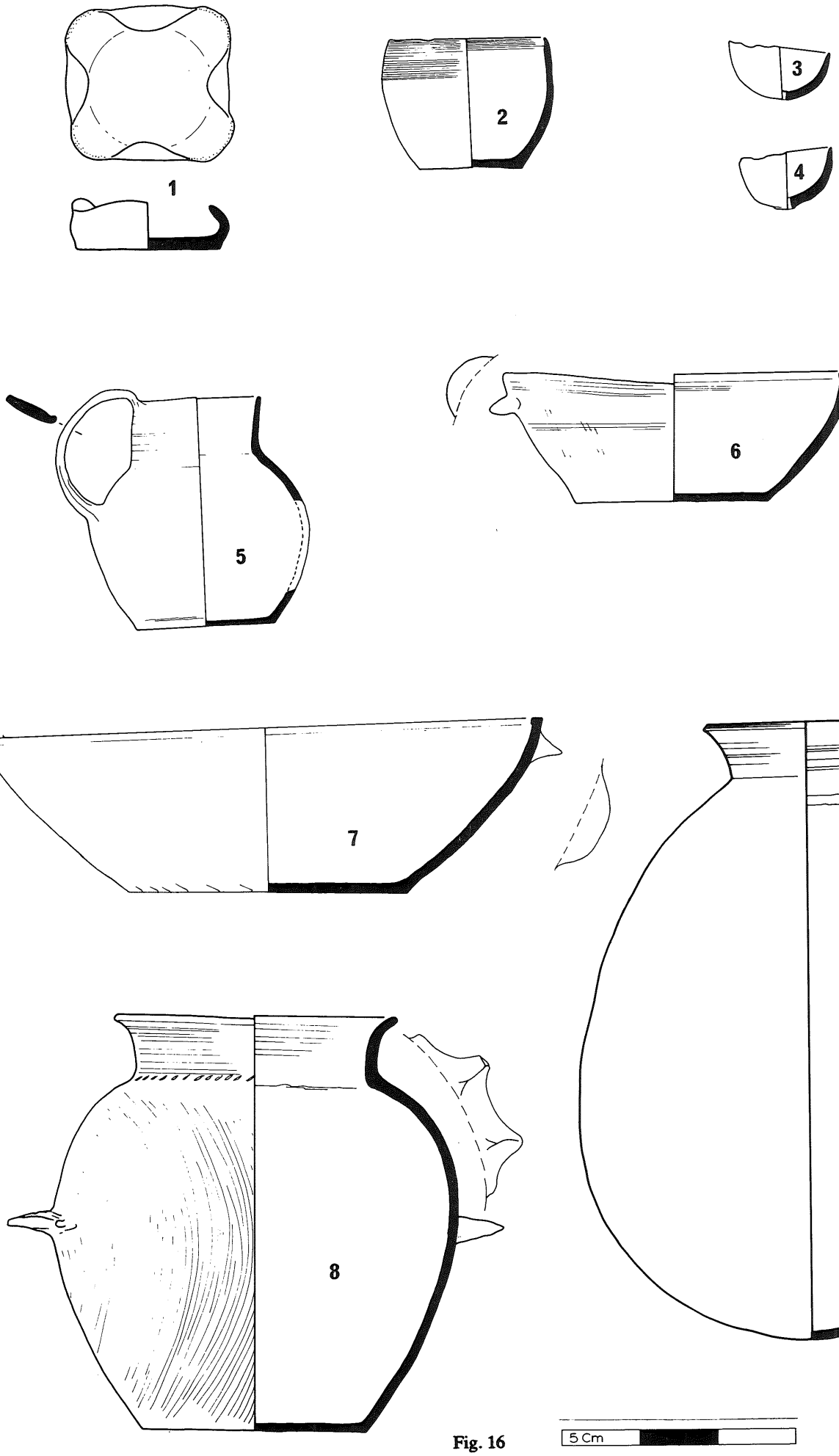
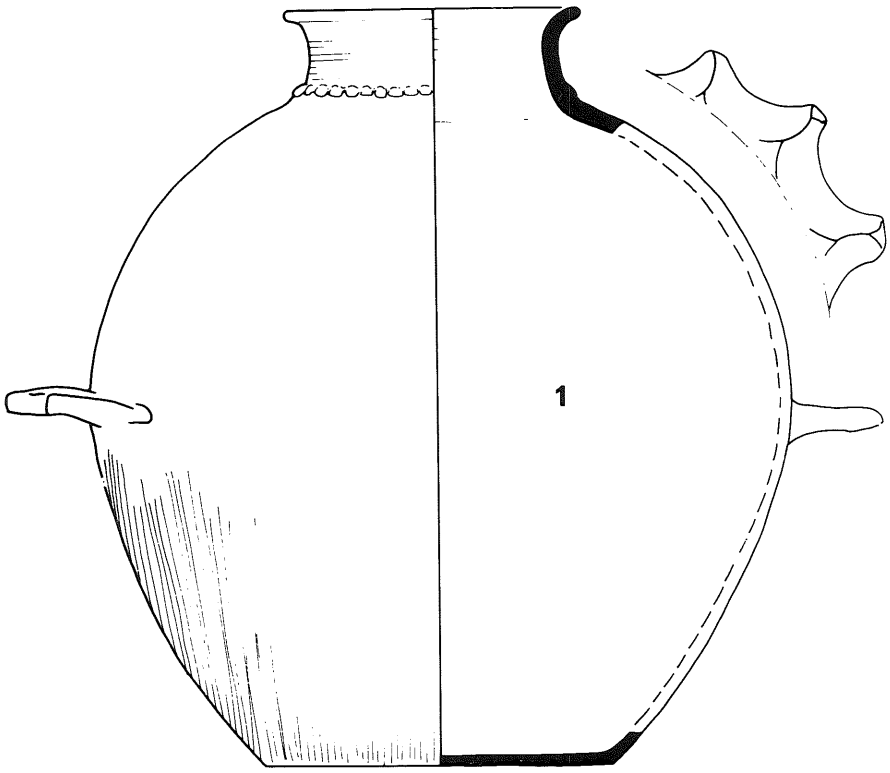
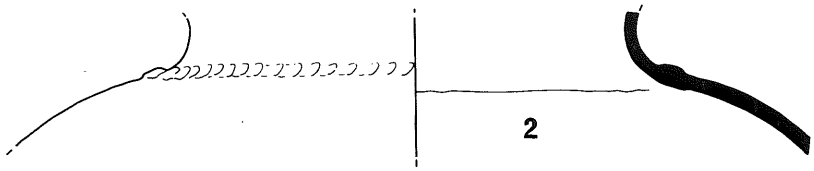
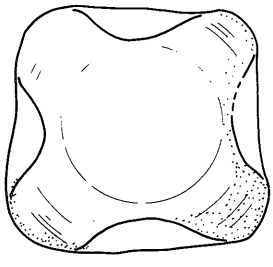
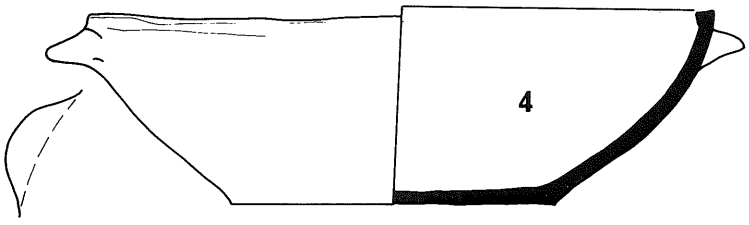


Fig. 16









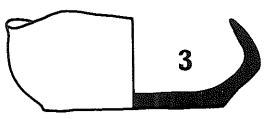




Fig. 17

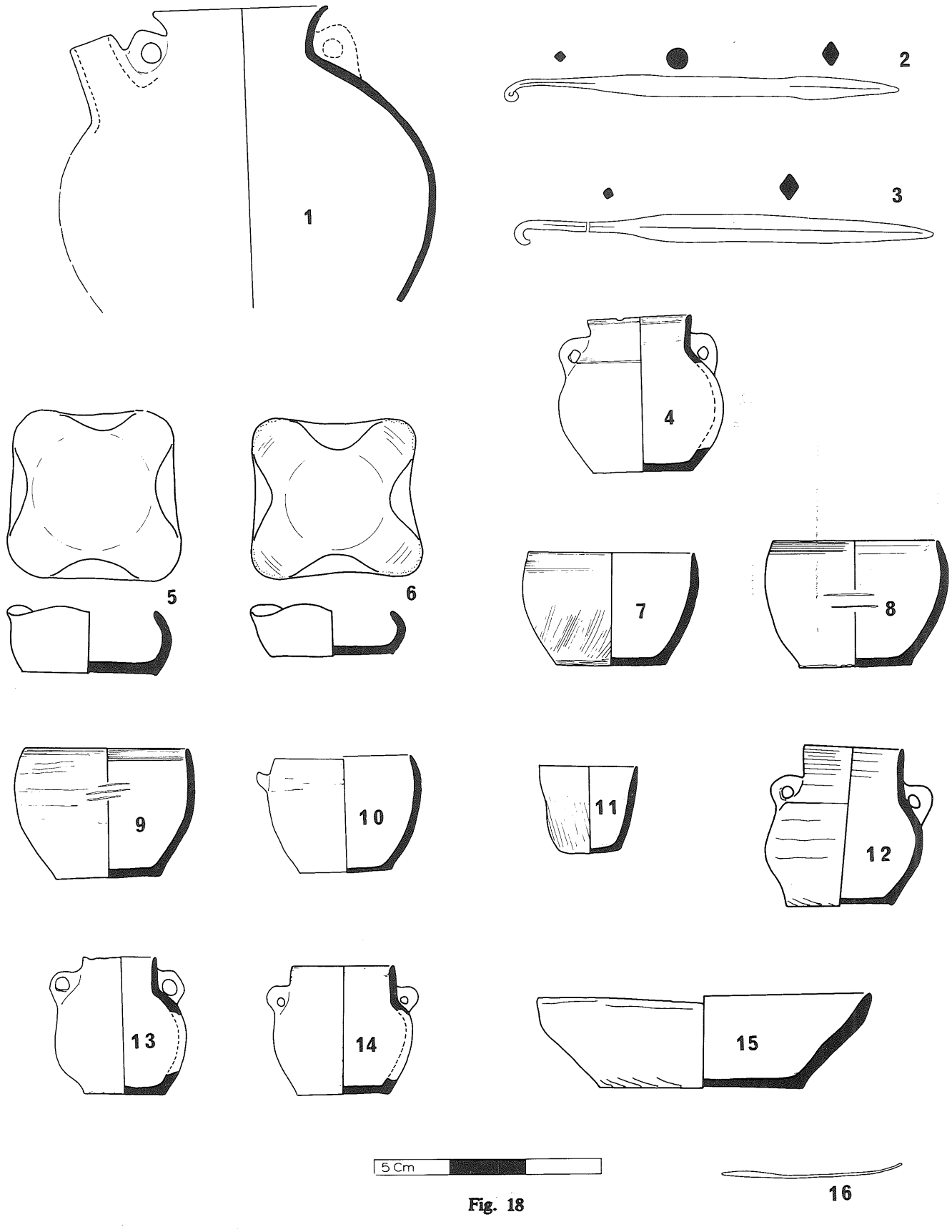


Fig. 18

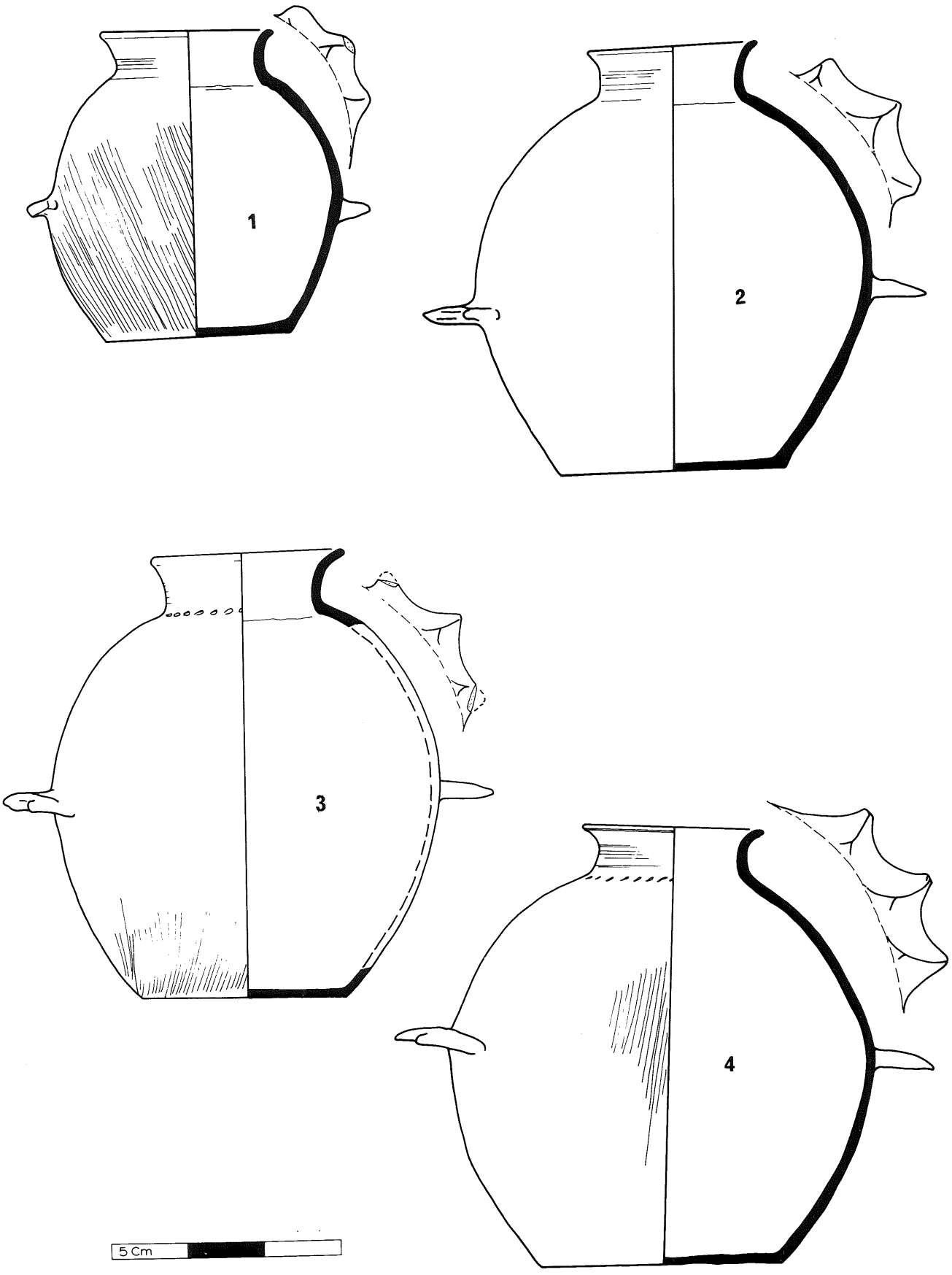


Fig. 19

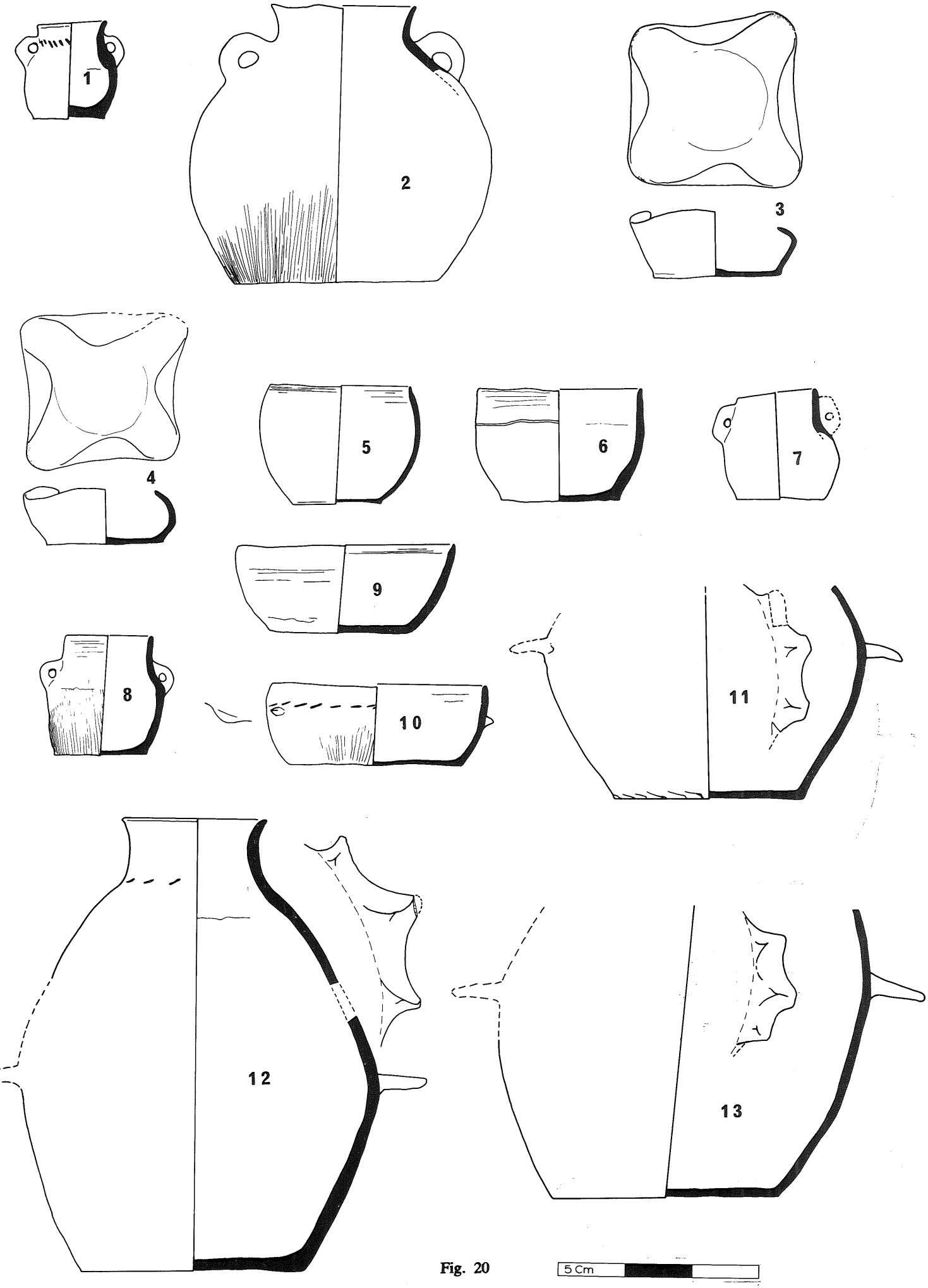


Fig. 20

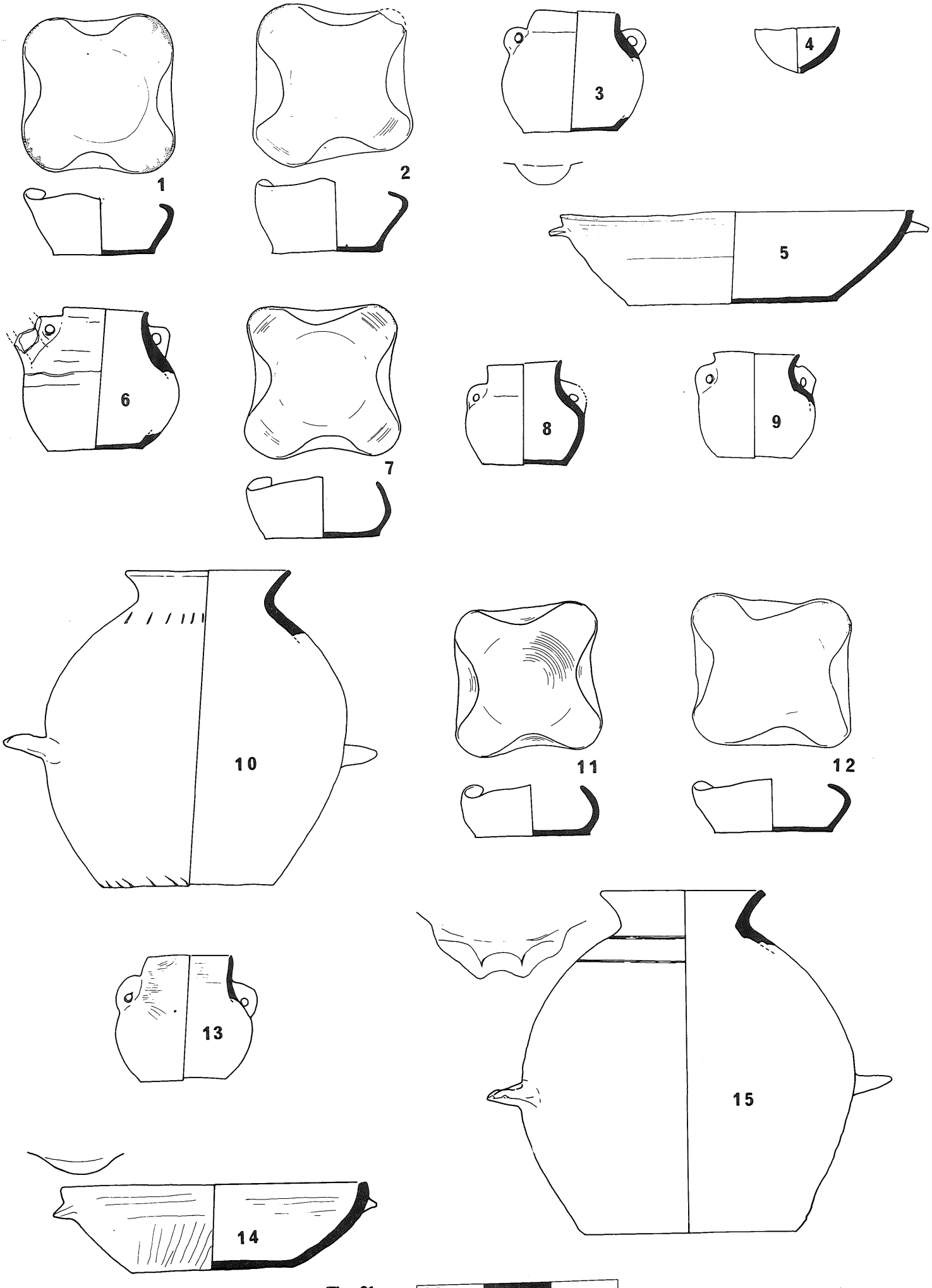


Fig. 21 5 Cm

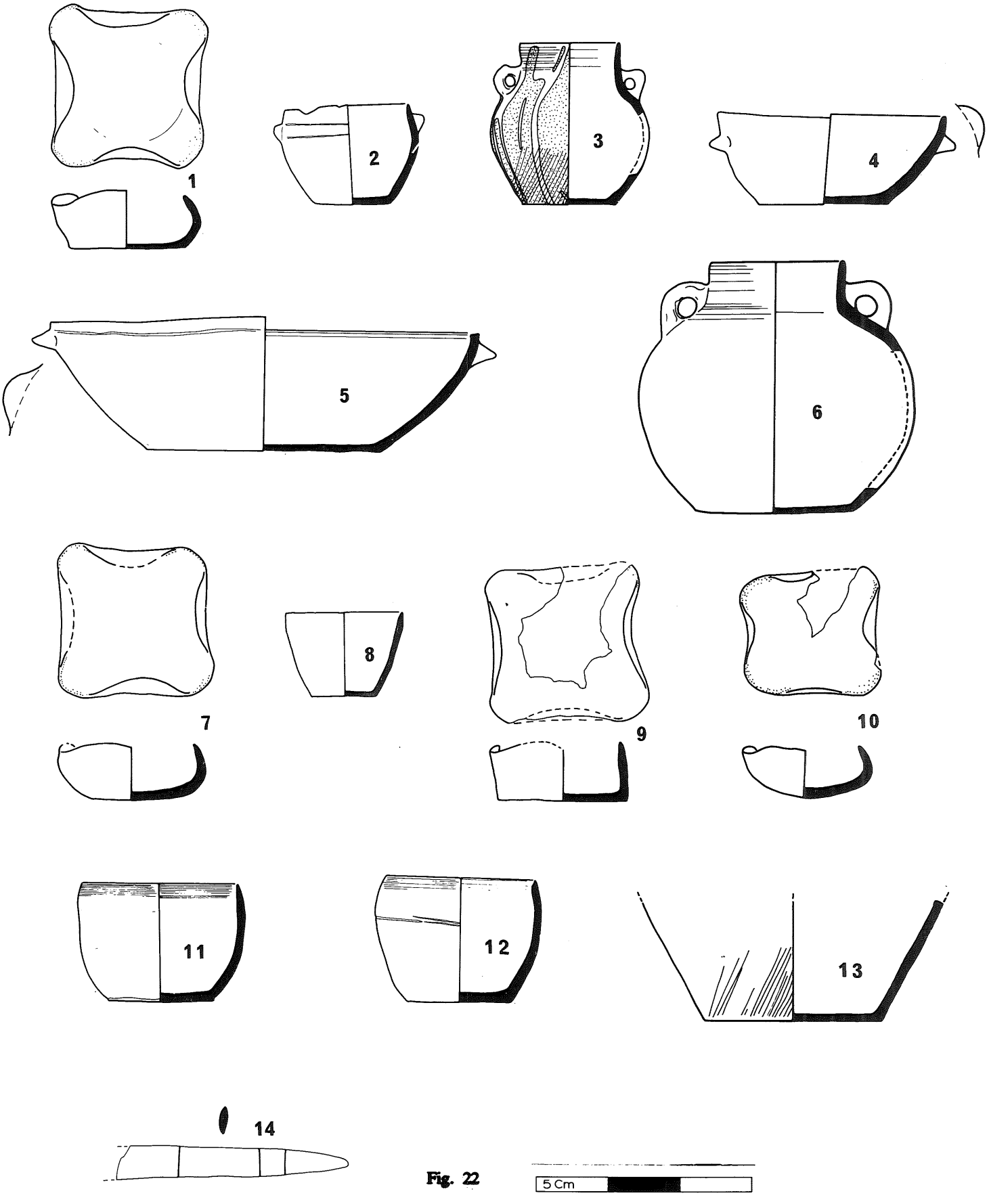


Fig. 22

phase 2 of Tell Iktanu (Prag, 1974: fig. 7: 6). Note also similar plain handles in Dever's family 'S' (1980: fig. 4: 8, 17) which he places in his EB IVC. Funnels (Figs. 16: 3, 4; 21: 4) appear, among other places in Dever's Family 'S' (1980: fig. 4: 5), at Jericho (Kenyon, 1965: Fig. 36: 11; 47: 15; 80: 3) and at Khirbet Kirmil southeast of Hebron (Dever, 1975: fig. 5: 28, 29?). A funnel of this type is included as a type in Dever's most recent illustration of family 'S' (1980: fig. 4: 5). Storage jars might be relevant here as well. Thumb-impressed decoration seems to be an earlier feature than the incised type (Fig. 17: 1, 2 compared with Figs. 16: 8; 19: 3, 4; 20: 12; 21: 10). The former come from the shafts at Tiwal esh-Sharqi to the exclusion of the latter—just as was the case with the bowls above—and can be compared with the jars from Iktanu, phase 2 (Prag, 1974: figs. 5: 13; 8: 5). Judgement is reserved for the time being for lamps, goblets, plain amphoriskoi, the jug with strap-handle in Figure 16: 5, jars such as Figures 16:9 and 21:15 and the metal objects (Figs. 18: 2, 3, 16). The javelin points particularly have a wide distribution throughout the land.

The preliminary conclusions regarding relative chronology is that the bulk of our assemblage belongs late in the EB IV (EB-MB) period. It is later than Tell Iktanu, phase 2, though related to it, and is perhaps contemporary with Dever's family 'S', if that is where this sub-division belongs. Tiwal esh-Sharqi and the occupation site beside it (Umm Hammad el-Gharbiya) may therefore fill the "gap" in Dever's most current chronological table (1980: Fig. 1) in the period between his EB IVB and MB I (Dever and Kenyon) or MB IIA elsewhere in the literature. The occupation period, whether it turns out to be continuous or intermittent, seems to cover at least two thirds of the EB IV (EB-MB) period, from Tell Iktanu, phase 2 onward.

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1982 EXCAVATIONS OF THE TELL EL-HAYYAT PROJECT

by
Steven E. Falconer
and
Bonnie Magness-Gardiner
and a contribution
by Mary C. Metzger

Introduction

The University of Arizona Tell el-Hayyat Project is designed to study village life between 2300 and 1500 B.C., an era of marked social and economic change in Palestine and Transjordan. The first season of excavations by the Tell el-Hayyat Project was conducted from January 16 through February 20, 1982. The data from this work indicate that further investigations at Tell el-Hayyat (Fig. 1) should help clarify the advent of Middle Bronze II in the Jordan Valley and provide new evidence of an Early Bronze-Middle Bronze farming village. The Project is affiliated with the American Schools of Oriental Research. The 1982 fieldwork was directed by the authors and conducted in cooperation with the Department of Antiquities, Hashemite Kingdom of Jordan. Financial support was provided by the University of Arizona and supplemented by the Department of Antiquities of Jordan and the American Schools of Oriental Research.

Research Concerns And Regional Background

Social changes in Near Eastern prehistory typically have been interpreted as minor disturbances in the progression of culture history. Episodes of marked change in social and economic systems have gone unexplained except in terms of historical catastrophe such as environmental alteration or large-scale population movement. Palestine's first urban era, Early Bronze II-III (*ca.* 2900-2300 B.C.), originally was thought to have ended disasterously with invasions of nomadic "Amorites" from Syria. The subsequent time range *(ca.* 2300-2000 B.C.) has been characterized as an interlude between the major urban periods of the Early Bronze Age and the Middle Bronze Age (i.e., MB II, *ca.* 2000-1500 B.C.). This transitional era includes the archaeological periods originally labelled "Early Bronze IV" and "Middle Bronze I" by W.F. Albright (e.g., 1949, 1962, 1966). More recently "EB IV" terminology has been suggested for the whole of Albright's old EB IV and MB I by Wright (1971), Lapp (1970), Olvárri (1969), Oren (1973) and Dever (1980). This body of opinion maintains that MB I material culture really derives from EB traditions and that "Middle Bronze" terminology is both inappropriate and misleading. However, rather than muddle the issue further, this report will follow Albright's system, while recognizing EB IV/MB I together as a non-urban archaeological interval.

The EB IV and MB I periods *(ca.* 2300-2000 B.C.) have left little archaeological evidence of permanent settlement at the best known sites of Transjordan and Palestine—the major *tilal* (tells). Therefore, this society has been characterized as largely non-sedentary. While hypothetical invasions of Amorites can now be dismissed (e.g., see Liverani, 1973), our current understanding of EB IV/MB I society still emphasizes pastoral nomadism at the expense of sedentary agrarian populations which we know must have existed. This is due, in part, to the incomplete data base from which our interpretations derive. Excavation of EB IV/MB I materials in Palestine has been carried out only at seasonal encampments or high country cemeteries. Along the eastern Jordan Valley only early EB IV evidence has been recovered so far, and excavated MB II A remains are extremely limited. Small farming village sites have been overlooked entirely, and in no case has a site been excavated with

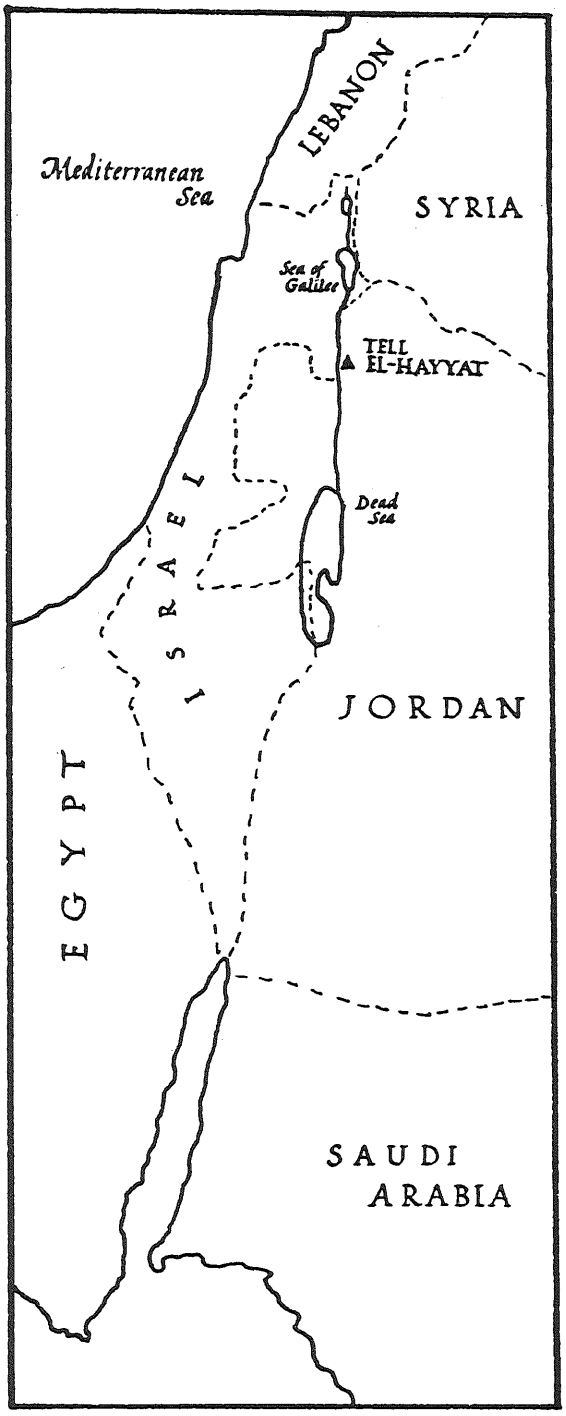
LEBANON
Mediterranean Sea
SYRIA
Sea of Galilee
TELL EL-HAYYAT
Dead Sea
ISRAEL
JORDAN
EGYPT
SAUDI ARABIA

Fig. 1

stratification extending through Early Bronze IV into the subsequent Middle Bronze II urbanized era. The results of our first season's excavations show that Tell el-Hayyat is such a site--a small agricultural settlement with evidence from EB IV/MB I to the end of MB II.

The transitional era between EB and MB presents problems for both historical and socio-economic interpretation. Historical questions involve identifying the cultural affinities and tracing the development of social groups responsible for the non-urban EB IV/MB I complex in Palestine and Transjordan. Socio-economic inquiries require a more complete understanding of the nature of EB and MB subsistence systems and social organization, and how they both changed. Excavations at Tell el-Hayyat have been conducted with special interest in these latter concerns, as well as those of more traditional culture history.

Early Bronze IV Non-Urban Evidence

The wide-ranging explorations of Nelson Glueck (e.g., 1934, 1935, 1939, 1951) revealed EB IV/MB I settlement systems with extensive use of land outside the present limits of dry farming (see also Evenari, *et al.*, 1971: 97, 1961: 982). It has been demonstrated in more recent years that the limits of settlement extended as far as the present 100 mm. mean annual rainfall isohyet and that several sites in Sinai and southern Transjordan probably received less than 100 mm. annual preciptiation (Prag, 1974: 72). In contrast, EB II-III *tell* sites were usually restricted to areas with more than 300 mm. annual rainfall and MB II sites generally received 400 mm. or more (Prag, 1974: 69-77; Raikes, 1967).

The arid settings of many EB IV/MB I sites were tempered by nearby springs, perennial streams or seasonal *awdiyah* (wadis) (Glueck, 1939: 171-172). Nevertheless, most authors have played down potential water sources or have argued that these sources were not sufficiently dependable for the needs of agriculturalists (Prag, 1974: 63). In areas where water and soil conditions were conducive to dry farming, evidence from *tell* sites and caves consists only of burials (Kenyon, 1957: 189-194; Lapp and Lapp, 1974).

Thus, archaeologists first attempting to understand this body of evidence were confronted with the earliest signs of substantial urban settlement (in EB II-III) followed by a period of dramatic relocation away from established agricultural town sites in areas of minimal, unpredictable rainfall. These basic features of the data were explained as results of an influx of desert dwellers from the north who brought a violent end to city life and inflicted their nomadic ways on Palestine. Late third millennium Akkadian and Sumerian references to supposed expansions of "Amorites" in Syria and upper Mesopotamia gave rise to the classic "Amorite invasion hypothesis" which soon became an acceptable explanation for the drastic changes from EB III into EB IV with the successive analyses of Glueck (1955), Albright (1961), de Vaux (1965) and especially Kenyon (1966).

However, over the past decade a number of analysts have voiced well-reasoned objections to the basic assumptions of the Amorite hypothesis (e.g., Haldar, 1971; de Geus, 1979; and especially Liverani, 1973). In fact, there is no current consensus on either the identity or social roles of the Amorites in Syria and Mesopotamia (e.g., see Kupper, 1959; Gelb, 1961; Luke, 1965; Liverani, 1973).

MB II Urbanism

Significantly, the best evidence for MB II A society comes from reoccupied EB *tell* sites which had been abandoned by EB IV (by EB III B at some sites). During MB II A Palestine witnessed a resurgence of sedentary city life. Domestic deposits are known best from Megiddo (Loud, 1948), Tell Beit Mirsim (Albright, 1949) and Ras al-'Ain (Kochavi, 1975). A large number of tomb groups also have been investigated.

Most MB II B and C cities, in turn, were built on the debris of MB II A townsites. Open *tell* settlements became transformed into massively-fortified urban centres throughout virtually all regions of arable land in Palestine by 1500 B.C.

Middle Bronze II B/C finally includes tremendous amounts of domestic evidence from a variety of sites ranging from small forts (e.g., Meborach, 3 acres) to sizable towns (e.g., Shechem, 13 acres; Gezer, 33 acres) to monumental urban centres (e.g., Hazor, 180 acres). Middle Bronze II covered a span of five centuries for which we have sufficient evidence to hypothesize reliably considerable population increase and general prosperity made possible by uninterrupted urban-based economic and political development (Mazar, 1968; cf. Kenyon, 1966).

Current Social Reconstructions

Despite our ability to reject well-worn notions of historical catastrophes, we still lack a comprehensive understanding of the evidence from the close of the Early Bronze Age. The dynamics of this transitional era continue to arouse much speculation, especially with the demise of the Amorite hypothesis. Only very recent surveys of more modest extent than Glueck's and excavation of a small number of desert sites have offered much fresh insight. With these new data and incorporation of anthropological insights into nomadism a new view of EB IV/MB I society has emerged. Recent syntheses, which integrate data from the Negev and the Jordan Valley, reduce or delete the role of ethnic movements. Publications over the last few years either treat hypotheses of Amorites and migrations as unworthy of discussion (Oren, 1973) or as merely inadequate (Prag, 1974; Dever, 1980).

EB IV/MB I populations have been characterized as partly nomadic/partly sedentary in a manner similar to West Semitic pastoral nomads documented in the Mesopotamian Ur III Period and later at Mari (Luke, 1965; Bucellati, 1966; Matthews, 1978), and paralleling the modern Rwala Bedouin of South Syria and north Jordan (Johnson, 1969: 38-46, 165-170; Musil, 1928). Using these analogues Dever (1980) has hypothesized a yearly round in which winter encampments were constructed in the central Negev/northern Sinai (e.g., at Jebel Rahma, Bir Resisim) and summer camp was pitched 80 miles north in the Hebron Hills (e.g., at Jebel Qa'aqir, Khirbet Kirmil).

In keeping with this revised outlook pastoral nomadism now must be seen as a form of adaptation to arid zones on the fringes, but in steady contact with, settled populations. Whatever the causes involved in the EB III collapse, Palestine was not simply devastated and deserted. It should not be asumed *a priori* that the prevalence of non-urban evidence rules out the probability of some element of sedentary farming. Agriculture, pastoralism and exchange continued but without the influence of substantial cities and the political and commercial links they provided. In particular, village sites known in the Jordan Valley probably were utilized year-round. For this reason Tell el-Hayyat should prove informative, for such a permanent EB IV/MB I through MB II farming village has never been excavated.

The Dever/Prag model attributes changing site concentrations to a shift, though not a migration, from central Palestinian EB *tell* sites to smaller sites in more marginal zones during EB IV/MB I (Dever, 1980: 42; Prag, 1974: 75-85). Contemporary with the advent of the Twelfth Dynasty of Egypt, Palestine witnessed a rebirth of urban centers, and habitation began anew on many of the *tell* sites which had been left unused since the end of EB II or III.

Clearly this model implies drastic social and economic readjustments; processes of change not documented well or analyzed in great detail. Perhaps one basic difficulty is that we desire general explanations, but have only just begun to develop detailed data with which to document those explanations (e.g., Cohen and Dever, 1979, 1980, 1981). Even the best critical studies to date still make use of parallels based on Mesopotamian Amorites and modern camel-herding Bedouin. And, while the Dever/Prag model marks the greatest progress since Kenyon proposed invasions, it tends to accommodate continued preoccupation with evidence from cemeteries and seasonal camps.

For further progress we require greater insight on equally important sedentary village populations. Farming villages, like Tell el-Hayyat, that may have endured these changes in society should provide documentation of what these changes entailed. Excavations concerned with EB-MB transitions have been carried out only in the last few years and only at a handful of one-period sites in environmentally marginal areas. Moreover, emphasis has been placed on sites west of the Jordan Valley for all periods after EB IV A. Now attention should turn to multi-phase domestic sites from which we may develop a stratigraphically controlled sequence of EB-MB material culture and subsistence data.

Late Third and Early Second Millennium Archaeology in the Jordan Valley

Fragments of such a sequence have become apparent at the Transjordan EB IV A-B sites of Iskander (Parr, 1960), 'Aroér (Olávarri, 1965, 1969, Iktanu (Prag, 1974), Ader (Cleveland, 1960) and Bâb edh-Dhrâ' (Rast and Schaub, 1974, 1978), all of which have at least two phases of occupation. However, we lack data for the very end of MB I, except for the few sites noted above in the Hebron Hills and the Negev. In the greater Jordan Valley area tomb deposits at Jericho (Kenyon, 1965), el-Husn (Harding and Isserlin, 1953), Amman (Dajani, 1967/68; Zayadine, 1978), Dhahr Mirzbaneh (Lapp, 1966) and Khirbet Kufin (Smith, 1962) plus cave sites just west of the Jordan in the Wâdi ed-Dâliyeh (Lapp and Lapp, 1974) provide the entirety of our evidence for MB I cultural contexts. Middle Bronze II A sites in the Jordan Valley and Transjordan have been even more elusive. Ceramic collections from the cemetery at Pella (Smith, 1973; Smith, *et al.,* 1981), and the domestic deposits, fortifications and tomb groups from Jericho (Kenyon, 1966) constitute the published body of evidence for MB II A in this region.

Archaeological surveys in the Jordan Valley, notably those published by Glueck (1951) and Ibrahim, Sauer and Yassine (1976) indicated that Tell el-Hayyat had the potential to bridge the EB-MB gap in our knowledge of the region. Glueck noted that "Tell Abu Hâyet" (his site no. 154) was used for modern burials and had no visible ancient architectural remains. He continued, "this insignificant looking site must, however, have been of considerable importance in ancient times, to judge from the considerable number of sherds found on and around it. They belong to the Middle Bronze I-II, Late Bronze I-II, Iron Age I-II periods. There are also numerous Roman period fragments" (Glueck, 1951: 259).

In many cases Glueck's identification and interpretation of surface remains have proven highly questionable (e.g., see discussion in Prag, 1974: 74-75). He has been taken to task repeatedly for analysing surface pottery in Transjordan based on misleading analogies with pottery far removed in western Palestine (Parr, 1972). In all fairness, these were the only comparative samples available to Glueck at the time of his initial surveys. In his own soundings at Khirbet Iskander, Parr found that this site was occupied much earlier than Glueck had been able to suggest (Parr, 1960: 128-133). In view of the consistent inaccuracies in Glueck's references, it seems likely that he may have erred at Tell el-Hayyat as well.

The major impetus for excavation of Tell el-Hayyat came from the more recent identification of EB IV/MB I, MB II A, MB II B/C and Persian by Ibrahim, *et. al.,* (1976: 49; their site no. 56). Further, the possibility that Late Bronze and Iron Age deposits were not present *(contra* Glueck) made Tell el-Hayyat an appealing source for easily accessible EB IV and MB II evidence. At the suggestion of Dr. James Sauer, then Director of the American Center of Oriental Research, the Tell el-Hayyat Project was formed and the 1982 excavations were planned. The results of our first season of excavations have confirmed the presence of stratified evidence from EB IV/MB I, MB II A and MB II B/C.

The geographical location of this site gives us the opportunity to investigate Bronze Age village economy in a fertile area. Tell el-Hayyat is situated 2 km. east of the Jordan River on the first terrace above the present floodplain, at an elevation of 240 m. below sea level (Pl. VI, 1). Pleistocene lakebed sediments for this terrace (Horowitz, 1971) provide highly fertile agricultural land when irrigated with water brought by the recently-built East Ghôr Canal. In antiquity, the Jordan River itself and the springs at ancient Pella (3 km. northeast of Hayyat) would have provided essential permanent water sources in the vicinity of Tell el-Hayyat. Glueck reported modern irrigation in the area using waters of the Qanât er-Rasîyeh, which were drawn largely from the Wâdi el-Malâwi (1951: 259). Modern average annual rainfall (approximately 300 mm.) would suggest that dry farming may have been possible in antiquity. However, the possibility of Bronze Age irrigation merits investigation.

Finally, current efforts to intensify agricultural production in the Jordan Valley inadvertently jeopardize the existence of Tell el-Hayyat and other small sites on the agricultural terraces (Ibrahim, *et al.*, 1976: 65). This was brought home to us rather forcibly when we arrived at the *tell* in 1982 to find that a corner of the site had been bulldozed to enlarge an irrigated field.

Objectives and Results of the 1982 Excavations

The 1982 field season was a short economical test investigation of the archaeological sequence at Tell el Hayyat. A topographic plan of the 0.5 ha. site was prepared, a 5.00 x 5.00 m. grid was superimposed and six 2.00 x 4.00 m. "half squares" (lettered A-F) were laid out for excavation on the western and southern slopes of the *tell* (Fig. 2). This provided maximum slope for a rapid exposure of the site's cultural deposition in an area clear of obvious modern burials. Plans for use of a random sampling strategy were precluded by Hayyat's burials, which also may have discouraged complete leveling of the site in recent years.

Through rapid but careful excavation of our six probes we were able to meet our initial objectives: 1) recovery of a stratified ceramic sequence to check the report of Ibrahim, *et al.;* 2) recovery of detailed information on lithic, floral and faunal remains; and 3) identification of areas with domestic architecture and floor levels for extended examination in 1983. In three of the probes (A, B and F) we reached virgin soil, thereby providing limited exposures of the site's stratification.

Stratification And Architecture

The first season's excavations provided evidence for five phases of occupation. Phase 1 is a disturbed layer immediately below modern ground surface with EB through Byzantine pottery. Phase 2 is represented by a thin layer of mixed debris associated with stone walls in Areas E and F. The latest ceramics in this phase can be dated to Middle Bronze II B/C. Phases 3, 4 and 5 are all architectural phases datable to Middle Bronze II A. Phase 5 produced considerable EB IV/MB I pottery mixed with MB II examples, but no domestic architectural remains as yet.

Excavation of Areas A and B exposed a series of exterior used surfaces from Phases 5, 4 and 3, as well as mixed debris and modern burials in Phase 1. The only architecture associated with Phase 5 anywhere on the site was a well-preserved pottery kiln in Area A (Pl. VI, 2). The kiln's fire box was dug into the virgin soil while the mudbrick walls of the firing chamber stood free above it (Pl. VII, 1). Apparently this was an updraft kiln. Its walls have been preserved close to their full original height. When filled with pots, the opening above the firing chamber would have been closed with bricks, rubble and mud. After the kiln went out of use, early in Middle Bronze II A, it was filled with bricky debris. Within this debris, we found a human skull and hand.

The pottery within the kiln is predominantly EB IV/MB I. The trickle painted cups and envelope ledge handles are characteristic of this period in the Jezreel Valley and Northern Transjordan


AGRICULTURAL FIELDS
N
ROAD
ROAD
3.70 ABOVE DATUM
4.45 ABOVE DATUM
A
B
C
D
E
F
MAIN DATUM
IRRIGATION CANAL
AGRICULTURAL FIELDS
TELL EL-HAYYĀT
0 10 20 M.
RAE 1982

Fig. 2

(see below). But the few sherds of MB II A inside the kiln, and the predominance of MB II A wares and forms on the use surfaces outside the kiln indicate it was in operation during early MB II A. The numerous thin weathered surfaces in Areas A and B produced MB II pottery mixed with diminishing amounts of EB IV/MB I types moving from Phase 5 to 3.

On Tell el-Hayyat's western slope a small sounding in Area F reached virigin soil. As in Areas A and B, Phase 5 included weathered, probably exterior surfaces with a mix of EB IV/MB I and MB II pottery.

Phase 4 consisted of a number of surfaces, pits and walls in Areas C, D and F. In Area F mudbrick walls were preserved over one metre in height (Pl. VII, 2). An associated cobbled floor (Pl. VIII, 1) was equally well preserved suggesting that we will be able to recover complete architectural plans and intact surfaces when we enlarge our excavations next season.

The pottery from floors in Phases 4 and 3 illustrates a homogeneous MB II A assemblage with a wide variety of domestic wares including decorated carinated bowls, burnished juglets, cooking pots and store jars. A modest amount of EB IV pottery was found mixed with the MB II A material.

Phase 3 remains included domestic architecture and floors in Areas C, D and F. Domestic occupation was represented by a hard-packed surface in F and D, and a series of ovens and floors connected with a mudbrick and stone wall in Area C (Pl. VIII, 2). Restorable ceramics from this phase are consistently MB II A, mixed with limited EB IV/MB I material. In Areas A and B, the uppermost of a series of exterior use surfaces produced ceramics of the same types found in Phase 3 in Areas C, D and F.

Phase 2 was the latest of Tell el-Hayyat's architectural phases. Bonded stone walls were exposed running along the north baulks of Areas E and F, and south across the middle of Area F (Pl. IX, 1). Unfortunately, associated surfaces were ill-defined and produced only small amounts f MB II B/C pottery.

Phase 1 was marked by recent burials over 2.00 m. deep in some cases. Material culture in these uppermost levels was very mixed due to occasional rodent burrows and plowing of the site's western slope sometime in the recent past.

Stone Tools

Stone tool technology represents a valuable, but often neglected, field of study for the late prehistoric Near East. Traditional chronological and culture-geographical concerns have produced a recognition of certain tool types as temporarily restricted "index fossils". Such uses can be expanded in a number of ways. Whole tool assemblages can be much more informative than index fossils, and the technological information provided by flaking waste and informal tools may be equally important.

The six trenches opened in 1982 also yielded flint tools and flaking debris that may reflect local manufacture. A substantial number of well-formed "Canaanean" blades, characteristic through EB and MB, were recovered, but most of our lithics do not show such technological refinement. Many blades retain chunks of flint core or cortex indicating that they were incomplete, or improperly manufactured tools. The character of this lithic evidence and the presence of a kiln in Area A suggest the significant role of local industry, even at very modest sites like Hayyat, during the re-emergence of cities in MB II.

Pottery

The five architectural phases at Tell el-Hayyat represent occupation from Middle Bronze II A (Phases 5-3) through MB II B-C (Phase 2). EB IV/MB I sherds were found mixed with the later pottery of all five phases (Pl. IX, 2). Phase 1 contained small numbers of sherds from the Iron Age, Persian and Byzantine periods, but no associated architecture.

Unlike MB II pottery, EB IV/MB I wares were handmade, except for the small trickle-painted cups. Other forms include hole-mouth jars, store jars with

incised or applied decoration and folded-envelope handles. One of the trickle-painted cups had interior as well as exterior decoration and a small open pouring spout.

Folded-envelope handles and trickle-painted decoration on cups and jars are typical of the Jezreel Valley and Transjordanian Plateau ("Family NC", Dever, 1971: 201; Amiran, 1970: pl. 24: 17-19; Harding and Isserlin, 1953). The use of rope moulding and thumb-impressed or incised bands is characteristic of EB IV pottery in the Jordan Valley ("Family J", Dever, 1971: 202; 1974: 35, note 13). This combination of characteristics is precisely what we should expect from a site at the junction of these two areas. Dever dates families NC and J to the 21st century B.C. (1971: 202). However, certain elements of continuity in the ceramic assemblage at Hayyat suggest that the EB IV/MB I forms evolve directly into MB II A without undergoing the typological developments Dever describes for the later "Southern Family" (1971: 203). This suggests that the regional families described by Dever represent geographical, rather than chronological, divisions. In order to determine chronological development, it will be necessary to study the typology of stratified ceramics within, rather than among, the separate regions.

Phase 5 pottery exhibits a limited range of forms, probably due to the limited area of excavation and the position of the soundings on the outskirts of the habitation area.

The straight-sided cooking pots of Phase 5 are handmade. Some have thumb-impressed moulding, while one example has two thumb-impressed ledge handles. The bell-shaped body of this example is unlike later straight-sided pots but has clear parallels in EB IV levels at 'Arô'er (Olávarri, 1969: fig. 5: 12).

Flat and disc bases predominate in all three phases of MB II A. The heavy body and thick rounded rims of the carinated bowls in Phase 5 resemble EB IV/MB I carinated bowls of Dever's "Southern Family" (1971: 203), rather than the more extreme carinated forms of the later Middle Bronze Age.

Jar rims also are thick and rounded in Phase 5 rather than elongated, flared and "profiled" as they are in Phases 4 and 3. However, the sample size for Phase 5 is small. Rims with parallel striations or ridges occur in all phases of MB II A at Tell el-Hayyat. Ben-Dor (1950: 28) reports this type of rim from Nahariya, but does not illustrate any examples. Ridged rims also occur in Tomb 7 at Ras al-'Ain (Beck, 1975: fig. 14: 4) and at the small village of Kefar Rupin (Gophna, 1979: fig. 3: 11).

Store jars have wide mouths, little or no neck and thickened rounded rims like those of the smaller jars. This type of store jar is not widely illustrated for MB II A. However, there is a similar rim from the pre-palace phase at Ras al-'Ain (Beck, 1975: fig. 3: 6). At Tell el-Hayyat the thickened rim is most common in Phase 5, but occurs in Phases 4 and 3 as well. In general Phase 5 pottery seems to show a transitional phase between EB IV/MB I and MB II A.

Ceramics in Phases 4 and 3 are more consistent with the published MB II A assemblage which includes craters, bowls, juglets, store jars and straight-sided cooking pots. The craters in these phases are slightly closed, deep globular bowls with horizontally-thickened rims. The example illustrated has a slightly rilled rim surface (Fig. 3: 8). Other craters at Tell el-Hayyat have plain rounded rims. Both types are found in the pre-palace phase at Ras al-'Ain (Beck, 1975: 48, fig. 2: 7-10) and in the Middle Bronze Age temple at Nahariya (Ben-Dor 1950: fig. 23).

Bowl types include deep globular bowls with inturned rims (Fig. 3: 11), open shallow bowls with bevelled rims (Fig. 3: 9) and the typical MB II A carinated bowls (Fig. 3: 20), see Amiran, 1970: pl. 27: 1-4). Globular bowls, have parallels in the pre-palace (Beck, 1975: fig. 2: 4) and palace (Beck, 1975: fig. 4: 10-11) phases at Ras al-'Ain. Bevelled-rim bowls are commonly found in the Megiddo tomb groups (Guy, 1938) and in the collective grave at Munhatta (Ferembach, *et al.*, 1975: fig. 2: 4-6).

Store jar rims in Phases 4 and 3 show a wide variety of elongated everted rims,

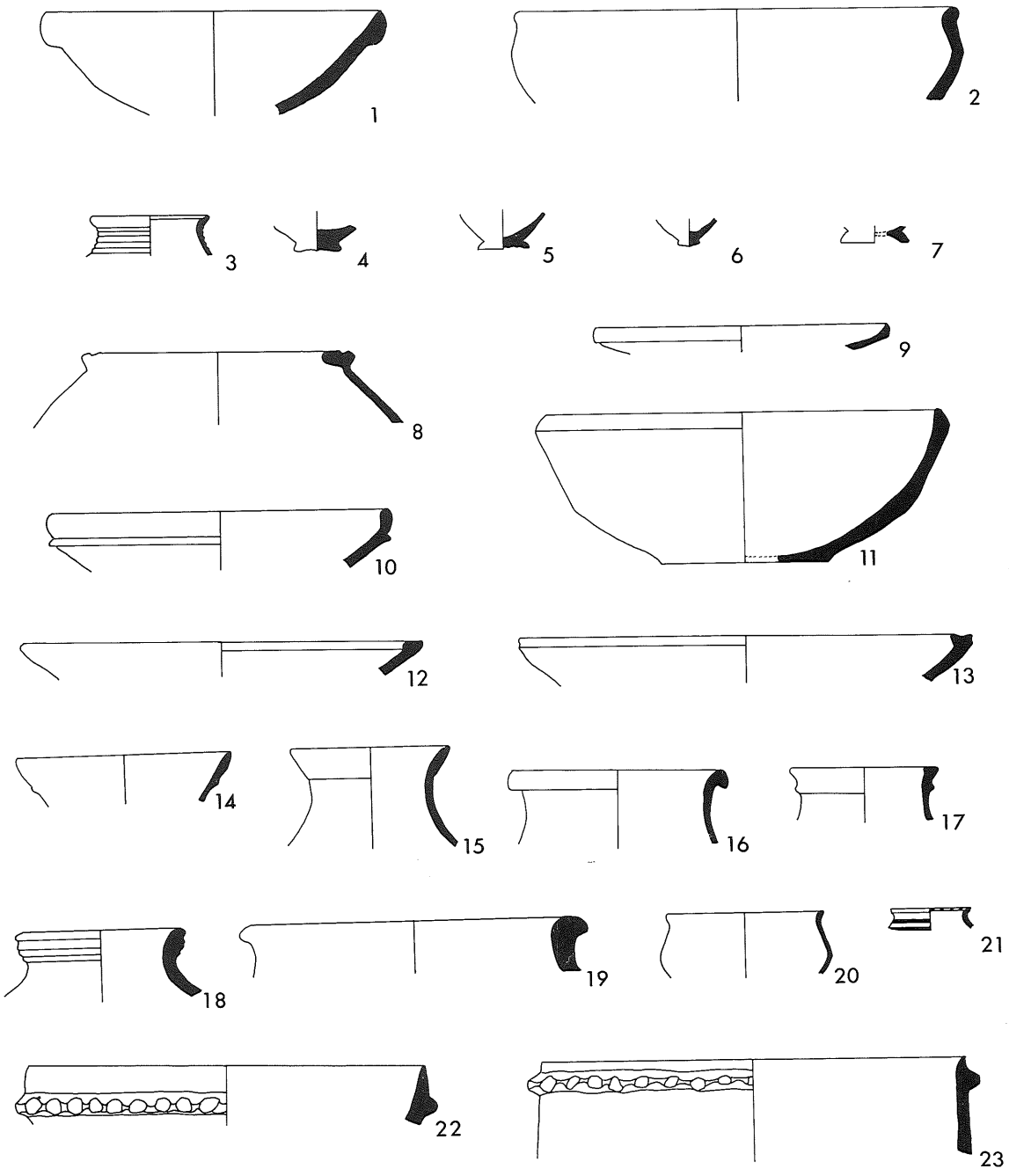

Fig. 3

some with a slight ridge at the bottom edge. This is also the case at Ras al-'Ain where they appear from the beginning of MB II A (Beck, 1975: fig. 5: 11-12, fig. 7: 19-21). Ridged rims, simple triangular rims and molded rims with squared cross-sections also occur in quantity. Again, these have parallels in the pre-palace phase at Ras al-'Ain, but are more common in the palace phases (Beck, 1975: 58).

Middle Bronze II A decorated wares occur in small quantities in Hayyat's Phases 4 and 3 (Pl. X). These include incised horizontal and wavy bands, as well as applied and impressed decoration on store jars. These two decorative techniques are quite common throughout the Middle Bronze Age (Amiran, 1970: 102-103). Painted decoration is the second most frequent technique in Phases 4 and 3. One of our two sherds of "trichrome" ware is similar in form and painted motif to a painted crater from Megiddo (Amiran, 1970: pl. 29: 2). On the sherd from Hayyat the red and black motif is painted over with a white slip. Other painted sherds show designs of concentric circles in black and red (see Amiran, 1970: pl. 31: 2, pl. 33: 14), as well as straight, wavy and cross-hatched red lines on store jar fragments (see Amiran, 1970: 113 for discussion). Painted decoration of this kind is confined to the pre-palace phase at Ras al-'Ain (Beck, 1975: 45). Decorative techniques such as continuous body combing and burnishing over red slip are also present at Tell el-Hayyat, but rare in comparison to incised and painted wares.

The range of types and parallels from the pre-palace and palace phases at Ras al-'Ain, and the continuities in bowl types in Hayyat Phase 5 indicate that the occupation of Tell-el Hayyat starts at the very beginning of MB II A and probably does not extend to the end of the period. The closest stylistic parallels for the pottery from Tell el-Hayyat are to be found in northern sites, such as Megiddo, Nahariya and Munhatta. This is not surprising considering the geographical location of Tell el-Hayyat.

Phase 2 represents a rather ephemeral reoccupation of the site without much evidence of architecture so far. Phase 2 pottery is mixed, but its latest components clearly belong to the MB II B/C Period. Among a small number of "chocolate ware" sherds is a loop base from a three-legged jar of the type illustrated by Smith, *et al.* from Tombs 23 and 24 at Pella (1981: fig. 26: 7). Slightly concave disc bases and a ring base have parallels in MB II B/C tomb groups 258, 644 and 645 at Megiddo (Guy, 1938).

Phase 1 pottery is indicative of the very mixed nature of Hayyat's upper stratigraphic levels. A mortaria rim belongs to the Persian period. While a large open carinated bowl seems to belong to an early phase of the Iron Age (Amiran, 1970: pl. 60: 1-3). Sherds from the MB II B/C horizon are also among the deposition in Phase 1. A few fragments of Tell el-Yahudiyeh ware also were found in this level. Late Bronze Age material is completely absent from the Tell el-Hayyat assemblage. This apparent lacuna is consistent with the survey findings of Ibrahim, *et al.* (1976: 49).

Subsistence Economy

Preliminary analyses of the floral and faunal remains reflect the mixed farming economy of Bronze Age Tell el-Hayyat. While current interpretations of Bronze Age society recognise the role of sedentary village farming (e.g., Prag, 1974: 96-98, 102-103), they offer little insight into the nature of agrarian subsistence systems and how they might have changed. In large part this is due to lack of a data base suitable for detailed inference. Virtually all floral and faunal analyses to date concern only EB II-III and/or MB II samples, with little attention given to EB IV/MB I. Hence, Prag's singular attempt to reconstruct EB IV/MB I subsistence (1974: 98-99) was hampered from the outset. Likewise, Dever could only suggest a gradual shift in economic strategy from EB II-III "agriculture and industry to pastoralism, dry-farming and perhaps trade" in EB IV (1980a: 38). At Tell el-Hayyat we hope to produce floral and faunal data relevant to EB IV/MB I and the transition to MB II urbanized economy.

Perhaps the most striking data gap can be seen in the results of faunal analysis done on *tell* deposits from Jericho. Clutton-Brock has reported a sizeable increase in deposition of pig *(Sus* sp.) and cattle *(Bos domesticus)* bones in Middle Bronze Age strata as compared to Early Bronze Age strata (EB II-III) (1979: 146-147, table 3). Over the same transition the percentage of sheep-goat remains dropped slightly, though sheep-goat made up the majority of every sample from pre-pottery Neolithic B through the Byzantine Period. It seems apparent that sheep and goat formed the basis for animal husbandry from EB onward (Clutton-Brock, 1971: 54), with the incidence of other species varying more widely — perhaps in response to changing emphasis on pastoralism. Gazelle *(Gazella* sp.), a primary meat source in Neolithic levels, appeared in dwindling numbers through the rest of the Jericho deposits only by virtue of hunting, not domestication (Clutton-Brock, 1971: 54, 1979: 150, 154). Aurochs *(Bos primigenius)* also was hunted through EB and MB (Clutton-Brock, 1971: 46).

On the basis of the limited and possibly biased data available for comparison, expected faunal results from Tell el-Hayyat were difficult to predict. Drastic changes at the MB I/MB II interface would have been anticipated if sheep and goat pastoralism was as pervasive as the current EB IV/MB I model maintains. On the other hand, we considered theories of societal "near-decomposability" (Simon 1965, 1973) which imply that lesser elements of complex society (like village farmers) may have been affected only minimally by higher order social upheaval (like the EB II-III urban collapse). Perhaps this also held true in cases of rapid urban renewal and growth, as in MB II. Therefore, it was our expectation that while drastic changes in material culture would be apparent moving into MB II, indicating new, larger-scale exchange networks, evidence for local subsistence economy would show more gradual transitions. Using the Jericho data as a general guide, we expected more specifically that pig and cattle herding increased gradually as a response to the demands of MB II urbanized society and that we would find evidence reflecting this transition. Our initial excavation results have refined some of these expectations.

Faunal Remains at Tell el-Hayyat: Preliminary Results

by Mary Metzger

The collection of faunal remains from Tell el-Hayyat has presented an excellent opportunity to examine animal husbandry patterns and ancient diet. Preliminary results of the faunal analysis point not only to trends in animal utilization, but also suggest ancient environmental conditions.

The faunal remains recovered during the 1982 Tell el-Hayyat excavation consisted of more than 6,880 bones and bone fragments. This includes 1,494 microfaunal remains which are almost certainly intrusive, postdating the occupation of the site. Of the remaining 5,387 bones, 2,337 (44%) were identifiable. The preliminary findings in this report are based on the analysis of this identifiable material.

Faunal remains were collected from each trench at the site, primarily via dry screening of all excavated sediment through 0.01 m. x 0.01 m. mesh. The areas which contributed the most toward the total of 5,387 bones were Areas A, B, D and F. The first two squares yielded a combined total of 2,636 bones (48.9%) Located at the southwestern end of the *tell,* Areas A and B contained layers of refuse and industrial debris associated with the kiln in A. However, domestic features were present in Areas D and F. The 1,663 bones from these two trenches comprise 31. of the total collection and testify to a variety of animal processing activities, for example, butchering, skinning and marrow processing.

Domestic species constitute 96% of the 1982 faunal remains from Tell el-Hayyat. These and the bones of small mammals, reptiles, fish, amphibians and birds form the faunal assemblage at the site. The following mammalian species have been identified:

Ovis aries	domestic sheep
Capra hircus	domestic goat
Sus scrofa	domestic pig
Bos taurus	domestic cow
Equus asinus	domestic donkey
Vulpes vulpes	red fox
Canis sp.	dog
Hemiechinus auritus calligoni	long-eared hedgehog
Mus musculus	house mouse
Meriones tristami	Tristam's jird
Spalax leucodon ehrenbergi	Palestine mole rat

Relative Frequency of Domestic Animals

The relative proportions of domestic species at Tell el-Hayyat are essential for assessing the economic importance of the four principal food animals. Donkey remains at this site are very recent in origin and are not considered here as a part of the ancient economy. The 1982 collection suggests that sheep and goats, pigs and cattle were maintained in relatively constant proportions. The combined sheep/goat evidence composes 41.5% of the total domestic assemblage. Pigs constituted 32.3% and cattle 26.2% While these frequencies remained fairly steady over time, the proportion of sheep to goat did change. Goats formed 54.7% of the sheep/goat flock during Phase 5. Later, in Phases 3 and 4, and certainly in Phase 2, sheep predominated over goats, averaging 61.9% of the flock.

Slaughter Schedule

Examination of tooth eruption, tooth wear and bone fusion rates has provided insights into the slaughter schedules of domestic animals at Tell el-Hayyat. Preliminary results indicate that about 45% of the sheep and goats were killed by the end of their second year. A second group comprising 17% of the original flock was killed in the fourth year. This latter group probably included surplus breeding stock of both sexes. A similar pattern has been observed at the modern village of Asvan Kale in Turkey (Payne, 1973).

Most of the pigs also appear to have been slaughtered at one of two age stages. Sixty-five percent of the herd was killed by the end of the first year; the remainder were slaughtered at about eighteen months. Analysis of the schedule for cattle has not been completed.

The relative proportions and slaughter patterns of domestic animals indicate that the inhabitants of Tell el-Hayyat depended on these animals for subsistence. Wild animal remains include no large hunted animals. Thus, it appears that wild animals were, at most, an incidental source of food. Considering the importance of pigs and cattle at the site, the ancient subsistence economy must have functioned in a favorable physical environment.

Domestic stock met the requirements of the village for meat and secondary products, i.e., milk, hair and wool. Earlier in the site's occupation goats had predominated over sheep. Later in MB II A, sheep remains outnumber those of goat. I believe the impetus for the shift was not an environmental change, but increased importance of secondary products, especially those derived from sheep (see Sherratt, 1980). Both sheep and goats are economically important; however, mutton, lamb and wool are commercially more valuable than goat flesh and hair. Increased sheep production at Tell el-Hayyat suggests perhaps that economic needs had broadened from purely subsistence to those combining subsistence and exchange.

Floral Evidence

Published floral analyses also are limited in quality and quantity. Reports available for the Jordan Valley generally neglect quantitative information in favor of simply listing cultivated species present (e.g., Helbaek, 1958; Feinbrunn, 1938; Hopf, 1969; Western, 1971). In most of these cases the authors were salvaging what they could from samples taken unsystematically by other excavators as apparent afterthoughts. Nonetheless, a few observations pertinent to Tell el-Hayyat can be made.

Three species retained paramount importance through EB and MB: olive *(Olea* sp.), emmer wheat *(Triticum dicoccum)* and hulled barley *(Hordeum distichum)* (Helbaek, 1958: 309, table 4). Jericho has provided the only floral information in the region from Neolithic, as well as EB deposits. Hopf reported a "complete floral change" there in the Early Bronze Age due to the appearance of several new cultivated species (1969: 357). This abundance of cultigens then dropped in number from fifteen to nine in EB IV/MB I before climbing back to sixteen in MB II. We certainly cannot hope to push these data from Jericho too far, since sample comparability is uncertain and amounts of each species were not indicated. But the changes intimated in Hopf's data deserve further testing and more detailed clarification. It will be important for us to determine whether any such changes involved the staples of olives and cereals, or whether variations took place primarily above and beyond those staples (as seems indicated by the Jericho floral data, for instance).

The 1982 excavations produced fifty-three soil samples for flotation processing ranging from 1 to 20 litres each. Exterior surfaces around the settlement's periphery in Areas A, B and F yielded almost70%of the total plant remains recovered. In contrast, flotation samples from within Middle Bronze structures were limited to a pit, hearth and two *tawabeen* (tabuns) in Areas C and D. The resulting collection of plant macrofossils includes the predictable staples of olive, hulled barley and emmer wheat. A lesser amount of miscellaneous legumes includes peas *(Pisum* sp.). Mixed dry-farming may be implicated further by traces of crop-following weeds, such as *Chenopodium* and *Amaranthus*. We can note the abundance and satisfactory preservation of the cultigens of greatest interest to us, and therefore the likelihood that we will be able to supplement the floral data previously available for the Bronze Age.

The 1983 Season: Specific Problems And Objectives

In addition to dealing with the fundamentals of stratigraphy and chronological pottery analysis, an explicit goal of this project is to examine socio-economic questions regarding ancient village life in both urbanized and non-urbanized society. Specifically, we hope to identify the local economic changes that played a part in EB-MB urban/non-urban transitions, and which might be expected to occur in other transitions elsewhere. We planned to test some of the most basic implications of the current Dever/Prag interpretations of changing EB-MB settlement patterns and material culture. Happily, the first season's excavation provided us with data to begin this process and new questions to approach during the second season of excavations.

Enlarged excavations will allow us to test more thoroughly for EB-MB material culture continuity. The area examined during the first season was too limited to support any definitive statement on cultural continuity or discontinuity. However, some aspects of the MB II A remains at Tell el-Hayyat suggest an element of continuity. For example, the kiln in Area A showed two distinct building phases. As it was cut 0.30 m. into virgin soil and was filled with MB I pottery in the lower levels, the earlier phase of this kiln may be dated to MB I. Unfortunately, an animal burrow cut off the kiln from clear stratification around its exterior. One of our priorities for the second season is to examine the kiln area more closely.

Enlarging the area of excavation will also allow us to address the question of continuity in architectural tradition. Now that we have identified the areas most likely to produce domestic architecture, we will extend the excavation to the center of the site in 5.00 m. squares over a larger continuous area. This will give us a larger sample size from which to draw more definite conclusions about the history and nature of human occupation at Tel el-Hayyat.

Plans for an expanded spring 1983 season call for: 1) deep soundings more toward the centre of the site where we hope to find unmixed EB IV/MB I depositon; 2) larger exposure of the domestic architecture of Areas C through F; 3) exposure of the remainder of the kiln in Area A; and 4) continued work along the settlement periphery which has produced so much subsistence data.

Tell el-Hayyat provides a challenging opportunity to assess village life during the development of "reurbanized" society in MB II. The general strategy of coordinated field methods and test expectations outlined above provides a practical means in which to pursue our basic research concerns. Building on previous EB and MB excavations in the Jordan Valley, and in Palestine and Transjordan generally, we hope to make a contribution toward clarifying the regional prehistory of the Jordan Valley in the third and second millennia B.C., especially regarding village life during that time. Simultaneously we hope to examine EB-MB continuities and contrasts and determine the full range of evidence at Tell el-Hayyat with which to explore their underlying economic foundations.

Acknowledgements

We would like to express our sincere gratitude to Dr. Adnan Hadidi, Director-General of the Department of Antiquities, Hashemite Kingdom of Jordan for his encouragement and guidance. Likewise, Dr. James Sauer, former Director of the American Center of Oriental Research and Dr. David McCreery, its present Director, provided hospitality and help essential to our success in the field.

Our gratitude is expressed to the University of Arizona Foundation which contributed the majority of our funds through Dr. William Dever of the Department of Oriental Studies. A William Sirley Fulton Scholarship from the Department of Anthropology, University of Arizona and a ZRF Travel Grant which covered the travel expenses Mr. Falconer and Ms. Magness-Gardiner, respectively. Finally, we are indebted to the Department of Antiquities for assistance with our worker's payroll which allowed us to achieve our field objectives.

In addition to the authors as Co-Field Directors, the Staff included Faunal Analyst Ms. Mary Metzger; Floral Analyst/Area Supervisor Ms. Patricia Fall; Lithic Analysts/Area Supervisors Mr. John Whittaker and Ms. Kathryn Kamp-Whittaker; Area Supervisor Mr. Ron Gardiner; Assistant Supervisor Mr. Thomas Davis; Draftsman/Surveyor/Photographer Mr. Robert Erskine; Departent of Antiquities Representatives Mssrs. Mohammed Darwish and Mohammed Jamra; Technical Men Mssrs. Ali Abd al-Rusool, Sadek Abdullah, Fuad Awadd and Khamis Fahid.

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TEST SOUNDINGS OF ARCHAEOLOGICAL AND RESISTIVITY SURVEY RESULTS AT RUJM AL-ḤENU

by
Patrick E. McGovern

Introduction

Because of ongoing development and the destruction of ancient sites in the Baq'ah Valley, now virtually a suburb of Amman, the Baq'ah Valley Project from its inception has sought to recover the maximum amount of representative archaeological data with the least expenditure of time, manpower, and finances. Thus, there has been a very conscious effort to develop specific working hypotheses that can be tested in a relatively straight forward fashion, utilizing the full battery of techniques that modern scientific archaeology has to offer (McGovern, 1980a). Although alien to Middle Eastern archaeology in which the traditional practice has been to excavate a single major site, such an approach is desirable as much for theoretical as for strictly economic reasons (cf. Dever, 1980: 46-74).

The Baq'ah Valley is a logical geographical unit for study, since it is a fertile, well-watered plain surrounded by barren hills. Indeed, the flat, relatively self-contained valley sharply contrasts with the standard Transjordanian plateau topography of deeply cut gorges descending to the Jordan Valley (Pl. XI; Bender, 1974: 6-11, 114-15). Evidence for human occupation, reaching back to the late Middle Paleolithic (*ca.* 45,000 B.P.) and virtually continuous up to the present, is especially prominent in the northwestern Umm ad-Dananīr region of the valley where the density of perennial springs is among the highest on the plateau (Hashemite Kingdom of Jordan and the Federal Republic of Germany, 1977: 1-7, Map HG 4.2N). In addition, the Umm ad-Dananir region is strategically located along probable ancient routes running north to Syria and northwest to the Jordan Valley via the Wadi Umm ad-Dananir.

The region originally attracted our attention because of a series of over thirty Late Bronze (LB) and Iron (Ir) IA burial caves on Jebel al-Hawayah and Jebel al-Qesir. These were possibly related to one of the "megalithic" buildings nearby, specifically the eastern structure at Rujm al-Ḥenu (Fig.1: site 1), which is located 500 to 1600 m. east of the caves and an associated settlement site at Hirbet Umm ad-Dananir. The surface ground plan and construction technique of Rujm al-Henu East (Fig. 2; Pl. XII, 1) resemble that of the LB Amman Airport Building (Hennessy, 1966: figs. 1-2, pl. 33A), 15 km. to the southeast. Until it was destroyed to clear a path for a jet runway, the airport building was the prime example of the *Quadratbau* architectural type on the East Bank (Wright, 1966; 1968; 1971a; 1971b). As the name implies, *Quadratbau* structures have a square layout with a central unit ("courtyard") surrounded by outer rooms. The type also occurs west of the Jordan at Hazor (remnants only; Yadin, 1972: 98-100) and on Mt. Gerizim (Boling, 1969: 84; 1975: 33-35), which date to LB I and Middle Bronze (MB) IIC-LB I, respectively. Although the surface ground plan of Rujm al- Ḥenu (E) is only approximately a square and is not fully defined on the interior, it offered the possibility for investigating another building of this type.

The Amman Airport Building with its rich deposits, including scarabs and cylinder seals (Ward, 1964), gold jewelry, Mycenaean vessels, and antique Egyptian and Minoan stone vases (Hankey, 1974), posed a whole series of questions. It was discovered at a time when the nomadic hypothesis of N. Glueck (1934: 138; 1939:

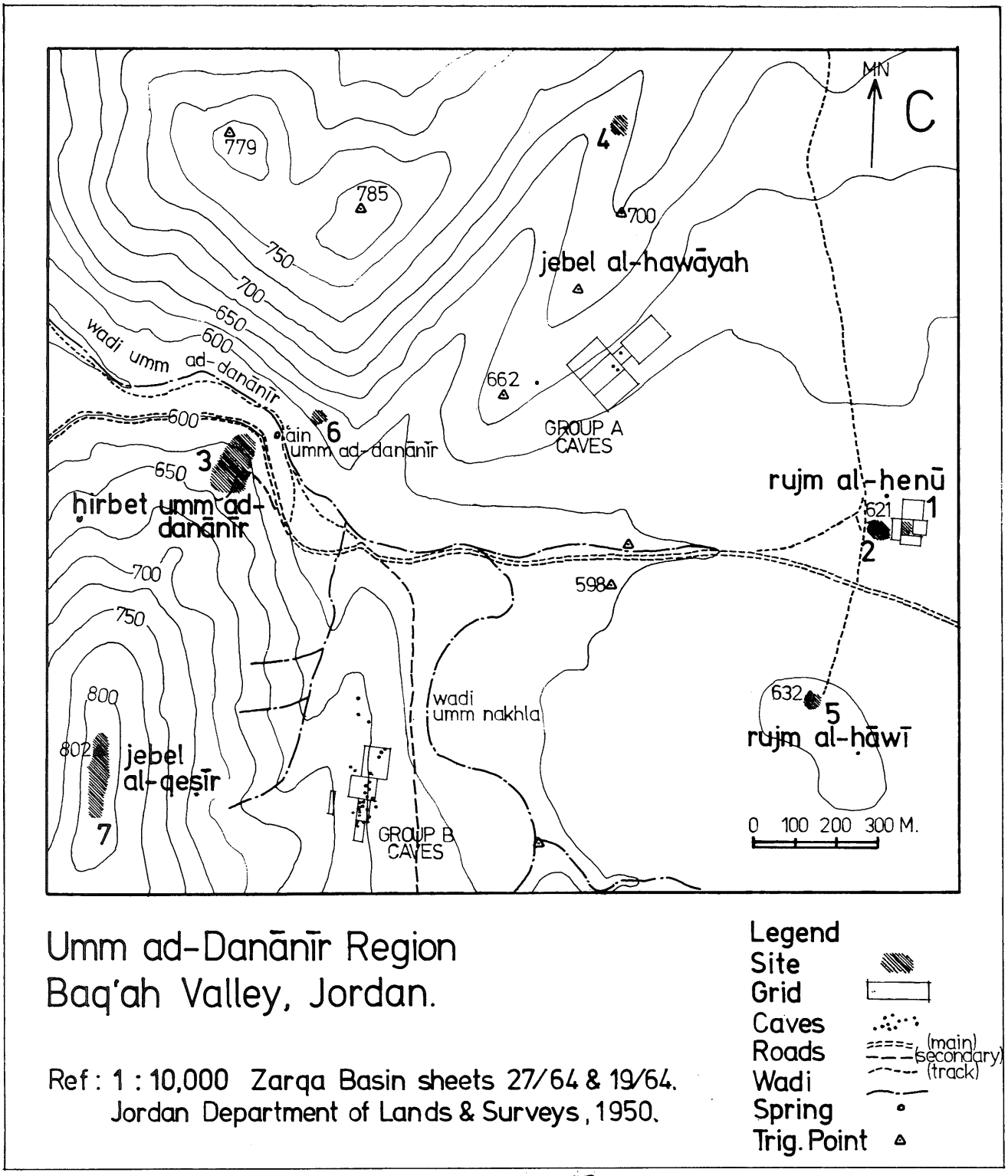


Fig. 1: Map of Umm ad-Danānīr region

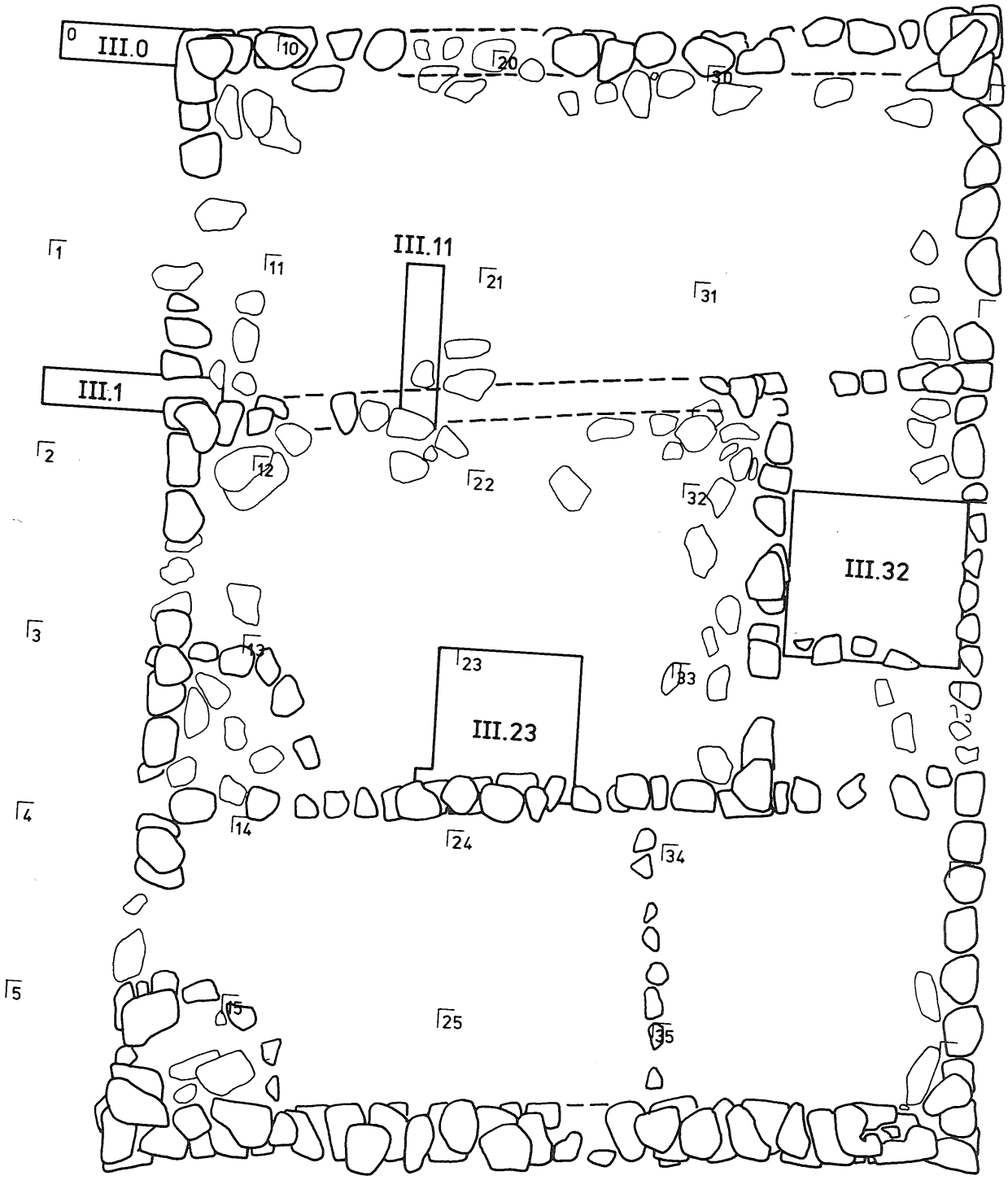


Fig. 2: Rujm al-Ḥenu (E) top plan

264-66; 1940: 124-25) held sway. Based on survey findings, Glueck maintained that all of central and southern Transjordan, south of the Wadi Zarqa, was essentially devoid of permanent settlements throughout the MB IIA-C and LB periods. Instead, nomads and/or "semi- nomads" (cf. Spooner, 1973: 3-4, 19-21, 42 [n.6] for modern anthropological distinctions) occupied the Transjordanian plateau. Since there was little evidence for a permanent settlement in the immediate vicinity of the Amman Airport Building (Hennessy, 1966, 1970; Herr, 1977), it was proposed that the building might have been a tribal shrine, possibly a temple or mortuary cult structure. and related to early biblical traditions (Campbell and Wright, 1969). By extension, other examples of the *Quadratbau* class could be similarly explained.

It should be stressed from the outset that functional interpretations based primarily on architectural analogies are often suspect. For example, Albright (1960: 36, 92-93) interpreted the Mt. Gerizim structure as a villa or patrician's house. Ground plans of later domestic structures at Beth Shan, Tell es-Sa'idiyeh, and Tell Far'ah (S) also appear to be of the *Quadratbau* type (Fritz, 1971).

The constantly accumulating evidence for an advanced culture in the MB and LB periods, especially from tombs (Dajani, 1966; Harding and Isserlin, 1953), prompted Glueck (1951: 423; 1970: 141) to modify his position by arguing for a contraction of urban life to a smaller number of major sites. While some (Albright, 1960: 82) concurred with this judgment, others still felt that it did not go far enough, particularly for the region north of Madaba (Harding and Isserlin, 1953: 14; Harding, 1967: 32-34; Ward, 1964: 47, 1973: 45-46; Ward and Martin, 1964: 19-22; Franken, 1970: 7-9; Zayadine, 1973: 19-21; Thompson, 1974a: 193-94, 1974b; Weippert, 1979: 25-26). Recent excavation of LB remains at the site of Sahab (Ibrahim, 1972; 1974; 1975a; 1975b), southeast of Amman, surveys in Moab (Miller, 1978: 51; Ibach, 1978), and evidence for MB and LB remains at the Amman Citadel (Dornemann, 1970), Tell Safut (Ma'ayeh, 1960: 114), and Ḥirbet Umm ad- Danānīr (LB level reached in the 1981 field season) support the view that there was a moderate concentration of variously sized, well-established communities on the central Transjordanian plateau (cf. Zayadine, 1973: 72, Map 6).

As a first step toward possibly elucidating these problems in the Umm ad- Dananir region, an intensive archaeological and geophysical survey was carried out in 1978 (McGovern, 1980a). An exhaustive collection of surface artefactual materials at Rujm al-Ḥenu produced three transitional MB/LB diagnostic sherds from the central room of the eastern building. Since no other MB/ LB sherds were found within 500 m. of the structure and in view of a number of architectural considerations (below), it then appeared probable that Rujm al-Henu (E) belonged to the *Quadratbau* class.

Concurrently, a resistometer was used to investigate buried remains inside and in the immediate vicinity of the building. While no additional interior crosswalls were indicated, the resistivity data did suggest a wider area of occupation.

In the 1980 season, the survey was followed up by archaeological soundings to test the various hypotheses described above and others implied by the survey data. For example, to what extent did the surface sherding evidence actually reflect cultural sequences? Did specific resistivity patterns ("signatures") correlate with walls, pits, or other archaeological features?

Archaeological Survey

Methodology

Earlier surveys by Glueck (1939: 191-200) and de Vaux (1938) had successfully located many sites in the Baq'ah Valley, but their work was partly vitiated by inadequate descriptions, a then poorly understood pottery sequence for Transjordan, and a methodological approach mainly relying on native informants and obvious surface remains.

Our 1978 survey sought to recover a more truly representative sampling of cultural materials in accord with statistical models (Watson, LeBlanc, and Redman, 1971: 121-25; Ragir, 1967: 181-87; Haggett, 1966; Hodder and Orton, 1976: 20). Otherwise, less conspicuous remains (e.g., remnants of architecture, small clusters of non-descript sherds or flints) might be overlooked. Even with such precautions, a surface collection can be highly skewed in a non-representative fashion because of the relative closeness of specific cultural levels to the surface, erosional processes, modern disturbance, and other factors.

The initial phase of the Umm ad-Dananir survey involved systematically traversing the relatively small area (52.5 hectares) between Jebel al-Hawayah and Jebel al-Qesir on the west and Rujm al-Henu and Rujm al-Hawi on the east (Fig.1). Base lines were set up by theodolite readings from benchmarks of the 1:10,000 Zarqa Basin Map (Department of Lands and Surveys of Jordan, 1950). Groups of three to five individuals then traversed two meter wide strips between the base lines. They walked slowly side by side, covering half a kilometre per hour, and collected as much artefactual material as possible at this speed. The level of discrimination was adequate to locate concentrations of three or more artefacts and small isolated features.

Seven of these artefact clusters, which were associated with architectural remains, could be designated "sites." Groups of sherds were also found randomly distributed in the Umm ad-Dananir fields where they had evidently been spread by agricultural activity. In contrast, sites were isolated from fields on hills bordering the valley or on bedrock outcrops. Rujm al-Henu (W) belonged to the latter class.

In the second phase of the survey, exhaustive surface collections of artefacts were gathered at each site, which was only possible because of the limited number of small (less than 2.50 hectare) sites in the Umm ad-Dananir region. Where larger sites and survey areas are covered, systematic or random sampling techniques are required. In the case of Rujm al-Henu (E), survey units were defined by the architectural layout of interior rooms; peripheral units extended out five metres from the walls of the building. A single form, modeled after the site survey record sheet in Hester, Heizer, and Graham, 1975: 24, was used to record details of site names, location, ownership, description and sketch, vegetation, soil, nearest water, structures and possible stratification, and miscellaneous features.

Rujm al-Henu (E)

Descriptions of Rujm al-Henu (E) by Glueck (1939: 194) and de Vaux (1938: 420-21) were necessarily brief, and require some correction of detail. De Vaux's schematic drawing (1938: fig.8) of the eastern building at Rujm al-Helu *(sic)* shows a rectangular main structure whose central room is defined on the west by the exterior wall. It is oriented north- south, and lacks crosswalls and entrance(s). Although de Vaux states that the approximate outer dimensions of the building are 20.00 x 40.00 m., the ratio of width to length on the drawing (0.68) is greater than 0.5.

A careful plan of the building (Fig.2) revealed that the eastern and western walls of Rujm al-Henu (E) are actually bowed inward, so that the northern and southern walls measure 23.00 and 24.50 m., respectively. The approximate north-south external length of the structure is 31.00 m., (cf.Glueck's measurements — 23.00 x 33.00 m.).

At least three crosswalls are visible on the eastern and southern interior, and arcs of stones delimit areas in the southwestern corners of three rooms. The structure may have been entered from the west where boulders are lacking at three uniformly spaced points (Pl. XIII, 1).

The main walls (exterior and central unit) are composed of huge boulders, the majority over a metre in length and weighing as much as a ton. They are of native limestone, reddish Nubian sandstone, and flint, which may have been hauled from *wadi* beds or possibly quarried from hillsides (Pl. XVIII, 2).

Although now badly weathered, the stones may have been roughly hewn to size and shape. Single lines of the boulders were dry-laid one on top of another with a packing of cobbles. Only one or two courses are visible, except in several corners where three courses are built up in a crude header and stretcher fashion. In contrast to the main walls, smaller stones (less than a metre in length) had been used for inner crosswalls and the corner arc-shaped enclosures, which suggested that they were secondary. The depth of soil accumulation inside and outside the building could not be ascertained, so that visible boulders might either be upper courses of buried walls or parts of the foundation.

Glueck (1939: 194) broadly dated Rujm al-Ḥenu (E) to Early Iron I-II (*ca.* 1300-600 B.C.; for a pre-1200 B.C. beginning of the Transjordanian Iron Age, see Glueck, 1939: 240 and Weippert, 1979). The surface sherding evidence from the 1978 survey considerably expanded this dating, according to the following diagnostic counts: 3 MB/LB (*ca.* 1650-1480 B.C.), 2 LB/Ir (*ca.* 1400-1100 B.C.), 6 Ir IIC/ Persian (P) (*ca.* 700-500 B.C.), 7 Late Roman (LR)/Early Byzantine (EByz) (A.D. 135-491), 11 EByz (A.D. 324-491), 1 Umayyad (Umay) (A.D. 661-750), 2 Mamlūk (Mam) A.D. 1250-1516), and 2 Modern (Mod) (after A.D. 1918). The post-Iron Age chronology follows Sauer, 1973: 3-5.

Rujm al-Ḥenu (W)

The western building at Rujm al-Ḥenu has a ground plan (Fig. 3; Pl. XII, 1) which is very different from that of the eastern building. Its layout conforms to the *qasr* architectural type (Glueck, 1939: 153-55) of which there are numerous examples distributed over a 20 km. radius of the Amman Citadel (Glueck, 1939: *passim,* 1970: 180-81; Landes, 1964: 72-76; Gese, 1958; Hentschke, 1960; Fohrer, 1961; Reventlow, 1963; Boraas, 1971; Thompson, 1972, 1973, 1977).

The main features of these buildings are large, rectangular or square enclosures and circular towers *(rujūm malfufah),* which are either incorporated into walls or separated by short distances from the main structures (completely isolated towers also occur-Glueck, 1937: 159). Like Rujm al-Ḥenu (E), *qasr* type buildings are normally constructed of dry-laid boulders of limestone, sandstone, and flint with a rubble chinking.

Glueck (1939: 194) and de Vaux (1938: 421) argued for the contemporaneity of the two Rujm al-Ḥenu structures. A closer examination, however, reveals dissimilarities that may reflect different constructional and occupational histories.

It is true that the eastern and western buildings at Rujm al-Ḥenu (Pl. XII, 1-2) have much in common. Separated by only thirty metres, both buildings are almost exactly oriented to the cardinal points of the compass. Their northern walls are offset by only five metres from a coincident east-west line. Rujm al-Ḥenu (W) also has a layout that is comparable to that of the eastern building, but on a much larger scale. An open central area (courtyard) is surrounded by a corridor, which is possibly divided up into casemate units (cf. the crosswalls in the northeastern and southwestern corners). Three equally spaced gaps in the eastern wall (Pl. XVII, 1) may have been entrances, which would have faced three possible entrances to the eastern building.

De Vaux's sketch (1938: fig. 8) of Rujm al-Henu (W), in addition to the misplacement and omission of walls and entrances, is too elongated north-south. The true dimensions of the building, including the southeast bastion, are *ca.* 46.00 m. north-south and 44.00 m. east-west.

Significantly, the boulders used for the western building are generally smaller (less than a metre long) than those of the main walls of the eastern building, and more closely resemble those employed for the presumed secondary constructions of the latter. Only the circular tower, the southeastern bastion, and several exterior corners of Rujm al-Henu (W) have concentrations of the larger boulders. Moreover, every exposed wall of the western structure is comprised of two lines of stones.

The sherding evidence from the western building also differed from that of

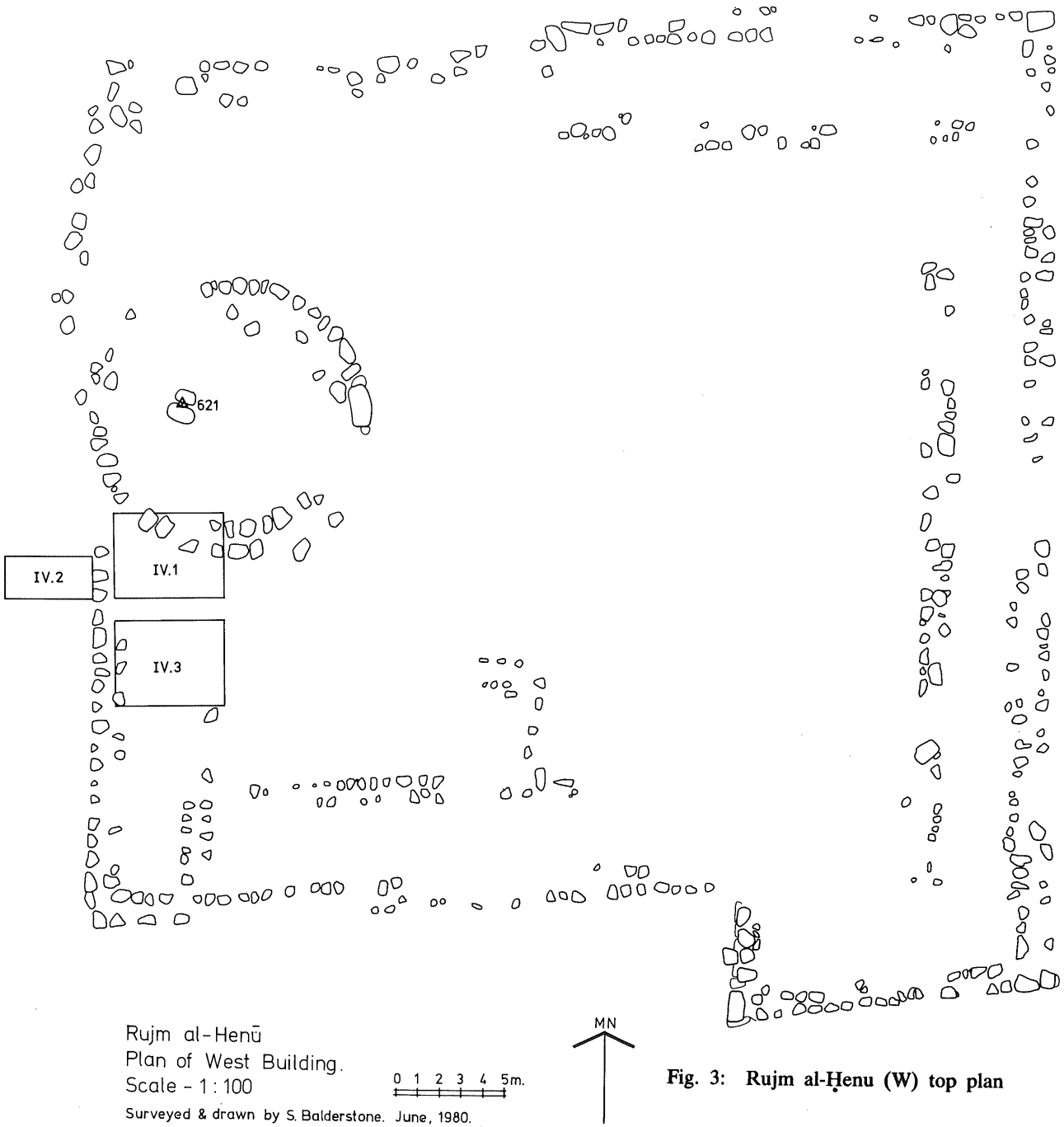


Fig. 3: Rujm al-Ḥenu (W) top plan

the eastern building. Apart from a single LB II (*ca.* 1400-1200 B.C.) diagnostic, the only pre-modern period represented was Iron II C/P (72 diagnostics). The interior positioning of the circular tower with a very limited exposure to the west suggested architectural phasing in which the elaborate *qasr* layout was preceded by an isolated *Rujm malfuf.*

The soil accumulation in and around the western building appeared to be greater than that of the eastern building. The visible structure completely covers the top of a mound, which rises more than three metres above the valley floor and is bordered on the west by large areas of denuded bedrock.

Pre-Excavation Interpretation

Early explorers were understandably intrigued by "megalithic" structures such as those at Rujm al-Ḥenu, which are unique to the southern Gilead region, and dated them to a prehistoric period (Mackenzie, 1911: 39; Watzinger, 1933: 23-24) or Roman times (Conder, 1899: 193). More recent investigation of *rujm malfuf* and *qasr* type structures has pointed to an Iron I (*ca.* 1300-900 B.C.; Glueck, 1937: 19, 1939: 157, 165-66; Landes, 1964: 72 [eleventh century]; Gese, 1958: 56-57) or Iron II (seventh-sixth century B.C.); Thompson, 1972, 1973, 1977) construction date, although other periods (e.g., Roman—Boraas 1971) have not been ruled out. The Iron I dating, in particular, has not been accepted by those who question Glueck's pottery dating criteria (Franken, 1970; Franken and Power, 1971; Mittmann 1971: 1-4; Weippert, 1979: 28-30). There is general agreement that the *Quadratbau* buildings were constructed in the late MB or early LB period, although they may have continued in use to the end of the Late Bronze Age (e.g., Amman Airport Building).

Functionally, the *qasr* and *rujm malfuf* type buildings have usually been interpreted as fortresses or watchtowers, which protected approaches to Amman (Conder, 1899: 193; Mackenzie, 1911: 25-26; Gese, 1958: 57; Landes, 1964: 72-74; Glueck, 1939: 163, 165-67, 1970: 183). An alternative hypothesis, not necessarily mutually exclusive from the watchtower hypothesis, is that such buildings served as habitation quarters for the rural Ammonite population (Glueck, 1939: 163). Their spatial distribution suggests a settlement pattern for maximally exploiting the arable agricultural land in the Amman area. Ḥirbet Muḍmar (Pl. XIX,2), which is located less than a kilometre southwest of Rujm al-Ḥenu in the middle of the Baq'ah, exemplifies the complementary relationship of agricultural, and domestic functions. The large complex of massive, bastioned buildings was erected on bedrock outcrops, surrounded by fertile fields, and could have housed a considerable population.

In the case of the two buildings at Rujm al-Ḥenu, differences in architectural details and overall layouts, as well as surface sherding evidence, suggest divergent constructional and occupational sequences. Assuming the eastern buildings were constructed sometime in the late MB or early LB period, Iron II C/P inhabitants of the region might have sited another building to the west, in order to obtain more easily large boulders for important structural elements (corners and towers). At the same time, the eastern building was not completely dismantled, but might have continued to be used (e.g., as an animal enclosure); easy access back and forth between the structures would be provided by facing entrances.

Rujm al-Ḥawi (Fig. 1: Site 5). which is situated about 350 m. southwest of Rujm al-Ḥenu on the other side of the modern road, bears importantly on the question of the temporal relationship of the Rujm al-Ḥenu buildings. Its main structure is virtually the mirror-image of Rujm al-Ḥenu (W), yet there is no building on the surface that matches Rujm al-Ḥenu (E). Double lines of limestone, sandstone, and flint boulders (less than a meter long for the most part) make up its outer walls. The rectangular building, which measures *ca.* 50 m. north-south and 30 m. east-west and is aligned to the points of the compass, has a circular tower

incorporated into its western wall (Pl. XX, 1) and a square bastion on the north (Pl. XX, 2). Surface pottery was equally divided between the Iron II C/P and Byzantine periods.

Rujm al-Henu (W) and Rujm al-Hawi may have been contemporaneous border posts. If an ancient route followed the line of the modern road, their circular towers would look west along the route toward a northwestern pass (Wadi Umm ad-Dananir) while their bastions would face one another and be approximately equidistant from the route. This proposal stresses the defensive nature of the towers, but need not exclude a concomitant domestic function. The first line of defenses was probably at Ḫirbet Umm ad-Dananir where Iron II C/P structures have recently been excavated (P1. XIX, 1).

Only Rujm al-Ḥenu (E) produced sherding evidence for activity in the Late Roman, Early Byzantine, Umayyad, and Mamlūk periods, which may have included the rebuilding of walls and adding secondary installations. Today, both structures at Rujm al-Henu are used primarily as dumping grounds.

The Resistivity Survey at Rujm al-Ḥenu East

Logistics

Based on the pre-excavation interpretation of Rujm al-Ḥenu (E) possibly belonging to the *Quadratbau* class, was it an isolated shrine used by nomads/ "semi-nomads" (see Introduction) or was it part of a larger settlement? While the nomadic shrine hypothesis might only be resolved by excavating identifiable cultic remains (altars, distinctive artefacts), the question of the building's isolation from an associated settlement could be approached by a combination of geophysical prospecting and archaeological techniques.

Since the land surrounding Rujm al-Henu (E) is today used exclusively for agriculture, any near-surface occupational remains would be disturbed by plowing. Accordingly, an aerial survey (Pl. XII, 1), often the ideal complement to a geophysical survey, did not reveal any unusual crop or soil marks near the structure.

Trial soundings might be sunk at random points around the building to investigate deeper lying remains, but this would entail considerable labor and expense (workmen and farmer compensation) with no guarantee of positive results. Alternatively, a suitable geophysical detecting device could be used to map probable areas of buried walls and structures, which could then be excavated in a systematic fashion.

There were compelling arguments against expanding a concurrent magnetometer survey, which successfully located silted-up caves (McGovern, 1979, 1981a). Limestone and sandstone, the preferred building materials in the Umm ad-Dananir region, have low specific magnetization values compared to the more magnetic soil. Even very large accumulations of stones, such as collapsed walls, would produce negligible anomalies, which would be totally indistinguishable from background fluctuations. Modern surface iron debris in and around Rujm al-Ḥenu (E) was an added deterrent to a magnetic survey.

Electrical resistivity techniques, on the other hand, have been shown to be excellent in detecting stone linear features and even in obtaining the top plans of entire structures (Ralph, 1969; Tite, 1972: 25). Since its first application to archaeology in 1946 by Atkinson (1952), a wide range of inexpensive, extremely portable commercial instruments have been developed, and theoretical principles are now well understood although sometimes difficult to apply in practice (Atkinson, 1963; Aitken, 1974: 267-86; Clark, 1970; Tagg, 1964). As with magnetic surveying, which depends on the magnetic contrast

between the archaeological feature sought and the surrounding medium, resistivity surveying takes advantage of another contrastive physical property of materials, *viz.* specific resistivity, which is a function of water retention and dissolved ionic salts and humic acids capable of conducting an electrical current. A sufficient resistivity contrast must exist between limestone/sandstone boulders at Rujm al-Ḥenu (E) and the surrounding soil, in order to detect significant anomalies.

Samples of soil from near the building, which had been finely sifted and mixed with various quantities of distilled water, were first tested in MASCA using a Gossen Geohm resistometer (108 Hz; 4.5V) and a standard linear array of four equally spaced probes (the Wenner configuration—Aitken, 1974: 270-71). In this arrangement, an alternating current (I) is applied to the outer probes, and the resultant voltage difference (V) is simultaneously measured across the inner probes. Assuming minimal contact resistance, the resistance (R) of the soil is then simply the quotient, V/I (by Ohm's law). By applying a simplified formula for specific resistivity ($\rho = 2\pi dR$), where d is the probe spacing, it could be calculated that the soil samples from Rujm al-Ḥenu (E) varied between 20 and 60 ohm-m. In contrast, the specific resistivity of limestone/sandstone was much higher—*ca.* 500 ohm-m. The intrusion of limestone/sandstone boulders between the probes should then result in detectible high anomalies. Where there is a relative absence of limestone and sandstone, R would diminish and produce low anomalies. Actual measurements in the field will be modified by many factors, including soil stratigraphy and inhomogeneities, nearness of the bedrock and water table, the spacing between the probes and their placement in the soil, the relationship of the probes to the archaeological feature, etc. (Aitken, 1974: 268-71, 273-85; Tite, 1972: 25-32). Our survey was carried out in late Fall when several days of rain assured good contact conditions.

A crucial logistical problem is establishing the most ideal probe distance for detecting archaeological features. For the Wenner configuration, the resistance measured is actually a rough average at the array midpoint of soils from the surface down to a depth of about one and a half times d (Aitken, 1974: 271). After experimenting with various probe distances, a one metre separation was selected for detecting presumably near subsurface remains. With a smaller separation, not enough current would reach the sought-after feature, while a wider separation would reduce locational precision.

As for the archaeological survey, resistivity grids were precisely laid out with theodolite, optical square, prismatic compass, and metric tapes. Four grids were set up surrounding Rujm al-Ḥenu (E) and three on its interior (Fig.4), covering 0.62 hectares and representing 6181 data points. On average, about 900 measurements/day could be made with the resistometer (sometimes operating two instruments simultaneously) compared with 1300 measurements/day for the magnetometer.

Traversing a resistivity grid is very straight-forward for the Wenner configuration Pl. XXI, 1). The linear array of four probes is moved one probe at a time along a line parallel to the Y-axis; to start a new line, the array is moved one metre in a positive direction of the X-axis. Plastic or linen tapes (not metallic because of conductivity effects) are laid along the X-axis and the side opposite. Another tape can then be exactly positioned along the measurement line, in order to ensure accurate probe placement. The probes are 1.50 m. long, mild steel rods. Their sharpened points were driven about ten centimetres below the dry surface.

A team of at least three people is needed to carry out the survey efficiently. The person with the resistometer takes and calls out readings to a second person, who records them on centimetre graph paper at the midpoint of the array (thus, initial and final measurements for each line are indented 1.50 m.), usually at a scale of 1:200. A third person moves the end probe to the front of the array in preparation for the next reading. As one line is finished,

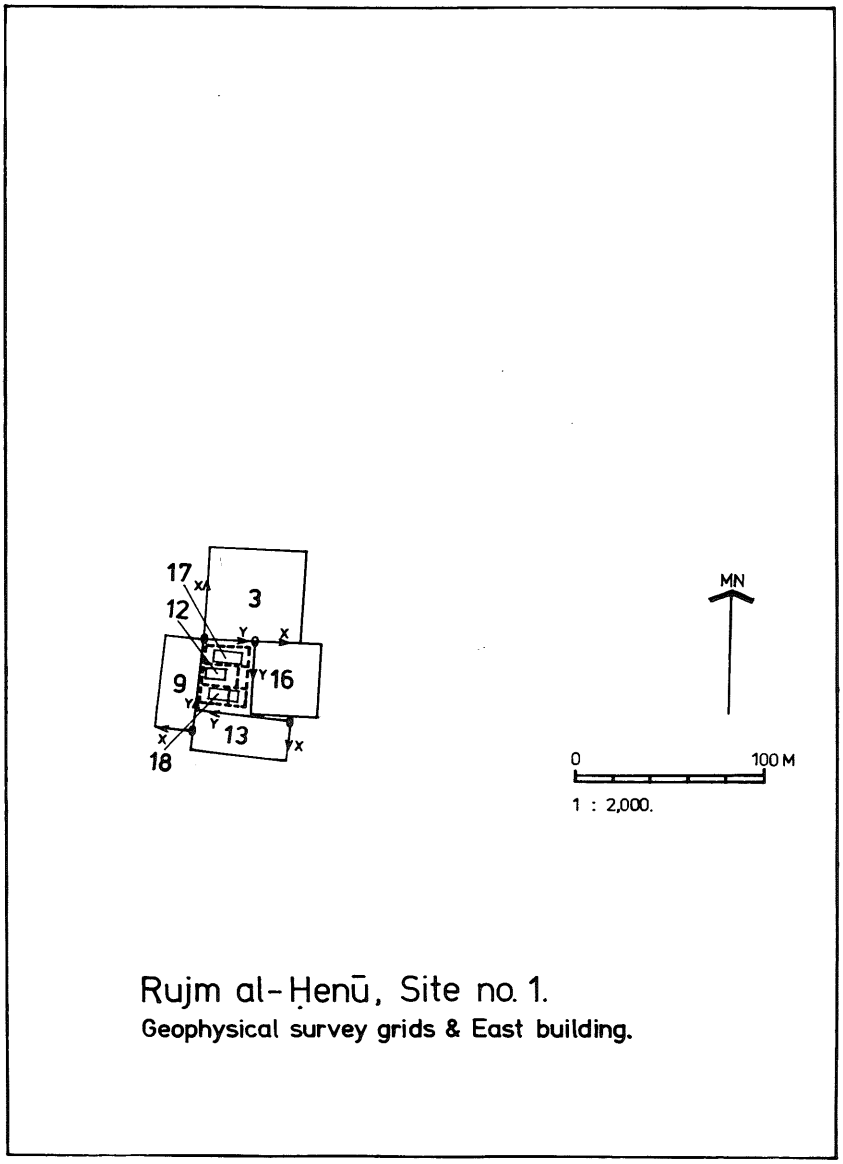


Fig. 4: Rujm al-Ḥenu (E) resistivity grid map

the tape parallel to the Y-axis is moved over a metre, and the same process is repeated, continuing in this fashion until the grid is completed.

The resistivity data is usually contoured up as soon as possible, so that significant anomalies can be further tested with different probe separations and/or arrangements. The choice of an appropriate contour interval, which will reveal significant highs and lows but does not clutter up the map, is often determined by inspection (Clark 1970: 703 suggests several theoretical procedures). A 10 ohm interval is used for all the grids at Rujm al-Ḥenu (E). High anomalies (more than 10 ohms above the background field) are indicated by diagonal hatching, low anomalies (at least 10 ohms below the background field) by stippling, and boulders by less fine stippling.

Pre-Excavation Interpretation of Resistivity Data

A number of fairly large, diffuse areas of higher resistivity were located on all sides of Rujm al-Ḥenu (E), which pointed to a wider area of settlement. For example, Grid 9 (Fig.9), which covered the area between the eastern and western building, has generally higher resistivity values in the region between X0-18 and Y17-47 in contrast to surrounding areas of the same grid. Another diffuse high begins in Grid 13 (Fig.10) between X3-22 and YO-24, and extends into Grids 16 (Fig.11; X10-35 to YO-39) and 3 (Fig.8; XO-35 to Y31-50). Possibly connected with the latter is a region of higher resistivity that approximately bisects Grid 3 between X21-40 and YO-31.

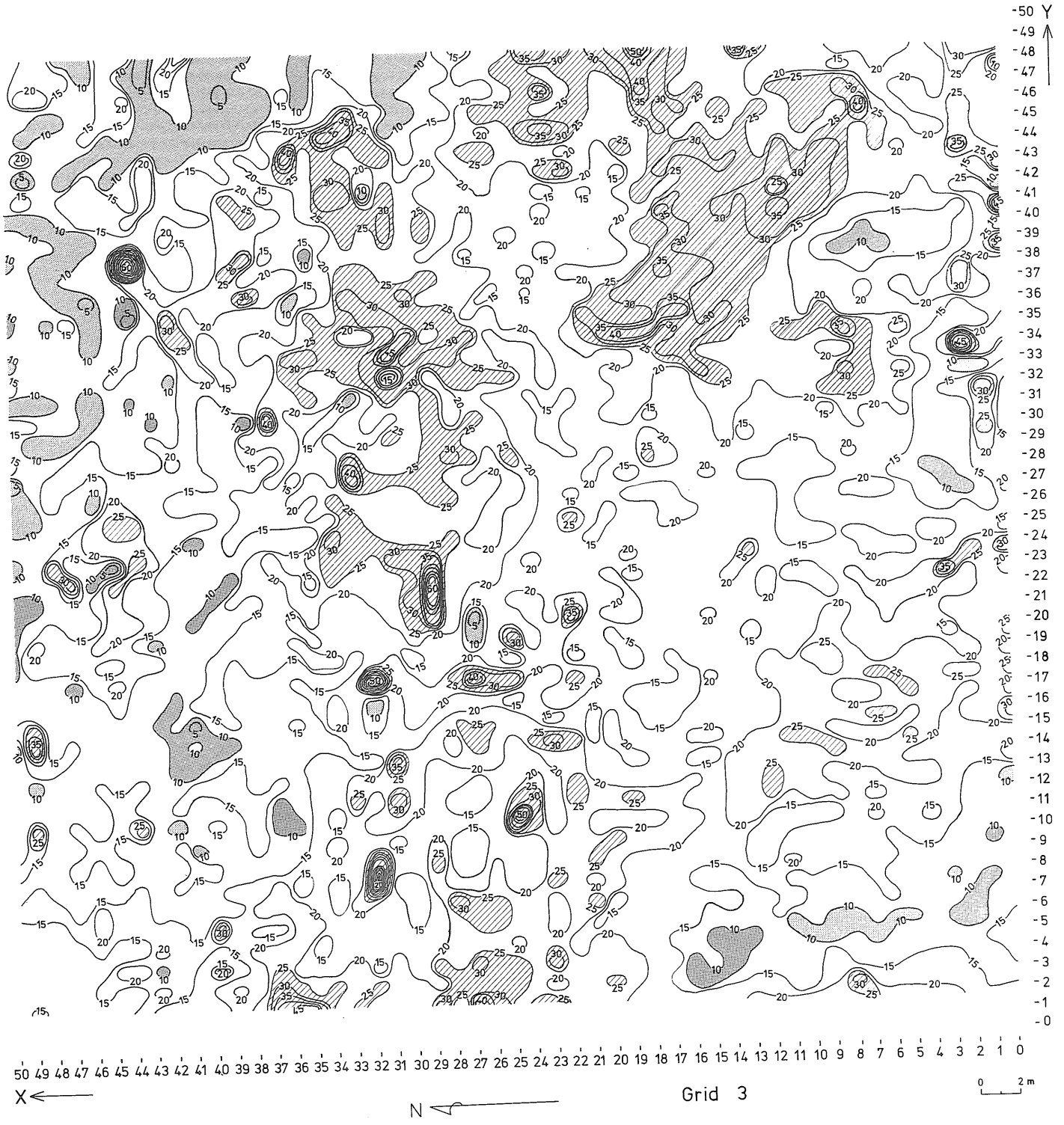
Before follow-up test excavations (below), it was uncertain whether these regions of higher resistivity represented foundations of outlying buildings, room additions to Rujm al-Ḥenu (E), wall collapse, bedrock irregularities, or miscellaneous stone accumulations. Although possible "M" patterns, which typically result from running a linear array of electrodes perpendicularly to a wall (Clark, 1970: 704-705) were noted (e.g., Grid 9: X8-9.5, Y30-33; Grid 13: X19.5 5-21, Y5-9), there was no consistent overall pattern. Isolated highs of various areal dimensions are interspersed with many low anomalies of the same type in all the grids. However, on the assumption of a simplified two-phase system, measurements at the same midpoint (Grid 16: X10, Y38) using various probe separations fit best a theoretical model of a thin (*ca.* 0.05 m.) soil layer directly over bedrock.

Resistivity results from Grids 12, 17, and 18 (Fig. 12: 1-3) inside Rujm al-Henu (E) suggested that there were no additional crosswalls than those visible on the surface. High and low anomalies again appear as irregular, diffuse regions. Some highs spread out from corners and along walls (Grid 17: X0-1, YO-8; XO.5-6, Y9-14; Grid 18: X22. 5-26, YO-6), perhaps resulting from rock tumbles, but other highs meander in the centres of rooms (e.g., Grid 12: X1-4, YO-6) in an unexplainable fashion or appear to correspond to secondary walls (Grid 18: X23-25, Y10-11).

Test Soundings at Rujm al-Ḥenu East

Excavation Strategy

A grid system was employed at the eastern building of Rujm al-Ḥenu (designated Field III during the excavation phase) that took advantage of its rectangular layout (Fig. 2). An arbitrary base point was established near the northwestern corner of the building, and a datum line laid out parallel to its exterior western wall. An array of grid points, which were arranged perpendicularly to the datum line and spaced five, six, or eight metres apart, then defined logical excavation units that were not intersected by crosscutting walls and allowed for one metre baulks. The numbering of the squares runs from north to south, and can be indefinitely extended eastward. By adding grid quadrants to the northeast, northwest, and the southwest, starting from the same base point which would now be at the midpoint of the expanded array, all areas surrounding the building could be investigated using a consistent grid system (cf. Albright, 1938: 8-9, pl.


Y
-50 -49 -48 -47 -46 -45 -44 -43 -42 -41 -40 -39 -38 -37 -36 -35 -34 -33 -32 -31 -30 -29 -28 -27 -26 -25 -24 -23 -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 -0
50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
X
N
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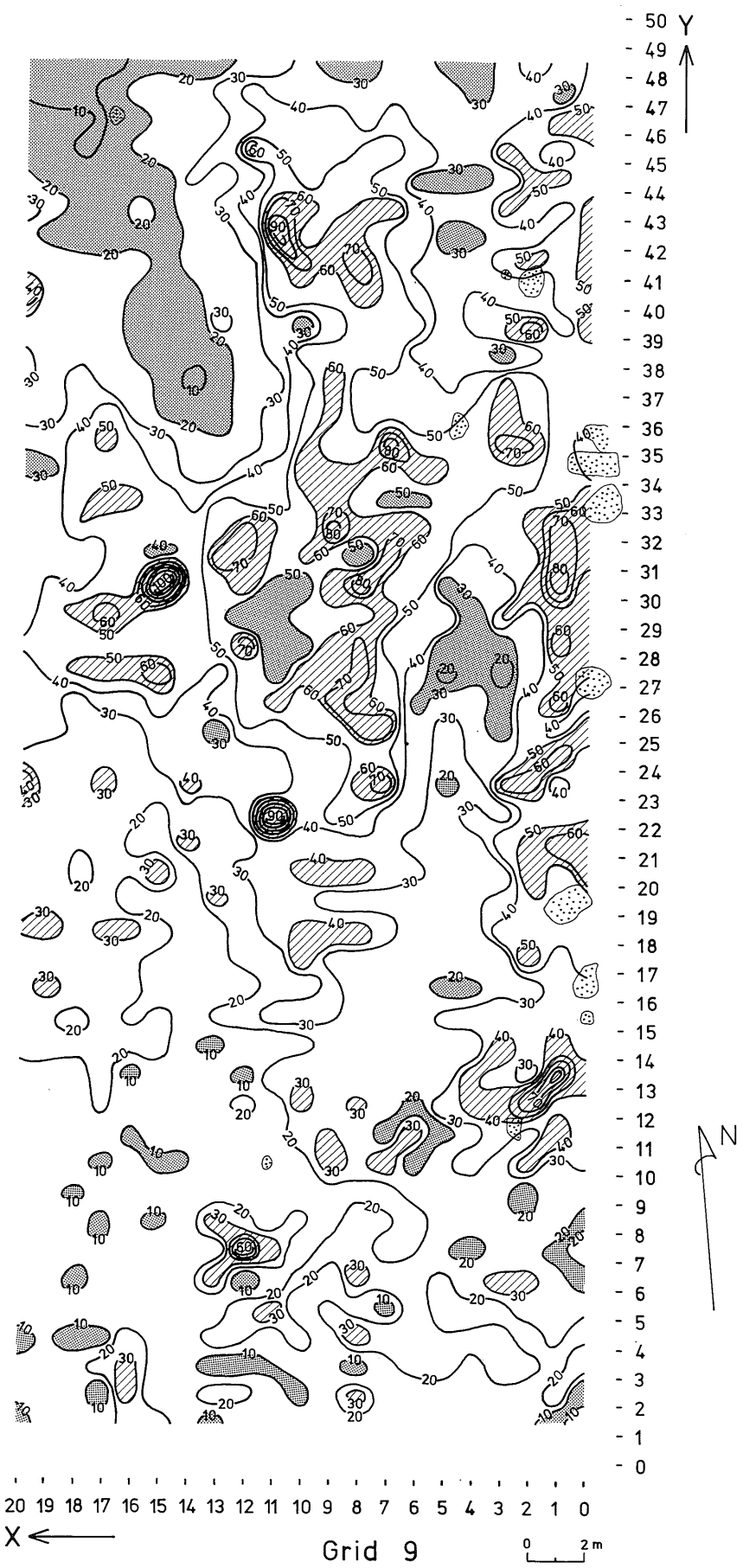
0 2 m

Fig. 8: Grid 3


Y
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X
Grid 9
0 2 m

Fig. 9: Grid 9

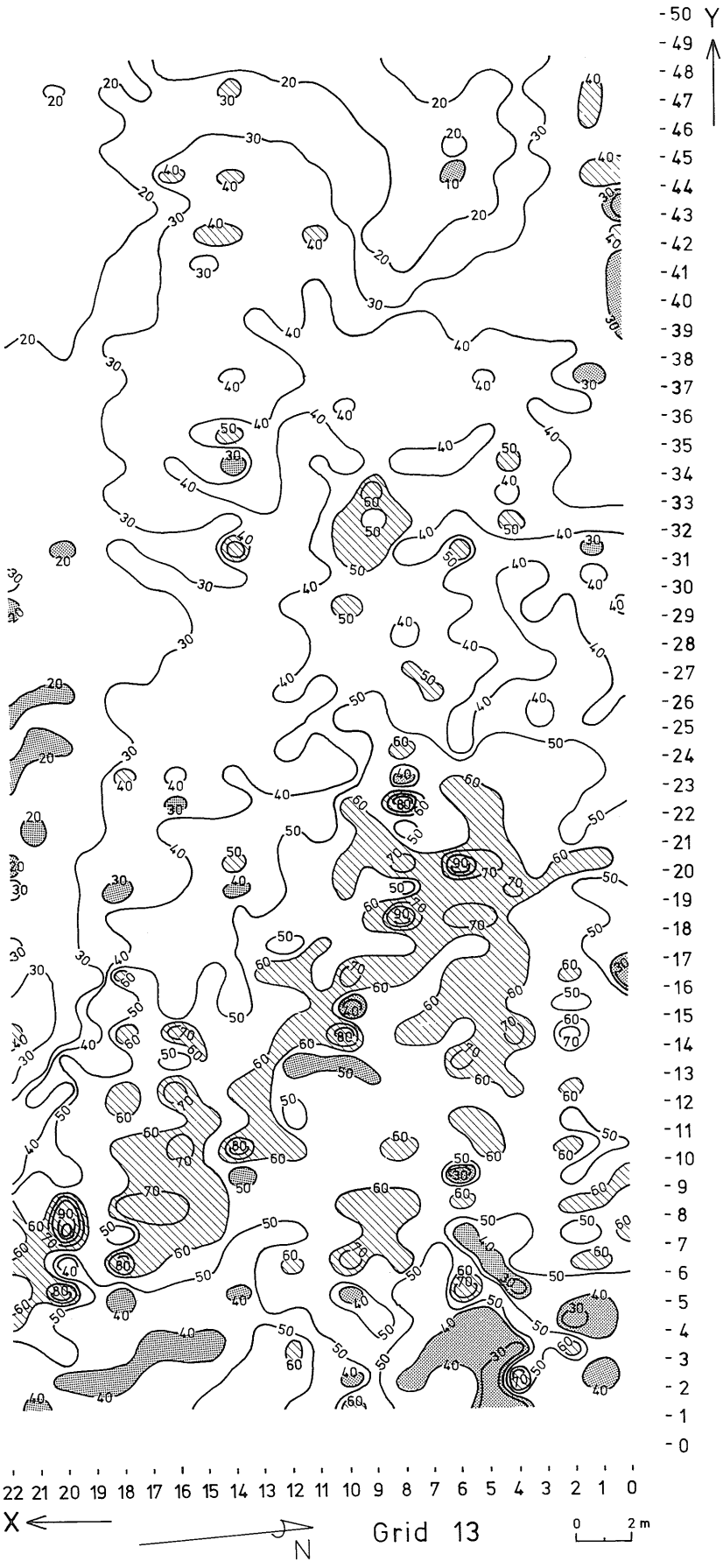


Fig. 10: Grid 13

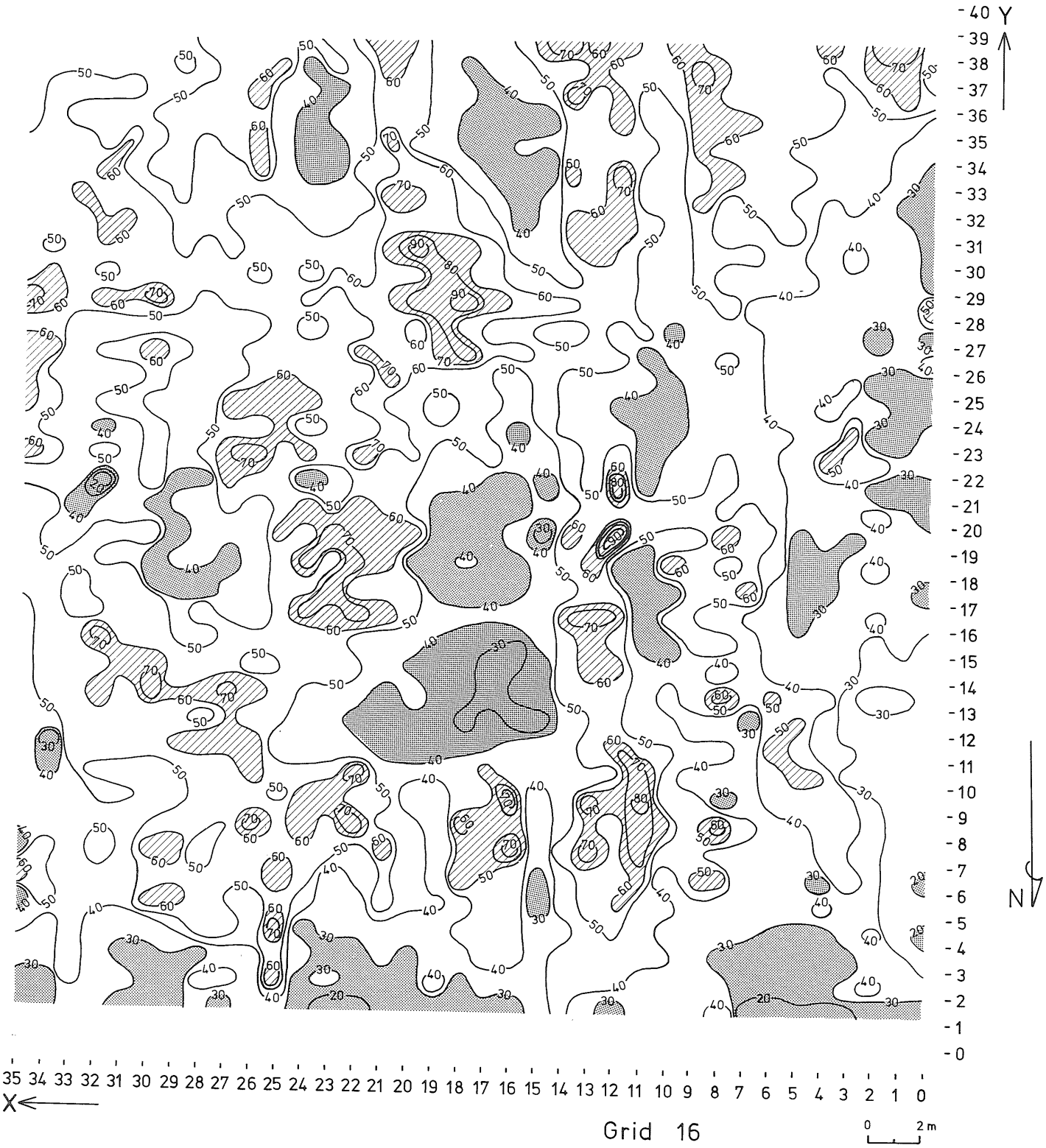
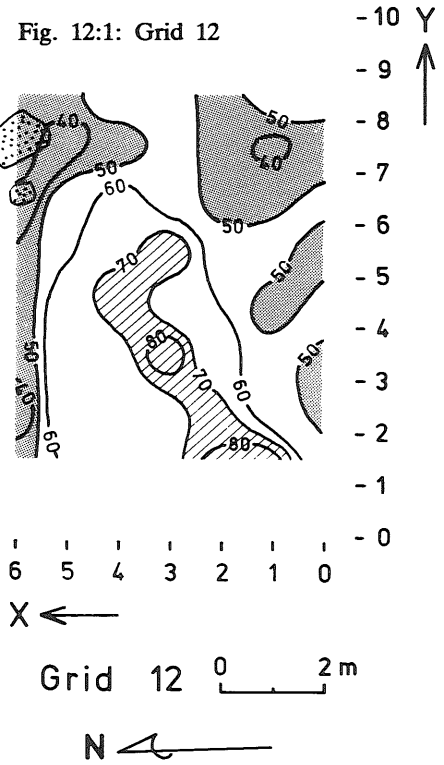


Fig. 11: Grid 16

Fig. 12:1: Grid 12



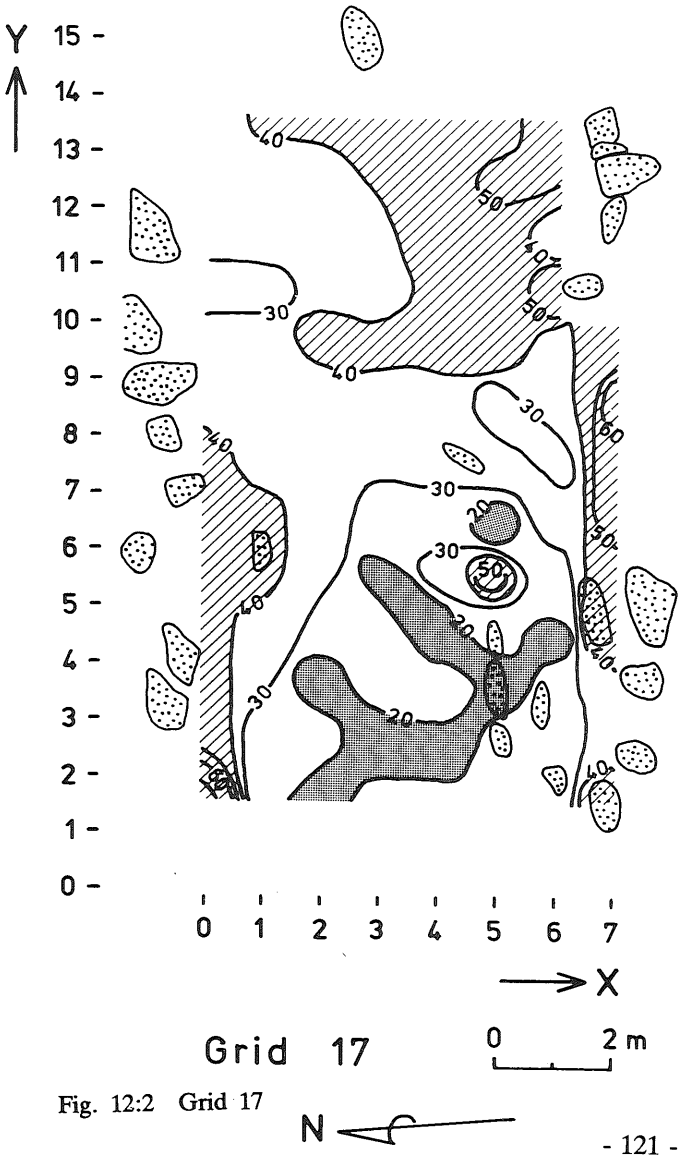
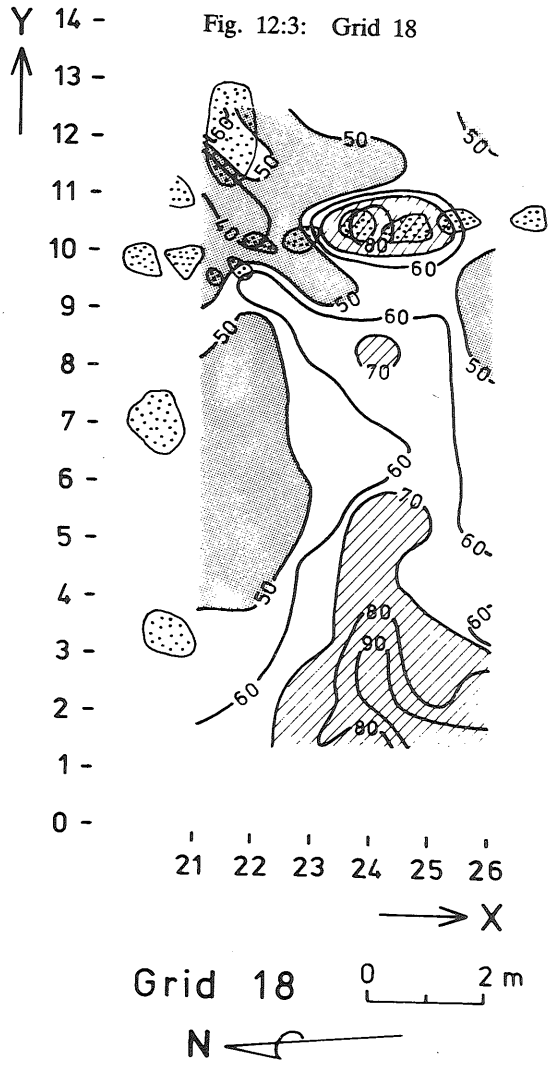


Fig. 12:2 Grid 17

Fig. 12:3: Grid 18



47).

The main objectives of the soundings were: 1) to date the building's construction and any occupational phases, 2) to determine the significance and relationship of surface interior and exterior walls, and 3) to test the resistivity data, particularly where there was the likelihood of a crosswall or outlying structure.

Test soundings in 1980 were limited to five squares, covering an area of 53 m² of which 43 m² were on the interior of the building (total area of *ca.* 750 m²). Two 1.00 x 5.00 m. trial soundings (Areas III.0 and III.1), perpendicular to the western wall and separated by 8.50 m., were intended to reveal foundation trenches and buried architecture between the two Rujm al- Ḥenu buildings. Excavation units inside the eastern building were located in different rooms and were variously sized (III.11—1.00 x 4.50 m.; III.23—4.00 x 4.00 m.; III.32—4.50 x 5.00 m.), but shared similar objectives: clarification of the interior room layout by exposing crosswalls, and the investigation of occupational phasing in three sectors of the building.

Stratigraphy and Finds

Before the start of excavation, a thick cover of vegetation had to be burned off to expose a silty, reddish gray (Munsell 5YR 5/2) topsoil (Loci III.0.1-2 = III.1.1, 3 = III.11.1,2,4 = III.23.1-2 = III.32.1-2), *ca.* 0.15 m. in depth. It contained large quantities of modern debris (plastic, aluminum foil, glass, etc.) and vegetal matter, intermixed with pebbles and sherds (total of 601; 2LB, 1 LB/Ir, 47 Ir II, 30 Ir IIC/P, 8/LR, 42 R/BYz, 18 EByz, 6 Byz, 3 Mam, and 18 Mod diagnostics).

Small objects[1] recovered from the topsoil included a glass bead (Fig. 13: 1) and a probable pipe bowl fragment (Fig. 13: 2; Pl. XXI, 2). The later is unparalleled, and may be of quite recent date. The bead has a long pear shape (Beck, 1973: type I.D.1.g), and an impressed thread decoration, which is common in the Roman period.

Just beneath the topsoil, a reddish yellow (Munsell 5YR 6/6) subsoil (Loci III.0.5 = III.1.2 = III.11.3 = III.23.4), similar to that at the western building (below) but more clayey, was usually encountered. Occasionaly, one or more other layers might intervene or displace it all together.

In Area III.32, a very fine, dark gray ashy layer (Locus III.32.2), 0.05-0.10 m. deep, extended across the entire square (Fig. 5). It appeared to be associated with a crude fireplace (Locus III.32.6-7) of four cobbles, which was set into a space between two boulders of the eastern interior wall of the central room (Locus III.32.4) and was filled with a pile of burned brush. Plastic and glass fragments attested to its recent origin, despite the presence of exclusively premodern sherds (total of 90; 5 Byz and 5 R/Byz diagnostics).

An ashy layer (Locus III.1.4) was also excavated in the eastern third of Area III.1 (Fig. 5) where a *ca.* 0.30 m. deep accumulation of fine ash, four blackened cobbles (fireplace?), and ten sherds (1 Ir I, 7 Ir II, and 2 LR diagnostics) rested against the exterior wall (Locus III.1.9). Beneath this, two thin (*ca.* 0.10 m.) layers may represent early stages in subsoil formation: Locus III.1.5, a brown silty soil with decomposed limestone nodules, and Locus III.1.6, a well-compacted, yellowish red silty soil with numerous clay chunks. Plastic, glass, and aluminum fragments date their deposition/formation to the post- war period; 15 sherds (9 Ir II, 2 LR, and 1 Byz diagnostics) were recovered. Loci III.1.5 and III.1.6 abruptly terminate to the west where the plow zone infringes on the excavation area (Fig.5). Here there were no intervening layers between the topsoil and the subsoil (Locus III.1.2).

The subsoil averaged 0.30 m. in depth outside the building, whereas it was between 0.10 and 0.15 m. thick on the interior. Disturbance by plowing very close to the exterior walls probably

[1] In the legends to the small object and stone artefacts (Pls. XXV,2-XXVII,1; Figs. 13-14), musem provenience with accession number is denoted by A.-Jordanian National Museum, Amman, and P. University Museum, University of Pennsylvania, Philadelphia, PA. Other abbreviations include: I=interior, E=exterior, L=length, W= width, H= height, and D=diameter.

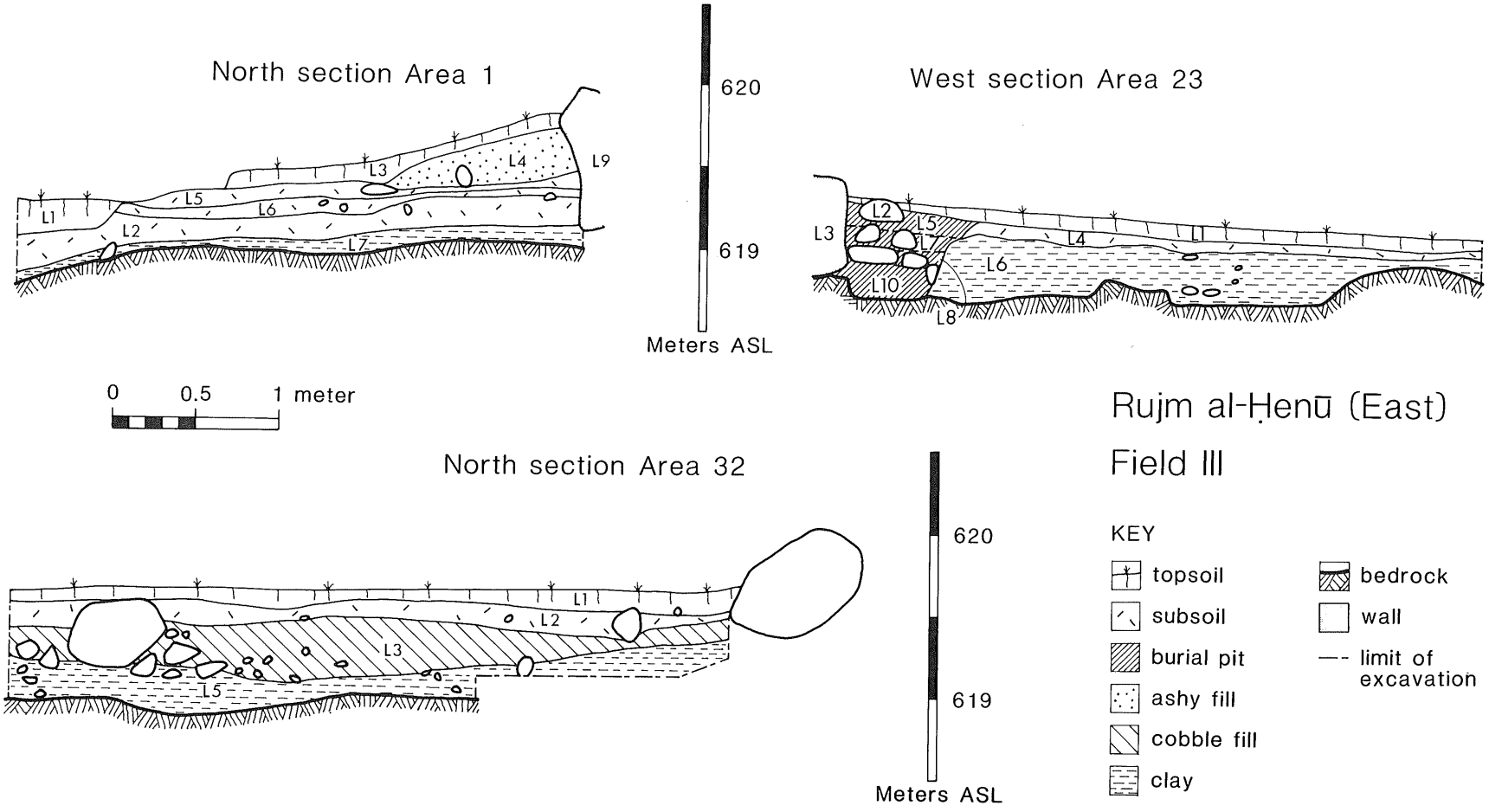


Fig. 5: Rujm al-Ḥenu (E) sections

accounts for the disparity. Consequently, modern debris (leather and pottery) was found in the subsoil layers (Loci III. 0.5 and III. 1.2) of Areas III.0 and III.1, together with 109 sherds (4 possible LB, 30 Ir II, 2 Ir IIC/P, 3 R/Byz, and 7 Byz diagnostics).

Natural sedimentation processes contribute to the formation of dense clay layers above bedrock (Limbrey, 1975: 79-80, 205). Where there is frequent plowing, however, this layer is either destroyed or not allowed to reform. This was observed on the western side of Area III.0; approaching the exterior wall, a *ca.* 0.10 m. thick, dark brown clay layer with cobbles (Locus III.0.6) was encountered. Forty-six sherds (3 possible LB, 29 Ir II, and 2 Byz diagnostics) from this locus may have been originally churned up by plowing, and then incorporated into a reconsolidated clay layer. The latter overlay modern Locus III.0.7, a half metre diametre hollow in the bedrock (Pl. XIII, 2) which yielded pieces of modern asbestos sheeting.

It is perhaps significant that the yellowish red clay layer (Locus III.1.7) in Area III.1 was completely sterile. While Locus III.0.6 ran up to the exterior wall (Locus III. 0.3), Locus III.1.7 appeared to run under this wall (Locus III.1.9) and a possible east-west wall (Locus III.1.8) which was exposed in the southern baulk (Fig. 5; Pl. XIV, 1). The latter wall, unless merely rockfall, is comprised of a single course of four small boulders. It abuts the exterior wall, and is in line with the northern interior wall of the central room.

The thinner subsoil layers inside the building (Loci III.11.3 = III.23.4 = III.32.3) produced 215 sherds (2 possible LB, 8 LB/Ir, 5 Ir II, 17 Ir IIC/P, 10 R/Byz,12 EByz, 4 Umay, and 2 Mam diagnostics). The absence of modern sherds and debris is noteworthy, since it suggests a longer undisturbed period which would account for a better-developed soil profile inside the building. In Area III.11, in particular, a very hard-packed, yellowish brown clay layer (Loci III.11.5-7), over 0.60 m. thick, had apparently formed at the expense of subsoil layer thickness. It probably fills a depression in the bedrock, which is closer to the surface in the other excavated areas. Interspersed throughout the dense clay, except in the final 0.10 m. cut above bedrock (Locus III.11.7), were 281 sherds (19 Ir II, 13 Ir IIC/P, 18 R/ Byz, and 1 Mam diagnostics). A looser, yellowish red clay (Locus III.23.6), *ca.* 0.10-0.50 m. thick, covered bedrock in Area III.23 (Fig.5), which yielded 532 sherds (29 Ir II, 29 Ir IIC/P, 15 R/ Byz, and 1 Byz diagnostics).

Area III.32 had a comparable yellowish brown clay layer (Loci III.32.5,8), which formed the matrix for piles of cobbles concentrated on the periphery and thinning out toward the center of the square (Pl. XVI, 1; Fig. 5). Again, only premodern sherds were recovered from this layer (total of 1022; 45 Ir II, 66 Ir IIC/P, 30 R/Byz and 2 Byz diagnostics), along with a basalt bowl fragment. Locus III.32.5 appears to be the foundation for a subsidiary wall (Locus III.32.9) in the southern baulk (Pl. XVI, 2). This wall does not abut with the exterior wall (Locus III.32.10), and may curve south to form an arc-shaped enclosure, comparable to two better-defined examples in the southwestern corners of the central and southern rooms. Only a thin line of clay runs under the exterior wall. A cobble build-up, possibly separate form Locus III.32.5, was observed under the interior eastern wall of the central room (Locus III.32.4).

The subsoil (Locus III.23.4) and clay (Locus III.23.6) layers in Area III.23 were cut by a pit (Loci III.23.5, 7-10) along the southern end of the square (Fig. 5), adjacent to the interior wall (Locus III. 23.3). Here, a pile of small boulders (*ca.* 0.20-0.50 m. long) and cobbles (Locus III.23.2) emerged, which extended out from the wall 0.75 to 0.90 m. (Pl. 7). Between the stones was a yellowish red, clayey soil (Locus III. 23.5) with patches of ash, which included 16 sherds (1 possible LB, 1 Ir IIC/P, and 1 EByz diagnostics).

When one of the stones on the west was removed, the partial remains of an articulated neonate were exposed (Pl. XV, 1), only 0.20-0.25 m. below the surface. With its head to the southwest, the

skeleton was poorly preserved and lacked lower limbs. It lay on its back in a matrix of brownish gray, clayey soil (Locus IH.23.7), about 0.10 m. thick, which constituted the uppermost fill of the pit and produced a total of 59 sherds (4 Ir II, 1 Byz, and 1 Umay diagnostics). Another thin (*ca.* 0.10 m.) layer (Locus III.23.8) followed, which was similar in colour and texture to Locus III.23.5, and yielded 45 sherds (2 Ir II and 1 Umay diagnostics). Again, a neonate (Locus III.23.9), almost completely intact but in extremely fragile condition, had been buried in this layer, about 1.50 m. east of the previous burial. The body was semi-flexed, lying on its right side, head to the west, and face to the south. Several non-descript Iron Age body sherds were closeby.

Below Locus III.23.8 in an area defined by two small boulders on the west and interior wall Locus III.23.3, a fully articulated adult male burial (Locus III.23.10) was discovered in a bedrock hollow (Pl. XV, 2; Fig. 5), approximately 0.50 m. below the surface. The body was fully extended on its right side, head to the west, and face to the south. Since the cranium was in the western baulk, the area was enlarged, in order to excavate the complete skeleton. The bedrock concavity, the lowest portion of the burial pit, undercuts wall Locus III.23.3, but, since the pit was dug from the subsoil level, it probably does not predate the wall. A total of 57 sherds (5 Ir II and 3 Ir IIC/P diagnostics) and a patinated glass fragment were recovered from the soil matrix of the grave.

Little need be added to the survey description of walls and architectural layout. Only one or two courses of single line walls were preserved in the excavated area.

According to the preliminary faunal analysis, several species of terrestrial mollusks and mammals (primarily sheep/goat, some donkey) were randomly distributed in the topsoil, subsoil, and clay layers.

Interpretation

The siting of Rujm al-Ḥenu (E) was partly determined by an open area of exposed bedrock. Natural soil and clay may have filled hollows in the bedrock (Loci III.1.7, III.11.7) or was brought in intentionally to create a level platform. Clay accumulation over bedrock occurs naturally, and, except where it had been later disturbed by plowing (Loci III.0.6-7) or pitting and dumping operations (Loci III.23.6, III.32.5,8), it was sterile. The eastern building's location on bedrock was largely unanticipated, because it is now surrounded by rich agricultural land and the neatest outcropping of bedrock is west of Rujm al-Ḥenu (W).

Like the western building (below), the main exterior and interior walls of Rujm al-Ḥenu (E) were founded on bedrock and/or the built-up clay layer, sometimes consolidated with cobbles (Locus III.1.7. and beneath wall Locus III.32.4.) Secondary walls (Locus III.1.9 and III.32.9) of smaller boulders (less than a metre long) were also built over cobble fills, whether purposely or accidentally. Wall Locus III.1.9 may be a room addition or the border for a pathway between the eastern and western buildings (the latter occur at Hirbet Mudmar).

Further similarities with the western building end here. Rather than the intact statigraphic sequence (foundation, occupation floor, destruction debris) recovered there, efforts to date the eastern building's construction and period(s) of occupation were largely frustrated by later disturbance. Although trial soundings were distributed in various sectors inside and outside the building and covered a larger relative area than for Rujm al-Henu (W), only mixed fills, *ca.* 0.20-0.65 m. deep, were found directly over bedrock and/or clay deposits. Although Iron II C/P pottery predominated (see the article by Vincent Clark), it was always mixed with Roman, Byzantine, and occasionally Islamic materials. The lack of stratigraphy, particularly the absence of foundation trenches and floors, meant that absolute dating was out of the question, and only the relative sequence of one secondary wall (Locus III.32.9) could be established.

Nevertheless, excavation results from Rujm al-Ḥenu (E) did provide confirmatory evidence for the survey hypothesis that the eastern building had a different

constructional and occupational history than the western building. While no LB pottery was found in the excavation of the western building, Rujm al-Ḥenu (E) yielded 1 LB, 10 possible LB, and 9 transitional LB/Ir diagnostics, besides the 3 MB/LB sherds from the survey. Additionally, excavation down to bedrock clearly demonstrated that very little remained of the eastern building, which would fit with an earlier construction date and the subsequent clearance of boulders from its upper wall courses for the construction of the western building. Mixed loci, however, are hardly definitive, and may only evidence robbing and dumping activity sometime between the Roman period and the present.

The three burials (two neonates and one adult male), which had been deposited in a pit in Area III.23 (Loci III.23.5, 7-10) that was demarcated and covered by a pile of small boulders and cobbles, had no associated burial goods for dating purposes. The glass fragment and over fifty sherds, belonging exclusively to the Iron II period, cannot provide an assured date for the pit and its contents as a whole, since a Byzantine and an Umayyad sherd came from the topmost layer of the pit fill (Locus III.23.7). The east-west orientation of the bodies, heads to the west and faces to the south (toward Mecca), argues for their deposition sometime during the Islamic period (A.D. 630-1918). The burials must predate the modern period, because local inhabitants, whose ancestors have lived in the region for at least the last hundred years, had no knowledge of these burials and comparable ones at Rujm al-Ḥenu (W) prior to excavation. Both buildings would have been ideal for cemeteries, since they are unsuitable for agriculture but close to human settlement.

Following its use as a cemetery, the eastern building was abandoned for an undetermined period of time. Modern debris is confined to the topsoil, except where plowing and pitting has disturbed soil layers outside the building. Crude fireplaces and piles of burned brush and ash were excavated in Areas III.1 (Locus III.1.4) and III.32 (Locus III.32.4), which had been laid down since 1948.

Interpretation of Resistivity Data

The trial soundings at Rujm al-Ḥenu (E) partly resolved the ambiguity of the resistivity results. In the four areas (III.0, III.1, III.11, and III.23) which overlapped with resistivity grids (total of 20 m²), the correspondence between rises and dips in the bedrock and highs and lows in resistivity, respectively, was evident. Thus, the bedrock hollows in Areas III.11 (Loci III.11.5-7) and III.0 (Locus III.0.7) coincide with lows in Grids 17 (X5, Y3.5) and 9 (X1.5, Y45.5). The possible east-west wall (Locus III.1.7) in Area III.1 may correlate with a high at X3, Y35.5 in Grid 9.

Generalizing these results, which represent less than 0.5% of the total area surveyed with the resistometer, may seem presumptuous without additional test soundings. Still, the results obtained thus far are quite uniform, and bedrock irregularities could well explain the diffuse highs and lows dominating each grid. Occasional small areas of very high resistivity can probably be attributed to isolated outcrops of bedrock. On the west in the area between the two buildings (Grid 9), high anomalies may represent wall lines of room additions, pathway boundaries, or even separate structures.

The combined resistivity and excavation results shed light on the question of whether Rujm al-Ḥenu (E) should be classified as a *Quadratbau* type structure. No additional buried crosswalls, belonging to the main structure, were uncovered where one might expect to find them (e.g., in Area III.23 to delineate a fully centralized room, or in Area III.11 to form two northern rooms). The surface crosswall in Area III.32 is definitely secondary. Thus, it is possible that the original layout completely lacked crosswalls, which would represent a major departure from the classical *Quadratbau* type. On the other hand, there might well be variant architectural traditions of the same general type, especially in the Amman area where "megalithic" construction was common and possibly the primary form of rural settlement. *Qasr* type structures do not adhere to a fixed architectural layout.

Because the occupational and con-

structional history of Rujm al- Ḥenu (E) is still uncertain, its possible isolation from a permanent settlement, according to the nomadic hypothesis, is of less importance. Still, if the above interpretation is correct, the building is isolated on all but the western side where later construction is well attested.

Test Soundings at Rujm al-Ḥenu West

Excavation Strategy

On the western side of the western building (designated Field IV), three areas (IV.1-3) were laid out (Fig. 3). Area IV.1, 5.00 x 4.00 m. in area, was set up in the corner formed by the outer southern face of the circular tower and the interior face of the enclosure wall. Area IV.2 was a 4.00 x 2.00 m. trench aligned perpendicularly to the outer face of the western enclosure wall and separated from Area IV.1 by a 1.00 m. baulk. Another 1.00 m. baulk divided Areas IV.1 and IV.3, the latter a 5.00 x 4.00 m. square located south of Area IV.1 along the interior of the western enclosure wall.

Apart from testing resistivity data, the same basic objectives were in view as at the eastern structure: 1) the period(s) of construction and use of the building, 2) the nature of the exterior surface walls, particularly the structural and temporal relationship between the circular tower and the enclosure wall, and 3) the internal layout of rooms and other installations, whether original or secondary. Although bedrock was reached in only a 20 m² area, representing about 1% of the total area of the building (*ca.* 1900 m²), the first objective was achieved and the other two partially resolved.

Stratigraphy and Finds

The appearance of Rujm al-Ḥenu (W) prior to excavation corresponded to that of the eastern building. Beneath a thick growth of vegetation, which had to be burned off, a silty, dark gray topsoil (Loci IV.1.1 = IV.2.1-IV.3.1) was exposed. It was intermixed throughout with variously sized pebbles, cobbles, and boulders, modern debris, vegetal matter, and 617 sherds (48 Ir IIC/P, 34 Ir II, 5 ER, 5 LR, 1 R/Byz, 2 Byz, 1 Mam, and 11 Mod diagnostics). The topsoil depth was generally 0.20-0.30 m. except in the vicinity of the enclosure wall (Locus IV.1.2) and the circular tower (Locus IV.1.3) where it was a maximum of 0.10 m.

Small finds from the topsoil included a glass bracelet fragment (Fig. 13:3), a probable pipe bowl (Pl. XXIV, 1; Fig. 13:7), a stone ring fragment (Pl. XXVI, 2) and a sling stone or weight (Pl. XXVI, 1) from Locus IV.1.1, and a sea urchin fossil (Pl. XXV, 1; Fig. 13:8) from Locus IV.3.1. Unpublished examples of the latter have also been found at Umm el-Biyara, Buseirah, and Timna (D. S. Reese, personal communications, 1981 and 1982).

Immediately below the topsoil, a massive rock tumble (Loci IV.1.4-6, 9, 11, 13, 14, 16, IV.2.3-4 = IV.3.2,4,7), 1.50-1.90 m. deep, was encountered (Figs. 6-7). A sandier variety of the topsoil, which had patches of a granular, reddish yellow (Munsell 5YR 6/6) soil, filled the spaces between rocks in the upper part of the rockfall (Loci IV.1. 4-6 = IV. 2.3-4 IV.3.2). The stones ranged in size from pebbles to boulders over a metre in length. Out of a total of 1494 sherds in the upper rockfall, there were 258 Ir IIC/P, 28 LR, 1 R/Byz, and 3 Mod diagnostics.

A variety of small artefacts came from the upper rockfall. A flint arrowhead (Fig. 13:10), half of a limestone "cosmetic" dish (Pl. XXII, 2; Fig. 14:2) a basalt tripod (?) table fragment (Pl. XXVII, 1), a pestle (Pl. XXV, 2), and a possible carved pipe bowl (Pl. XXIV, 2; Fig 14:4), in addition to thick plaster fragments, were found in Locus IV.1.4 along the outer face of the circular tower (Locus IV.1.3). Locus IV.3.2 produced a badly damaged limestone "cosmetic" dish (Pl. XXIII, 1; Fig. 14:1) a carnelian drop pendant (Pl. XXII, 1; Fig: 13:4) a possible potter's tool (Fig. 14:3) a cowrie shell (Fig: 13:5) with its dorsal side shaved off,[2] a ceramic male

[2] This writer would like to express his gratitude to D. S. Reese for species identification of the cowrie shell.

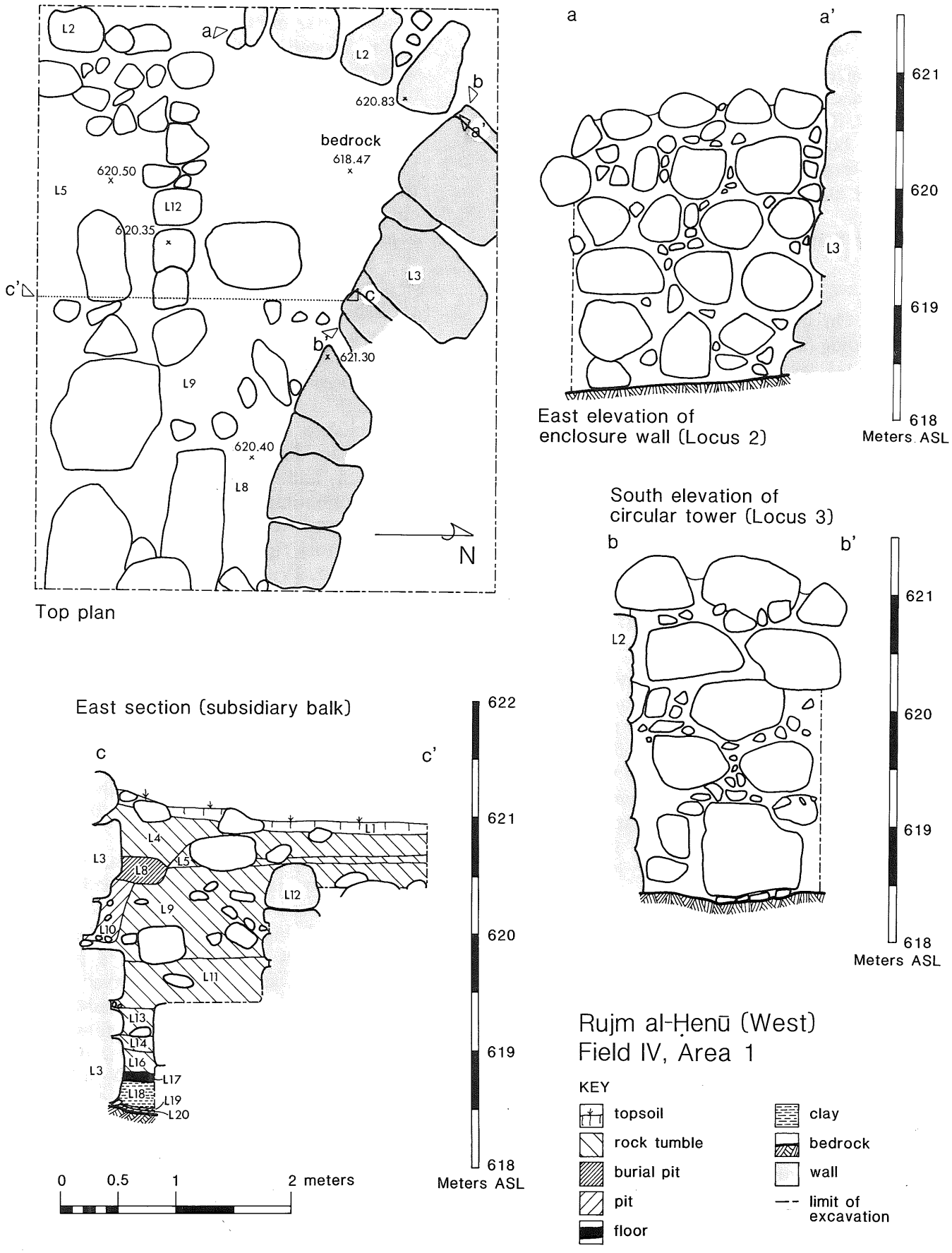


Fig. 6: Rujm al-Ḥenu (W) top plan of Area IV.1 with sections and elevations.

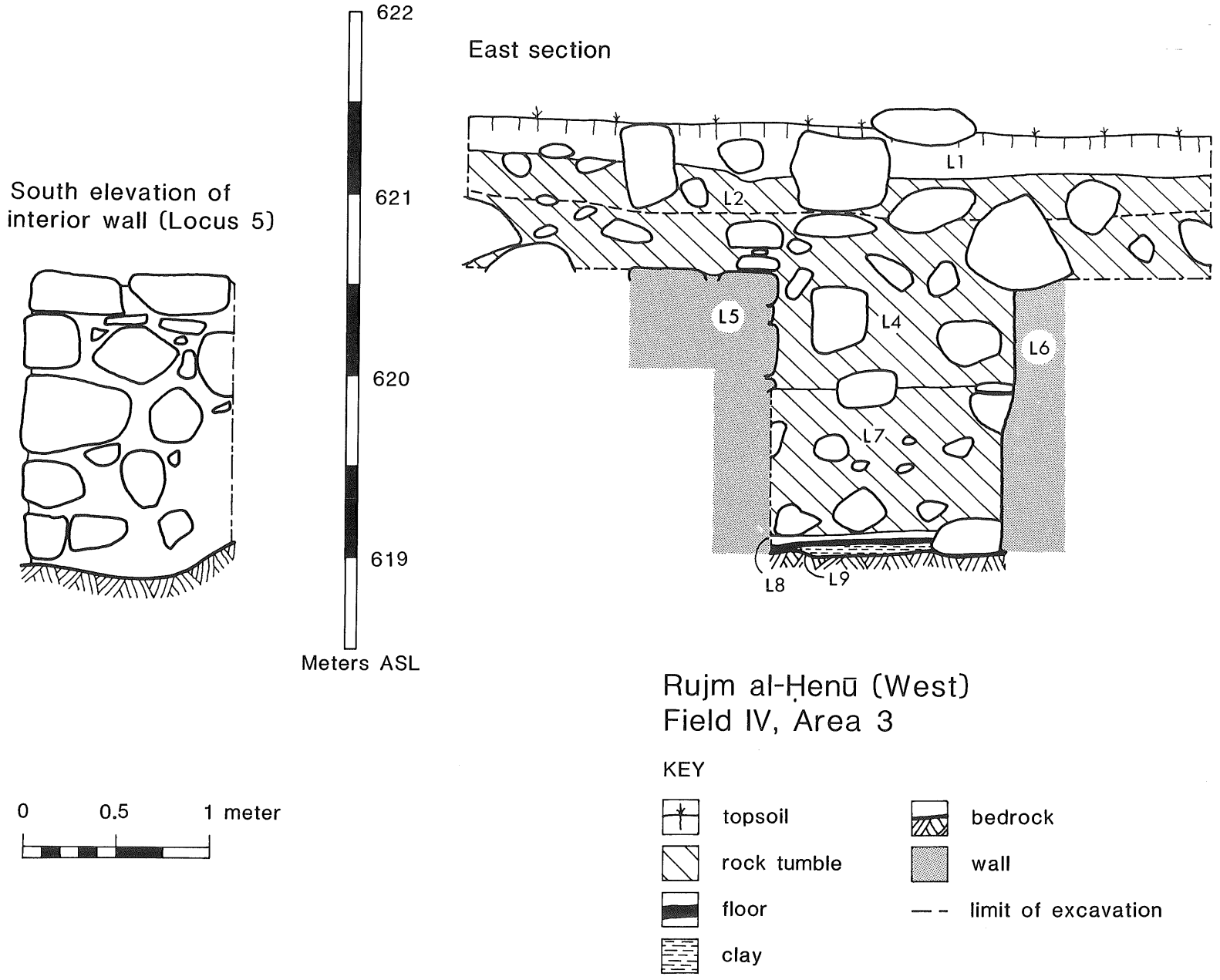


Fig. 7: Rujm al-Henu (W), Area IV.3 section and elevation

	Object	*Field No.*	*Basket*	*Locus*	*Description*
Fig. 13:1	Bead	III.1	III.0.2	III.0.1	Beck type I.D.1.g (circular long pear-shape) IV. Impressed reddish orange threads on a blue glass matrix. A.
Fig. 13:2	Pipe Bowl? Fragment	III.2	III.0.1	Surface	E impressed decoration. I unblackened. Fired clay (Munsell 10YR 6/2 [light brownish gray]). P. 81-6-204.
	Glass Fragment	III.3	III.23.25	III.23.10	Patinated; transparent and somewhat bubbly matrix. Light green. P. 81-6-205.
	Stone Bowl Fragment	III.4	III.32.13	III.32.5	Internally bevelled rim. D: 20 cm.; H: 4 cm. Basalt. P. 81-6-206.
Fig. 13:3	Bracelet Fragment	IV.2	IV.1.1.	IV.1.1	Blue glass. P. 81-6-207.
Fig. 13:4	Pendant	IV.14	IV.3.7	IV.3.2	McGovern type VI.F.2 (elongated drop). Carnelian. P. 81-6-215.
Fig. 13:5	Cowrie Shell	IV.18	IV.3.8	IV.3.2	Back shaved off. *Cypraea (Monetaria) moneta* (Red Sea species). p. 81-6-209.
Fig. 13:6	Nail?	IV.11	IV.3.5	IV.3.2	Flattened "head," narrowing to point at tip L: 3.1 cm.; W: 1.4 cm. Iron. P. 81-6-214.
Fig. 13:7	Pipe Bowl? Fragment	IV.3	IV.1.2	IV.1.1	E incised decoration. I unblackened. Fired clay (Munsell 5YR 6/4 [light reddish brown with hand-burnished slip (2.5YR 3/6 dark red]). P. 81-6-216.
Fig. 13:8	Fossil	IV.10	IV.3.3	IV.3.1	Sea urchin (Echinoidea). Perforated. P. 81-6-211.
Fig. 13:9	Male Figurine Fragment	IV.17	IV.3.8	IV.3.2	Only torso and upper legs preserved; genitals, buttocks, and belt(?) indicated. Fired clay (Munsell 10R 6/6 [(light red]). A.
Fig. 13:10	Arrowhead	IV.23	IV.1.7	IV.1.4	Pre-Pottery Neolithic B type. Flint. P. 81-6-252.
Fig. 14:1	"Cosmetic" Palette	IV.13	IV.3.7	IV.3.2	Probably undecorated except for E groove below rim. Limestone. P. 81-6-208.
Fig. 14:2	"Cosmetic" Palette Fragment	IV.8	IV.1.7	IV.1.4	Limestone. A.
Fig. 14:3	Potter's Tool?	IV.16	IV.3.7	IV.3.2	Probably reused potsherd. P. 81-6-218
Fig. 14:4	Pipe?	IV.7	IV.1.7	IV.1.4	Numerous E scratches and incisions probably from manufacture. E blackened; I unblackened. Bone (femur). P. 81-6-217.
	Coin	IV.9	IV.3.4	IV.3.2	After restoration, only slight indications of a head on obverse; reverse completely worn away. D: 2.2 cm.; T: 0.3 cm. Copper or bronze. P. 81-6-251.

Iron Strip	IV.19b	IV.3.15	IV.3.5	Corrosion obscures any detail. L: 4.5 cm.; W: 2 cm.; T: 0.4 cm. P. 81-6-252.

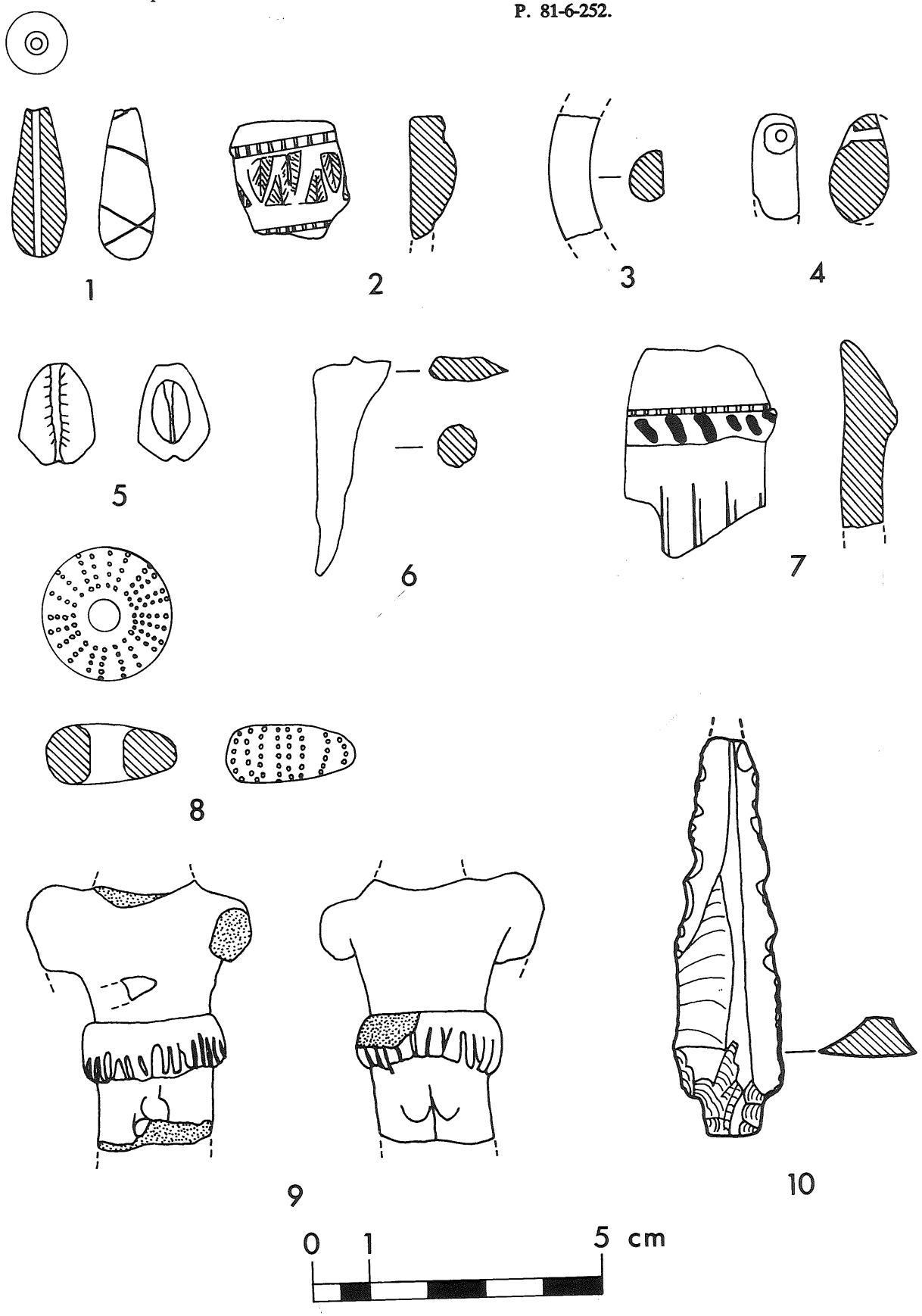


Fig. 13

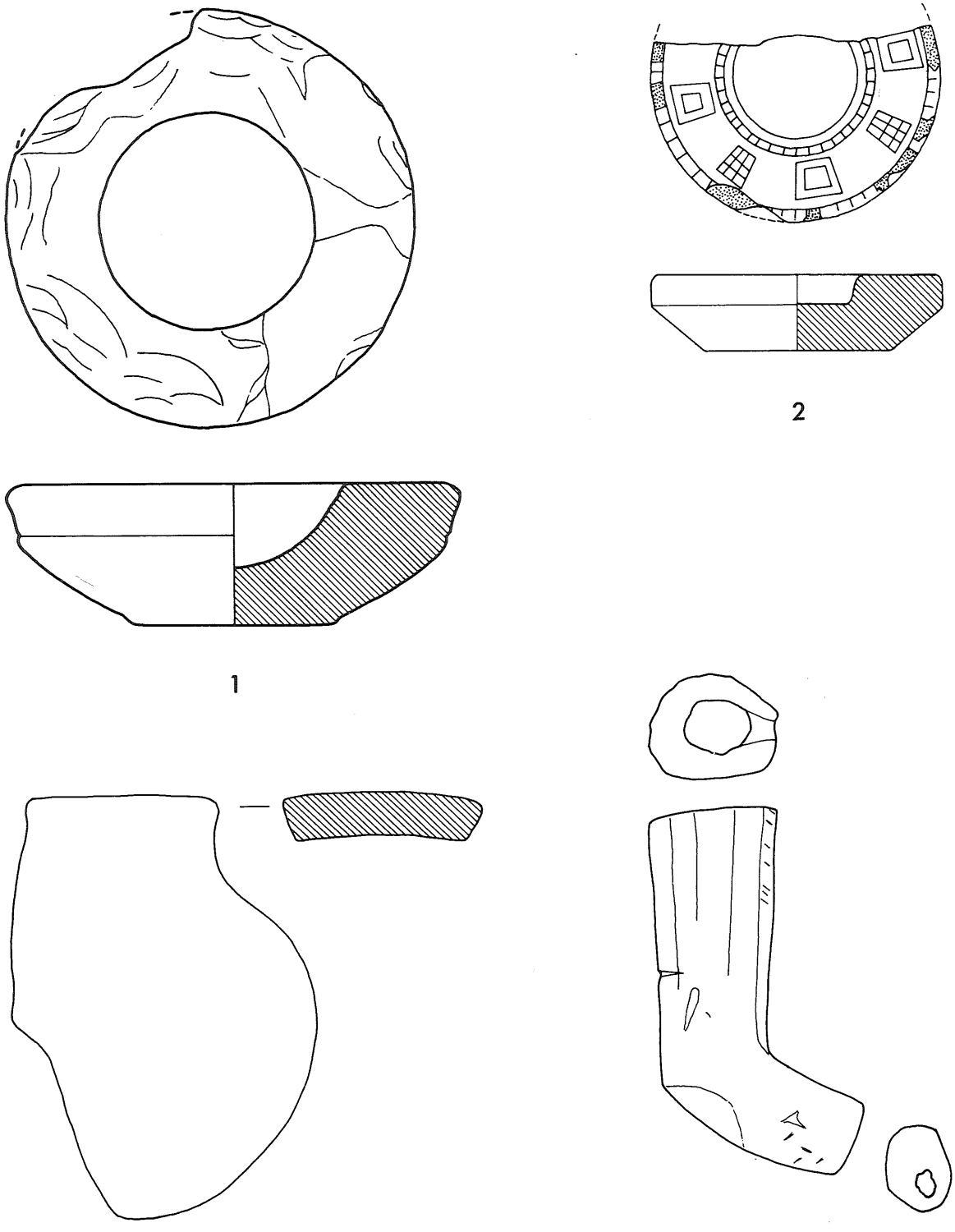


Fig. 14

figurine fragment (Pl. XXIII, 2; Fig. 13:9), a probable nail (Fig. 13:6) a completely worn/corroded coin, a basalt grinding stone, and basalt quern and table fragments.

The majority of these finds are either very non-specific cultural/chronological indicators or unparalleled. Belonging to the former category, together with the miscellaneous stone pieces, iron nail, potter's tool (?), and coin, is the pendant, which is damaged on one side. It apparently belongs to the elongated drop type (VI.F. 2—McGovern, 1980b: 224-28), which occurs in a greater variety of materials (semi-precious stones, gold, faience, and bone) than any other Palestinian pendant type, and has a long time span and a wide geographical distribution. Aldred (1971: 144) traces the origins of Egyptian bead jewelry in its multifarious forms to the simple drop pendant, strung on a necklace, and this simple geometric shape continues to be popular throughout the Middle East today. Similarly the worked cowerie shell (a Red Sea import) was a very common jewelry element, usually on necklaces, in antiquity, and is still esteemed by modern Bedouin women. By contrast, no parallels could be found for the pipe bowls(?) and the male figurine.

The mixed nature of the upper rockfall was substantiated by the more closely dated small artefacts. The flint arrowhead is a standard Pre-pottery Neolithic B type. The two limestone "cosmetic" dishes belong to a class of such artefacts, which occur in various materials (limestone, basalt, sandstone, calcite, glass, faience, etc.) and are generally Iron II in date (Thompson, 1971). The badly damaged example (Pl. XXIII, 1; Fig. 14:1) appears to have a plain rim (Thompson's first type) in the few remaining areas that are unmarred; it has an exterior groove and ridge about a third of the way down the side, and a slight disc base. The second example, made of the same fine-grained limestone as the first example, is much finer in other respects. It has a unique rim decoration of "rope" designs which enclose a central band of alternating "checkerboards" and concentric trapezoids (cf. parallels cited under Thompson's third type). The palette is about half the size of the damaged specimen, sharply carinated, and has a flat base. Very likely, the two palettes derive from the Iron II C/P occupational phase of the western building. If they belonged to upper class Ammonite society (Thompson, 1971: 70), then Rujm al-Ḥenu (W) would seem to have been more than a border post.

During the removal of Locus IV. 1.4, a primary human burial was uncovered *ca.* 0.65-0.85 m. below the surface, lying in a burial pit (Locus IV.1.8) between wall Locus IV.1.3 and a large boulder on the east side of Area IV.1 (Pl. XVIII, 1). In a filling of pale reddish brown, silty soil, a fully extended and articulated adult body had been laid in a supine position, oriented east-west, head to the west and face to the south. Unexplainably, the lower portions of the right radius and ulna as well as the right hand were missing. The left femur near the hipjoint had also been broken and had not fully mended in antiquity. Because the lower legs and feet extended into the eastern baulk, these were left unexcavated.

In the process of clearing this burial, a skull, arm bones, ribs, vertebrae, and pelvis, in apparent disarticulation, were exposed on the western end of the same burial pit. These remains belonged to a second, stratigraphically earlier adult burial. The head was again oriented west, facing south, and the articulated left arm lay across the top of the head. Other bones in articulation included seven vertebrae attached to the skull, the left and right clavicles, scapulae, and arms, the bones of the right leg with the right hand lying beneath the right femur, and the left tibia and fibula. The lower body had probably been pushed aside to accommodate the upper burial in the pit, and its considerable articulation may imply that it was still partially carnated when this occurred. Although 64 Iron Age sherds, including 14 Iron II C/P diagnostics, were found in the pit, the location and orientation of the skeletons support an Islamic date. No burial goods accompanied the bodies.

At the same level and to the west,

another pit (Locus IV.1.7) was discovered in the corner formed by the enclosure wall (Locus IV.1.2) and the circular tower wall (Locus IV.1.3). Instead of a burial, it contained only a reddish brown soil interspersed with cobbles and 77 sherds (12 Ir IIC/P and 4 LR diagnostics).

Below Locus IV.1.7, yet another pit (Locus IV.1.10), 0.50 m. deep and quite narrow (*ca.* 0.30 m.), ran alongside the circular tower (Fig. 6). Several plaster fragments and 39 sherds (8 Ir IIC/P, 1 LR, and 1 Byz diagnostics) were randomly scattered in the dark gray soil matrix.

A completely articulated sub-adult was excavated in the upper rock tumble (Locus IV.3.2) of Area IV.3. The body, 0.10-0.20 m. below the surface, was fully extended on its back east-west, head to the west and face to the south. Only Iron Age body sherds were found in its vicinity.

When the large boulders of the rockfall ouside the structure began emerging in Area IV.2, it was decided to discontinue excavation at a depth of *ca.* 0.50 m., mainly because of lack of manpower. For the same reason, work in Areas IV.1 and IV.3 was restricted to the western halves of these squares at a similar depth. The stratigraphic profiles down to bedrock in Areas IV.1 and IV.3 are virtually identical (Figs. 6-7), and will be discussed here in turn.

While clearing the uppermost layer of the upper rockfall (Locus IV.1.9) in Area IV.1, a single line of boulders comprising an east-west wall (Locus IV.1.12) was discovered along the southern baulk. A 0.70 m. wide doorway, subsequently filled in with stones, existed between this wall and the enclosure wall (Locus IV.1.2). The removal of the remainder of Locus IV.1.9 and the other loci (IV.1.11, 13, 14, 16) of the lower rockfall was then constricted to a *ca.* 1.50 x 2.00 m. area between wall Loci IV.1.2, IV.1.3, and IV.1.12, and a subsidiary eastern baulk.

The five layers (Loci IV. 1.9, 11, 13, 14, 16) which made up the lower rockfall differed primarily in soil texture and color: IV.1.9 (silty, dark gray), IV.1.11 (silty, grayish yellow with clay clumps), IV.1.13 (silty, reddish yellow intermixed with decomposed sandstone and limestone), IV.1.14 (clayey, yellow), and IV.1.16 (silty, reddish yellow with many clay nodules and ash pockets). Otherwise, various sized cobbles and boulders and pure Iron II C/P sherds (total of 990; 105 diagnostics) were randomly distributed throughout the layers.

Along the face of wall Locus IV.1.12, a trench (Locus IV.1.15) was traced, extending 0.30 m. north of the wall and cutting through Loci IV.1.11 and IV.1.13. It was filled with a silty, gray soil, together with 22 Iron II sherds (2 Ir IIC/P diagnostics). Possibly this is a foundation trench associated with a rebuilding of wall Locus IV.1.12, which might explain the three rough boulders of its upper three courses bordering the doorway which sharply contrast with the well-cut ashlars of the lowest two courses.[3] However, Locus IV.1.15 is more likely a pit comparable to Loci IV.1.7 and IV.1.10. Unfinished stones may have been used intentionally (cf. the construction of the circular tower, enclosure, and Locus IV.3.6 walls, below) or the upper courses of wall Locus IV.1.12 may have been exposed to more extensive weathering after the building was abandoned.

Large quantities of smashed pottery vessels, particularly storage jars, first appeared in the lower part of Locus IV.1.14, and were heavily concentrated in Locus IV.1.16 (total of 582 sherds; 32 Ir IIC/P diagnostics). The sherds lay upon or were embedded in a beaten, multicolored (yellow and pink) clay surface (Locus IV.1.17).

The foundational make-up for the clay surface and the walls comprised three differently coloured clay layers: Loci IV.1.18 (*ca.* 0.25 m. thick, brown, intermixed with cobbles, charcoal fragments, and 37 late Iron Age sherds [7 Ir II C/P

[3] Vincent Clark, who supervised work at Rujm al-Ḥenu (W), favors this interpretation. Dr. Clark kindly drew up an overall stratigraphic report of this building, details of which have been incorporated here. Mr. William D. Glanzman's report on Area III.1 at Rujm al-Ḥenu (E) should also be mentioned in this regard. This writer is solely responsible for the stratigraphic interpretations of both buildings presented here.

diagnostics]), IV.1.19 (0.01-0.02 m. thick, pink, well-compacted), and IV.1.20 (0.01-0.02 m. thick, dark brown, 10 sherds 4 Ir IIC/P diagostics]) were found near the upper margin with Locus IV.1.19. Beneath Locus IV.1.20, bedrock was reached at *ca.* 618.4 ASL (Fig. 6).

As in Area IV.1, excavation of the lower rock tumble (Locus IV. 3.4) in Area IV.3 revealed interior wall construction. Two interior walls ran perpendicularly to the enclosure wall and parallel with each other; *ca.* 1.25 m. apart, they defined an east-west corridor. Further excavation in the square was limited to the area (*ca.* 1.25 x 2.50 m.) of the corridor. The northern corridor wall (Locus IV.3.5) extends from the eastern baulk toward the enclosure wall (Locus IV.3.3), and a 0.90 m. wide doorway separates it from the latter. The southern corridor wall (Locus IV. 3.6) meets the enclosure wall. Where it enters the eastern baulk, a probable door jamb was exposed.

The lower rockfall in Area IV.3 continued down alongside wall Loci IV.3.5-6 as Locus IV.3.4,7 (Fig. 7). Numerous cobbles and boulders (including several dressed stones) and 300 late Iron Age sherds (50 Ir IIC/P diagnostics) were randomly mixed in the compact layer of reddish brown, granular soil.

The rockfall was again directly over a surface (Locus IV.3.8), which ran up to wall Loci IV.3.3, 5, 6 and had 207 sherds (17 Ir IIC/P diagnostics) and a grinding stone fragment embedded in it. In contrast to surface Locus IV.1.17, IV.3.8 was a *ca.* 0.10 m. thick layer of gray, granular soil. The bottom 0.01-0.02 m. was most likely the original surface (Locus IV.1.17); it was well compacted, interspersed with ash, but devoid of pottery. The overlying 0.08-0.09 m. may represent either occupational build-up or destruction debris.

The foundation for surface Locus IV.3.8 and wall Loci IV.3.3, 5, 6 was a 0.05-0.20 m. thick, dark brown clay layer (Locus IV.3.9 = IV.1.18-20) above bedrock. Seventeen late Iron Age sherds (2 Ir IIC/P diagnostics) were found along its upper margin, immediately below the surface. In the corner formed by the enclosure wall (Locus IV.3.3) and the southern corridor wall (Locus IV.3.6), a pit (Locus IV.3.10) was excavated, which cut the clay layer but was sealed off by surface Locus IV.3.8. The pit coincided with a 0.30 m. diameter, 0.40 m. deep hollow in the bedrock, and was filled with a loose sandy, brown soil with 6 sherds (3 Ir IIC/P diagnostics).

The enclosure wall (Loci IV.1.2 = IV.2.2 = IV.3.3) where it had been fully exposed in Areas IV.1 (Fig. 6) and IV.3 had five standing courses, *ca.* 2.50 m. high. The wall was constructed of a double line of roughly shaped boulders, most of the which were of limestone (some sandstone and flint) and less than a metre long.

The circular tower wall (Locus IV.1.3) also had five courses, *ca.* 3.00 m. high, preserved (Fig. 6), but double lines of more massive boulders (over a metre long) had been employed.

Single lines of smaller boulders had been used to construct all the interior walls (Loci IV.1.12, IV.3.5, 6). Five courses of wall Loci IV.1.12 and IV.3.5 (Fig. 7) stood *ca.* 2.20 m. and 1.60 m. high, respectively; Locus IV.3.6, the southern corridor wall, had four courses, *ca.* 1.90 m. high. While rough stones made up the baulk of these walls, well-cut ashlars with squared-off corners and dressed faces had been used for the end stones of wall Loci IV.1.12 (lowest two courses) and IV.3.5 (Fig. 7; Pl. XVII, 2), which bordered doorways.

The enclosure, circular tower, and interior walls were founded on bedrock and/or the lowest clay layer (IV.1.20, IV. 3.9). Walls that meet are not bonded to one another, *viz.* the enclosure wall (Locus IV.3.3) and the southern corridor wall (Locus IV.3.6), and the circular tower (Locus IV.1.3) and the enclosure wall (Locus IV.1.2), which curves inward to meet the former (Fig. 6; Pl. XVII, 2).

A preliminary faunal analysis indicated that bird and mammal (mainly sheep/goat, some rodent, possible donkey) remains were randomly distributed in the topsoil and rockfall.

Interpretation

Test soundings near the circular tower and on the interior and exterior of the southwestern enclosure wall of Rujm al-

Henu (W), despite the limited exposure (less than 1% of the total area of the building), produced some extremely important results.

Before the building was constructed, large areas of bedrock with soil and clay filling crevices and hollows (Loci IV.1.19, 20 and lower IV.3.9) were probably visible. Remaining irregularities n the bedrock may have been intentionally leveled out by laying down more clay (Loci IV.1.18 = upper IV.3.9 contemporaneous with pit Locus IV.3.10). The bedrocked/or clay then served as the foundation for the interior and exterior walls and the single surface (Loci IV.1.17 = IV.3.8.) uncovered in the excavation. Judging from the number of smashed storage jars and other vessels, which were on or embedded in this surface and which dated exclusively to the Iron II C/P period (see Vincent Clark's article on the pottery), this must have been an Iron II C/P occupational floor. The fact that the floor runs up to the various interior and exterior walls exposed in Areas IV.1 and IV.3 and is directly over the built-up clay layer implies that it was associated with the construction and earliest use of the building.

Above the floor, almost the entire accumulation inside the structure, over one and a half metres thick, was destruction debris (cobbles and boulders) from the collapse of upper courses of walls. Thus, the building appears to have been built, occupied, and then destroyed, possibly as the result of an earthquake, within a relatively short time. The sealed Iron II C/P floor provides one of the most precise datings for a *qasr* type building (cf. the seventh-sixth century B.C. date for Khirbet al-Ḥajjar and Rujm al-Malfuf South—Thompson 1973: 50; 1977: 29), which are often stripped down to bedrock or disturbed by Roman and Byzantine occupation. Rujm al-Ḥawi, the companion building to Rujm al-Ḥenu (W), may have a comparable archaeological sequence.

South of the circular tower at Rujm al-Ḥenu (W), a number of small rooms had evidently been laid out. The room in Area IV. 1, defined by wall Loci IV.1.2, 3, 12 and of unknown eastern extent, had been filled with storage jars. The doorway between the enclosure wall and interior wall Locus IV.1.12 must have led to an uncleared room which was bordered on the south by corridor wall Locus IV.3.5. The so-called east-west corridor is entered by a doorway between the enclosure wall and wall Locus IV.3.5. A probable door jamb at the eastern end of the southern corridor wall (Locus IV.3.6) suggests that another doorway, perhaps one of a series, opened onto rooms in the southwestern sector of the building (cf. surface wall lines on Fig. 3).

Different wall construction techniques were observed at the western building: 1) larger boulders (over a metre long) were used for the circular tower than for the enclosure and interior walls (less than a metre), 2) boulders were generally very rough, except for the well-cut ashlars of wall Loci IV.1.12 (lowest two courses) and IV.3.5, which border doorways, and 3) presumably contemporaneous walls (e.g., the southern corridor wall and the enclosure wall) are unbonded. These incongruities may be the result of architectural phasing or simply reflect divergent contemporary building practices.

Following its destruction, Rujm al-Ḥenu (W) lay abandoned for an extended period of time. Deterioration of the structure is evidenced by the soil and rock accumulation around walls (e.g., Locus IV.1.12) which may have stood above ground for a time and were consequently more weathered.

The upper archaeological fills at the western building are quite comparable to the mixed loci of the eastern building. Both have Late Roman and Byzantine materials (also Umayyad and Mamlūk at the eastern building) mixed with predominantly Iron II C/P pottery. No activity surfaces from these periods were found, so that the fills could have resulted from dumping after the Byzantine period.

Like Rujm al-Henu (E), the western structure was used as a cemetery probably sometime in the Islamic period. Two adults (Locus IV.1.8) and one sub-adult (Locus IV.3.2) were excavated, each laid out east-west in a supine position, head to the west and face to the south (toward Mecca). Since they were found in upper

rockfall fills and were unaccompanied by burial goods, closure dating is impossible. Several pits (Loci IV.1.7, 10, 15) probably belong to the same period.

After the cemetery phase, Rujm al-Ḥenu (W) was again abandoned up until the present. Modern debris and pottery, including Ottoman types of the last several hundred years, were interspersed in the topsoil.

Conclusions

The interpretations presented above are necessarily tentative, since only a small fraction of the total areas of the two buildings at Rujm al-Ḥenu have been excavated thus far. Nevertheless, by combining standard archaeological, geophysical, and aerial survey techniques, a very deliberate excavation strategy was developed, in order to test specific working hypotheses. Consequently, the archaeological returns from the soundings were considerable and are probably quite representative. Further excavation at Rujm al-Ḥenu (W) could well yield a largely undistrubed Iron II C/P occupational level, at least in areas near collapsed walls. Just the opposite can be anticipated from the eastern building. However, the discovery and excavation of any remaining intact loci (e.g., in corners) will have been worth the effort if the building's history is further elucidated.

Acknowledgements

The 1978 survey and the 1980 season of test excavations were directed by the writer, and co-sponsored by the Department of Antiquities of Jordan, the National Geographic Society, and the University Museum and its Applied Science Center (MASCA) of the University of Pennsylvania. Mssrs. Bruce W. Bevan, Ibrahim Haj Hassan (Department Representative), Ms. Susan Spencer, Ms. Jenine Howard, and Mr. Mohamed Salem comprised the core staff in 1978. Area supervisors at Rujm al-Ḥenu East (Field III) and West (Field IV) in 1980 included Mssrs. Vincent A. Clark (Areas III.0, III.23, and IV.1-3), Wiliam D. Glanzman (Areas III.1 and III.32), and Nicholas Hartmann (Area III.11). During the latter season, Mssrs. Ali Sa'idi and Sa'ad Hadidi served as Departmental representatives, Ms. Marilyn B. Saul as osteologists, and Mr. Nicholas Hartmann as photographer. Ms. Helen R. Schenck, the registrar/draftsman, drew the small objects and laid out the plates, including those of the sections and top plans for Fields III and IV. Mrs. Susan M. Balderstone, the architect during both seasons, surveyed and prepared the architectural and regional plans. Ms. Jean Bray and Mr. Neil Gallagher, volunteers from the active amateur archaeological community in Amman, assisted in the excavation and registration process. Workers were hired from the Umm ad-Danānīr region, the Palestinian refugee camp in the valley, and the towns of Salt and Suweilih.

As an afiliated project of the American Schools of Oriental Research, Dr. James A. Sauer, the director of the center in Amman, generously made available the institute's facilities, which served as the expedition's base of operations in both seasons. Additional accommodations for staff members were also kindly provided by Mrs. Crystal-M. Bennett, Director of the British Institute for Archaeology and History in Amman, and Herr Kruger of the Deutsches Evangelisches Institut für Altertums Wissenschaft des Heiligen Landes.

The writer would also like to express his sincere appreciation to Dr. Adnan Hadidi, Director-General of the Department of Antiquities of Jordan and his staff for their ready assistance and ongoing support of the project.

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THE IRON IIC/PERSIAN POTTERY FROM RUJM AL-ḤENU

by
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Introduction

A detailed typological analysis of the Rujm al-Ḥenu pottery has thus far been restricted to the Iron IIC/Persian material, which predominates at both eastern and western buildings. Morever, the only intact loci, which provided a dating for the enclosure wall construction and the major period of occupation at the western structure, belonged to this period.

A total of 101 sherds comprises the Rujm al-Henu (W) type series, and they are distributed among Iron IIC/Persian contexts as follows:

Loci IV.1.9, 11, 13 (lower rockfall) — 31 sherds

Locus IV.1.15 (trench or pit) — 2 sherds

Locus IV.1.16 (destruction debris on floor) — 20 sherds

Locus IV. 1.17 (floor) — 1 sherd

Locus IV.1.18 (foundation) — 3 sherds

Loci IV.3.4, 7 (lower rockfall) — 29 sherds

Locus IV.3.5 (northern corridor) — 6 sherds

Locus IV.3.8 (floor) — 7 sherds

Locus IV.3.9 (foundation) — 1 sherd

Locus IV.3.10 (pit) — 1 sherd

A smaller corpus of material (34 sherds) from Rujm al-Ḥenu (E) is illustrated and discussed. Although these sherds came from clay layers directly over bedrock on the inside of the building (Loci III. 23.6 [11 sherds] and III. 32.5 [23 sherds]), they were associated with Late Roman and Early Byzantine pottery and had an uncertain stratigraphic context. Nevertheless, the late Iron Age forms clearly belong with the Rujm al-Ḥenu (W) type series, justifying the combined treatment.

The best parallels for the Rujm al-Ḥenu series as a whole come from Tell Ḥesban, located ca. 30 km. to the south. As noted in the Heshbon report (Lugenbeal and Sauer, 1972: 31-32), few parallels are to be found outside the area of ancient Ammon and Moab. Where there are West Bank comparanda, these are usually unique pieces from a repertoire quite unlike that of the East Bank. Therefore, the Rujm al-Ḥenu series have been largely arranged according to the schema and terminological distinctions which have been developed for the larger and more representative corpus of material from Tell Ḥesban.

Following the dating criteria used at Tell Ḥesban (Lugenbeal and Sauer, 1972: 62-64), the Rujm al-Ḥenu type series can be broadly dated between 700 and 500 B.C. Eight sherds (IV. 30, IV. 35, IV. 56-58, IV. 60, IV.89, and IV.96) might conceivably belong to the eighth century, but the various types carry over into the seventh century. Further work is needed in refining the ceramic chronology of the last phase of the Iron Age and the beginning of the Persian period.

The type series for each building are numbered sequentially on the figures[1], and referred to by field (III = Rujm al-Henu E; IV = Rujm al-Ḥenu W) and series number in the following descussion.

Ware colours[2] range between Munsell 10R 5/6 (red), 5YR 6/4 (light reddish brown), 7.5YR 7/4 (pink), 10YR 8/3 (very pale brown), and black. Reddish browns and pinks predominate, which would sug-

[1] Sherds in the type series were drawn by William Glanzman, and the final plates inked and laid out by Jane Evans. Sherd diameters (D.) on the plates are in centimeters. Examples with doubtful stances (e.g., Fig. 6: 87) are positioned vertically. Both type series are part of the permanent collection of the University Museum, University of Pennsylvania, Philadelphia, PA.

[2] The primary ware color is that just below the exterior surface ("rind"). Interior (I), exterior (E), and core (C) variations of ware are also given. All ware colors were observed under subdued lighting.

gest a kiln firing temperature between 600 and 900 C (Matson, 1971; Kelso and Thorley, 1943: 89-92). Since pottery ware colours from iron-rich clays are highly sensitive to changes in firing conditions (highest temperature attained, period of time held at each temperature level, oxidizing/reducing processes in different areas of the same kiln, etc.), slight colour differences are less important than the overall range of variation. Moreover, post-depositional processes in a calcareous, alkaline environment, such as the Baq'ah, can affect surface colours. Detailed petrographic and chemical studies of the late Iron Age wares, similar to those already carried out for the Late Bronze wares (McGovern, Harbottle, and Wnuk 1981), are planned.

Bowls

Bowls with an outset rim (Heshbon Type Bo:1), which constituted a sixth of the Tell Ḥesban corpus, are represented by only four examples (III.1; IV. 1-3) at Rujm al-Ḥenu. The grooving below the exterior rim of IV.2 is paralleled by Heshbon sherds 26 and 36, although the latter differ in rim profile. III.1 and IV.1 are of black and very dark gray wares, respectively, and burnished (IV.1 on a wheel).

IV. 4-5 with rounded shoulders and flaring rims (note particularly IV. 4), which apparently belong to wide, shallow forms, are examples of Heshbon Type Bo:5. Both sherds are unslipped; while IV.5 has a close, overall wheel burnishing, IV.4 has widely spaced bands of wheel burnishing.

Thirteen sherds (III. 2-6; IV.6, 8-14) belong to Heshbon Type Bo:6, which is characterized by short, outflaring rims and upright, rounded sidewalls, often ridged. Whereas the most common ware colour at Tell Hesban is light tan (Lugenbeal and Sauer 1972: 35), it is less common at Rujm al-Ḥenu (IV.9, 12; III.3) where the predominant color is pink or reddish yellow, standard for other types. Examples are occasionally slipped (IV.6 — reddish brown; IV.10 — I white, E brown) and burnished (IV.6, 8, 12, 14). Colour variations of interior and exterior surfaces (e.g., IV. 9, 12) are the result of differential firing conditions. This is the most popular bowl type at Rujm al-Ḥenu, comparable to the unpublished Deir 'Alla repertoire (Lugenbeal and Sauer, 1972: 36).

Bowls with plain, upright rims and exterior ridges (Heshbon Type Bo:13) are illustrated here by only two examples (IV.18-19) despite its greater popularity at Tell Ḥesban. IV.18 has a tapered, rounded rim, and an applied lug handle/ knob below the rim. IV.19 is a more closed form with the sidewall tilted slightly inwards; the rim is squared off and somewhat thickened. Both sherds are slipped on the interior and exterior (IV.18 — yellowish red; IV.19 — light red); IV.18 is also wheel burnished.

Three sherds (III.8; IV. 20-21) belong to Heshbon Type Bo:14b-c in which rims are rounded (slight grooving on IV.21) and inturned (note especially III.8). IV.20 has a wide, rounded exterior ridge below the rim. IV.20 and IV.21 are wheel burnished on the interior and exterior.

Because of their slightly carinated, shallow forms and thickened rims, IV.22-24 can be assigned to Heshbon Type Bo: 17b (cf. Heshbon sherds 211-212, 214). IV.22 and IV.23 are of a dark gray ware. While only IV.24 is slipped a reddish brown, all the Rujm al-Henu sherds are wheel burnished on the interior and exterior. In contrast to Tell Hesban examples, IV.22 has two shallow, exterior grooves below the rim. Because of their similarity to Heshbon sherd 219, III.9-10 may belong here. Like IV.22, the latter have two grooves below the rim; neither is slipped and/or burnished.

The "holemouth" bowl (Heshbon Type Bo:26) is represented at Rujm al-Henu by a single example (IV. 25), which has a pronounced groove, bordered by a small lip above and a triangular ridge below, for holding a lid. It is undecorated, and of the standard pink ware.

Vertical, rounded rims and curving sidewalls characterize Heshbon Type Bo: 27b to which IV.26-28 belong. Rims can be slightly inturned (IV.28) or everted (IV.26-27). A red slip (IV.27-28) and/ or

wheel burnishing (IV.26-27) were standard surface finishings.

Basins

Although unattested at Tell Hesban, four sherds (III. 11-13; IV.29) share the common feature of a heavy, flat everted rim which is thicker than the upright or somewhat curved sidewall. The rims of III.11, 13 are also developed interiorly. III.13 and IV.29 have two shallow grooves along the top of the rim. All the sherds are heavily tempered, and have a thick gray core. Parallels for the rim profiles are rare, but resemble forms at Kadesh Barnea (Dothan 1965: fig. 5:7) and Megiddo (Lamon and Shipton, 1939: pl. 18:91).

Fine Bowls

Five sherds (III.14; IV.31-34) in the type series are from extremely fine vessels whose surfaces were finished off with a wheel- burnished red slip on the interior and exterior. Rim profiles vary: flaring and pointed (III. 14; cf. Harding and Tufnell 1953: fig. 21: 70), pointed (III. 31; cf. Harding and Henschel-Simon 1944: pl. 69, 16:1), and an upturned, sometimes everted form with two exterior grooves (IV. 32-34; Heshbon Type Sb:4). The latter range from a simple up-turned rim above a rounded shoulder (IV. 32) to a rim flaring out from a sharp carination (IV. 33) to a wide flange that virtually eliminates the shoulder of the vessel (IV. 34). This bowl type may have been a precursor of the Nabataean fine bowl.

Platters

Three examples (IV.35-37) of Heshbon Type Sb:lb are illustrated from Rujm al-Henu. All have sidewalls that gently curve up to rounded, splayed rims. IV.36 and IV.37 have a single, shallow groove on the interior below the rim. IV.37 is unique in having a grayish brown, wheel-burnished slip.

Mugs

Heshbon Type M:I is represented by four sherds (III.15; IV.38-40), which have a globular body rising to a long, bowed neck and an inverted, rounded rim. Only IV.40 has a light red, unburnished slip.

Cooking Pots

Sixteen examples (III. 16-17; IV. 42-55) attest to the popularity of this form. However, the relative rarity of cooking pots in Field III should be noted. The majority of the sherds (IV. 42-49, 53-55) belong to Heshbon Type P:2b-C, combining features of Types P:2b and P:2c—neckless, bulbous (sometimes flattened IV. 42-43), slightly flaring rim, and often a single groove along the top of the rim (IV. 45-47, 53-54). Heshbon Type P:lc is represented by III.17 and IV.44 with neckless, bulbous rim that is grooved, unlike the Heshbon examples. Handles rise above their point of attachment on the rim and join the rounded sidewall at the shoulder. A circular depression at the base of the handle of IV.54 is of uncertain significance. Sherds IV.51-52 belong to Heshbon Type P:3, which differs from Type P:2b-c only in having the groove on the exterior rim. The nearly vertical stance of IV. 52 contributes to its more well-defined neck and lower handles. Sherd III.16 is representative of Heshbon Type P:lc, a closed form with a curved sidewall, a rounded, interiorly thickened, upturned rim, and a pair of high handles from rim to shoulder. Firing conditions account for the variegated surface coloration, typically a reddish hue, of the cooking pot examples.

Holemouth Jars

The popularity of this form, corresponding to Heshbon Type Ja:1, is evidenced by twenty-two examples (III. 18-23; IV. 56-71). In general, the rims are thickened, sharply inturned—with a more or less pronounced exterior ridge at the juncture to the neck (lacking on IV.71)—and flattened (e.g., IV.56) or smoothly curved (IV.64). IV.71 has a handle attached below the rim, which appears to have been the exception rather than the rule. Only two specimens are slipped, IV.65 on both interior and exterior sur-

faces in white, and IV.70 on the exterior in a very pale brown. Exterior burnishing occurs on IV.61 and IV.64. The closed form inhibited oxygen flow, creating a reduction environment on the inside of the vessel and producing a gray interior surface (III. 18-23; IV.61-65, 68-69). In contrast to Tell Ḥesban (Lugenbeal and Sauer, 1972: 51), a larger percentage of the Rujm al-Ḥenu sherds have a light coloured (oxidized) interior (IV.56-60, 65-67, 70-71). IV.58 and IV.68 have slight cores, and IV.65 none at all. Several of these sherds have a grooved exterior rim (1 groove—IV.57; 2 grooves—IV.58; 3 grooves—IV.59), which is paralleled at En-Gedi (Mazar, Dothan, and Dunayevsky 1966: fig. 21:6, pl. 18:8).

Pithoi

III.24 and IV.72 derive from heavy, neckless jars with thickened, bulbous rims (Heshbon Type Ja:2a). Grooving, less deeply cut than on Tell Ḥesban examples (Lugenbeal and Sauer, 1972: 52) occurs on the exterior rim of IV. 72. Sherd III.24 lacks grooves, but appears to have a ridge on its sidewall or shoulder. A very pale brown slip was applied to IV.72.

Jars

IV. 73-75, 77 are closest to Heshbon Type Ja:9, which is characterized by a sloping neck that narrows to an exteriorly thickened rim. The external grooving on sherds IV. 74-75, 77 is also found at Tell Ḥesban (Lugenbeal and Sauer, 1972: pl. 8: 428, 433, 443, etc.). IV. 73 is the only member of the group that is slipped — exterior, white.

A complete, two-handled decanter (IV. 101) has an exteriorly developed, grooved rim and an upright neck. Handles spring from the shoulders to a grooved ridge in the middle of the neck. The bag-shaped body attains its maximum diameter near the ring base. A white slip with widely spaced wheel burnishing covers the exterior surface of the vessel. The rim profiles are most similar to Type Ja: 9f (Lugenbeal and Sauer, 1972: pl. 8: 448; cf. Lamon and Shipton, 1939: pl. 10:39).

Jugs and Juglets

IV.76 with its everted neck, thickened rim, and neck ridge may belong to Heshbon Type Ju:7. Comparable rim profiles without the ridge (III.25-26; IV.78) are assignable to Heshbon Type Ju:7. IV.78 has a red, wheel burnished slip.

Sherds IV. 79 (juglet) and IV.80 (jug) are comparable to Heshbon Type Ju:10. Both have everted, externally thickened rims, and handles which have broad rim and neck attachments. The latter rise high above the rims, and, in the case of IV.80, sometimes appear to be too heavy for the size of the vessel. Additional parallels for the elongated jug or juglet type occur at Amman (Harding and Henschel-Simon, 1944: 71, pl. 17024; Harding and Tufnell, 1953: 63, fig. 23:116), Tyre (Bikai, 1978: fig. 3:6), and Ashdod (Dothan and Freedman, 1967: figs. 39:6, 40:12 — eighth century shortened forms).

Tripod Cups/ Bowls?

Three examples (III.27; IV.81-82), characterized by an inturned rim and an exterior ridge, are either tripod bowls or smaller versions of the Holemouth Jar (see above). The ridge at the rim-body juncture can be a slight bulge (III.27) or a triangulated ridge (IV.81). IV.82, rather than having a ridge here, has a deep groove with a slight edge below. A single groove along the top of the rim of III.27 should also be noted. Jordanian parallels can be cited from Amman (IV.81—Harding and Henschel-Simon, 1944: 70, 75, pl. 17:10; Dajani, 1966: 42, pls. 7:47, 129; 8: 57, etc.; IV.82—Dajani, 1966: pl. 8:56) and Sahab (IV. 81—Harding, 1948: fig. 4: 25, 27, 30; IV. 82—Harding, 1948: fig. 4:28).

Sherd IV.41 very likely corresponds to Heshbon Type Tc:3. It has an inturned, thickened rim, bulging neck with exterior rounded ridge, and a steep sidewall. A handle, rising above the rim, is attached to the rim and upper sidewall. The specimen is covered ith a red unburnished slip.

Lamps

The four lamp rims (IV. 83-86) all

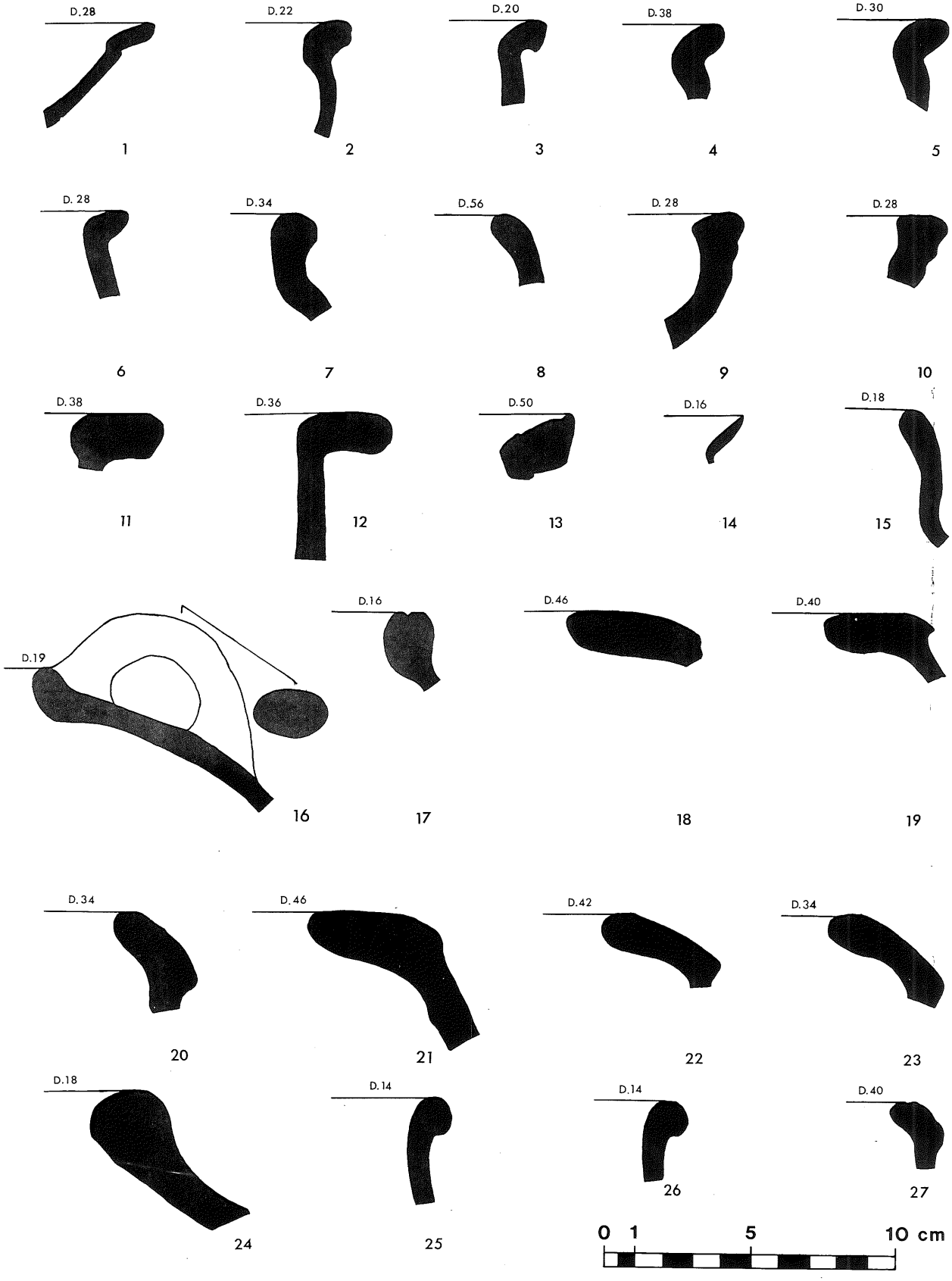
D.28
1
D.22
2
D.20
3
D.38
4
D.30
5
D. 28
6
D.34
7
D.56
8
D. 28
9
D.28
10
D.38
11
D.36
12
D.50
13
D.16
14
D.18
15
D.19
16
D.16
17
D.46
18
D.40
19
D.34
20
D.46
21
D.42
22
D.34
23
D.18
24
D.14
25
D.14
26
D.40
27
0 1 5 10 cm

Fig. 1

LEGEND TO Fig. 1
RUJM AL-ḤENU EAST TYPE SERIES

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
III.1	Bowl	1	III.32.24	III.32.5	black C thick, dark gray	IE burnishing
III.2	Bowl	2	III.32.19	III.32.5	7.5YR 7/4 (pink) IE 2. 5YR 6/6 (light red) C slight, gray	none
III.3	Bowl	3	III.23.12	III.23.6	7.5YR 7/6 (reddish yellow) C thick, gray	none
III.4	Bowl	4	III.32.16	III.32.5	5YR 7/4 (Pink) IE 2. 5YR 6/6 (light red) C medium, gray	none
III.5	Bowl	5	III.32.16	III.32.5	7.5YR 7/4 (Pink) IE 2. 5YR 6/6 (light red) C medium, gray	none
III.6	Bowl	6	III.23.9	III.23.6	7.5YR 7/6 (reddish yellow) C thick, gray	none
III.7	Bowl	16	III.32.22	III.32.5	7.5YR 7/4 (Pink) C thick, gray	IE slip: 10R 5/6 (red) IE burnishing
III.8	Bowl	15	III.23.19	III.23.6	7.5YR 7/4 (Pink) no core	none
III.9	Bowl	7	III.32.21	III.32.5	7. 5YR 7/6 (reddish yellow) C slight, 10YR 6/2 (light brownish gray)	none
III.10	Bowl	8	III.32.27	III.32.5	5YR 7/4 (pink) C medium, 10YR 6/3 (pale brown)	none
III.11	Basin	12	III.23.21	III.23.6	5YR 7/6 (reddish yellow) C thick, gray	none
III.12	Basin	11	III.32.19	III.32.5	5YR 7/4 (pink) C thick, gray	none
III.13	Basin	13	III.23.9	III.23.6	10R 6/8 (light red) C thick, dark gray	none
III.14	Bowl	9	III.23.9	III.23.6	7.5YR 7/6 (reddish yellow) no core	IE slip: 10R 5/6 (red) IE wheel burnishing
III.15	Mug	10	III.32.13	III.32.5	5YR 7/6 (reddish yellow) C thick, gray	none
III.16	Cooking Pot	24	III.23.26	III.23.6	I 5YR 5/6 (yellowish red) E 5YR 5/6 (Yellowish red) to 10YR 5/2 (grayish brown) C thick, 10YR 5/3 (brown)	none
III.17	Cooking Pot	14	III.23.19	III.23.6	2. 5YR 5/4 (reddish brown) C thick, 7. 5YR 6/4 (light brown)	none
III.18	Jar	17	III.32.24	III.32.5	7.5YR 6/4 (light brown) I dark gray C thick, dark gray	none
III.19	Jar	18	III.32.16	III.32.5	7.5YR 7/4 (pink) I dark Gray C thick, dark gray	none
III.20	Jar	19	III.32.16	III.32.5	5YR 7/6 (reddish yellow) I dark gray C thick, gray	none
III.21	Jar	20	III.32.27	III.32.5	5YR 7/4 (pink) I gray C thick, gray	none
III.22	Jar	21	III.32.21	III.32.5	5YR 7/6 (reddish yellow) I dark gray C thick, dark tray	none
III.23	Jar	22	III.32.23	III.32.5	5YR 7/6 (reddish yellow) I gray C thick, gray	none
III.24	Pithos	25	III.32.20	III.32.5	5YR 6/4 (light reddish brown) C thick, gray	none
III.25	Jug	26	III.32.15	III.32.5	2.5YR 6/8 (light red) I 5YR 7/6 (reddish yellow) C thick, gray	none
III.26	Jug	27	III.32.16	III.32.5	2.5YR 6/8 (light red) I 5YR 7/6 (reddish yellow) C thick, gray	none
III.27	Tripod Bowl?	23	III.32.22	III.32.5	5YR 7/6 (reddish yellow) I gray C thick, gray	none

Legend To Fig. 2
Rujm Al-Ḥenu East Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
III.28	Handle	28	III.32.27	III.32.5	2.5YR 6/6 (light red) C medium, 7. 5YR 7/6 (reddish yellow)	none
III.29	Base	34	III.23.21	III.23.6	2.5YR 6/4 (light reddish brown) E 7.5YR 8/4 (pink) C medium, 7.5YR 7/2 (pinkish tray)	none
III.30	Base	33	III.23.13	III.23.6	7.5YR 6/4 (light brown) I gray C thick, gray	none
III.31	Base	31	III.32.16	III.32.5	5YR 7/6 (reddish yellow) I dark gray C medium, dark gray	none
III.32	Base	32	III.32.12	III.32.5	5YR 7/4 (pink) I dark gray I medium, dark tray	none
III.33	Base	29	III.23.9	III.23.6	7.5YR 7/4 (pink) I 2.5YR 6/6 (light red) E 5YR 7/6 (reddish yellow) C slight, gray	E slip: 10R 5/6 (red) IE hand burnishing
III.34	Base	30	III.32.23	III.32.5	5YR 7/6 (reddish yellow) E 2.5YR 6/6 (light red) C thick, gray	none

Legend to Fig. 3
Rujm Al-Ḥenu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.1	Bowl	72	IV.3.11	IV.3.4	Very dark gray C thick, gray	IE wheel burnishing
IV.2	Bowl	16	IV.1.17	IV.1.9	7.5YR 6/4 (light brown) C thick, dark gray	none
IV.3	Bowl	59	IV.3.13	IV.3.4	7.5YR 7/4 (pink) IE 2.5YR 6/6 (light red) C slight, gray	none
IV.4	Bowl	51	IV.3.12	IV.3.4	5YR 7/4 (pink) C medium, light gray	IE wheel burnishing
IV.5	Bowl	48	IV.3.18	IV.3.8	7.5YR 7/4 (pink) I 2.5YR 5/4 (reddish brown) E 2.5YR 5/4 (reddish brown) and 10R 5/6 (red) no core	IE wheel burnishing
IV.6	Bowl	10	IV.1.34	IV.1.16	C thick, gray	IE slip: 5YR 5/4 (reddish brown) IE wheel burnishing
IV.7	Bowl	21	IV.1.39	IV.1.18	5YR 7/4 (pink) no core	IE slip: 2.5YR 5/6 (red) IE wheel burnishing
IV.8	Bowl	23	IV.1.21	IV.1.11	5YR 7/4 (pink) IE 5YR 7/6 (reddish yellow) C medium, gray	IE wheel burnishing
IV.9	Bowl	50	IV.3.11	IV.3.4	5YR 7/6 (reddish yellow) I 10YR 8/4 (very pale brown) and light gray E 10YR 8/3 (very pale brown) C medium, light gray	none
IV.10	Bowl	74	IV.3.16	IV.3.7	10YR 7/3 (very pale brown) C medium, lihgt gray	I (rim) slip: 10YR 8/2 (white) E slip: 10YR 5/3 (brown)
IV.11	Bowl	27	IV.1.17	IV.1.9	5YR 7/4 (pink) C medium, lihgt gray	none

IV.12	Bowl	18	IV.1.21	IV.1.11	7.5YR 7/6 (reddish yellow) I 10YR 6/3 (pale brown) C medium, gray	IE wheel burnishing
IV.13	Bowl	15	IV.1.19	IV.1.9	5YR 7/4 (pink) C thick, gray	none
IV.14	Bowl	9	IV.1.26	IV.1.13	2.5YR 6/6 (light red) IE 10R 6/6 (light red) C slight, 10YR 7/3 (very) pale brown) and gray	IE wheel burnishing
IV.15	Bowl	17	IV.1.24	IV.1.13	5YR 7/4 (pink) C thick, 7.5YR 8/4 (pink)	IE wheel burnishing
IV.16	Bowl	62	IV.3.12	IV.3.4	7.5YR 7/4 (pink) C medium, light gray	I slip: 2. 5YR 5/6 (red) E slip: 2.5YR 5/6 (red) and 10YR 4/2 (dark grayish brown) IE wheel burnishing
IV.17	Bowl	20	IV.1.19	IV.1.9	2.5YR 6/6 (light red) C slight, 7.5YR 7/4 (pink) and light gray	IE wheel burnishing
IV.18	Bowl	97	IV.3.13	IV.3.4	5YR 7/4 (pink) C slight, gray	IE slip: 5YR 5/6 (yellowish red) IE wheel burnishing
IV.19	Bowl	37	IV.1.22	IV.1.11	7.5YR 7/4 (pink) no core	IE slip: 2.5YR 6/6 (light red)
IV.20	Bowl	19	IV.1.34	IV.1.16	2.5YR 6/8 (light red) IE 7.5YR 6/4 (light brown) C medium, 7.5YR 6/4 (light brown) and tray	IE wheel burnishing
IV.21	Bowl	14	IV.1.26	IV.1.13	5YR 7/4 (pink) E 2.5YR 6/6 (light red) C slight, light gray	IE wheel burnishing
IV.22	Bowl	11	IV.1.34	IV.1.16	dark gray C thick, gray	IE wheel burnishing
IV.23	Bowl	12	IV.1.34	IV.1.16	dark gray C thick, light gray	IE wheel burnishing
IV.24	Bowl	54	IV.3.13	IV.3.4	7.5YR 7/4 (pink) C medium, gray	IE slip: 5YR 5/4 (reddish brown) IE wheel burnishing
IV.25	Bowl	56	IV.1.17	IV.1.9	7.5YR 7/4 (pink) C medium, gray	none
IV.26	Bowl	28	IV.1.34	IV.1.16	5YR 7/4 (pink) IE 5YR 6/4 (light reddish brown) C medium, gray	IE wheel burnishing
IV.27	Bowl	63	IV.3.15	IV.3.5	5YR 7/4 (pink) C slight, light gray	IE slip: 2.5YR 6/6 (light red) IE wheel burnishing
IV.28	Bowl	61	IV.3.15	IV.3.5	7.5YR 7/4 (pink) C medium, gray	IE slip: 2.5YR 5/6 (red)
IV.29	Basin	29	IV.1.22	IV.1.11	Light gray C thick, gray	none
IV.30	Bowl	2	IV.1.38	IV.1.17	2.5YR 6/6 (light red) IE 7.5YR 7/4 (pink) C medium, 7.5YR 7/4 (pink)	IE wheel burnishing
IV.31	Bowl	22	IV.1.34	IV.1.16	2.5YR 6/4 (light reddish Brown) C medium, 7.5YR 7/4 (pink)	IE ship: 10R 5/6 (red) IE wheel burnishing
IV.32	Bowl	49	IV.3.18	IV.3.8	7.5YR 6/4 (light brown) no core	IE ship: 2.5YR 5/6 (red) IE wheel burnishing
IV .33	Bowl	52	IV.3.11	IV.3.4	7.5YR 7/4 (pink) C shght, gray	IE slip: 2.5YR 5/6 (red) IE wheel burnishing
IV.34	Bowl	53	IV.3.17	IV.3.7	7.5YR 7/4 (pink) no core	IE slip: 10R 5/6 (red) IE wheel burnishing

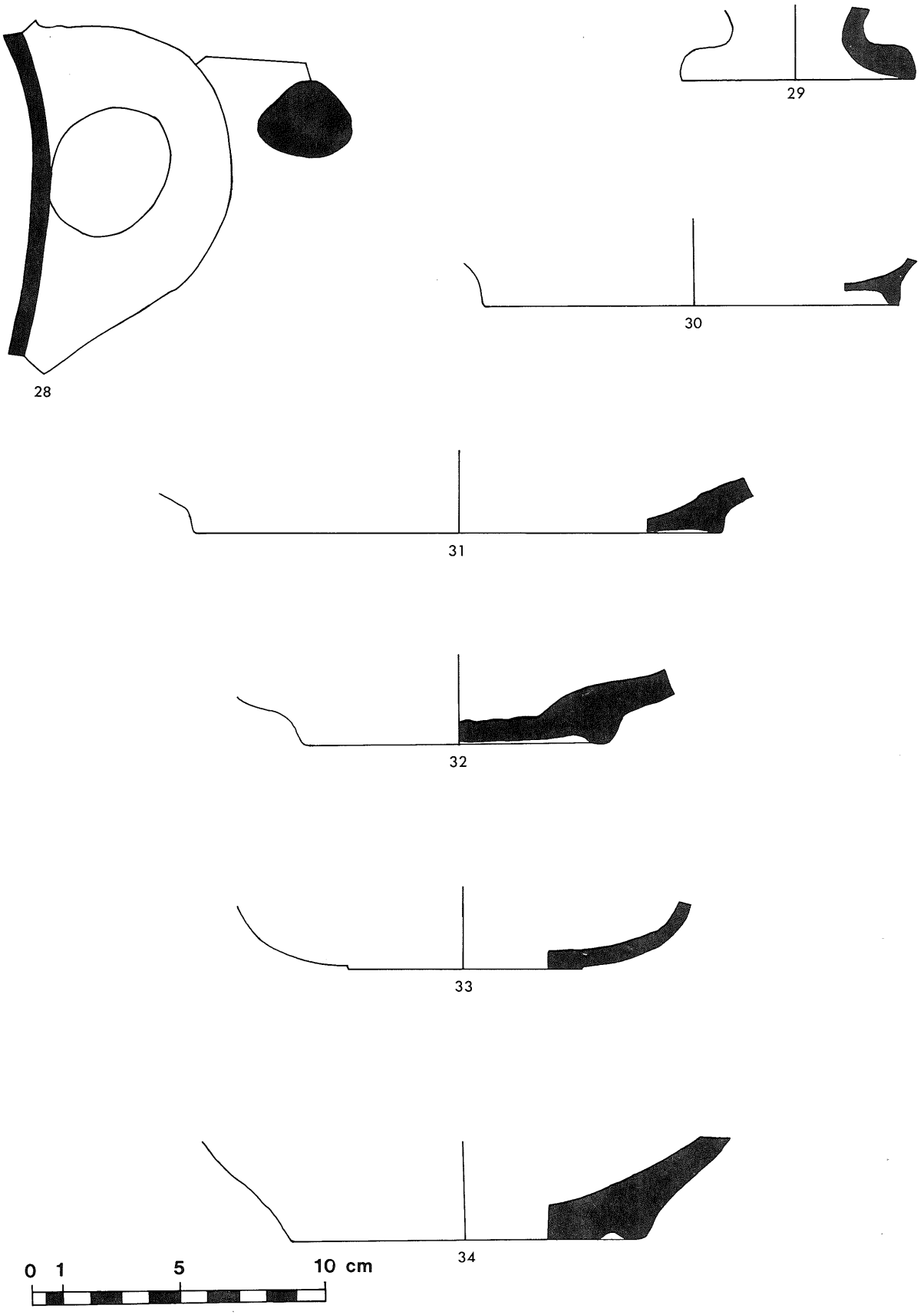

Fig. 2

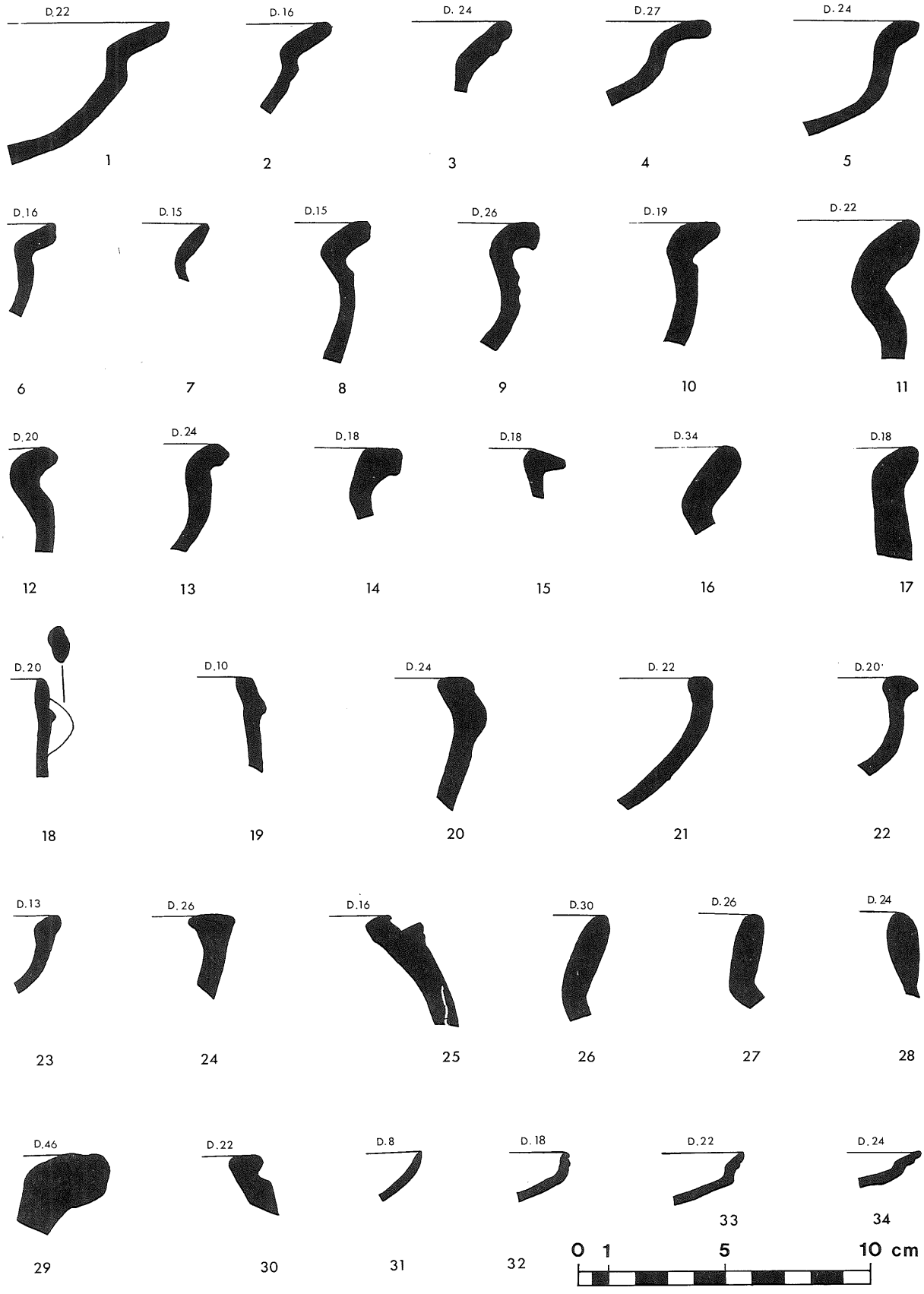
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Fig. 3

Legend To Fig. 4
Rujm Al-Ḥenu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.35	Platter	1	IV.1.34	IV.1.15	5YR 7/6 (reddish yellow) C thick, gray	none
IV.36	Platter	13	IV.3.23	IV.3.10	10YR 7/3 (verypale brown) C medium, light gray	none
IV.37	Platter	55	IV.3.11	IV.3.4	10YR 7/3 (very pale brown) no core	IE slip: 10YR 5/2 (grayish brown) IE wheel burnishing
IV.38	Mug	58	IV.3.15	IV.3.5	gray C medium, light gray	none
IV.39	Mug	25	IV.1.17	IV.1.9	2.5YR 6/6 (light red) C medium, 10YR 7/4 (very pale brown)	none
IV.40	Mug	26	IV.1.39	IV.1.18	10YR 7/3 (very pale brown) no core	IE slip: 2.5YR 6/6 (light red)
IV.41	Tripod Cup?	88	IV.1.33	IV.1.16	7.5YR 7/4 (pink) C medium, gray	IE slip: 10R 5/6 (red)
IV.42	Cooking Pot	68	IV.3.17	IV.3.7	7.5YR 7/4 (pink) IE 10YR 5/6 (red) C thick, gray	none
IV.43	Cooking Pot	31	IV.1.17	IV.1.9	2.5YR 6/6 (light red) IE 10R 5/6 (red) C thick, 7.5YR 7/4 (pink)	none
IV.44	Cooking Pot	67	IV.3.22	IV.3.9	7.5YR 7/4 (pink) IE 10R 5/6 (red) C thick, gray	none
IV.45	Cooking Pot	30	IV.1.21	IV.1.11	5YR 7/4 (pink) IE 10R 5/6 (red) C thick, 7.5YR 7/4 (pink)	none
IV.46	Cooking Pot	32	IV.1.24	IV.1.13	5YR 7/4 (pink) IE 10R 5/6 (red) C thick, 7.5YR 7/4 (pink)	none
IV.47	Cooking Pot	70	IV.3.12	IV.3.4	7.5YR 7/4 (pink) IE 2.5YR 5/6 (red) no core	none
IV.48	Cooking Pot	33	IV.1.17	IV.1.9	2.5YR 6/6 (light red) C medium, light gray	none
IV.49	Cooking Pot	34	IV.1.34	IV.1.16	2.5YR 5/6 (red) C thick, 5YR 7/4 (pink)	none
IV. 50	Cooking Pot	69	IV.3.11	IV.3.4	dark gray IE 5YR 5/3 (reddish brown) and dark gray C thick, 5YR 5/3 (reddish brown)	none
uIV.51	Cooking Pot	35	IV.1.22	IV.1.11	2.5YR 6/6 (light red) C thick, 7.5YR 7/4 (pink)	none
IV.52	Coking Pot	91	IV.1.33	IV.1.16	10R 5/6 (red) and 10YR 5/4 I 10R 5/6 (red) and 10YR 5/4 (yellowish brown) C medium, 10YR 5/4 (yellowish brown)	none
IV.53	Cooking Pot	92	IV.134	IV.1.16	2.5YR 6/4 (red) C thick, light gray	none
IV.54	Cooking Pot	89	IV.1.34	IV.1.16	5YR 5/6 (yellowish red) C medium, 10YR 5/2 (grayish brown)	none
IV.55	Cooking Pot	93	IV.3.19	IV.3.8	5YR 6/4 (light reddish brown) IE 2.5YR 5/6 (red) C thick, dark gray	none

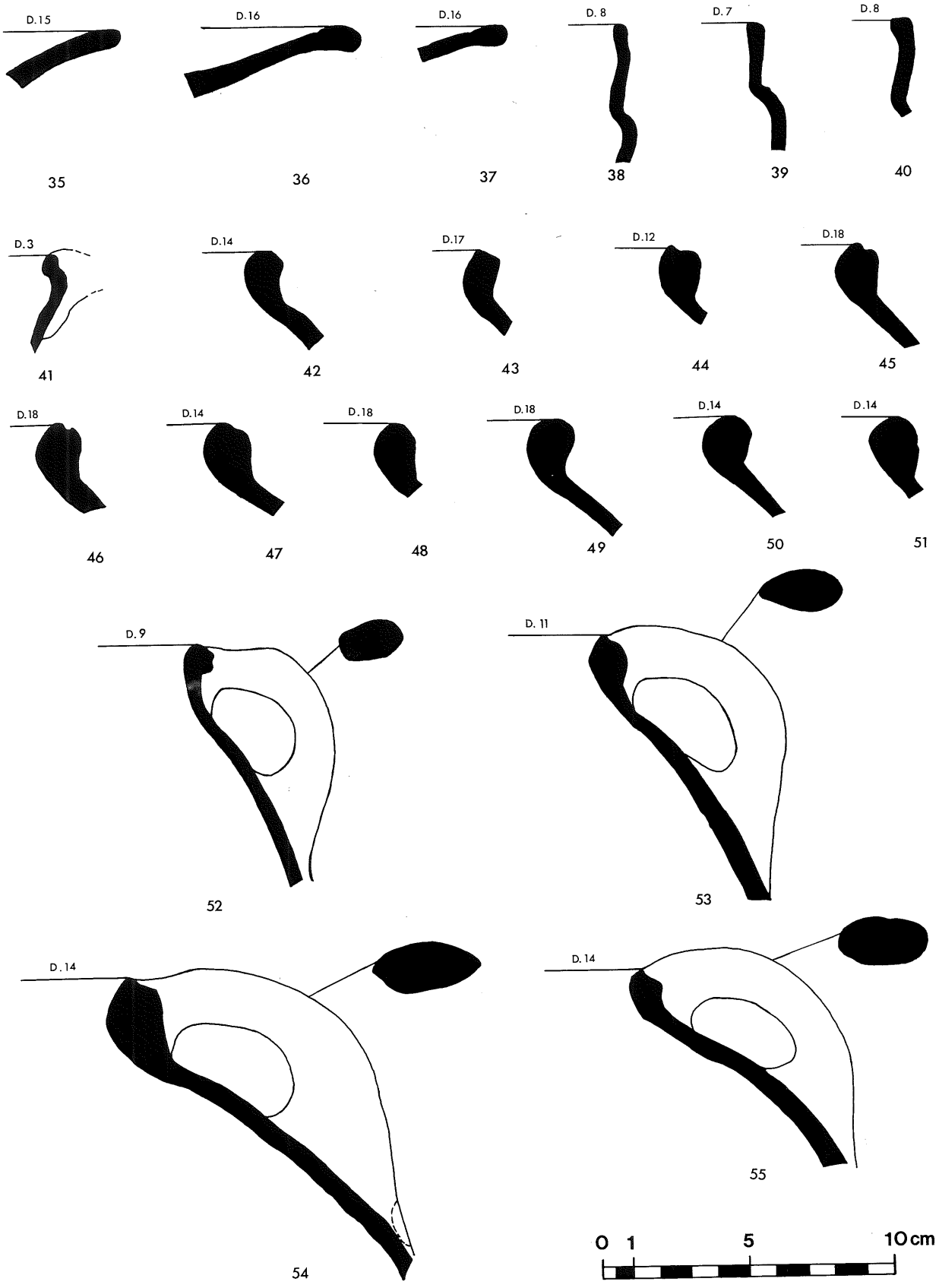
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Fig. 4

Legend to Fig. 5
Rujm Al-Ḥenu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.56	Jar	3	IV.1.17	IV.1.9	7.5YR 7/4 (pink) C medium, gray	none
IV.57	Jar	4	IV.1.17	IV.1.9	7.5YR 7/4 (pink) C thick, gray	none
IV.58	Jar	5	IV.1.19	IV.1.9	7.5YR 7/4 (pink) IE 10YR 8/3 (very pale vrown) C slight, light gray	none
IV.59	Jar	78	IV.3.11	IV.3.4	7.5YR 7/4 (pink) E 10YR 8/4 (very pale brown) C slight, 7.5YR 7/2 (pinkish gray)	none
IV.60	Jar	6	IV.1.17	IV.1.9	7.5YR 7/4 (pink) C slight, light gray	none
IV.61	Jar	44	IV.1.39	IV.1.18	7.5YR 6/4 (light brown) I gray C thick, gray	E burnishing
IV. 62	Jar	41	IV.1.34	IV.1.16 dark gray	2.5YR 6/8 (light red)	none
IV. 63	Jar	42	IV.1.34	IV.1.16	5YR 7/6 (reddish yellow) I and E (rim) dark gray E 10YR 7/3 (very pale brown) C thick, dark gray	none
IV.64	Jar	43	IV.1.17	IV.1.9	10YR 6/3 (pale brown) I and E (rim) dark gray C thick, dark gray	E wheel burnishing
IV.65	Jar	73	IV.3.11	IV.3.4	7.5YR 7/4 (pink) no core	IE slip: 10 8/2 (white)
IV.66	Jar	75	IV.3.16	IV.3.7	5YR 7/6 (reddish yellow) I 5YR 7/4 (pikn) E 10YR 7/3 (very pale brown) C thick, gray	none
IV.67	Jar	80	IV.3.11	IV.3.4	7.5 YR 7/4 (pink) C medium, gray	none
IV.68	Jar	17	IV.1.33	IV.1.16	2.5YR 6/8 (light red) I gray E 10R 5/6 (red) to 7.5YR 6/4 (light brown) C thick, light gray	none
IV.69	Jar	40	IV.1.22	IV.1.11	5YR 7/4 (pink) I gray E 5YR 6/4 (light reddish brown) C thick, gray	none
IV.70	Jar	81	IV.3.20	IV.3.8	5YR 7/4 (pink) C thick, dark gray	E slip: 10YR 8/3 (very pale brown)

Legend to Fig. 6
Rujm Al-Ḥenu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.71	Jar	79	IV.3.14	IV.3.7	5YR 7/4 (pink) E 10YR 7/3 (very pale brown) C thick, dark gray	none
IV.72	Pithos	82	IV.3.20	IV.3.8	5YR 7/4 (pink) C thick, light gray	E slip: 10YR 8/3 (very pale brown)
IV.73	Jar	65	IV.3.17	IV.3.7	5YR 7/6 (reddish yellow) I 7.5YR 7/4 (pink) C thick, light gray	E slip: 10YR 8/2 (white)

IV.74	Jar	57	IV.3.12	IV.3.4	7.5YR 7/4 (pink) IE 5YR 7/6 (reddish yellow) C slight, light gray	none
IV.75	Jar	60	IV.3.11	IV.3.4	7.5YR 7/4 (pink) C slight, light gray	none
IV.76	Jug	39	IV.1.26	IV.1.13	light gray E 5YR 5/4 (reddish brown) to light gray no core	none
IV.77	Jug	66	IV.3.20	IV.3.8	5YR 7/4 (pink) C medium, light gray	none
IV.78	Jug	38	IV.1.21	IV.1.11	7.5YR 7/4 (pink) C slight, gray	IE slip: 10R 5/6 (red) IE wheel burnishing
IV.79	Juglet	36	IV.1.21	IV.1.11	7.5YR 7/4 (pink) C slight, light gray	none
IV.80	Jug	71	IV.3.15	IV.3.5	7.5YR 7/4 (pink) C medium, gray	none
IV.81	Tripod Bowl?	77	IV.3.15	IV.3.5	7.5YR 7/4 (pink) C thick, gray	I (rim) and E wheel burnishing
IV.82	Tripod Bowl?	76	IV.3.11	IV.3.4	7.5YR 7/4 (pink) no core	I (rim) and E wheel burnishing
IV.83	Lamp	24	IV.1.17	IV.1.9	5YR 7/4 (pink) C slight, 7.5YR 6/2 (pinkish gray)	none
IV.84	Lamp	98	IV.1.34	IV.1.16	10YR 8/2 (white) no core	none
IV.85	Lamp	64	IV.3.17	IV.3.7	7.5YR 7/4 (pink) C slight, light gray	none
IV.86	Lamp	97	IV.3.15	IV.3.5	7.5YR 7/4 (pink) IE 7.5YR 8/2 (pinkish white) no core	none
IV.87	Body Sherd	102	IV.3.18	IV.3.8	7.5YR 7/6 (reddish yellow) C slight, 10YR 6/2 (light brownish gray)	E slip: 5YR 6/4 (light reddish brown) E paint: 2.5YR 4/2 (weak red and white E wheel burnishing
IV.88	Handle	94	IV.1.34	IV.1.16	5YR 7/6 (reddish yellow) I 10YR 6/3 (pale brown) C thick, gray	E slip: 10YR 8/2 (white)

Legend to Fig. 7
Rujm Al-Henu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.89	Base	8	IV.1.17	IV.1.9	5YR 7/4 (pink) C slight, light gray	none
IV.90	Base	83	IV.3.16	IV.3.7	7.5YR 7/4 (pink) I gray E 10YR 6/2 (light brownish gray) and gray C slight, gray	none
IV.91	Base	85	IV.3.16	IV.3.7	7.5YR 7/4 (pink) I 10YR 7/3 (very pale brown) E 10YR 8/3 (very pale brown) C slight, light gray	none
IV.92	Base	86	IV.3.14	IV.3.7	5YR 7/4 (pink) I dark gray E 10YR 7/3 (very pale brown) C thick, light gray	none
IV.93	Base	87	IV.1.33	IV.1.16	2.5YR 6/8 (light red) I light gray E 2.5YR 6/6 (red) C thick, light gray	none

IV.94	Base	47	IV.1.34	IV.1.16	gray IE very dark gray no core	IE wheel burnishing
IV.95	Base	84	IV.3.17	IV.3.7	5YR 7/4 (pink) no core	E wheel burnishing
IV.96	Base	7	IV.1.22	IV.1.11	5YR 7/6 (reddish yellow) I 2.5YR 5/6 (red) C slight, light gray	E slip: 10YR 8/2 (white)
IV.97	Base	45	IV.1.37	IV.1.15	gray E very dark gray no core	I slip: very dark gray,
IV.98	Base	46	IV.1.17	IV.1.9	gray I very dark gray E 10YR 5/3 (brown) no core	IE wheel burnishing
IV.99	Base	101	IV.1.33	IV.1.16	5YR 7/4 (pink) I 7.5YR 7/4 (pink) E 10R 5/6 (red) to 5YR 6/4 (light reddish brown) no core	I slip (patches): 2.5YR 6/6 (light red)
IV.100	Base	90	IV.3.17	IV.3.7	7.5YR 7/4 (pink) I gray C medium, gray	none

Legend to Fig. 8
Rujm Al-Henu West Type Series

No.	*Form*	*Reg. No.*	*Basket*	*Locus*	*Ware*	*Surface Treatment*
IV.101	Decanter	IV.2	IV.1.33-36	IV.1.16	5YR 6/6 (reddish yellow) C medium, gray	E slip: 10YR 8/2 (white) E wheel burnishing

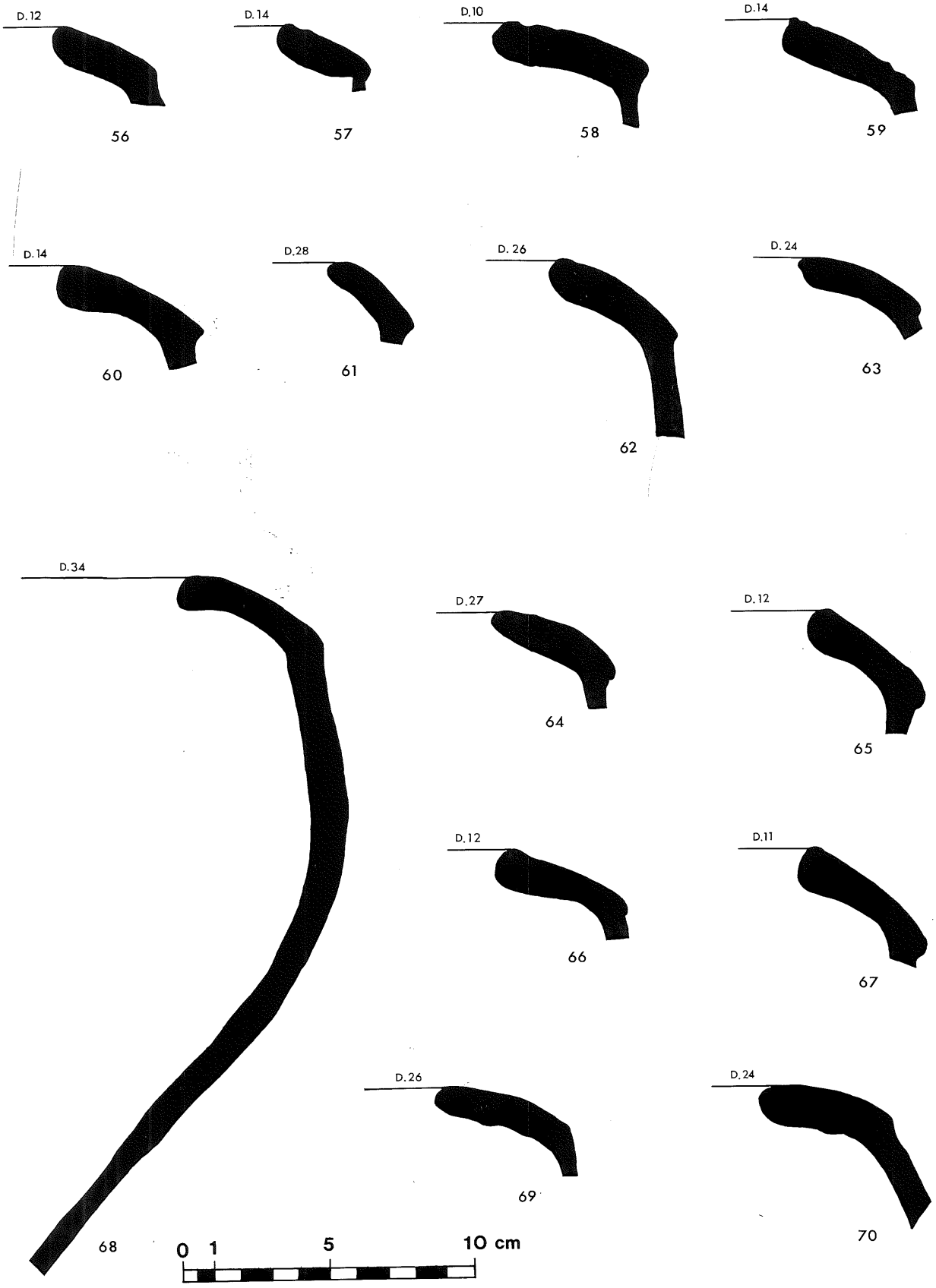
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Fig. 5

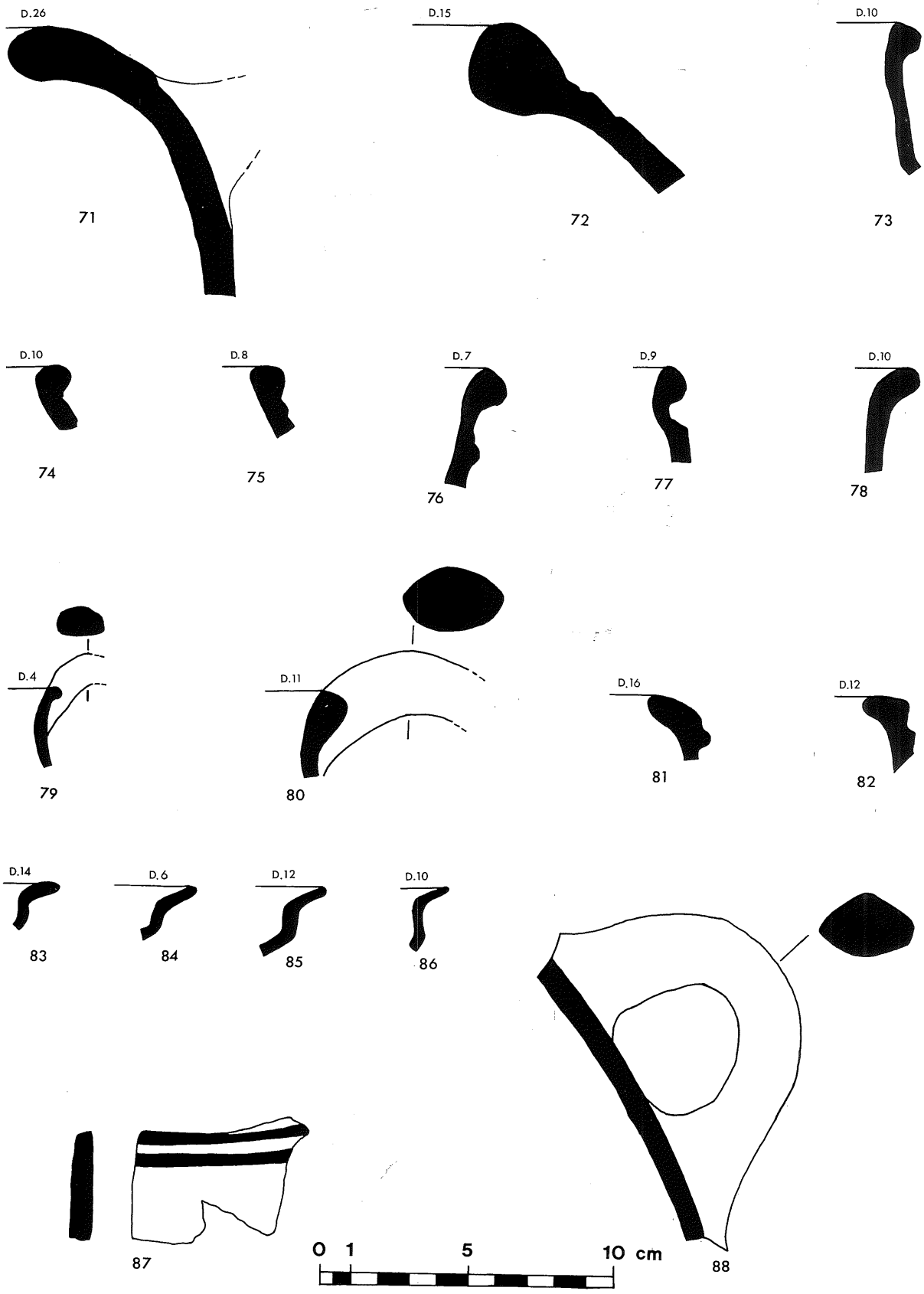
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Fig. 6

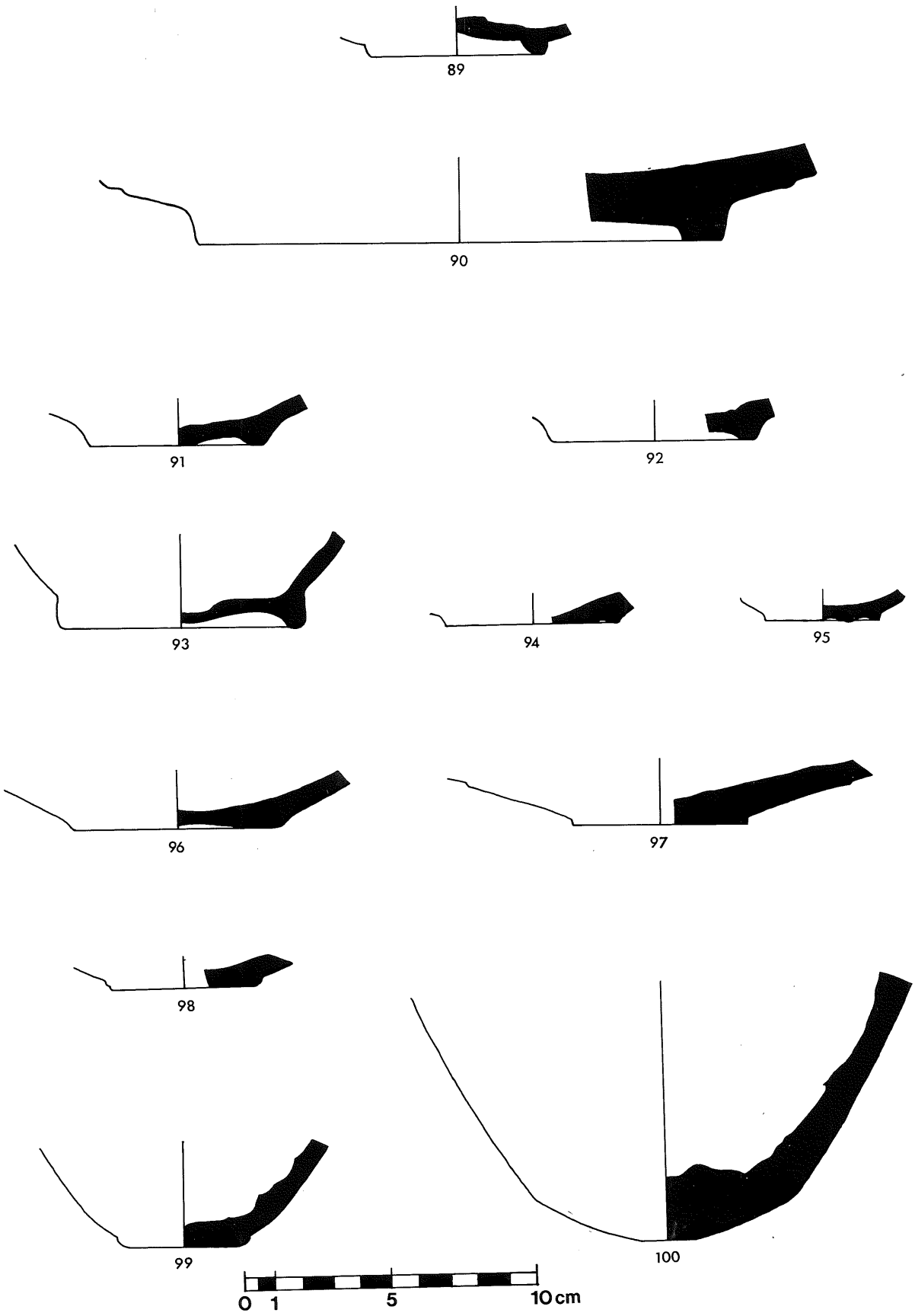

Fig. 7

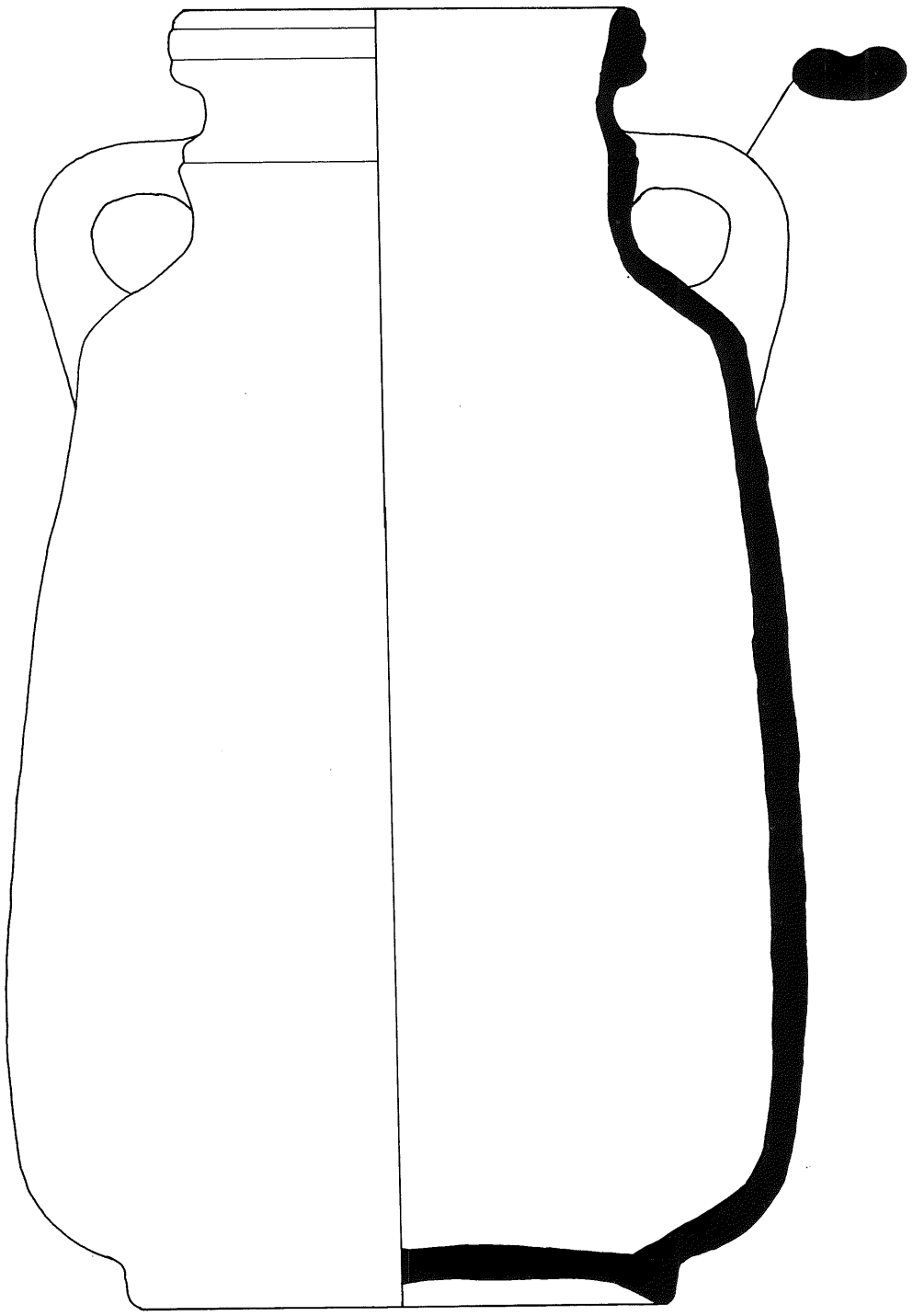

Fig. 8

derive from the typical, late Iron Age shallow, widely flanged form with a flat or disc base. They are of a highly fired, fine ware.

Bases

A representative collection of bases (III. 29-34; IV.89-100) from Rujm al-Ḥenu are illustrated. Most common are ring bases, usually from larger vessels, and step-cut and disc bases, often from bowls. Pedestal bases (III.29) are rare.

Ring bases are rather low as a rule. Gray interiors (III.30, 32; IV.92-93) point to closed forms, most likely holemouth jars. The thick, heavy ware of IV.90 is similar to that used for mortaria.

Among the step-cut bases (III.31, 34; IV.91, 94-95), IV.95 is the most often occurring form. Most of the disc bases (III.33; IV. 96-98) come from bowls, typically slipped (III.33 — red; IV. 96 — white; IV.97 — very dark gray) and burnished (III.33 — hand; IV.97- 98 — wheel). IV.99 is probably from a jug or jar, because of the poorly finished interior.

IV. 100 is the rounded base of a heavy storage jar, also represented by rims III.24 and IV.72 and handle III.28.

Painted Body Sherd

IV.87 illustrates the standard late Iron Age painted decoration (cf. Lugenbeal and Sauer, 1972: 61-62): a light reddish brown, wheel-burnished exterior slip has two preserved horizontal bands in a weak red with traces of a white band in between.

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LA CAMPAGNE DE FOUILLES 1982 A KHIRBET MEDEINET AL-MU'ARRADJEH PRES DE SMAKIEH (KERAK)

par
Emilio Olavarri

Durant l'été 1976, la Mission Espagnole réalisa un bref sondage archéologique dans les ruines de Medeinet al Ma'arradjeh près de Smakieh, dont il a été rendu compte dans cette même revue.[1]

Il s'agissait alors d'établir une chronologie préliminaire du site en prévision d'une campagne de fouilles plus importante. (fig. 1)

Comme nous l'avons dit à l'époque, Medeineh fut une cité forteresse située à la frontière orientale du royaume de Moab sur le flan occidental du wadi Modjib qui n'a révélé qu'une seule période d'occupation, pas très longue, pendant le XIIème et la première moitié du XIème siècle, c'est-à-dire, la phase la plus ancienne du Fer I Moabite.

En 1978, une mission de l'Armée de l'Air Espagnole survola le site (Pl. XXVIII) en vue d'obtenir les photographies nécessaires au levé des plans photogrammétriques que les figures 1 et 2 reproduisent, plans que nous avons utilisés avec profit pendant la dernière campagne.[2] Dans la même année, J.M. Miller prospecta la région de Moab au Sud du Wadi Modjib, et visita les ruines de Medeinet al-Mu'arradjeh en les distinguant de la Khirbeh homonyme de Medeinet 'Alia, située 5 k.m. au Sud, en bordure du même wadi.[3]

Ce n'est que pendant l'été 1982 que la Mission Espagnole put reprendre ses travaux à Medeinet al-Mu'arradjeh. Ceux-ci durèrent un mois (du 12 août au 13 Septembre) et furent dirigés avec la collaboration du Department des Antiquités de Jordanie. Nous devons les résultats de la campagne à l'aide et à l'interêt personnel du Directeur Général, le Docteur Adnan Hadidi. Le Docteur Fawzi Zayadine, promoteur de la fouille, nous a offert une collaboration également efficace.

Pendant la fouille, D. Mario Menéndez, auteur des plans des murailles et des structures, fut topographe-dessinateur. Je dois également signaler l'aide généreuse apportée par l'Ambassade d'Espagne à Amman, en particulier par son Excellence l'Ambassadeur D. Luis Pedroso, ainsi que l'appui tant moral que scientifique que nous a apporté à tous moments le Docteur Martin Almagro, Directeur de la Mission Espagnole en Jordanie. A tous, je rends hommage de ma plus sincère gratitude.

Le projet de cette campagne était centré sur deux objectifs. En premier lieu, nous voulions établir le plan des murailles défensives de la cité, visibles sur presque tout leur tracé en se servant des plans en courbes de niveau obtenus d'après les photographies aériennes (Fig. 2). Nous avions également l'intention de fouiller la porte de la cité dont la localisation était jugée suffisamment sûre après une prospection de la zone Sud-Est des ruines. On peut dire que ces deux objectfs ont été atteints de manière satisfaisante, malgré le peu de temps dont nous disposions.

Nous devons signaler que nous fûmes toujours conscients de la fragilité des structures en pierre de Medeinet al-Mu'arradjeh, due à la forte pente du sol de

[1] Cf. E. Olàvarri, *Sondeo Arqueologico en Khirbet Medeineh junto a Smakieh (Jordania), ADAJ,* XXII (1977-1978), p. 136-149 et pl. LXXXIV. Nous utilisons le toponyme *Medeinet al Mu'arradjeh* en nous référant à la cité fouillée par la Mission Espagnole à Smakieh sur le wadi du même nom. *Medeinet 'Alia,* est le nom donné par les paysans à la Kirbeh homonyme, située à 5 km. au Sud prospectée par N. Glueck *(AASOR), XIV, p.* 32-33 et 98.

[2] Cf. A. Almagro, *The Photogrammetric Survey of the Citadel of Amman and other Archaeological Sites in Jordan, ADAJ,* XXIV (1960), p. 111-119. Voir *Ibid.,* pl. LXXI, 1 et 2 les photos respectives de Medeinet al-Ma'arradjeh et Medeinet 'Alia.

[3] J. Maxwell Miller, *Archaeological Survey South of Wadi Mujib. Glueck's Sites Revised, ADAJ,* XXIII (1979), p. 79-92.

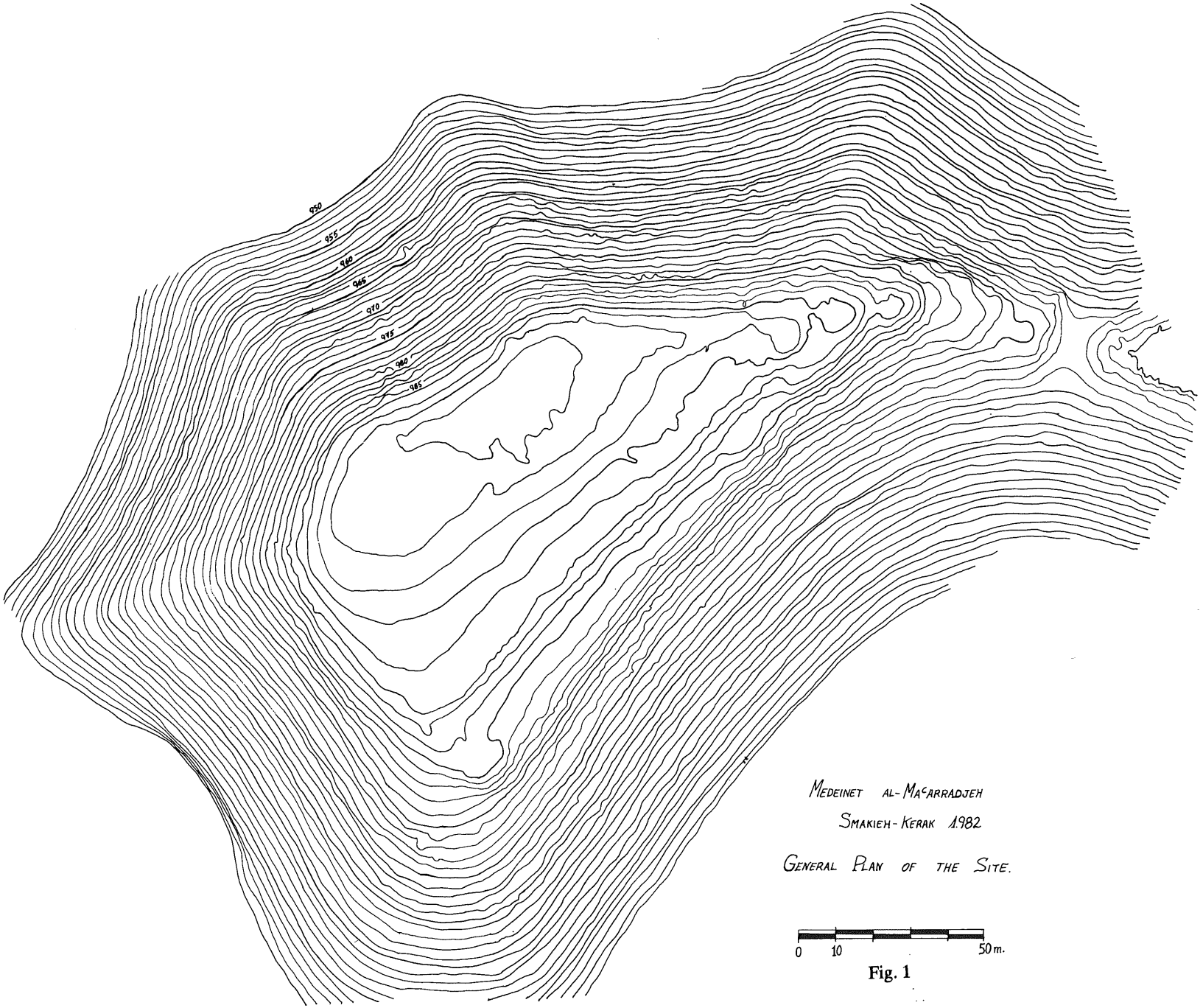
950
955
960
965
970
975
980
985
MEDEINET AL-MAᶜARRADJEH
SMAKIEH-KERAK 1982
GENERAL PLAN OF THE SITE.
0
10
50 m.

Fig. 1

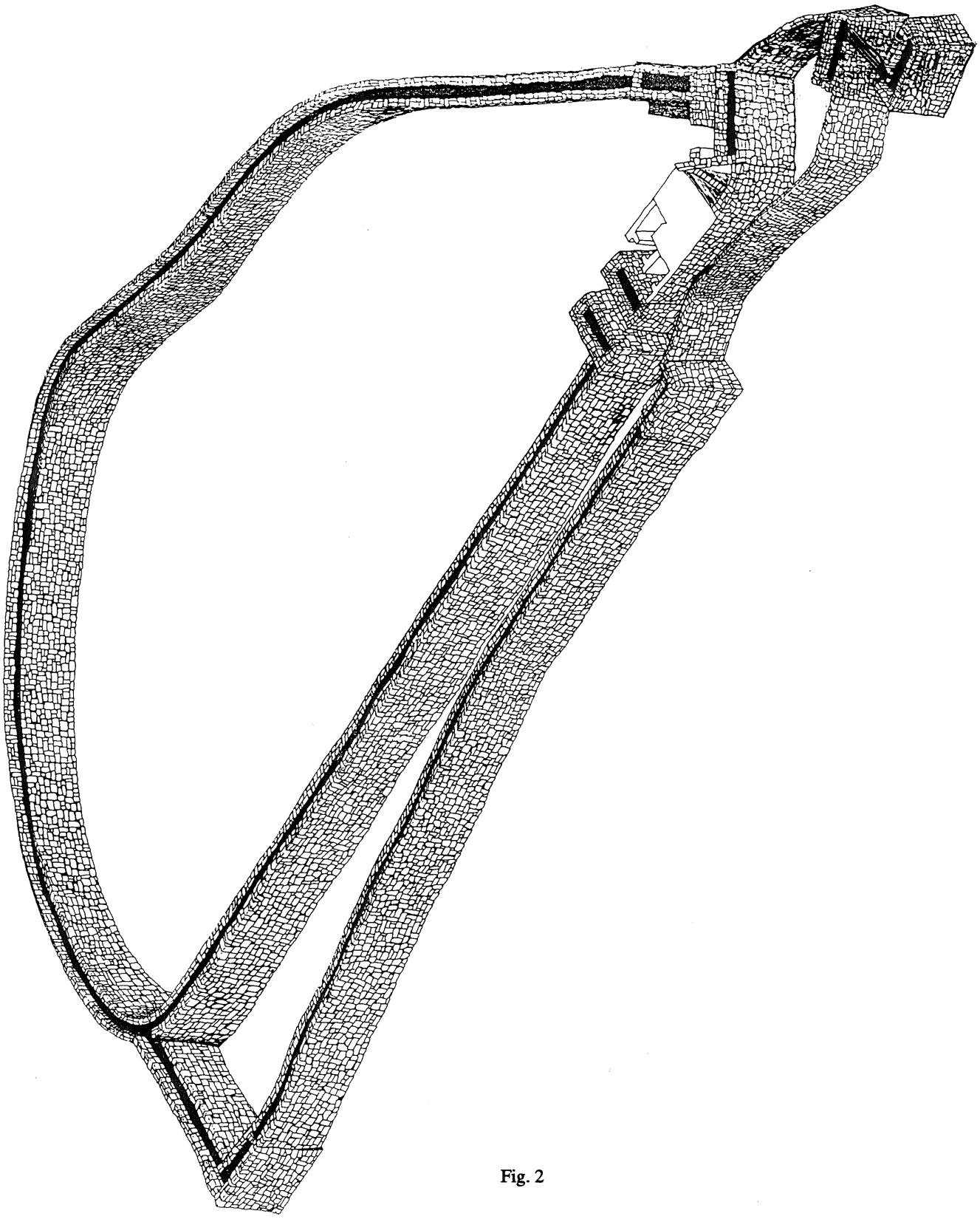

Fig. 2

la cité sur lequel elles étaient construites et surtout à la mauvaise qualité de leur maçonnerie. En effet, le liant utilisé est un mortier de terre à faible cohésion, que l'eau dissoud facilement. Nous n'avions pas les moyens de les consolider, et nous avons jugé préférable de ne dégager qu'en surface les structures que nous ne pensions pas fouiller en profondeur, à seule fin de les reporter sur le plan général. Nous croyons ainsi avoir évité leur détérioration rapide et leur disparition.

Les Murailles (Fig. 3)

Le tracé des murailles qui défendaient la cité présente une forme ovale qui s'ajuste au contour de la plate-forme naturelle de la colline. Il est large et ouvert dans la partie Nord, se resserrant en angle aigu dans la partie Sud où est située la porte. L'accès au plateau de Medeineh se fait par le Sud, en passant par un isthme étroit au Sud de la tour 3; sur celui-ci, on distingue un reste de construction en remblai compact, fait de gros blocs. Comme à Medeinet 'Alia, la cité jumelle située à 5 km. au Sud, le chemin extérieur qui conduit à la cité était dallé; certaines pierres sont encore en place.

Sur ses flancs Nord et Est, là où la pente de la colline est la plus escarpée et pratiquement inaccessible à un agresseur, la cité était défendue par une seule muraille, dont le sommet est encore visible sur la majeure partie de son tracé. Dans ce grand tronçon, la largeur totale de la muraille varie de 3.70 m. à 4.00 m.; elle est construite avec deux parements parallèles, extérieur et intérieur, de 1.00 m. d'épaisseur chacun et reliés par un massif de terre et de pierres de moindres dimensions.

Dans sa partie occidentale, moins pentue, la cité possède deux murailles défensives. La muraille intérieure, la plus haute, prend naissance au coin Sud-Ouest de la tour 4, prolongeant le mur Sud de cet édifice, et de là, va en ligne droite jusqu'à l'angle Nord-Ouest de la cité où elle rejoint la muraille inférieure. La largeur de cette muraille varie de 3.50 à 3.75 m.; elle est également construite avec deux parements et un blocage intérieur de pierres. Contre la partie Sud de cette muraille intérieure, dans la cité, furent construites quelques maisons qui, comme la C-3, s'appuyent sur l'enceinte. A la hauteur de la tour 2, il semble que la muraille intérieure s'interrompe, laissant une ouverture ou porte (défendue par des tours?) qui permet l'accès à l'espace situé entre les deux murailles. Sur sa moitié Nord, nous avons observé une rangée d'habitations adossées à la face intérieure de la muraille, dont certaines présentent encore piliers et linteaux. Si Medeinet al Mu'arradjeh a été une citadelle militaire (hypothèse non vérifiée), il s'agissait de casemates occupées par la garnison de la place.

La muraille extérieure occidentale se distingue de la précédente par un tracé plus irrégulier. Son épaisseur est aussi plus faible (elle varie de 3.30 m. à 3.50 m.). Il semble qu'il s'agisse d'une muraille complémentaire, comme l'indique sa construction en pierres plus petites disposées en appareil irrégulier, ce qui a facilité leur éboulement sur la pente, déformant ainsi légèrement le tracé. On a pu vérifier que cette muraille inférieure s'appuie sans s'engager contre les tours 1 et 2. Le tronçon Sud de cette muraille, c'est-à-dire celui compris entre la tour 2 et la pointe méridionale de la cité, n'a pu être examiné sinon sur sa face extérieure. L'espace intérieur qui s'étend entre ce tronçon de la muraille inférieure et les édifices maison C-3 et tour 4 n'a pas de passage ou de corridor, et est apparemment constitué d'un remplissage de pierres.

Nous avons remarqué que les murailles de Medeineh ne présentent pas de blocs cyclopéens comme on peut les voir utilisés dans d'autres cités contemporaines et voisines de Moab (par exemple celles de Balu'a et Medeinet 'Alia). L'appareil des murs n'est pas non plus à carreaux et boutisses; il est assez fruste, sans assises continues.

Entre les deux murailles occidentales de l'emplacement de la tour 2 à l'extrême Nord, s'étend un espace *"inter muros"* vide de structures. Pendant le travail de nettoyage de la tour 2, nous avons dû noter que cet espace possède un sol

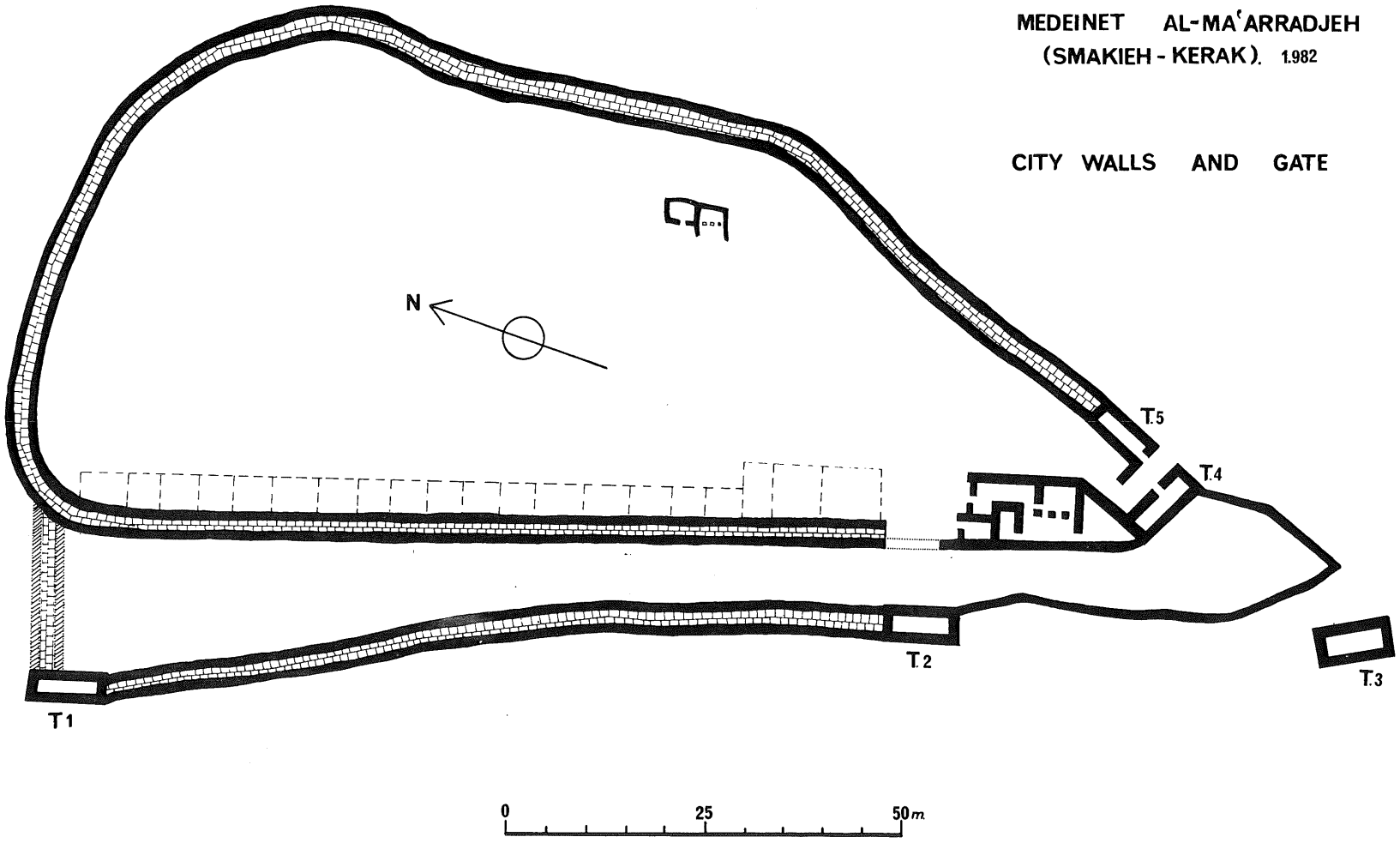
MEDEINET AL-MA'ARRADJEH
(SMAKIEH - KERAK). 1.982
CITY WALLS AND GATE
N
T.5
T.4
T.2
T.3
T.1
0
25
50 m.

Fig. 3

empierré, fondé sur des piliers composites, alignés: Tout l'espace entre ces piliers a été rempli de débris de construction. Sur ces piliers reposent des linteaux, parfois de chant, qui soutiennent le pavement du sol. C'est le même système qui est employé pour la construction des terrasses des maisons, comme nous le verrons plus tard.

Les tours (Fig. 3 et 5. Pl. XXIX,1)

La muraille inférieure occidentale est renforcée par deux tours, situées l'une à son extrémité Nord, tour 1 et l'autre en son milieu, tour 2. La tour 1 s'est révélée très détruite en surface. Faute de temps, il n'a pas été possible de nettoyer ses limites et de faire le croquis complet de sa structure (Fig. 5). Sa face occidentale extérieure mesure 9.25 m. de large sur 1.00 m. d'épaisseur de parement. Cette tour constitue le coin Nord-Ouest de la muraille.

La tour 2 est située au tiers Sud de la muraille inférieure. Elle a une forme également rectangulaire, mesurant sur son côté extérieur 9.75 m. de long sur 4.75 m. de large. Sa structure extérieure est constituée par un mur de 1.00 m. d'épaisseur. L'intérieur est plein, rempli de terre et de pierres. En aucun point de ses flancs en effet, nous n'avons noté de porte. La muraille inférieure occidentale s'appuie sans s'engager sur cette tour 2. Sa partie Sud touche l'angle Sud-Est de la tour sans lui être appareillée, ce qui a provoqué l'écroulement partiel de celle-ci à cause de la pente, cédant sous la pression des décombres accumulés entre les deux murailles. La partie Nord de la muraille part de la face Nord de la tour 2, et possède un tracé légèrement incurvé jusqu'au contact de la tour 1.

La fonction principale de ces deux tours ne paraît être ni défensive ni stratégique. Je pense que l'on a voulu ainsi renforcer la structure de la muraille en ses points les plus fragiles. La tour 1 consolide le retour de la muraille inférieure qui rejoint la muraille haute. Par ailleurs, à la hauteur de la tour 2, la muraille inférieure présente un décrochement qui agrandit l'espace existant entre les deux murailles et forme un autre saillant que l'on a renforcé avec cette nouvelle tour.

La tour 3 (Fig. 5 et planche XXIX, 1) est construite hors les murs de la cité, à son extrémité Sud. Cette tour pleine extérieure que l'on appelle en Espagnol "albarrana" (arabe "albarrani") est semblable aux précédentes; sa forme rectangulaire mesure 9.75 m. de long sur 5.00 m. de large. Elle a également un mur de 1.00 m. d'épaisseur à double parement et son intérieur est rempli de pierres et de terre. La distance minimale entre la pointe Nord-Est de la tour 3 et la muraille est de 4.50 m., distance qui était couverte par un pont qui la reliait à la cité. Ses quatre côtés extérieurs ont été suffisamment dégagés pour que l'on puisse affirmer avec certitude que cette tour n'a pas de porte à la hauteur du sol. Le chemin d'accès à la cité passait au pied de la façade Sud de la tour 3, et de là, par une forte pente, arrivait à la porte principale située entre les tours 4 et 5. Il est possible que ce chemin, aujourd'hui totalement détruit par l'érosion de la pente, ait été pavé.

Face à la tour 3, la muraille de la cité tourne brusquement. Grâce à un nettoyage léger de cette zone, on a pu observer clairement que cette pointe Sud de la muraille est une structure entièrement pleine, construite en pierres dégrossies et disposées en carrés juxtaposés, sur lesquelles s'élevait une tour d'angle qui en son temps atteignait la hauteur de la terrasse de la tour 3, avec laquelle elle communiquait par un pont.

La porte de la cité (Fig. 3 et 4; XXX et XXXI, 1-2)

La porte de la cité était située à l'extrême Sud de la muraille orientale, sur le versant le plus escarpé de la colline. Ses structures les plus notables sont les tours 4 et 5 disposées perpendiculairement et non parallèles. La tour 4 a une forme rectangulaire légèrement déformée et mesure 11.00 m. de long sur 5.00 m. de large en moyenne. Sa construction est très massive. Les murs ont 1.00 m. d'épaisseur, laissant à l'intérieur un grand espace (non fouillé) dans lequel on entre par une porte de 1.20 m. de large, située sur son côté Nord.

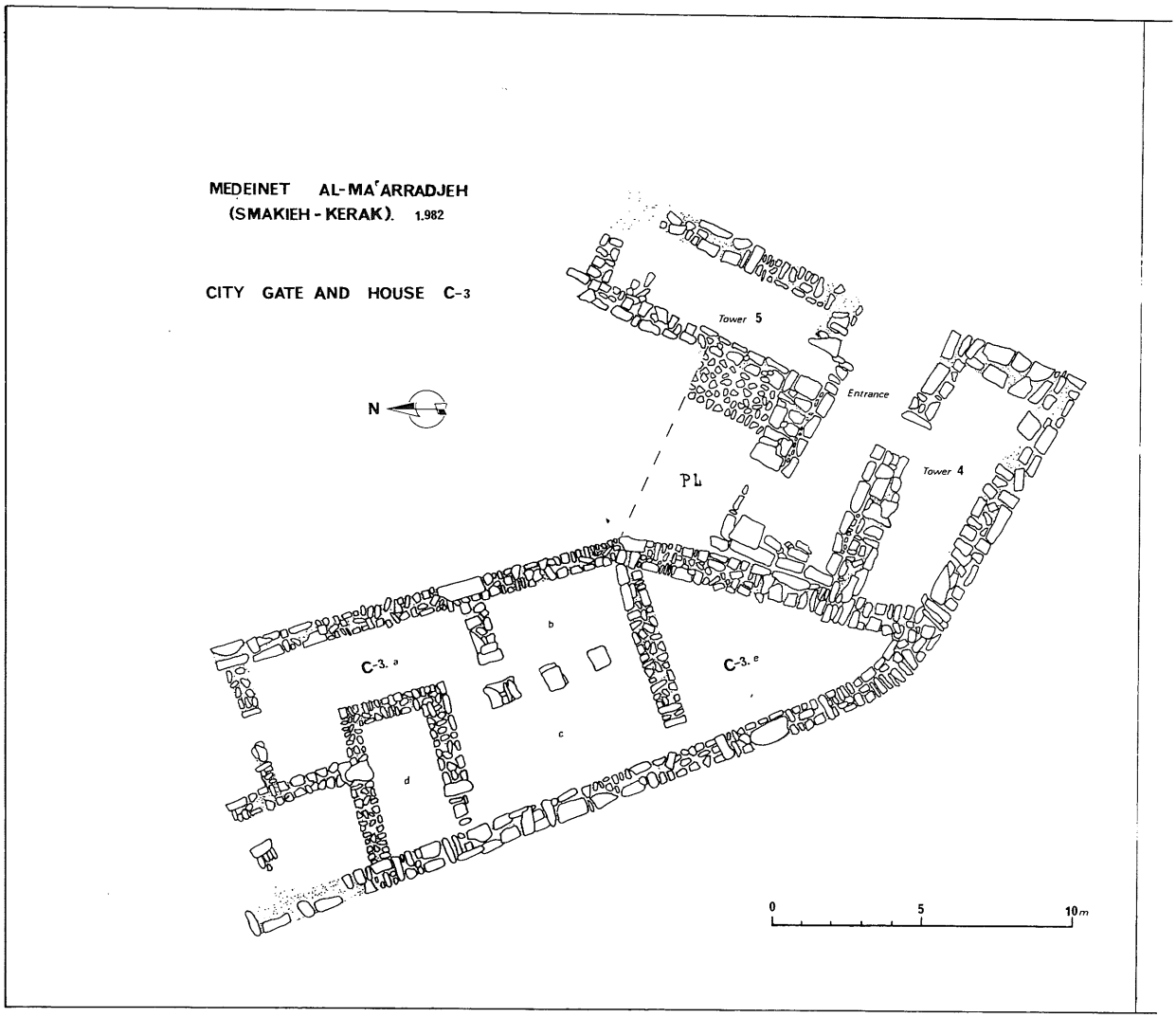
MEDEINET AL-MA'ARRADJEH
(SMAKIEH - KERAK). 1.982
CITY GATE AND HOUSE C-3
N
Tower 5
Entrance
Tower 4
Pl
C-3. a
b
c
d
C-3. e
0
5
10 m

Fig. 4

MEDEINET AL-MA^{c}ARRADJEH
SMAKIEH - KERAK. 1.982

THE TOWERS

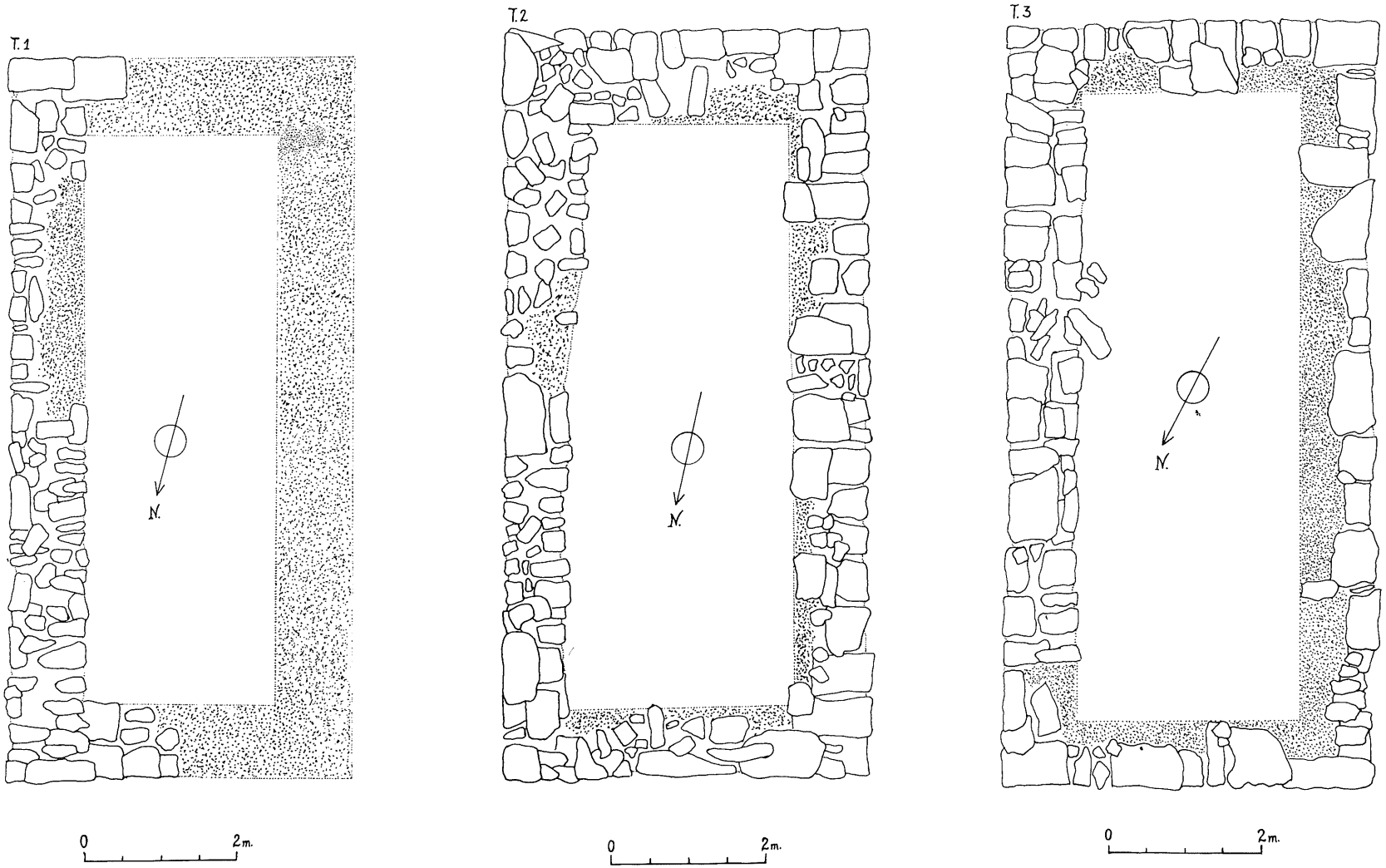

Fig. 5

La tour est alignée sur la muraille orientale dont elle est l'extrémité. Elle est aussi rectangulaire, mesurant 9.00 m. de long sur 4.00 m. de large. Sa largeur coïncide avec celle de la muraille orientale. L'épaisseur de ses murs est de 1.00 m. La pièce intérieure avait un remplissage de terre qui nivelait les irrégularités du rocher qui affleure en quelques points.Le niveau de ce remplissage est à 0.43 m. au-dessus du sol de la porte de la ville. La porte qui donne accès à la tour 5 est ouverte sur son mur Sud, et on voit à l'extérieur une partie de l'escalier. Dans l'angle Sud-Est de la tour 5 apparaissent des restes d'un foyer avec de la vaisselle domestique, utilisée sans doute par la garde qui surveillait l'entrée de la ville. Les fondations de la paroi Est de cette tour ont disparu en grande partie. Elles se sont écroulées dans l'effondrement d'une tombe antérieure (du Bronze Ancien?) creusée sur le flanc de la colline. La paroi occidentale de la tour 5 a été renforcée par un gros contrefort de 1.40 m. de large construit à l'intérieur de la cité et adossé à elle. Elle renforçait cette importante structure, creusée à l'intérieur.

Le vestibule de la porte a une largeur de 2.50 m. sur 10.00 m. de profondeur (Pl. XXIX, 2). A l'emplacement du seuil on trouve aujourd'hui le rocher qui descend vers l'Est. Le sol de ce vestibule est de terre brune, et sur celui-ci apparaissent d'abondantes cendres. Nous n'avons retrouvé aucun reste de dallage ni de seuil. Ce vestibule rectangulaire était délimité au Sud par la tour 4, au Nord par la tour 5 et un redent supplémentaire qui prolongeait sa paroi Sud, et à l'Ouest par un mur qui séparait le vestibule du locus C-3.e. On a construit des banquettes de pierres, adossées à ces trois parois et qui s'élèvent à 0.45 m. du sol; elles ne se poursuivent pas au-delà des tours 4 et 5 en direction Ouest (Pl. XXXI, 1, 2). A côté de la paroi occidentale du vestibule, il y a un escalier de trois marches dont la fonction peut être interprétée de diverses manières (Pl. XXX, 1). Peut-être, on l'utilisait comme pierre pour aider à enfourcher une monture ou bien, c'était le siège réservé au président des assemblées qui se tenaient dans la porte de la cité, selon de nombreux témoignages de l'Ancien Testament, ou encore comme piédestal d'une statue.

On entre dans la cité par un étroit passage latéral du vestibule (1.80 m. de largeur). Ce passage s'ouvre dans un mur d'1.00 m. d'épaisseur, fait de grosses pierres.

Passé cette porte, on se retrouve dans un espace ouvert dont la fouille a été à peine ébauchée. Le sol d'occupation de celui-ci se trouve seulement à 0.55 m. en-dessous du niveau de destruction; il était fait d'une couche de terre battue mêlée à de la chaux broyée. C'est un sol tout à fait approprié aux espaces ouverts à l'air libre et de passage fréquent. Il est possible de situer ici la place proche de la porte de la cité.

La maison C-3 (Fig. 3 et 4).

Cet intéressant édifice appartenait sans doute à quelque famille ou personnage important de la cité comme pourrait l'indiquer la qualité de sa structure et la proximité de la porte. Il n'a été fouillé qu'en surface. Ce n'est que dans le locus C-3.d que nous avons atteint le sol d'occupation, nous limitant pour le reste à donner une vue du tracé superficiel des murs pour en saisir le plan. Cette maison comprend: une cour ouverte (a), deux pièces séparées par des piliers (b et c), une pièce d'habitation entourée de murs (d) et un réduit triangulaire (e).

Le locus C-3.d. est une pièce rectangulaire de 4.50 m. de long sur 2.30 m. de large. Ses murs, conservés pour certains sur une hauteur de 2.00 m. sont bien appareillés. Sur le mur oriental, il y a une fenêtre (Pl. XXX, 2), à 0.60 m. au-dessus du sol, ayant une ouverture de 0.55 m. de haut sur 0.35 m. de large. Il paraît clair que cette fenêtre fut ouverte parce que c'est de la cour C-3.a que venait la seule lumière qui éclairait la maison. La porte, située dans l'angle Sud-Ouest à côté de la paroi de la muraille, mesure 1.30 m. de large, et conserve son seuil, en place. Le sol est de terre et dessus n'apparaît rien d'autre que des fragments de jarres de stockage. L'absence de cendres et de vaisselle nous font penser que cette pièce était destinée au coucher. La cuisine était

probablement installée dans une des pièces restantes.

Le locus C-3.a est une cour; la porte de la maison était située dans son mur Nord. Elle communique avec la pièce C-3.b et d par une porte étroite de 0.70 m. de large ouverte entre son mur Sud et un des derniers piliers. Ces deux pièces C-3.b et c étaient séparées par trois piliers monolithes. Sur ces piliers et sur les murs Nord et Sud de la pièce C-3.c reposaient quatre linteaux doubles dont certains sont encore *in situ;* on retrouve les autres tombés au pied des piliers sur le niveau de destruction. Ces linteaux ou architraves sont constitués de longues pierres horizontales, posées de chant et leur longueur varie de 1.60 à 2.00 m. Ils constituent les poutres maîtresses sur lesquelles repose la terrasse, qui couvrait les trois pièces C-3. b, c et d, et servait de plate-forme intérieure à la muraille intérieure.

Le locus C-3.e, dont la forme triangulaire a été commandée par l'emplacement de la muraille intérieure et le mur occidental de la porte de la cité, est difficilement identifiable dans la mesure où il n'a pas été fouillé en profondeur. Il est possible qu'on ait là l'escalier par lequel on accédait au toit de la maison.

La céramique (Fig. 6).

Pendant cette campagne, nous avons retrouvé la majeure partie des types et formes céramiques que nous présentions dans notre premier rapport *(ADAJ,* XXII, p. 147, Fig. 2). Les fragments recueillis, peu nombreux, ne nous permettent pas d'offrir un répertoire complet des vases typiques du Fer I Moabite. La majeure partie de ces fragments furent trouvés sur les sols d'occupation, peu d'entre eux provenant des couches de destruction de la cité. C'est une céramique très uniforme, attribuable à un seul niveau d'occupation de la cité pendant le Fer I ancien (XIIème et XIème siècles). Les fragments de grandes jarres de stockage et de cratère prédominent; moins nombreux sont les fragments de vases plus petits (jarres à eau, marmites, bols, etc...). Nous n'avons enregistré aucun fragment de lampe, sans doute parce que nous n'avons pas fouillé de sols de maisons.

La pâte de la céramique de Khirbet al-Mu'arradjeh est de qualité médiocre. Elle possède une grande quantité de particules dégraissantes assez grosses, même dans les petits bols. La cuisson est uniforme, sauf dans les fragments de grandes jarres qui ont un noyau de pâte grise et même noire.

La tradition typologique du Bronze Récent est présente dans presque tous les exemplaires rencontrés dans la cité. Tant dans les formes que dans l'engobe blanc caractéristique qui recouvre la majeure partie des vases, grands ou petits, on retouve le témoignage incontestable d'un héritage reçu de l'époque céramique antérieure. Nous faisons référence au Bronze Récent de Palestine, période certainement attestée en Moab (Balu'a, 'Arô'er), mais non suffisamment fouillée ni connue. Signalons, dès l'abord que la décoration peinte a totalement disparu sur la céramique du Fer I de Khirbet Medeineh, comme sont également inconnues toutes les formes d'origine étrangère qui s'introduisent à cette époque en Palestine, par exemple, la céramique, méditerranéenne philistine. On n'a trouvé aucun fragment de céramique polie en surface.

Durant cette campagne, sont apparus quelques fragments de bords du type des grandes jarres de stockage *(pithoi),* identifiées par W.F. Albright comme "collared rim jars"[4] par leur trait caractéristique et auxquelles il attribue, le premier, une valeur chronologique distinctive dans la céramique du Fer I. Ces jarres sont de forme ovoïde, parfois même elliptique; leur base est arrondie, et toutes ont deux anses verticales posées sur le départ de la panse. A Medeinet al-Mu'arradjeh comme en Palestine, apparaissent deux types successifs dans le temps. Le type le plus ancien de *pithos* se caractérise par un col haut à profil

[4] W. F. Albright *The Archaeology of Palestine,* London 1954, p. 118.

[5] W. F. Albright et J. L. Kelso, *The Excavation of Bethel* (1934-1960), *AASOR,* Vol. XXXIX (1968), pl. 56 (1-22) et pl. 61 (1).

Figure 6

No.	No. reg.	Date	Locus	Description
1	MC-8231	8.9	C-3.d	Bord de bol caréné. Pâte blanche à grandes particules noires. Cuisson uniforme. Engobe blanc en partie disparu.
2	MC-8230	27.8	PL	Bord de bol. Pâte ocre à particules noires dans la section.
3	MC-8219	6.9	PL	Bord et panse de bol caréné. Pâte blanchâtre à particules noires. Cuisson homogène. Engobe blanc à l'extérieur.
4	MC-8228	14.8	C-2	Fragment de marmite à anse. Pâte rougeâtre avec d'abondantes particules de calcaire, à section noire.
5	MC-8215	17.8	C-2	Marmite complète. Pâte rouge foncé avec d'abondantes particules de calcaire. Cuisson uniforme.
6	MC-826	30.8	Porte	Fragment de bord et col de jarre. Pâte rouge à particules. Cuisson uniforme.
7	MC-8216	6.9	PL	Bord et col de jarre de stockage. Pâte rouge à particules. Cuisson uniforme. Engobe blanc à l'extérieur.
8	MC-8221	25.8	PL	Bord et col de jarre de stockage. Pâte rouge, noire à la section avec abondantes particules.
9	MC-823	4.9	C-3.b	Bord de jarre de stockage. Pâte rouge avec abondantes particules. Cuisson uniforme.
10	MC-8222	4.9	C-3.a	Bord de jarre de stockage. Pâte rouge à particules abondantes roses. Cuisson uniforme.
11	MC-8227	31.8	Porte	Borde de jarre de stockage. Pâte rouge à section noire avec abondantes particules.
12	MC-8224	6.9	C-3.d	Anse verticale de jarre de stockage. Pâte rouge à section grise avec abondantes particules roses. Engobe blanc à l'extérieur.
13	MC-828	4.9	Porte	Bord de cratère. Pâte rouge à particules abondantes. Cuisson uniforme.
14	MC-827	4.9	Porte	Bord de cratère. Pâte rouge foncé à particules roses abondantes. Cuisson uniforme.
15	MC-8225	6.9	C-3.d	Bord et col de cratère. Pâte rougeâtre à section grise, engobe blanc à l'extérieur.
16	MC-8229	26.8	PL	Bord de cratère. Pâte rouge foncé. Dégraissant peu visible. Cuisson uniforme.
17	MC-8226	6.9	C-3.d	Base de cratère annulaire. Pâte rouge, à section noire, à particules et engobe extérieur blanc.

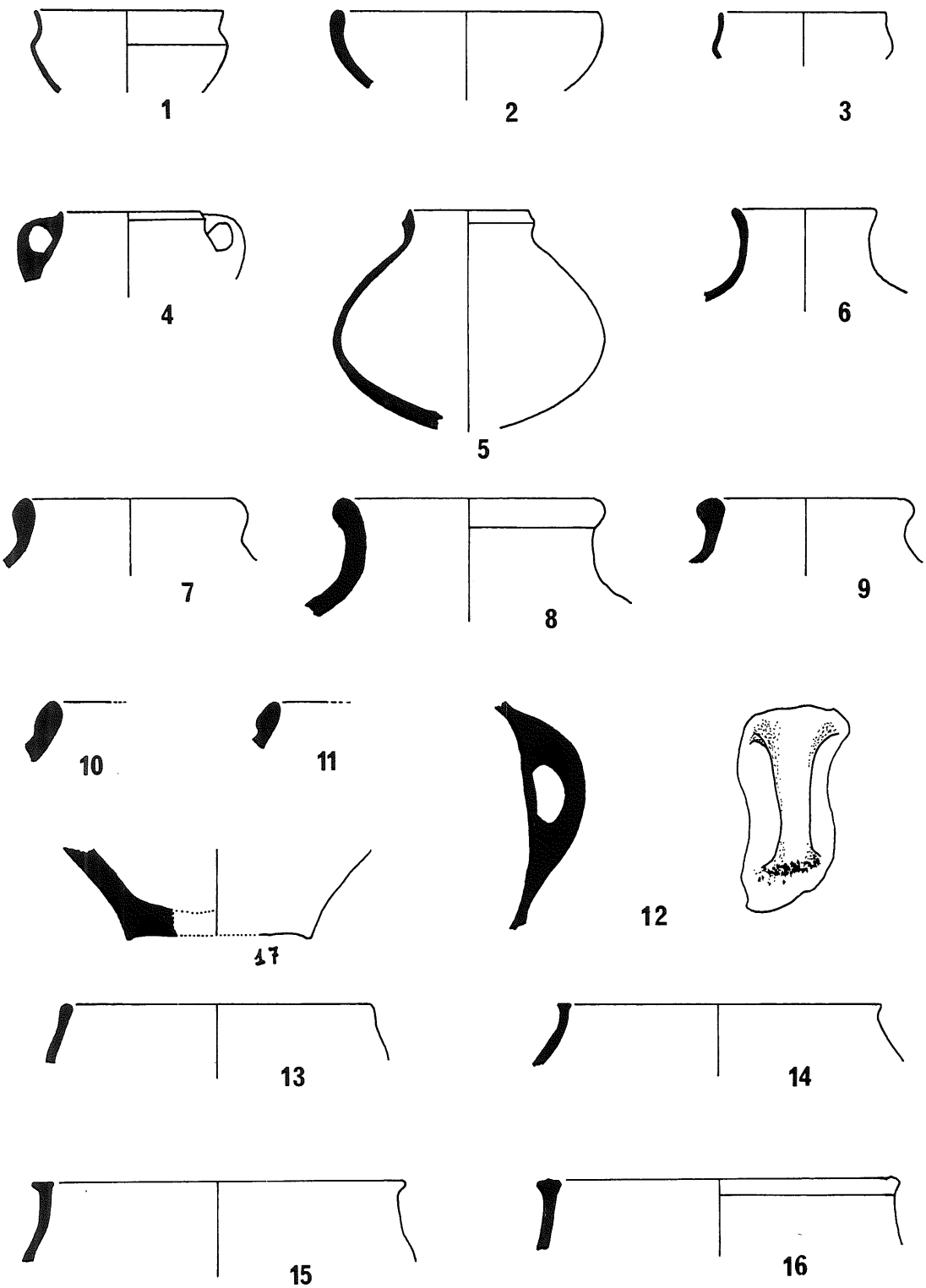

Fig. 6

concave, et un rebord circulaire éversé (Fig. 6:8). Cette classe de jarres commence à apparaître en Palestine à la fin du XIIIème, avant l'invasion philistine, et disparaît vers l'année 1050 av.J.C. Sa présence est enregistrée dans le niveau VII de Megiddo (première moitié du XIIème siècle), dans les trois premières phases de l'édifice du Fer I, 1 (1225-1150) de Bethel 5 et dans la phase 1 de 'Ai (et-Tell).[6]

Le second groupe, chronologiquement et typologiquement postérieur au précédent, comporte un col plus court et bas (fig. 6: 7, 9, qui tend à disparaître (Fig. 6 : 10, 11). Dans ces deux derniers exemples, le bord se replie sur lui-même vers l'extérieur formant une lèvre épaisse. A en juger par sa pâte, le fragment représenté par la figure 6: 12 appartient à ce dernier type de *pithos*. En Palestine, les jarres de stockage pendant la seconde moitié du XIeme siècle, et leur apparition a été attribuée à la création céramique des israélites récemment installés dans la région.[7]. Nous ne pouvons affirmer que les exemplaires moabites de Khirbet Medeineh reproduisent exactement les modèles occidentaux de Palestine appartenant à ce second groupe dans la mesure où fait défaut le "collar" qui les caractérise.[8] Nous dirons plutôt que pendant le XIème siècle le type de *pithos* moabite évolue vers une forme propre, créant une variante de cols nettement differenciés.

Nous voulons signaler un détail stratigraphique qui peut avoir quelque intérêt pour la chronologie de la cité de Khirbet Medeineh. Le fragment de *pithos* le plus ancien appartenant au premier groupe (Fig. 6: 8) a été trouvé dans les pierres qui forment le contrefort adossé à la paroi occidentale de la tour 5. Il appartient par conséqent à l'époque de la construction de la cité. En revanche, les fragments du second groupe, comme ceux de la Fig. 6 (7, 9, 10 et 11), sont en général relativement abondants et apparaissent sur les sols d'occupation ou dans les niveaux de destruction. Il s'agit sans doute du modèle de jarre en usage au moment où la cité fut détruite ou abandonnée.

Le col de jarre (Fig. 6: 6) présente dans sa pâte et son aspect, tous les traits caractéristiques de la céramique du Fer I de Khirbet Medeineh. Sa forme en revanche est anachronique, pouvant appartenir au type de "jarre domestique" decorée qui figure dans le répertoire du Bronze Récent II B de Palestine et de Transjordanie.[9]

Les bols carénés (Fig. 6: 1, 3) sont déjà connus à Medeinet al-Mu'arradjeh (*ADAJ,* XXII, p. 147, Fig. 2 (4), 5 et 6). Ces nouveaux exemplaires sont légèrement plus petits. Le numéro 1 a une carène plus marquée et le numéro 3 a la partie supérieure de sa paroi repliée vers l'intérieur de manière inhabituelle.

Le bol arrondi (Fig. 6:2) est également connu à Medeineh (*ADAJ,* XXII, p. 147, Fig. 2: 16). Ces bols ont habituellement une base plane, parfois légérement surélevée, et étaient connus dans le Fer I transjordanien par ceux de la tombe de Madaba.[10]. A cette même époque, ils sont largement attestés en Palestine."[11]

Avec les numéros 4 et 5 de la figure 6, nous voulons présenter le type commun de marmite de Medeineh à la fin de son occupation, vers 1050 av. J.C. Il faut signaler ici quelques détails qui le distinguent clairement des marmites

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[6] J. A. Callaway, *The 1966 'Ai (Et-Tell) Excavations, BASOR,* 196 (déc. 1969), p. 9, fig. 5 (1).

[7] W. F. Albright, *loc. cit.,* et R. Amiran, *Ancient Pottery of the Holy Land* Jerusalem, 1969, p. 232 sv.

[8] On peut comparer les fragments de Medeineh reproduits dans notre Fig. 5 avec les cols des *pithoi* de Bethel (W. F. Albright et J. L. Kelso, *op. cit.,* pl. 56 (23-26) et pl. 57 (1-5) et de 'Ai (et-Tell) J. A. Callaway, *op. cit.,* fig. 5 (3 et 4). Cf. Aussi les exemplaires du deuxième groupe (le "type israélite") dans R. Amiran, *op. cit.,* pl. 77, nos. 4-10 et 12).

[9] R. Amiran *op. cit.,* pl. 44 (6) et *PEFA,* VI, 1953, p. 26, fig. 9 (97).

[10] G.L. Harding *An Early Iron Age Tomb at Madaba, PEFA,* VI, 1953, fig. 12, nos 17-22.

[11] R. Amiran *op. Cit.,* pl. 60 (8 sv.); O. R. Sellers et alii, *The 1957 Excavations at Beth-Zur, AASOR,* vol. XXXVIII (1968), fig. 11 (10) et pl. 25 (10) et E. Grant et G. E. Wright, *Ain Shems Excavations, part IV,* Haverford, 1938, pl. 62 (18-20), 22-25), (neveau III)

contemporaines de Palestine: le diamètre de son embouchure, entre 0.12 et 0.15 m., est notablement étroit,[12] généralement ils ont deux anses (le numéro 5, complet, n'en a pas) et sa forme tend à être globulaire plus qu'aplatie. Ces traits, alliés, à la forme du bord avec sa moulure extérieure les rendent apparemment proches des marmites du Fer II de Palestine. Nous tenons quand même à présenter à nouveau ce modèle de marmite de Medeineh comme une forme typique du Fer I Moabite, en raison de son contexte céramique, absolument non perturbé et homogène.

Sur la figure 6: 13, 14, 15 et 16, nous présentons quatre fragments de cratères de profils et de forme suffisamment connus dans le Bronze Récent et le Fer I Transjordanien.[13] Ils ont au moins deux anses verticales rattachées au bord, et leurs bases sont annulaires comme dans l'exemple 17, bien qu'il appartienne à un cratère de plus grande dimension que les précédents.

Les travaux de fouille de cette campagne ont confirmé les résultats et les conclusions antérieures.

L'étude de la céramique, en particulier celle de la forme évoluée des cols de *pithoi* (Fig. 6: 7,9) peut nous permettre de baisser approximativement le moment de la destruction de la cité vers 1050 av. J.C. mais pas au-delà. L'existence de cette classe de jarres en Palestine pendant la première partie du XIème siècle (à Bethel on en trouve jusqu'au Fer I) et la totale absence de céramique polie à Medeinet al-Mu'arradjeh nous permettent de réaffirmer que la cité a été construite au début du XIIème siècle (peut-être à la fin du XIIIème siècle) et abandonnée vers 1075-1050 av. J.-C.

Mais l'aspect le plus intéressant des résultats obtenus est de permettre l'étude des parallèles que l'on peut établir avec les maisons découvertes à Medeineh. L'utilisation de piliers, la distribution des pièces et la localisation de la cour présentent une indubitable analogie avec les maisons de cette période du Fer I qui se construisaient en Palestine. On peut prévoir que des campagnes futures dans notre Khirbet de Moab nous permettront d'arriver à éclaircir l'origine et le développement de ce qu'on appelle "four room pillared house" et interprétée, sans doute un peu hativement, comme "an original Israelite concept".[14]

Emilio Olavarri
Museo Arcqueologico Nacional
Madrid, Spain

[12] Dans le premier rapport, nous avons présenté un fragment de marmite typiquement occidental palestinien *(ADAJ)*, XXII, p. 147, fig. 2, no. 1). Le diamètre de son embouchure est de 0.30 m. environ *(ibid.,* 142). Sa forme et ses dimensions en font un parallèle des marmites du Fer I palestinien, R. Amiran, *op. cit.,* pl. 76, no. 6 (marmite du niveau III de Beth-Shemesh). Par conséquent, le type commun des marmites en Palestine du Fer I n'est pas inconnu dans la Khirbeh de Medeineh maobite.

[13] G. L. Harding, *op. cit.,* fig. 14, nos. 52 sv. et R. Amiran, *op. cit.,* pl. 69.

[14] Y. Shiloh, *'The Four Room House. Its Situation and Function in the Israelite City', IEJ,* 20 (1970), p. 180-190; V. Fritz, *Bestimmung und Herkunft des Pfeilerhauses in Israel. ZDPV,* 93 (1977), p. 30-45. Récemment F. Braemer a repris l'étude de toutes ces maisons dans son ouvrage *L'architecture domestique au Levant à l'Age du Fer* (Paris, 1982). Il montre que ces types de plans étaient utilisés au Fer I dans des régions qui ne pouvaient être sous influence israélite et que leurs origines sont peut-être à rechercher ailleurs qu'en Palestine.

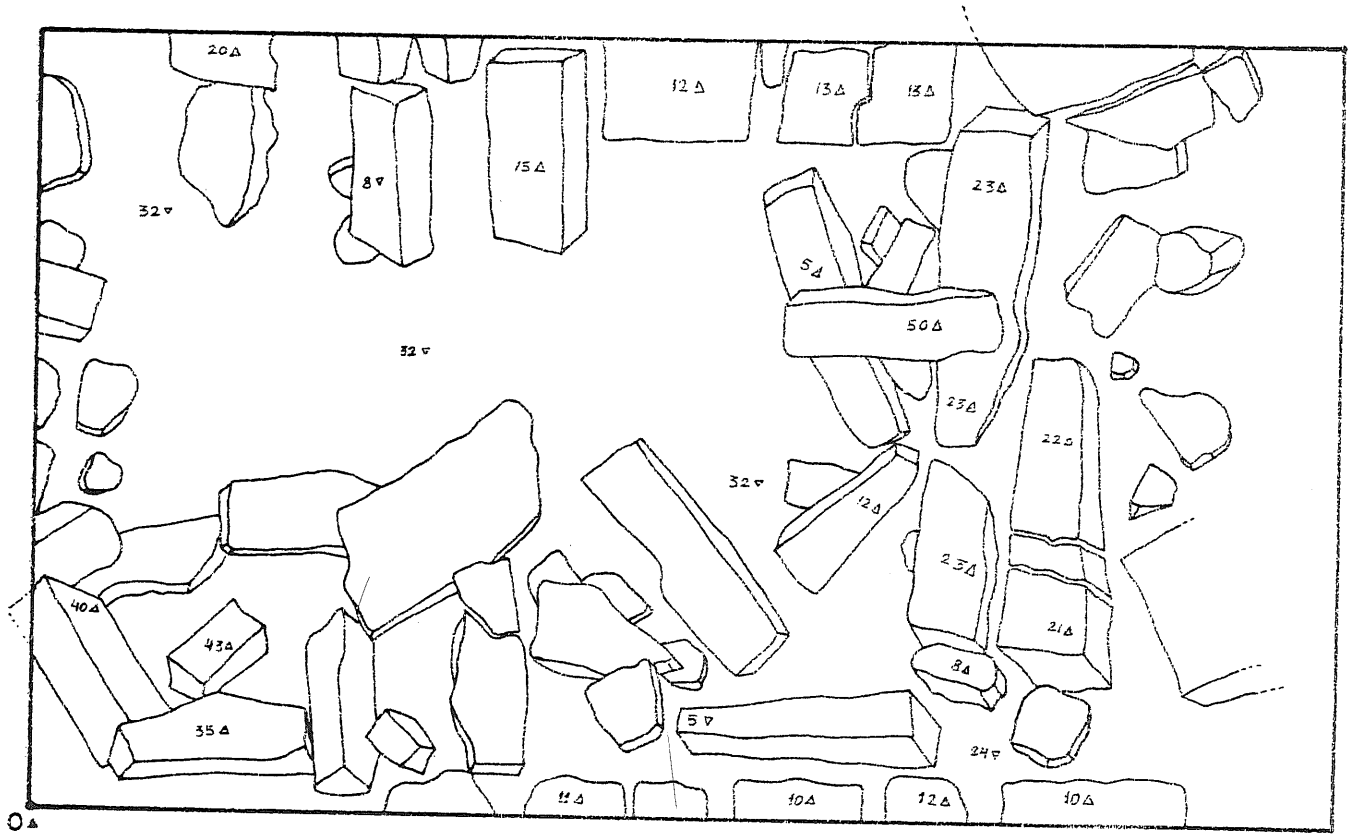

Fig. 1

N

— LOCUS 2 —

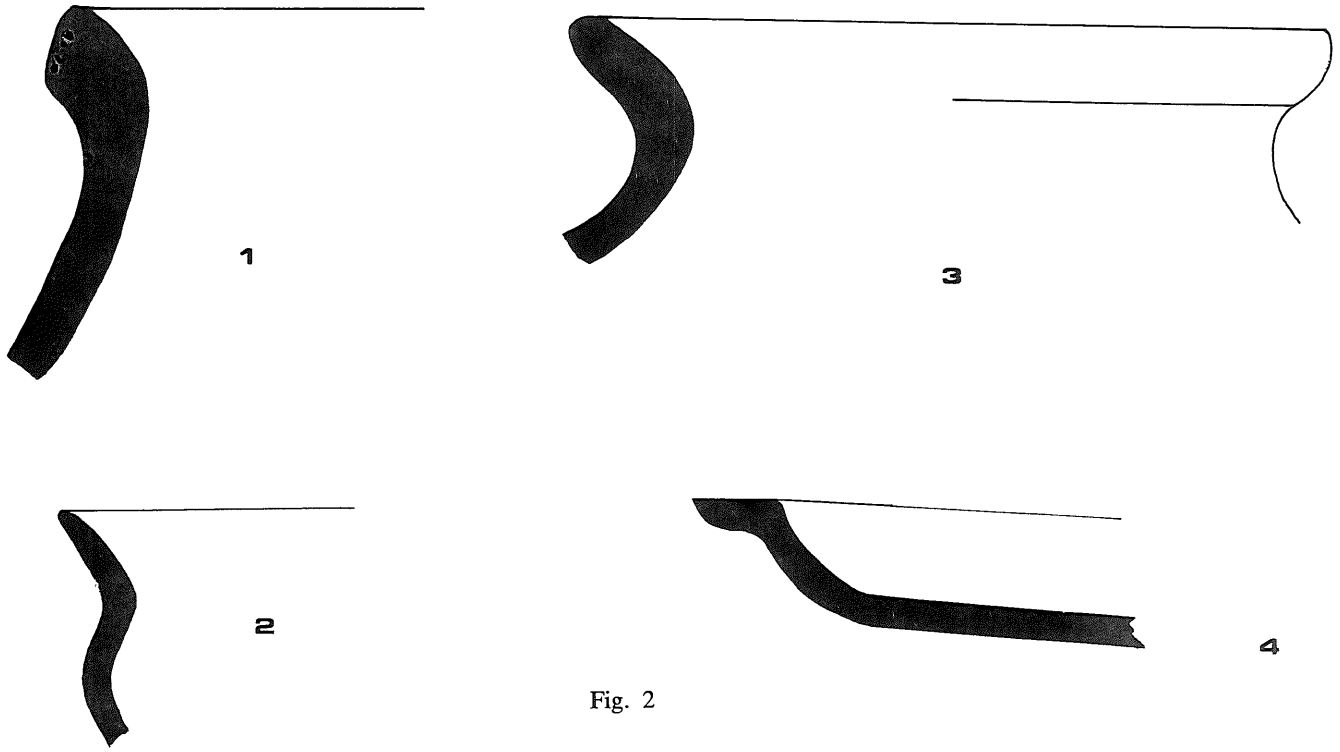

Fig. 2

1) Rim and neck of a jar, cream color paste with large black particles. The exterior and interior surfaces are covered in white. This same form occurs at Medeineh.
2) Rim, neck, and shoulder of a slightly carinated bowl. Red paste with white surface. Also found at Medineh, the shapes reminiscent of the Late Bronze Age.
3) Rim and neck of an open-mouth jar. Red paste with coarse black particles. This form also occurs at Medeineh.
4) Small fragment of an alabaster plate with a rim of an extended lip in a horizontal plane.

THE IRON I STRUCTURES IN THE AREA SURROUNDING MEDEINEH AL MA'ARRADJEH (SMAKIEH)

by
Mario Menéndez

Introduction

Having observed in the aerial photograph of Khirbet Medeineh, obtained by the Spanish Archaeological Mission,[1] the existence of a series of a circular structures on a plateau to the west of the *tell,* we decided to excavate this area to determine their nature. We had been previously informed of the abundance of retouched flints around the circular structures.[2]

Once we had examined the region, we decided to excavate the group of circles which were on the upper level of the highest part of the plateau, 900.00 m. high, directly west of Khirbet Medeineh. These structures were without doubt the best preserved in terms of their construction. With regard to the retouched flints, their greatest concentrations appeared to coincide with the stone circles we had selected for excavation. Having made these observations, we began our work on 14 August 1982.

Structures

A visual analysis of the aerial photograph allowed us to distinguish two associated units, although in form they were quite different. The first unit was the Great Circle, formed by slabs of stone sunk into the ground (Locus 1) and the second consisted of a rectangular precinct adjacent to the exterior (Locus 2). Undoubtedly these two structures are associated since this scheme or mode is repeated many times in the group of circles at Medeineh, and we are able to verify this association at other sites in the Moab region.

Locus 1

Locus 1 presented us with an almost perfectly circular arrangement with a diameter of 18.00 m. The circle is defined by large slabs of stone sunk in the ground down to approximately 0.70 m. below the surface. We opened a 2.00 x 2.00 m. trench in the centre of the circle. The upper level, perfectly horizontal, was archaeologically sterile, although there were numerous bits of gravel and small stones of *ca.* 0.05 m. diameter. At a depth of 0.50 m. there appeared a level of *huwwar,* formed by a compact white chalk. There were, therefore, no archaeological levels in the interior of the stone circle, nor any organic remains which would have helped us to recognize and establish its use.

Locus 2

Locus 2 consists of the rectangular structure adjacent to the exterior of the Great Circle. The dimensions of the trench we opened were 5.00 x 3.00 m., following the structure walls visible on the surface. The direction of the short wall is precisely westerly. The first row of stones, perfectly preserved, rests directly on the ground. The other two walls run parallel for a distance of 2.50 m. with the short wall closing in the area at the northern end. The southern wall, which would have closed in the rectangular structure, is not preserved, nor is the probable door or gate which would have provided access to the small chamber (Fig. 1). The soil of this area is of ("earth"); it contained no organic remains or ashes, but ceramic

[1] Cf. aerial photograph of the Spanish Archaeological Mission (Fig. 3) and Fig. 1 of E. Olávarri in his study cited in note 3, below.

[2] This information was provided by E. Olávarri, excavating at the same time at Khirbet Medeineh. It was possible to make daily comparisons of the material from the respective sites.

pieces in the soil indicate past habitation of this level. This layer appeared 0.32 m. below the ground-level.

Ceramics

The collection of ceramics which Locus 2 offers us is very broken up and heterogeneous. The oldest sherds are present at Medeineh with the same type of paste that characterizes that site.[3] To this oldest group belongs 90% of the potsherds, which can be assigned to the ancient phase of the Iron I period.[4] We also found representatives of Iron II, Nabataean, and Byzantine periods, but in no case do these latter phases represent permanent habitation or intensive use of the structure. We must therefore consider the short, incidental use of the structure, with insignificant archaeological evidence other than that of the Iron I age.

The characteristic ceramic forms are the following:

— Rim and neck of a jar (Fig. 2:1) with cream color paste containing large black particles. The exterior and interior surfaces were covered in white.

— Rim, neck, and shoulder of a bowl, slightly carinated, of red paste with white inclusions (Fig. 2:2). This shape is documented at Medeineh, where it is a surviving example of the late phase. Late Bronze Age.

— Rim and handle of an open-mouthed jar (Fig. 2:3), red paste with black-granules, the exterior surfaces are covered in white.

— Small fragment of an alabaster plate with the rim of an open, horizontal lip.

The ceramics of Locus 2 present us with a group of forms and pastes characteristic of the early phases of Iron I, placing the group in a close temporal relationship with the materials from Khirbet Medeineh.

Conclusions

The two trenches in the area of circles, situated to the west of Medeineh, demonstrate the contemporaneity of these structures with the city nearest to them. That is to say, they were constructed around 1,200-1,075 B.C., in an early phase of Iron I times, as is attested by the ceramic fragments. These circles were re-used during the Iron II and Byzantine eras, but these later uses have an ephemeral character about them, and in neither case do they conform to true levels of occupation.

With regard to the possible functions of the circles, it would be risky to try to establish definitive conclusions. Neverthless, the fact that they appear in proximity to a fortified city, which undoubtedly offered them a protection they could provide for themselves, leads us to think that these circles were built by some of the groups of shepherds who lived in the Moab area during the Iron I period. To this way of thinking, the great slabs of stone sunk into the ground formed a circular corral in which the shepherds guarded their property. This form of circular corral can be seen at the present time in some of the towns in the Moab region. This would also explain the lack of archaeological levels inside these structures.

The rectangular chamber (Locus 2) would be, according to this hypothesis, the cabin in which the shepherd stayed. Its construction and occupation was connected with the existence of Medeineh. The destruction or abandonment of these cities also resulted in the end of the occupation of these cabins. They were used again only in an accidental and sporadic way.

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[3] E. Olávarri, "Sondeo Arqueologico en Khirbet Medeineh" *ADAJ,* 22 (1977-1978), p. 136-149.

[4] Although there is not an abundant bibliography on this theme, cf.
— J. W. Crowfoot, An Expedition to Balu'a, *PEF,QS* (1934) p. 76-84.
— G.L. Harding, An Early Iron Ag Tomb at Madaba, *PEFA* 6 (1953) p. 27-47.
— E. Olávarri, Sondages à Aroer sur l'Arnon, *RB,* 72 (1965), p. 77-94.

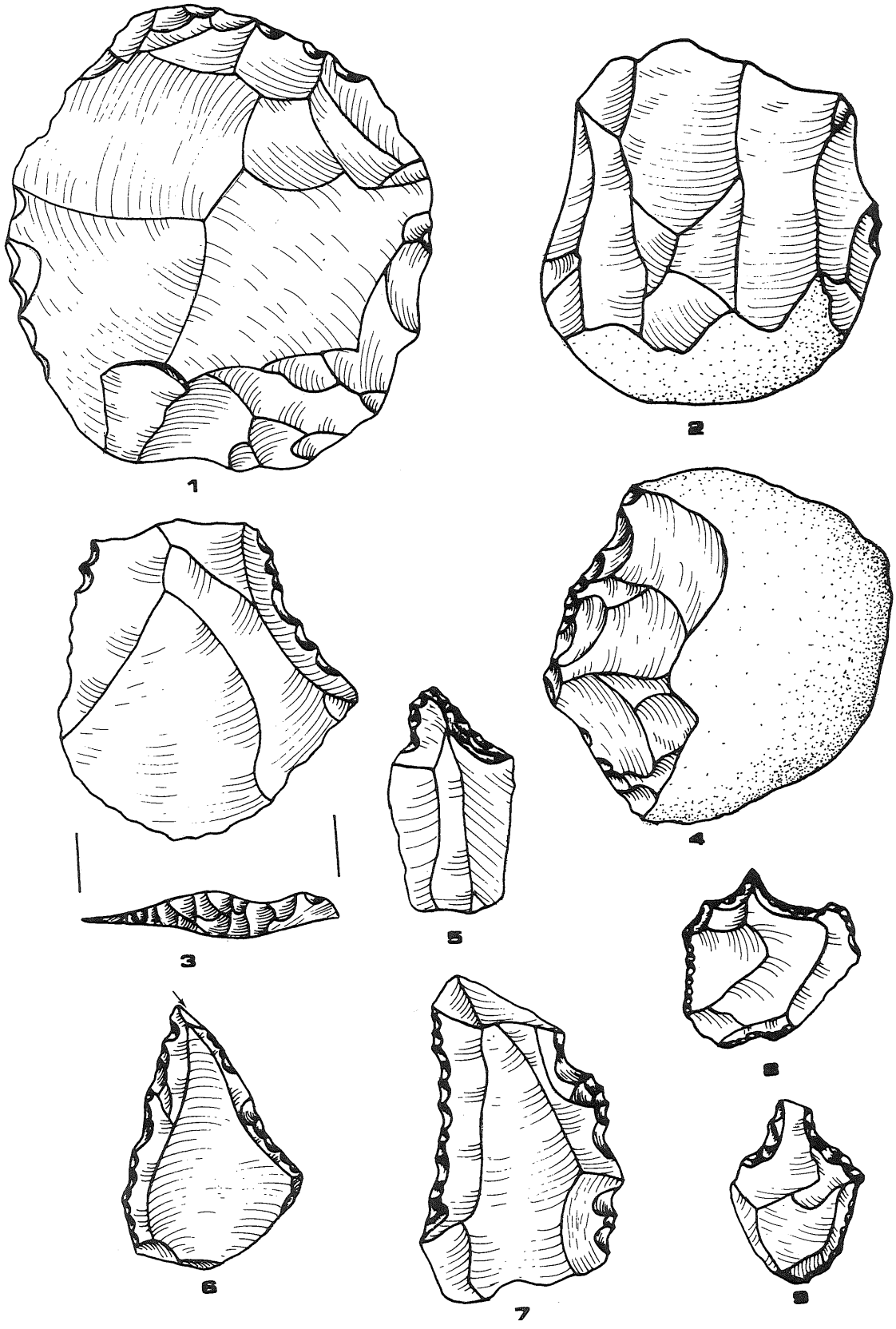

Fig. 3

1) Bifacially flaked disc of white flint, with traces of use all around its perimeter.
2) Chopper. Cortical base; in the distal area there appear deep traces of use.
3) Levallois flake. Direct semi-steep retouch on the right edge, producing a denticulte. On the left, simple alternate retouch. Multi-facetted platform.
4) Simple convex sidescraper, with excellent Charentian retouch.
5) Nosed carinated endscraper.
6) Burin on retouched flake.
7) Denticulate on thick flake. Simple direct retouch occurs on the left edge.
8) Awl on a small flake.
9) Broken awl.

The Paleolithic Surface Deposit

The abundant remains of flint which appeared on the surface cannot be put in relation with the previously mentioned structures. This lithic material forms part of an open-air site, situated at the highest area of the slope, with its location coinciding with that of the later circles. From the top of the hill, where we place the site's nucleus, the flints begin to spread out along the sides of the hill, becoming progressively smaller in density.

The flints gathered from the site amount to about 300, enough for us to make a statistical analysis with a reasonable amount of certainty. We suspected that in this kind of survey collection that it would be very difficult to eliminate the subjective element when we conducted the analysis. For example, we observed substantial differences in the items collected by different people in the same area. To this we must add the scarce number of typical implements at this site and the difficulty of using "guide fossils" for the Paleolithic of the Near East. But a typological analysis is the only means available to us to determine a cultural affiliation.

The flint implement sample presented us on the one hand with a series of tools with clear Mousterian aspects: an excellent disc with bifacial retouch (Fig. 3: 1), choppers (?) (Fig. 3: 2), and numerous sidescrapers. The last are generally simple,[5] some being the "Quina type" with excellent Charentian retouch (Fig. 3: 4). On the other hand, there exists a high percentage of other tools of blades and flakes. There are some notches and some rare burins (Fig. 3: 6). The denticulates are generally produced on small flakes (Fig. 3: 7).

Among this group, which we have defined as Mousterian, there is a great number of pieces that point to a more advanced age, different from the Middle Paleolithic but still closely allied to it. There is a high percentage of endscrapers, many of which are thick and "nosed" (Fig. 3: 5). There are excellent awls (Fig. 3: 8, 9) and a large number of retouched blades and small flakes. Therefore it appears that this open-air site should be classified as Early Aurignacian, parallel with Levels 11 c-d and 12 at Khiam.[6] These clearly belong to the Upper Paleolithic but demonstrate a strong dependence on the implements of the Mousterian tradition, with a high percentage of denticulates, which can be compared favourably with other sites in the region.[7] Some of the flakes in the sample are of Levallois technique (Fig. 3: 3), reflecting an older tradition.

In conclusion, we are confronted with an open-air site absolutely independent of the stone circles. The flints present us with an industry typical of the Early Aurignacian, with strong influence of the tools of the Mousterian tradition.

Mario Menédez

[5] F. Bordes, Typologie du Paléolithique Ancien et Moyen, (1961).

[6] J. Glz-Echegaray, Excavaciones en la terraza de El Khiam, BPH, Tom, I, Madrid, 1964.

[7] D. de Sonneville-Bordes, Paléolithique Supérieur et Mésolithique à Yabrud (Syrie), *L'Anthropologie* 60 (1956) p. 78.

THE 1982 ARCHAEOLOGICAL AND EPIGRAPHIC SURVEY OF THE 'AQABA-MA'AN AREA OF SOUTHERN JORDAN

by
W. J. Jobling

Introduction

The third season of the 'Aqaba-Ma'an Survey took place during January and February 1982. The project, which is funded by the Australian Research Grants Scheme of the Australian Federal Department of Science and Technology, was conducted in cooperation with the Department of Antiquities of Jordan and the British Institute in Amman for Archaeology and History.

Special thanks are due to the Director-General of Antiquities, Dr. Adnan Hadidi, for his approval of the project and his continued support. This year the representative from the Department of Antiquities was Mr. Nabil Baqa'in, Inspector of Antiquities at Kerak.

The director also wishes to express his gratitude to Mrs. C.-M. Bennett, OBE, FSA, for her continuing support and enthusiasm for the survey which was initiated at her suggestion some three years ago. This year Mrs. Bennett was able to participate in the survey for one week and supervise the sondages at Tell el Kharaza as well as give other in-field advice and guidance. Her association with, and interest in, the project are greatly appreciated.[1]

Mr. Richard Morgan, a graduate in geography and historical archaeology from the University of Sydney, ably assisted the project and in particular was responsible for the photography and first draft of the map of the historical geography of the 'Aqaba-Ma'an area. This map is based on the survey work carried out over the last three seasons.

The continuing interest of Mr. Michael Macdonald in the recording and study of the Thamudic Inscriptions is also greatly appreciated.

This year a base camp was established in the village of Quweirah and special attention was given to further work on the Archaeological and Epigraphic Map of the 'Aqaba-Ma'an area (Fig. 1). The survey area extends from Ras en Naqb in the north to Aqaba and the Saudi Arabian border in the south and is bounded to the west by the Shafat Ibn Jad range and to the east by the Saudi Arabian-Jordanian border. An area of approximately 2,700 km² has been surveyed so far. Major antiquity and epigraphy sites have been noted, however the final map will include a large number of smaller sites scattered throughout the area.[2]

The area is characterised by huge bare sedimentary residuals which tower above the desert floor which is swept by windblown aeolian sands. The pediplane at about 900.00 m. above sea level has a large accumulation of drift sand which has developed through overgrazing and over use of the fragile soils that cover the stoney desert floor. This overgrazing has denuded the soil of its binding vegetation. The wind which blows off the Ma'an Plateau has deflated most of the topsoil. Sand dunes which pile up against the windward face of the residuals and the escarpments are the result of these processes.

In the infrequent and highly variable rainstorms steep sided gullies have formed in the relatively loose aeolian material and

[1] Miss Penny Vickers of the British Institute for Archaeology and History joined the survey in its last week and contributed substantially to the final phases of exploration and epigraphical research. Miss Elizabeth Roberts, B.A., who was appointed Research Assistant to the survey completed a bibliographical index of work done in the area.

[2] G. L. Harding, *Some Thamudic Inscriptions from the Hashemite Kingdom of the Jordan*, Leiden, 1952, Map page 6.

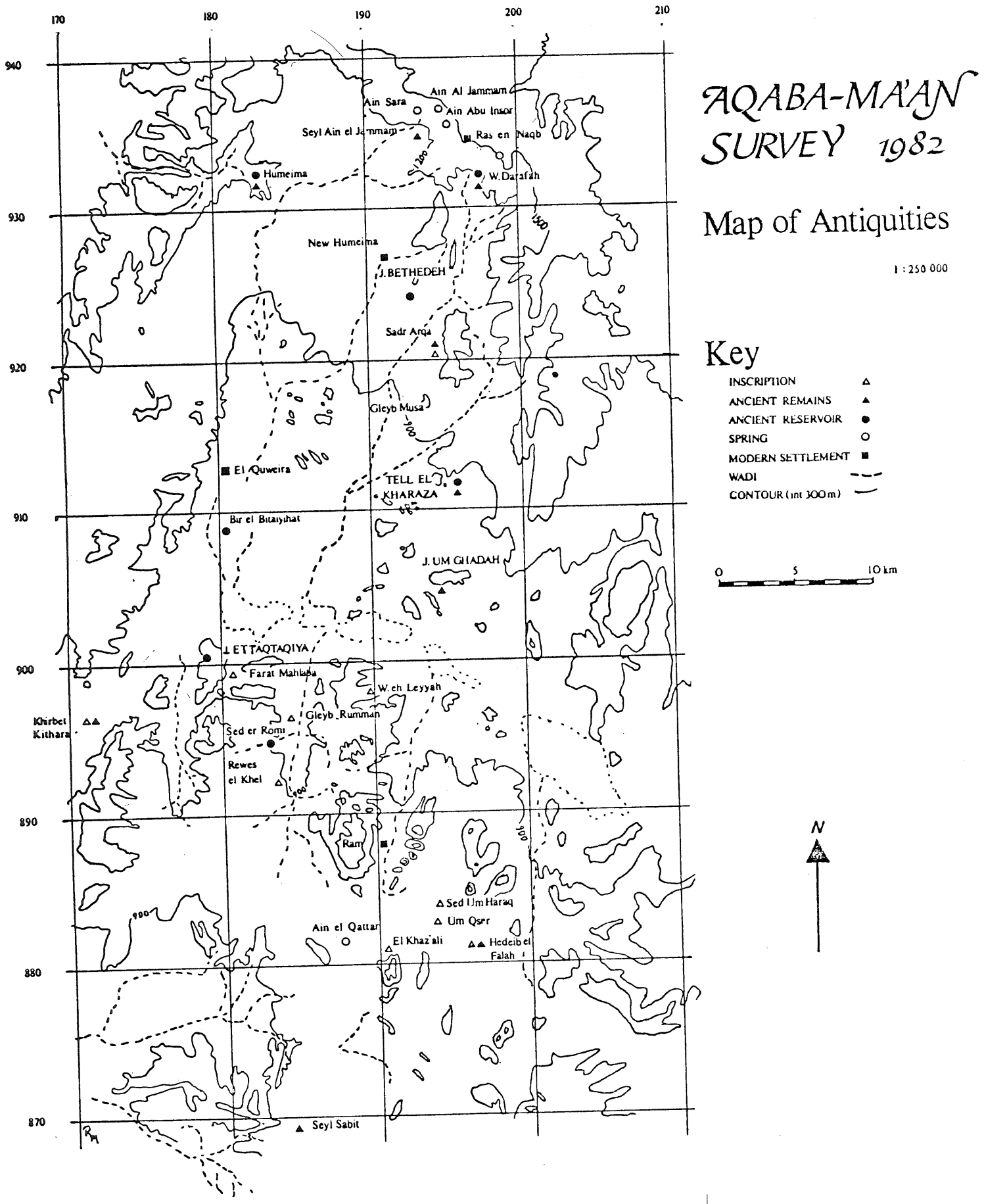

Fig. 1: The Archaeological and Epigraphic Map of the Aqaba-Ma'an area of Southern Jordan: Some Major Sites (1982)

any large boulders that may have been dislodged from the escarpment above have been moved along in the wake of this finer material which acts as a very unstable support for the size and weight of these boulders. With the quick run-off and almost total overland flow the gullies fill quickly and the *awdiyah* (wadis) flow with great force. Under the Ras en Naqb escarpment the early farmers appear to have attempted to slow, and indeed, catch some of this water by constructing barrages perpendicular to the general flow of the *awdiyah* (wadis). These sandstone block walls would have saved the destruction of their small cultivated terraces on the *wadi* floor. The *wadi* floor is the most fertile area, and if maintained adequately these barrages would have been useful as shallow dams for temporary water storage. Evaporation after a rainfall, however, would have necessitated the channelling of this water to an underground reservoir. There was no such reservoir apparent at Seyl 'Ain el Jammam but certainly there were other areas where this type of water collection and storage was being used. A good example of this procedure exists at Sadr Arqa.

Another major determinant for a desert environment is the climate. Quantitatively this can be calculated with the various moisture indices (i.e., Thornthwaite's moisture index and Koppen and Geiger's climate classification).[3]

In the survey area precipitation and evaporation rates determine the aridity of the area. There is a deficiency in precipitation compared with evapotranspiration thus causing the climate to be arid. It is estimated that in this regard Thronthwaite's Moisture Index would be in the vicinity of -30 to -50 (semi-arid to arid).

Another climatic factor is the high variability of present rainfall patterns. In this respect the desert rainfall is extremely irregular and unpredictable. There is a high quotient of variation, which is the ratio between the maximum and the minimum annual rainfalls. These elements of the climate characterize this environment of blustery winds, little binding vegetation and high erosion rates during precipitation. As a result this leads to poorly developed soils, little agricultural production and irregular topography as at the present.

From a meteorological point of view rainfall is most likely to occur in the survey area when "lows" occur in the winter season over the Mediterranean Sea with a centre over Cyprus. Thus the summers tend to be dry because "highs" develop over this area. The further away the centre of the low pressure system the less rainfall occurs in the desert.

During the 1982 survey particular attention was focussed on the northern sectors of the area, between Wadi Ram and Ras en-Naqb (Pl. XXXII, 1). Together with the sondage at Tell el Kharaza, the following major sites present a profile of this area.

Khirbet Darafa (G.R. 197932)

Situated to the east of the new 'Aqaba-Ma'an road, this site appears to be part of a large antiquities complex (Pl. XXXII, 2).

A large cistern formed out of the natural stone has also been modified to include at least one large niche which appears to have been well tooled and to have held some object which was fixed in place by plaster. This niche bears some resemblance to niches at 'Ain Shalaleh in Wadi Ram and at Petra. There are several other possibly natural niches on the walls of the cistern, however they have been extremely weathered. The large well tooled niche which still has evidence of the plastering may suggest that the cistern was used as a sanctuary (Pl. XXXIII, 1).

The dimensions of the cistern are 3.50 x 4.90 x 4.60 m. and there is evidence of a carefully tooled ledge along the eastern and higher side of the cistern which suggests that there was a covering, or roof,

[3] M. Evenari, *et al., The Negev, The Challenge of a Desert,* Cambridge, 1971, P. 29-30.

which sloped down to the western wall. The cistern is situated so as to gain maximum advantage of the water run-off. The present depth of the cistern is 3.50 m. however there is a considerable depth of silt in the cistern which indicates that the cistern was probably much deeper. Large pieces of worked stone on the surface may have been cult stones. Several pieces of worked stone amongst the rubble in the south-west corner of the cistern may have been part of a dais associated with cultic usage connected with the large tooled niche. However such interpretations remain problematical and hence tentative. Some 250.00 m. to the south of this cistern is evidence of a series of run-off dam walls (or filter dams) which would appear to have gathered water run-off from the same hill.

Surface sherding produced a variety of Nabataean sherds of which 99% were plain which, along with surface flints and flint debitage, suggest that the site has had a long history of human occupation.

The site is close to the spring of 'Ain Darafa, situated mid-way up the Ras en-Naqb escarpment. The site is currently inhabited by Bedouin and their flocks.

Seyl Jamam (G.R. 194936)

Situated below 'Ain el Jamam in an area which has good water supplies, Seyl Jamam would appear to have been the centre of an extensive lithic industry complex (Pl. XXXIII, 2). This complex, which embraces 'Ain el Jamam is currently occupied by several Bedouin families which have moved into semi-sedentary residence because of the good water supplies and proximity of the new highway to Ma'an from whence they obtain grain supplements for their flocks and animals.

A preliminary study of the flints from Seyl Jamam would suggest that there was a lithic industry ranging from Late Paleolithic to Chalcolithic. This would seem to provide parallels which concur with observations about Ras en-Naqb made by D.O. Henry, *et al.*[4]

'Ain 'Abu 'Insor (G.R. 195936)

Situated just above the new 'Aqaba-Ma'an roadway, this site is significant because of its spring and the large, lengthy, though badly weathered, Thamudic inscription situated on the rock face high above the spring (Pl. XXXIV; 1). The inscription is difficult to read but it should be noted that it has been pecked into the rock face. The characters are quite large and appear to have been well executed. Together with 'Ain el Jamam , these closely related sites provide evidence of good water sources which provide a relatively constant water supply for the areas at present.

Aqueducts from reservoirs fed by these springs were traced as far south as Khirbet Humeima. Initial exploration would suggest that the aquifers in the Ras en-Naqb escarpment were sources of water and the focus for the developed hydrology of the area in the later Roman and Byzantine periods.

Sadr Arqa (G.R. 192919)

Situated almost mid-way between Jebel Kharaza (G.R. 192915) and Khirbet Darafa (G.R. 197932) Sadr Arqa was found to have a large number of graves, cairns and Thamudic inscriptions.

A short distance to the west at Al Radah al Bathah is a very large water cistern still in use by the Bedouin (Pl. XXXIV, 2). This cistern is the repository of rain water run-off which is controlled by a series of silt dams which, although showing modern repair techniques, also appear to be of considerable antiquity and are probably related to the technology of water conservation associated with the construction of the water cistern. This cistern, hollowed out of the rock, is estimated to have a capacity of ±100,000 litres. It was observed that even in prevailing drought conditions this cistern preserves a good supply of water.

[4] D. O. Henry *et al.*, An Investigation of the Prehistory and Paleoenvironments of Southern Jordan, *ADAJ*, XXV (1981) p. 113-143.

A comprehensive epigraphical survey was conducted and twenty-three Thamudic inscription sites were recorded, copied and photographed. Some of these sites contained multiple inscriptions. It was noted that there was a distinctive variety in the style, size and medium of these inscriptions. Some inscriptions were pecked, others were incised into the rocks scattered over the floor of the *wadi.* Almost all inscriptions exhibited a considerable degree of skill in execution. There appears to be a relative regularity in the size of individual letters. It is proposed to analyse and publish a study of the typology of scripts in this area and other areas where Thamudic inscriptions were located in the 1980 and 1981 surveys of the 'Aqaba-Ma'an area.

One particularly interesting Thamudic inscription was removed for exhibition in the Kerak Museum by Inspector Nabil Baqa'in (Pl. XXXV, 1).

A tentative transliteration of this inscription is:

l.kwm لخوم

Though a short inscription it would appear to be important in that it provides evidence of a variation in the *wāw* grapheme. The usual form of this grapheme in this area is that of a circle divided per pale.[5] However in this inscription the circle is divided per saltire and is formally the same as Phoenician-Hebrew and Aramaic *ṭet,* but does not have the same sound.[6]

Tell el Kharaza (G.R. 194911)

This site, which was located and surveyed in the 1981 survey, was the scene of an intensive week's work this year when two trial trenches were excavated under the direction of Mrs. C-M. Bennett, OBE, FSA, Director of the British Institute in Amman for Archaeology and History (Pl. XXXV, 2).

There were nineteen levels down to the bedrock which was Level 20.

The east facing section showing levels at the western end of the sondage shows the ash layers and cut and fill features which consistently extended from the rock scarp out to the beginning of the deflation of the occupation site (Fig. 2). A regular feature of the levels was the fireplace and appearance of animal dung and bones. The pottery sherd analysis ranges from the end of the Pottery Neolithic to the end of the Middle Bronze Age. Surface sherding suggests a later use of the area during the Iron Age.

As can be seen from Table 1, the analysis of the bone fragments reveals that they were from limb extremities and a head (i.e., from those parts of the animal carcass usually subtracted and discarded in butchering). Level 12 was the exception to this observation. The bone fragments from Level 12 were those from the edible part of the carcass proper.[7] The bone fragments indicate a preponderance of goats with two or three sheep and two gazelle. The rock scarp above the surface level of the sondage had barely discernible panels of glyptics in which occur horned animals and human figures in what are either hunting or dancing poses. This may suggest that the large overhang at Tell el Kharaza was a sacrificial site or that it was a place for the ritual slaughtering of animals.[8]

Altogether the sondage and the surface sherding would seem to suggest that this site was regularly occupied throughout antiquity and was particularly favoured by pastoral nomads.

Further exploration of Tell el Kharaza also revealed a most interesting complex of dams and well tooled water channels in the rift behind the overhang (Pl. XXXVI, 1).

Comparison of the tooling of the water channels with those at Petra suggests that they were the work of Nabataeans. Comparisons of the dams at Tell el Kharaza with those in the Wadi Rumman,

[5] G. L. Harding *op. cit.,* Plate XXVI.

[6] G. R. Driver, *Semitic Writing,* Oxford, 1976, Figs. 81 and 82.

[7] The analysis of animal bones was prepared by Dr. Ilse Köhler of the Universiy of Hanover. Dr. P. H. McCarthy, Dept. of Veterinary Anatomy, The University of Sydney, prepared the table of the bone analyses for publication and assisted with the interpretation of the data.

[8] S. Helms, Jawa: *Lost city of the Black Desert,* London, 1981, Appendix E.

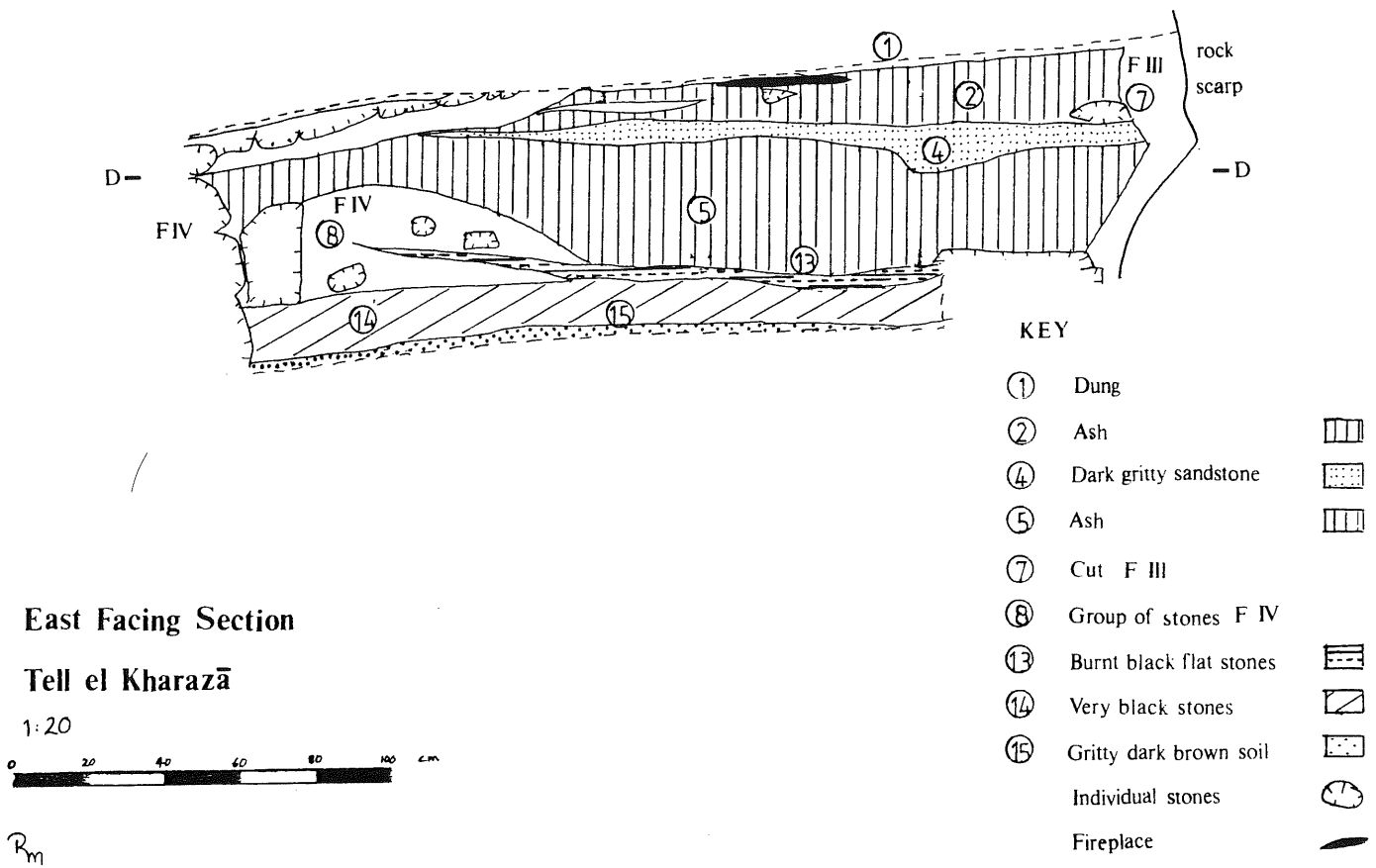

Fig. 2: Tell el Kharaza Sondage: Section.

Table 1: Tell El Kharaza 1982 Analysis of Animal Bones

Stratum No.	*Species*	*Bones*
1	Goat	mandible)
	Goat	cranium) fragments
	Sheep/Goat	rib fragments
2	Goat (neonatal/stillborn)	metatarsus
		scapula
		pelvic fragments
	Goat	proximal phalanx
	Goat	middle phalanx
	Sheep/Goat	metacarpus (distal epiphysis)
	Small Ruminant	rib fragments
		some burnt leg bone fragments with cutting marks
3	Goat (burnt?)	cornual process of frontal bone
7	Small Ruminant (Goat?)	atlas
9	Gazelle (?)	mandible
	Sheep/Goat	proximal phalanx
	Small Ruminant	rib
	Small Ruminant	metacarpus
11	Goat	priximal phalanx
	Goat	3 cornual processes
	Sheep/Goat	metatarsus
	Sheep/Goat	3 fragments of mandible
	Small Ruminant	5 molar teeth
	,, ,,	maxilla fragment
	,, ,,	6 rib fragments
	,, ,, (neonate)	scapula
	,, ,,	cervical vertebra
12	Goat	scapula
	,,	metacarpus
	,,	distal part of femur
	,,	metacarpus
	Goat unfused	metatarsus
	Goat	cornual process of frontal bone
	,,	horn
	,,	occiput fragment
	Sheep	metacarpus
	,,	middle phalanx
	Sheep/Goat	distal part of humerus
	,,	,,
	,,	,,
	unfused	distal part of metatarsus

	,,	distal part of tibia
	,,	5 fragments of maxilla
	,,	7 fragments of cranium
	,,	fragments of scapula
	Gazelle (?)	distal part of metatarsus
	Small Ruminant	humerus (neonate/infantile)
	,,	4 rib fragments
	,,	5 molar teeth
14	Small Ruminant (?)	4 rib fragments
	,,	long bone fragment
	,,	vertebra fragment

and further north at Petra also suggest links with Nabataean workmanship and hydrology.

Hediebh el Fala (G.R. 196881)

Further survey work was conducted at this site which was located in the 1980 survey.[9] More Thamudic inscriptions were found and of particular interest are those Thamudic inscriptions which are inked or painted on the rock overhang (Pl. XXXVI, 2). Two such inscriptions were identified in the 1981 survey while this year a longer and even more distinct inscription was found.

As most Thamudic inscriptions are either pecked or incised in the rock the three inscriptions which are recorded in an ink or paint-like substance should provide an important addition to our understanding of Thamudic calligraphy.[10]

Also located in an overhang situated some 200 metres to the west of the inscriptions was a petroglyph which is similar in many respects to the petroglyphs in the gallery at Khaz 'Ali (Pl. XXXVII, 1). This would appear to be the first example of such distinctive petroglyphs found outside the Khaz 'Ali Gallery.[11]

Wadi el Leyyah (G.R. 192896)

Again some time was spent in this *wadi* which forms a large bay to the west of the northern entrance of Wadi Ram. As in the 1981 survey, Thamudic inscriptions were found which appear to be additional to those recorded by the late G. Lankester Harding.[12] One of the new inscriptions was removed by Inspector Nabil Baqa'in for exhibition in the Kerak Museum (Pl. XXXVII, 2). A tentative transliteration of this inscription is as follows:

l. 'Ṣ M لعصم

A longer and philologically more significant Thamudic inscription also found in the Wadi el-Leyyah sheds light on the Thamudic grapheme formed by two concentric circles and disputed as indicating either *wāw* (و) or *ǧīm* (ج). (Pl. XXXVIII):

l tm's ḫsr t'ṣf byt wǧy

لتما س حسر تمصف بيت و جي

By TM's. He grieved for T'ṢF of the house of WǦY.

[9] W. J. Jobling, Preliminary Report on the Archaeological Survey Between Ma'an and 'Aqaba, *ADAJ,* XXV (1981) p. 109, Plates XXVII: 2, XXX: 1 and 2.

[10] G. L. Harding recorded "paintings" at 'Ain Abu Nekheileh, south of wadi Ramm-vide Jordan Dept. of Antiquities Archives, Nos. A 894, A 896.

[11] i. J. Savignac, Le Sanctuaire d'Allat á Iram, RB, XLII (1933) p. 405-422, XLIII (1934) P. 572-589; XLV (1936) p. 235-262.
ii. G. L. Harding, *Some Thamudic Inscriptions from The Hashemite Kingdom of the Jordan,* Leiden 1952, p. 12-13, plate III.

[12] G.L. Harding, *op. cit.,* inscriptions p. 391-476.

The occurrence of the *wāw* and *ǧīm* in the last name (wǧy) of this inscription is evidence that the grapheme formed by two concentric circles is to be identified as *ǧīm*.[13]

While presuppositions about the human occupation of semi-arid and desert areas such as those contained in the survey area usually presume a minimal occupation, both epigraphic and non-epigraphic archaeological remains are frequent enough to suggest that the 'Aqaba-Ma'an area was more densely populated, at least from time to time in several places (i.e., places which were geographically and ecologically favourable).

In this regard the views expressed by J. T. Milik and M. C. A. Macdonald over the interpretation of the relationship between Nabataeans and Safaitic tribes reflected in their respective discussions of the *ʿmrt* tribe of the Madaba area is pertinent to models of interpretation which may be generated for the inhabitants of the 'Aqaba-Ma'an area in the comparable period.[14] While choosing to disagree with the view Milik holds about the settled state of the Safaitic 'Amraites Macdonald favours the view that the *ʿmrt* were at least a semi-settled tribe and were possibly multilingual.

This view may bear comparison with M. B. Rowton's theory of the dimorphic oscillation of such tribal societies in the Ancient Near East and hence accommodate the sort of mobility implied by Milik and Macdonald.[15] Such a view about the 'Amraites and the Madaba area which is situated to the north of the 'Aqaba-Ma'an area is a tempting possibility with regard to the later periods of occupation reflected in the archaeological survey of the 'Aqaba-Ma'an area and the sociolinguisitc implications of the Thamudic and Nabataean epigraphic evidence so far recorded.

To these sociolinguistic observations may be added topological and climatological considerations. W. Oxtoby, commenting on Harding's view that deposits of small prehistoric worked flints on the eastern edge of *ḥarra* districts of Syria and Jordan are evidence of a microlithic culture which flourished in these regions under climatic conditions more favourable than today, draws attention to the vexed question of paleoclimatology and the present climatology of these semi-arid and desert areas.[16] According to S. A. Huzayyin the climate of the Afro-Asian desert belt has not, as W. B. Fisher argued, remained unchanged within historic time but gradually reached its present aridity in the period from the third to the sixth centuries A.D.[17] While a further comparative study of the data of climate variations in the 'Aqaba-Ma'an area is necessary to fix the precise point, or points, of weather changes, there is sufficient evidence for the earlier periods of human occupation to suggest that conditions more conducive to a higher density of population occurred.[18] Thus it may have been that the 'Aqaba-

[13] Mr. Michael Macdonald and Professor F. V. Winnett have been kind enough to inspect photographs of this inscription and guide me with their comments on its significance.

[14] M. C. A. Macdonald, Safaitic Inscriptions in the Amman Museum and Other Collections II, *ADAJ,* XXIV (1980) p. 185-186.

[15] M. B. Rowton, Autonomy and Nomadism in Western Asia *Orientalia,* 42 (1973) p. 247-258; Urban Autonomy in a Nomadic Environment, *JNES* 32 (1973) p. 201-215; Enclosed Nomadism, *Journal of the Economic and Social History of the Orient* 17 (1974) p. 1-30; Dimorphic Structure and Topology. *Oriens Antiquus* 15 (1976) p. 17-31; Dimorphic Structure and the Problem of the Apiru ʿIbrim, *JNES,* 35 (1976) p. 13-20; Dimorphic Structure and the Parasocial Element, *JNES,* 36 (1977) p. 181-198. Cf. J. Henninger, Zum Frühsemitischen Nomadentum im L. Földes (ed.), *Viehwirt-Schaft und Hirtenkultur. Ethnographische Studien,* Budapest, 1969, p. 33-68.

[16] W. Oxtoby, *Some Inscriptions of the Safaitic Bedouin,* New Haven, 1968, p. 8.; Cf. S.W. Helms *op. cit.,* p. 151-6, p. 184-7, p. 229-242.

[17] S. A. Huzayyin, Changes in Climate, Vegetation and Human Adjustment in the Saharo-Arabian Belt, Background Paper No. 13 in the Wenner-Gren Foundations International Symposium, *Man's Role in Changing the Face of the Earth,* W. L. Thomas (ed.), Chicago, 1956 - Fifth Impression 1967, P. 304-323.; Cf. W.B. Fisher, *The Middle East: A Physical, Social and Regional Geography,* 3rd Edition, London, 1956, P. 52-56.

[18] D.O. Henry, et. al., *op. cit.,* p. 135. Cf. A.D. Crown, Towards a Reconstruction of the Climate of Palestine 8,000 BC- O BC, *J.N.E.S.* 31:4 (1972) p. 328-329 and Fig. 4.

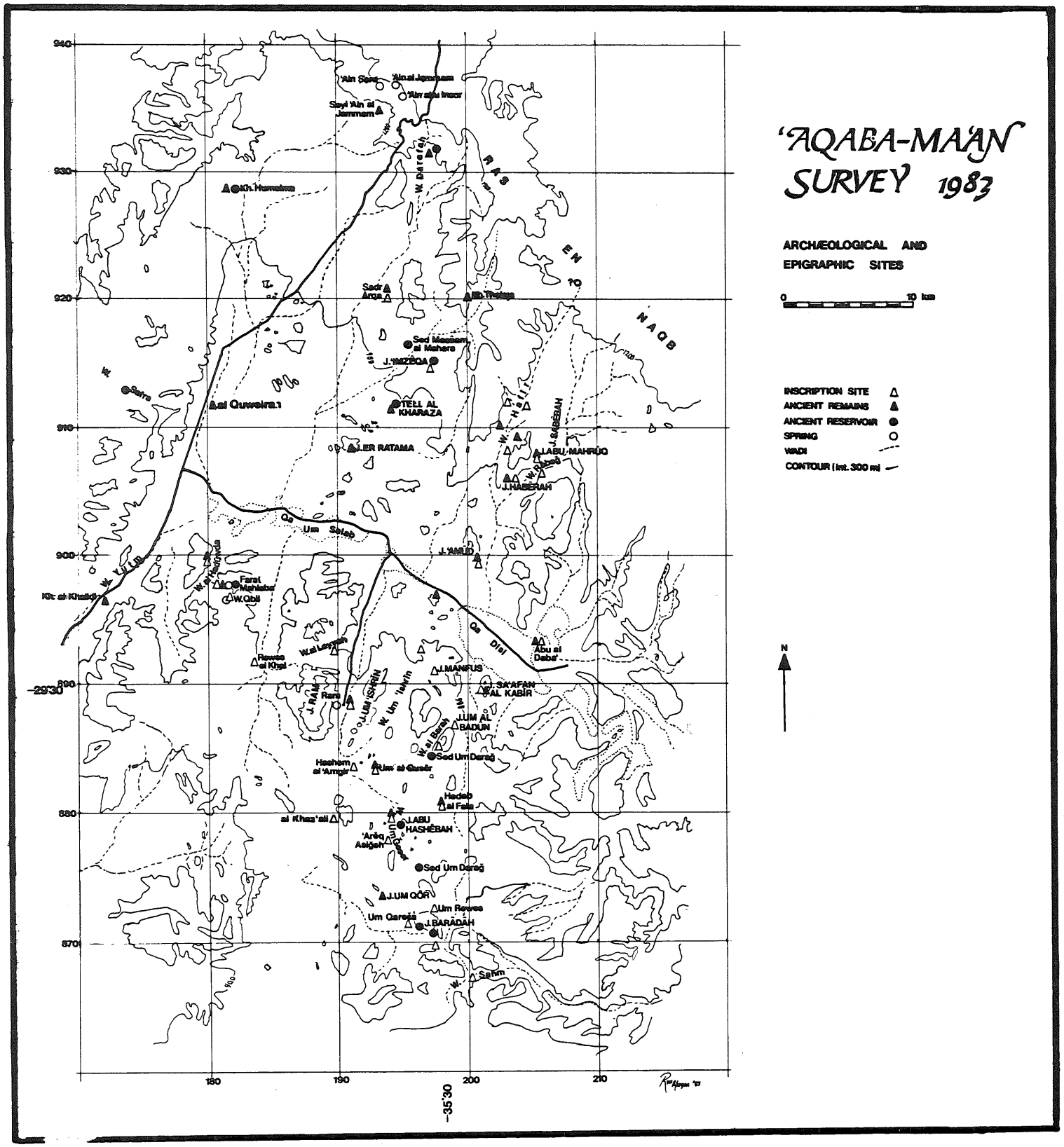

Fig. 3: The Archaeological and Epigraphic Map of the Aqaba-Ma'an area of Southern Jordan: Some Major Sites. (1983).

Ma'an area was a marginal area where minimal climate variations provoked substantial changes in man-land relationships over a long period of time.

The exploration and survey of the Nabataean type water system at Tell el Kharaza as well as the location of other water sources, catchment and storage systems in the 'Aqaba-Ma'an area provide evidence of a sophisticated interaction of man with the natural physiographic features of these arid areas in antiquity.

From the springs at 'Ain al Jamam and 'Ain ed Darafa below Ras en-Naqb in the northern end of the area under survey down to the springs, cisterns, dams, and barrages in and to the south of Wadi Ram there is evidence of a degree of hydrological engineering skill which will be the substance of a separate study arising out of the 'Aqaba-Ma'an surveys. For the present, however, as can be seen from the draft of the map of the historical geography of the area there is extensive evidence of the controlled use of surface and underground water (Fig. 3). Though some of these sites are still in use by the local inhabitants many other sites which have fallen into disuse or which have silted up suggest that there was a higher density of occupance with use of water resources in antiquity than previously thought. It remains for further surveys and excavations to determine the precise patterns of the history of such occupance.

The 1981 and 1982 survey seasons of exploration as well as the sondages at Tell el Kharaza have provided a profile of the archaeological history of human occupation which appears to have embraced the Upper Paleolithic through to the end of the Middle Bronze Age with a continuation from the Iron Age through to the Byzantine and early Islamic periods.

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W. J. Jobling, Preliminary Report on the Archaeological Survey Between Ma'an and 'Aqaba, *ADAJ,* XXV (1981) p. 109.

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Urban Autonomy in a Nomadic Environment *JNES,* 32 (1973) p. 201.

J. Savignac, Le Sanctuaire d'Allat à Irq,m *RB,* XLII (1933) p. 405.

PRELIMINARY REPORT ON THE FOURTH SEASON OF THE 'AQABA-MA'AN ARCHAEOLOGICAL AND EPIGRAPHIC SURVEY, 1982/1983

by

W. J. Jobling

Introduction

The fourth season of the 'Aqaba-Ma'an Archaeological and Epigraphic Survey was completed during the period of December 1982 and February 1983.[1] This survey which is funded by the Research Grants Scheme of the Australian Department of Science and Technology was again conducted at the invitation of Dr. Adnan Hadidi, Director of the Department of Antiquities of the Hashemite Kingdom of Jordan and with the co-operation of Mrs. C.-M. Bennett, O.B.E., F.S.A., D. Litt., Director of the British Institute at Amman for Archaeology and History.

At the invitation of the Director General of Antiquities in Saudi Arabia, Dr. Abdullah Masri, and with the good offices of the Australian Ambassador in Saudi Arabia, His Excellency, Mr. Douglas Sturkey, the director of the survey was also able to spend ten days in Saudi Arabia to study and discuss comparable areas in the North West Hegaz and to use the valuable resources of the Riyadh museum.

Mr. Richard Morgan again assisted for a second season and was responsible for the photography and cartography of the survey. Inspector Nabil Baqa'in of Kerak was the representative of the Department of Antiquities of Jordan.

Mrs. C.-M. Bennett, O.B.E., F.S.A., D. Litt, spent six days in the field with the survey team and gave advice and guidance based on her twenty-five years of experience in the history, archaeology and antiquities of the Middle East. As Mrs. Bennett retires as Director of the British Institute at Amman for Archaeology and History this year it is appropriate that her personal interest in and support for this survey be acknowledged and grateful thanks be expressed for her friendship and many kindnesses.

Miss Geraldine King, Research Assistant of the Corpus of the Inscriptions of Jordan Project, Centre for Jordanian Studies, Yarmouk University, was also able to visit several of the more important epigraphy sites and kindly assisted and advised with the copying and interpretation of inscriptions. Mr. Michael Macdonald, Director of the Corpus of the Inscriptions of Jordan Project once more enthusiastically encouraged the survey and made available his expertise and extensive research and library resources.

The survey team was based this year at the Disi Agriculture project. Special thanks are expressed to the Minister for Agriculture and his colleagues for the use of the facilities at the Disi Agricultural Project.

During this season, the aim of the survey was firstly to further the work of identification of sites for the archaeological and epigraphic map and secondly to identify and record as many inscriptions and examples of Rock Art as time and weather conditions allowed. The following map shows the area explored which was 1,700 square kms. (Fig. 1).

Complementary to this map is the following list of sites (Table 1) which

[1] W. J. Jobling, Preliminary Report on the Archaeological Survey Between Ma'an and 'Aqaba, *ADAJ,* XXV, (1981) p. 105-112.
W. J. Jobling, Preliminary Report on the 'Aqaba-Ma'an Archaeological and Epigraphic Survey, Second Season, *ADAJ,* XXVI (1982).
W. J. Jobling, Preliminary Report on the 'Aqaba-Ma'an Archaeological and Epigraphic Survey, Third Season, *ADAJ,* XXVII (1983).

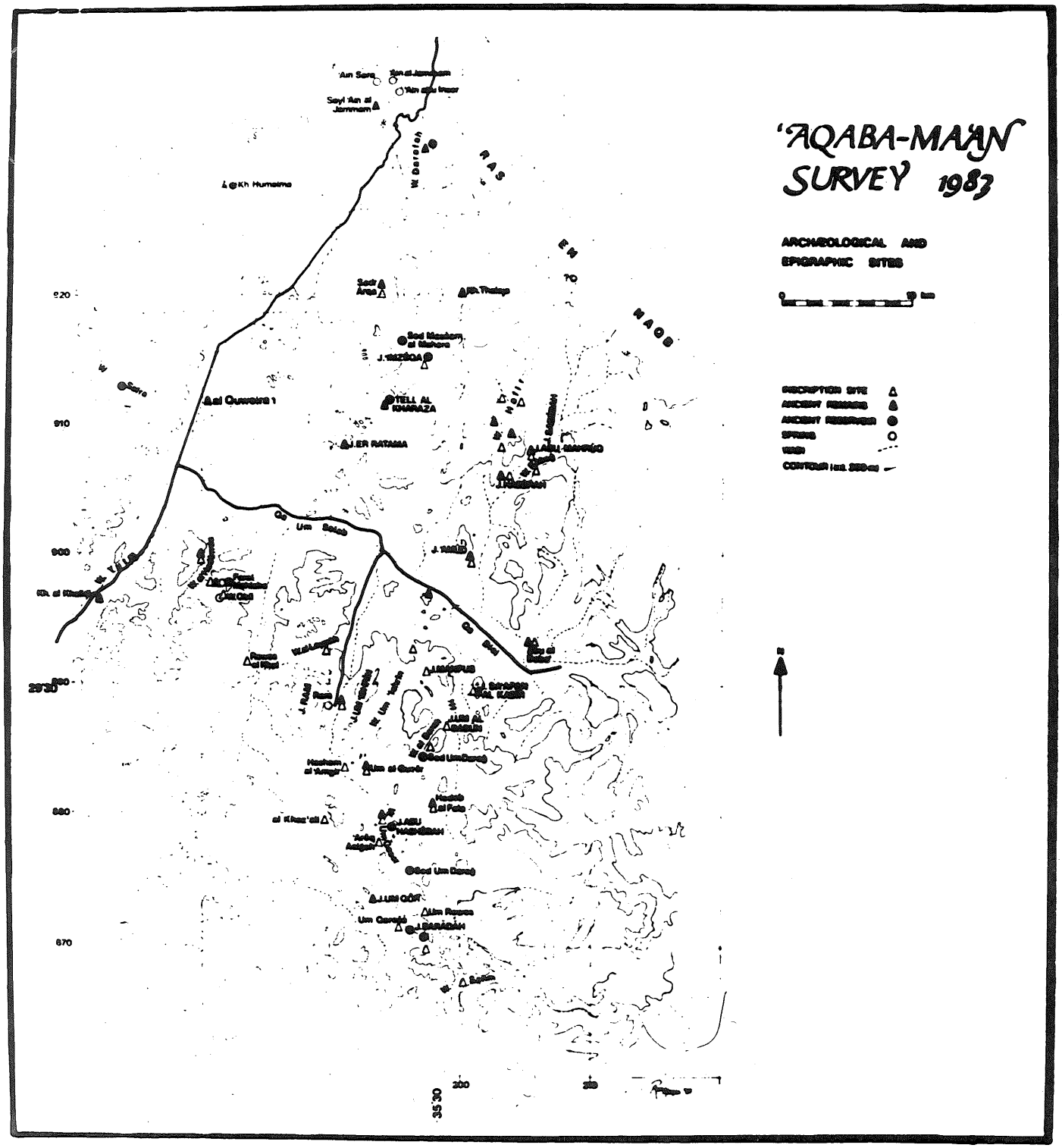

Fig. 1: Archaeological and Epigraphic Map of the 4th Season of the Aqaba-Ma'an Survey 1982-83.

comprise some of the place names and other cartographic, archaeological and epigraphic data from research conducted in the archives and library of the Registration Department of the Jordanian Department of Antiquities, the Fisher Library at Sydney University and the Australian War Memorial in Canberra.[2]

Table 1: Sites — 'Aqaba-Ma'an Survey Northern area

English name	*Grid Ref.*	*Antiquity*	*Inscription*	*Reservoir*	*Spring*	الاسم بالعربي
Marbat al Abyad	184922	x				مربات الابيض
Jebel 'Amud	201898	x	x			جبل عمود
Jebel Arqa	193917			x		جبل ارقه
Sadr Arqa	194922	x	x			صدر أرقة
Balkha	179927	x				بلخا
Al Batra	204933				x	البترا
Jebel Bethedeh	193924			x		جبل بثيده
Bir al Bitaiyihat	180909			x		بير البطيحات
Abu Al Daba'	206893	x	x			ابو الضبعه
Wadi Darafah	193933	x	x	x	x	وادى ظرافه
Bir al Fuweli	197936			x		بير الفولا
Jebel Um Ghadah	195905	x				جبل ام غاده
Jebel Habêrah	203906	x	x			جبل هبيره
Wadi Hafîr	205915	x	x			وادى حفير
Khirbet Humeima	180929	x		x		خربة حميمه
Jebel 'Imzêqa	197914		x	x		جبل امزقه
'Ain Abu Insor	195936				x	عين ابو نسور
'Ain al Jammam	195937				x	عين الجمام
Seyl 'Ain el Jammam	194935	x				سيل عين الجمام
Tell al Kharaza	194913	x		x		تل الخرزه
Jebel Abu Mahrûq	205907	x	x			جبل ابو مخروق
Al Manjir	192927	x				المنجير
Sed Masâam al Mahara	195917			x		سد مسام المهره
Rujm 'Ain al Qana	192937	x				رجم عين القناه
Bir al Qatar	203909			x		بير القطار
Al Quweirah	181913	x				القويره
Wadi Rabeg	204907		x			وادى رابغ

[2] (i) G. L. Harding, *Some Thamudic Inscriptions from The Hashemite Kingdom of the Jordan,* Leiden, 1952, p. 6.

(ii) Map References:
Ottoman Empire, 1:500,000, Ma'an Sheet, (1915).
Sinai Peninsular, 1:250,000 Sheet 4, Aqaba, (War Office 1915)
Transjordan, 1:1,000,000, (War Office 1915)
South Levant, 1:100,000, Series: Sheets:-
— NH36 R4 Um Sahm (1943)
— NH 36 R3 'Aqaba (1944)
— NH 36 R2 Batn El Ghul (1945)
Hashemite Kingdom of Jordan, 1:250,000 Sheet 3, Ma'an (1950)
Hashemite Kingdom of Jordan, 1:250,000 Archaeological, Sheet 3, Ma'an (1950).
Hashemite Kingdom of Jordan, 1:250,000 Series, Sheets:-
165/875 Wadi El Alureima (1967)
165/885Jebel Um Rakham (1957)
165/895 Wadi El Yutm (1957)
180/915 Wadi Hanut (1958)
180/925 Wadi El Gharid (1957)
195/915 Wadi Ghafir (1957)
195/925 Jebel El Batra (1957)
195/935 Jebel Tawil El Hamar (1952)
Jordan 1:50,000 Series, Sheets:
3049 I El Quweira (1974)
3049 II Jebel Um 'Ishrin (1974)
3149 IV Jibal El Batra (1974)
South Levant, 1:100,000 Sheet, NH 36 R I Makhfar El Quweira (1975)
Hashemite Kingdom of Jordan, 1:250,000 Archaeological Sheet , Ma'an (1982).
'Aqaba-Ma'an Survey 1982 Map of Antiquities and Epigrapic Sites, *ADAJ,* XXVII (1983).

Wadi Rabēg	204906	x				وادى رابق
Al Rajfi	165912	x				الرجفه
Jebel er Ratama	191908	x				جبل الرتمه
Rûbêq	176923	x				ربيق
Wadi Safra	173914			x		وادى صفرا
‘Ain Sara	193936				x	عين صاره
Khirbet Thalaja	200920	x				خربة الثلاجة
Nab al Yammam	195936				x	ناب اليمام
Southern Area						
Aqaba	150882	x				العقبه
‘Areq Asiǧeh	194878		x			عريق السيجه
Jebel Um al Badûn	198888		x			جبل ام البدون
Wadi al Barah	197885		x			وادى البره
Jebel Baradah	197872		x	x		جبل برده
Sed Um Daraǧ (al Barah)	197885			x		سد أم درج
Sed Um Daraǧ (Meraq)	196876		x	x		سد ام درج
Dims Haǧaǧ	192890		x			دمس حجاج
Jebel Ettaqtaqiya	179901			x		جبل الطقطقيه
Hedêb al Fala	198881	x	x			هضيبة الفلا
Wadi Um Ǧeser	194879		x	x		وادى ام جسر
Wadi al Hadûwda	180899	x	x			وادى الهدوده
Jebel Abu Hashêbah	195878			x		جبل ابو خشيبه
Hashem al ‘Amgir	192884		x			هشيم المقير
‘Ain al Hiwara	174895				x	عين الهواره
‘Ain al Hushim	180873				x	عين الهشيم
Wadi Um ‘Ishrin	196894		x			وادى ام شرين
Khirbet al Khalidi	172897	x				خربة الخليده
Tell al Khalifeh	150885	x				تل الخليفه
Khashim Mizmar	193894		x			خشم مزمار
Al Khaz’ali	191881	x	x			الخزعلي
Khirbet Kithara	163885	x				خربة كثاره
Wadi al Layyah	190893		x			وادى اللايه
Farat Mahlaba	182897	x	x	x	x	فارات محلبه
Makman al Jahaleen	191889	x	x			مكمن الجاهلين
Jebel Manfus	198891		x			جبل منفوس
‘Ain Mereifiq	189886				x	عين مريفق
Abu Nukheila	189886				x	ابو نخيله
Um Qaresa	194874	x	x			ام كراسغ
Ain al Qatar	189882				x	عين القطار
Wijn al Qatar	189882	x	x			وحن القطار
Wadi Qbil	183896		x		x	وادى قبل
Jebel Um Qôr	193873	x				جبل ام قور
Um al Quṣêr	195882	x	x			جبل ام قصير
Quṣêr Mudeifi	174900	x				قصير مضيفي
Ram	191887	x	x	x	x	رم
Bir Ram al ‘Atiq	188898	x				بير رم العتيق
Rakhimtein	180904	x				رخمتين
Rewes el Khel	183892		x			رويس الخيل
Um Rewes	197872		x			ام رويس
Risqeh		x				رزقه
‘Ain Rumman	188889				x	عين رومان
Gleyb Rumman	184896		x			قليب رومان

Wadi Rumman (Sed)	183895		x	x		وادى رومان
Jebel Sa'afan al Kabîr	202890	x	x			جبل سعفان الكبير
Jebel Sabêbah	205908		x			جبل سبيبه
Seyl Sabit	184869	x	x			سيل صابت
Wadi Saham	200867		x			وادى سحم
'Ain Sidd	190890	x			x	عين سد
Abu Silwan		x				ابو سلوان
Taraf al 'Imraq	190885		x			طراف المراق
Tereif Merar	190885	x				طريف مرار
Jebel Utud	184900		x			جبل اوتد
'Ain al Wejeihat	190890		x		x	عين الوجهات

(Note: The Grid References in this table are based on the Archaeological Map of the H.K. of Jordan 1:250,000 of 1982. Standardisation of English and Arabic names still remains a problem. English spellings from old maps have been retained for the present purposes.)

The cartographic details shown in this map include the sites discovered during the 1982-83 season of the 'Aqaba-Ma'an Archaeological and Epigraphic survey. The position of each site is given to the nearest kilometre with its name be it a *jebel, wadi* or local name. The key indicates the type of site. Geographical information has been limited to 300.00 m. contours, major *awdiyah* (wadis), sealed roads and important ancient and modern settlements.[3] A final series of maps consisting of the four seasons of the 'Aqaba-Ma'an survey is in preparation.

Some Aspects of the Geomorphology of the Area

Dominating the present desert floor towards the centre of the 'Aqaba-Ma'an survey are a series of *Qi'an* (basins) which were once *playas,* or ancient lakes, around which habitation situations occurred.[4] Thus around Jebel 'Amud there is considerable lithic evidence of such occupation both in rock shelters and extending out onto the edge of the *playa.* Together with the following observations about rainfall and regional economy it is pertinent that the geologically recent drainage system centred at Qa' Disi, Qa' 'Um Salab and Qa' Abu Qureishi which are the lowest points of the 'Aqaba-Ma'an area probably once had enough water to drain into the Wadi Yutm. The geological folding north of 'Aqaba through which the Wadi Yutm passes appears to have been the other drain operative under periods of greater rainfall.[5]

These observations combined with the evidence for a considerable range of fauna reported in ancient texts and reflected in the Rock Art of the area suggest the existence of conditions ecologically more favourable for human occupation from time to time.[6]

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[3] The key used is that of G. L. Harding, *op. cit.,* p. 6, with some minor modifications.

[4] R. U. Cooke and A. Warren, *Gemorphology in Deserts,* London, 1973, p. 215-218.

[5] G. Osborn and J. Matthew Duford, Geomorphological Processes in South Western Jordan, *PEQ,* January-June (1981) p. 5.

[6] R. Miller, Water use in Syria and Palestine from the Neolithic to the Bronze Age, *World Archaeology,* 11: 13 p. 331-334.

Rainfall and Regional Economy

During the past four years of the survey study has also been made of the rainfall and water resources of the 'Aqaba-Ma'an area, not least of all because of the crucial significance of the availability and use of water in man-land relationships in these semi-arid and desert environments in South West Asia and its exponential relationship to indigenous technology as well as the social and economic systems of dependent populations.[7]

Rainfall variations in the 'Aqaba-Ma'an area occur because of the nature of present prevailing desert conditions and the incongruous precipitation. As can be seen from the table of Mean Monthly Precipitation (Fig. 2) rainfall statistics show that precipitation across the 'Aqaba-Ma'an area varies from Ras en-Naqb escarpment to Wadi Ram.[8]

Topographic influence is also an important factor in these rainfall variations. Thus at higher altitudes there is greater and more frequent condensation especially from low cloud which is more prevalent in the winter months.[9] Under such conditions (as were observed during the last two seasons of the survey) the runoff from the slopes is immediate due to the lithology, (except in the instances of snowfall), and so the water percolates to the desert floor soaking the areas near the base of the slopes and contributing to erosion (Pl. XXXIX, 1). It is during, or as a result of, the runoff producing storms that it was observed that the saturation of the loose floor material caused the *awdiyah* (wadis) to flow for short periods of time. No less than four runoff producing storms were observed during January and February 1983.[10]

It seems reasonable to postulate that in times of greater rainfall in the past these *awdiyah* (wadis) would have drained into the ancient lake systems into the *Qi'an* (basins) mentioned above.[11]

Throughout the inselbergs runoff is captured by the joints and erosional features and it is significant that in many places this process has been modified and copied by man. This is particularly the case with the Nabataean dams and storage reservoirs (Pl. XXXIX, 2). However many such reservoirs have been abandoned and allowed to silt up. Thus there would appear to have been a decline in the demand for water.[12] Such evidence of hydrological technology as occurs throughout the 'Aqaba-Ma'an area would indicate that at times there was a density of population which may have been equated with higher water consumption. Also it was noted that more favourable climatic conditions would have been pre-empted by better rainfall which would have increased the water intake to aquifers which fed the sub-artesian wells and artesian springs as well as raised the levels of water tables. The location of ancient dams, reservoirs, cisterns and springs as well as the manifestations of the aquifer in the 'Aqaba-Ma'an area are primary factors in the location of antiquity sites, the determination of demographic concentration and frequently the explanation of the density of epigraphic remains.[13]

Rock Art and Petrographs

A fascinating addition to the corpus of Rock Art already recorded and copied in

[7] N. Roberts, Water Conservation in Ancient Arabia, *Proceedings of the Seminar for Arabian Studies,* 7 (1977) p. 143.; cf. W. Lancaster, *The Rwala Bedouin Today,* Cambridge, 1981, p. 9-10; and A. Musil, *Manners and Customs of the Rwala Bedouins,* American Geographical Society Oriental Exploration and Studies, No. 6, New York, 1928, p. 5-10, 13-19.

[8] Fig. 2 and rainfall observations have been prepared by R. V. H. Morgan, B.A., Dip. Museum Studs, (University of Sydney).

[9] M. Evenari, *et. al., The Negev, The Challenge of a Desert,* Cambridge, 1971, p. 32.

[10] J. W. Lloyd, The Hydrology of the Southern Desert of Jordan, (United Nations Development Programme/Food and Agricultural Organization of the United Nations: Investigations of the Sandstone Aquifers of East Jordan), Technical Report No. 1.

[11] G. Osborn and J. Matthew Duford, *op. cit.,* p. 3-5.

[12] J. Drayton, The Problem of Climatic Change in the Arabian Peninsula, *Proceedings of the Seiminar for Arabian Studies,* 5 (1975) p. 41; p. 45-46.

[13] N. Roberts, *op. cit.,* p. 134.

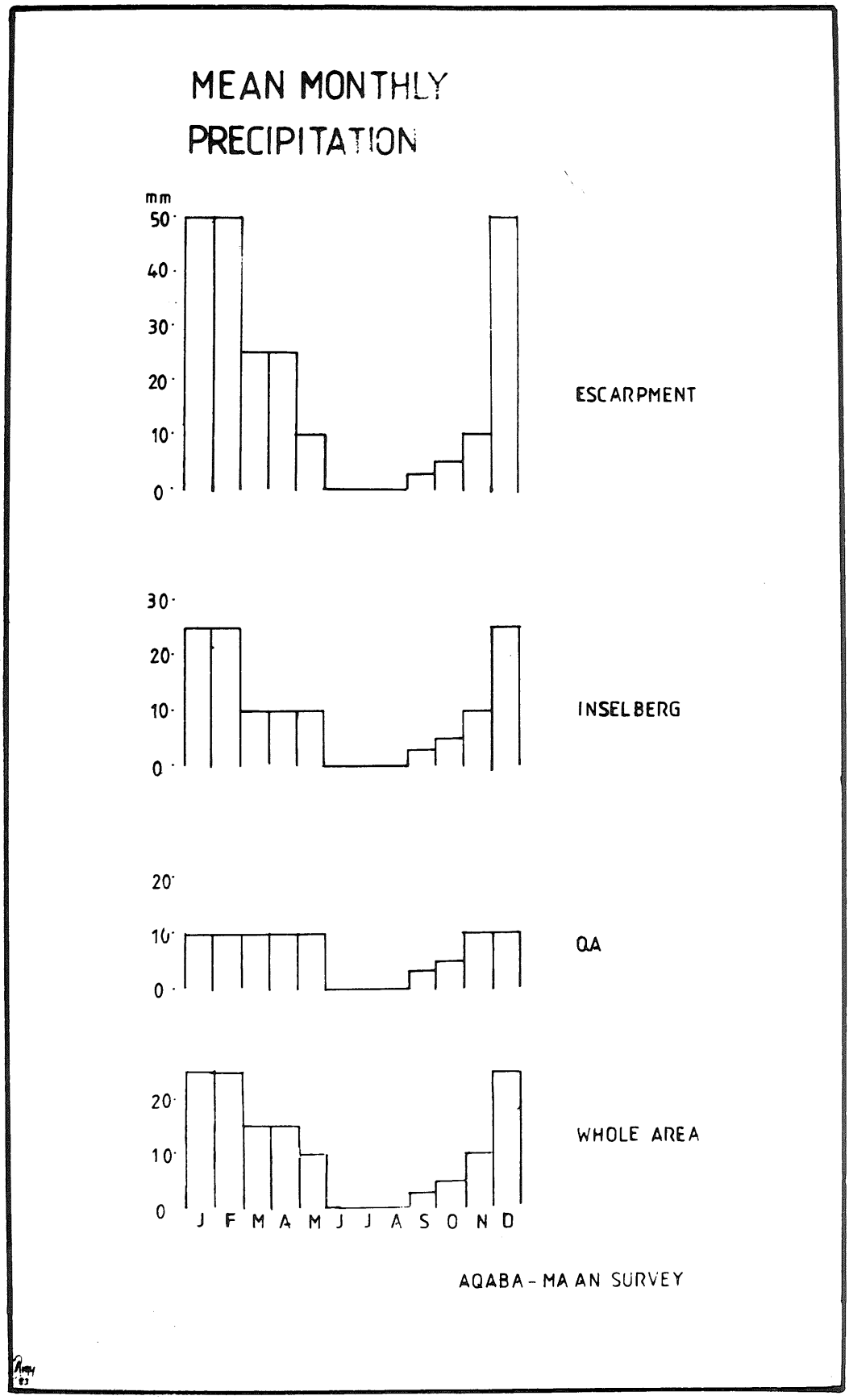

Fig. 2: Mean Monthly Percipitation of the Aqaba-Ma'an area.

the previous three seasons of the 'Aqaba-Ma'an survey has been the extensive range of detailed panels and individual examples of the area. From the highly stylised animal and human figures of the most exquisite execution to detailed action scenes which portray the co-ordinated hunting or warfare of the past inhabitants of these *awdiyah* (wadis), this art articulates visually a valuable range of human activty in, and response to this Southern Jordan evironment (Pl. XL, 1).

As in previous years, there has also occured a considerable number of scenes which seems to be combined with Thamudic inscriptions (Pl. XL, 2). Also identified and photographed in this season's survey were hunting and pastoral scenes which shed light on the fauna of this area and provide parallels with the Sinai, Southern Palestine and the Southwestern and Northwestern Provinces of Saudi Arabia.[14] Of particular interest in these scenes is the occurrence of what appears to be representations of the *Bos primigenius* which occurs in contexts which suggest that it was not domesticated (Pl. XLI, 1).[15] Other Animals of interest are the large cats and ostriches both of which occur in hunting scenes, usually as the object of the hunt and pursued by armed hunters assisted by dogs (Pls. XLI, 2; XLII,1). It may be possible to associate these hunting scenes with the lithic remains of the vicinity.[16] On the other hand, the combination of some of these scenes with Thamudic inscriptions may suggest that they are Thamudic art, although in some cases it would seem that the patina of the art work may indicate that some of the art scenes may be older in execution than the inscriptions which occur on the same rock face.[17]

In the Wadi Hafir there are both large and small panels of rock art which are concerned with what appear to be battle scenes. The frequency of such scenes and their style of execution suggest that this extensive Wadi, which also contains many Thamudic inscriptions, was either the scene of a severe and bloody battle, or the home of warriors who recorded their military exploits and exercises in the martial arts (Pls. XLII 2; XLIII, 1). The range of weapons included in these scenes are the single and double flexed bows, arrows, swords of different lengths, spears which vary in size and proportion according to whether they are used by infantry or mounted personnel, lassoes, clubs and a variety of shields.

At 'Areq 'Asigeh (GR 193879) more examples were found of pediography (foot symbolism) on the rock of the *Wadi* floor. These symbols are similar to those at Khaz 'Ali (GR 191881) and Sed Um Darag in the *Wadi* al Barah (GR 19885) (Pl. XLIII, 2). Mrs. Bennett has drawn attention to the occurrence of similar foot symbolism in the Petra region and similar motifs have been identified in Syria and North West Saudi Arabian rock art.[18]

Epigraphy

As in previous seasons considerable attention was given to the location and recording of North Arabian epigraphy. While the publication of the complete corpus of inscriptions from the 'Aqaba-Ma'an survey is still in preparation it is pertinent to note that in the 1982-83 survey there were several hundred Thamudic inscriptions located, recorded and photographed as well as two Lihyanite—Dedanite inscriptions which are being prepared for separate publication forthwith.

Of particular interest at this stage are the following Thamudic inscriptions some of which have been taken to the Kerak Museum.

[14] E. Anati, *Palestine Before the Hebrews,* London, 1963, p. 213; cf. J. Zarins *et al.,* The Second Preliminary Report on the South-western Province, *ATLAL,* 5 (1981) P. 34-37, Plates 32-41.; M. Ingraham *et. al.,* Preliminary Report on a Reconnaissance Survey of the Northwestern Province (with a note on a brief survey of the Northern Province), *ATLAL,* 5 (1981) P. 79, Plates 96 and 97; and, S. Helms, *Jawa: Lost City of the Black Desert,* London, 1981, p. 27ff.

[15] J. Zarins, *op. cit.,* p. 35; cf. S. Helms *idem.*

[16] J. Zarins *idem.*

[17] J. Zarins, *op. cit.,* p. 36; cf. G. Osborn and J. Matthew Duford, *op. cit.* p. 14-15.

[18] P. J. Parr, *et. al.,* Preliminary Survey in N.W. Arabia, 1968, *Bulletin of the Institute of Archaeology,* 10 (1972) Plate 23, No. 58.

Pl. XL, 2. Jebel 'Amud: Thamudic Inscription, (GR 201898), AM83/26B/17.

w šḥdd ḵtt

And *šḥdd* drew (it).

The name *šḥdd* occurs in Safaitic (see HIn.[19] p. 341). The verbal form *ḵtt* occurs in several inscriptions from this area (see *T.I.J.* Nos. 134, 251, etc.). This inscription provides a good example of the contrast in execution between the *ḥ* and *ṭ* letters.

Pl. XLIV, 1. Jebel Manfus: Thamudic Inscription, (GR 198891), AM83/20B/18A.

'rq

The name *'rq* occurs in Safaitic (see HIn. p. 38.) The same name occurs higher up on the rock face where it is written next to a similarly executed drawing of a camel within a rectangular cartouche.

Pl. XLIV, 2. Wadi Hafir: Thamudic Inscription, (GR 204913), AM83/35B/6. Kerak Museum Registration No.

(1) *l zhwd bn lḥd*

By *zhwd* son of *lḥd.*

The name *zhwd* is new and may be derived from the root *zhw* (to increase, to thrive, see Lane p. 1264, col. 1), and *wd* (see HIn. p. 636). *wd* is a theophoric element (see BHT p. 98). The name *lḥd* occurs in Thamudic (see HIn. p. 511).

(2) *wasm šḏh*

The name *šḏh* is unknown and the root doesn't seem to appear in Classical Arabic. The signs appearing at the beginning of this inscription are probably a *wasm.*

(3) *f l r'lt*

And by r'lt

This is a difficult inscription to translate. The above translation is very tentative (see B.I.T.. p. 423 JS (Tham) 11, and p. 438 JS (Tham) 180). The *l*'s in this inscription are not consistent in execution and are read as uncertain. The name *r'lt* is not attested in North Arabian, however see *r'l* (HIn. p. 281 and Hava p. 258).

(4) *l ykbr*

By *ykbr*

The name *ykbr* occurs in Safaitic (see HIn. p. 681). The hammered line at the beginning of the inscription and the tailed circle by the side are probably *wasm.*

Pl. XLV, 1: Wadi Hafir: Thamudic Inscription, (GR 204913), AM83/35B/7. Kerak Museum No.

bn ḵmr

Son of *ḵmr*

The form *ḵmr* occurs as a name in Safaitic and Thamudic (see HIn. p. 228).

Pl. XLV, 2: Wadi Hafir: Thamudic Inscription, (GR 203909),

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[19] Abbreviations:

ARNA: F. V. Winnett and W. L. Reed, *Ancient Records from North Arabia,* Toronto, 1970.

B.D.B.: F. Brown, S. R. Driver and C. A. Briggs, *A Hebrew-English Lexicon of the Old Testament,* Oxford, 1968.

BHT: A. Vanden Branden, *Histoire de Thamoud,* Beyrouth, 1966.

BIT.: A. Van den Branden, *Les Inscriptions Thamoudéenes,* Louvain, 1950.

Dozy: R. Dozy, *Supplement aux Dictionnaires Arabes,* Leiden, 1967, Tome, 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 and Inscriptions,* Toronto, 1971.

Lane: E.W. Lane, *An Arabic-English Dictionary,* (8 Volumes), London, 1863-1893.

Moscati, *Comparative,:* S. Moscati (ed), *An Introduction to the Comparative Grammar of the Semitic Languages,* Weisbaden, 1969.

T.I.J.: G. Lankester Harding, with collaboration of E. Littman, *Some Thamudic Inscriptions From the Hashemite Kingdom of the Jordan,* Leiden, 1952.

AM83/30/8A. Kerak Museum No.

(1) *l krtn*
(2) *l 'wf*
(3) *l ʿtb*
(4) *l qnt*
(5) *mʿn*
(6) *l 'kbr*
(7) *l nšṯ*
(8) *šʿ*
(9) *bn ḥdḍ*
(10) *l mšš*

(1) *l krtn* By krtn

The name *krtn* is unknown. However for the root *krt* see Dozy, Supplement, II, p. 453. The form *'krtn* possibly occurs in Thamudic (see ARNA p. 134).It may be possible to relate the *krt* of this form to West Semitic *krt* (=to cut), the final nun being a nun energicum (see DISO. p. 127). There is a problematical grapheme above the *t*. It is possible that the writer started to write his father's name but there was not enough space for him to continue the *b* of *bn*.

(2) *l 'wf* By 'wf

The name *'wf* occurs in Safaitic (see HIn. p. 86). There are certain abrasions between the *w* and *f*.

(3) *l ʿtb* By *ʿtb*

The name *ʿtb* occurs in Thamudic and South Arabian (see HIn. p. 404). There is a hammered line which may concur with similar lines running down the left side of inscription four and below inscriptions six and seven. It doesn't appear to be in the same technique as the letters in this inscription.

(4) *l qnt* By *qnt*

The name *qnt* occurs frequently in Thamudic and Safaitic as well as South Arabian (see HIn. p. 489).

(5) *l mʿn* By *mʿn*

The name *m'n* is well attested in Safaitic, Thamudic and South Arabian (see HIn. p. 556). The *lam auctoris* has been damaged. The *n* occurs to the side of ʿ presumably because of the crack in the stone at this point.

(6) *l 'kbr* By 'kbr

The name *'kbr* occurs in Safaitic (see HI, p. 61).

(7) *l nšṯ* By *nšṯ*

So far the name *nšṯ* is unattested in North Arabian and the root unknown in Classical Arabic. However it is noted that the form *nšṯ* occurs in Hebrew (see B.D.B. p. 677). As mentioned above a hammered line appears below this inscription.

(8) *šʿ*

The name *šʿ* is frequently found in Safaitic (see HIn. p. 349). There is another hammered line above the *š* running along the crack on the edge of the rock.

(9) *bn ḥdḍ* Son of *ḥdḍ*

The name *ḥdḍ* is unattested in North Arabian. However it is suggsted that the final grapheme originally read *d* not *ḍ* (see Moscati *comparative.* p. 27-28, *et passim).* This would give the well attested name *ḥdd* (see HIn. p. 179). The alteration to the original grapheme *d* may be simply another hammer mark as those mentioned above. The abrasion following the last letter did not appear to be an *n* when studied in the field.

(10) *l mšš* By *mšš*

This inscription is damaged by hammering and the last two letters must remain uncertain. The names *mš* and *mš'l* occurs in Safaitic (see HIn. p. 546).

Pl. XLVI, 1. Wadi Sahm: Thamudic

Inscription, (GR 200867), AM83/40B/31. Kerak Museum No.

(l) ǧb't bn nty
By *ǧb't* son of *nty*

The small stone on which this inscription occurs was found in the Wadi Sahm. Unfortunately there is an obvious break at the beginning of the inscription. It is possible that the *lam auctoris* was written on the missing part of the stone. The name *ǧb'* occurs in Thamudic (see HIn. p. 152). The form *nty* is unknown as a name, however for the root see Hava p. 750.

These inscriptions and their tentative translation and interpretation reflect an important aspect of the antiquities of Southern Jordan in that they are the symbolization of one of the languages spoken by a large number of the inhabitants of this area during an important phase in pre-Islamic history. Along with Nabataean, the other widely attested language of this area, Thamudic reflects something of the mind of these people, their religion and their society.

Lithics

As in previous seasons there was extensive evidence of lithic industry within the area surveyed. While a detailed analysis and drawings of this new lithic evidence is being prepared for separate publication the flints from Jebel Um Qor (Pls. XLVI, 2; XLVII, 1), Wadi Um Ishrin (Pl. XLVII, 2), Jebel Sababah (Pl. XLVIII, 1), Wadi Hafir (Pl. XLVIII, 2), and Wadi Rabeq (Pl. XLIX) provide a profile of this lithic material. Situated both to the north and south of the *Qi'an* (basins) within the centre of this area these sites occur in the lee of rock overhangs where there is also evidence of circular and rectangular wall foundations. Such sites are usually situated close to present water supplies.

The selected examples of flints from these sites also serve as an indication of the quality of workmanship in the area. Good sources of flint, some obviously worked, occur at Seyl Jammam, in the Wadi Hafir and in the Wadi Rabeq below the Ras en-Naqb escarpment.

While more intensive analysis of this material still remains to be done it is perhaps permissable at this stage to relate this lithic material to the earlier observations made about climate and rainfall. Such a relationship suggests that the area under survey once had a density of population significantly larger in earlier periods of human occupation. This may relate to variation in climate and ecology and thus provide further evidence for a less arid environment.[20]

Summary

In the early part of the twentieth century areas such as those under survey were something of a *terra incognita* as far as western scholars were concerned. Early explorers were amazed at the sites located during their travels. Since then study of ancient traditions and the ancient geographers and historians, both Cassical and Islamic, has provided an impetus to explore and investigate further these early reports.This report and those that have preceded it are a contribution to this great and fascinating enterprise.

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[20] N. Groom, *Frankincense and Myrrh: A Study of the Arabian Incense Trade,* London, 1981, p. 217ff.

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PRELIMINARY REPORT ON THE MEASUREMENT OF ARCHITECTURAL ELEMENTS ON THE FAÇADES AT PETRA

by
Judith McKenzie
and
Angela Phippen

Introduction

Between October 1981 and January 1982 the authors spent a total of two and a half months at Petra recording the architectural elements of the principal monuments and measuring the mouldings on the façades using a theodolite.

The success of the project was dependent on the logistical support provided by Dr. Adnan Hadidi, Director-General of the Department of Antiquities of the Hashemite Kingdom of Jordan and Prof. J. B. Hennessy, and we are indebted to them. Appreciation is also expressed to the University of Sydney Pella Expedition and Department of Civil Engineering, and to the British Institute at Amman for Archaeology and History and its Director Mrs C.-M. Bennett, O.B.E., for the use of equipment.

Thanks are also due to Dr. Youssuf M. Siyam of the Faculty of Engineering and Technology at the University of Jordan, and to Mrs. Susan M. Balderstone for helpful discussions about the surveying technique. Mr. Nabil el-Qadi and Mr. Mohammed Murshed also provided assistance.

The final report will form the basis of a post-graduate thesis by Judith Mckenzie at the Department of Archaeology, University of Sydney, Australia, under the supervision of Drs. A. W. McNicoll and J. P. Descoeudres.

Some explanation is necessary to justify the survey, as considerable work has been carried out in Petra already.

The traditional sequence of tomb façades at Petra was established by R. E. Brünnow and A. von Domaszewski *(Die Provincia Arabia* I, 1904). They established a typology of the tombs, dividing them into seven main groups based on the number of classical elements present. They then suggested that these groups formed a chronological sequence when placed in order of increasing complexity, which involved an increasing presence of classical elements.

However, at Medain Saleh, tombs of Brünnow and Domaszewski's first four types (pylongrab, Stufengrab, Proto Hegrtyp and Hegrtyp) have inscriptions for the period from A.D. 1 to 76. This shows that in the first century A.D. Brünnow and Domaszewski's first four types were chronologically parallel and not in sequence.

Attempts have been made to date the Khasneh by comparing it with dated evidence not from Petra. However, this method has not yielded decisive results as it suggests a date either in the first century B.C. or the second century A.D.

In the last twenty-five years sufficient excavation of free-standing monuments at Petra has been carried out to elucidate the chronology of the classical rock façades. However, until the present study no detailed examination and synthesis of this evidence has been carried out. Hammond, Wright and Parr have concentrated only on those monuments which they themselves have excavated.

An examination of the dated façades at Medain Saleh shows that there was a marked degeneration of classical elements during the first century A.D.

An examination of the published material from Petra indicated that a similar degeneration appeared to occur at Petra. However, as few of the architectural details of the façades were published it was necessary to conduct fieldwork to collect sufficient evidence to test the hypothesis.

From the drawings of the mouldings and other measurements and information

collected it is possible to establish a sequence for the classical façades which is confirmed by the monuments dated by epigraphic evidence.

Method for Measuring Inaccessible Mouldings

As the mouldings are often inaccessible due to the height of the façades it was necessary to devise a method of measuring them from the ground level. It was decided to use a theodolite. Considerable time had to be spent refining the method to suit the characteristics of the site.

The method used was briefly as follows: three theodolite stations (1, 2 and 3) were set up on a base line which was established perpendicular to the least weathered part of the face of the façade (Fig. 1). At each station the horizontal circle of the theodolite was clamped perpendicular to the façade, then the vertical angles to the points of intersection of surfaces (A and B in Fig.2) on the mouldings were recorded at each of the three stations. The length of the baseline (z) was measured, and the levels of stations 1, 2 and 3 were recorded. Using trigonometry the position of points A and B were plotted. Line AB was drawn in free-hand.

The use of three stations rather than two stations creates a triangle of error which indicates the accuracy of the results. This showed that the results are accurate to 0.01 m. at a distance of 40.00 m.

A Cooke, Troughton and Simms V208 theodolite with a prismatic eyepiece was used. The smallest division on it was 1 minute, allowing readings to $^1/_3$ minute. Greater accuracy is not required as mesurements of mouldings on the ground show that a variation of two or three centimetres in an individual element is quite common.

To illustrate the accuracy of the method a control was conducted by measuring the guttae block which was *in*

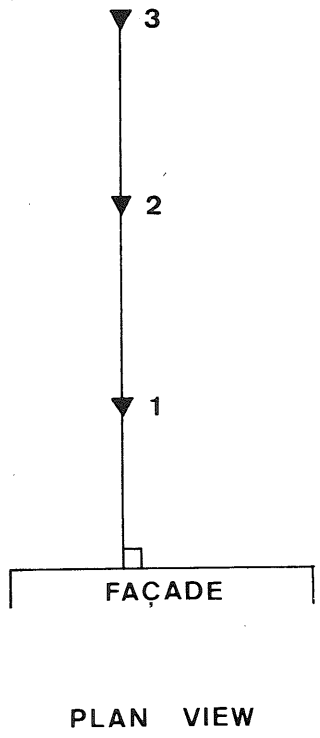


Fig. 1

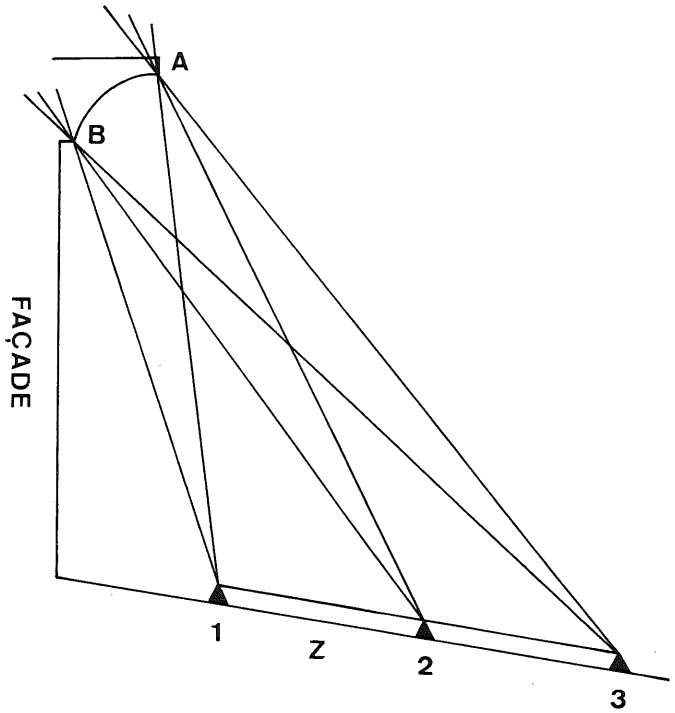
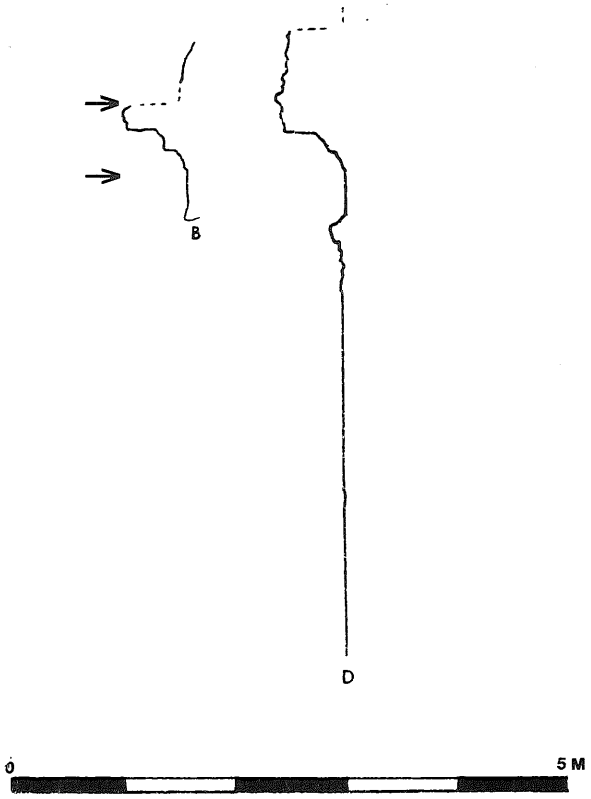
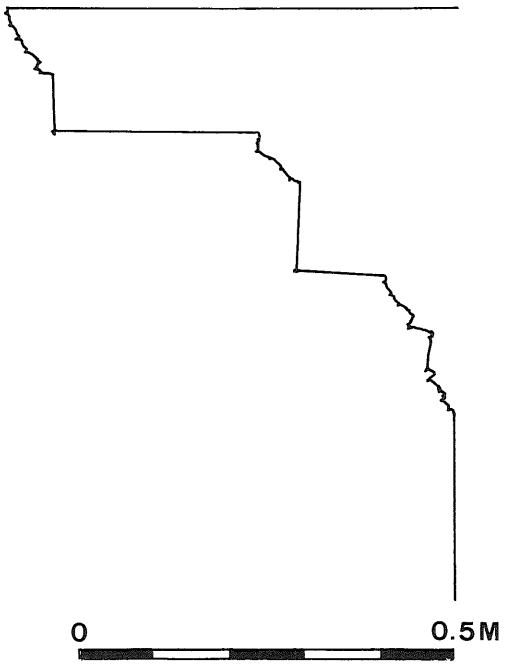


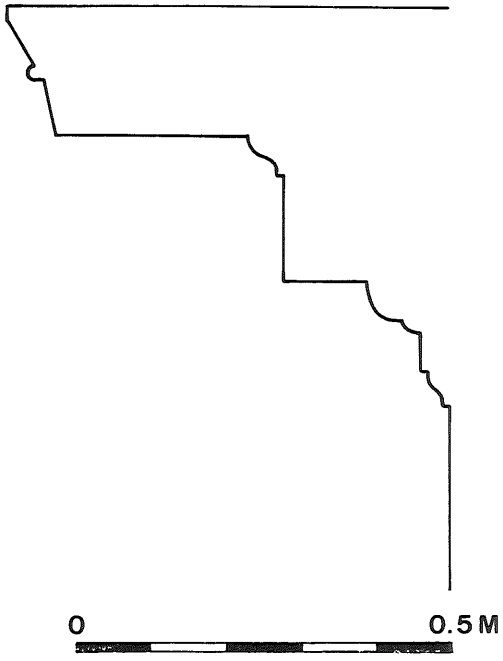
Fig. 2



(a) photogrammetry plot as published[1]



(b) Photogrammetry plot[2]



(c) Theodolite plot

Treasury. Doorway of chamber on southern side of Vestibule.

Fig. 3

(1): P. J. Parr et al., *ADAJ* XX (1975) fig. 2
(2): Courtesy of Petra Excavation Fund and the Department of Photogrammetry and Surveying, University College London.

situ on the Qasr el Bint and measuring a fallen one on the ground using a tape measure. The two drawings produced were the same.

A step by step description of the method with sufficient detail to be followed in the field by an archaeologist or architect is in preparation.

It is possible to obtain similar section drawings using photogrammetry. However, photogrammetry is a much more expensive method involving the use of expensive equipment and technical expertise.

The photogrammetry plots of sections which have been published are of little use as they are at much too small a scale to show any detail (Fig. 3a). Futhermore, little consideration has apparently been given to the amount of weathering on the part of the façade chosen for the section. Better photogrammetric results are obtained if plotting is done at a larger scale (Fig. 3b). A comparison of the plots from the two methods can be seen by an examination of Fig. 3. The part illustrated in Fig. 3b and Fig. 3c occurs between the arrows in Fig. 3a.

Using the theodolite all the mouldings of the following facades were measured:

Khasneh
Deir
Urn Tomb
Palace Tomb
Corinthian Tomb
Tomb of the Roman Soldier
Triclinium of the Tomb of the Roman Soldier
Lion Triclinium
Renaissance Tomb
Tomb of Sextus Florentinus
Turkmaniya Tomb
Tomb 813
Tomb 825
Tomb 649

The mouldings on the Bab el Siq Triclinium and the Tomb with the Broken Pediment were too weathered to measure.

The plotting is at present in progress and the analysis of the material should be completed by the end of the year.

Judith McKenzie
Angela Phippen
London, England

THE CENTRAL LIMES ARABICUS PROJECT: THE 1982 CAMPAIGN

by
S. Thomas Parker

Introduction

The Central *Limes Arabicus* Project is a long-term investigation of the sector of the ancient Roman fortified frontier east of the Dead Sea. The primary purpose of the Arabian *limes* was to control the movement of goods and people between the Empire and the Arabian peninsula and especially to control the incursions of nomadic Arab tribes that inhabited the desert east of the frontier. During the early Principate the security of the southeastern frontier of the Roman Empire was provided by the Nabataean client kingdom. Trajan's annexation of Nabataea in A.D. 106 brought the Romans face to face with the problems of controlling a long desert frontier. By 114 Trajan had completed a major trunk road, the *via nova Traiana,* that extended for *ca.* 360 kms. from the borders of Syria to the Red Sea. A chain of forts, some reoccupied Nabataean posts, others of Roman construction, spaced at intervals along the *via nova* formed the initial framework of the *Limes Arabicus.*[1] This essentially linear defense was maintained by the Romans for the next two centuries.[2] The Arabian frontier protected a large sedentary population in Palestine and Transjordan (including the cities of the Decapolis), the lucrative caravan routes between Arabia and the Empire, and the Palestinian land bridge that connected the two most important Roman provinces in the East: Egypt and Syria.

During the third century the Roman Empire experienced a serious crisis. Civil wars, external invasions, depopulation, and major economic problems beset the Empire. Portions of the eastern provinces were repeatedly ravaged by Persian armies and were temporarily occupied by the rebellious state of Palmyra. Aurelian destroyed Palmyra in 273, but it was Diocletian (284-305) who finally restored political stability to the Empire and began a thorough reorganization of the imperial frontiers. A major victory over Persia in 298 resulted in the advance of the Roman frontier in Mesopotamia east of the Tigris. In Syria, the frontier from the hauran to the Euphrates was guarded by the *Strata Diocletiana,* the heart of the fortified zone of forts, watchtowers, and roads.[3] In Transjordan, a surface survey conducted by the author in 1976 suggested that a major buildup of fortifications occurred in the Diocletianic era along the Arabian frontier, where the number of fortified sites approximately doubled. The linear defense of the Principate was abandoned in favour of a defense in depth along most of the frontier. The Arabian *limes* was now a broad fortified zone, 20-30 kms. in

[1] S. Thomas Parker, Archaeological Survey of the Limes Arabicus: A Preliminary Report, *ADAJ,* 21 (1976) 19-31; Parker, Towards a History of the Limes Arabicus, p. 865-878 in W. S. Hanson and L. J. F. Keppie, eds. *Roman Frontier Studies 1979,* Oxford: British Archaeological Reports, 1980. For additional treatments of the Arabian frontier, cf. G. W. Bowersock, Limes Arabicus, *HSCP* 80 (1976) p. 219-229; David F. Graf, Saracens and the Defense of the Arabian Frontier, *BASOR* 229 (1978) p. 1-26; D. L. Kennedy, *Archaeological Explorations of the Roman Frontier in North-East Jordan,* Oxford, 1982.

[2] One exception to the linear posture was in the northern sector, where a chain of forts well east of the *via nova* guarded the northwestern outlet of the Wadi Sirhan. Cf. S. Thomas Parker and Paul M. McDermott, A Military Building Inscription from Roman Arabia, *ZPE,* 28 (1978) p. 61-66; D. L. Kennedy, The Frontier Policy of Septimius Severus: New Evidence from Arabia, p. 879-887 in W. S. Hanson and L. J. F. Keppie, *Roman Frontier Studies 1979,* Oxford: British Archaeological Reports, 1980).

[3] A Poidebard, *La Trace de Rome dans le désert de Syrie. Recherches qériennes (1925-1932)m* 2 vols., Paris: Geuthner, 1934; Denis van Berchem, *L'armée de Dioclétien et lq refor,e constqntinien-nem* Paris: Geuthner, 1952, p. 10-17.

depth. The central sector of the frontier, i.e., the region east of the Dead Sea, received the bulk of the new fortificiations (Fig. 1). For about two centuries the forts of the Diocletianic *limes* remained occupied, but in the late fifth and sixth centuries there is clear evidence that most of these forts were abandoned, including nearly all in the central sector.[4] Primary defensive responsibility for the southeastern frontier was turned over to Arab federates, who were unable to contain the explosion of Muslim tribes from Arabia in the early seventh century. The Muslim conquest of Transjordan, Palestine, and Syria opened a new epoch in western history.

The Central *Limes Arabicus* Project, therefore, seeks to answer two principal historical questions:

1) What can explain the dramatic military buildup in the central sector of the Arabian frontier about A.D. 300?
2) What can account for the apparent abandonment of most of these fortifications about two centuries later?

In order to address these principal questions the project is organized around five biennial field campaigns in the even numbered years between 1980 and 1989. The central frontier is being examined through full scale excavation of the Roman legionary fortress at el-Lejjūn, the most important site in the sector, limited soundings of *ca.* six smaller forts and watchtowers (three have been sounded to date), intensive survey of the *limes* zone itself, and survey of the desert fringe immediately east of the frontier in an effort to learn something of the nomadic opponents of the Romans.

The project began field work in 1980.[5] The 1982 campaign was conducted between June 6 and July 29, under a permit kindly granted by the Department of Antiquities of Jordan. The project is sponsored by North Carolina State University and is affiliated with the American Center of Oriental Research (ACOR) in Amman. Principal funding for the 1982 season was provided by the National Endowment for the Humanities on a gifts and matching basis. Additional funding was provided by the Department of Antiquties of Jordan, the Dumbarton Oaks Center for Byzantine Studies in Washington, D.C., student fees, and several private donors. The author wishes to express his gratitude to all these organizations and individuals for their support. A special debt is owed to Dr. Adnan Hadidi, Director of the Department of Antiquities, Dr. David W. McCreery, Director of ACOR, and Mr. Dhyab al-Yousef, Governor of the Kerak District, for invaluable advice and assistance.

Senior staff included Dr. S. Thomas Parker of NCSU as director, stratigrapher, and pottery specialist, Dr. Bert DeVries of Calvin College as architect/surveyor, Dr. Frank L. Koucky of Wooster College as geologist and director of the survey, Mr. Scott Rolston of Yarmouk University as human osteologist, Dr. Vincent A. Clark of ACOR as Semitic epigrapher and team leader of the desert survey, Mr. Michael Toplyn of Harvard University as faunal analyst (Dr. Ilse Köhler provided preliminary interpretation of faunal remains in the field in 1982), Dr. John Wilson Betlyon of Smith College as numismatist, Dr. Patricia Crawford of Boston University as paelo-botanist, Ms. Jennifer Groot as object specialist, Dr. Sallie S. Fried of Brown University as draftsperson, Mr. Eric Green of NCSU as photographer, and Ms. Martha Jane Newby of the University of Montana as camp manager. Area supervisors were Dr. Anne E. Haeckl of the University of Colorado (Area A—the *principia),* Ms.

[4] Parker, *ADAJ,* 21 (1976) p. 26-28; Towards a History, p. 873-874.

[5] For preliminary reports on the 1980 season, cf. S. Thomas Parker, The Central Limes Arabicus Project: The 1980 Campaign, *ADAJ,* 25 (1981) p. 171-178; The Central Limes Arabicus Project: The 1980 Campaign, *ASOR Newsletter,* 8 (1981) p. 8-20; Preliminary Report on the 1980 season of the Central Limes Arabicus Project, *BASOR,* 247 (1982), p. 1-26. A summary of knowledge about Lejjun and its garrison unit prior to the beginning of excavation is presented in S. Thomas Parker and James Lander, Legio IV Martia and the Legionary Camp at el-Lejjun, *Byzantinische Forschungen,* 8 (1982), p. 182-210.

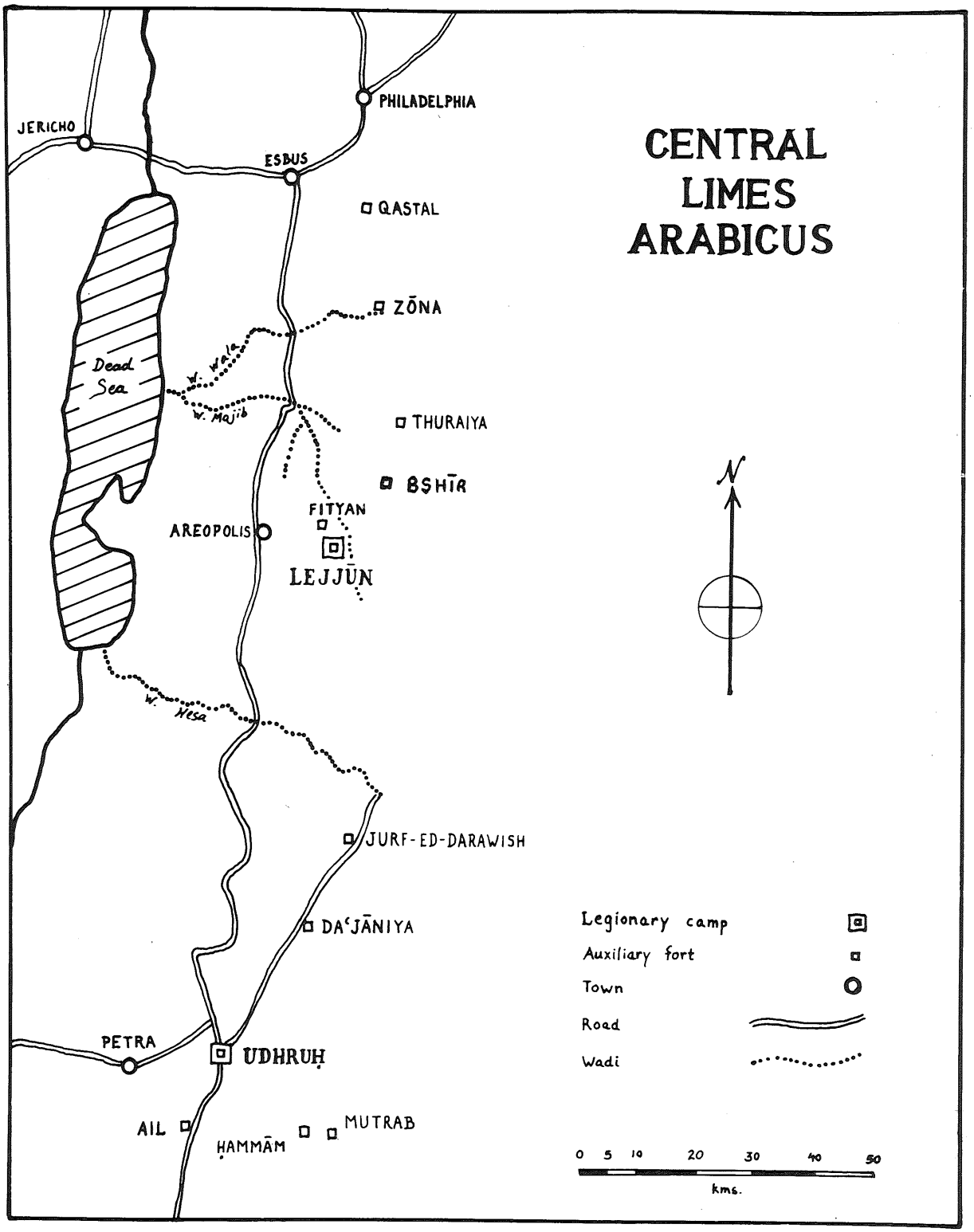

CENTRAL
LIMES
ARABICUS
PHILADELPHIA
JERICHO
ESBUS
QASTAL
ZŌNA
Dead
Sea
W. Wala
W. Majib
THURAIYA
BṢHĪR
FITYAN
AREOPOLIS
LEJJŪN
W. Hesa
JURF-ED-DARAWISH
DA'JĀNIYA
PETRA
UDHRUḤ
AIL
ḤAMMĀM
MUTRAB
N
Legionary camp
Auxiliary fort
Town
Road
Wadi
0 5 10 20 30 40 50
kms.

Fig. 1

Jennifer Groot (Area B—the barracks), Mr. Robert Schick of the University of Chicago (Area C—the fortifications), Mr. Scott Rolston (Area F—the cemetery and soundings), Dr. Particia Crawford (Area G—the *vicus* building), and Dr. Vincent A. Clark (Area H—Qasr Bshīr).[6]

The following brief report presents a summary of the results of the 1982 campaign in preliminary form. It includes a tentative stratigraphic outline, results from the areas excavated within the Lejjūn fortress, soundings within the Lejjūn valley, soundings at Qaṣr Bshīr, the survey, and the signaling experiment. Finally, some tenative historical conclusions are drawn that attempt to shed some light on the major historical questions outlined above.

Excavation of the Lejjun Legionary Fortress

A) Stratigraphic Summary

The first season of excavation in 1980 established a basic stratigraphic sequence based on numismatic and ceramic evidence.[7] Results from the 1982 campaign permit a slightly more refined stratigraphic picture:[8]

Stratum	*Period*	*Approximate Dates*
VII	Early Roman	*ca.* 63 B.C.-A.D. 135
Post Stratum VI Gap	Late Roman I-III	*ca.* A.D. 135-284
VI	Late Roman IV	*ca.* 284-324
VB	Early Byzantine I	*ca.* 324-363
VA	Early Byzantine II	*ca.* 363-400
IV	Early Byzantine III-IV	*ca.* 400-500
III	Late Byzantine I-II	*ca.* 500-551
Post Stratum II Gap		*ca.* 551-1910
II	Late Ottoman	*ca.* 1910-1918
I	Modern	*ca.* 1918-

B) Plan of the Fortress

It has long been supposed that Lejjūn was the base of *legio* IV *Martia.* Although this identification seems increasingly likely, it has still not been proven by the recent excavations. The fortress (Fig. 2) measures 242.00 m. x 190.00 m. and covers an area of *ca.* 4.6 ha. (*ca.* 11 acres). One gate is located in the middle of each wall. Two major streets intersect at a right angle in the middle of the fortress: the *via principalis* extends from the north gate to the south; the *via praetoria* extends from the east gate to bisect the *via principalis* at the *groma,* the exact centre of the fortress. At the intersection of the two main streets is the *principia* or headquarters building. The entire eastern half of the fortress is devoted to barracks blocks. The fortress is protected by an enclosure wall 2.40 m. in thickness and studded with projecting towers: four circular angle towers and twenty U-shaped interval towers.[9] Excavation within the fortress in 1982 continued in three areas opened in 1980: the headquarters building, a barracks block, and the fortifications.

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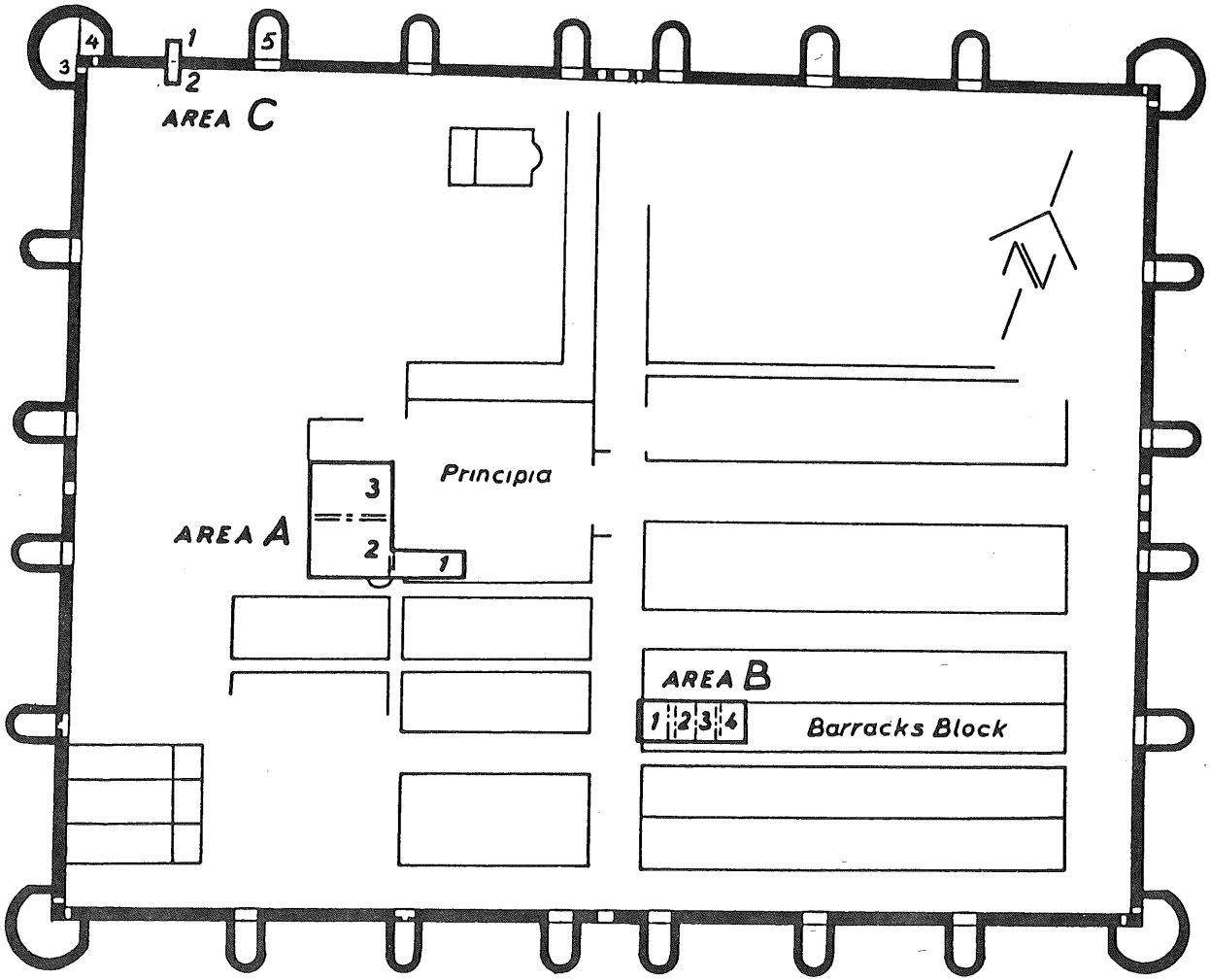
[6] Student staff included Michael Brasche, Kim Bryant, Stephanie Damadio, Susan B. Downey, Karen Dubilier, Ann Grabhorn, Victoria Godwin, Erik Harrell, Nelson Harris, Bradley Hunter, Laura Hess, John Lampe, Joy McCorriston, Tom McGimsey, Be Moore, Katy Old, Laurie Tiede, and Janet Wollam. Susan Downey and Karen Dubilier served as pottery registrars; Ann Grabhorn acted as pottery restorer. Tom McGimsey served as assistant architect.

[7] Cf. Parker, *BASOR,* 247 (1982), p. 3-5.

[8] The folllowing periodization is based on James A. Sauer's chronology for the later periods of Palestinian history, cf. *Heshbon Pottery 1971,* Berrien Springs, MI, Andrews University, 1973 p. 1-7. The one refinement in the stratification of Lejjūn presented here is the subdivision of Stratum V (Early Byzantine I-II) into two phases (VA, VB) separated by the earthquake of 363.

[9] For a detailed discussion of the plan and architectural features of Lejjun, cf. Parker and Lander, *BF,* 8 (1982) p. 188-199.



L.80 areas A, B & C

Plan adapted from Brünnow & von Domaszewski, PA, vol. 2

architect: bert de vries

EL-LEJJŪN FORTRESS

Central Limes Arabicus Project

0 16m. 40 80 120

Fig. 1

C) The Principia (Area A)

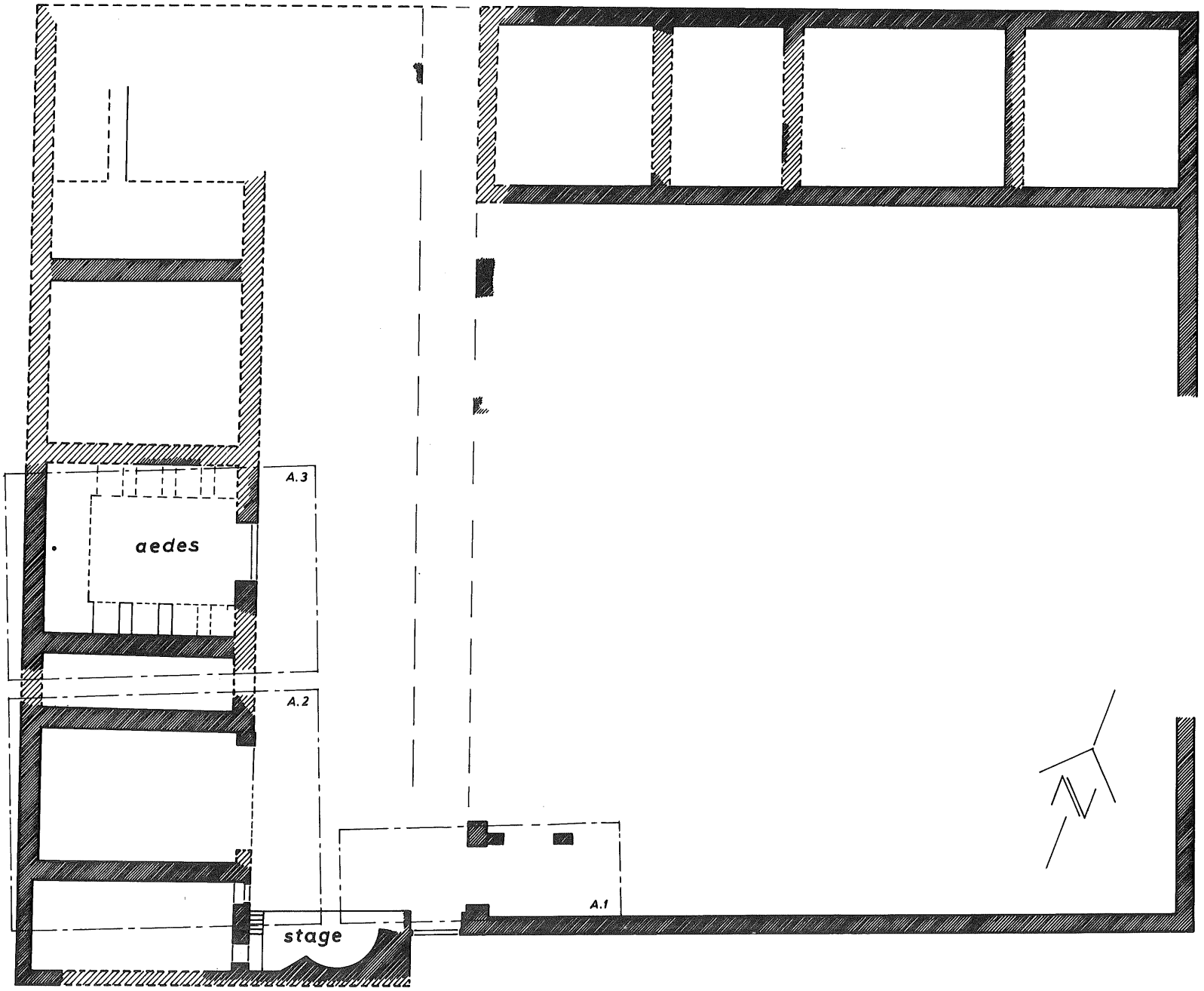
The headquarters building (63.00 m. x 52.50 m.) is paralleled by many such structures throughout the Empire. The main entrance through the eastern wall gives access to a large central courtyard (Fig. 3). Subsidiary entrances are located in both the north and south walls. The principal range of official rooms is located along the western wall, including administrative offices and the *aedes* or shrine of the legionary standards. Primary goals of excavation in the *principia* are to recover its architectural plan, reconstruct its occupational history, and provide any evidence regarding the identity, origin, and internal organization of the garrison unit of the fortress. The large squares opened in 1980 along the southern and western walls of the building were continued this season. In square A.1, along the southern wall, removal of massive earthquake collapse was completed, exposing a beaten earth surface of early sixth century (Stratum III) date. The discovery of two piers with collapsed arches suggested that the courtyard was once flanked on the north and (presumably) south sides by a monumental arcaded portico of arches supported by piers. The portico was roofed by tiles (literally thousands were recovered in this square).

In square A.2, comprising the southwestern corner of the *principia,* a staircase was found that gave access to the raised podium with its apse discovered in 1980. The apse, first interpreted as a *schola* by Domaszewski, seems rather to have served as a *rostrum* or speaking platform from which the legionary prefect could address small groups of soldiers. There was some architectural evidence which suggested that the area between the north and south subsidiary entrances may have been a *basilica* or transverse hall separating the main courtyard to the east from the range of official rooms to the west. Though this interpretation is tentative, it is supported by similar plans in headquarters buildings throughout the Empire. Three entrances found within A.2 connected the *basilica* with the official rooms to the west. Dramatic evidence of earthquake collapse within the one room was provided by the fall of one wall with nearly all its coursing still closely aligned. Recovery of Late Byzantine (Stratum III) material under this wall suggested that it fell during the earthquake of 551.

Important architectural evidence was also encountered in the *aedes* or legionary shrine (A.3). Removal of tumble and wall collapse had exposed the monumental (3.00 m. wide) entrance with its iron gate in 1980; this season's work revealed a series of barrel vaults along the south, west, and (possibly) north walls. The vaults presumably supported an elevated podium along three sides of the *aedes.* A raised pier was found on the podium along the western wall, exactly aligned with the middle of the eastern entrance. The hole in this pier and bits of gold foil recovered within it suggested that it served as the legionary standard base. The vaults themselves may have served as the legionary bank (a well attested function of the *aedes* elsewhere) but this assumption must await excavation of the vaults next season.

D) The Barracks (Area B)

Primary goals in the barracks were to elucidate the plan of several rooms within one typical block (block 'B', see Fig. 4), obtain a complete stratigraphic profile of the history of the fortress, and retrieve cultural data on the Roman frontier legionary of the fourth and fifth centuries. The four squares (B. 1-4) opened in 1980 were continued this season. Domaszewski's plan of block B, with eighteen pairs of rooms along either side of a central spine wall, had already been brought into question by the 1980 excavation. Although the inner (northern) row of rooms corresponded to Domasewski's plan, the outer (southern) rooms appeared to be courtyards of irregular size. The two westernmost inner rooms were of larger size (5.20 x 4.85 m.) than the other rooms (5.20 x 4.00 m.) and were persumably a centurion's quarters. The smaller rooms probably each housed one *contubernium* of eight common



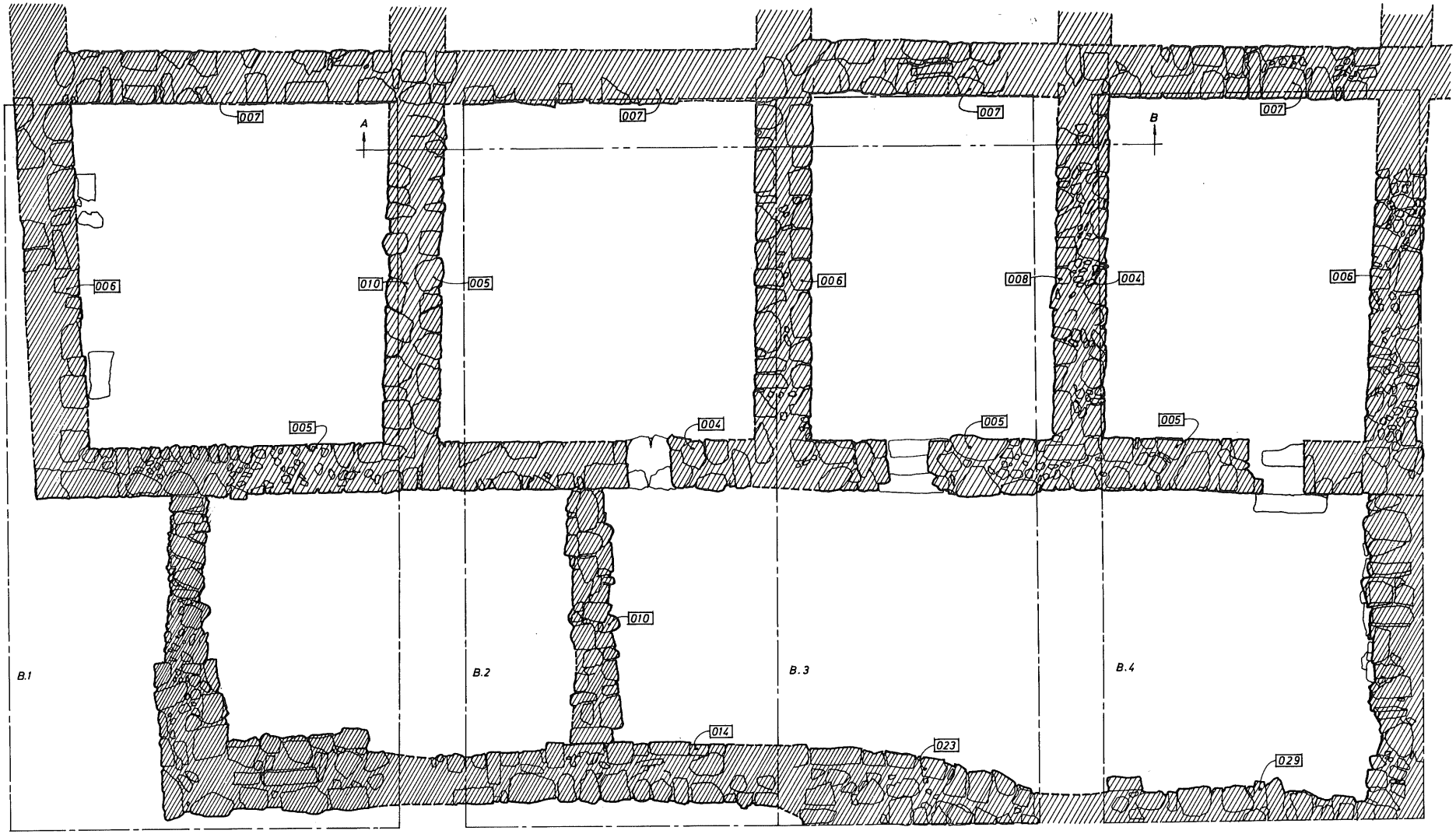
L.82 Area A PRINCIPIA

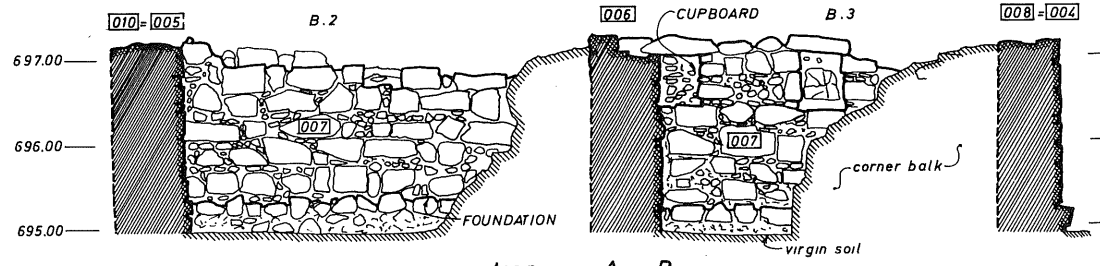
drawn by Bert DeVries & Tom McGimsey

Central Limes Arabicus Project

1m. 5 10 15

Fig. 3





L.82 Area B
BARRACKS ROOMS

drawn by
Bert DeVries & Tom McGimsey

section A - B



Central Limes Arabicus Project



Fig. 4

soldiers. Excavation in 1980 also revealed that each inner room was roofed by a series of three parallel limestone arches which supported oblong roofing beams covering the gaps between the arches. Excavation of three interior rooms to sterile soil was completed this season (B.2 3, 4). Two of the exterior courtyards (B.2 and B.3) were also completely excavated.

The most important discovery of the 1982 season in the barracks was the appearance of earlier limestone wall foundations, not aligned with the extant barrack walls; these earlier foundations apparently formed the original barracks in the Late Roman period (Stratum VI). These barracks had been completely demolished sometime in the fourth century, perhaps as a consequence of the 363 earthquake, which is known to have been severe locally.[10] The baracks were rebuilt along the same basic plan but with smaller interior rooms. Unfortunately, this destruction and rebuilding removed most stratification of the earliest strata (VI, VB) of the barracks' history. To date, Late Roman stratification has appeared only in the south courtyard of B.3, which contained a series of three superimposed floors associated with the earlier Late Roman walls.

In the Early Byzantine period the south courtyards in all four squares reflect heavy domestic occupation. A series of superimposed floors with many pits suggest that the courtyards were used for the preparation, cooking, and eating of meals. The legionary diet in the fourth and fifth centuries included such plants as barley (probably also used as animal fodder), dates, grapes, olives, and lentils.[11] The most common meat animals were sheep and goat, followed by chicken, cattle, and pig. One pit in B.2 contained charred bones of several of these species and about a dozen eggshells. Unlike some Roman frontiers such as Britain, where *venatores* (professional hunters) supplemented the meat diet with wild game, there is little evidence at Lejjun that hunting contributed to the diet. Dung appears to have been the most widely used fuel, though wood, reeds, and sedges were also exploited. Evidence of metal-working appeared in the south courtyard of B.1. A group of pits contained iron slag and a number of metal objects, including spearpoints, blades, spikes, nails, rods, clips, and hooks. Evidence of such activity in the courtyard of B.1 ended before the Late Byzantine (early sixth century) period.

Much simpler stratigraphy appeared in the north rooms of B.2 3, and 4. A single plaster floor resting on nearly sterile fill was encountered in each room. Ash, sometimes in several recognizable layers, covered these floors. The ash in turn was found under *ca.* 2.00 m. of massive roof and wall collapse, probably resulting from seismic activity. Apparently all three interior rooms collapsed by the end of the Early Byzantine period, perhaps due to the earthquake of 500.

The interior room of B.1, part of the centurion's quarters, not surprisingly was better furnished. A well-laid flagstone floor was found in the southeast corner. In the southwest corner was a large storage installation; abutting this installation along the west wall of the room was a rectangular bench. Many fragments of cooking pots were found imbedded or resting on this bench. Unlike the other north rooms of the barracks, excavation of B.1 was not completed before the end of the season.

The Late Byzantine (Stratum III) occupation of the barracks, following the devastating earthquake of 500, was marked by limited reconstruction and reoccupation. No attempt was made to clean out or reconstruct the north rooms of B.3 or B.4. In the B.1 centurion's quarters two of three roofing arches had collapsed. A thick fill of dung and *huwwar* was simply laid over the rubble and a rather carelessly applied *ḥuwwar* floor covered the fill. The interior was then used for storage, as the large number of Late Byzantine storage jar fragments suggested. The south courtyards in all four squares continued in use;

[10] Kenneth W. Russell, The Earthquake of May 19, A.D. 363, *BASOR,* 238 (1980) p. 47-64.

[11] Wheat has not yet been found in a securely controlled context of this period, but its inclusion in the diet seems possible.

several rather poorly built walls were erected along with some domestic installations, such as a mill and hearth in B.4. The metal-working industry in the south courtyard of B.1 definitely continued into this period. All this activity was ended by the earthquake of 551.

E) The Fortifications (Area C)

The major goal in Area C is to sample each component of the fortifications of the fortress: the enclosure wall itself, an angle tower, an interval tower, and a gateway. A trench through the enclosure wall near the northwest corner of the fortress was completed in 1980. This season it was decided to excavate the northwest angle tower and the interval tower immediately to the east along the north wall (Fig. 5).[12] The U-shaped interval tower was investigated through a trench (C.5) which bisected the structure on its north-south axis. The tower, originally of two stories, measured *ca.* 10.80 x 9.00 m. It was entered via a recessed doorway built into the enclosure wall. Although the entire second story had been robbed or collapsed, the pitch of the upper walls of the first story suggested that it was roofed by a barrel vault that supported the upper story. The walls of the tower were bonded into the enclosure wall, clearly indicating that the towers and the enclosure wall were of contemporary construction. Both the tower walls and the enclosure wall were constructed of similar material: the lower courses of roughly cut chert, the upper courses of well-dressed limestone. Excavation of the tower revealed the entire doorway to the ground floor: the lintel, doorposts, and threshold, all of dressed limestone, survived intact. Unfortunately, substantial reuse of the tower in relatively modern times had apparently removed most of the ancient stratification.

The northwest angle tower is a massive structure, *ca.* 16.00 m. in diameter and originally of three stories. Excavation in 1982 was confined to the northeast and southeast rooms. Work was slowed by numerous bedouin burials. At least sixty mostly disarticulated individuals were found; a rich array of artefactual material was associated with these burials, including coins which suggested that the tower was used for burials in the Mamlūk and Ottoman periods (1263-1918). The southeast room contained a winding staircase built around a central pier, completely excavated this season. A doorway at ground level provided access into the tower from inside the fortress. A long corridor led from this doorway to three more doors at ground floor level that gave access into the northeast, northwest, and southwest rooms of the tower's ground floor. The corridor then turned a corner that led up a series of stairs and landings to the upper stories. Further excavation is planned in both towers in the next season. In addition to the excavation of the two towers this season, the exterior face of the enclosure wall connecting the towers was cleared, exposing an entire stretch of the fortifications.

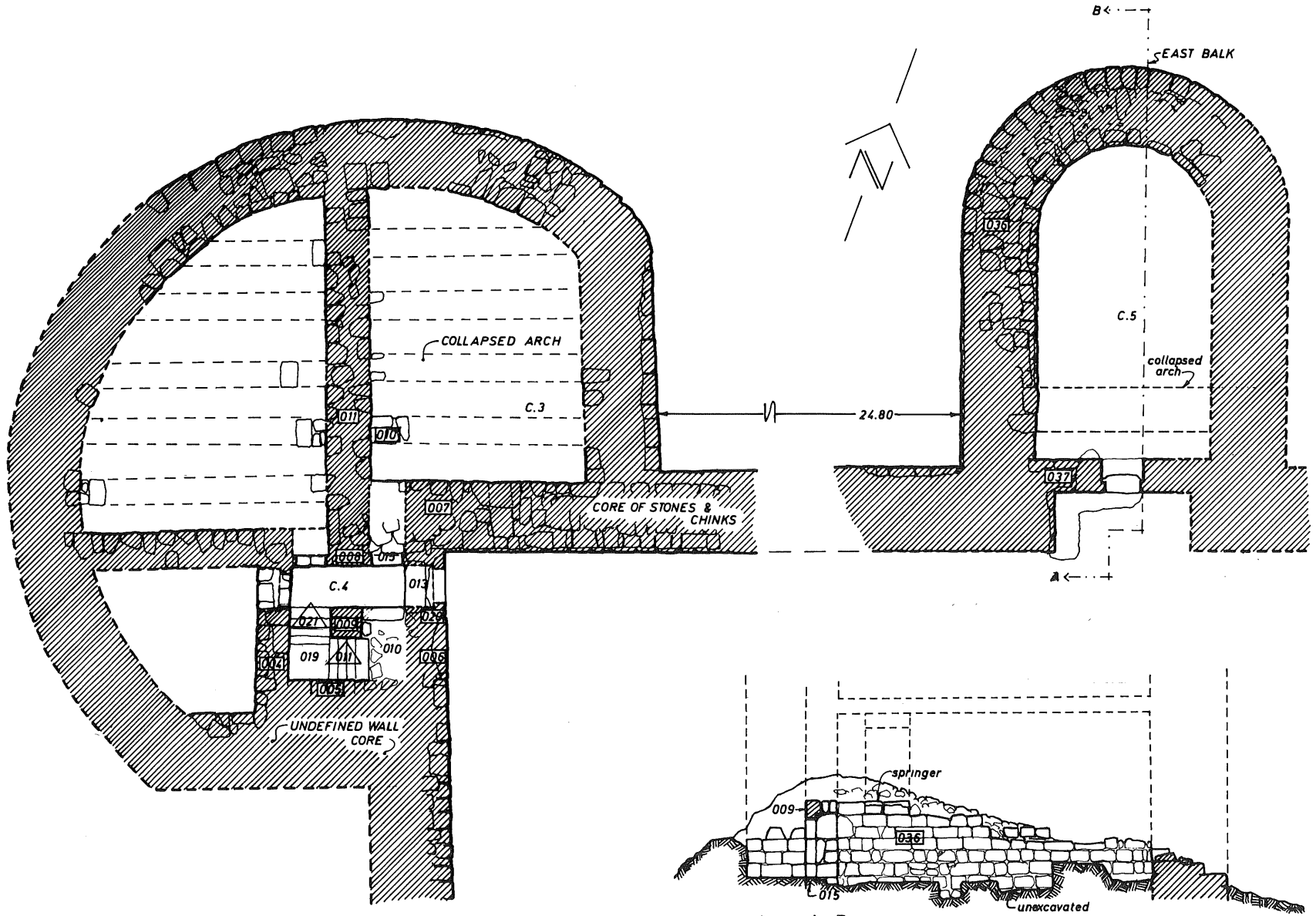
Soundings in the Lejjūn Valley (Fig. 6)

A) Structure in the Western Vicus (Area G)

An extensive civilian settlement *(vicus)* grew up around the legionary fortress. The *vicus* was a typical feature of Roman military establishments; it supplied the local garrison with various services and housed merchants, discharged veterans, and families of the soldiers. The project plans to investigate several structures of the *vicus* in order to gain a better understanding of the relationship between soldier and civilian. In 1982 extensive soundings of a major structure in the western *vicus* were conducted (Fig. 7).

The building (35.00 x 28.00 m.) is rectangular in plan and consists of ranges of rooms enclosing a central courtyard. The single entrance is located in the middle of the eastern wall, nearest the fortress. A plan based on surface measurements was drawn in 1979 and has been

[12] The northwest angle tower is tower VI on Domaszewski's plan; the interval tower is VII. Cf. R. Brünnow and A. von Domaszewski, *Die Provincia Arabia,* 3 vols., Strassburg: Trübner, 1904-09, v. 2, 24-38, for the best early discussion of the site.



section A-B

L.82 Area C

ANGLE & INTERVAL TOWERS

drawn by Bert De Vries & Eric Green

Fig. 5

Central Limes Arabicus Project

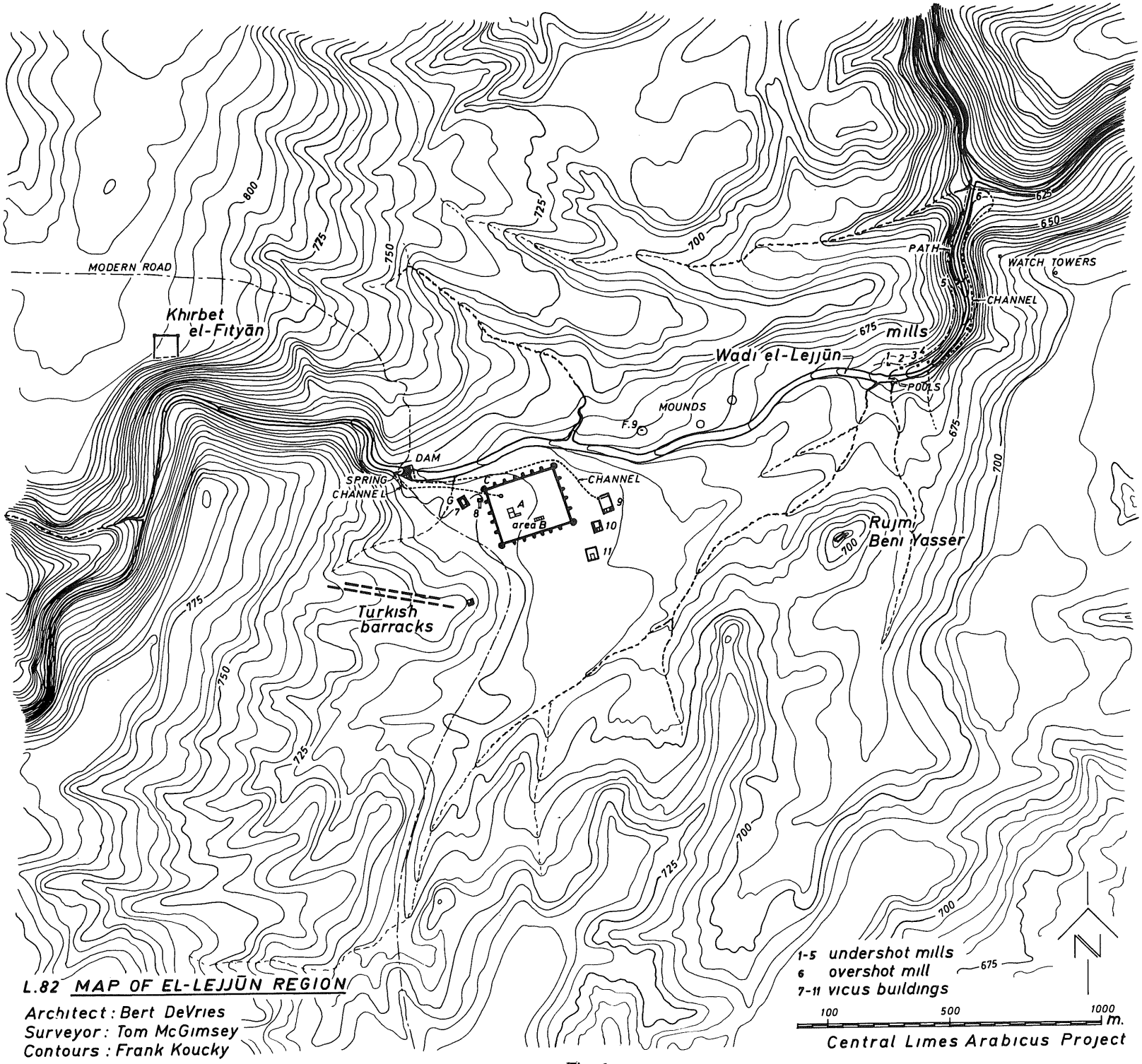
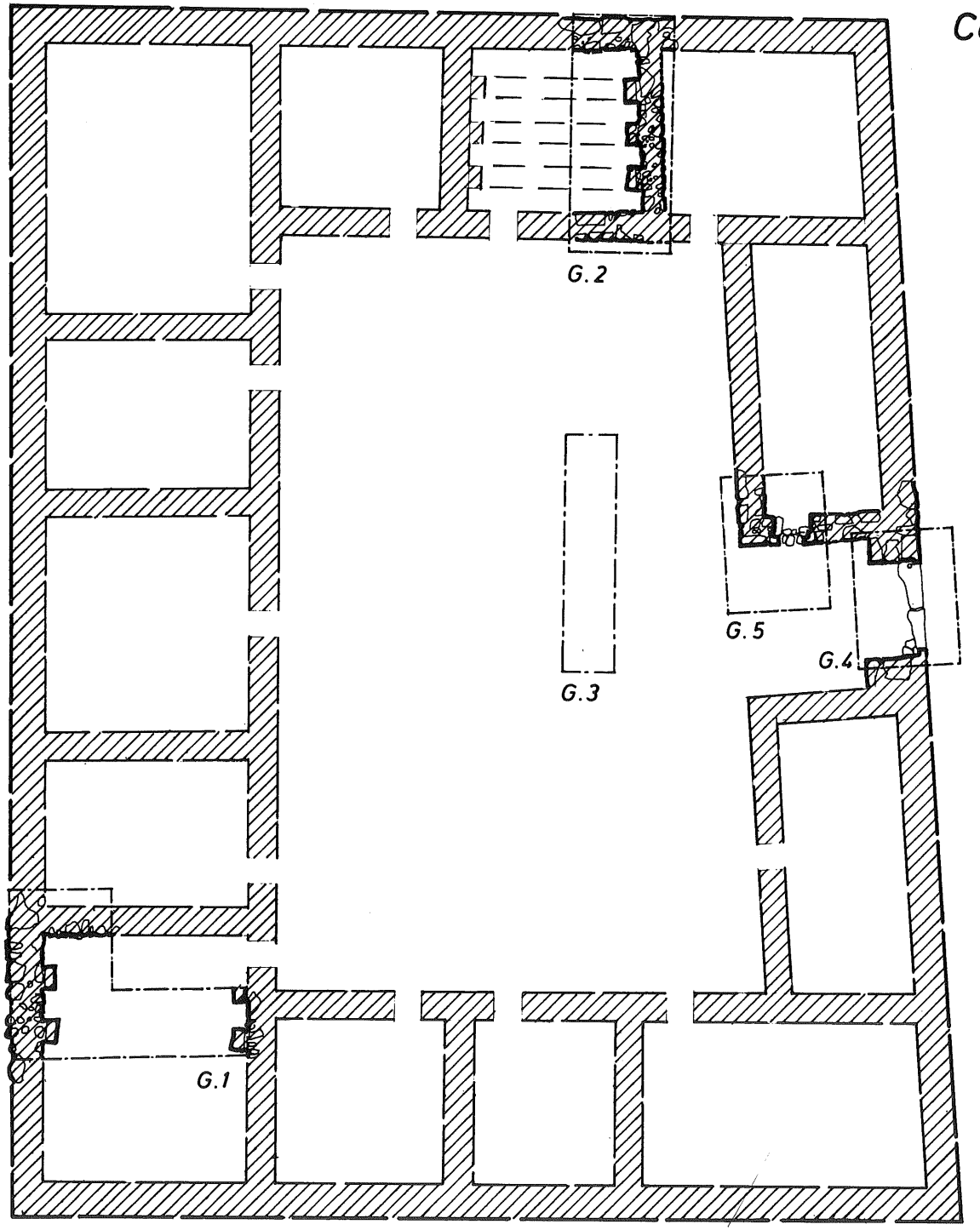

MODERN ROAD
Khirbet el-Fityān
Wadi el-Lejjūn
mills
PATH
WATCH TOWERS
CHANNEL
POOLS
MOUNDS
F.9
DAM
SPRING CHANNEL
area B
Rujm Beni Yasser
Turkish barracks
800
775
750
725
700
675
650
625
1-5 undershot mills
6 overshot mill
7-11 vicus buildings
100
500
1000 m.
N
L.82 MAP OF EL-LEJJŪN REGION
Architect: Bert DeVries
Surveyor: Tom McGimsey
Contours: Frank Koucky
Central Limes Arabicus Project

Fig. 6



Central Limes Arabicus Project

1m. 5 10 15

L.82 Area G

VICUS BUILDING No.7

Overall plan adapted from a survey by Jim Lander

Architect: Bert DeVries

Surveyor: Tom McGimsey

Fig. 7

published elsewhere.[13] In 1982 five probes were opened to date the building and determine its function. The probes were located in one large room in the southwestern corner (G.1), one smaller room along the northern wall (G.2), the central courtyard (G.3), the gateway (G.4), and a room opening into the gateway (G.5).

A similar stratigraphic picture emerged in each room: under massive roof and wall collapse were a thin occupation layer and a single *huwwar* floor. Under the floor was sterile soil. Two of the rooms (G.1 and G.2) were roofed by a series of parallel limestone arches supported by piers. The piers abutted the room walls; both the piers and the walls showed evidence of plastering. Evidence of a relatively brief occupation also appeared in the courtyard probe which, apart from a single ash lens, was completely sterile. The probes of the gateway and its adjoining room also produced a single occupation surface. Pottery from all the probes was uniformly Early Byzantine. This dating was supported by the numismatic corpus of eleven datable coins, all of which dated to the fourth century.

Apparently the building was constructed in the fourth century (Stratum V), perhaps shortly after the erection of the legionary fortress. The plan of the structure, its limited access, and the relative paucity of artefactual evidence suggested that it may have served as a *mansio,* or hotel for travellers. The building could have provided a relatively secure resting place for merchants or government officials with its single gate and location within bowshot of the fortress. The single floor within each room suggested that the building had a relatively brief occupational history, clearly ending no later than the early fifth century. Its destruction was apparently so thorough that no subsequent attempt was made to rebuild or reoccupy the building. More precise dating of the building awaits closer study of the numismatic and ceramic evidence.

B) Installations in the Wadi Lejjūn and Search for the Cemetery (Area F)

North of the *wadi* a series of three small mounds extends along the north bank, northeast of the fortress. Surface pottery collected from the mounds suggested their contemporaneity with the legionary fortress, although two also produced Nabataean (Early Roman, Stratum VII) sherds. One of these later mounds was selected for sounding in order to determine its occupational history and function. A trench (F.9) situated on its eastern side revealed two parallel wall lines of small, roughly cut stones. The extremely limited amount of artefactual material made any interpretation tentative, but the structure may have served as one of a series of watchposts that guarded the fortress, *vicus,* and *wadi* installations from the north.

Survey of the *wadi* in 1980 had revealed a complex system of hydrological features, including upper and lower dams and three undershot watermills. This season two more undershot mills were discovered as well as a water channel along the opposite bank from the mills. The structure identified as the "lower dam" in 1980 may actually be an overshot mill. In an effort to date the system, a sounding (F. 16) was laid out in one of the mills. It produced only limited material, but several sherds of Late Roman date were recovered. More evidence is needed to illustrate the relationship between the water system and the fortress.

A renewed effort was made in 1982 to locate the ancient cemetery associated with the fortress. Several soundings were laid out in promising areas of the valley. Dr. Bruno Frohlich of the Smithsonian Institution joined the team for several days to search the valley with a resistivity monitor. Unfortunately, these efforts proved fruitless and no ancient, unrobbed tombs were discovered. Two tombs consisting of a central chamber and *loculi* were found cut into the south bank of the *wadi* east of the fortress; but these tombs were completely robbed and were in use as animal stables.

[13] Parker, in the *ASOR Newsletter,* p. 12, fig. 4; Parker and Lander, *BF, 8* (1982) *pl. XXI.*

Soundings of Qaṣr Bshīr (Area H)

In addition to large scale excavation of Lejjūn, the largest Roman military site in the central sector of the Arabian frontier, the project also is conducting soundings at several smaller military sites in the region. In 1980 such soundings were completed at the *castellum* of Khirbet el-Fityan and the watchtower complex of Ḳujm Beni Yasser.[14]. This season Qaṣr Bshīr, a *castellum* located 15 kms. northeast of Lejjun was selected for excavation. Bshīr was known as a contemporaneous site with Lejjūn on the basis of its building inscription of A.D. 306 and surface pottery collected in 1976.[15] The fort was presumably occupied by an auxiliary unit but was abandoned by the end of the fifth century. It was hoped that soundings would yield a corpus of artefactual material for comparison with the legionary fortress, a complete stratigraphic history of the fort, and perhaps some evidence relating to the type of garrison unit.

The fort is a classic Diocletianic *quadriburgium,* measuring *ca.* 56.00 m. square. Four large square towers of three stories project from the corners; two smaller square interval towers flank the main gate in the southern wall. The vaulted gateway leads into the central coutyard, which is surrounded on all sides by ranges of rooms, presumably barracks, of two stories. The water supply of the fort was secured by two cisterns within the fort, several exterior cisterns, and a large reservoir.

One probe (H.1) was opened in the southwest corner of the central courtyard to encompass an arched entrance into the barracks. A second probe (H.2) was laid out in the corner of a barracks room in the southern wall, west of the gateway. A notable discovery in H.1 was the recovery of Umayyad pottery from rubble under topsoil. This was the first evidence of post-Byzantine use of the fort, although the context of the material and the lack of similar pottery from both the H.2 probe and surface sherding suggested that the Umayyad occupation was not extensive. Under the Umayyad stratum was a series of superimposed soil and ash layers, all dated to early Byzantine I-II (Stratum V) by pottery and a coin of Constantius II (A.D. 347/8). The four bottom loci were clearly occupation layers, rich in sherds and animal bones. These layers in turn rested upon a plaster floor which marked the limit of excavation this season.

Probe H.2 encountered several layers of tumble alternating with ash lenses, resulting from the burning of dung. All these layers produced Early Byzantine pottery (and a coin dated *ca.* 340-365) and rested on a leveling fill overlying bedrock. The large amount of animal bone (including horse and camel) and apparent mangers built into the back wall of this room (and most other ground floor rooms of the fort) suggested that Bshir was garrisoned by a cavalry unit. The soldiers may have been housed on the upper floor of the baracks while animals were stabled on the lower floor. However, more evidence is needed to test this hypothesis. It is clear that the major period of occupation at Bshir occurred in the fourth century and that the fort was abandoned in the fifth century for as yet undertmined reasons.

The Survey of the *Limes* Zone

As indicated above, the survey team is covering both the fortified frontier zone itself as well as the desert fringe immediately east of the *limes*. A sector of this latter area was covered in 1980: some fifty sites were located in the desert east of al-Qatrana.[16] This season the survey covered the sector of the *limes* between the upper Wadi Mujib and the modern Deset Highway. One hundred and thirty sites were visited in this region; most are new additions to the emerging archaeological map of Jordan. The results of the surveys of 1980 and 1982, combined with the recently completed Central Moab survey (under the direction of J. Maxwell Miller) of the region to the west, has resulted in coverage of a complete section of the

[14] Parker, *ADAJ,* 25 (1981) p. 177; Parker, *BASOR,* 247 (1982), p. 11-18.

[15] Parker, *ADAJ,* 21 (1976) p. 24.

[16] Parker, *ADAJ,* 25 (1981) p. 177-178; Parker, *BASOR,* 247 (1982) p. 18-19.

Moabite plateau from the edge of the Dead Sea escarpment to the fringe of the desert. Farther south, the region south of the Wadi Ḥēsā has recently been surveyed by Burton MacDonald. All three projects have begun to share their results to present an overview of the archaeological resources of an extensive region: central Moab and northern Edom, which together comprise a major portion of Rome's Arabian frontier.

The preliminary tabulation of the artefacts recovered from the 130 sites visited by the Central *Limes Arabicus* Project in 1982 suggested that the best represented periods were Paleolithic (to 35,000 B.C., 38 sites); Chalcolithic/Early Bronze (4500-2200 B.C., 44 sites, plus 9 possible sites); Iron Age (1200-539 B.C., 39 sites, plus 10 possible sites); Early Roman (79 sites) and Late Roman/Early Byzantine (50 sites). About half the early Roman (Nabataean) and Late Roman/ Early Byzantine sites appear to have been watchtowers. The region was apparently sparsely occupied in the Epipaleolithic period (35,000-8,500 B.C.), the Neolithic period (8500-4500 B.C.), in the Middle and Late Bronze periods *(ca.* 2200-1200 B.C.), and in the Late Byzantine and Islamic periods (A.D. 500-1918).

The Signaling Experiment

A major goal of the survey was to locate and date the watchtowers of the region in order to conduct an experiment involving the Roman signaling system. After permission had been obtained from the Jordanian government, members of the staff were placed in fourteen forts and watchtowers known to be contemporary with the Lejjūn legionary occupation. The purpose of the exercise was to test the feasibility of transmitting intelligence from outlying posts to the major troop concentration at Lejjūn (and vice versa). Signaling by night was attempted by the flames of torches.[17] Each post kept a detailed log of what transmissions it received and sent. A simple code was developed to alert adjacent posts of the approximate strength of a hypothetical incursion. Khirbet el-Fityān, excavated in 1980, was chosen as the central hub of the network because of its proximity to Lejjūn and its excellent field of observation. One group of ten posts radiated northeast from Fityān to Qasr el 'Al, which overlooks the Wadi Mujib *ca.* 20 kms. northeast of Lejjūn. A second group of three posts radiated southward from Fityān some 15 kms. to Qasr Abū Rukbah. The experiment began at 3 p.m. and ended at 9 p.m.

Attempts to signal during daylight met with mixed results. Reflected light from mirrors could be picked up by the adjacent posts only within *ca.* 5 kms. High winds tended to dissipate the smoke signals originating from four scattered posts: smoke from only two of these was seen by adjacent posts. The signaling at night by torches, however, met with spectacular results. The torches were clearly visible at distances up to 10 kms.; most posts reported successful reception and transmission of messages from several different posts. Although the analysis of the logs from the posts is still in a preliminary stage, it seems clear that much valuable evidence has been obtained.

Historical Conclusions

The second season of the Central *Limes Arabicus* Project has sharpened the picture of the historical development of this sector of the Roman frontier. But a number of significant problems remain. Only a brief historical sketch may be attempted in this report, with the primary focus on the principal historical questions raised in the introduction.

On the basis of the existing evidence, what can account for the dramatic military buildup in this sector about A.D. 300? Surely some reorganization and reconstruction was required following the general chaos of the third century and the Persian and Palmyrene invasions of the eastern provinces. But the shift from an essentially linear defense of the second

[17] Cf. Frontinus, *Strategemata* 2.5.16, who notes that the Arabs signaled the approach of an enemy with smoke by day and with fire by night. Roman use of fires for signaling is attested on Trajan's column.

and third centuries to a defense in depth *ca.* 300 implies a change in the security situation on the central Arabian frontier. It might be argued that local Roman commanders were simply implementing an Empire-wide order for a change in its strategic posture, and to some degree this may be true.[18] But in the southern sector of the Arabian frontier, from Ras en-Naqb to Aqaba, the linear defense of forts along the *via nova Traiana* apparently remained unchanged. Several regional factors may have combined to alter the security situation on the southeastern frontier.

First, the crisis of the third century probably disrupted commercial traffic between the Empire and the Arabian peninsula; some Arab tribes in consequence may have turned to brigandage and raiding, encouraged by the very weakness of the Empire.[19] Second, groups of tribes may have united politically in anti-Roman coalitions during the third and fourth centuries. One such case may be that of Imru' el-Qais, whose tombstone of A.D. 328 at Nemara in southern Syrian proclaims him "king of all the Arabs." His influence apparently extended from southern Syria, where he was buried, into the Arabian peninsula, where he claims conquests.[20] A later and better documented example of this kind of threat is that of Mavia, the Saracen queen during the reign of Valens (364-378), whose tribal confederation launched devastating raids on the southeastern frontier until her conversion to Christianity.[21] It seems likely that such a threat existed along the central sector of the Arabian frontier in the late third and fourth centuries.

The Roman response took several forms. The large number of milestones of Diocletian attest that the provincial road system was systematically repaired.[22] The old line of forts along the *via nova* remained occupied, but now served as the rear echelon of a broad zone *ca.* 20-30 kms. in depth to the east. *Legio* IV *Martia* was established in its new fortress at Lejjūn, and other reinforcements were placed in a chain of forts 10-20 kms. apart that guarded major migration routes between the desert and the settled areas. Most of the *castella,* or auxiliary forts, such as Qaṣr Bshīr, Qaṣr eth-Thuraiya, and Khirbet ez-Zona, appear to be new foundations of the *quadriburgium* type. But most of the watchtowers appear to be reused Nabataean and/or Iron Age structures, such as Rujm Beni Yasser near Lejjūn. A complex system of observation and communication was established that could transmit word of nomadic incursions rapidly. The success of this system of frontier defense is reflected in the relative abundance of sites occupied in the Early Byzantine period (fourth and fifth centuries), not only within the frontier zone itself, but even on the desert fringe east of the frontier.

During the later fourth and fifth centuries the frontier garrisons *(limitanei)* may have evolved into a hereditary peasant militia. But it must be stressed that this supposed transformation, resting on evidence from the Roman law codes and such sites as Nessana in the Negev, has not yet been demonstrated by the cultural material from Lejjūn or the other excavated sites of the central Arabian *limes.* The discovery of several watermills in the Wadi Lejjūn, which may be connected with the legionary occupation, implies considerable local grain production.

Further, what can account for the apparent abandonment of most forts by

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[18] Edward N. Luttwak, *The Grand Strategy of the Roman Empire from the First Century A.D. to the Third,* Baltimore: John Hopkins, 1976 p. 130-190, for the implementation of this strategy throughout the Empire.

[19] Werner Caskel, The Bedouninization of Arabia, p. 36-46 in G.E. von Grunebaum, ed., *Studies in Islamic Cultural History,* Memoirs of the American Anthropological Association, 76, Wisonsin, 1954.

[20] G.W. Bowersock, The Greek-Nabatean Bilingual Inscription at Ruwwafa, Saudi Arabia, p. 513-522 in *Hommages à Claire Préaux,* Brussels: University of Brussels, 1975. See p. 520-522 for a discussion of the Imru' l-Qais inscription, with full references.

[21] Rufinus, *HE,* 2.6; cf. Bowersock, *HSCP,* 80 (1976) p. 225-226.

[22] P. Thomsen, Die Romischen Meilensteine der Provinzen Syria, Arabia, und Palaestina, *ZDPV,* 40 (1917) p. 1-103; 92-93, which lists 26 milestones of Diocletian and 11 of the Tetrarchy dated 306-317. Others have appeared subsequently.

the early sixth century? The results of the 1976 survey, which suggested a widespread abandonment in this period, have now been confirmed by excavation at Lejjun, Fityān, Yasser, and Bshir. With the possible exception of Bshīr (where the excavated area is too small to draw secure conclusions) all these forts were abandoned peaceably: Fityān, Yasser, and Bshir before 500, Lejjūn after the earthquake of 551. The final phase of occupation of the fortress (Stratum III, Late Byzantine) suggests much about the frontier in the early sixth century. The earthquake of 500 caused considerable damage to the barracks, yet no attempt was made to rebuild the inner rooms of the *milites* (B.3. and B.4). Stratum III occupation was mostly confined to the outer courtyards. Some reconstruction may have occurred in the *principia,* but the beaten earth floors, secondary thresholds, and other shoddy architectural alterations suggest the garrison lacked the means for a proper restoration. As has been argued elsehwere, the legion may have been mobilized along with other eastern *limitanei* by Justinian *ca.* 532.[23] If so, the last two decades of occupation may reflect the activity of discharged soldiers and their families, who may have moved into the more substantial buildings (such as the *principia)* or open areas (such as the barracks' courtyards). On the other hand, if the legion was transferred from Lejjūn for service elsewhere, the final occupation may reflect the presence of civilians from the *vicus* or surrounding region. The *mansio* in the western *vicus,* for example, showed no trace of Late Byzantine occupation. This final occupation was ended by the earthquake of 551.

It appears that the central Arabian *limes* was abandoned for both military and economic reasons. The Emperor Justinian (527-565) was engaged by continuing wars with the Persians in Mesopotamia, serious pressure on the Danube, the attempted reconquest of the West, and a massive program of public works. The efficiency of the regular *limitanei* was apparently inadequate to control Arab raids. He turned over primary responsibility for the defense of the southeastern frontier to Arab federate forces under phylarchs, especially the Ghassanids.[24] Replacing the *limitanei* with federates probably saved financial resources and manpower for service on more threatened frontiers but also sharply reduced local security. This growing level of insecurity along the Arabian frontier is reflected by the low number of the sites occupied in the Late Byzantine (sixth and early seventh centuries) period.

From an imperial perspective, the savings in financial resources and scarce military manpower obtained from the essential abandonment of the Arabian *limes* may have been worth the loss of population and revenues from a fringe area of the Empire. But the long range implications of this shift in policy were devastating. As long as an effective Ghassanid client phylarchy was supported, some measure of security, albeit reduced, was maintained along the frontier. But the successors of Justinian weakened the Ghassanids without any corresponding revitalization of the old *limes.* [25] This disastrous policy facilitated the Muslim conquest of the Levant in the early seventh century.

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[23] Procopius, *Anecdota* 24 p. 12-14; cf. Parker *ADAJ,* 25 (1981) p. 173, 178; *BASOR,* 247 (1982) p. 21-22.

[24] Procopius, *Bellum Persicum* 1.17.45-48. For a full discussion of the creation of the Ghassānid phylarchy, cf. Irfan Kawar (Shahid), Arethas, Son of Jabalah, *JAOS,* 75 (1955) p. 205-216.

[25] Parker, Towards a History, p. 874.

UDRUḤ — 1980, 1981, 1982 SEASONS, A PRELIMINARY REPORT

by
A. C. Killick

Introduction

The village of Udruḥ lies 20 km north-west of Ma'an and 10 km. east of Wadi Musa, at a height of 1,300 m. above sea level (Fig. 1). The present village comprises sixty houses with an estimated population of 700. The area has an annual rainfall of less than 0.20 m. and a perennial spring has consequently attracted settlement to the site throughout antiquity. The main site at Udruḥ lies to the west of the village and consists of a large fortress with 200.00 m. long walls and projecting defensive towers (Fig. 2; Pl. LI, 1). The area inside these walls is strewn with large masonry rubble and building debris. Astride the north perimeter wall of the fortress is an Ottoman fort with walls standing 6.00 m. high. Outside the south-west corner tower of the fortress is a Byzantine church. Brunnow and Domaszewski recorded the site of Udruḥ/udhruḥ and its fortifications on the 14-15th March 1897 and the 24-27th March 1898 (1904: 431). Much of the site had been destroyed by modern building activity before any further serious work was conducted there.

The historical references to Udruḥ begin in the mid-second century A.D. when Ἄδρου is mentioned as a town in Arabia Petraea (Ptolemy V,16,4). The town is missing from the military lists of the *Notitia Dignitatum* at the end of the fourth century A.D. This is surprising since the trade route from Arabia northwards to Syria passed through Udruḥ in the Nabataean period and that same route later became part of the *via Traiana Nova,* the Roman road constructed in A.D. 111-114 between Syria and the Red Sea coast.

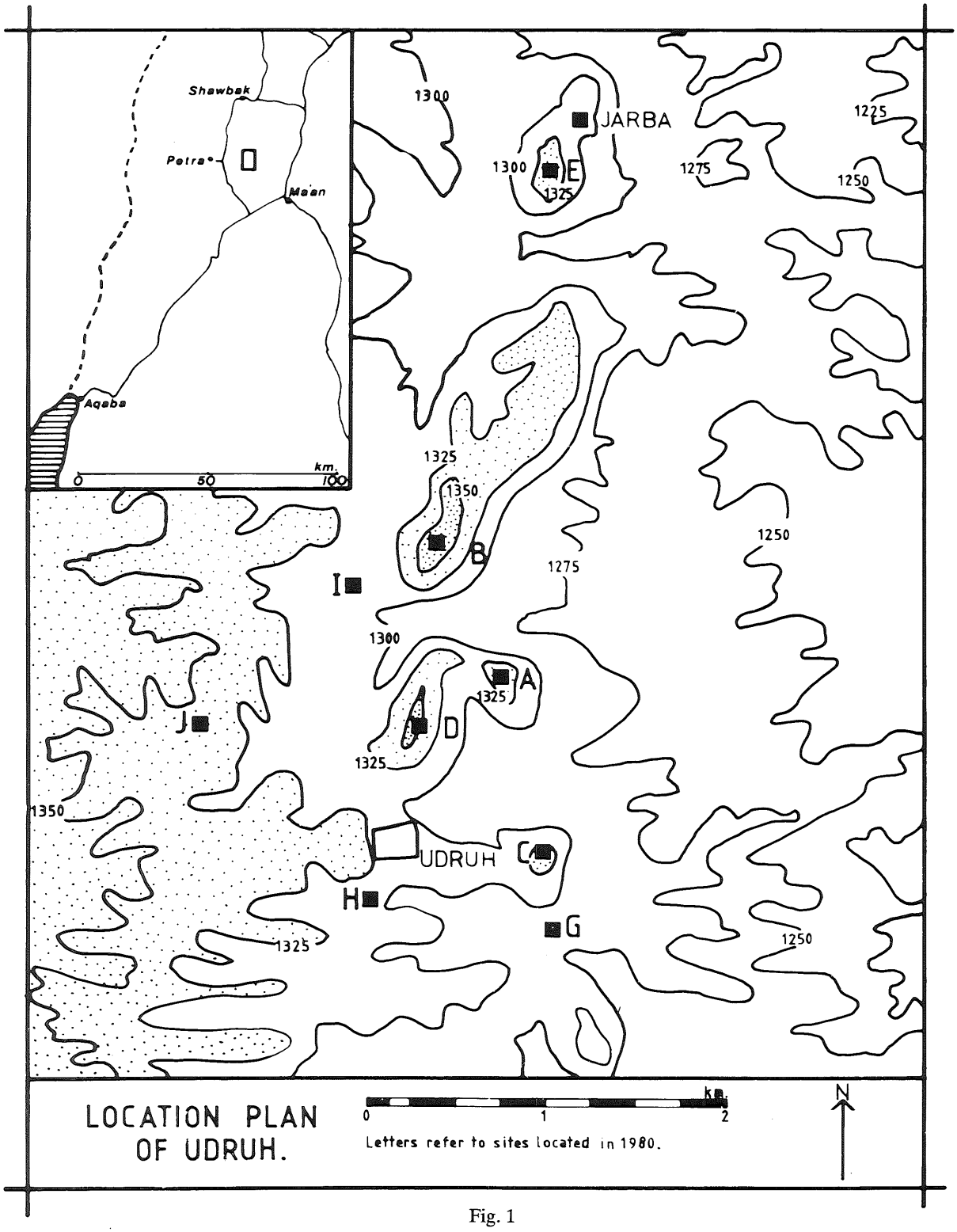
The Justinianic tax edict from Beersheba clearly refers to Udruḥ (ἀπο Ἀδρων) Clermont-Ganneau, 1906) at the top of the list of all towns of Palaestina Tertia, paying a tax of sixty-five gold pieces. This is the largest tax in the list and indicates the importance of Udruḥ at this date. Yakut (I: 174; II: 36 and 46), and al-Bakri (1: 239) describe Udruḥ together with the site of Al-Jarba, a mile away, both of which were conquered during Muhammad's lifetime in A.D. 658 and the population of Udruḥ was granted peace for a tax of 100 dinars. At this same date at Udruḥ there was a conference between Amr ibn al Aasi representing Muawiya ibn abi Sofian, governor of Syria, and Abu Musa al Asari representing Khalif Ali ibn abi Talib, cousin and son-in-law of the prophet (see Lammens, 1907).

1980 Survey Season

In September a British expedition spent a month re-surveying Udruḥ and the immediate area.[1] Surface artefacts from the main site were found to indicate occupation during the Lower Palaeolithic, Neolithic, Iron Age, Hellenistic, Nabataean, Late Roman, Byzantine, and from Early Islamic times through into the Ottoman period.

The main standing architecture at Udruḥ are the walls of a military fortress. It is trapezoidal in outline, with its shorter axis aligned north to south (Pl. LI, 1; Fig. 2). There were six interval towers projecting from the north and south walls (246.00 and 248.00 m. long) and four on

[1] In 1980 the project was funded by the British School of Archaeology in Jerusalem, the British Institute at Amman for Archaeology and History and the author. I am very grateful to Mrs. C.-M. Bennett for all her support and to the Department of Antiquities of Jordan which provided a valuable representative, Mr. Nabil el Qadi. I am very grateful for the energy and assistance of the survey team: Mr. J. Bruce, Mr. D. Jones, Mr. R. G. Killick, Mr. W. Lean, Miss J. Moon, and Mr. G. Summers.


Shawbak
Petra
Ma'an
Aqaba
km.
0
50
100
1300
JARBA
1225
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E
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1325
1350
UDRUH
C
H
G
1325
1250
LOCATION PLAN
OF UDRUH.
km
0
1
2
Letters refer to sites located in 1980.
N

Fig. 1

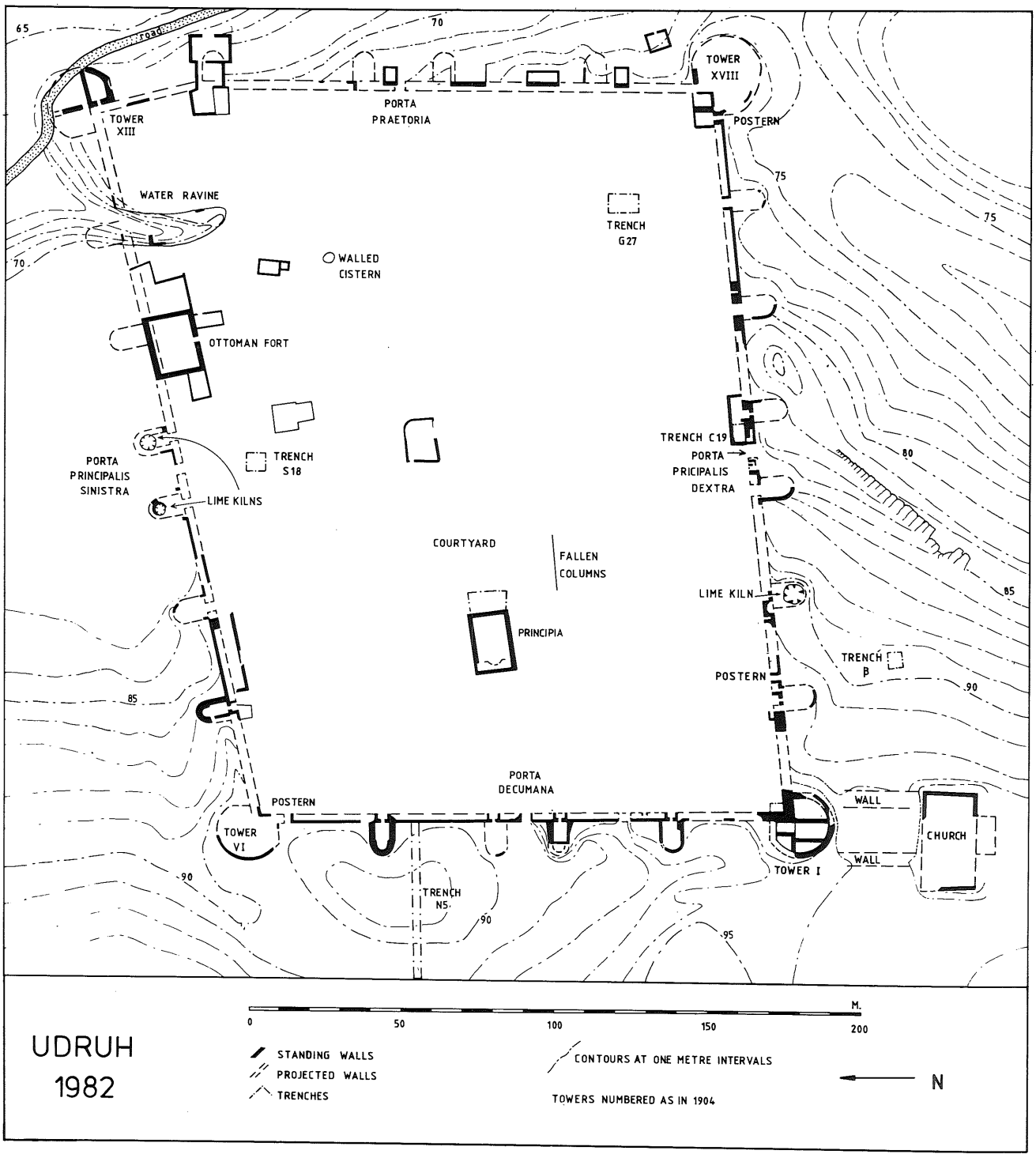
road
TOWER XIII
PORTA PRAETORIA
TOWER XVIII
POSTERN
WATER RAVINE
TRENCH G27
WALLED CISTERN
OTTOMAN FORT
TRENCH C19
PORTA PRINCIPALIS DEXTRA
PORTA PRINCIPALIS SINISTRA
TRENCH S18
LIME KILNS
COURTYARD
FALLEN COLUMNS
LIME KILN
PRINCIPIA
TRENCH β
POSTERN
PORTA DECUMANA
POSTERN
TOWER VI
WALL
CHURCH
WALL
TOWER I
TRENCH N5
65
70
75
80
85
90
95
M.
0
50
100
150
200
UDRUH
1982
STANDING WALLS
PROJECTED WALLS
TRENCHES
CONTOURS AT ONE METRE INTERVALS
TOWERS NUMBERED AS IN 1904
N

Fig. 2

the west and east walls 177.00 and 207.00 m. long). Arched gateways mid-way down each wall were flanked on either side by an interval tower. The site falls 30.00 m. from west to east. Brunnow and Domaszewski (whose tower numbering system we retain in Fig. 2) state that "the destroyed parts of the perimeter wall have been completed in so far as can be done by analogy with the congruent complete parts" (1904: 435), but they fail to show this distinction on their overall plan. Figure 2 demonstrates that the north-east corner is the source of an irregularity in what would otherwise be a standard rectilinear fort plan. The perimeter wall was positioned so that the main water source could be included within its protection. In 1907 Lammens wrote of a "powerful spring... issuing at the base of the citadel in a sort of funnel" (1907: 18). This refers to the water-cut ravine to the east of the Ottoman fort, although the main spring is now 40.00 m. lower down on the plain to the east. In the section of the ravine the walls of tower XII can be seen. The bend in the east wall may also be due to the location of the spring. The perimeter wall is constructed from two faces of large well-drafted ashlars with a rubble core.

Interval towers IX, X, and XXIII have been extensively altered and towers XI, XII, XIV, XV and XVI have been completely removed (Fig. 2). The remaining extant towers are 10.50-11.50 m. long and 8.00-9.00 m. wide and they are all similar in construction to tower III. This is the best preserved interval tower, although recently its rounded rear wall has been dismantled and rebuilt. The ground floor entrance to the tower is vaulted and a barrel vault covers the ground floor room (Fig. 3). The ground floor has been rebuilt at one end although it would have originally had a horse-shoe shape half dome. The front entrance to the tower is recessed and the front face of its vault is in line with the back face of the perimeter wall (Fig. 2). There is a large single stone lintel over the ground floor entrance, above which is a five stone relieving arch which leaves a bow-shaped gap of 0.12-0.20 m. above the lintel. Above the relieving arch is a rectangular window. The walls of the upper tower room, nowhere surviving, probably rested on the outside walls of the ground floor. The threshold stone for the upper room of tower III is in position and there are three other first floor thresholds elsewhere in the fortress which suggest that the doors were one metre wide and opened inwards. The stairs up to the first story were at one side of the tower, inside the perimeter wall, and had arched entrances on the ground floor (Fig. 3). The tower walls are constructed with small blocks and large cut limestone ashlars are used to form the vaulting.

The west gateway, the *porta decumana* of the fortress, is 3.00 m. wide and is the only gate surviving above foundations. From one voussoir in position and the measurements of the other fallen stones, the elevation of this gateway is suggested (Fig. 3 **Pl. L1, 2**). There is also evidence of a moulding on the face of the arch. There are three barrel shape postern passages through the perimeter wall (1.80 m. wide) but their use is unclear; perhaps others have been dismantled for building stone. Prior to excavation, suggested published dates for the fortress ranged from Trajanic (Vincent, 1898: 445) to sixth century A.D. (Bowersock, 1976: 226). The fact that the towers and perimeter wall are contemporary in construction is clear from their architecture.

There are two buildings on the site which are ancillary to the fortress but worthy of note. Outside the south-west corner tower (tower 1) is a rectangular Byzantine church, measuring 32.50 by 17.50 m. It has an extension on its south side measuring 15.00 x 5.80 m. The whole structure appears to be connected to tower I by two walls, of which only the foundations are visible. The external walls of the church have a rubble core with mortar which is exposed and many of the drafted facing stones have been removed (for a detailed plan see Vincent, 1898: 445). Built over the fortress wall and tower XI is the so-called Ottoman fort (21.00 x 16.50 x 6.00 m. high; **Pl. LII, 1**), although its precise date is still unknown. The elevation and plan exhibit several different stages of rebuilding. Within the fort and arranged around the south-east corner are

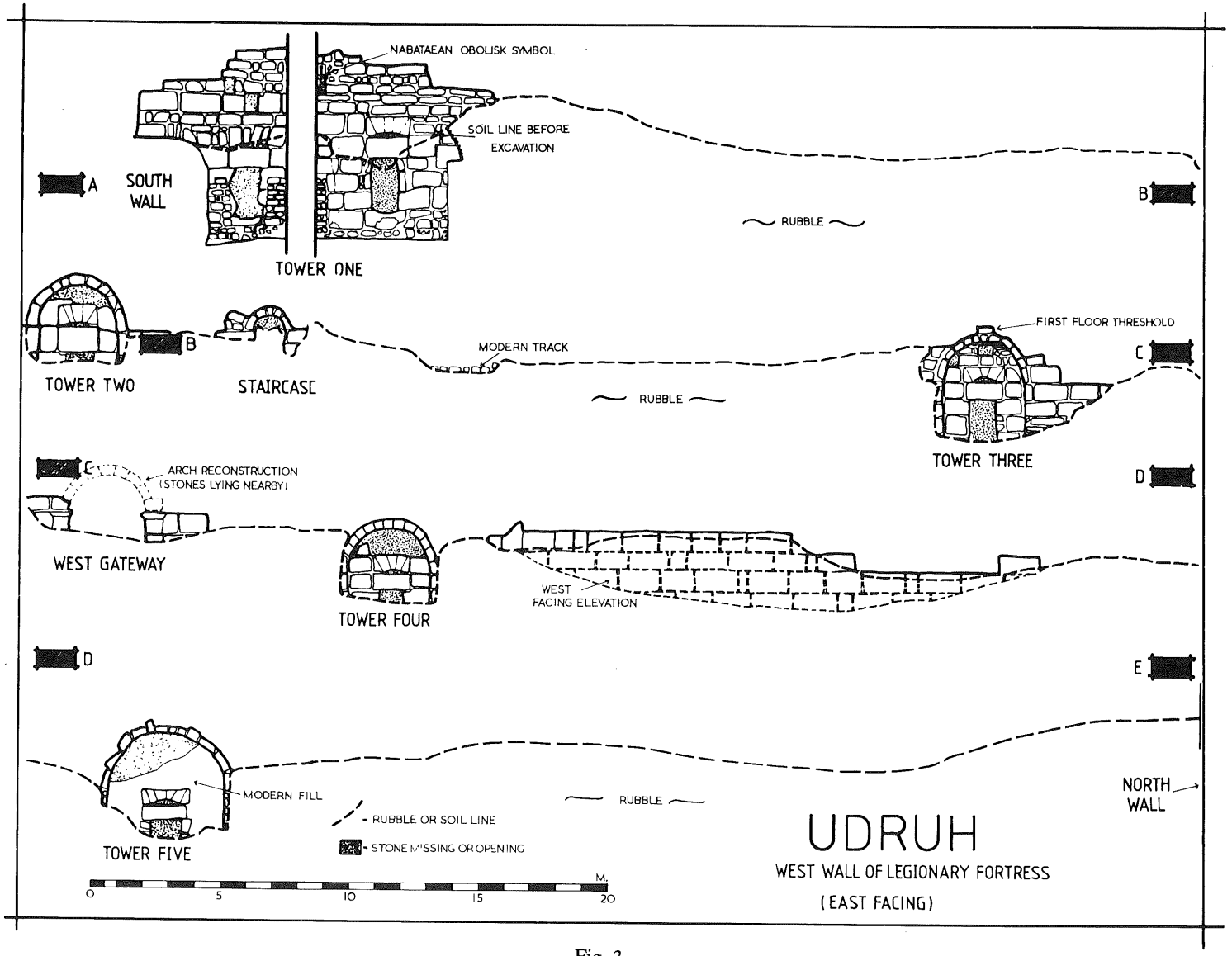
NABATAEAN OBOLISK SYMBOL
SOIL LINE BEFORE EXCAVATION
A
SOUTH WALL
B
RUBBLE
TOWER ONE
B
TOWER TWO
STAIRCASE
MODERN TRACK
FIRST FLOOR THRESHOLD
C
RUBBLE
TOWER THREE
D
ARCH RECONSTRUCTION (STONES LYING NEARBY)
WEST GATEWAY
TOWER FOUR
WEST FACING ELEVATION
D
E
MODERN FILL
RUBBLE
NORTH WALL
RUBBLE OR SOIL LINE
STONE MISSING OR OPENING
TOWER FIVE
M.
0
5
10
15
20
UDRUH
WEST WALL OF LEGIONARY FORTRESS
(EAST FACING)

Fig. 3

several buildings still standing to first storey height. The remainder of the interior is a large open courtyard with foundations of other buildings visible at ground level (Pl. LII, 1; Fig. 2). Rebuilt in the walls are two Christian motifs similar to the one in the Byzantine church and a broken inscription in Greek reading θλθε. There is also a fragmentary Thamudic inscription (Pl. LIII, 1).

Within the fortress most of the traces of major buildings are obscured by general building debris or have been robbed of their drafted masonry. A small rear portion of the possible *principia* or headquarters building is discernible with an apse at its west end (Fig. 2). The walls have two faces and a rubble core and there is a triple lintel standing over the doorway to a small room. Along the sides of an open area in front of this building are several pillars which have been rolled back, and they form the edge of the *principia* courtyard.

The area around the main site of Udruḥ was examined in 1980 and several new sites were located, mainly on hill tops. A pattern appears on the map when these sites are plotted, which suggests the region to the east of the *via Traiana Nova* was overlooked by a series of connected watch towers or signal posts. This series of towers, protecting the road and perhaps the fortress, continues northwards to Shawbak (Fig. 1).

Tell Udruḥ (site 'C') lies 500.00 m. east of the main site and commands a wide view over the plain on three sides, except to the north, where sites 'A' and 'B' are visible on the hillside (Fig. 1). Brunnow and Domaszewski mention the site and Glueck (1934-35 and 1951) notes the quantity of Nabataean pottery there. Neither writer commented on the ring ditch which encircles two-thirds of the site and has fourteen causeways. It is 1.20 m. wide and up to 0.59 m. deep, with its upcast thrown back on the outside. There is a badly eroded Nabataean inscription rebuilt into the fragmentary wall foundations on the highest point of the site (Fig. 7).

Site "A" lies 750.00 m. north-east of Udruḥ, 10.00 m. below the summit of a small hill, and commands extensive views over the plain to the east and south-east. The site consists of a large number of dressed limestone blocks forming the foundations of a building (12.00 x 12.00 m.) with walls of up to 1.50 m. thickness.

Site "B" is located on top of a prominent hill, Khirbet el Temei'ah, 2 kms. to the north-east of Udruḥ. There are at least two buildings standing on the hill top (Fig. 7) and both are rectangular and constructed from ashlar blocks. The larger building (13.50 x 10.50 m.) has two external buttresses and an entrance on the south side.

All three sites have surface pottery which is Late Byzantine/Early Islamic. Tell Udruḥ has predominantly Iron II pottery as well as a little Nabataean which is also present on the other two sites. Excavation is required to clarify their periods of occupation. A fourth site may be connected with this tower system. On a low hill 5 kms. along the road north of Udruh is the site of Djerba/Jarba (site 'E'), a large and extensive hill top settlement. Three hundred metres to the south of the main site are the foundations of a tower, with ahslar masonry and a few fragments of surface Nabataean pottery. The town is mentioned by Yakut (1: 174; II: 36 and 48), as being connected with Udruh.

Just over a kilometre to the north of Udruh, on either side of the *via Traiana Nova,* are a group of milestones (site 'I'). There are seven stone fragments, and Brunnow and Domaszewski recorded an inscription on one of them (Brunnow and Domaszewski, 1904: 463; Vincent, 1898: 441). Only parts of the inscription are now discernible under heavy erosion.

Two kilometres to the north-west of Udruḥ, on the slopes of the Wadi Ash'ar, is a large quarry site more than a kilometre in diameter (site 'J'), previously unrecorded. This is a large open cast limestone quarry which provided the building stone for the main site of Udruḥ and the tower system. Blocks of various dimensions and perhaps of different periods can be seen drafted *in situ,* ready to be broken away on one face. The site may well be the most extensive ancient

quarry in Jordan.

1981 Excavation Season

In August and September a British expedition spent two months in excavation at Udruh.[2] The fortress was divided into a 10.00 m. grid and work in 1981 was concentrated on tower I, where in 1980 all the major elevations had been drawn. The remains stand partially to the first storey. Only with much difficulty could access be gained to the interior rooms before excavation. The tower projects 15.00 m. either side of the west and south fortress walls. The tower walls butt onto the perimeter wall at right angles and run for 6.00-7.00 m. before turning to form a horse-shoe shape projection (Fig. 2). In area and shape tower I closely resembles tower VI. After excavation it is clear that there were four rooms on the ground floor of the original structure and a staircase with side corridors. From the inside corner of the fortress two doorways lead into the tower. The doorway on the south leads into the largest of the rooms, the roof of which has collapsed. The doorway on the west wall leads to a staircase rising to the first floor set around a stone pillar. A further two ground floor rooms led off landings on the stairs and through one of these rooms access was gained to the fourth and smallest room (Fig. 4).

The walls and vaults of the staircase and corridors are constructed from large limestone ashlars and the occasional re-used Nabataean dressed block. While most of the walls in the tower rooms have similar small block foundations to the walls of tower III (see above), their upper courses have been rebuilt. The roof of the rooms are of a corbelled small stone type, and have also been rebuilt in a later period than the original structure. The first storey. apart from the top of the staircase, is also later. On the ground floor the original wall lines were not significantly altered subsequent to their first construction. The evidence suggests that the first floor surfaces and the later structural phase are contemporary and probably Umayyad in date (Pl. LIII, 3; LIII, 4).

Inside the perimeter wall, trench CI9 (4.00 x 4.00 m) was excavated, close to the south gateway (Fig. 2). The foundational method of the perimeter wall and its construction date were clarified and a building butting onto the inside face of the wall was cleared. For the foundations of the wall a shallow trench was first cut in the limestone bedrock into which the basalt lower stones were set with packing stones. The top of the trench and the lower part of the wall were mortar faced. Over the top of bedrock and the trench was a worn stone surface, contemporary with the earliest phase of the fortress, which sealed beneath it Nabataean pottery. In subsequent phases, the area close to the wall was filled with rubble and a low retaining wall built. In the last phase the staircase to tower XXI was blocked and a long building built up against the perimeter wall. One room of this building was cleared together with a doorway on the east side. The last structural phase is Early Islamic.

The *principia* or headquarters building was the second major area of excavation. Only a small part of the building is visible and that is probably only because of its later use as a church. There is a considerable amount of rubble and debris within the fortress and this is the only building clearly identifiable. Two areas were excavated and in both areas further confirmation of the original constructional techniques was obtained. The wall consist of basalt blocks set on bedrock with mortar running over the wall face and down over bedrock. In trench K13 at the front of the *principia,* several phases of alteration to the original walls are exposed, including a narrowing of the doorway in a later phase. A bell-shaped

[2] In 1981 the project was funded by the British School of Archaeology in Jerusalem, The British Academy, the British Institute at Amman for Archaeology and History, the Palestine Exploration Fund, and Ashmolean Museum, the Manchester Musem and the author. Mrs. C.-M. Bennett again gave her full support. The Department of Antiquities of Jordan kindly allowed us to live in Nazzal's Camp in Petra and provided a second vehicle to transport workmen as well as contributing towards their cost. I am grateful for the assistance of: Mr. P. Bien Kowski, Mr. J. Bowsher, Mr. J. Bruce, Miss M. Cassar, Mr. Nabil el Qadi, and especially Mr. S. Reid and Miss M. Rozan. I am also grateful to H.R.H. Pricess Alia for her small find drawings.

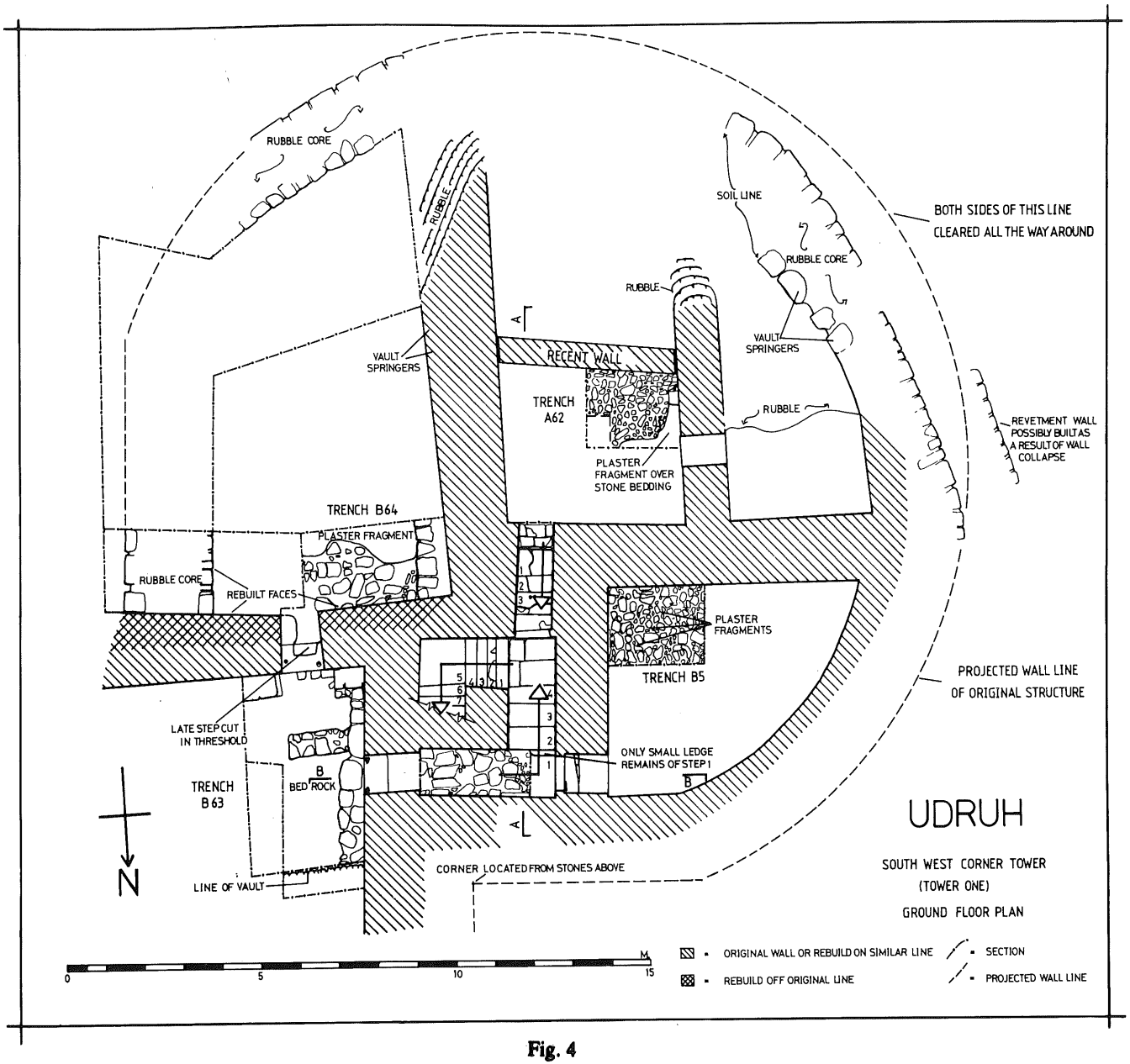
RUBBLE CORE
RUBBLE
SOIL LINE
BOTH SIDES OF THIS LINE
CLEARED ALL THE WAY AROUND
RUBBLE CORE
RUBBLE
VAULT SPRINGERS
VAULT SPRINGERS
RECENT WALL
TRENCH A62
RUBBLE
REVETMENT WALL POSSIBLY BUILT AS A RESULT OF WALL COLLAPSE
PLASTER FRAGMENT OVER STONE BEDDING
TRENCH B64
PLASTER FRAGMENT
RUBBLE CORE
REBUILT FACES
PLASTER FRAGMENTS
TRENCH B5
PROJECTED WALL LINE OF ORIGINAL STRUCTURE
LATE STEP CUT IN THRESHOLD
ONLY SMALL LEDGE REMAINS OF STEP 1
TRENCH B63
BED ROCK
N
LINE OF VAULT
CORNER LOCATED FROM STONES ABOVE
UDRUH
SOUTH WEST CORNER TOWER
(TOWER ONE)
GROUND FLOOR PLAN
0
5
10
15
M
ORIGINAL WALL OR REBUILD ON SIMILAR LINE
REBUILD OFF ORIGINAL LINE
SECTION
PROJECTED WALL LINE

Fig. 4

cistern, cut into the limestone bedrock with a 5.00 m. wide top opening was partially excavated. A third century A.D. entablature is re-used in a low wall built directly over the cistern.

The second trench was placed inside the *principia.* Excavation was hampered by fallen ashlars so that above bedrock the trench was restricted in area to 2.00 m. x 1.00 m. In the latest phase, a rough stone floor and walls to the south and west were constructed from fallen ashlars. The south wall had an Umayyad *Tabula Ansata* rebuilt into it. The floor sealed several fragmentary surfaces which contained Early Islamic pottery. Although the area of excavation was narrow, the wall of the *principia* was constructed with basalt blocks set in a foundation trench on bedrock. The wall was mortared similarly to the other trenches. A stone surface was laid over bedrock as in trench C19. The pottery from these levels was sealed and exclusively Early Roman material.

1982 Excavation Season

In August and September a British expedition spent a further two months in excavation at Udruh.[3] A threat to tower XIII from a road widening scheme required its immediate excavation. The three rooms of the tower nearest the road were excavated (Fig. 5). Five structural phases were identified from Early Roman through to Mamluk, although the major re-structuring phase came in the Byzantine/Early Islamic period (cf. tower I, 1981) when arches and vaults with stylobate walls were constructed. Five other areas were worked, the results of which await further excavation in 1983. A trench was placed in the south-east corner of the fortress where (Fig. 2, trench G27) it was hoped to find evidence of internal military-style buildings. However, a sequence of Islamic buildings had robbed out almost to bedrock traces of earlier occupation, while outside the fortress (Fig. 2, trench B) an area revealed a significant quantity of Nabataean fine wares, lamps, glass and other artefacts.

Preliminary Dating and Future Work

Throughout antiquity settlement was drawn to Udruḥ because of its location on the trade route running along the edge of the eastern desert and the presence of a perennial spring on the site together with extensive agricultural plains to the north-east. In Roman and Nabataean times the site may have taken on a strategic importance because of the proximity of Petra and the construction of the Roman road network.

While Paleolithic (Mousterian) and Neolithic (PPNB/PPNA) artefacts have been found scattered around the main site there have been no indications from excavations to date of any settlement. Iron Age pottery from lower levels in several trenches as yet also have no structural associations. Nabataean artefacts and masonry however indicate a substantial settlement which pre-dates the foundation of the perimeter wall. Apart from this perimeter wall (Early Roman from ceramic evidence only) there have been no other real indications of any other military aspect of the site and thus one cannot reject the possibility of a defended trading establishment with a small military garrison. The importance of the site in the very Early Islamic period, as the literary sources suggest, has been found in the rebuilding of towers I and XIII at that time. The extent of rebuilding in this

[3] In 1982 the project was funded by the British School of Archaeology in Jerusalem, the British Institute at Amman for Archaeology and History, the British Academy, the Palestine Exploration Fund, the Society of Antiquaries of London, the Ashmolean Museum, an anonymous donor, the Seven Pillars of Wisdom Trust, Miss M. Saacke, the Manchester Museum and the author. I am very grateful for the assistance of the Department of Antiquities in the setting up of the Ottoman fort as an excavation house and contributing towards the workmen again. I am also grateful to the Petra Tourism Project who lent the excavation large earth moving machinery and also to the people of Udruḥ who always make us so welcome. I am indebted to Mr. Nabil el Qadi for his help again and also to Miss Marie Rozan who was the cook, registrar, lithics and bones specialist. I am also grateful to the other staff: Miss W. Horton, Miss K. McDiarmid, Miss C. Cox, Mr. P. Bienkowski and Mis E. Hargreaves.

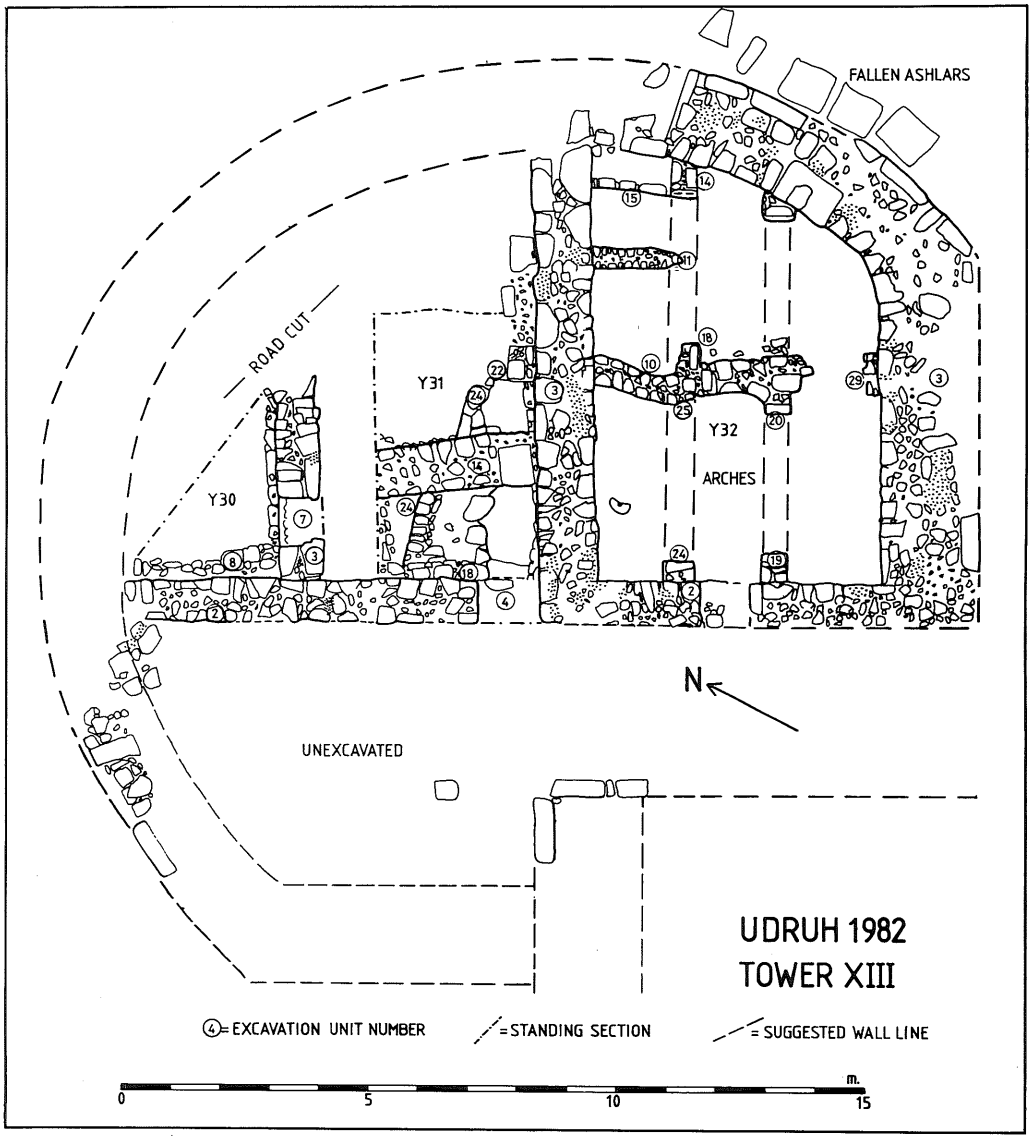
FALLEN ASHLARS
ROAD CUT
Y31
Y32
Y30
ARCHES
N
UNEXCAVATED
UDRUH 1982
TOWER XIII
④= EXCAVATION UNIT NUMBER
= STANDING SECTION
= SUGGESTED WALL LINE
m.
0
5
10
15

Fig. 5

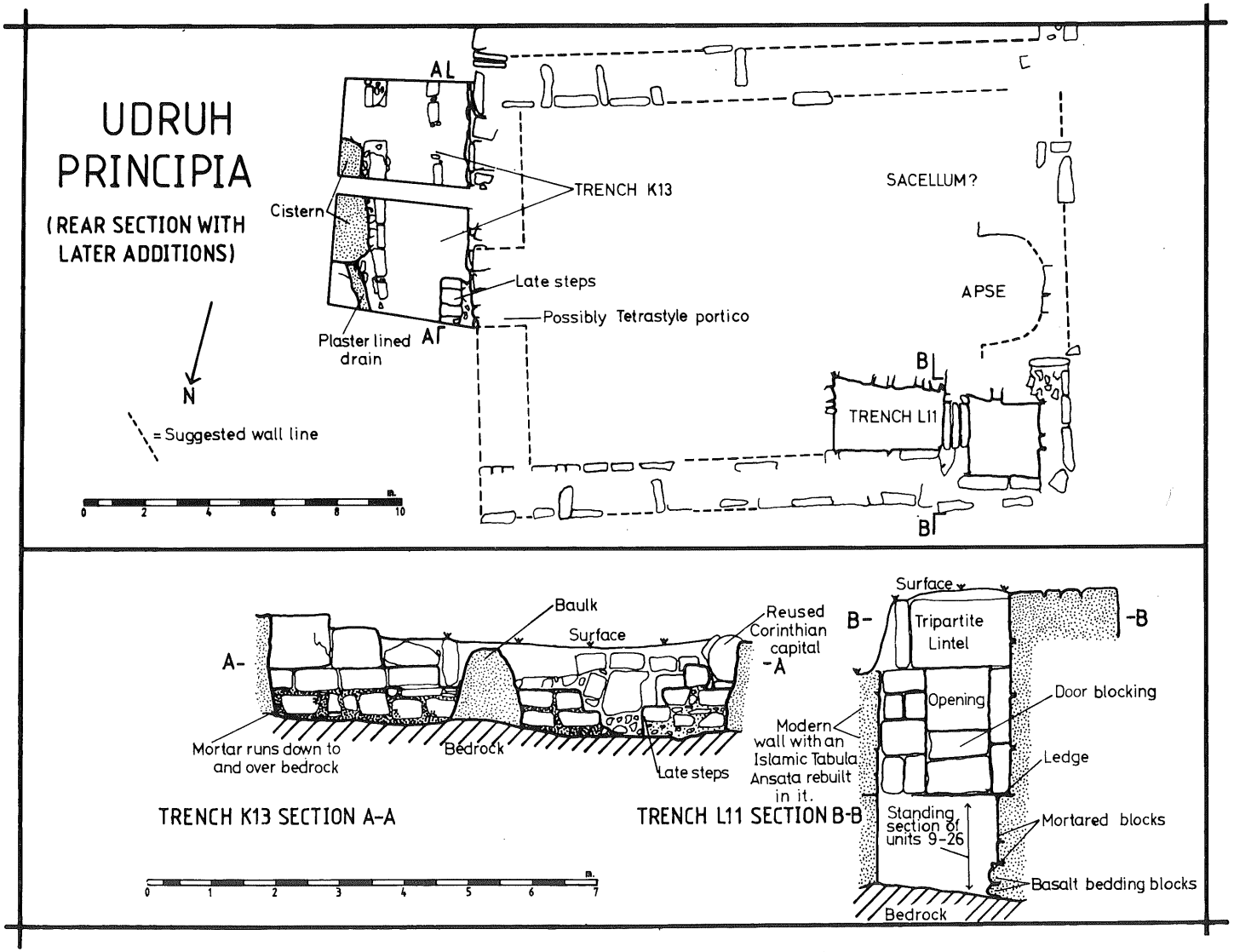
UDRUH
PRINCIPIA
(REAR SECTION WITH
LATER ADDITIONS)
N
= Suggested wall line
0 2 4 6 8 10 m.
A
L
TRENCH K13
Cistern
Late steps
Possibly Tetrastyle portico
Plaster lined drain
A
SACELLUM?
APSE
B
TRENCH L11
B
A-
Baulk
Surface
Reused Corinthian capital
-A
Mortar runs down to and over bedrock
Bedrock
Late steps
TRENCH K13 SECTION A-A
0 1 2 3 4 5 6 7 m.
Surface
B-
Tripartite Lintel
-B
Opening
Door blocking
Modern wall with an Islamic Tabula Ansata rebuilt in it.
Ledge
Standing section of units 9-26
Mortared blocks
Basalt bedding blocks
Bedrock
TRENCH L11 SECTION B-B

Fig. 6

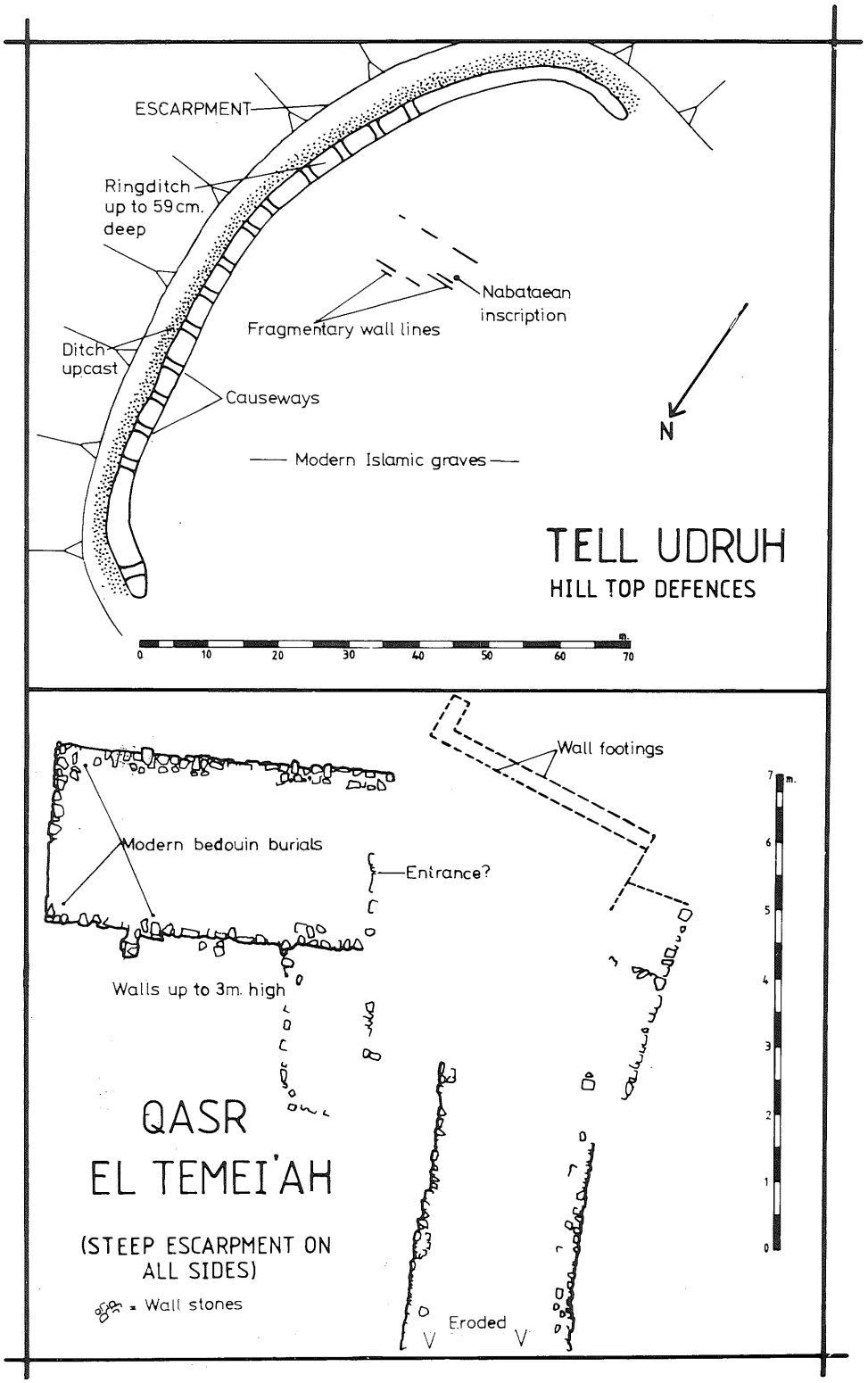
ESCARPMENT
Ringditch up to 59cm. deep
Nabataean inscription
Fragmentary wall lines
Ditch upcast
Causeways
N
Modern Islamic graves
TELL UDRUH
HILL TOP DEFENCES
0 10 20 30 40 50 60 70 m.
Wall footings
Modern bedouin burials
Entrance?
Walls up to 3m. high
QASR
EL TEMEI'AH
(STEEP ESCARPMENT ON ALL SIDES)
= Wall stones
Eroded
7 m.
6
5
4
3
2
1
0

Fig. 7

period must be tested. A considerable amount of Late Islamic occupation is present everywhere. The work is still in progress and future excavation should clarify the important historical problems which the site still presents.

A. C. Killick
London, England.

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SURVEY OF THE SOUTH RIDGE OF THE WADI ʿISAL, 1981

by
Linda K. Jacobs

Introduction

The Wadi ʿIsal[1] is located seven kilometres south of the Wadi Kerak and runs approximately parallel to it--that is, west-northwest. It has as its source several springs at its eastern end, which are near to the village of Kathrabba (Fig. 1), and it empties into the Ghor ʿIsal and the Dead Sea, just south of the Lisan Peninsula.

Since it is one of the lesser *awdiyah* (wadis) in the series of east-west *awdiyah* (wadis) running into the Rift Valley, it is rarely mentioned or visited by travellers. Although Glueck (1939: 147) flew over the Wadi Isal and photographed the Roman road which runs along its south ridge and visited the Ghor ʿIsal (1935: 6), he seems never to have actually visited the ridges on either side of the *wadi*. This is not strange, however, as he did not do much east-west exploring, and in fact very few of these east-west drainages have been surveyed. Little seminal work has been done in the south in particular.

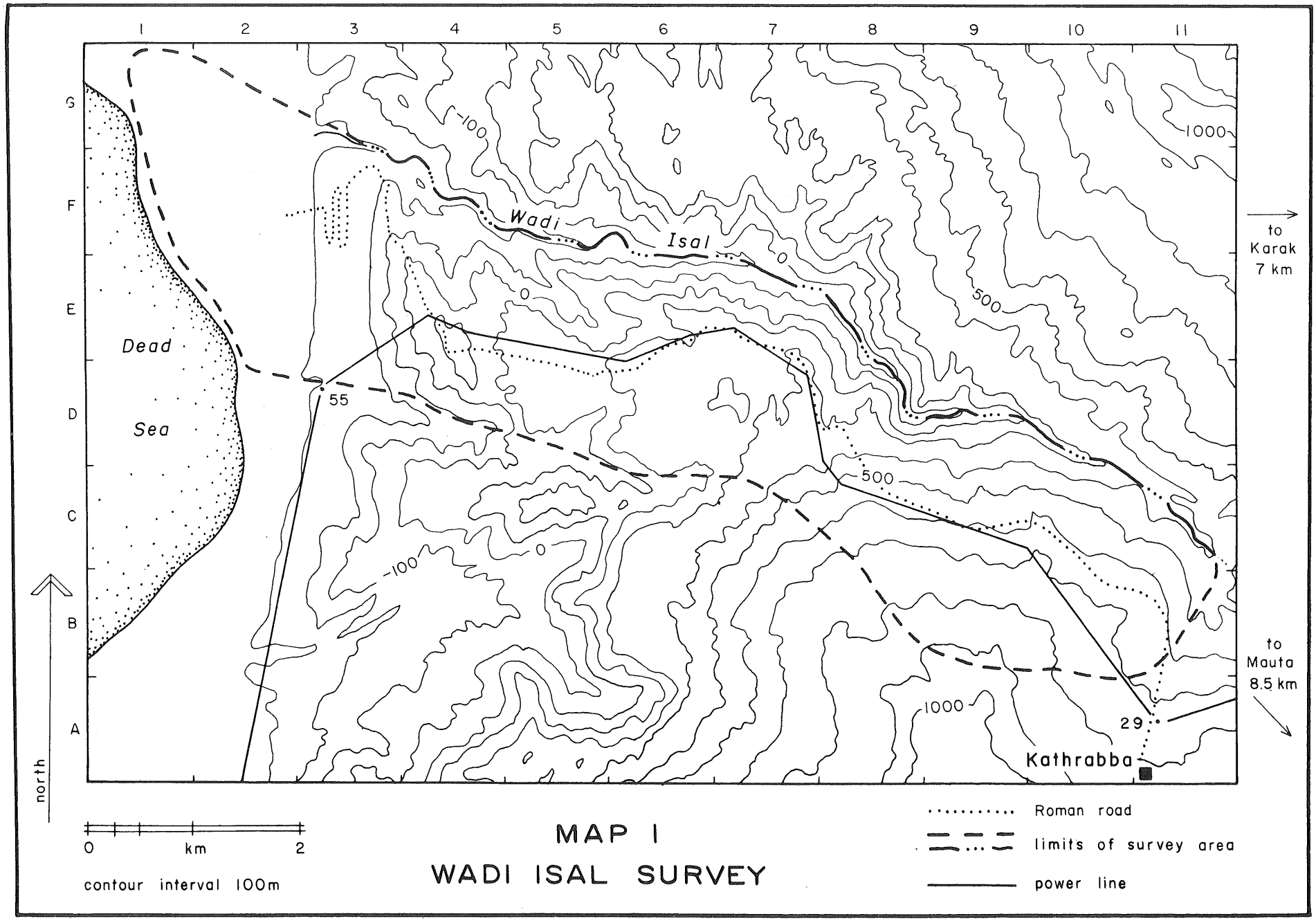
Recently, however, this lack is being remedied by surveys of the Wadi el-Hasa (MacDonald, 1980) and by more general surveys of W. Jobling (1981) and M. Miller (1979). A survey of the Wadi ʿIsal promised to be interesting for a number of reasons, not the least of which was the presence of the Roman road which Glueck photographed. The fact that the road was built at all marks the *wadi* (or at least its southern ridge) as a viable communication route between the highlands and the lowlands of Transjordan. In fact, the trek from the Ghor ʿIsal to Kathrabba along the remains of this road is quite an easy one (Fig 1).

Combined with the vaiability of this communication route, the presence of Early Bronze Age sites, both in the lowlands (Rast and Schaub, 1974) and in the highlands (Glueck, 1935; MacDonald, 1980), and indications of trade between them (McCreery, 1980a), led one to suspect that the Wadi Isal may have been a communication route as early as Early Bronze times. In addition, it seems that the location of the majority of Early Bronze Age settlements has yet to be discovered, as the number of burials at the Early Bronze Age cemeteries at sites in the Ghor seem not to be accounted for by the population of even a thousand-year settlement of these small sites. Thus, a primary goal of the survey was the location, mapping and collecting of Early Bronze Age sites in the Wadi ʿIsal.

A second goal was methodological. Traditional survey methods in the Near East involve the discovery and identification of sites in one of two ways: 1) searching for mounds, or, 2) looking for likely spots for sites and investigating these. Although pragmatic in terms of covering a wide area in a short time span, these methods obviously have built-in biases which can only be evaluated by comparing their results with the results of a more intensive coverage. This can be accomplished by a random sampling of a large area in which a selection of quadrants are completely surveyed, or by the complete coverage of a smaller, delimited area. Only fifteen kilometres long, and limited on all sides by natural boundaries, the Wadi ʿIsal was of a manageable size for a small team to cover in a limited amount of time.

We were thus trying to provide a yardstick by which to measure the results of other more traditional survey methods. In addition, settlement pattern studies are best-served by this approach, since *all* sites of a given period (not just the largest, most

[1] Or 'Asal or E'sal



1
2
3
4
5
6
7
8
9
10
11
G
F
E
D
C
B
A
Dead
Sea
Wadi
Isal
-100
0
500
1000
55
29
Kathrabba
to
Karak
7 km
to
Mauta
8.5 km
north
0
km
2
contour interval 100m
MAP I
WADI ISAL SURVEY
Roman road
limits of survey area
power line

Fig. 1

prominent ones) are located, and a study of the settlement pattern of Early Bronze Age settlements was a primary goal of the survey.

A third, and possibly the most immediately important goal of the survey was to add to the cultural inventory of sites of an area which is, and has been, the target of development in Jordan. The whole of the Wadi Araba region was at one time the subject of a vast and comprehensive development plan, which has since been broken down into smaller—but still monumental—projects. The first and largest of these—the Arab Potash Company's refinery—has changed the landscape radically, from the Ghor Kerak all the way south to Numeira (about fifteen kilometres), with the construction of a township, a paved road, a large refinery, water drilling, etc. More building is planned for the future. Some antiquities have been destroyed (McCreery, 1980b), others narrowly missed, while unknown numbers of others may have been covered by the massive building and earth-moving.

The breakdown of this comprehensive development plan has given us a temporary respite in the destruction of sites, but it is clear that this area must be surveyed before such development takes place. No decisions by developers or by the Department of Antiquities can be made without such inventories. Therefore surveys—hopefully with theoretical problems as their bases—should, in the author's view, receive the highest priority in the years to come (Jacobs and McCreery, 1980).

Thus this survey had three goals: a specific theoretical one—to define and explain settlement patterns and communication routes of the Early Bronze Age; a methodological one—to establish a reference by which to measure other survey results; and a pragmatic one—to provide a complete inventory of antiquities in a small part of a region slated for development.

The Environment

The Wadi ʿIsal is one of many west-running streams which are fed by springs and runoff which flow into the Dead Sea. Its rate of fall is 90.00 metre/1000.00 metres of horizontal run (Abel, 1967: 178), and thus it is constantly, if slowly, downcutting on its way to the sea. It has a perennial flow of water, as do several of the other major *awdiyah* (wadis) in the region.

Near the sea, the narrow *wadi* opens into the alluvial fan of the Ghor ʿIsal, which lies at 400.00 metres below sea level. It is here that the first traces of the Roman road can be seen. Until recently, the dangers of winter flooding prevented occupation at the mouth of the *wadi,* as huge boulders and tons of silt were carried with great force into the *ghor.* Recent flood-control measures have lessened the danger, however. The *ghor* is strewn with medium-sized, water-rounded boulders, and many of the ancient builders utilized these. Further away from the mouth, one expects to find ancient remains, just as one finds modern Bedouin settlements; because of the yearly deposit of silt, however, few of these remains are evident. Only a few sites, built above the floor, have been found.

Just west of the *ghor,* the rocky talus slope mounts toward the first plateau, and on this talus, one finds more evidence of ancient human occupation. This talus slopes gently upward at first, and it is in this area that the sites are found; then suddenly the slope becomes quite steep. At this point, the Roman road makes a series of switchbacks (Fig. 1) to make its ascent to the first plateau at about 100.00 metres above sea level. This ascent of 500.00 metres from the *ghor* to the first plateau, occurs in a horizontal span of less than three kilometres, and is thus the most difficult part of the journey to the highlands.

Once one reaches the plateau, however, the ascent toward the east is much more gradual. Gently rolling hills are occasionally interrupted by small, deep *awdiyah* (wadis), but the Roman road traverses the route of least difficulty.

The western end of the plateau is barren and windswept. Most of the topsoil has been scoured from the hills, and no water source (except runoff) is available,

since the stream bed itself is practically inaccessible here. The area is not inhabited today—even Bedouin encampments are only found further east—and seems not to have been occupied in the past. Except for an occassional stone tomb and the Roman road, it is quite desolate.

The vegetation here is low and spiney and includes wild sage, camel thorn and other xerophytic plants. The only wild animals seen were jack rabbits, gerbils, lizards, and an occasional snake or scorpion.

As one walks east-southeast toward the village of Kathrabba, one climbs to an elevation of something over 700.00 metres above sea level—a gentle 600.00 metre climb over twelve kilometres. More springs are in evidence, the soil is plentiful if rocky, and the evidence for human use—both present and past—becomes increasingly abundant.

Cleared and plowed fields appeared further west than any other evidence of modern occupation. Although the crops had already been harvested by the time of the survey, people from Kathrabba listed the crops as wheat, chick peas, lentils, barley, melons, figs, olives, grapes, maize, and prickly pear. These are grown by dry-farming, although each of the three springs (two near power pole 36, one at pole 30—see Fig. 1) has been canalized and used to water the olive groves.

The rainfall on the plateau ranges 200-300 mm. per year (Abel, 1967), making this dry farming possible but marginal, but there is evidence—both ancient and modern—for water catchment systems to augment nature. Cisterns have been found at several sites, and in addition, more primitive systems, whereby channels cut into bedrock direct runoff into small basins in the rock. The dating of these latter are problematic, but they are certainly being used by modern Bedouin.

There are *no* settlements on the south ridge today at all, barring a few tents which the people of Kathrabba occupy in the summer. But the villagers have their fields, here, and therefore modern artefactual remains are scattered throughout the eastern half of the survey area. This situation is not quite the same as in the past, when this ridge was more heavily used than today. However, one cannot say that it was ever densely populated or even densely travalled—despite the presence of the road and several standing buildings in the survey area.

Methodology

As stated above, the survey team[2] accomplished a complete coverage of a naturally delimited area which covered eighteen square kilometres. This area was defined on the north by the *wadi* floor itself; on the east by the source end of the *wadi* and the easternmost of several small feeder streams (the Wadi el-Jaya) which run into the Wadi Isal; on the south by the next major *wadi* (unnamed on the 1:50,000 map), and when that ended, by a major east-west ridge; and on the west by the line of vegetation which marked the edge of the Dead Sea (Fig. 1). As is clear, the only arbitrarily-chosen limit was the east-west ridge defining the southern edge of the survey area for a distance of about five kilometres.

The south ridge of the Wadi Isal is divided by the Roman road which runs along the highest part of the plateau; by a modern dirt track which runs approximately parallel to and sometimes on top of the Roman road; and by a power-line (installed to provide electricity to the potash project) for which the road was cut. The poles of this line are numbered (Fig. 1) and are spaced about 330.00 metres apart; thus the survey area was conveniently divided into quadrants defined by the numbered poles and the road or line itself. Bearings for each of the sites in the survey were taken from two of these poles, and the sites were numbered in the field according to the number of the nearest

[2] The survey team consisted of four people: the author; Miss Hilda Ayoub of the Department of Antiquities; Dr. John Alden; and Mrs. Greta Kaltenbach. We worked in the field from 9 November-3 December, 1981, with a total of 19 working days.

pole. Our survey area thus stretched from pole 30 to pole 52—the westernmost pole on the plateau, and bearings were also taken on pole 53, the first pole in the *ghor* itself.

These field numbers have been changed in this report to a gridded numbering system to make their locations and numbers more closely correlated, but the pole numbers are given on all the maps (Figs. 1-10) in order to make clear some of the site descriptions that follow. Sites are marked on the map with symbols representing the periods of occupation—the larger of the symbols representing major occupations of that period.

How was the survey organized? The technique was a mixture—as always—of systematic coverage and compromises with topography. We proposed to walk in 50.00 metre wide transects and cover all of the area defined above. Because of the hardiness of the crew, we were very successful in this goal, and except for certain necessary adjustments for sheer cliffs, farmers' fields, etc., we are confident that complete coverage was attained.

We tried to make no prejudgements about where sites might be located, and in that sense the survey was modelled on "New World" rather than traditional "Old World" survey methods. In the same vein, we did not define a "site" beforehand, since we simply did not know what we would find.[3] In fact, there was not much difficulty in deciding which were sites and which were not, and in retrospect, a working definition seems to have been the presence of at least ten artefacts in a 10.00 x 10.00 metre area. Single pot breaks of course were not defined as sites. During the later analysis of the pottery, a total of eight sites were eliminated for having fewer that the requisite number of artefacts.

Although the crew as a whole walked in 50.00-metre transects, the author moved back and forth from site to site recording, photographing and collecting. We did not make systematic collections of the sites, but simply picked up a selection of diagnostic and non-diagnostic artefacts, since we planned to return after preliminary analysis to do systematic collections of the Early Bronze Age sites found. The sites were generally so small, however, that we picked up *all* the diagnostic sherds we saw (rims, bases, decorated bodies) and many undecorated bodies as well. Evidence of stone tool manufacture—flakes, cores and tools—were also collected, as well as all other artefactual material including evidence for modern occupation.

We also made a concerted effort to trace the remains of the Roman road from the *ghor* eastward. In many places it has been completely obliterated and was impossible to find, but we did locate it at intervals along the survey route and to the south and east of Kathrabba. The 1:50,000 map of this region (Sheet ✣ 3152 III) which is based on 1961 aerial photographs does show the Roman road, and the maps in this article are based on this map with certain corrections based on observations in the field. The road shows up very clearly on these photographs as a thin double line, so they are very useful in filling in the gaps where the road no longer exists.

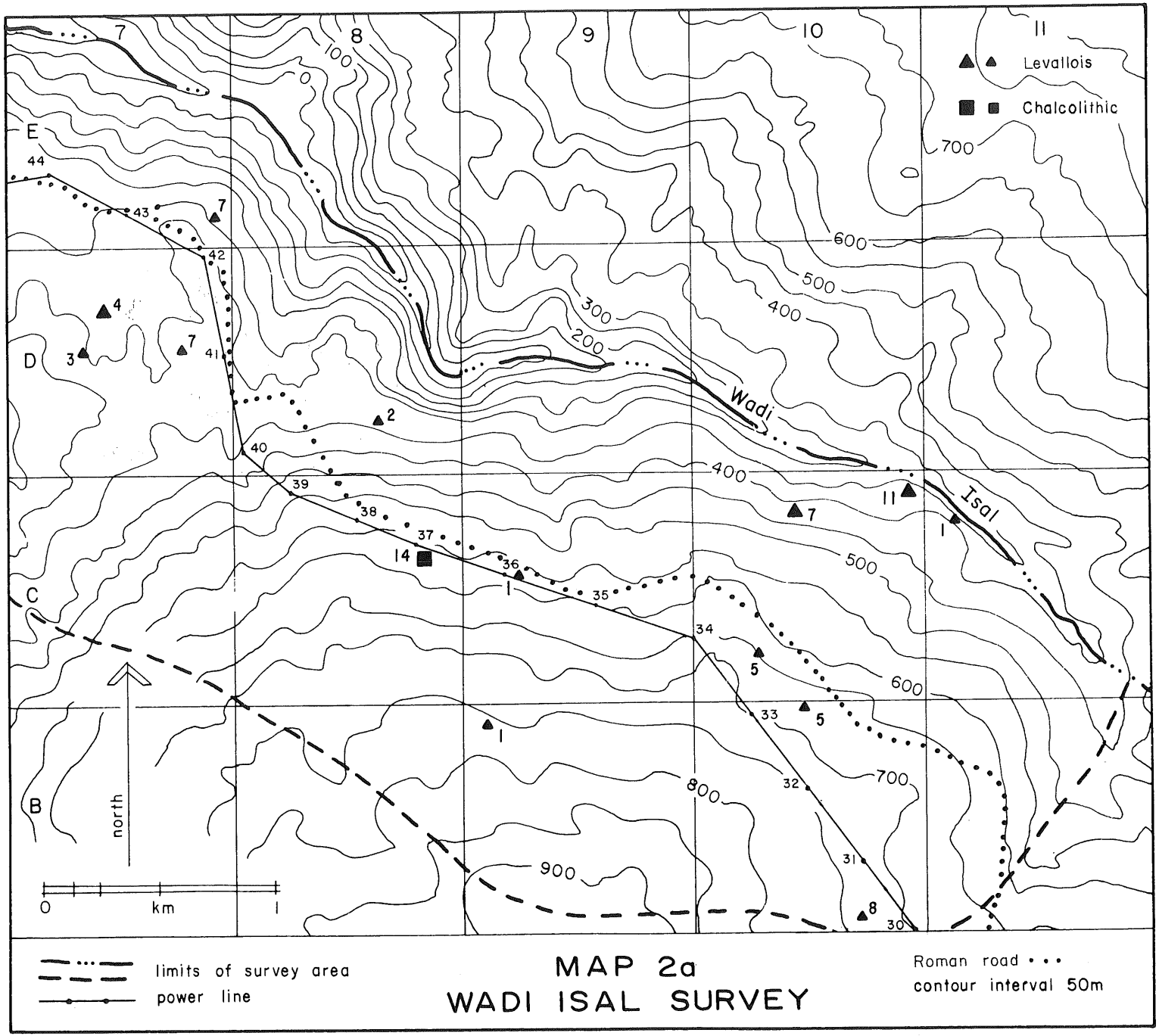
Results[4]

A total of ninety sites were identified in the course of the survey and thirty-two "megalithic" tombs. The great majority of sites were Byzantine, with a much fewer number of Paleolithic, Chalcolithic, Iron II, Nabataean, Roman and Mamlūk. Artefacts from all these periods were found scattered throughout the survey area, but major occupations were few and concentrated in the middle and eastern portions of the survey area.

Interestingly, in terms of the goals of the survey, we found *no* Early Bronze Age

[3] Dr. David McCreery asked me, about halfway through our field season, whether we were finding "sites" or "scatters". What is the meaning of this distinction?

[4] Mr. Colin Gillett assisted me in identifying and dating the pottery from the survey. The maps were drawn by Mr. Brian Byrd, and most of the pottery by Mrs. Anne Hastings. Housing was generously provided by Jacobs Engineering Co. in the Potash Township. I am grateful to all of these people for their help; all errors, however, are my own.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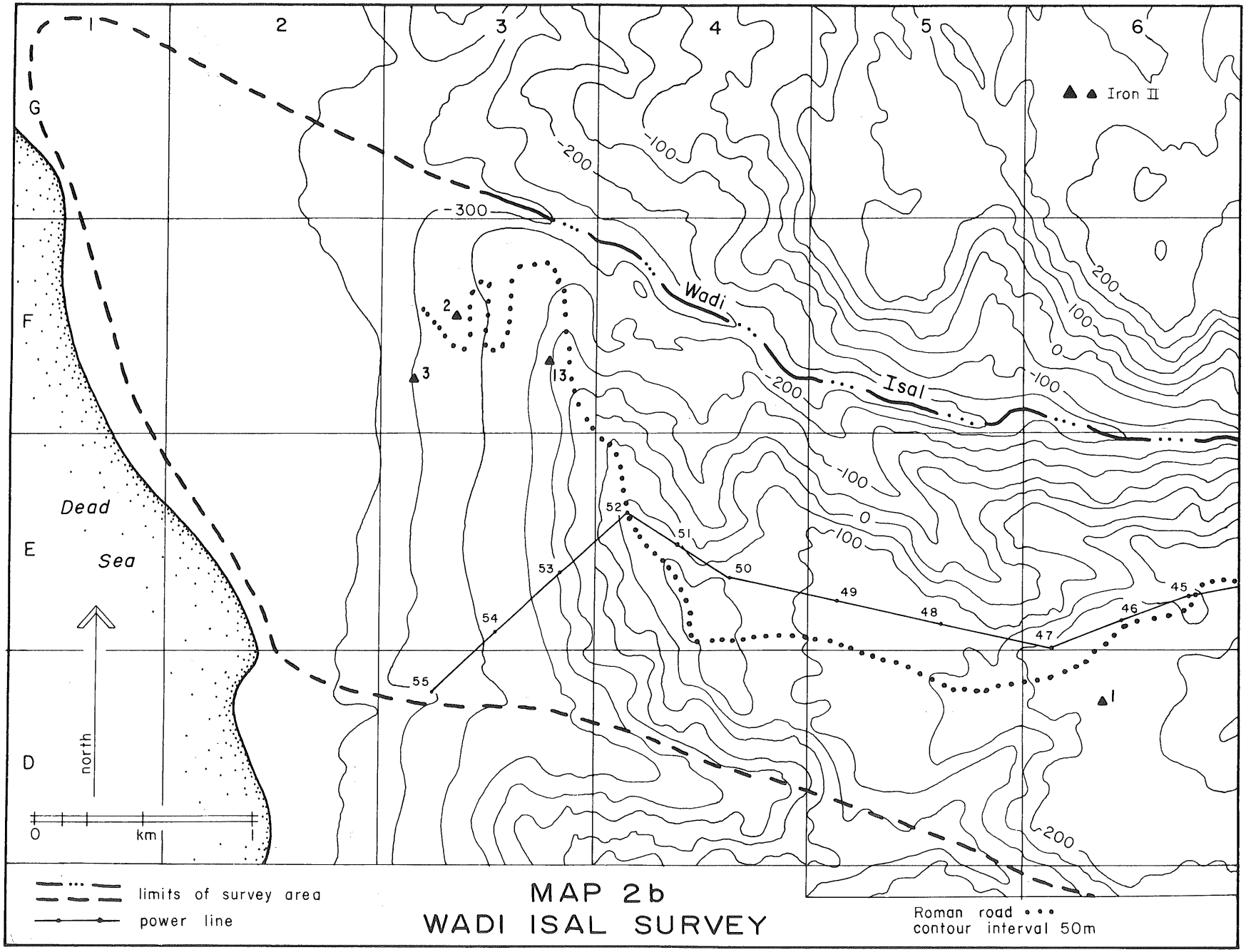
MAP 2a
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 2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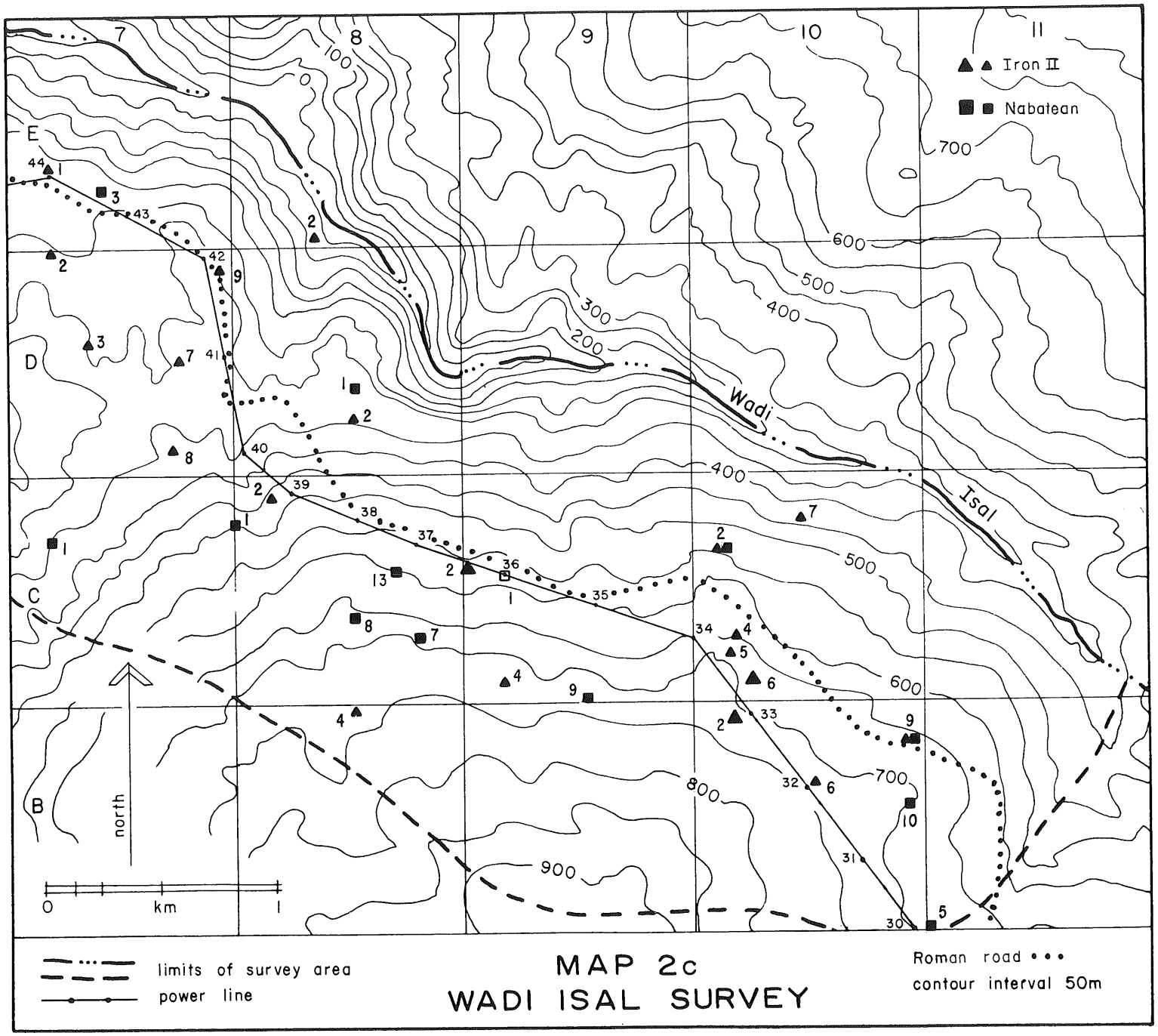
MAP 2b
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 3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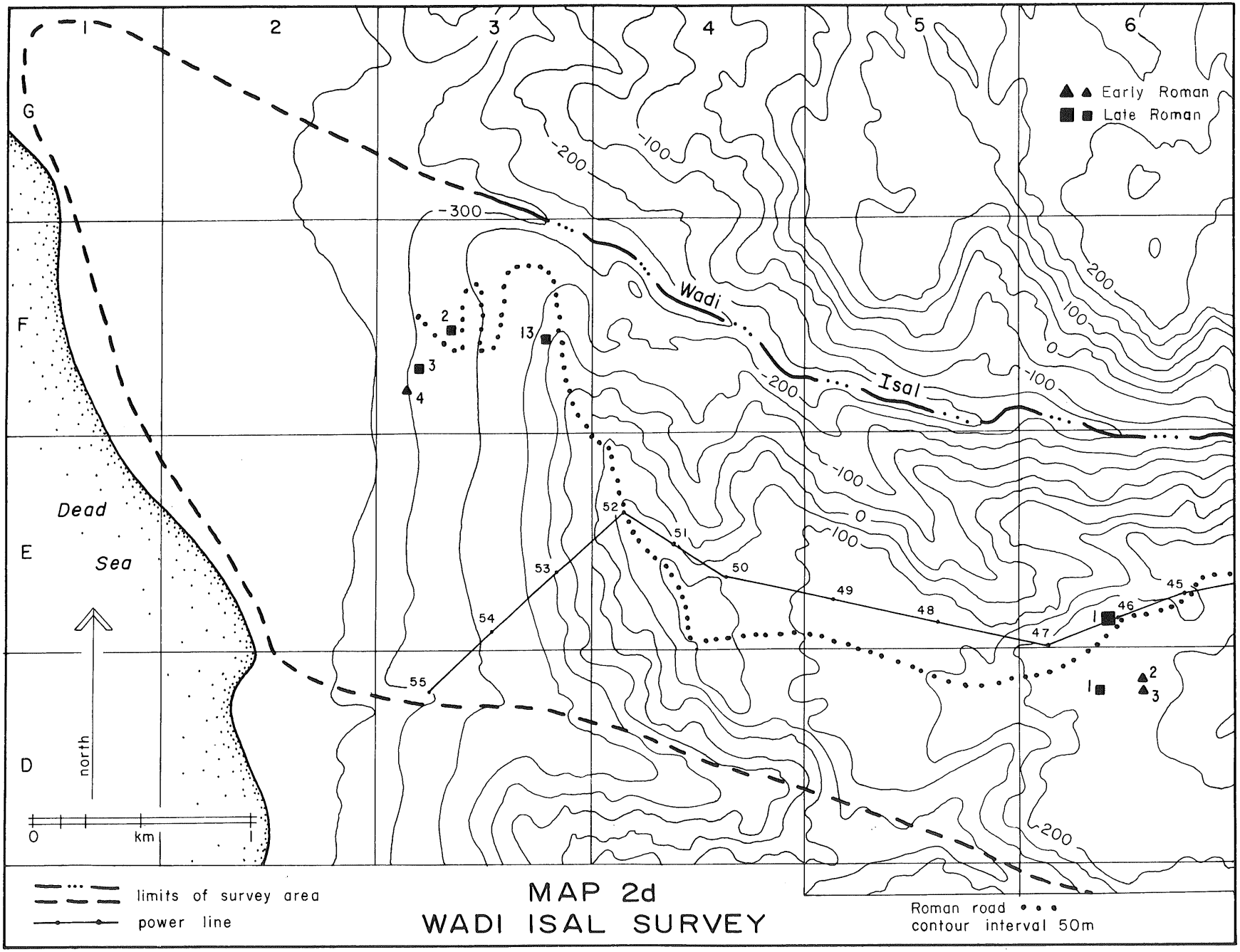
MAP 2c
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 4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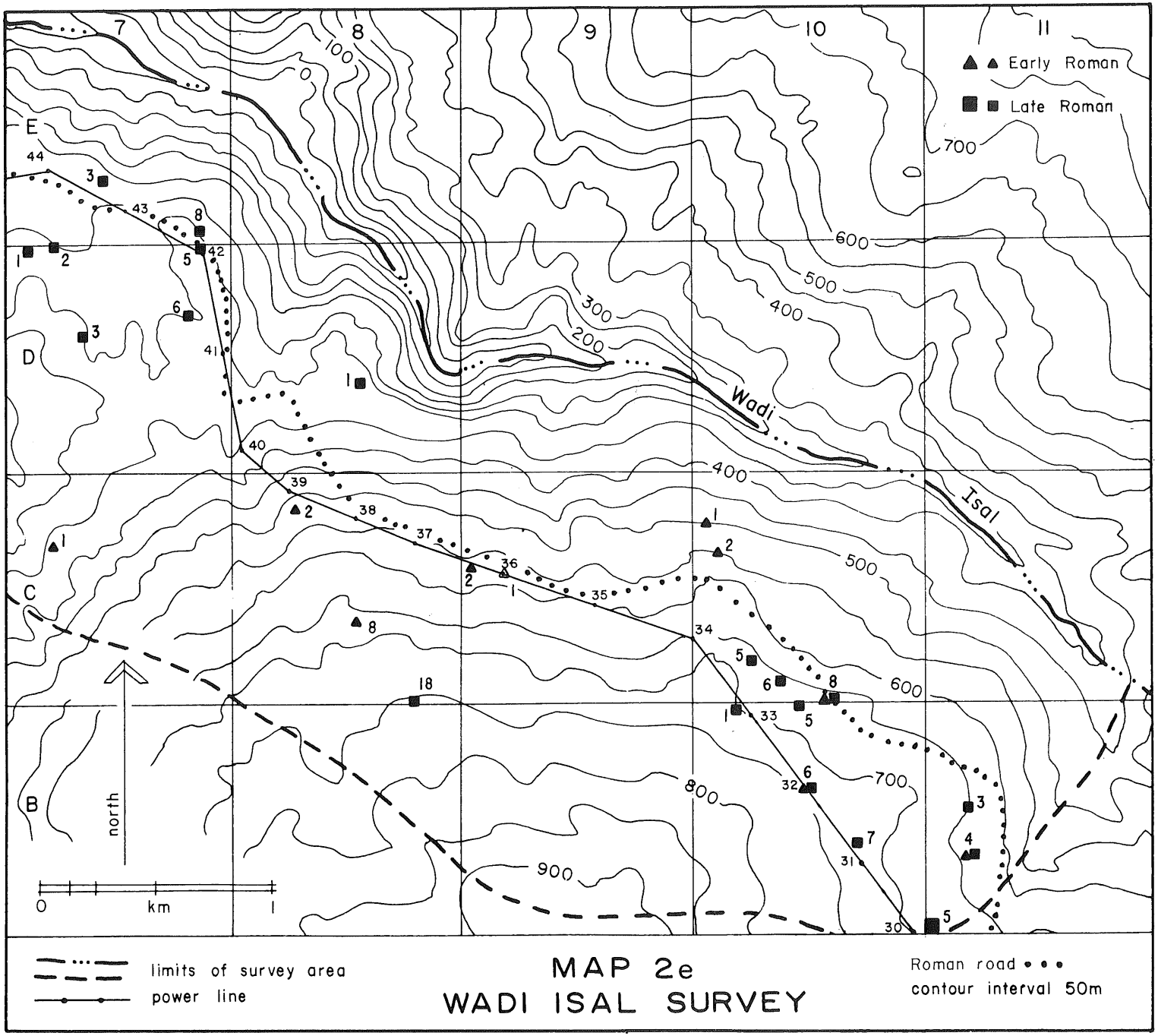
MAP 2d
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 5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MAP 2e
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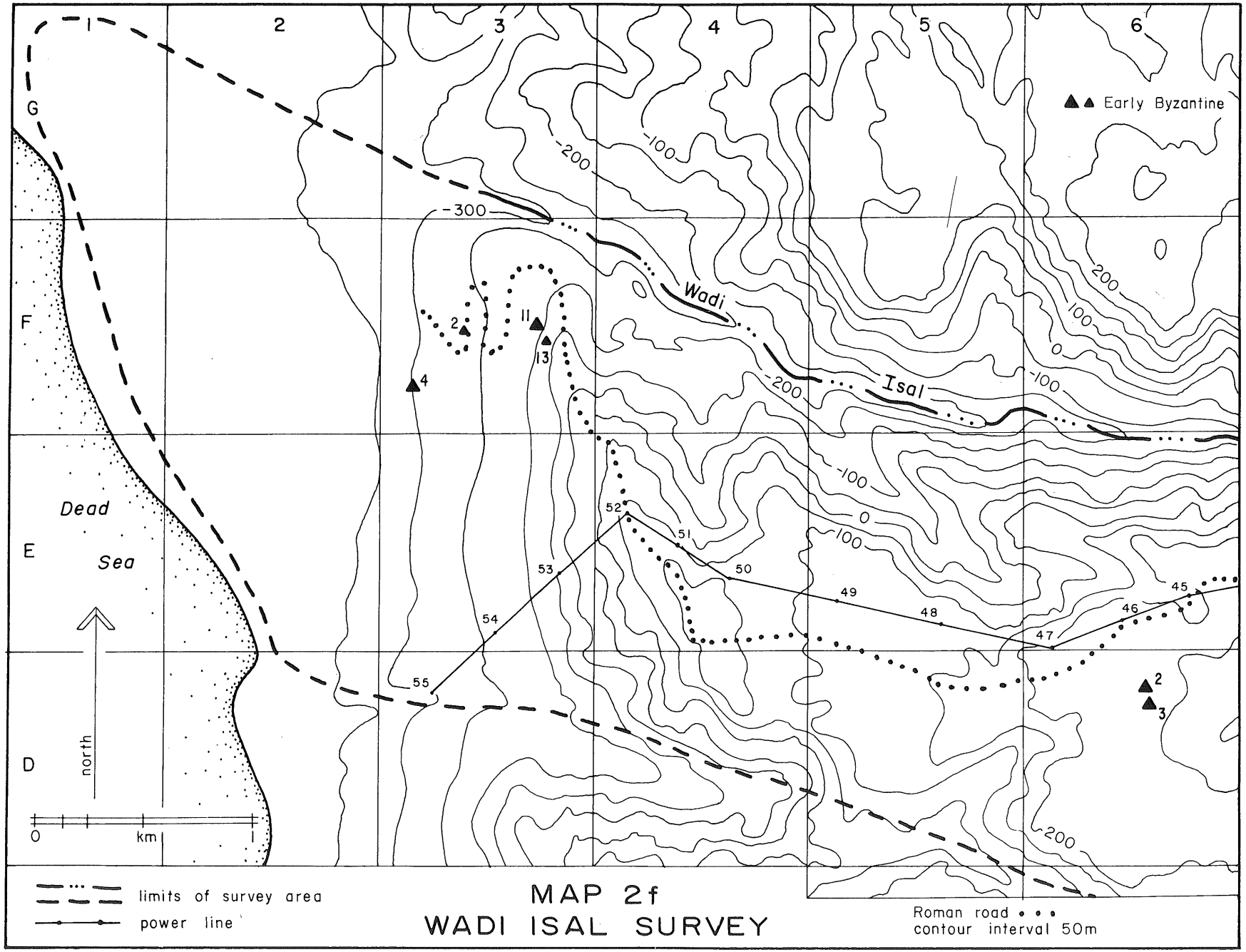
Roman road
contour interval 50m

Fig. 6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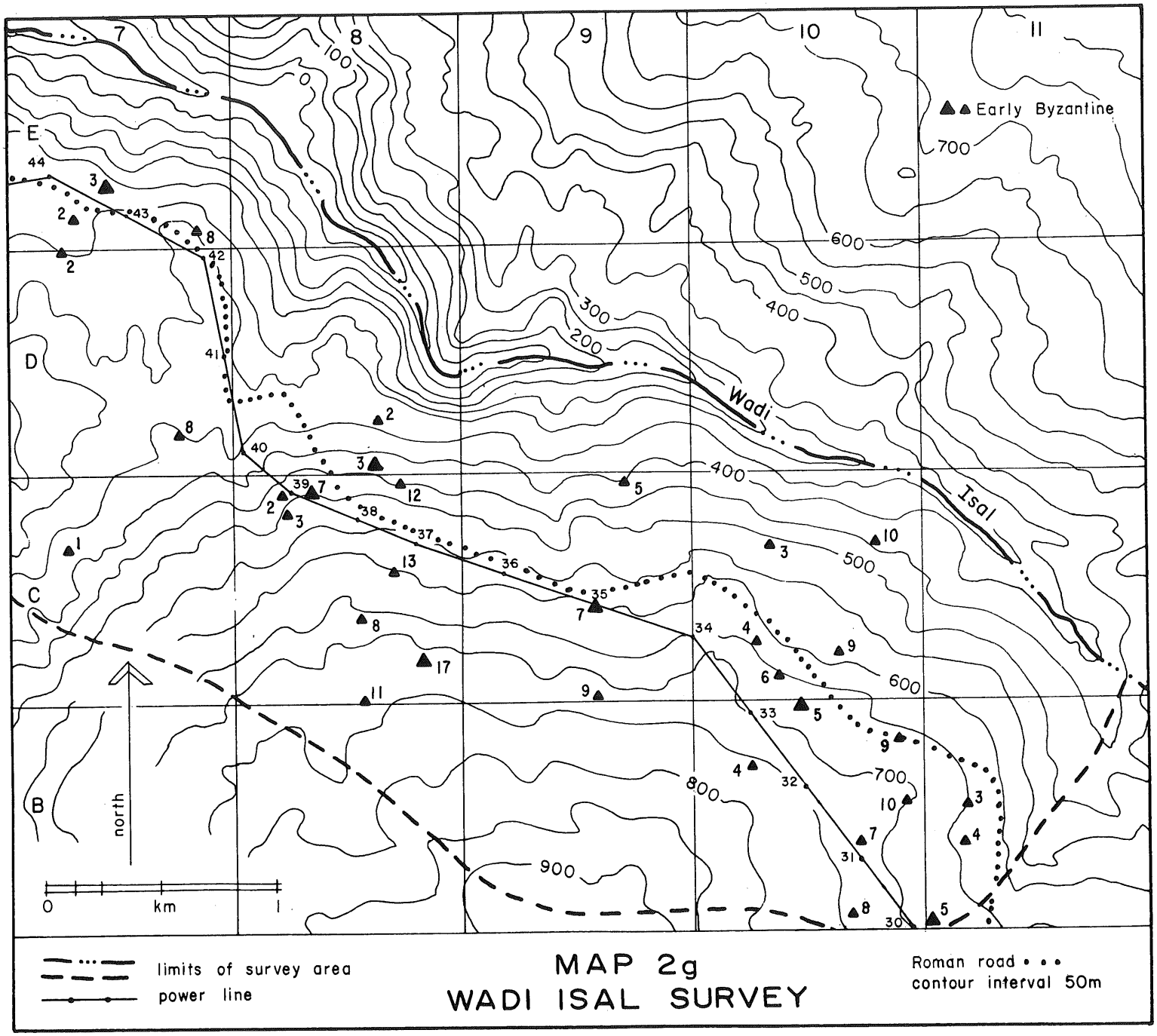
MAP 2f
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 7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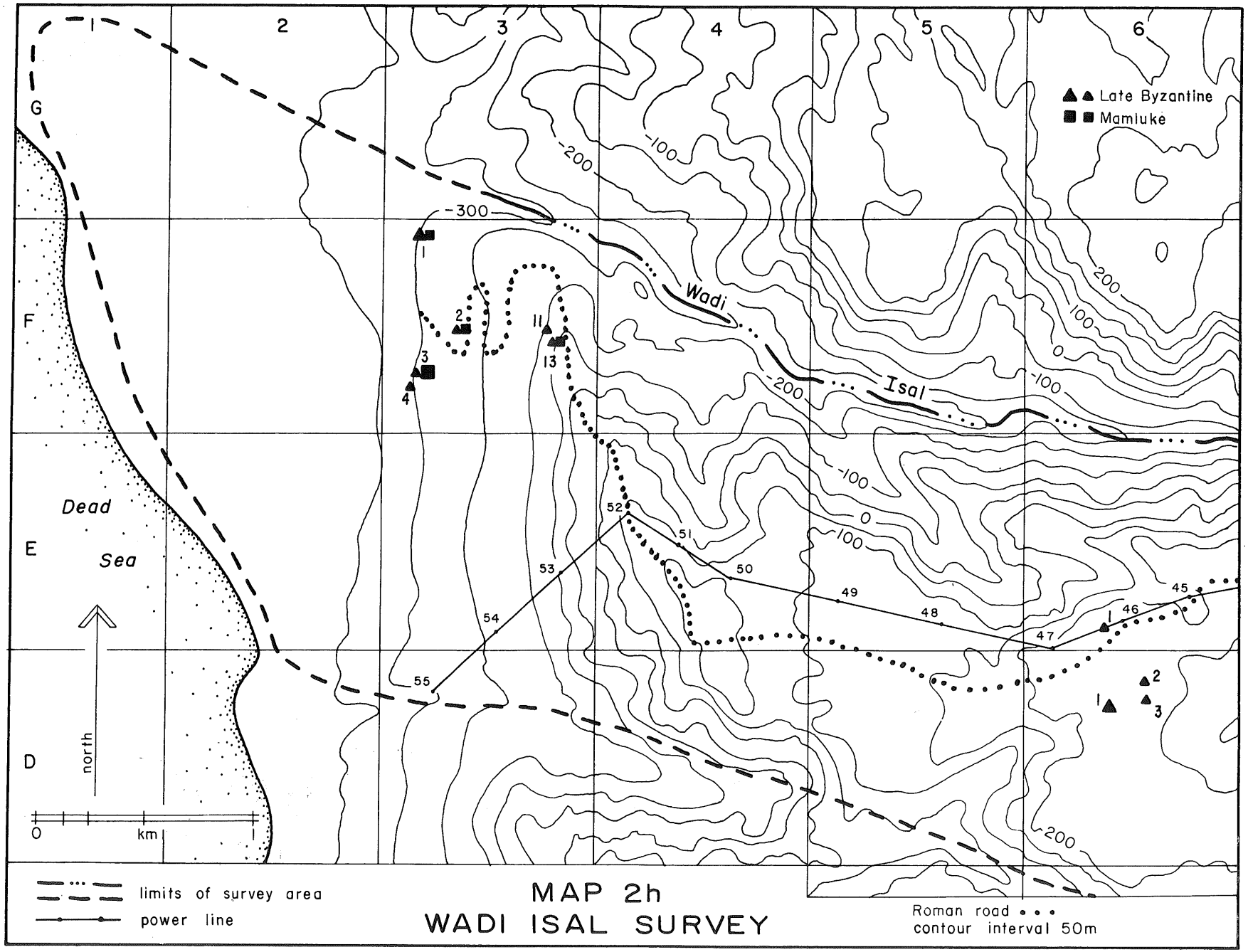
MAP 2g
WADI ISAL SURVEY

Fig. 8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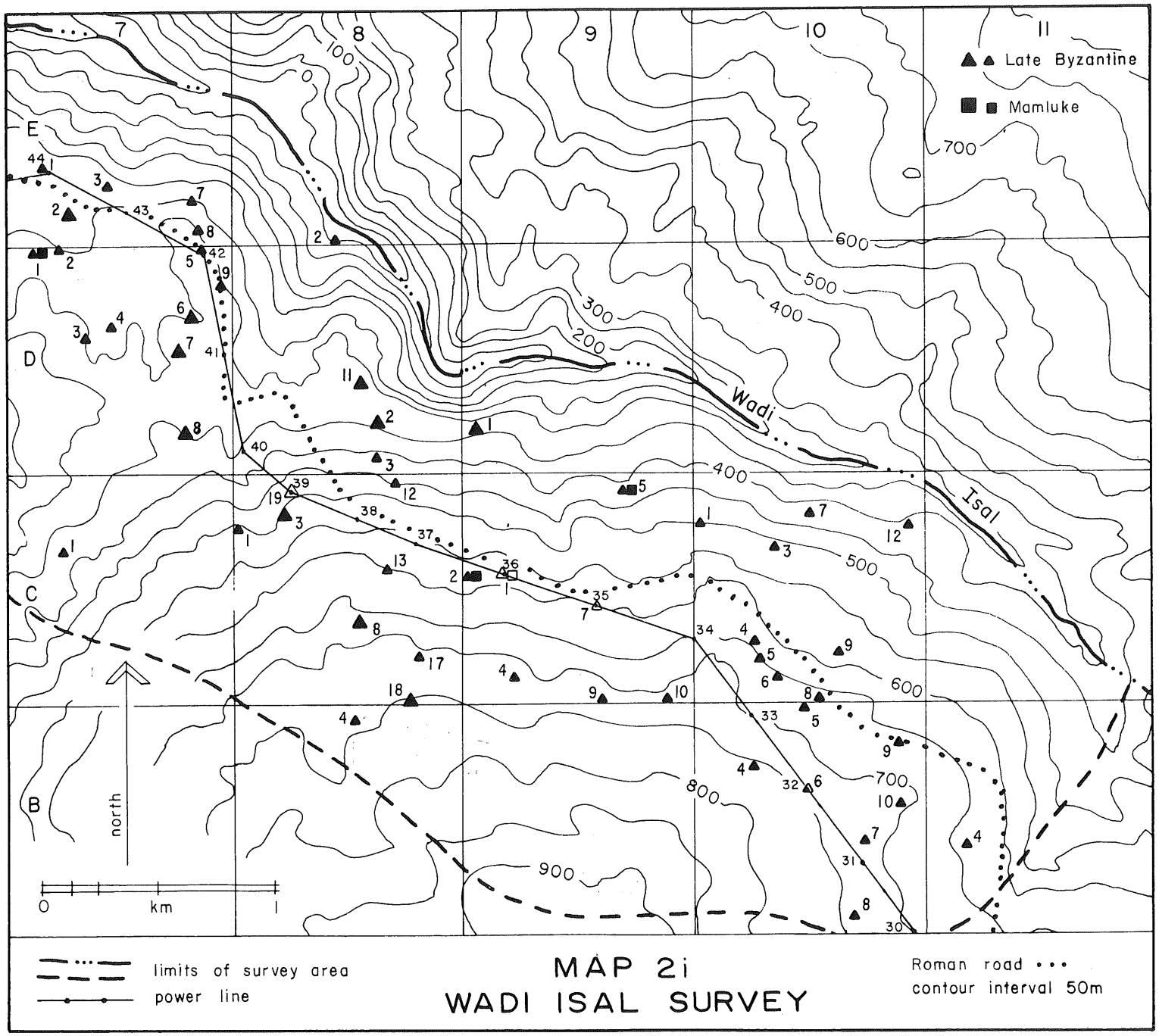
MAP 2h
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 9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power line
MAP 2i
WADI ISAL SURVEY
Roman road
contour interval 50m

Fig. 10

sites at all, and in fact, only a very few sherds which might be Early Bronze. A large number of chaff- and grit-tempered sherds with characteristic Early Bronze decoration and forms were identified by Dr. James Sauer as being of recent local manufacture. Indeed several informants from Kathrabba told us the same thing and showed us the local source of clay (just north of pole 30). This pottery is no longer being made, however, so we were unable to see any examples of it still in use.

In addition to the absence of Early Bronze Age sites, there is no evidence for the *wadi* being used as a commuication route either later or earlier than the building of the road—if the presence and location of sites is any indication of that type of use. As is clear from Maps 2a-2i (Fig. 2-10), sites do not cluster around the road (which is also the obvious route which would have been used before the road was built) any more than one would expect from the siting of the road on the flattest part of the ridge. In addition, there are very few sites, either of the Roman or Byzantine periods, which are actually in sight of the road, although this is not clear from the maps. Site F3-2 is a notable exception, which will be discussed below.

The great majority of sites identified are not settlements at all, but rather transient occupations at best. Fourteen sites out of ninety had evidence of structures—seven with standing buildings and seven with fragments of walls just discernible in the ground. Some of these latter may be modern or Ottoman structures, but their appearance on sites with predominantly earlier pottery encourages one to suppose their early date. The standing structures—all built with the same techniques—are certainly of Byzantine date.

The majority of the sites were small flint and sherd scatters, often no larger in area than 200.00 square metres, with no other remains. These may be Bedouin encampments, but it seems more likely that they are even less permanent—perhaps shepherds' stopping places or harvest-time camps.

A) The Middle Paleolithic Period

Three sites with predominantly Levallois-Mousterian material were found on the survey (Sites C10-7, C10-11, and D7-14), while Levallois flakes and tools were found in small numbers at 11 other sites (Fig. 11: e-n). Sites C10-7 and C10-11, as well as other Levallois scatters, are located near the *wadi* bottom on flat areas which seem to be Pleistocene river terraces. The largest Mousterian site (C10-11) is on a flat ten metres above the present *wadi* floor, on a triangle of land around which the river bends. Its densest area of scatter is about forty metres in diameter, but the scatter of Levallois material is continuous to at least as far as Site C11-1, on the next flat of jutting land 125 metres to the southeast (Fig. 2, Map 2a). This may represent one very large site whose centre portion has been cut away by the river.

The tools are mostly formed from fine-grained quartzite and chert and include Levallois points (Fig. 11: e, f, j-1) and blades. Levallois cores and flakes were also collected. An Acheulean handaxe, made from mottled brown chert (Fig. 11:0) was also found on the site, but its isolation in terms of other tool types, makes it likely that it was washed down from elsewhere. No other Acheulean material was found on the survey, however.

B) The Chalcolithic Period

The Chalcolithic Period is represented by only one site, admittedly an impressive one-site C8-14 (Fig. 2, Map 2a). This site was cut by the new powerline road on the north, and a small part of its lower (northern) slope was bulldozed to install pole 37. The slope south of the pole is plowed and planted in wheat; it is on this lower part of the site that much of the flint material was found (Fig. 11: a-d).

On a flat summit, aproximately 30.00 metres north-south by 25.00 metres east-west is the remains of a stone-lined cistern. It is on this flat, and on the slope immediately surrounding it that most of the pottery is concentrated. The pottery scatter covers an area of about 600.00 square metres, while the total site is probably 900.00 metres in area—all of which has flint debris in varying density. Close to the road on the northwestern edge of the site is the stone foundation of what seems to be a small rectangular structure 4.70 metres north-south x 2.50 m. east-west, with walls

Figure 11

Site	Description
a. C8-14	Stemmed point, brown chert
b. C8-14	blade, grey chert
c. C8-14	blade, grey chert
d. C8-14	point, beige chert
e. C10-11	point, brown and beige chert
f. C10-11	point, grey-brown chert with blue veins
g. C10-11	blade, beige and white mottled chert
h. C10-11	point, grey chert
i. C8-14	blade, grey chert
j. C10-11	point, brown and beige chert
k. C10-11	point, whitish grey chert
l. C10-11	point, dark grey chert with white mottling
m. C10-11	blade, brown chert
n. C10-11	blade, mottled grey-brown quartzite
o. C10-11	handaxe, brown chert with beige veins

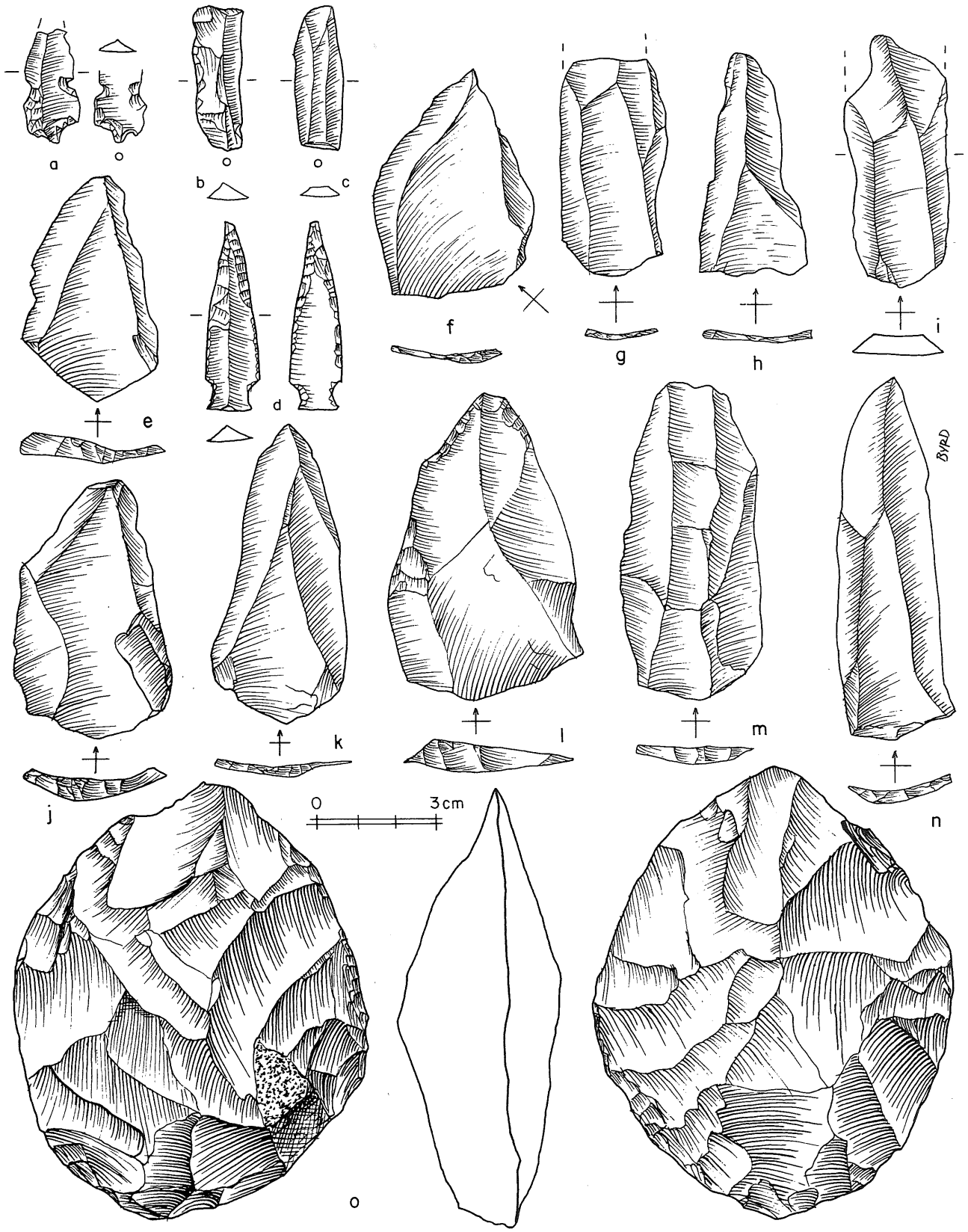

Fig. 11

0.60 m. thick.

There seems to be an approximately equal amount of Early and Late Chalcolithic material on the site, and the flint all seems to be Chalcolithic or later in date. Typical Chalcolithic forms and decorations are used in this grit-tempered, well-fired ware (Fig. 12). In the early Chalcolithic, mat-impressed bases in red-slipped pinkish ware, rope mouldings and nose lugs are all present. Sherd spindle whorls were also found, as well as limestone grinding stones. None of the so-called "hallmarks" of the Chalcolithic are present, however, such as churns, chalices, painted decoration, cornets, or pedestalled bowls (Amiran, 1969); this absence can be explained by the distance of the survey area from the better-known Chalcolithic sites, and, possibly by the small size of the sample.

Very little Chalcolithic material was found elsewhere on the survey, and all of the material thus identified was done with misgiving, as there were found only isolated pieces, which were usually small and non-diagnostic. Chalcolithic pottery was tentatively identified at two other sites, C10-7 and D7-8.

C) The Iron II Period

Iron II material was found scattered at twenty-four sites in the survey area, and it predominated at three of these sites (B10-2, C9-2, and C10-6). This pottery (Fig. 13) is characterized by pastel wares in light orange, pale green, and buff, with somewhat large sized white grit temper. The surface is slightly rough and often lightly slipped in buff. The most common forms are jars with plain rounded rims and bowls with folded rims, and low ring or flat bases. Unlike the Byzantine sites described below, very little flint material is found on sites with predominantly Iron II pottery.

On all three of these sites, remains of structures are visible. C9-2 is a small but prominent hillock directly south of the power line between poles 36 and 37. On the highest part of the hill is a stone circular structure—probably a later tomb, since it is similar to other such structures in the survey area—and the remains of several stone walls which form a small rectangular room on the west side of the summit.

Site C10-6 is just north of the power line and close to Pole 33. It is on a small hillock whose summit and upper slopes have been recently cleared of stones which have been piled in one corner of the site. It consists of two terraces—an upper flat area 60.00 m. east-west x 10.00 m. north-south, and a lower terrace which rings this upper flat on its north side. The pottery is dense on both terraces but slightly more dense on the lower; either the pottery has washed down, or the disturbances on the upper site has destroyed some of the artefactual evidence. On the upper flat, four stones aligned in a northeast-southwest direction may be the remains of a wall.

Just south of pole 33 (which has actually been placed on the lower slope of the site) is Site B10-2, also on a hill. The site is 80.00 m. north-south x 60.00 m. east-west. Heaped stones seem to be the remains of north-south walls, but their exact orientation was indecipherable.

D) The Nabataean and Roman Periods

Although the road which connects the lowlands with the highlands via the south ridge of the Wadi Isal is called Roman by Glueck, Roman sites do not constitute the majority of sites in the survey area. Forty-three sites with Roman pottery on them are located on Map 2d (Fig. 5). Only two of these sites (B11-5 and E6-1) can be said to have a predominance of Roman pottery, which seems to indicate that the Roman use of the area was not heavy. This leads one to suspect that the road may not be Roman at all—a possibility which will be discussed further below.

In the analysis of pottery, the sites were divided into the Early and Late Roman periods on the basis of the presence or absence of certain diagnostic characteristics, such as sandwich firing (Early Roman), sigilatta glazing (Early Roman), general predominance of pastel colors over fire orange (Early Roman), etc. The presence of these characteristics led to the identification of Early Roman pottery on thirteen sites and Late Roman pottery on twenty-four sites. However, the small number of diagnostic sherds and the overlap in wares and types betwen the Early and Late Roman periods makes this kind of distinction dubious, especially in

Figure 12: Chalcolithic

Site	Description
a. C8-14	bowl with rope moulding on body and rim; reddish yellow (5YR 7/6) with possible red slip. Grey core, white grit temper with chaff impressions on surface.
b. C8-14	jar; reddish-yelow (7.5 YR 8/4) with white grit temper.
c. C8-14	bowl; reddish-yellow (7.5 YR 8/4) with white grit temper.
d. C8-14	base with mat impression on exterior; ext. pinkish yellow (2.5 YR 5/8), int. very pale brown (10YR 8/3). White grit temper.
e. C8-14	base with exterior mat impressions; pink (5YR 7/4).
f. C8-14	handle; pinkish grey (7.5 YR 7/2) with very pale brown slip (10YR 8/4). White grit temper.
g. C8-14	handle; reddish yellow (7.5YR 7/6) with grey core. White grit temper with chaff impressions on exterior.

Figure 13: Iron II

Site	Description
a. C10-6	jar; pink (5YR 8/4) with white grit temper
b. C10-6	jar; white (2.5YR 8/2 with white grit
c. C10-6	bowl; light red (2.5YR 6/6) with white (2.5 YR 8/2) slip. White grit temper.
d. C10-6	bowl; ext. pink (5YR 8/4), interior pink (10YR 8/4), with white grit temper
e. C11-5	jar; pink (10YR 8/4) with white grit temper
f. C10-6	jar; light red (2.5 YR 6/8) with white grit
g. C10-5	base; exterior reddish yellow (5YR 8/6), interior grey (5YR 6/1). White grit temper.
h. C9-2	bowl; light red (2.5YR 6/8) with red (2.5 YR 5/8) slip. White grit temper.
i. C10-5	bowl; pink (7.5 YR 7/4), with white grit temper.
j. C10-6	jar; reddish yellow (5YR 7/6) with pink (7.5YR 8/4) slip. White grit.
k. C10-6	jar; pink 10YR 8/2).

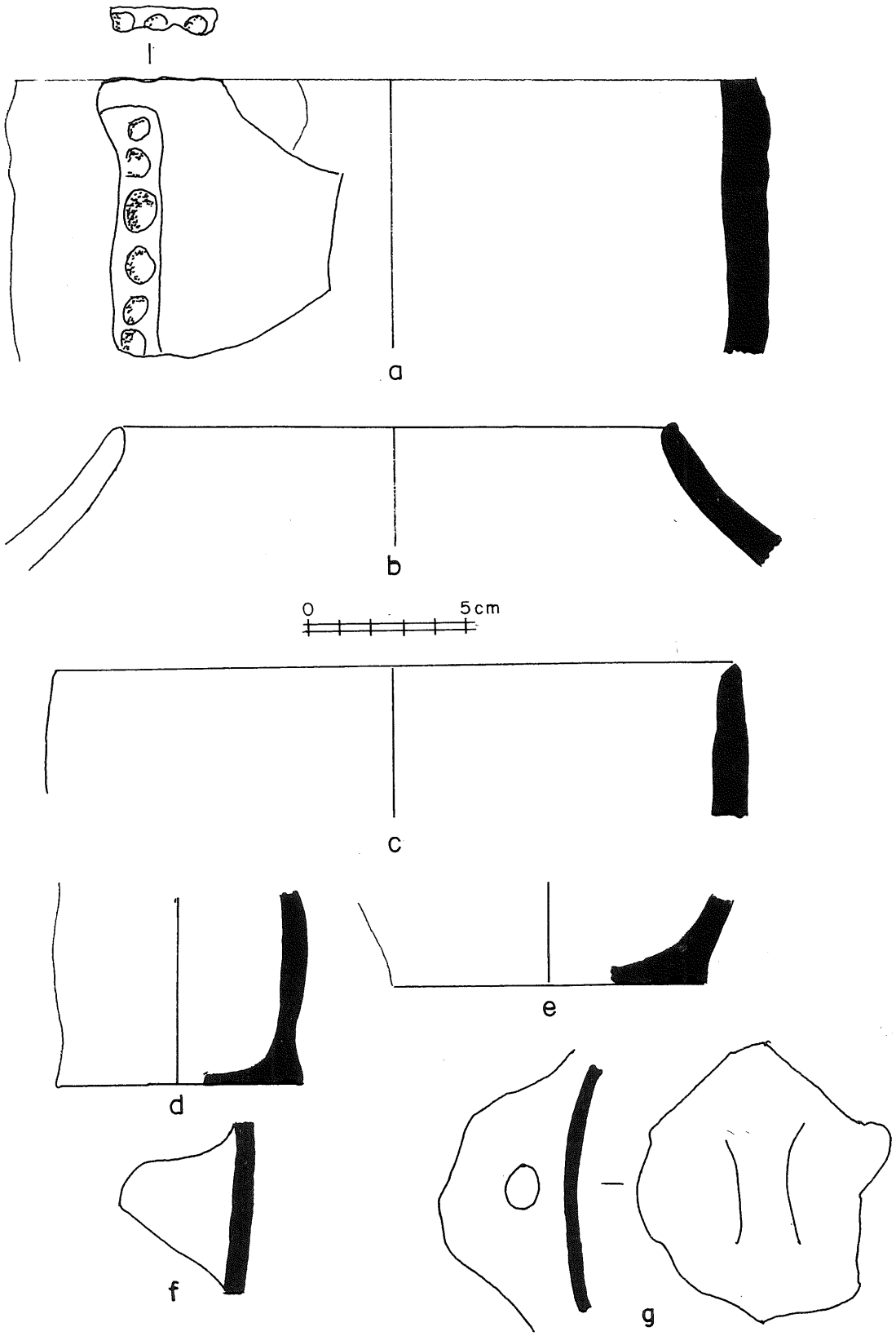

Fig. 12

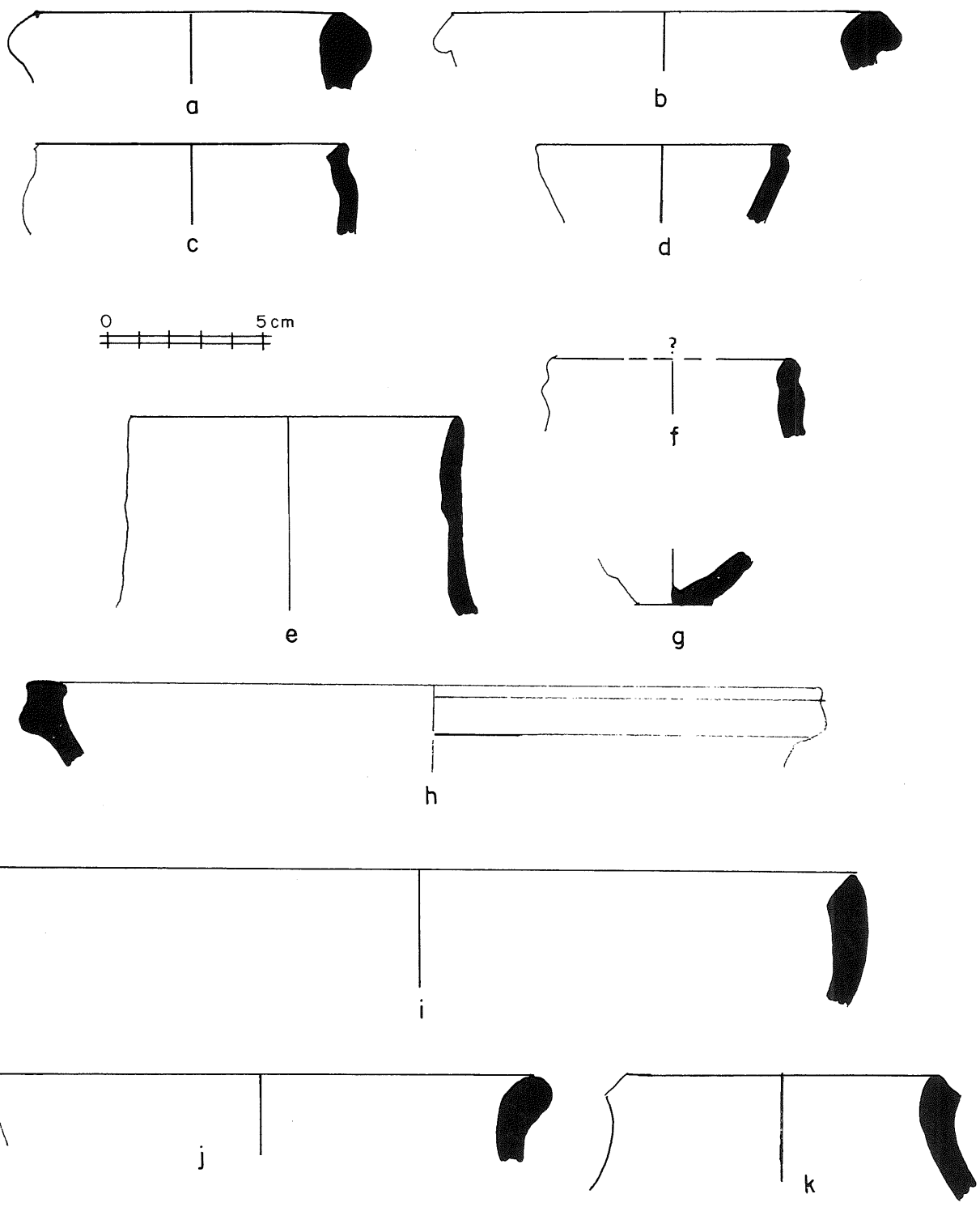

Fig. 13

unstratfied samples from surveys. This Early-Late division, therefore, should be treated with skepticism.

Similarly with Nabataean sites. There are certain characteristics of Nabataean ware and form which belong to no other period, such as rouleted bases, very thin, hard red ware, and Nabataean-style painting. Thus the presence of these traits were taken to indicate a Nabataean presence (or Nabataean affiliations). In this way, twelve Nabataean sites were identified (Fig. 4, Map 2c). However, the overlap between Nabataean and Roman wares makes it difficult to distinguish the two periods with certainty, especially on the basis of so few diagnostic sherds. Thus, we have probably erred on the side of ascribing too few sites to the Nabataean period, and perhaps a slightly larger Nabataean presence should be assumed.

Only two Roman sites (B11-5 and C8-17) had any architecterual remains. C8-17 seems to be a predominantly Byzantine site, and it will be discussed below. The remains at B11-5 consisted of a large square structure, 12.00 m. x 13.00 m., within which was what appeared to be a square well or cistern (4.00 x 4.00 m.) built against the west wall. Its attribution as a well or cistern was based on information from the villagers of Kathrabba, who said it was "more than thirty metres deep", but other than this testimony, there is no way to determine its function.

The structure and the well itself seem to have been built with similar techniques. The walls consist of two rows of dry-laid stones which are dressed on their exterior face only. The interstices between the stones were filled with rubble. The walls of the main structure are one metre thick; the wall surrounding the well could not be measured because of its collapsed state.

Both Nabataean and Late Roman pottery were found on this site in substantial numbers, so it is possible to attribute the building to the earlier period and assume its continued use in the later. However, the similarity of building technique with all the other standing buildings of the survey may indicate a later date.

Based on the admittedly dubious distinction between the Nabataean and Early and Late Roman sites in this survey, the mean distance from the "Roman" road was calculated for all periods to try to determine a) the date of the road and/or b) whether the location of the road influenced settlement patterns on the south ridge.

These figures would suggest that the Late Roman sites were more directly related to the road (if distance is a function of separateness) than sites occupied during other periods, and indeed one can see in Map 2e (Fig. 6) that Late Roman sites are clustered around the road at its eastern end, in the middle of the survey area and in the *ghor* (Fig. 5, Map 2d). Other indications, however, argue for an even later date for the road, and these will be discussed in the following section.

The presence of an equal number of Nabataean and Early Roman sites in the survey area, and the fact that both types of pottery occur together on only two sites, indicate that this area, despite its location, was not an exclusively Nabataean province. In fact, the very few numbers of Nabataean sherds (three sites have only one sherd each) indicate more contacts with the north than with the south, although once again it should be emphasized that the very few diagnostic sherds make any comparison of this kind difficult.

E) The Byzantine Period

Table 1: Distance Of Nabatean-Roman Sites From Road

Period	*No. Of Sites*	*Mean Distance From Road (m.)*	*Max. Dist. (m.)*	*Min. Dist. (m.)*
Nabataean	13	328.45	1000	10
E. Roman	13	260.38	1000	5
L. Roman	24	219.79	700	5

By far, the greatest number of sites was occupied during the Byzantine period, aparently the most populous period in all Transjordan. Sixty-nine sites had Byzantine pottery on them, and bearing in mind again the difficulties of distinguishing Early from Late Byzantine pottery based on few diagnostic sherds, the great majority of these (63) were occupied during the Late Byzantine period (Figs. 9, 10). Forty sites had Early Byzantine wares on them, and only six of these were abandoned during the subsequent period.

The separation between Early and Late Byzantine is as problematic as that of the Early and Late Roman (Sauer, 1973, Staller, 1949); however, a division was made on the presence or absence of the following (rough) criteria:

1) incised wavy lines (Late)
2) white paint on brownware (Late)
3) orange ribbed wares (Early)
4) grey ribbed wares and ridged handles (Early)
5) certain diagnostic forms.

Although the characteristics of Late Byzantine wares also grade into the Umayyad wares, the absence of any clearly Umayyad sherds on the survey led us to assign these types to the Late Byzantine period.

Only eleven of the forty Early Byzantine sites had major Early Byzantine occupations, but these were significant in that four of the standing buildings located during the survey were on these sites.

Site B11-5, already described above in the Nabataean-Roman section, also had a large amount of Early Byzantine pottery. No pottery was found inside the structure or in the walls, so it is difficult to date the building itself, but as we said above, the similarity of construction techniques with other buildings relates it to the Byzantine period.

Site C8-17 consists of a large stone building 16.00 m. east-west x 5.00 m. north-south, which was built in a technique similar to that of Site B11-5 — i.e., large, rough-cut stones dry-laid in two rows with rubble core. The north wall of this one-room building formed a terrace wall on the down-slope. Attached to this building on the south is another simple structure 11.00 m. east-west x 7.00 m. north-south. The walls of this structure are built of dry-laid uncut rubble. There may be a doorway connecting these two rooms at the southeastern corner of the building, or the smaller structure may be a modern addition. The roughness and size of the second room leads one to surmise its use as a courtyard or animal pen.

Although no pottery was found inside either of these two rooms or in the walls themselves, a large number of Early Byzantine sherds was found outside the east wall.

Forty metres southeast of the building is a cistern cut down into bedrock and lined at the top with large cut limestone blocks. Next to it, a large rock-cut basin with a drain leading into the cistern is hewn out of bedrock. This may be a water catchment device or (based on ethnographic information) an animal trough. Most of the pottery found near the cistern was on the downhill (north) slope, and most of it was Late Byzantine, with some Roman and Nabataean sherds as well.

Two structures in the Ghor Isal have predominantly Early Byzantine pottery near them, and one of these, Site F3-2, seems to be closely related to the road. This site consists of a large 12.50 m. x 7.00 m. building located only four metres from a section of the road on a high point of the talus slope overlooking the *ghor*. It is built in the technique already described. This site seems to be the one metnioned by Glueck (1935: 6) as the "Qasr Esal", since the building is surrounded by a pile of back dirt which he says was the initial attempt by the Turks to build a police post using the ancient foundation. However, he gave its size as 16.00 m. square and did not mention the close proximity of the road, so its identification remains in doubt.

Its situation overlooking the *ghor* and the road seems to imply its use as a watch post or a customs or toll station. In addition, its clear relationship with the road makes one assume that the road was built or at least continued in use during the Early Byzantine period. The absence of

Roman milestones along the road also seems to imply that it was built after the Roman period (Thomsen, 1917: 58).

The second Early Byzantine structure in the Ghor Isal (Site F3-4) is somewhat out of the ordinary mould. This is the westernmost site in the survey area, having the appearance of a large mound of stones on the otherwise featureless *ghor*. Although the construction technique is the same as all the other buildings described, this seems to consist of a series of exterior walls stepping down what may or may not be a natural hill. The main structure is 22.00 m. east-west x 12.00 m. north-south. On the south side, at least two additional walls are visible, each one two metres from the one next to it. The walls themselves are only 0.80 m. thick, which is slightly narrower than the standard one metre of other buildings. On the north side, a possible doorway is lengthened into a passageway by these added walls. The actual number of these walls and their function (extra protection? retaining walls?) remain a mystery. However, the site's position seems to imply that it is a watch post, unless the road passed near this site in the past.

Structures which are associated with Late Byzantine pottery include C10-12, D7-1, and F3-1. Site C10-12 consists of a largely destroyed three-room structure whose exterior dimenstions are 15.00 m. east-west x 9.50 m. north-south. Built in the same technique as all the other buildings, this structure is the furthest from the ancient road, at least in terms of accessibility, since it is located on top of Site C10-11, the Paleolithic site close to the *wadi* bottom. Several tombs thirty metres south of the building have been robbed, but they seem to have been contemporary with the building, judging by the pottery nearby.

Site D7-1 is the only Byzantine structure whose construction varies from the norm. This is a nearly square one-room "house" 14.00 m. east-west x 11.00 m. north-south built of one row of dry-laid uncut field stones. There is a doorway in the south wall. Eighty metres northeast are two circular structures about 5.00 m. in diameter which might have been animal pens. Apart from the pottery which cannot be distinguished from other Later Byzantine sites, this building seems of a totally different character than the others. Perhaps there is a functional difference; this may be a house site or a campsite.

The last Byzantine structure is one in the Ghor Isal which Glueck (1935:6) calls a *birkeh,* and around which he found Nabataean, Byzantine, and Arabic sherds. This consists of a large square, 35.00 m. on a side, which is located at the mouth of the *wadi,* and a water channel which runs from inside the *wadi* itself, around the "reservoir" and waters the gardens in the *ghor*. The reservoir has walls more than 3.00 m. high and 2.50 m. thick, which are built in the usual Byzantine style. The reservoir is currently used as garden space, and the water channel, which has been recently restored, no longer brings water to it.

On all of the Byzantine sites, both with and without structures, the pottery is accompanied by an almost equal abundance of flint. The vast majority of the flint is in the form of flakes; tools are exceedingly rare on these sites. Occasionally, we found an unretouched blade, but these were also rare. It seems that these people were using the sharp edges formed from knocking off simple flakes, with no preparation of the stone beforehand, and no alteration of the flakes afterwards to produce real tools. This practice seems to be in line with the hypothesis that most of these sites were transient occupations at best.

Following our hypothesis that the road was built after the Roman period, we calculated the mean distance from the road the Byzantine sites.

If we compare this Table to Table 1, it is clear that the Late Roman sites cluster more closely to the road (mean distance 219.79) than either the earlier or later sites. However, the clear association of Site F3-2 with the road, and the absence of milestones leads one to place the road in the early Byzantine period. These two lines of evidence, combined with the transitional nature of the pottery between the Late Roman and the Early Byzantine, lets us date the building of the road to the

Figure 14: Nabatean, Roman, Byzantine

Site	Description
a. B11-5	bowl; redddish yellow (7.5 YR 7/4), white grt. L. Roman
b. B11-5	bowl; light reddish brown (5YR 6/4) with white grit temper. L. Roman
c. C10-11	bowl; light red (2.5 YR 6/8), (L. Roman).
d. B11-5	bowl; light red (2.5 YR 6/8), white grit temper (L. Roman)
e. B11-5	bowl; grey (10YR 5/6) with white grit. L. Byz.
f. F3-3	bowl; reddish brown to dark grey (2.5YR 4/4 - 5 YR 4/1) exterior, int. reddish brown (2.5 YR 4/4). White grit temper. L. Byzantine
g. C10-11	bowl; exterior pink (5YR 7/4), interior reddish yellow (5YR 6/8). White grit. L. Byzantine
h. C8-17	jar; reddish yellow (5YR 7/6) with white grit temper. L. Byz.
i. C8-13	jar; reddish yellow (5YR 7/6). Nab.
j. C10-5	handle; surface reddish grey (10YR 5/1), body, pinkish white (5YR 8/2). Late Byz.

Figure 15: Mamlūk

Site	Description
a. F3-3	jar; pink (7.5 YR 7/4) with sand and grit temper.
b. F3-3	jar; red (2.5YR 4/6) with white grit temper.
c. F3-3	jar; pink (5YR 7/3), smokestained. White grit temper.
d. F3-3	jar; light reddish brown (5YR 6/4) with white grit temper.
e. F3-3	bowl; reddish yellow (5YR 7/6) with reddish brown (2.5 YR 4/4) paint. Black core. White grit.
f. F3-3	jar; red (2.5 YR 4/6) with traces of dark red (2.5 YR 5/6) glaze. White grit temper.
g. F3-3	jar; grey (10 YR 4/1) or smokestained?. white grit.
h. F3-3	bowl; light grey (10 YR 7/2). White grit.

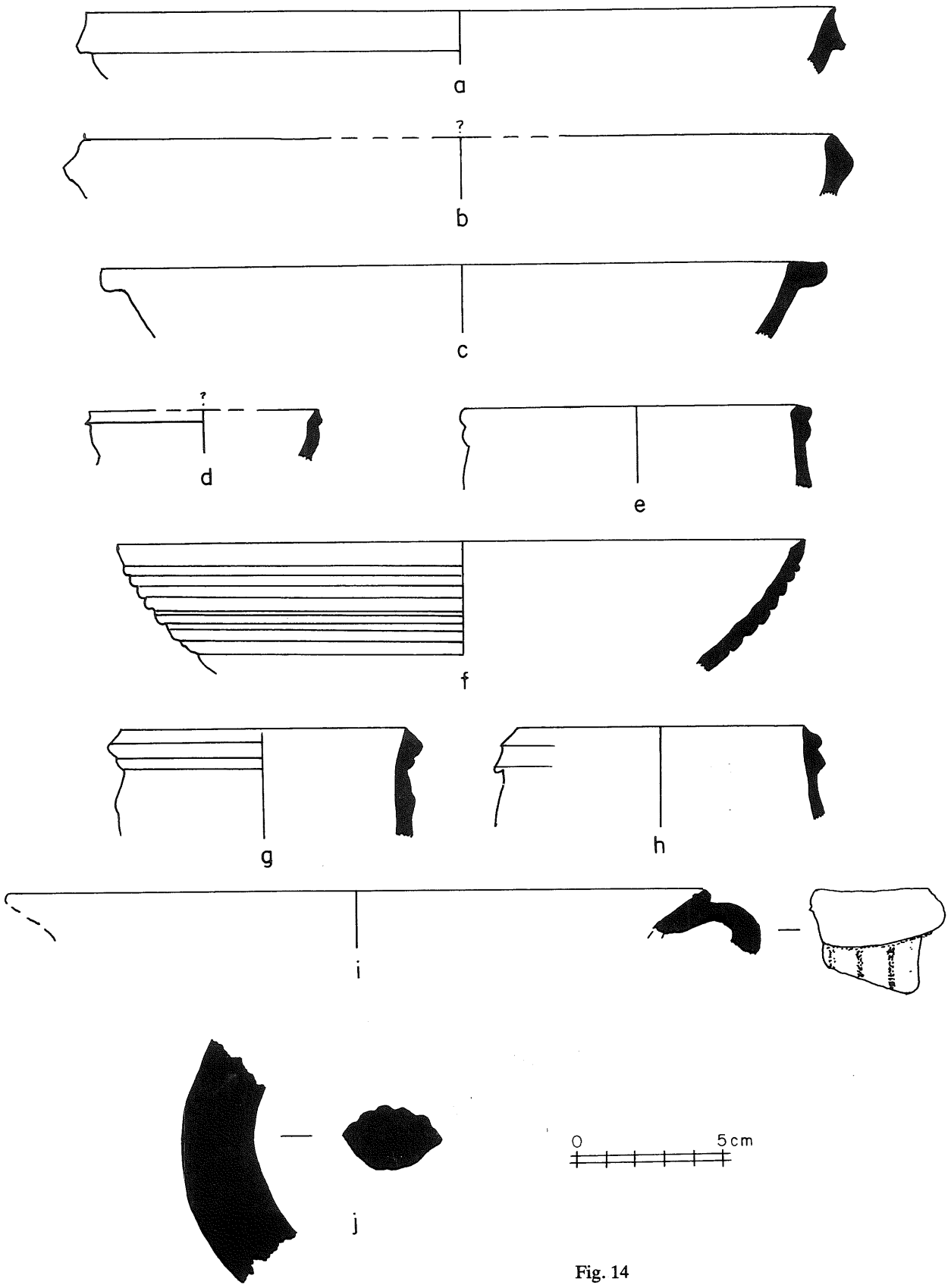

Fig. 14

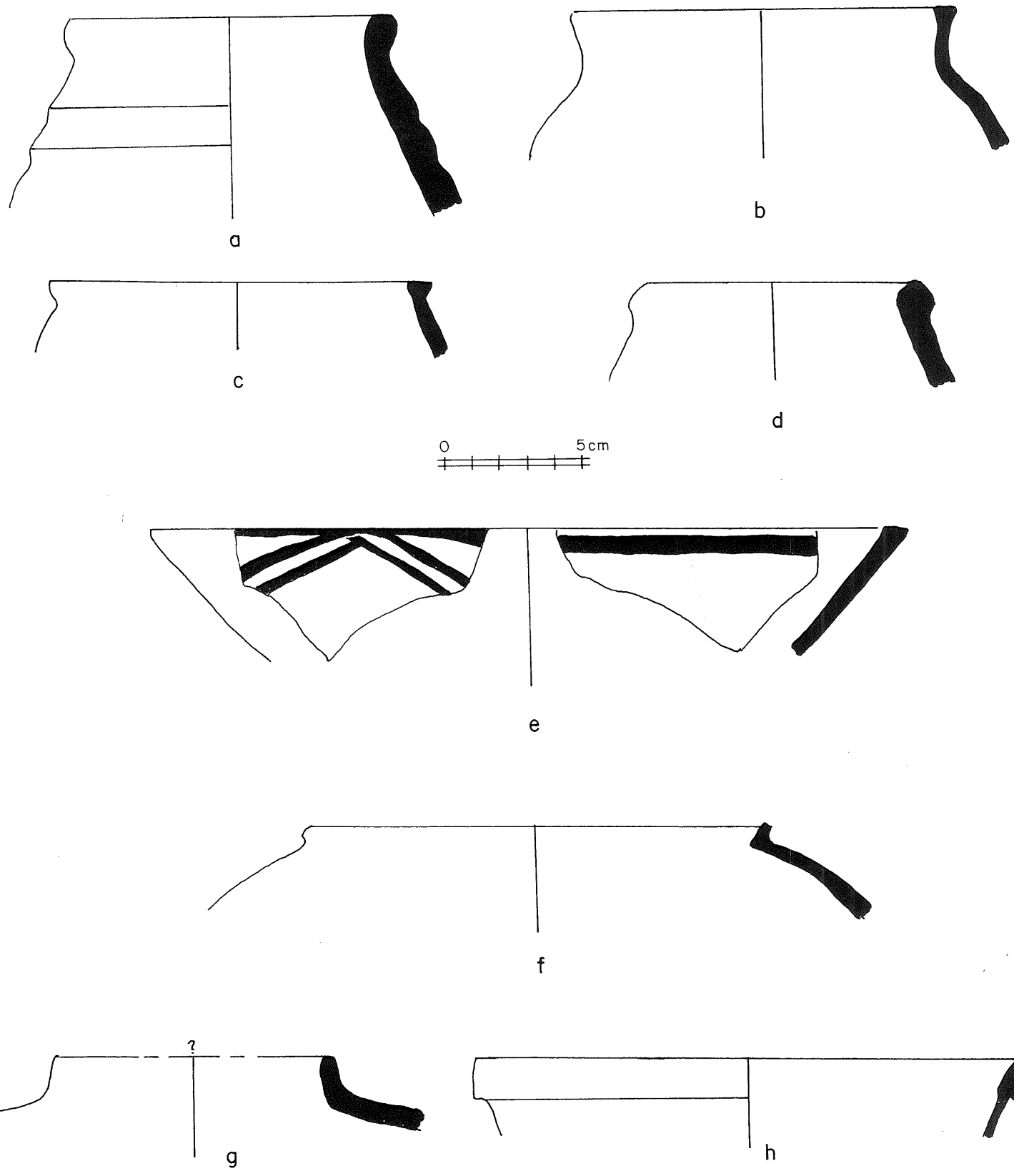

Fig. 15

Table 2: Distance Of Byzantine Sites From Road

Period	*No. Of Sites*	*Mean Distance From Road (m.)*	*Max. Dist. (m.)*	*Min. Dist. (m.)*
Early Byzantine	40	274.45	1000	5
Late Byzantine	63	272.45	1000	10

very end of the Roman period or the beginning of the Byzantine—perhaps early in the fourth century.

F) The Mamluk Period

Although ten sites with Mamlūk pottery were identified (Fig. 10, Map 2i), only one of these can be said to have a substantial Mamlūk ocupation--Site F3-3 in the Ghor Isal. This situation contrasts markedly with the north ridge of the *wadi* which has several large Mamlūk settlements.

Site F3-3 is a small mound 90.00 m. north-south x 30.00 m. east-west, located directly on the alluvial fan. The site has modern tombs on top, but the vast majority of its pottery is Mamlūk (Fig. 15), with a lesser but substantial amount of Late Byzantine as well. A coin found on the site dates to the reign of "King Nasr"—probably a late twelfth century monarch.

Mamluk pottery from the survey is typically low-fired grit-tempered ware, with a very thick dark grey core. Some of it is painted with dark red in geometric designs. In addition to the pottery and the coin, a carnelian bead and over fifty pieces of glass were found. With the exception of two glass bracelet fragments found on Site C9-1, this was the only glass found on the survey, and so must be associated with the Mamluk (rather than the Byzantine) occupation.

G) Later Remains

The pottery described above as being of recent local manufacture was found at thirty-seven sites in the survey area. At the one site where it predominated (Site C9-6), no flint scatter was associated with this pottery (a rare occurrence in this survey), and this lends credence to the supposition that it is modern. All of these sherds may have been brought to the sites by the Kathrabbans (or their parents) themselves, rather than being evidence of heavier use in the recent past. In fact, however, the number of sites with these so-called "Late Ottoman" sherds outnumbers those sites (11) with more obviously modern remains, such as China ware, plastic, shotgun shells, etc. These latter bespeak a more international orientation in even the remote parts of Jordan, and at the same time imply that the south ridge is being used less now than in the recent past.

H) Tombs

Thirty-two stone structures, presumed to be tombs, were discovered scattered throughout the survey area, usually situated on high places. These were nearly uniform in size and construction but varied slightly in design. Typically these tombs were circles of large stones (always larger than one man could carry alone), 5.00-6.00 m. in diameter. Sometimes these would have a particularly large "headstone" in the ring. Usually the interior of the circle was sunken and littered with land snail shells, indicating the presence of organic material. In only one of the tombs, however, were human bones actually visible.

Variations in design included two-chambered tombs with a central dividing wall (5 examples); circles with two large stones standing on end facing each other in the center (2); a mound of stones completely or partially filling the interior of the circle (3); a rectangular structure within the circle (1); and in two cases, a simple rectangular structure, approximating the shape of a coffin, with no circle surrounding it.

Very few sherds were found near these tombs and *no* sherds were found within them, so their dating is problematic. However, given the density of Byzantine sites in the survey area, and the presence of a few Byzantine sherds

near four of the tombs, perhaps we can date them to that period. Staller (1949: 17) describes numerous stone circles in the Mt. Nebo region, which are smaller than ours (one diameter given is 3.30 metres), but which he also assumes to be tombs. Some of these he assigns to the Chalcolithic period, based on their proximity to dolmen fields, but it seems more likely that these represent a different style used by a different (later?) people. Their age, however, must remain in question.

Conclusions

The most striking result of our survey is the total absence of Early Bronze sites in the area, despite the presence of such sites both north and south of the Wadi Isal in the highlands and the lowlands. It is obvious that one must look elsewhere, both for the Early Bronze communication route (the Wadi Kerak?) and for the smaller of the Early Bronze village settlements.

Methodologically, the results are matched, in the order of magnitude of number of sites identified, by E.B. Banning's systematic survey of the Wadi Ziqlab (this volume). These figures will be useful as reference data for surveys to come.

Clearly, the Wadi Isal has always been a marginal occupation zone, occupied only when the density of population in other, more desirable, parts of Palestine became too great. The limitations presented by lack of water and adequate topsoil were apparently not compensated for by its reative ease of access. This is still true today.[5]

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[5] This research was supported by a Fellowship from the National Endowment for the Humanities, to which I am especially indebted. I would also like to thank Dr. Adnan Hadidi, Director-General of the Department of Antiquities, and many members of the Department itself for their assistance throughout the research.

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TELUL EDH DHAHAB AND ITS ENVIRONS SURVEYS OF 1980 AND 1982 A PRELIMINARY REPORT

by
Robert L. Gordon
and
Linda E. Villiers

Introduction

The Telul edh-Dhahab, twin "gold peaks" in the canyon of the lower Zarqa River seven kilometres east of Deir 'Alla, have often been discussed, but rarely described. A *caveat* is therefore in order at the outset. The present report is not concerned with any conjectural "identifications" of this or neighbouring sites. Such theories will be discussed elsewhere. Here we attempt to fill a long-standing *lacuna* in regional archaeological evidence.

A thorough surface survey of Tell edh-Dhahab el-Gharbi, the western peak, was begun in September-October 1980 with the support of an ASOR-NEH fellowship. Dr. R. Gordon was ably assisted by Mohammad Darwish, Representative, and Mr. Mohammad Jamra, Assistant, both from the Department of Antiquities. Dr. James A. Sauer, then Director of ACOR Amman, provided material and professional aid. Survey work on both peaks and in their southern environs was conducted during August-September 1982 under the auspices of the Centre for Jordanian Studies, Yarmouk University. R. Gordon, Director; L. E Villiers, Assistant Director; Mr. Sa'd Hadidi, Representative for the Salt District, and a team of Jordanian students took part. Dr. Mahmoud el-Ghul and Dr. Mo'awiyah Ibrahim, successive Directors of the Centre, fully supported the project. Mssrs. Dani Petocz, Hubert den Haas and Henry Cowherd produced illustrations. The cooperation of the Department of Antiquities and its Director-General, Dr. Adnan Hadidi, was welcome at all stages.

Telul edh-Dhahab remains the largest historic site in the survey area. As such, it receives full description in Part I of this report. The regional survey has now covered a semicircular area of a four to five kilometre radius east, west and south of the central site. The sites located are briefly described in Part II. The most informative of the prehistoric, lithic sites, the Epipaleolithic site of El Huna (on Zarqa) is treated in some detail by L.E. Villiers in Part III.

Part I: Telul ed-Dhahab Survey (Robert L. Gordon)

Topography

These two steep, rocky peaks stand enclosed by a wide meander of the Zarqa River. A narrow saddle connects Tell edh-Dhahab esh-Sharqi, the eastern peak, to the southern escarpment of the Zarqa canyon and the El 'Ardha plain above. A similar, lower saddle links Tell edh-Dhahab el-Gharbi to the northern slope and to 'Ajlun Mountain (Fig. 1: plan; Pl. LIV). The peaks were cut out by the river after the subsidence of the Jordan rift valley due to the subsequent fall in the level of the Lissan Lake. The summits are of shell limestone, while a massive red sandstone layer forms sheer cliffs on the middle slopes of both peaks. Conglomerates which outcrop on the eastern peak could be of Pleistocene date. The present level of the river at this point is -120 m./-140 m. BMSL; of the summits, -17m. (east) and -11 m. (west) BMSL; of giving them a total height of 100.00 and 130.00 m. respectively. Recent downstream cutting of the meanders has made the eastern and north-eastern slopes of both peaks particularly precipitous and has caused the collapse of some walls and slag deposits on Tel edh-Dhahab el-Gharbi. The same movement

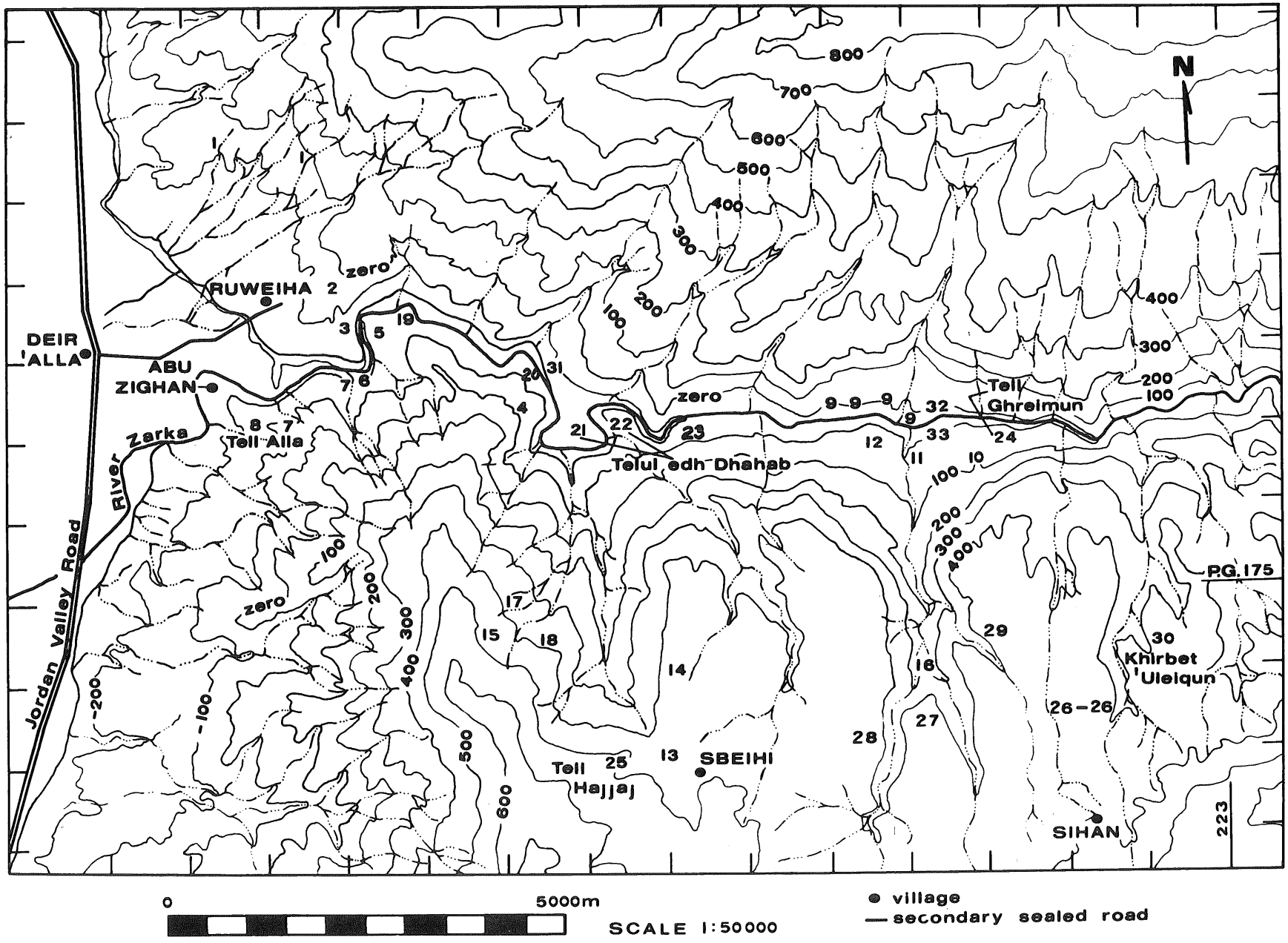

Fig. 1: Survey S. of Telul edh-Dhahab.

has also produced new terraces at river level at the NE base of the eastern peak and the SE base of the western one. If there were any ancient remains there, they have been swept away by action of the river. In addition, earthmoving operations related to the deep cutting of the north saddle for a water pipeline and the construction of a pier between the peaks may have destroyed remains on the broad terrace at the NW base of Tell edh-Dhahab el-Gharbi.

On the map, these peaks appear nearly equal in size. Both are very steep, but the area suitable for occupation is far greater on the western peak. Only the narrow summit of Tell edh-Dhahab esh-Sharqi (3 dunums) and small terraces east and west of it (4 dunums) are level enough for regular construction. Aside from a summit terrace of similar area (5 dunums), Tel edh-Dhahab el-Gharbi has broad terraces near the top (14 dunums) and at its NW base (30 dunums) with a series of narrow terraces between (9 dunams), giving a total habitable area approximately seven times that of the eastern peak. As is shown below, both wall remnants and artefact collections confirm that occupation on the western peak was several times more extensive and intensive.

Architecture

On both peaks the architectural remains consist of numerous surface walls or foundations which are rarely preserved as much as one metre above ground level. The only carved stone architectural members are the remains of colonnades on the west peak (Steuernagel, 1927: 288). In the previously published short descriptions of the two sites (De Vaux, 1938: 411-413; Glueck, 1939: 232-234), it is often difficult to determine which features are meant.

The summit ridge of the eastern peak (Pl. LV,1) runs from a high point at its eastern end (-17.00 m. BMSL) to a slightly lower one (-23.00 m.) at its west end, 100.00 m. apart. These points are covered with rubble, the remains of two substantial structures, the plans of which are difficult to define. The eastern tower appears the more regular (11.00 m. N-S, 16.00 m. E-W) as defined by wall traces averaging one metre in width. The west tower appears trapezoidal (10.00 m. W, 7.00 m. S), but the walls are obscured by the ruble. These were free-standing structures, not part of the summit circuit wall, which appears much lighter from intermittent traces and defines a long, narrow triangle 140.00 m. in length, 50.00 m. wide at its west end, narrowing to a point at its east end, the two towers centred within this area at either end. Numerous light walls within this space form a regular rectilinear pattern, suggesting a planned complex of structures. No signs of structures were found on the series of small, stepped natural terraces which lead gradually from the east end of the summit down to the saddle. This area, though level, was apparently considered indefensible.

A line of heavy rubble parallel to the south side of the summit terrace, some thirty metres away on the steep slope below it, may indicate the line of a heavier outer defensive wall, which could not be clearly defined. Nor could we determine, as Glueck (1939: 233) appears to suggest, whether a wall continued around the other slopes at this level (-42.00 m.).

It is strange that neither De Vaux nor Glueck reported the northwestern long wall which runs from the summit to the base of this hill, even though they both emphasized the corresponding southwestern long wall. These walls are the heaviest visible construction on the site. They are identical in construction, average 2.40 m. in thickness, and consist of a double row of massive, roughly squared blocks, normally more than one metre in length. Beginning from points below the west end of the summit (the level of the postulated outer circuit wall) these walls descended at least to the flood level of the river (-90.00 m.) where traces of them disappear. The SW wall ends atop a cliff, (Pl. LV, 2) directly above the tunnel, entrance described below. The NW wall is lost in recent alluvium near the modern pier, (visible on Pl. LIV).

Together, these walls enclose the entire western quadrant of the hill (Pl. LVI), the side facing Tell edh-Dhahab el-Gharbi, and run toward its base at either end. The long walls did not enclose a choice area for settlement, as this face is

only marginally less steep than the others. The slopes immediately below the west end of the summit and small terraces just south of the NW wall were indeed occupied by some structures, but otherwise the space between these walls appears devoid of terraces and wall traces. As defensive walls, however, they are admirably positioned, as the general plan (Fig. 1A) clearly shows. Both followed prominent spines of bedrock for added height and strength. Outside the SW wall, the rock-cut subsidiary *wadi* served as a moat, while the steep north slope and the River Zarqa provided impediments ahead of the NW wall.

Midway between the lowest preserved portions of the long walls, perched on a cliff immediately above the river, stands a solid structure (18.00 m. N-S, 7.00 m. E-W) of smaller limestone blocks (Pl. LVII, 1). It consists of retaining walls and fill built to produce a projecting terrace platform against the hillside facing the river at its flood level (terrace at -99.00 m.), at the point of least distance between the two hills. Rougher, heavier walls of sandstone boulders extend to north and south for some twenty metres either side of this structure, always on the brink of the cliff, which in turn provides a natural line of defence southward to the foot of the SW long wall (Pl. LVI). Glueck's date for the structure, Byzantine to medieval Arabic (1939: 233) was apparently based on the construction techniques, as no sherds from the walls are mentioned. We found none, but now believe this structure must be read in association with the long walls, despite the clear differences in constructon. The structure and its wings could be remnants of a third line of defense along the river. Their proximity to the river level and to the opposite hill could also have been significant factors in determining their positions.

The tunnel in the SW base of Tell edh-Dhahab esh-Sharqi, which opens directly beneath the foot of the SW long wall, was explored by night to avoid the nusiance of the numerous bats which inhabit it. Our findings differ significantly from the previously reported description (De Vaux, 1938: 411-412). The entrance tunnel is indeed 2.50 m. high and 1.00 m. wide. The walls are uneven. It runs relatively straight and level 53° NE for 22.50 m., at which point it enters the west side of the south end of an irregular ovoid chamber (7.00 m. E-W; 12.00 m. N-S). The floor of the chamber dips 0.50 m. lower and its ceiling rises 1.00 m. higher than the entrance tunnel. The floor level rises nearly two metres as it approaches the narrow north end of the chamber. Aside from a natural recess, no opening was found at his end. The only continuation from the chamber is a tunnel just large enough to crawl through which begins opposite the entrance tunnel, offset 1.50 m. to the north, and runs less regularly in approximately the same direction 40° NE for 24.40 m., then 65° E for 6.90 m. A slight rise in level is detectable, though this tunnel is neither straight nor even. It enters a slightly larger opening (2.00 m. high; 2.00 m. wide) which turns 170° S for eight metres and ends abruptly. A thorough search revealed no other openings. The total length of the tunnels is thus less than 70.00 metres. It was certainly not part of a water system. It may have been a tomb. The floor throughout is carpeted in guano, which may hide some cuttings in the chamber.

Steuernagel described two terraces on Tell edh-Dhahab el-Gharbi; De Vaux, three terraces; and Glueck, less certainly, four. We count six terraces in all from the summit to the NW base as shown on the plan (Fig. 2).

The Summit Terrace (I) of oval shape, stands at the extreme southeastern end of the occupied area. This, together with the Main Terrace (II), was surrounded by a fortification wall which most resembles a casemate wall of light construction, walls 0.70 m. thick, 2.50 to 7.00 m. wide, with salients or towers up to 9.00 m. square. This structure is clear for the past side of the Summit Terrace and in its SE tower (Pl. LVII, 2) but on the south, the casemate structure is obscured by several walls, probably the foundations of the southern parts of the main structures on this terrace. At the centre of the summit stands a low rock outcrop covered with rubble. Foundations and possibly steps at

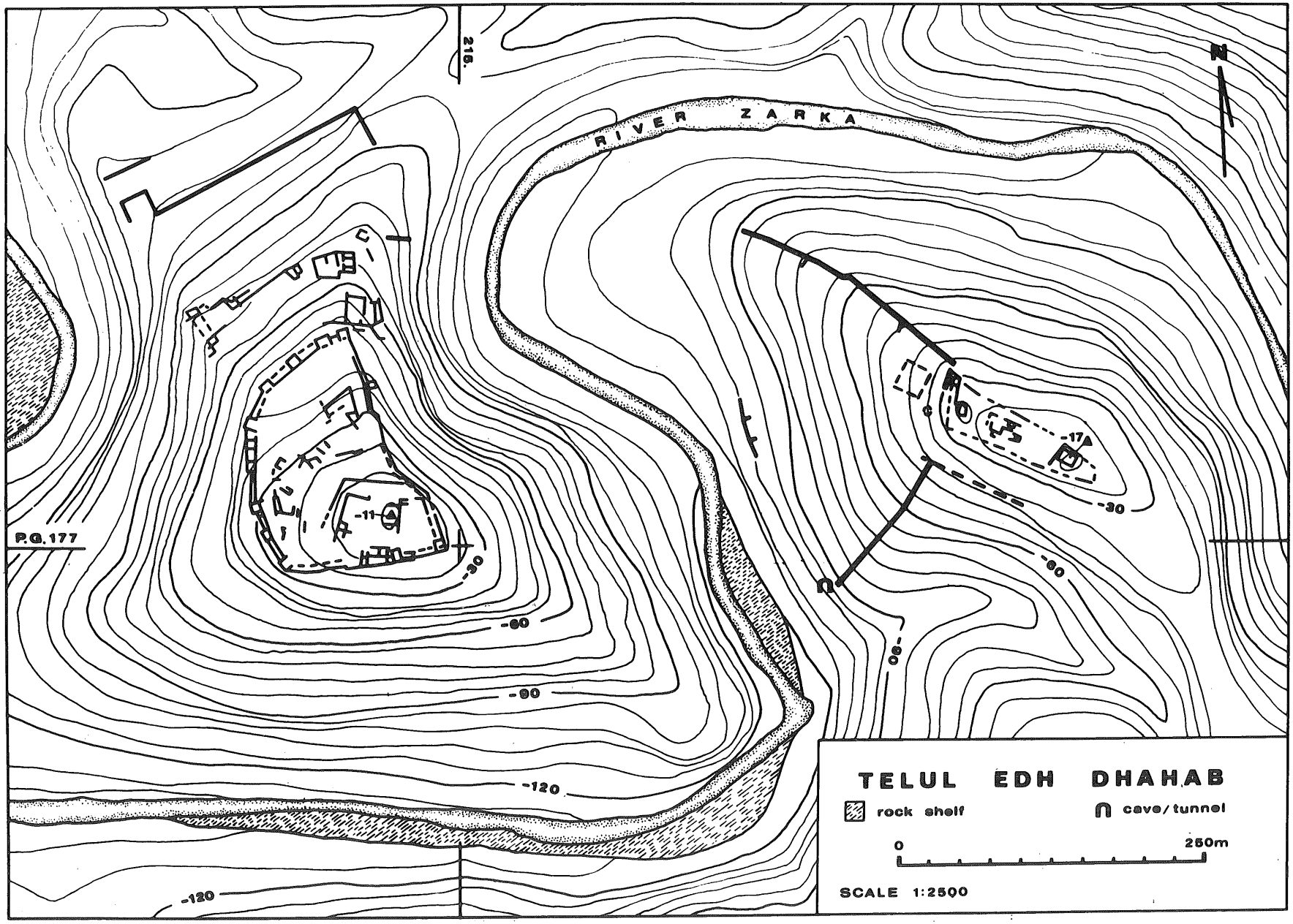

Fig. IA: Telul edh-Dhahab. General plan

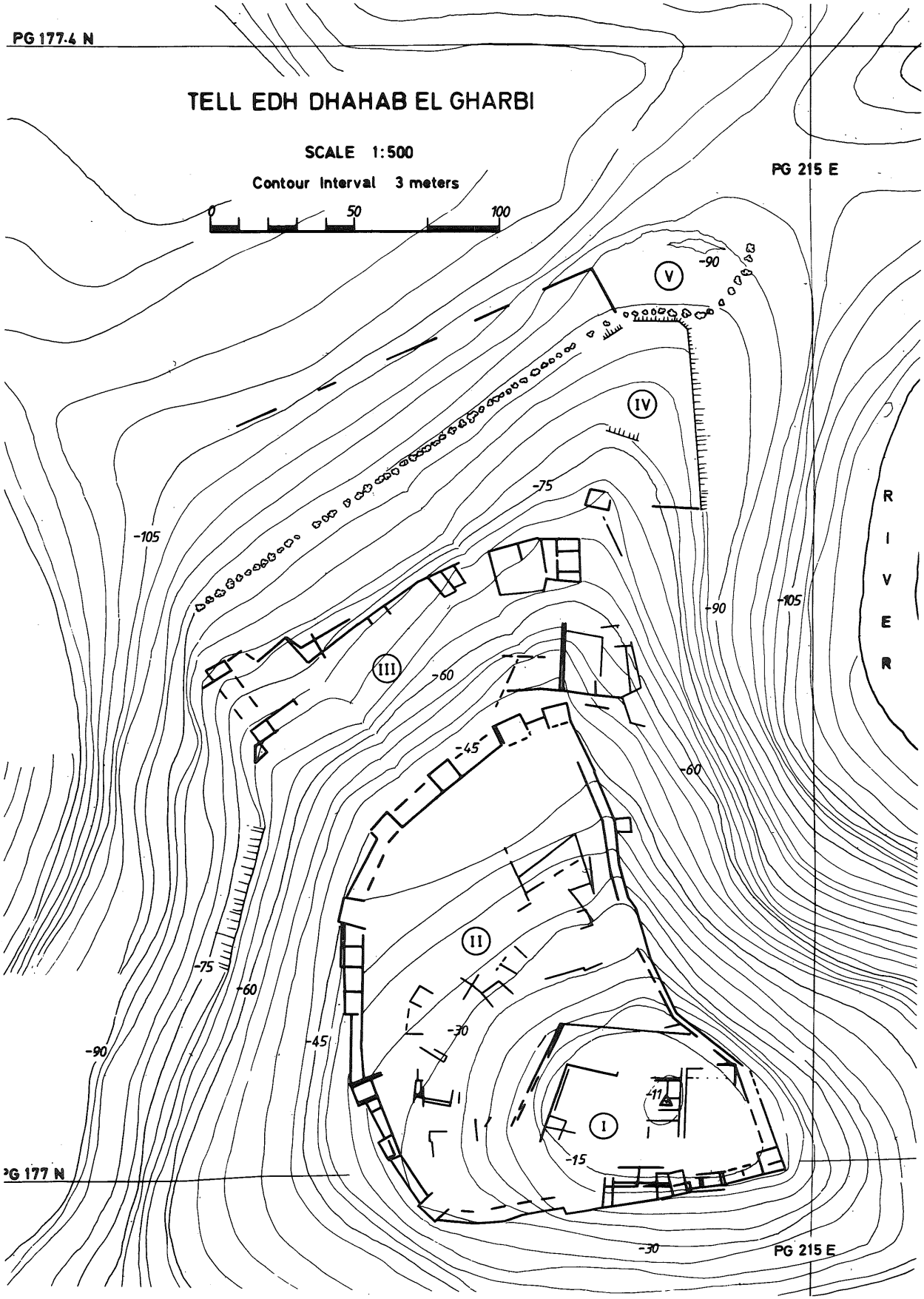

Fig. 2: Tell edh-Dhahab el-Gharbi plan

the south end were cut in this bedrock. Wall traces indicate a rectangular structure at least 16.00 m. N-S by 11.00 m. E-W, oriented precisely north-south, with two E-W dividing walls and the northern segment again divided by a N-S wall. These remains probably do not represent the complete structure, however, at least in its final form, as only the eastern limit is fixed and other unreadable wall stubs to north and south follow the same orientation, as do also those attached to or overlying the south fortification wall. The complete structure, or central complex, could have extended entirely across the terrace (up to 55.00 m. N-S; 22.00 m. E-W).

A parallel structure covering a similar area is indicated by the remains of peristyle columns scattered over the eastern third of this terrace. The long west wall of the peristyles is separated from the east wall of the central building by an interval of two metres. The only column bases definitely *in situ* are the northern row, at the extreme NE corner of the Summit Terrace (I): two corner pillar-columns with two columns between, giving the colonnade a width of eleven metres. Around these, the corresponding north, west and east walls lie 3.50 m. from the colonnade. The northeastern foundations encroach on the inner foundations of the fortification wall. A complete pillar-column lies fallen just south of this corner with its capital to the north (Pl. LVIII, 1-2). This shows that the north peristyle was short, possibly square. It certainly did not account for all the extant column drums. It was from this fallen column that the best profiles were taken. Another series of fallen pillar-column blocks is shown in (Pl. LIX, 1). This lies by the west wall of the peristyles twenty metres south of the north colonnade. Two column drums, possible *in situ,* and a further set of corner blocks, from a row south of these, as shown in the Plate. To the east of these, another standing column drum may also be *in situ,* (Pl. LIX, 2), near the southern fortification wall. Together, this evidence suggests a second, larger peristyle south of the first, with its south wall by the southern fortification wall, as shown on the plan (Fig. 2; Pl. LX, 1). The total length of these courtyard areas on the summit would have been 40.00 m., their width at the north end 18.00 m., wider on the south.

The northwestern slope of the Summit Terrace was built up behind massive retaining walls of blocks up to two metres in length. A toppled series of these in alternating positions at the south end of the remaining segment shown on the plan (Fig. 2; Pl. LX, 2), represents a fallen corner. A return at this point might mean that a southwestern, indirect entrance to the Summit Terrace was used. Above the remains of these retaining walls, a third large structure can be discerned on the western part of the Summit Terrace (at least 31.00 m. N-S; 18.00 m. E-W) but with its orientation NNE in accordance with the line of the retaining wall.

The Main Terrace (II on the plan Fig. 2) fans out west and north of the Summit Terrace. The double fortification wall was narrow above the precipitous eastern slope, widening along the south and southwest, and fully developed with evenly-spaced towers for the northwestern portion where it faced the lower terraces. At the eastern end of this last portion stood two towers flanking the only entrance, the Main Gate, with an opening seven metres wide. Bedrock lies exposed on the higher levels of the Main Terrace all round the base of Terrace I. Over the rest of its area, narrow walls with various orientations can be noted, but no clear building plans emerge. It thus appears that the structures on Terrace II were not built to a unified plan, but were small separate units which followed only the contours of the terrace. A large discoid millstone was found near the south end of the terrace by the fallen retaining wall blocks, and modern burials here and along the western edge of the terrace. Considerable recent digging was noted inside the Main Gate.

On the slopes outside the Main Gate were several unusual features. To the southeast lies the slag concentration discussed below. North and northeast of the gate numerous walls are visible. Some of these could have supported a roadway leading up to the gate. Other heavy walls

lead down the rock spine to the north to no apparent purpose.

The third terrace (III) is long and narrow, parallel to and below the NNW rim of the Main Terrace. At its eastern end, directly below the Main Gate and the walls just mentioned, lie the foundations of a large, nearly rectangular building (32.00 m. E-W; 19.00 m. N-S) the North Building. Its southern foundations are cut in bedrock. Its western divisions are obscure. The east end was divided to form a central room (8.00 by 7.50 m.) with narrow flanking rooms and a central door leading to a N-S corridor. A column drum from the summit peristyles lies in this building. Retaining and fortification walls lead westward and enclose the west end of this terrace.

Terrace IV is a natural terrace of massive red sandstone which exists only NNE of the North Building. A single lightly-built room stood on the spine which leads down from the North Building. A heavy wall was built downslope eastward from this, apparently to protect the southeast corner of the terrace. The natural sandstone cliff protects the east side of the terrace. No other structures were found here.

As a natural terrace, Terrace V occupied only the northern tip of the hill, facing the saddle which connected Tell edh-Dhahab el-Gharbi with the adjacent slopes. This portion is protected by a natural limestone barrier three metres high on its north side. The slope southwest of this point was terraced by construction of a heavy retaining wall 180.00 m. long with foundations for a tower (20.00 x 20.00 m.) at its SW end. Another terraced platform lay midway along behind the wall. A second above and behind the SW tower marks the line of defense which continued upward to the SW end of Terrace III, on the brink of the cliff which descends to the river (Pl. LXI).

The broad terrace which extends beyond the long retaining wall to the northwest (VI) has been severely disturbed in recent years. It is entirely possible that it was walled, as Glueck appears to indicate, but only heaped ranges of boulders remain. No walls were found *in situ*.

Details of the Peristyles

The only visible carved architectural members on either site belong to columns and pillar-columns of the peristyles which stood on the east end of the Summit Terrace of Tell edh-Dhahab el-Gharbi. All are of a relatively porous light gray limestone which is severely weathered wherever it has been exposed above the surface. Recent digging shows, however, that the pieces are in excellent condition below the present ground level. Every measurable column and half-column (on the corner pillars) has a diameter of 0.57 to 0.62 m., including the drum found in the North Building on Terrace III. The drums were cut in taller segments (0.50-0.90 m.) than the corner pillar-column blocks (heights 0.36-0.42 m.). A centering hole was noted on one recently tipped pillar-column block and a cutting for a central dowel (side 5.50 - 6.00 m.; depth 0.04 m.) on one fallen drum near the south end of Terrace I.

The dimensions of profiles of the capital of the fallen pillar-column at the NE end of Terrace I could be measured. The block is 0.34 m. high. Its total length can be estimated at 1.03 - 1.05 m. of which the pillar capital crown would account for 0.69 - 0.70 m. and the half-column abacus 0.34 - 0.35 m. and the half-column abacus 0.34 - 0.35 m. The Doric capital (Pl. LXII, 1), consists of the normal abacus (height (0.12 m.) and a slightly convex echinus (0.085 m.) but the rings at the bottom of the echinus are replaced by a prominent cavetto :0.02 m.). The spread of the echinus is almost certainly exaggerated on the pillar-column, where the projection reaches a maximum of nine centimetres from the shaft, although only six centimetres seem to have been allowed on either side of the columns. The pillar capital (Pl. LXII, 2), profile resembles a flattened sima moulding (height 0.185 m.), the convex portion divided by a groove, with one prominent and one subsidiary fillet below (height 0.05 m.). The block includes a portion of the shaft below both profiles. Parallels and dates are discussed

below.

Surface Collections

Aside from selective samples, over 12,000 sherds and numerous artefacts of other materials were collected from thirty random sampling points on the top two terraces of Tell edh-Dhahab el-Gharbi, from a total area of 750.00 square metres. Transects covering 500.00 square metres of the eastern hill yielded only 324 sherds. Thus, the periods of occupation on the west peak can be determined with much greater accuracy. A full report of sampling procedures will appear elsewhere. Only a brief summary is included here.

Lithics show a Middle Paleolithic and a post-Paleolithic presence on both peaks. Sherds of the Early Bronze Age were numerous (675) on the west peak, with all phases from EB I through EB IV clearly indicated (Pl. LXIII, 1). Most identifiable sherds from both sites were either Iron Age or Hellenistic. These were found in nearly equal quantities on the western site (4681: 5697) whereas Iron Age sherds predominated on the eastern site (104: 20). Of the Iron Age material from the west peak, painted sherds of the Iron Age IB phase (Pl. LXIII, 2) include bowl and krater rims and an unusual form applied to the body of a vessel. From the IC phase comes (Pl. LXIV, 1) a broad platter rim and numerous jar rims, but very few fragments of the normal cooking pots or of the fine burnished ware. Identifiable Iron II pottery was not common, but a figurine head of this phase confirms continued occupation. An oddity of the Iron Age collections is a wide shallow basin with a spout (Pl. LXIV, 2) represented by several fragments.

Among the Hellenistic pottery, fragments of fishplates (Pl. LXV, 1-2) accounted for a large percentage of the finds. Both ware and surface treatment vary, but none have the fine fabric and true sintered slip of imported products. Black or red paint or combinations of these, varying through orange and brown, dipped and dripped, regularly imitate the better wares. The same is true of numerous incurve-rim bowls and goblet rims, though the fabric of these always ranks with the best of the fishplates. Relatively few imported pieces were found (Pl. LXVI, 1) including only one fragment of a platter with the true black "glaze." Folded jar rims of small jars were common, but cooking ware was rarer than expected. Unguentaria and amphoriskoi are lacking entirely. The Hellenistic period is also represented on the west peak by numerous fragments of moulded glass bowls with engraved grooves near the rim, several fragments of gray-ware lamps, and at least three coins. The coins are listed below.

Roman occupation was noted on both sites (299:17 sherds). This material is limited in quantity and none of it can be clearly attributed to any but the very earliest phase of Roman domination. Folded-rim jars are common; "Pergamene A" ware, rare. One plain bow lamp nozzle was found. A limited Byzantine presence was identified only on the west peak (82.0 sherds), though we do not doubt earlier reports that Byzantine sherds were found on the east peak. None of our sherds of this period was particularly informative.

Objects

Five objects of some note have been found.

1) Head of terracotta figurine, broken off at neck and badly worn, of red clay with yellowish-white slip. Facial features enlarged, especially the almond-shaped eyes. Headdress unclear. Mould-made with impressed details. H:4.2; W; 3.2; Th: 3.0 cm. Terrace II SW. Eighth or seventh century B.C. ('Amr 1980 personal communication). (Pl. LXVI,2).
2) Bronze Coin. Obverse: anchor in circle of dots, inscription: BA. Reverse: star in circle, illegible letters between rays. Irregular shape, poorly struck, Diam. 1.6 cm. Random Point 7, Terrace II. Alexander Iannaios, late issue, 83-76 B.C. (Naveh, 1968: Pl. 2-3) (Pl. LXVII, 1-2).
3) Bronze Coin, As No. 2, found attached to it. Worse struck and worse preserved. Plate (LXVII, 1-2).
4) Bronze Coin. Obverse: Jugate busts

facing right. Reverse: single cornucopiae with vertical stalk and hanging vines. Inscription illegible. Diam. 1.2 cm. Terrace III SW. Ptolemais-Akke, late second to early first centry B.C. (Newell, 1939: Pl. II-III).

5) Handle attachment of jar with inscribed cross. Lentoid section, gray core, brown fabric, red exterior. Much limestone temper. Cross lightly incised before firing. H: 7; W: 4.2; Cross: H: 3.2; W: 3.8 cm. Iron Age (Abright, 1932: 81).

Iron Industry

Numerous small bits of dark slag or dross were found in virtually every sample from the upper terraces of Tell edh-Dhahab el-Gharbi. Numerous fragments of iron objects were also collected. Slag, cinder, treated ore, and a furnace bottom were found in a concentrated deposit, weathering out at the top of the eastern scarp just SE of the Main Gate. This deposit appears as a dark patch on Plate LXVIII. The slag had flowed freely, producing layers only one centimetre thick. The furnance bottom is bowl-shaped (0.20 x 0.15 x 0.06 m.), not strongly magnetic, and exhibits flow structure in section. Portions have been sent to various laboratories for testing.

Conclusions

The chronological linkage of the two sites and the marked differences in their areas of occupation deserve special emphasis. The collections from the eastern hill are poor precisely because occupation there was naturally limited. Glueck's (1939:234) theory of a chronological separation of the two sites — the east peak Iron Age and earlier, the west peak Hellenistic and later — must be rejected. It clearly contradicted his own evidence, for he found late pottery on the eastern site and early pottery on the western one. Both sites are eminently defensible, but in case of hostilities, it would be practically impossible to hold one for long without also occupying the other. On preliminary reading, the systmatic samples are compatible with this argument and with the previous evidence. The poverty of ceramic material from the eastern site must be kept in mind. The absence of a given phase from this site is not meaningful. It appears that both sites were occupied during the Early Bronze Age, the Iron Age, and the Hellenistic to Byzantine periods, but with a marked decline during the Roman and Byzantine periods. The long walls of Tell edh-Dhahab esh-Sharqi further emphasize this linkage, at least for one of the main periods of occupation (Iron Age or Hellenistic), since they serve to conjoin the defensible areas of both hills.

The preserved evidence of fortifications cannot be dated without excavation, though present evidence warrants some suggestions. There can be no doubt now that the west hill as well as the east was occupied during both Iron I and II. Moreover, and quite naturally, the western peak was much more intensively occupied. The extensive casemate walls on the western peak would be at home in the Iron Age or in the Hellenistic-Early Roman period. They do, however, appear to underlie the peristyles of the later period on the summit. It seems quite possible that they were founded during the earlier period.

The Hellenistic material from the western peak barely outweighs that of the Iron Age. Yet it appears to represent a much shorter period of occupation. None of it can definitely be ascribed to the early Hellenistic phases. Instead, as Glueck recognized, late Hellenistic and early Roman material predominate. We find that a large quantity of late Hellenistic finds are linked to a much smaller quanitity of material which represents only the earliest phase of Roman domination. The Roman Imperial period is not definitely represented. Coins, glass and lamp fragments likewise point to the first century B.C. The peristyle colonnades on the summit fit comfortably within this phase. In the Hellenistic world, heart-shaped corner pillar-columns were used exclusively for the Doric order from 300 B.C. onward (Busing, 1970: 56-63). The cavetto on the Doric echinus at Telul edh-Dhahab is paralleled

on the Doric capitals of the Tomb of the Beni Hezir in Jerusalem (Avigad, 1954: 44, fig. 30) which belong to the late second or early first century B.C.

The destruction of these peristyles appears to mark the end of intensive occupation on the site. Where the columns fell, the drums remained stacked against each-other from that day to this. Few of them have been disturbed and those only recently. If intensive occupation had continued, these blocks and drums would surely have been reused. We tentatively suggest that this destruction occurred very early in the Roman period. After that time, only a very limited Byzantine presence is sugested by the finds. The heavy fortifications represented by the long walls and the west base structure of the eastern hill and the lowest terrace wall and tower (Terrace V) on the western one should be read in conjunction. Together, they bespeak the most ambitious fortification plan ever applied to these twin peaks. In form, structure and placement, they suit the Greek tradition and the age of artillery, though we cannot rule out an iron Age date for them.

The iron ore of Ajlun Mountain was certainly exploited during the Ayyubid-Mamluk period. One major source was the Mugharet Wardah mine, which lies only four kilometres north of Telul edh-Dhahab, high on the southern slopes of the mountain (Coughenour, 1976: 71-76). The iron industry of Telul edh-Dhahab must be earlier, since not a single Islamic sherd was found on either site. Just how early it was remains to be determined, since Byzantine sherds were found in the slag deposit, along with those of the earlier periods.

Part II: Survey South of Telul Edh Dhahab a Short Preliminary Report
(Robert Gordon and Linda Villiers)

During August and September, 1982, the Centre for Jordanian Studies of Yarmouk Univesity in cooperation with the Department of Antiquities conducted a survey of the southern environs of Telul edh Dhahab in the lower Zarqa basin. The author, L. E. Villiers, Sa'd Hadidi, and a team of Jordanian students took part.

An intensive area survey covered a roughly semicircular area of four to five kilometre radius east, west and south of Telul edh-Dhahab (Fig. 1) excluding the modern villages of Sbeihi and Sihan DeVaux, 1938: 410). All habitable ground was walked in transects, sites were sampled with finer transects (usually following the cardinal directions) and all structures and large sites were mapped. Preliminary sorting of site collections has been completed.

Sites at the borders of the survey area had been surveyed in varying detail: Tell 'Alla (Site 8, Ibrahim *et al.* n.d.); Telul edh-Dhahab (Sites 21-22, Glueck, 1939, 233); Tell Hajjaj (Site 25, DeVaux, 1938, 411); The Roman road on 'Arqub Abu Buseila (Huppenbauer, 1962; Mittmann, 1963, 1965); and Khirbet 'Uleiqun ("'Aleqouny" De Vaux, 1938, 415). Yet within the area thus enclosed, no sites were noted in R. De Vaux's general survey of 1937, and no detailed regional survey had been undertaken since that time. The map (Fig. 1) shows the positions of the sites studied during the 1982 survey. Tables 1 and 2 show the periods of occupation of each site according to preliminary analysis of artefacts collected.

Lithic artefacts were collected from over thirty sites or scatter areas. Acheulian to Middle Paleolithic sites cluster along the lower reaches of the Wadi Zarqa, with only one diffuse occurrence in the upland areas. The occupation is sparse and scattered. Only Tell Mubarrad and Tell Mghanni West (Sites 1-2) above the mouth of the Zarqa canyon show any density. No Upper Paleolithic sites were located in the area surveyed. Site distribution during the Epipaleolithic to Early Brtonze Age periods is expanded. A major Late Kebaran site (El Huna, Site 9) lies by the Zarqa River east of Telul edh-Dhahab. 'Ain Sabha (Site 6) also had an Epipaleolithic phase.

The earliest proven occupation in the upland El 'Ardha plain is of the Pre-Pottery Neolithic B phase (Sites 13-14). From that time on, the lithic evidence shows presence or occupation at numerous locations. Among the ceramic collections, however, very few possible Late Neolithic

Table 1: Telul edh-Dhahab Area Survey--South Half, Prehistoric Sites, 1982

Area		Site	Coordinates P.G.	N	E	Paleolithic LP	Paleolithic MP	Paleolithic EP	Neolithic PPN	Neolithic LN	Neolithic CH	Bronze EB	Bronze LB	Iron EI	Iron P	Classical H	Classical R	Classical BZ	Islamic UM	Islamic AM	Islamic OM
Tell el-Hamme	1.	Abu 'Aubeida Dolmens		180.211					-----p?-----												
	2.	Tell Mubarrad*		180.212		XXXX															
	3.	Tell Mghanni (West) ++		178.212		p ////								////		XXXX////		p			p
	4.	T. Dhahab Extension W.		177.214		?	p		-----p------												
	5.	Wadi Hawārith Pump Sta.*		178.212			p		p?		XXXX										
	6.	'Ein Sabha		178.212				p----?-----XXXX--													
	7.	Sabha & Zighān Caves		177.211							p?			p							
	8.	Tell 'Alla (Handaquq)		177.211							////XXXX			p	p						
Khuyūf	9.	El Huna (on Zarqa River)		177.219				XXXX									p				
	10.	El Mu'allaqah (Khuyuf)*		176.220					--------//XXXXXX												
	11.	El 'Azab (on Zarqa)*		177.219							XXXX										
	12.	Abu en-Najr		177.218					-----p?-----							p		p			
Wadi Hajjāj	13.	Ed Dibāb (Sbeihi) !!		173.216					///	?	XXXX//					p	p	p		p	p
	14.	'Arqūb er-Rāshid		174.216					///		p		p			p	////XXXX			p	//
	15.	Abu Buseila		174.214							---?----										
	16.	Wadi Dafali		174.219							XXXX						p				
	17.	Khirbet Umm el-'Idhām !		175.215			p		---p?-------				p?	////		p	XXXX////				

KEY: *=Destroyed. !=Endangered. ++=to preserve. XXXX=main period of occupation. ////=occupation.
p=Presence. ----p?---- = time range of possible presence.

Table 2: Telul edh-Dhahab Area Survey--South Half, Historic Sites, 1982

Area	Site	Coordinates P.G.	N	E	Paleolithic LP	Paleolithic MP	Paleolithic EP	Neolithic PPN	Neolithic LN	Neolithic CH	Bronze EB	Bronze LB	Iron EI	Iron P	Classical H	Classical R	Classical BZ	Islamic UM	Islamic AM	Islamic OM
Wadi Zarqa	3. Tell Mghanni (West)	++	178.212		?	////							////		XXXX	////	p			p
	20. 'Irāq et-Tahūna South	!!	178.214										XXXX		XXXX	pp	pp			p
	19. Pump Station Structure	*	178.213												p					
	21. Tell edh Dhahab West	++	177.215			p		p----------		////			XXXX		XXXX	////	p			
	22. Tell edh Dhahab East	++	177.215			p		---p---		p //			XXXX			////	?			
	23. Gypsum mine west	++	177.216					---------?--					////		//////////////				p	
	24. Tell Ghreimūn	++	177.220					-----p?-----				?	p?		//////////////			p	XXXX	
El Ardha Plain	17. Khirbet Umm el-'Idhām	!	175.215			p		----p?---				?	////		p	XXXX	////			
	18. Arqūb Abu Buseila		174.214													p	p			
	25. Tell Hajjāj	++	173.215					----p?----		////			XXXX		////////		p		?	
	26. Khirbet Mshatta-Quseib	*	173.220							p--			p			////	XXXX	p	////	
	27. Ed-Dukheināt (Cuttings)		173.219													p	p			
	28. Khirbet Beyuda	!!	173.218							?					p	////	p		XXXX	p
	29. Khirbet Jarrīsh	!!	174.220													?	p	////	XXXX	
	30. Khirbet 'Uleiqūn	++	174.222												?		?		XXXX	
W.Zarqa	31. 'Iraq et-Tahuna (Mill)		178.214																	p
	32. Khuyuf Mills (N & S)		177.219																	p

KEY: *=destroyed. !=endangered. ++=to preserve. XXXX=main period of occupation. ////=occupation. p=presence. ----p?---- = time range of possible presence.

sherds and none of the standard Chalcolithic types have been found. By contrast, ceramics of the hitherto elusive transition from the Late Chalcolithic to the Early Bronze Age (e.g., elongated, serrated ledge handles) were remarkably numerous, especially in the Khuyuf area Sites 10-11) and at Ed Dibab near Sbeihi (Site 13). It thus appears that true Chalcolithic occupation may have been concentrated near the Jordan Valley, while renewed expansion in the Wadi Zarqa and up onto the 'Ardha should be attributed to this transitional phase.

Within the survey area, most of the sites of that phase were not reoccupied during the Early Bronze II-IV phases. Instead, other centres apparently grew during Early Bronze I and continued into Early Bronze IV. These same sites were regularly reoccupied in the Early Iron Age and during the Greco-Roman period. No settlement of the Middle or Late Bronze Age has been found. This hiatus was succeeded by another rapid efflorescence during Early Iron I. Aside from the well-known sites of this period (Telul edh Dhahab, Sites 21-22; Tell Hajjaj, Site 25) at least four others have been found, plus lesser establishments, particularly along the River Zarqa (Sites 3, 17-24).

The survey has shown that all these sites were intensively reoccupied during the Hellenistic period. The population in the *wadi* appears to have risen during that time, then slowly declined during the Roman and Byzantine periods. During these later periods population shifted out of the valley onto the highlands (large new foundation: Khirbet Mshatta-Quseib, Site 26). Probably only three of the remaining sites at the end of the Byzantine period continued in Umayyad times: Tell Ghreimun, Khirbet Mshatta, and Khirbet Jarrish (Sites 24, 26, 29). These grew again under the Ayyubid and Mamluk rulers alongside two seemingly new foundations, Khirbet Beyuda and Khirbet 'Uleiqun (Sites 28, 30), again in the highlands. Tell Ghreimun was the only Mamluk site found within the Wadi Zarqa. Only rare evidence of Ottoman-Mandate period predecessors for the present population boom were found. Three mills by the River Zarqa are reportedly late Ottoman or yet more recent. They were in use a generation ago.

It is sad to note that most of the sites found have already been destroyed or are being destroyed by new housing and intensive agricultural development. For salvage, one Epipaleolithic site (El Huna, Site 9) deserves soundings. The largest, richest transitional Late Chalcolithic/Early Bronze site (Ed Dibab, Site 13) is now being destroyed by house construction. Immediate soundings are recommended. The neighbouring Rujm Hafayir (Huppenbauer, 1962: 174-175) is similarly threatened. Tell edh-Dhahab el Gharbi was surely the largest of the many Iron Age/Hellenistic sites in the area, but the newly discovered satellite sites on the terraces upstream and downstream from Telul edh Dhahab are in greater danger. 'Iraq et-Tahuna South (Site 20) is rapidly being destroyed by plowing. Of all the other sites noted in the Wadi Zarqa, Tell Mghanni (Site 3) at the west end and Tell Ghreimun (Site 24) at the east end of the survey area could offer the best historical statigraphy. Tell Ghreimum is the only true cultural *tell* in the area with significant stratigraphic depth. These two should be preserved along with the best-preserved Mamluk site, Khirbet 'Uleiqun (Site 30).

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MAIN-LAND RELATIONSHIPS IN THE ANCIENT WADI ZIQLAB: REPORT OF THE 1981 SURVEY

by
Edward B. Banning and Clare Fawcett

Introduction

The basic goal of the 1981 survey of the Wadi Ziqlab basin was to reveal patterns in the location of sites of various types with respect to environmental variables which we might expect to be culturally, and particularly economically, important to the ancient occupants of these sites. Possibly the distribution of sites and even isolated artefacts with respect to such variables will tell us something about changes in land use in the past. Such changes, one suspects, would be related to changes in climate, vegetational cover, technology, demographic structure, hydrology and other factors. If we can recognize patterns in the relationships between certain kinds of sites and environmental variables, it would follow that we can make predictions about where sites of the same kinds should occur in unsurveyed regions which shared with Wadi Ziqlab a broadly similar culture. We would then be able to test these predictions by examining suitable locations in further surveys. In an attempt to begin such a project, the authors, accompanied by Mr. Hikmat Ta'ani (representative of the Department of Antiquities of Jordan, Irbid), sampled one-fifth of the area of Wadi Ziqlab for archaeological sites and isolated artefacts in a wide range of environmental circumstances. Their base for the survey, from 21 November to 19 December, was a house in Deir Abu Sa'id, which lies on the southern watershed of Wadi Ziqlab.

Survey Methodology

In order to permit study of the relationships of sites to their environments it was obviously necessary to minimize biases in survey methodology which would give us a false impression of those relationships. If, for instance, we had surveyed only the ridge and plateau areas, which are most accessible, and had avoided more difficult terrain, we might have come to the erroneous conclusion that sites were always located on hill-tops, or were located predominantly on brown stony soils and bare rock. We needed as much as possible to give all types of environments within the Wadi Ziqlab drainage basin a fair chance of being searched for sites and artefacts. At the same time the terrain of the Ziqlab is very rough, while large parts of the survey areas are covered with oak forest or thick oak scrub. These factors make surveying very difficult; steep cliffs and thick scrub in some area are impassible.

As a result it was necessary to forge a compromise between statistical requirements and practical ones. We redefined the borders of the survey area to fit the Universal Transverse Mercator Grid Zone 36 (Series K737 maps at 1:50,000). This produced a gridded sampling frame of 115 sqares of 1 km^2 each. From these we randomly selected twenty squares with replacement, a 20% sample (three squares were selected twice), as targets for intensive survey by the methods described below. In addition we supplemented the statistical sample with a purposive survey of some sites known to exist in the *wadi* catchment and in areas like the western end of the *wadi* where important environmental zones had been missed by the random sample.

Within each of the randomly selected squares, the crew of three walked three or four transects, collecting sherds and artefacts, and recording sites, on the way. We were able to determine what proportion of the strips walked falls into each environmental zone, and use this proportion as a weight, or correction factor, when looking for associations

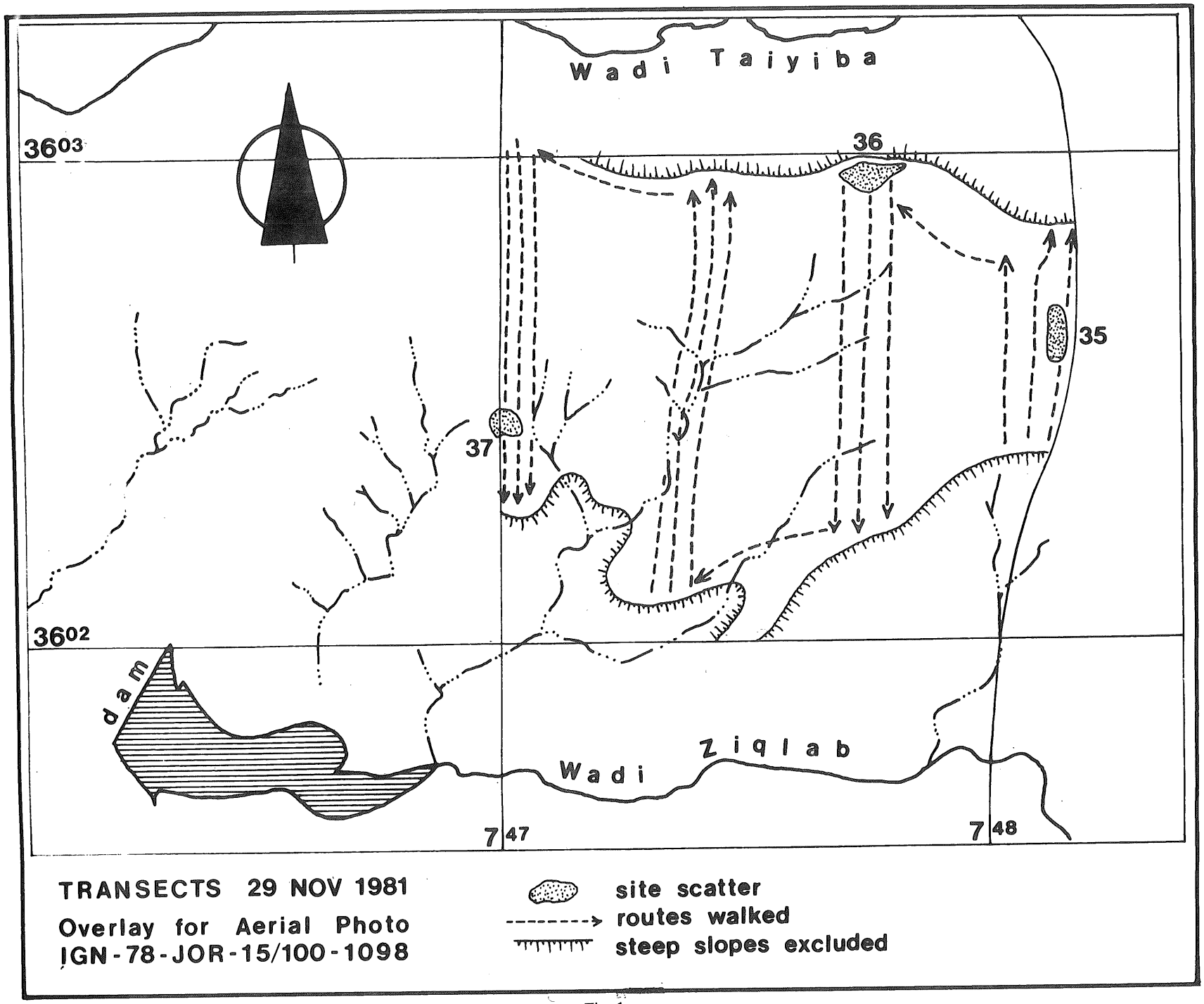

Wadi Taiyiba
36 03
36
35
37
36 02
dam
Wadi Ziqlab
7 47
7 48
TRANSECTS 29 NOV 1981
Overlay for Aerial Photo
IGN-78-JOR-15/100-1098
site scatter
routes walked
steep slopes excluded

Fig. 1

between site locations and environmental types. If, for instance, our survey walks took us through *terra rossa* soil five times as frequently as through brown stony soils, it is obvious that we would expect to find five times as many sites on the former as on the latter even if there is no correlation between site location and soil type. By weighting the sites on brown stony soils by a factor of five the two soil categories would then become comparable. We have also recorded not only the spacing interval between the transects and crew members, but the actual routes walked and site areas, on tracings which fit over aerial photographs of the surveyed squares. Figure 1 is an example of an overlay for an aerial photograph, showing the routes walked and sites discovered. Note that the grid lines are bent in some cases. This is due to monoscopic distortion and is particularly pronounced near the edges of the photograph and where the grid lines cross high ridges or mountains. Because of this distortion the scale is not exactly the same all over the photo, but the distance between grid lines should be one kilometre. While the transects also look bent in some cases, this is also due primarily to photographic distortion, and they in fact run north to south at 250-metre intervals. Note also that the transects stopped at the edges of scraps too steep to cross, but we can measure these areas (where the probability of finding settlement sites is near zero anyway) and account for them statistically.

We collected sherds and lithics on the survey in the following ways. Whenever we believed that we had encountered a site, defined either by a marked increase in the density of artefacts on the ground or by the presence of architecture or other artificial features, we each collected a small sample of material using our own judgement as to what might be diagnostic in terms of helping to date the site. These we term "purposive" samples. In a few cases, where sherd densities seemed reasonably high, we collected all sherds and artefacts within 5-m^2 circles arbitrarily located on the site, and called the material from each of these circles a "random" sample. In addition we often collected purposive samples of possible diagnostic artefacts and sherds which we encountered on our transects but which did not appear to be associated with any sites. The items in these samples we term "isolated finds." Analysis of the pottery and other finds will appear in the final report.

In order to meet the basic goal of the survey and to test hypotheses concerning changes in land use, it was necessary to ensure that our survey strategy would provide the categories of data required. The statistical sample should provide a fairly representative view of site locations. The collected material should provide criteria for dating most of the sites. In terms of land use we would also like criteria for dividing sites into functional categories. For some sites, like aqueducts, cisterns or quarries, the function is fairly obvious. For simple scatters of sherds or lithics it is not. Many of these will be settlement sites, but we would still like to know whether they represent the settlements of agriculturists, pastoralists, or hunter-gatherers. Others may be non-settlement sites, like charcoal-burning camps or cemeteries. In this unhappy situation, where we do not have other evidence in the form of architecture or features we will facilitate preliminary analysis with the assumption that any sherd scatter more than 500 m^2 in an area represents an agricultural settlement, while smaller ones we will treat as camps of various types. The patterns of site location themselves might suggest to us what resources may have been exploited at each "camp," permitting tentative functional classifications which we may test against a range of relevant environmental factors, or against the contents of the artefactual assemblages.

The Environment Of Wadi Ziqlab

The arched rim of the Jordan Graben has resulted both from uplifting of the Transjordanian Block on its western side as well as down-faulting towards the Graben further to the west (Bender, 1974: 23). In northern Jordan these disturbances of rather thick sediments are characterized more by block-folding, flexuring and

tilting than by the block-faulting seen to the south and east (Bender, 1974: 115), and the Wadi Ziqlab drains the northern part of an upwarped dome around Ajlun, the western side of the "arched rim" immediately north of this dome, and a narrow band across the downfaulted Cretaceous and later sediments bordering the Jordan Graben. Significant sub-parallel faults occur in the narrow western part of the Ziqlab drainage, and there are local occurrences of complex faulting farther upstream, as near Inba (Bender, 1974: 116, 121: Fisher, *et. al.,* 1966: 7). In falling from the rim of the Transjordanian Block at over 1075 m. to the bottom of the Jordan Graben at —200 m., the wadi and its tributaries have deeply dissected most of the drainage basin. In the upper parts this dissection has a mature appearance and rounded relief with an amplitude of 50.00 to 150.00 metres, but below a major rejuvenation point in the neighbourhood of Tubna (probably consequent to renewed faulting in late Tertiary or Pleistocene times) the stream has incised a steep-sided gorge and the amplitude of relief is 200.00 to 250.00 metres (Fisher, *et. al.,* 1966: 4-7).

This geological structure has had important consequences for other aspects of the environment. Due to orographic effects the highest mean annual rainfall occurs at the rim of the Jordan Graben, where it is more than 500 mm., but the marked increase in apparent aridity towards the western part of the Ziqlab valley cannot be explained in terms of precipitation alone. Even the driest, most westerly part of the basin receives a mean annual rainfall greater than 300 mm., and the marked differences in vegetation between the eastern and western ends of the valley must "owe more to temperature and evaporation contrasts than to absolute differences in precipitation" (Fisher, *et. al.,* 1966: 13). The contrast in mean daily temperature between the cooler highlands and the mouth of the valley is in the order of 6 C° (Climatic Altas of Jordan, 1971: 12-24).

In the eastern highlands of the Ziqlab, Mediterranean zone vegetation still includes important stands of *quercus calliprinos* forest and open woodland, on predominantly Terra Rossa soils derived from crystalline limestones of the Ajlun series. The climax vegetation would have been an association of *Quercus calliprinos-Pistacia Palaestina,* but the *Pistacia* is relatively infrequent at present (Zohary, 1962: 112). Towards the west, the woodland becomes more open, with a gradual transition into a *Quercus ithaburensis-Styrax officinales* association on the ridges bordering the Wadi Ziqlab. Some *Styrax* was also observed in the highest parts of the *wadi* catchment (on the slopes southwest of Khirbet Mahrama, site 60). In the lowest parts of the *wadi* there is Irano-Turanian shrub steppe with climax vegetation of the *Zizyphion loti* alliance (Zohary, 1962: 112), and local concentrations of hydrophilic vegetation occur in and immediately downstream from springs at the bottom of the Ziqlab gorge (particularly near Tell Abu el Fukhkhar, site 43). Anthropogenic alteration of the climax vegetation is especially marked in the extreme east, all along the northern edge, and in the western third of the survey area, where both cultivation and grazing have removed significant portions of the natural vegetation. In the south central part of the basin there is little modern exploitation, although it is clear that most of the forest even here has regenerated only in recent times, as evidenced by the presence of dams and agricultural terraces in the forests (sites 67-69, 74-76).

The principal non-agricultural resources of the area are limestone and chert as building material, chert and flint for stone tool manufacture, oak for charcoal and tanning, and water from springs estimated at 8 million m^3 per year (Burdon, 1959: 73; cf. H. Vierhuff and K. Trippler, 1977: 6-7). The A7 and B2 limestones and chert bands of the Ajlun and Balqa series, which cap most of the western half of the Ziqlab basin (Fig. 2), are part of the most important aquifer system in Jordan, recharging with 40-80 mm. of water per year, or a volume of 9 million m^3 per year (Vierhuff and Tripper, 1977: list 5.1.1., map HG 5.1). This groundwater is very close to the surface,

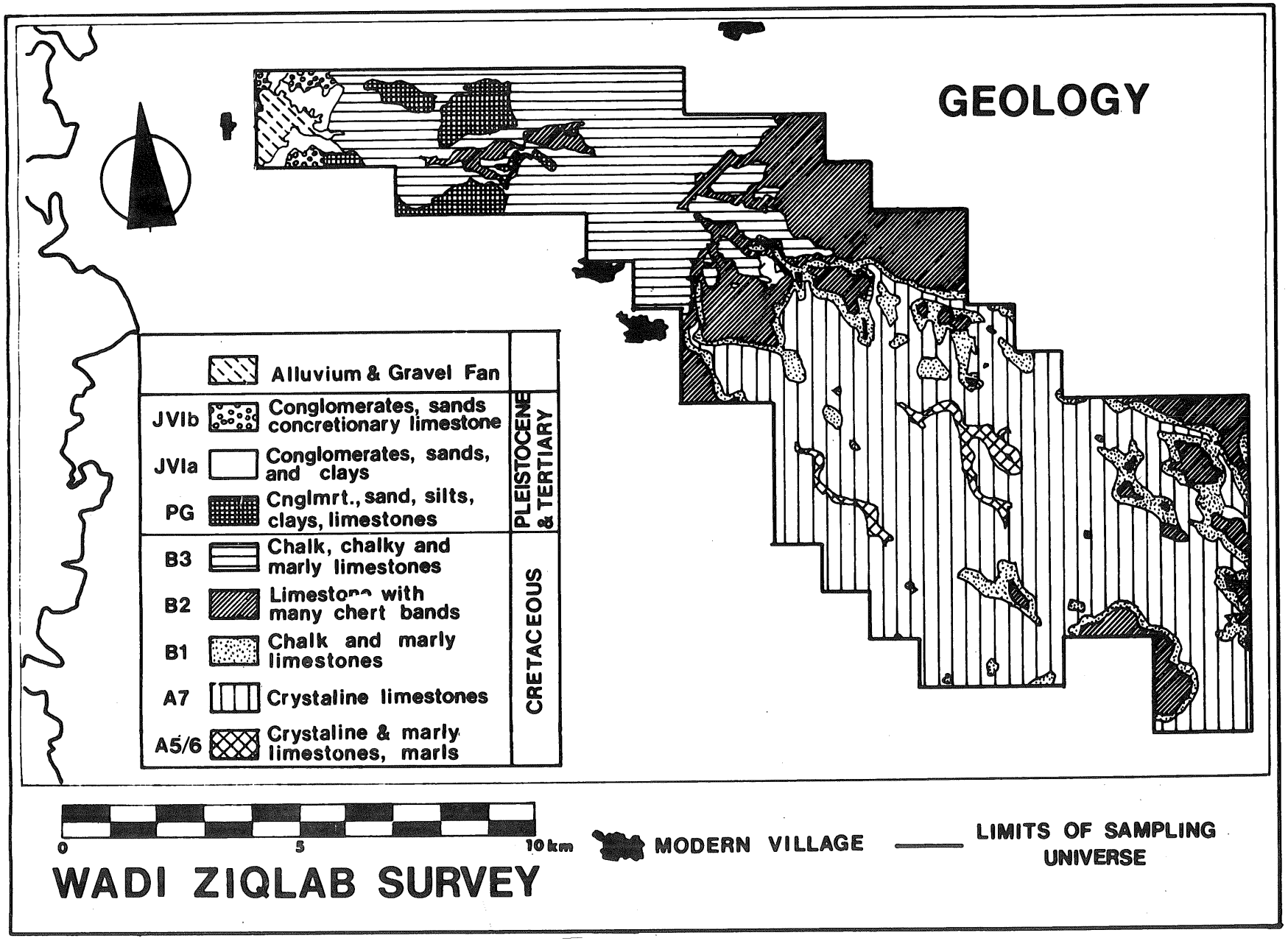

GEOLOGY
Alluvium & Gravel Fan
JVIb Conglomerates, sands concretionary limestone
JVIa Conglomerates, sands, and clays
PG Cnglmrt., sand, silts, clays, limestones
PLEISTOCENE & TERTIARY
B3 Chalk, chalky and marly limestones
B2 Limestone with many chert bands
B1 Chalk and marly limestones
A7 Crystaline limestones
A5/6 Crystaline & marly limestones, marls
CRETACEOUS
0
5
10 km
MODERN VILLAGE
LIMITS OF SAMPLING UNIVERSE
WADI ZIQLAB SURVEY

Fig. 2

permitting exploitation even where there are no naturally occurring springs.

Site Distributions

The very fact that the bulk of the sites recorded during the 1981 Wadi Ziqlab survey come from exploration of only 20% of the wadi's total area excludes the possibility of presenting complete distributions of the sites of various periods, quite apart from omissions due to site destruction or invisibility (the final report will deal with the problems of differential visibility and the probability of site destruction). But the concern of this project is less the physical distribution of sites than the settlement systems and resource exploitation systems which are responsible for that distribution. As this is a preliminary report, it is premature for us to offer tests of specific hypotheses regarding site location criteria or the relationships between these criteria and models of economic exploitation of the Wadi Ziqlab in the past. These will appear in the final report. It is possible, however, for us to offer at this stage of analysis maps of observed site distributions in a number of chronological periods, with preliminary observations on especially favored environmental circumstances, and on apparent changes in preferences for site location. We may also suggest hypotheses for the causes of these changes to be investigated further in the final report. Since the 20% sample should be representative of the survey area as a whole (once we acount for differences in site preservation or visibilty, and for the areal extent of environmental zones), it will be possible to make statistical evaluations of the strength of these hypotheses in the analyses to follow.

The maps require a certain amount of explanation. Since there are problems with the dating of some of the sites, those whose date is reasonably secure are represented by a solid square or triangle, while sites of doubtful date or loci of sherds too few in number to represent certain occupation during a given period are marked by a hallow square or triangle. Squares represent sherd scatters, triangles represent lithic scatters, and large circles represent known sites not included in the survey because of inaccessibility (usually military) or distance from the sampling universe.

One should also note that "periods" represented on the map have been grouped so as to correspond whenever possible to the most obvious changes in the pottery or lithic assemblages and do not necessarily correspond to political or presumed ethnic units. The readings are only provisional in many cases, and, until detailed analysis of the pottery and flints is complete, these groupings based on similarities of ware, technology and morphology seem the most convenient units of preliminary analysis of land use changes. Since there is no reason to assume that land use strategies, agricultural technology or ceramic assemblages should have a one-to-one correspondence with political units anyway, we feel that chronological units on these grounds are as useful as any of similar breadth. If possible a more refined chronology will permit finer chronological distinctions in the final report, in case there were any short-term changes in land use which such broad divisions obscure.

Lower Paleolithic (Fig. 3)

The length of time which has elapsed since the end of the Acheulean makes questionable the assumption that we can reconstruct the physical environment of the Ziqlab during the Acheulean to a degree sufficient for analysis. Not even the topography of the survey area has been immune to major change during such a long period, and the hardrock geology is almost the only environmental dimension in which we can have confidence.

Nonetheless Acheulean occupation of the Wadi Ziqlab seems to have been sporadic. The only biface recovered from the 1981 survey was an isolated find (x.255), probably indicative only of communication between the lush Jordan Valley to the west and grasslands to the east. Sites 16 and 63 are located near the upper reaches of small branch *awdiyah* overlooking what may have been good

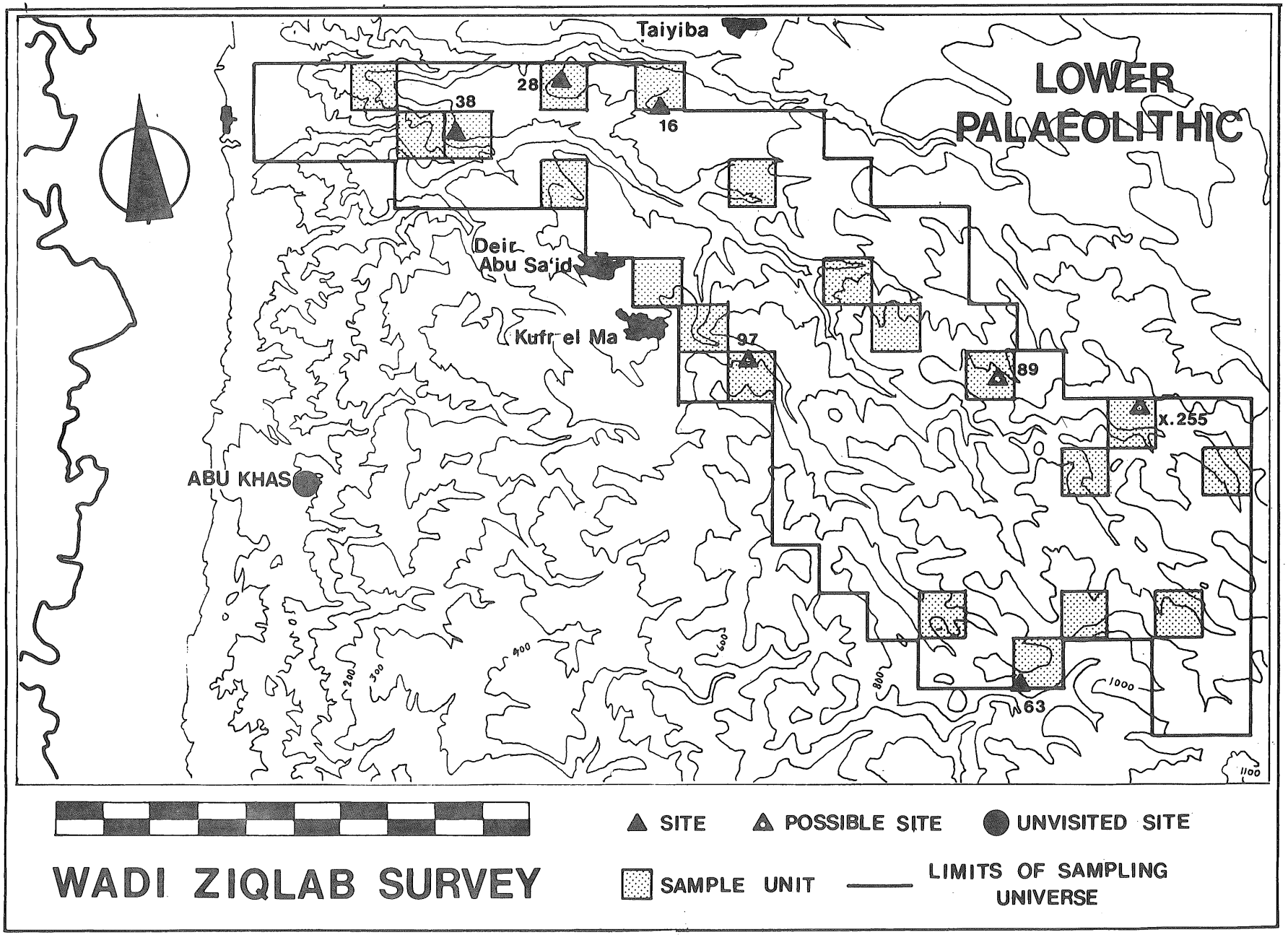

LOWER
PALAEOLITHIC
Taiyiba
28
38
16
Deir
Abu Sa'id
Kufr el Ma
97
89
x.255
ABU KHAS
63
1000
1100
WADI ZIQLAB SURVEY
SITE
POSSIBLE SITE
UNVISITED SITE
SAMPLE UNIT
LIMITS OF SAMPLING
UNIVERSE

Fig. 3

communication corridors, for both man and his game, between the deeper valleys and the plateau. Sites 28 and 38, on the other hand, are located above high cliffs, where there must have been good visibility of herd movements below but little direct opportunity for hunters to act on those movements (cf. Rollefson, 1981: 7). All of the lithic finds above the Jordan Valley's lower slopes which seem to belong to the Acheulean show a tendency to be located on or very near outcrops of chalk and marly limestones. Unless there is some theory to acount for this tendency, however, the correlation may be a spurious one.

Middle Paleolithic (Fig. 4)

The greater diversity of sites and site environments relative to the preceding Acheulean suggests that there was more consistent exploitation of the highlands east of the Jordan Valley during the Middle Palaeolithic rather than, possibly, a single type of exploitation by itinerants during the Acheulean. The most important Levalloiso-Mousterian sites are located close to the Jordan Valley. When freshwater Lake Samra lay at the mouth of the Wadis Ziqlab and Taiyiba at the beginning of the Upper Pleistocene (Bender, 1974: 26, 95-97) sites 35 and 36 would make good bases for the hunting of herd animals which sometimes congregated near the lakeshore as well as lacustrine game like waterfowl or even fish. It is reasonable to assume that Lake Samra embayments at the mouths of the Ziqlab and the Taiyiba contained marshes where the streams slowed down upon entering the lake. Such an environment would be an attratctive place for exploitation by Mousterian hunters and gatherers. Sites 1 and 2 are on two knolls which would have been on a peninsula jutting into Lake Lisan during its maximum extent, but site 1 is on a western slope, the lakeward side of the knoll, and may have been occupied after the lake began to retreat below the —200 m. level. Lake Lisan was much more brackish than its predecessor Lake Samra and gradually shrank towards the modern Dead Sea over the Upper Pleistocene.

Some of the sites, like 93-95, 89, are clearly factory sites and probably quarry sites. The chert from which the flakes and cores at these sites are made is of rather poor quality and invariably has a deep orange patina, possibly from lying in terra rossa soil. While there are many bands of chert in the A7 series crystalline limestone which outcrops at all of these sites, the precise identification of the chert source for these sites has not been established. No good Levallois blades or points occurred on these sites, but crude cores and large flakes lay on the surface in great numbers.

Above the cliffs overlooking the Lower Ziqlab are several Levelloiso-Mousterian sites. We have already noted that some of these, like 35 and 36, may have been located so as to permit easy visibility of herd movements along the valley. While the valley slopes are much too steep for hunters to have moved down them quickly enough to surprise any game below, possibly lookouts at these points could signal to hunters at strategic points along the *wadi* course. Site 87, on a small, round spur overlooking a meander in the Wadi 'Ain Sirin, is probably an admirable choice as an ambush point. Sites 33, 35, 36 and 38 are all located on or very near the interface between the B3 chalky limestones and the PG conglomerates, where flint and chert are much rarer than in the B2 silicified limestones (there seems to have been virtually no exploitation of B2 deposits, where chert beds are up to 2.00 m. thick locally. Bender, 1974: 78). None of these sites is likely to be a quarry site, and cores are not common on them. The artefacts usually show a smooth grey-tan patina, but the source of the raw material is unknown. It is in any case of a higher quality than the chert from sites 89, 93-95.

Upper Palaeolithic to Neolithic

No immediately obvious patterns emerge from the distribution of Upper Palaeolithic sites in the Wadi Ziqlab catchment. In at least ten instances they are located on former Middle Palaeolithic sites, and it seems as though there was still

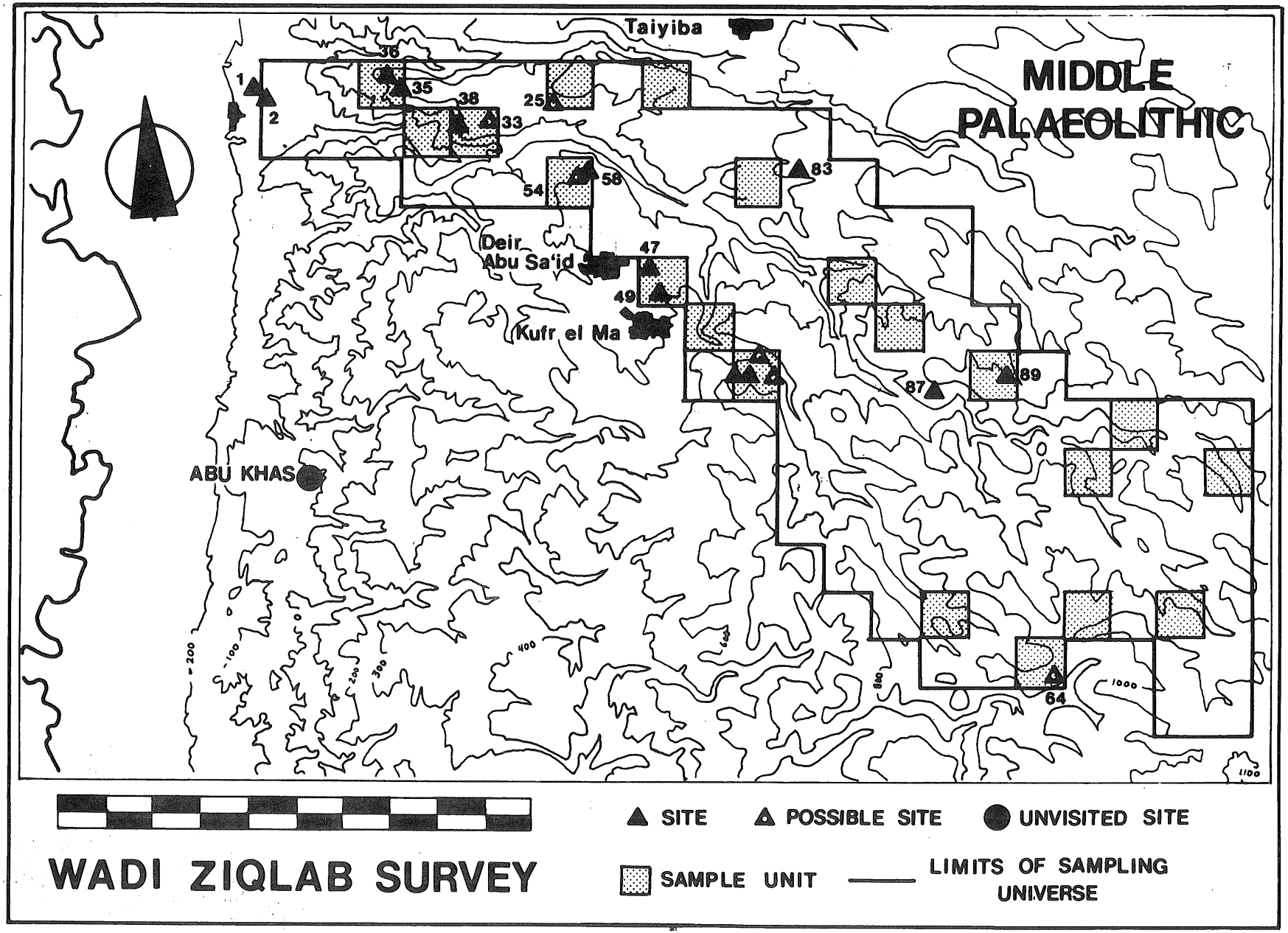

MIDDLE PALAEOLITHIC
Taiyiba
Deir Abu Sa'id
Kufr el Ma
ABU KHAS
1
2
35
36
38
33
25
54
58
83
47
49
87
89
64
SITE
POSSIBLE SITE
UNVISITED SITE
SAMPLE UNIT
LIMITS OF SAMPLING UNIVERSE
WADI ZIQLAB SURVEY

Fig. 4

a preference for sites on top of cliffs overlooking the *wadi,* although more sites began to occur along shallow branch *awdiyah* which would have provided access to the gorge. Since the Pleistocene Lake Lisan shrank there was deeper incision of the *wadi,* perhaps making such access corridors more valuable. One interesting phenomenon which requires investigation is the apparent avoidance of the highlands in the southeast half of the Ziqlab catchment. If it is real it suggests that the environment of the highlands was different than it had been during the first half of the Upper Pleistocene. The most probable difference would seem to lie in the density or composition of the vegetation, which would be sensitive to climatic fluctuation, while also having strong effect on the movements of animals, including humans.

Most of the artefacts from these sites are flakes with few or no diagnostic traits, and many are best dated "Upper Palaeolithic or later" (Rollefson, personal communication).

None of the sites discovered during the survey produced artefacts diagnostic of the Kebaran, Geometric Kebaran, or Natufian.

Scattered occurrences of "late" flints, most of which are probably Neolithic or Chalcolithic, occurred throughout the survey area, but again there were no good diagnostics of the PPNA, PPNB or Pottery Neolithic. We have not identified any sherds as definitely Neolithic, although some crude ones could yet turn out to belong in that period. Ibrahim, Sauer and Yassine reported possible Neolithic/ Chalcolithic sherds at Khirbet 'Araq er Rashdan (site 5, their site 44) (1976: 49), but this site is right on the edge of the Jordan Valey. It is possible that the highlands were still too heavily forested during the Neolithic to permit agricultural exploitation.

Chalcolithic and Early Bronze Ages

Occupation of the Wadi Ziqlab catchment seems to have been very slight during both these periods. Probable Chalcolithic sherds from sites 6 and 31 are rare and probably represent only transitory exploitation of the hills east of the Jordan Valley by hunting expeditions or herders. Early Bronze occupation also appears to have been slight. Mittmann (1970: 60) noted some EB I and III sherds at Khirbet Mahrama, our site 60, but in two visits to the site we found no sherds which were certainly Early Bronze. Glueck claimed that there was EB I-II occupation at Tell el Fukhkhar (1951: 194) but all we found on the site were Roman and Byzantine sherds (our site 43). Glueck also reported "considerable numbers of EB I(-II) sherds" at Sibya (1951: 193) but we were unable to visit this site, about 500.00 m. west of site 16, for military reasons. Glueck even reported two dolmen fields in the survey area (1951: 196, 200-201). The places he describes should lie at about 2160/2090 and 2190/ 2140 by Palestine Belt Grid coordinates (Clark 1880 spheroid), but at present there is no sign of them. The stone piles which appear at the former "site" are obviously modern field clearances and bear no resemblance to dolmens, or even to "broken-down circular bases, on which, in all probability, large dolmens once rested" (Glueck, 1951: 196). In all probability, Glueck was mistaken in his identification of dolmens in the Ziqlab area.

A large number of flints provisionally idenitified as "Neolithic or later" may well belong in the Chalcolithic or Early Bronze, but none occurred in assocation with sherds of these periods, and the dating is uncertain.

Middle to Late Bronze (Fig. 5)

Again good diagnostics are generally lacking for this period in the *wadi,* and we will follow the convention of the Australian expedition to nearby Pella in grouping Middle and Late Bronze (A. Walmsely, personal communication) whose wares tend to be similar.

Glueck reported "clear MB I" and possible LB II occupation at Sibya, but otherwise no one has suggested MB or LB presence in the Wadi Ziqlab. The preliminary results of the 1981 survey, however, suggest rather greater use of the

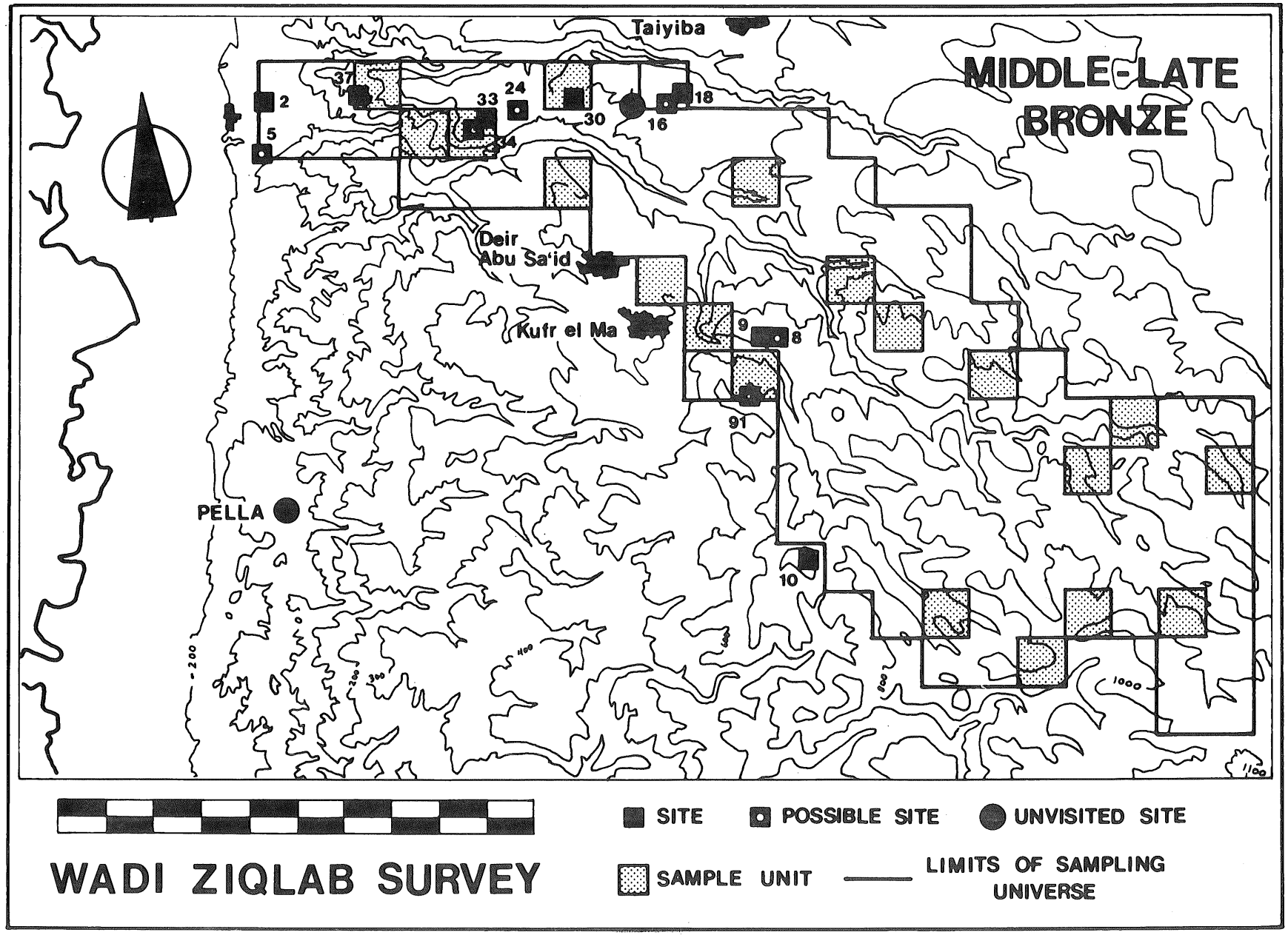

Taiyiba
MIDDLE-LATE BRONZE
37
2
33
24
30
18
16
5
34
Deir Abu Sa'id
Kufr el Ma
9
8
91
PELLA
10
200
300
400
500
1000
1100
SITE
POSSIBLE SITE
UNVISITED SITE
WADI ZIQLAB SURVEY
SAMPLE UNIT
LIMITS OF SAMPLING UNIVERSE

Fig. 5

wadi during this time than we expected. The evidence is, admittedly, scanty and we have been forced to mark many of the sites as "possible" or doubtful, but one hypothesis worthy of further investigation is the possibility that colonization of the highlands by agriculturists ocurred during the second millenium B.C., while oak forests had discouraged intensive exploitation of the area in Early Bronze times. Obviously alternative hypotheses are numerous, and the low density of MB-LB sherds on most of these sites may suggest small camps more than permanent farming settlements. Middle Bronze, and to some extent Late Bronze, towns in the Jordan Valley may have utilized such camps in the highlands to extend their catchments into areas where they could exploit oak for charcoal fuel or pasture for the grazing of sheep and goats. These are among the hypotheses to be explored in the final report. It should also be noted that sites 9 and 10 could be MB-LB forts or watchtowers rather than agricultural settlements, although the architecture visible on them more probably belongs to the Iron Age. In general the MB-LB sites tend to be located in the foothills and on the ridges overlooking the lower Ziqlab.

Iron I-II (Fig. 6)

It is during the Iron Age that occupation of the Wadi Ziqlab drainage basin became well established. All of the areas in which we see modern villages seem to have been exploited during the Iron Age, and some of the sites (60, 70 and Glueck's Sibya, 19651: 193) seems to have been important villages. In addition there are possibly Iron II forts or watchtowers at 9, 10 and Sibya. The placement of these along with sites 111 and 60 suggests that a major communications route between the Jordan Valley and the highlands around the Iron I-II sites of Khirtbet Heraqla (Glueck, 1951: 105-106) may have passed along the Wadis Sumeil, 'Ain Zubiya, and Wa'ra.

The sherd scatter at site 28, where we found many Iron I-II diagnostics, seems to result from the recent robbing of shaft tombs there by charcoal burners camping on the site.

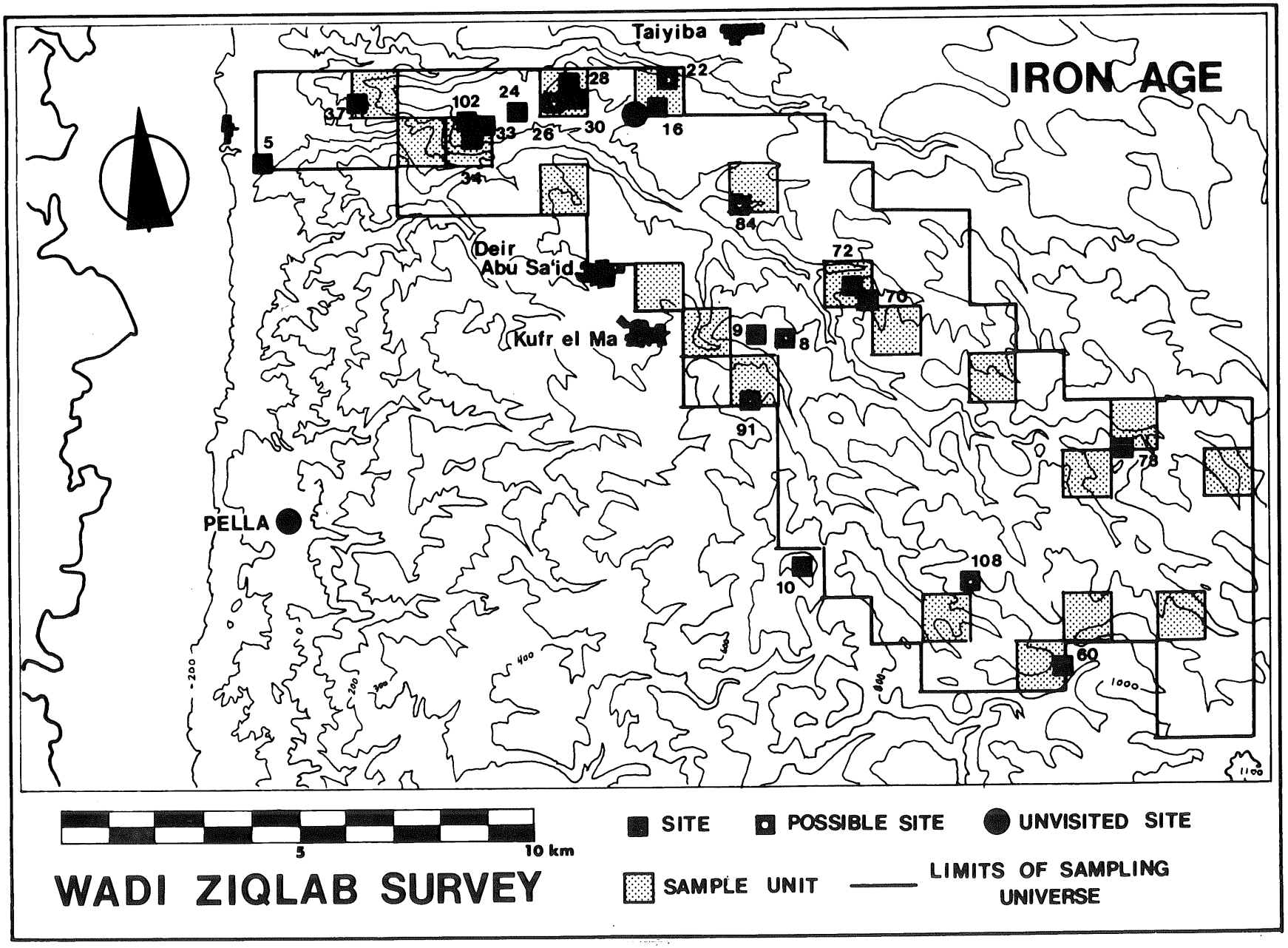
Persian and Hellenistic

We recognized no Persian sites in the survey area during the 1981 season, but are able to report some late Hellenistic occupation of the Wadi Ziqlab. The modern village of Jenih es Safa seems to overlie a late Hellenistic site (Mittmann, 1970: 41), and while we did not find any Hellenistic sherds on site 80, Mittmann reported a sparse scatter including sherds from the second century B.C. onwards (1970: 42). Sites 4 and 5 near the mouth of the Ziqlab showed some late Hellenistic and early Roman occupation at Sibya, very near Jenin es Safa (1951: 193). Site 10, Ras Birqish, also appears to have been occupied at this time. In general, occupation from the end of the Iron II to about the beginning of the second century A.D. seems to have been very slight in the Ziqlab region.

Roman-Byzantine (Fig. 7)

Occupation of the Ziqlab basin grew to a definite peak in the Byzantine period and continued to be very dense during Umayyad times. Almost half of the sites recorded during the 1981 survey were occupied during the Byzantine period. Sites 4, 43, 79, 106 and 109 were probably important villages in late Roman and Byzantine times, occupying the hinterland between the large towns of Tabaqat Faḥl (Pella) to the southwest, Jerash (Gerasa) to the southeast and el Ḥusn to the northeast. What tenuous evidence we have for the date of two aqueducts (sites 44 and 57) suggests that they belong in this period. Clearly it was at this time that the most intensive agricultural exploitation of the area became established. There is some evidence for placing many of the isolated cisterns in this period as well (sites 16, 19, 61, 79, 98 and possibly 20, 69, 77, 80 and 92).

Some architectural fragments also suggest that there were at least some large public buildings in the area. At site 43 we observed wall lines of a large structure capping the acropolis as well as several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SITE
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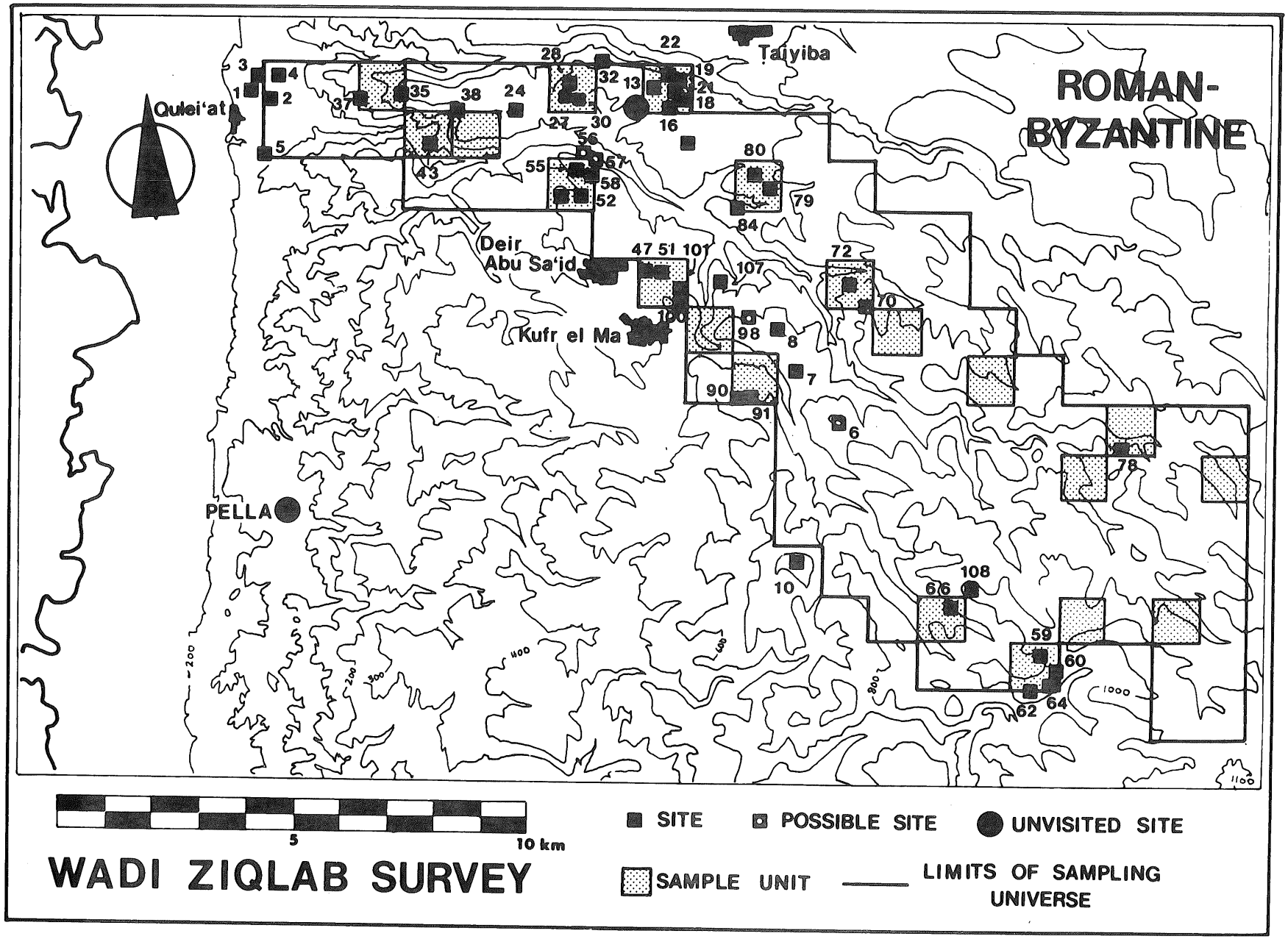
SAMPLE UNIT
LIMITS OF SAMPLING UNIVERSE

Fig. 6


ROMAN-
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UNIVERSE
WADI ZIQLAB SURVEY

Fig. 7

unfluted column drums. These must have been less visible when Glueck visited the site, as he reported only "the ruins of some nondescript buildings" within what appeared to be a fortification wall on top of the hill (1951: 194). Mittmann found evidence for churches at Jenin es Safa (1970: 41) and Marhaba (site 106) (1970: 42-43), as well as a lintel inscribed in Greek at Zubiya (site 108) and a (later Byzantine?) corinthian column capital at Rihaba (site 109) (1970: 58).

Given the high density of Byzantine sites in the area one might have expected fairly dense occupation on terra rossa soils which cover so much of the highlands. In fact Byzantine peasants seem to have avoided building sites on these soils, preferring to build on or next to patches of brown stony soil or on the brown steppe soils in the foothills. Possibly they were reserving the terra rossa soils for intensive grain cultivation. The terra rossa has a heavy texture and a high saturation percentage, so that it will store available water in quantities adequate for the growth of crops well into summer (Fisher, *et. al.*, 1966: 21-22). At the same time the high clay content of terra rossa might not be conducive to human settlement where good drainage is required. But the brown stony soils have similarly high saturation percentages and clay content (Fisher, *et. al.*, 1966: 26). Perhaps, then, the explanation lies in the greater fertility of the brown stony soils, particularly in available potash (Fisher, *et. al.*, 1966: 27, profile 14). This higher nutrient content conceivably may have overridden the difficulty of plowing among the stones.

Late Byzantine-Umayyad

Occupation of the Wadi Ziqlab during this period is a continuation of the earlier Byzantine and was apparently of similar intensity. The number of sites occupied was still high but seems to have declined somewhat by Umayyad times. About ten sites may be new foundations in late Byzantine or Umayyad periods, of some thirty-six sites, but all of the larger villages were still on former Roman sites and even the "new" sites probably only represent small shifts of a few hundred metres from sites already existing in the previous two centuries or so.

Ayyūbid-Mamlūk (Fig. 8)

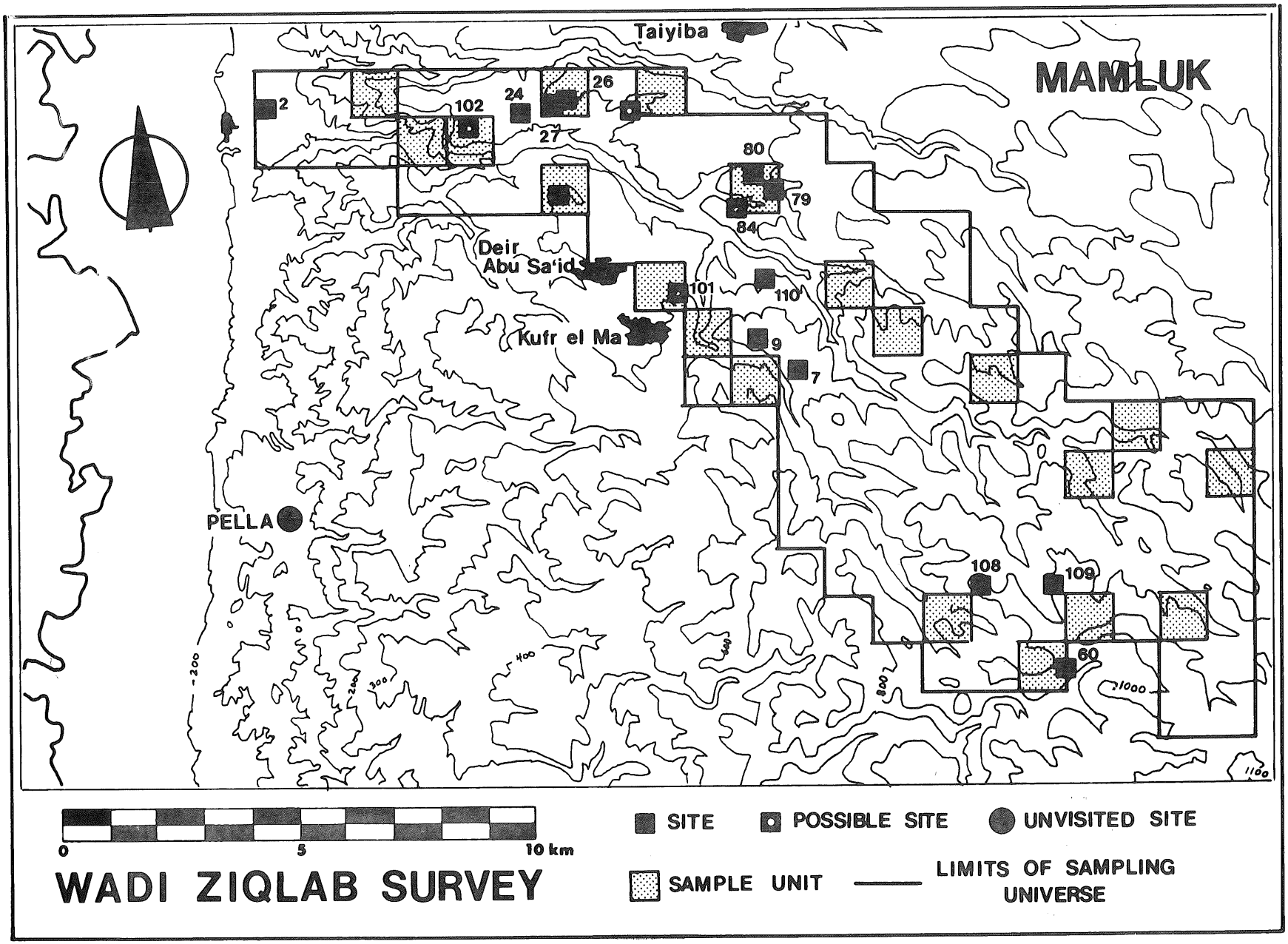
There is little evidence for occupation of the Ziqlab between Umayyad and Mamlūk times, but it is hard to believe that the population dwindled away entirely during this time, particularly since the Mamlūk settlement system seems to have developed right out of the Byzantine-Umayyad one, albeit on a smaller scale. While there are only about one-third as many Mamlūk sites as Byzantine ones, they are nonetheless distributed in almost exactly the same way. It is possible that a revival of agricultural exploitation in Mamlūk times corresponded with a clustering of population into fewer, larger, villages, while it had been common for farmers during the Roman and Byzantine periods to maintain smaller hamlets and individual farmsteads close to the fields. If this is the case, the Mamlūk settlement subsistence system may mark the transition from a Byzantine agricultural strategy to the strategy employed in the area by farmers during Ottoman and modern times.

The most important Mamlūk settlements seem to have occurred at sites 24, 60, 79, and possibly 108 and 109 (now obscured by modern settlement). At site 60, Khirbet Mahrama, in particular, there are many traces of rather large stone buildings which probably date from this time, since Mamlūk pottery is dominant on the site and since there was no major occupation there since the Mamlūk period.

Closing Remarks

The following are among the hypotheses to be tested over the coming year.

1) Chalcolithic and Early Bronze sites occur where we would expect natural clearings and not where there was probably climax oak-pistacio forest. Clearing of forest would not be


Taiyiba
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10 km
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POSSIBLE SITE
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LIMITS OF SAMPLING
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Fig. 8

worthwhile for small-scale grain agriculture by dry-farming or for pasture.

2) Expansion into heavily forested zones occurred during the Middle Bronze period.
3) Expansion into heavily forested zones occurred during the Iron I period.
4) Simple techniques of irrigation and soil collection were applied to fields in the bottoms of small valleys during the Iron II period.
5) Irrigation by rock-cut aqueducts became available during the Roman-Byzantine period to facilitate the production of cash crops.
6) Irrigation was abandoned at the end of the Umayyad period in favour of subsistence dry-farming.
7) Roman-Byzantine pastoral camps[1] occurred very close to agricultural villages and in fields suitable for grain cultivation (presumably after harvest season).
8) The ethology of sheep and goats[1] will permit seasonal migration of pastoralists between the Jordan Valley and the eastern plateau in such a way that crossing of the highlands bordering the Valley will occur after the grain harvest.

Some other hypotheses will require testing by further fieldwork.

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[1] In order to make these tests operational we need to know more about ways to recognize and interpret ancient pastoral camps, and about herd management and sheep-goat ethology. Some of the sites discovered during the 1981 survey of Wadi Ziqlab appear to be ancient "bedouin" encampments, with very low density scatters of small (trampled?) sherds and sometimes low, stone enclosures. Other surveys in Jordan have also revealed the possible camps of ancient pastoralists. An ethnoarchaeological survey concentrating on the Beidha region in southern Jordan will address these and other problems bearing on ancient pastoralism (Banning and Köhler, forthcoming; cf. Hole 1974; Juli 1978; Miragliuolo 1979).

Acknowledgements

Thanks are due to J. S. Holladay, L. Levine and T. C. Young at the University Of Toronto for their comments on the research proposal for this survey. Dr. Adnan Hadidi and Ms. Maha Jeyousi at the Department of Antiquities of Jordan were very helpful both before and after the field season. Dr. David McCreery and the American Center of Oriental Research were instrumental in getting the Project into the field and in providing the environment for the work which followed the field season. Dr. G. O. Rollefson (American Center of Oriental Research) kindly "read" flints from the survey while Dr. A. Leonard (University of Missouri-Columbia) and Mr. A. Walmsley offered comments on some of the pottery. Major Ghazi and Corporal Farouk at the National Geographical Centre, Zarqa, were very helpful with our many requests for maps and aerial photographs. The Ministry of Tourism and Antiquities, thanks to the offices of Mr. Michel Hamarnaeh, director, provided us with a four-wheel-drive vehicle for five days. We would also like to thank Mr. C. Gustavson-Gaube for comments on the early stages of analysis and publication plans. Our representative from the Department of Antiquities of Jordan at Irbid, Mr. Hikmat Ta'ani, was very helpful and patiently walked some 80 km. with us over steep hills and through oak scrub. The project was funded by a doctoral fellowship from the Social Sciences and Humanities Research Council of Canada (452-81-1970) and a W. F. Albright fellowship from the American Schools of Oriental Research.

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THE WADI EL ḤASA ARCHAEOLOGICAL SURVEY 1982: A PRELIMINARY REPORT

by
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Edward B. Banning, Brian F. Byrd,
Cesare D'Annibale

Introduction

The Wadi el Ḥasa Archaeological Survey was in the field for its third and final season between May 2 and June 11, 1982. The first infield season was carried out in October-December, 1979 (McDonald, Banning, Pavlich, 1980) while the second season was in the field April-June, 1981 (MacDonald, Rollefson, Roller, 1982).

Survey team members for the 1982 season were Burton McDonald, Gary O. Rollefson, Edward B. Banning, Brian F. Byrd, and Cesare D'Annibale. Nabil Baqa'in served as representative of the Department of Antiquities of Jordan, while Abu Arif was cook. The team members stayed at a rented house in Al Ḥasa on the Desert Highway during the six-week, infield season. Rollefson was the lithic analyst for the season while James A. Sauer, President of the American Schools of Oriental Research, read the pottery for the first half of the season while Burton MacDonald, Edward B. Banning, and Vincent A. Clarke completed the pottery reading for the final half of the season.

The project was financed during all three seasons by a grant from the Social Sciences and Humanities Research Council of Canada (Grant No. 410-80-0735-R2). A grant to develop a computer program for the storage, management, and retrieval of the data from all three seasons of the Survey was received from the University Council for Research of St. Francis Xavier University, Antigonish, Nova Scotia.

The territory surveyed in the 1982 season was from where the 1981 season had left off, that is, from the Wadi el 'Ali on the west to the region around Qal'at el Ḥasa, close by the Desert Highway, on the east. As in previous seasons the Wadi el Ḥasa served as the northern boundary while the southern boundary was from 2 to 8 km. south of the Wadi. As the survey team worked further to the east the territory to the south became more and more a flood plain and it was disturbed badly by gravel-pitting activity. During the 1982 season approximately 69 km² were surveyed (Fig. 1). This was less than in the previous two seasons but the work was done more intensively. In the territory 522 archaeological sites were surveyed (Fig. 1) making a total of 1074 sites for the three-year project. The main *awdiyah* (wadis) other than the Wadi el Ḥasa surveyed during the 1982 season were the Wadi el 'Ali (Pl. LXIX,1), Wadi Aḥmar, Wadi er Ruweiḥi, and Wadi Abu ed Diba. Their associated ridges, slopes, and plateaus were also surveyed.

Objectives of the Survey

The main object of the Survey was to locate all evidence of human presence in the area from earliest times down to the modern period or until A.D. 1918, the time when the Ottoman Turks were expelled from Jordan. All surveyed sites were plotted on 1:25,000 scale maps.[1] They

[1] Map sheets at the scale of 1:25,000 used in the 1982 season were Muhai (225/035) and Qal'at el Ḥasa (225/025). These maps were prepared for the Ministry of Economy and the U.S.A. Operation Mission to Jordan. Stereo-compiled by Hunting Aerosurveys Limited from aerial photographs dated 1953 with existing data supplied by the Department of Lands and Surveys, reproduced and printed by 42 Survey Engineer Regiment May 1959. At the scale of 1:50,000 Map Sheet 3151 I Series K737, 'Aina, was used. It was prepared by the Army Map Service (AMTV), Corps of Engineers, U.S. Army, Washington, D.C. and compiled in 1959 from the best available large scale sources. Planimetric detail revised by photo-planimetric methods. Map not field checked.

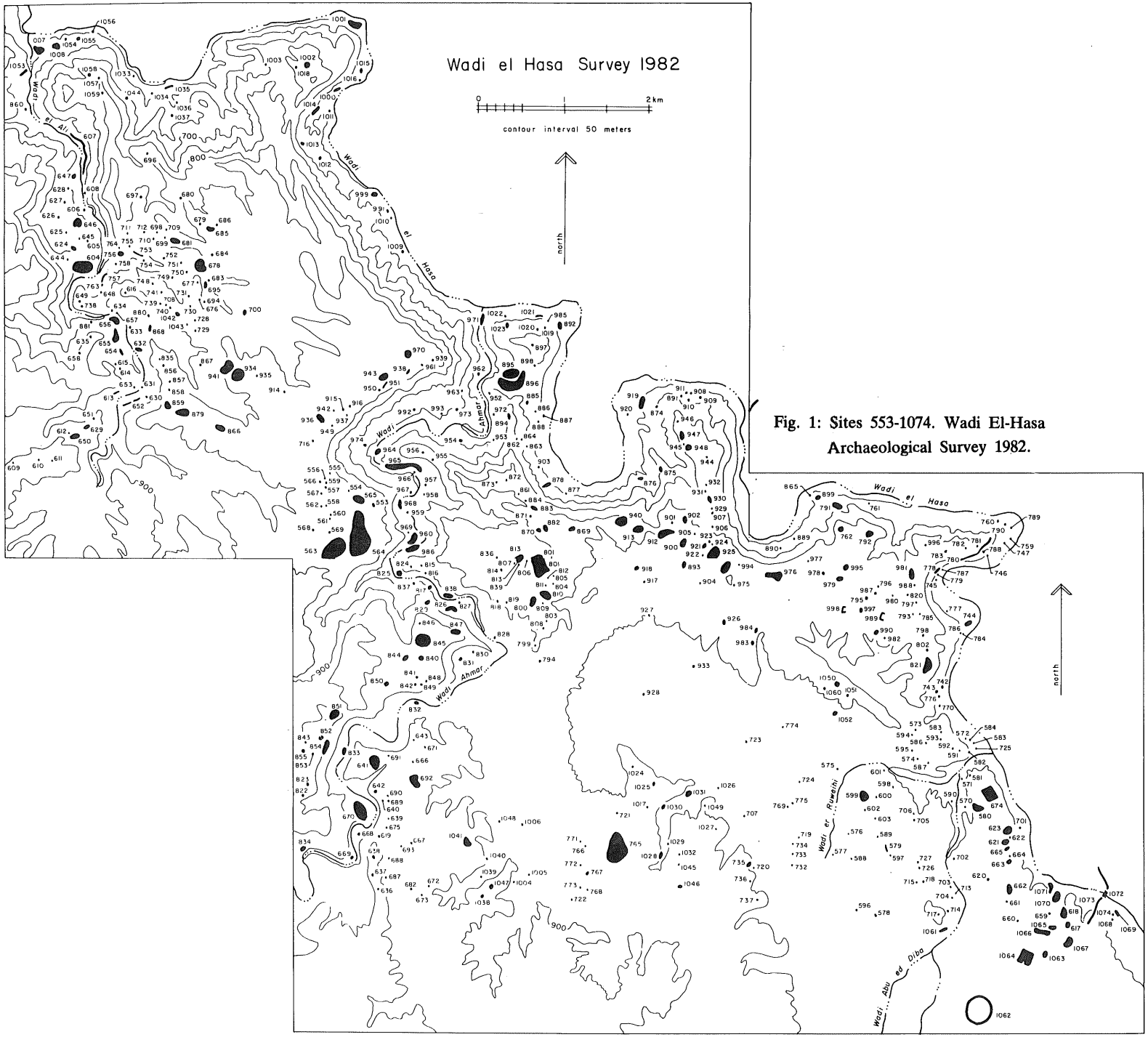

Fig. 1: Sites 553-1074. Wadi El-Hasa Archaeological Survey 1982.

were described, photographed, and sketched where feasible. The sites were "sherded' using a purposive or total collection method for lithics, sherds, glass, coins, beads, and so forth. These artefactual materials helped determine dates of occupation and were used to work out settlement patterns for the various prehistoric and historic periods.

Each site was evaluated on a scale of 1-100 so as to suggest to the Department of Antiquities of Jordan, and to other interested parties, which sites have, in the survey-team's estimation, the greatest potential and/or need for further research and/or excavation.

The final objective of the project is the writing of a preliminary archaeological history of the area.

Methodology

During the 1982 season we employed a combination of statistical sampling and purposive survey for the location of sites. For the purposes of sampling the eastern third of the Wadi el Ḥasa's south bank, we selected borders for the sampling universe running from the coordinates 2390/0280 (Palestine Grid) south to 2390/0260, west to 2300/0260, north to 2300/0320, west to 2270/0320, and north to 2270/0380. The channel of the Wadi el Ḥasa formed the northern boundary both of the sampling universe and of the purposive survey area. Originally we had planned to walk systematic transects over the entire sampling universe, coincident with the north-south lines of the Palestine Grid at half-kilometre intervals, each transect being walked by a team of six, spaced at intervals of approximately 15-50-15-50-15 metres, making a total transect width of about 145 m. Unfortunately, by the second week, it became apparent that at our average pace we would not be able to finish the systematic sample within six weeks. In order to ensure that we would have some statistical basis for analysis of the site distributions, we divided the one-kilometre squares of the Palestine Grid among two strata, "Ḥasa gorge" and "plateau," and randomly selected three squares from the former and eight from the latter using a spatial design. This provided representation from each stratum roughly proportional to its areal extent. The southwest corners of the squares selected are at the coordinates 2320/0320, 2360/0320, 2370/0310, and 2270/0350, 2280/0350, 2310/0310, 2320/0310, 2330/0280, 2350/0280, 2350/0290 and 2370/0280. Within each of these squares we walked one north-south transect through the centre and one more centred on its west edge, using the same spacing between team members as on the unfinished systematic sample. All the transects from the systematic and random sampling total 69 km. in length and were completed in about fifteen field days. We spent the remainder of the field season doing purposive survey, on foot, in areas where sites were known, where Sites could be expected, or where the random and unfinished systematic samples had left large gaps.

Our operational definition of "site" was any scatter of lithics or sherds which showed notably higher density than the surrounding "back-ground" of occasional isolated sherds or flints. By this definition sites could occur where there were very few sherds or lithics, as long as they seemed to cluster in a density which contrasted with their surroundings (particularly where the background scatter had a density of 0). In some cases, particularly on the plateau west and south of Rujm Bakher, Site 716, the background was very high, so that the "sites" are nodes or high-density clusters in what is a huge and continuous scatter of flints. Alternatively loci exhibiting evidence of architecture were counted as sites. In general, we did not record any sites which were obviously post-Ottoman unless there appeared to be earlier occupation as well.

On each site, whenever possible, we collected small purposive samples of sherds or lithics, attempting to include as many diagnostics as possible. In the case of lithics we emphasized cores, flakes or blades with intact platforms, and tools. In the case of ceramic scatters we attempted to find rims, handles, bases and decorated sherds whenever possible. This strategy improved our ability to date the sites

accurately, but the samples are not necessarily representative of the lithic and sherd assemblages as a whole. The counts given with the "readings," then, are only a guide to suggest when a particular period is represented by only one or two artefacts, or by a dense scatter.

Lithic Sites of the 1982 Season

Introduction

Lithics samples were collected from 298 of the sites located during the 1982 survey season. Dating of the samples was based on time-specific diagnostic elements when they were present. In the absence of such typological or technological markers, general chronological determination could be tentatively assigned within certain lithics samples based on relative patination, abrasion, and associations with other, non-lithic artefacts such as potsherds.

As was the case in the 1981 season (MacDonald, *et. al.,* 1982), many of the samples consisted solely of flakes and/or blades, with tools and cores either rare or absent. Although certain time periods are characterized by specific technological features, other manufacturing traditions are shared across cultural-temporal boundaries. Consequently, in some cases only the most general assignments could be made, such as "Paleolithic" (Lower, Middle, or Upper Paleolithic) or "Late" (Late Upper Paleolithic through Early Bronze Age.) In samples with very few chipped stone artefacts, even this breakdown was not possible, and the "unidentifiable" category was the only safe characterization. In many instances, however, somewhat finer distinctions could be determined, and collections or parts thereof could be assigned to Lower/ Middle Paleolithic, or Middle/Upper Paleolithic,... Epipaleolithic/Early Neolithic, etc.

Chronology

Table 1 provides a summary of the distribution of lithics samples collected this season. Among the 298 sites with chipped stone material, fully 749 separate cultural-temporal subsets were discernible. Of the total number of sites, 79 (26.5%) were single-period occupations, with the remaining 219 sites containing two or more episodes of prehistoric habitation.

Table 1
Absolute and relative frequencies of sites containing aretfacts from specific and general cultural periods.

Period	*n*	*%*
Lower Paleolithic	30	10.1
Lower/Middle Paleolithic	50	16.8
Middle Paleolithic	188	63.1
Middle/Upper Paleolithic	35	18.6
Upper Paleolithic	63	21.1
Upper/Epipaleolithic	20	6.7
Epipaleolithic	7	2.3
Epipaleo/Early Neolithic	17	6.0
Early Neolithic	48	16.1
Pottery Neolithic	2	0.7
Chalcolithic	1	0.3
Chalcolithic/Early Bronze	5	1.7
Early Bronze	18	6.0
Late	172	57.7
Paleolithic	11	3.7
Unidentifiable	82	27.5

Total number of lithics collections: 298

Definite presence of Lower Paleolithic habitation was found at thirty sites this season. At 10.1%, the relative frequency of occupation compares closely with the 1981 survey season (10.9%). The Late Acheulian is the most prominent stage in this period, accounting for all but one of the sites. The lone candidate for earlier occupation is Site 801, which includes three very crude Abbevillian bifaces, indicating a Middle or Lower Acheulian age. Late Acheulian at the site is demonstrated by a finely worked Micoquian biface as well as a thick amygdaloid piece. That at least two periods of the Lower Paleolithic are represented here is suggested by differential patina on the bifaces, supported by similar differences among the cores and flakes in the sample. Unfortunately, the site is entirely deflated, so there is no possibility of locating

stratified artefacts to resolve the issue.

The use of the Levallois technique for the production of flakes, blades, and points characterizes the Late Acheulian of southern Jordan (Rollefson, 1981) as well as the whole of the Middle Paleolithic. For this reason, when bifaces were not present among a sample containing Levallois pieces, it was sometimes difficult to assign the artefacts to either the Lower or Middle Paleolithic. Thus in fifty instances (16.8% of the site total) collections could be dated only to the Lower/Middle Paleolithic.

During the preliminary analysis, there was a growing subjective feeling that among the Levallois pieces, temporal distinctions between the Lower and Middle Paleolithic might be associated with decreasing size (especially width) and increased attention to platform preparation and symmetry. A similar temporal trend has been detected *within* the Middle Paleolithic of the southern Levant (Jelinek, 1981; 1982), and the collections from the 1981 and 1982 seasons in the Wadi el Ḥasa survey, combined with other collections from southern Jordan, might demonstrate whether this trend continues into the Lower Paleolithic. A detailed metric and technological analysis of this material is planned and the results will be reported in the near future.

The Middle Paleolithic (Levantine Mousterian or Levalloiso-Mousterian) occupations dominated the lithics samples by far, occurring at 63% of the sites. A similar figure was noted for the middle section of the Wadi el Ḥasa drainage in 1981 (65%). As has been pointed out above, the Levallois technique dominated this period of cultural development in southern Jordan, and cores and flakes indicating a non-Levallois technology are relatively rare.

Several *in situ* Middle Paleolithic base camps were discovered this season, including three, Sites 621, 622, and 623, along the shore of a Pleistocene lake near the eastern edge of the survey area. Another, Site 634, is located in a small rockshelter in the Wadi el 'Ali. Charcoal and preserved bone are evident at Site 621. The potentials these sites have for understanding human exploitation of the area are thrilling to contemplate.

The transition from the Middle Paleolithic to the Upper Paleolithic is also well attested by the evidence from the 1982 season. Emireh elements (points and blades with thinning retouch on the interior surface of the proximal end) were found at six sites, including the lakeshore *in situ* Sites 621 and 623. In addition to the Middle Paleolithic layers at these two sites, there are also undisturbed Uppper Paleolithic (Aurignacian) occupations stratified above the earlier material, adding further excitement to the area.

Upper Paleolithic habitations are well-represented in the eastern portion of the Wadi el Ḥasa survey area being distributed over roughly one-fifth of the prehistoric sites. In addition to the two sites mentioned above, two other undisturbed lakeshore settlements, namely Site 1062 and 1067, contain enormous quantities of Aurignacian and Aurignacian/Kebaran tools, cores, and debitage. Sites 1062 is very large (perhaps 3-4 hectares in extent), situated at the mouth of a small wadi where it debouches into the former Pleistocene lake. In addition to the extraordinary density of artefacts along the wadi slope and along a long but shallow rockshelter, copious amounts of charcoal, ash, and bone are visible. Site 1067, located in the lake marls to the east of Site 1062, may be associated. The amount of disturbance Site 1067 has suffered can be determined only by excavation, but its location within the lake marls indicates a shrinking or vacillating lake surface.

The typological distinctions between late Upper Paleolithic and early Epipaleolithic occupations were rarely present among the lithics samples, and for twenty sites artefacts could be assigned only to the Upper/Epipaleolithic classification. The thick deposits at Site 1062 may, in fact, include a transitional series in the development from the earlier to later cultural traditions.

Epipaleolithic sites were found in relative abundance this season compared to the evident absence of such habitations in the 1981 survey area. A collapsed rockshelter, Site 784, near the eastern end

of Wadi el Ḥasa contained dense numbers of Geometric Kebaran artefacts, including rectangular and trapezoidal microliths. Although no bones or ash were visible at the exterior edge of the collapse, it is possible that such material is preserved *in situ* beneath the tumbled stone.

Two Natufian sites were located this season which provide additional exciting potentials for future research. Site 895 (Pl. LXIX, 2) is an *in situ* village (*ca.* 80 m. in diameter) located in a protected basin at the confluence of the Wadi Aḥmar and the Wadi el Ḥasa. The moderate presence of Ḥelwan retouch on lunate microliths indicates that the occupation occurred in the earlier part of the Natufian period. A Natufian "outlier," Site 1020, is located several hundred metres to the south of Site 895, and it appears to represent a chipping station rather than a semi-permanent habitation. Erosion at both sites has revealed several stone-lined cysts which may be Natufian burials.

Since microliths are the most distinctive elements of the Epipaleolithic period, it is tempting to use the presence of unretouched bladelets and microblade cores to date collections when retouched tools are not present. Hower, since microblades are also produced in Early Neolithic contexts, one is left with assigning seventeen sites to the Epipaleolithic/Early Neolithic.

The Early Neolithic is well-represented in the 1982 collections, occurring at forty-eight sites (16.1%). While many of these were diffuse scatters disturbed by deflation and erosion, Site 892 is evidently an *in situ* hamlet or small village on the bank of the Wadi el Ḥasa. This site contains exposed patches of ash and bone in association with typical PPNB artefacts. No evidence of permanent structures are visible at this site, but some hut circles may exist at Sites 1007 and 1008, at the juncture of Wadi el 'Ali and Wadi el Ḥasa. The latter sites are deflated, but there is a dense distribution of artefacts over *ca.* 1-2 hectares at each location. Four projectile points from Site 1008 are made in a style not familiar in other areas of Jordan: a short narrow tang is formed by two corner notches, and two opposed lateral notches are formed just above the tang. The remainder of the inventory is typical Early Neolithic, but whether this is PPNA or PPNB is not certain.

Six specialized camps attributed to the PPNB (Betts, 1982; Rollefson, et. al., 1982; Rollefson and Frohlich, 1982) were found this season. These "burin sites" are a curious feature in that the vast majority of the tools are burins (normally on truncations), and sometimes they are the only implements found at a site. As was the case with the burin site cluster in the 1981 survey area, the six sites this year are all located at higher elevations overlooking a major drainage (Sites 559, 561, 564, and 565 are above the Wadi Aḥmar; Site 610 is above the Wadi el 'Ali, and Site 924 overlooks the Wadi el Ḥasa). One projectile point typical of the PPNB was found at Site 610 which provides tentative chronological assignment for this site type (but see Rollefson and Abu Ghaneima, n.d.).

Pottery Neolithic sherds were found at two sites which also contained lithic artefacts; since the lithics are non-diagnostic (originally classfied as "Late"), they have been assigned a Pottery Neolithic age on the basis of the associated ceramic evidence. The dating of other non-descript lithics to specific periods is also based on the association of potsherds: one collection is tentatively dated to the Chalcolithic, five samples to Chalcolithic/ Early Bronze, and eighteen collections to various parts of the Early Bronze Age. In some instances these associations are very tenuous, but in other cases the correlation is quite strong, especially when the sample represents a single period occupation ("Late") located in and among permanent and semi-permanent structures.

In a large number of cases, however, the corroborative evidence provided by datable ceramic samples did not exist with lithic scatters of undiagnostic artefacts, and as a result the residual "Late" category is large (172 samples). Probably a majority of this material is attributable to transhumant Chalcolithic/Early Bronze Age groups. The lithics samples associated with potsherds from this season hold much

promise for detecting diagnostic features of the chipped stone artefacts through intensive metric and technological analysis. The research holds a high priority for future work in view of the substantial distribution of these as yet poorly understood "Late" sites.

Summary and Observations of the Lithic Material

A comparison of the percentages in Table 1 with the results of the 1981 season reveals a fairly close correspondence for the Paleolithic periods, although the Upper Paleolithic occupations are somewhat more frequent (in a relative sense) in the 1981 survey area; however, this is not statistically significant in Chi-Square tests. While Epipaleolithic occupations were not definitely detected in 1981, several good sites were found in 1982. In the later periods, the relative frequencies of occupations in the various periods is also generally equivalent except for the Early Bronze Age. In this case the difference is probably due less to an implied Early Bronze vacuum in the 1981 survey area than to the increased occurrences of permanent and/or semi-permanent habitations in the 1982 survey sectors, particularly on the high ridges above the Wadi el Ḥasa. In these hamlets and villages more evidence was available to date lithics which would otherwise have been included in the "Late" category.

A major difference between the two survey areas involves the higher incidence of *in situ* sites for specific periods found in 1982. Only a few instances of relatively undisturbed Neolithic or later period sites were found in 1981, all along the terraces and banks of major drainages. While this pattern also applies to the easternmost section of the survey area, *in situ* sites range through all of the prehistoric periods except the Lower Paleolithic and the Chalcolithic.

The location of extensive *in situ* Middle Paleolithic, Upper Paleolithic, Epipaleolithic, and Early Neolithic sites along an ancient lakeshore and the major wadi confluences promises to provide an immense wealth of information concerning varying methods of exploiting varying environmental circumstances. These sites also will contribute greatly to resolving a number of problems raised recently concerning the geological history of the Hasa Basin and formations along the Wadi el Ḥasa (Vita-Finzi, 1966; Copeland and Vita-Finzi, 1978).

The numbers of sites located in the 1982 season precluded a detailed study of settlement patterns throughout the occupational history of the area under the time constraints for this preliminary report. Work will progress on this facet in the coming year, however. Some subjective impressions remain to be tested by more intensive research dealing with differential exploitation through time.

Briefly, Lower Paleolithic sites appear to be confined basically to the plateau and ridges high above major *awdiyah* (wadis), although this may be a feature attributable to severe erosion of early sites lower down in the drainage systems. For the Lower/Middle Paleolithic sites, there is also an impression that the middle ranges of elevation are characterized by very temporary occupations, while on the plateau both relatively long occupations took place (base camps) as well as shorter ones (chipping stations and temporary camps). Levallois points are found in relatively high numbers at the lower elevations (particularly notable at the *in situ* lakeshore sites), while these hunting implements appear to occur less frequently on the plateau and high ridges.

Upper Paleolithic and Epipaleolithic base camps may also be more characteristic of the lower elevations, while Neolithic base camps occur both along the wadi banks and in the highlands. Transient stop-overs for all three major periods occur sporadically throughout the survey area. Chalcolithic sites are absolutely rare, as they were in 1981, but Early Bronze Age sites constitute a more intensive occupation (possibly on a semi-permanent basis) in the eastern survey area compared to the 1981 season. Early Bronze Age hamlets and villages are confined primarily to the highland areas.

Large areas of the systematic and purposive survey transects were virtually

void of any prehistoric presence, but it appears that this is primarily due to "archaeological visibility" factors than a true absence of occupation. This observation pertains to immense alluvial fans and smaller seasonal mudpans, where recently accumulated sediments have probably obscured earlier evidence of habitation.

In contrast, other sections of the 1982 survey area provided severe challenges to the detection of distinct occupational episodes. This was particularly the case for the plateau between Wadi el 'Ali and Wadi Aḥmar, where the entire highlands area was characterized by a nearly continuous distribution of chipped stone artefacts. Under these circumstances, collections were made at obvious lithic concentrations, such as the dominant Lower Paleolithic Site 970, but such distinctive artefact clusters were rare. Consquently, lithics samples were collected around irregularly spaced artificial features, such as tower/tomb structures, that stretched in an arc from Site 616 (Pl. LXX,1) overlooking the Wadi el 'Ali to Site 939 high above the Wadi Aḥmar.

Overall, the 1982 season provided an unprecedented array of information concerning Jordan's prehistory, virtually uninterrupted through the last half to three-quarters of a million years. Certainly, there is so much information contained in the *in situ* sites alone that a large number of prehistorians will be kept very busy for a generation or more to clarify human cultural (and physical?) development in this area of the Near East which has not captured much professional interest in the past. The preliminary results produced in the three years of briefly investigating the southern Wadi el Ḥasa and tributary drainages has already provided an intriguing set of hypotheses for this area, and implications for the settlement and exploitation of the rest of Jordan promise to be richly rewarding.

Ceramic Sites of the 1982 Season

Introduction

A total of 6,059 pottery sherds were collected from 206 or from 37% of the 522 sites surveyed. These sites span a period of time from *ca.* 4750 B.C. to A.D. 1918. However, not every historic period was represented by ceramic materials during the 1982 season. There are some periods which are not represented at all by any artefactual material.

Chronology

No definite Middle Neolithic *(ca.* 6000-4750 B.C.) ceramic sites (characterized by dark burnished ware in Syria) have been found in Jordan. Late Neolithic (*ca.* 4750-4250 B.C.) pottery was found in the survey area during the 1981 season and again this season. Late Neolithic pottery was found at two sites, namely Sites 857 and 870, with the possibility of sherds from the same period at two additional sites, namely Sites 1028 and 1061. Site 857 is a tower-site located on the ridge to the east of the Wadi el 'Ali while Site 870, also a tower-site, is located on the northern edge of the plateau overlooking the Wadi el Ḥasa. The number of sherds, fifteen and seven respectively, is small at each site.

Chalcolithic period (*ca.* 4250-3300 B.C.) pottery was collected at five sites, namely Sites 616, 647, 858, 915 and 939 with a total of thirty-one sherds. All these sites are located either in the Wadi el 'Ali, on the ridge immediately east of the Wadi, or on the plateau between the Wadi el 'Ali and the Wadi Aḥmar to the east. Besides these sites Chalcolithic-Early Bronze I (*ca.* 4250-2900 B.C.) pottery was found at five sites, namely Sites 630, 644, 810, 883, and 856, yielding a total of twenty-six sherds. Here again three of these sites (Sites 630, 644, and 856) are located in the Wadi el 'Ali or just to the east of Site 810 is located in the Jebel el Kutuf region east of the Wadi Aḥmar while Site 883 is located on the ridge high above the Wadi el Ḥasa just to the north of Pottery Neolithic Site 870.

Besides the Early Bronze I period pottery found in association with Chalcolithic period pottery, Early Bronze I pottery was found at fifteen sites which yielded a total of ninety-eight sherds. These Eary Bronze I sites are generally small and the number of pottery sherds from the period collected at the sites is small as well. These sites are terrace-walls, camps, hamlets, and stone enclosures. Hamlet sites, namely Sites 688, 782, 783,

791, 855, and stone enclosures. Hamlet sites, namely Sites 688, 782, 783, 791, 855, 869, and 989, yielded Early Bronze I pottery. These sites are generally small and consists of remnants of foundation walls, buildings constructed of unhewn, field-stones, and structures which are probably enclosures. These sites are found, generally speaking, along the south bank of the Wadi el Ḥasa but also east (Site 688) and west (Site 855) of the Wadi Aḥmar. They are generally located on the ridges above these *awdiyah* (wadis) rather than in the wadis themselves. A number of Early Bronze I sites had associated terrace-walls, e.g., Sites 653, 728, and 1031. Moreover, Early Bronze Age (*ca.* 3300-1950 B.C.) pottery was found at seven sites, namely Sites 568, 604, 688, 728, 830, 855, 892. All this evidence indicates that there was a very definite Early Bronze presence in the survey area.

No sherds or other identifiable artefactual material was found in the survey area which indicates either a Middle Bronze period *(ca.* 1950-1550 B.C.) or Late Bronze period *(ca.* 1550-1200 B.C.) presence in the area. Such is not surprising after the findings of the previous two-field seasons (MacDonald, *et. al.,* 1980; 1982).

What is possibly Iron Age I period *(ca.* 1200-918 B.C.) pottery was found at only one site, namely Site 604, Al Mabra. This site is a large village situated on the west slope of the Wadi el 'Ali. It is definitely an Iron Age site and could possibly date from the beginning of the period. Fifty possibly Iron I sherds along with eighty-eight Iron Age sherds were collected at the site. Immediately to the north of this site and on the same side of the Wadi nine Iron Age sherds were collected at Site 624, a small site which may be a farm. To the northwest of Site 604 is a looted tomb, Site 644, from which found at a village site, Site 615, on the west side of the Wadi el 'Ali in an agricultural area. This site is located approximately 1 km. southeast of Site 604. Four Iron Age sherds were found at a probable farm, Site 654, immediately to the northeast of Site 615. Moreover, five probable Iron II sherds were found at Site 648, another probable farm on the east side of the Wadi el 'Ali but in the same general area as the above-mentioned Iron Age sites. Thus there appears to have certainly been an Iron Age presence, especially during the Iron II period, in the Wadi el 'Ali. There is some Iron Age presence immediately east of the Wadi at Site 616, Al Qasr, where four sherds from the period were found. This site provides an excellent view of the Wadi el 'Ali both north and south as well as the surrounding country to the east and west. East of the Wadi el 'Ali there is virtually no Iron Age presence. Three Edomite ware sherds were found at Site 732, a sherd scatter, west of the Wadi er Ruweiḥi, in the eastern segment of the survey area. At Site 601, on the south bank of the Wadi er Ruweiḥi, one Iron II sherd was found. Finally, on a terrace on the south side of the Wadi el Ḥasa eight possible Iron I-II sherds were found at Site 1015. Otherwise, the area east of the Wadi el 'Ali is devoid of Iron Age presence. This seems to indicate that the people of the Iron Age period settled no further east than this Wadi and that Sites 616, Al Qasr, and 647 may be an indication of their eastern frontier.

As in previous survey seasons not a sherd from the Persian Period (*ca.* 539-332 B.C.) was found in the survey area. Alexander the Great conquered the Persians in 332 B.C. and the area became part of the Greek world. A surprising amount of Hellenistic period (*ca.* 332-63 B.C.) pottery was found in the survey area

predominantly an Iron Age site, eleven Hellenistic and fifty-five Late Hellenistic sherds were collected. At Site 605, a cemetery-site, just to the north of Al Mabra, two of the four sherds collected were read as Late Hellenistic. At Site 680, a tower/tomb complex, located on the ridge overlooking the Wadi el 'Ali, eleven sherds were collected and they were all Late Hellenistic. This site is positioned above and to the northeast of both Sites 604 and 605. At Site 967, on the west bank of the Wadi Aḥmar, at what appears to be an Nabataean camp, six Hellenistic sherds were collected. One and two Late Hellenistic sherds were found at Site 620, a Nabataean caravanserai, and at Site 623, a lithic and sherd scatter respectively. Both sites are located in the same general region to the west of the Wadi el Ḥasa.

In southern Jordan the Nabataeans, who are generally believed to have settled down near Petra during the Persian period, avoided the Greek armies and remained independent throughout the period.

Nabataean sites, as in the previous two seasons, were numerous. Forty-five sites had Nabataean pottery, nine sites yielded Nabataean-Roman pottery, Nabataean/Roman pottery was collected at five sites, while Nabataean-Byzantine pottery was found at one site. These sites were found throughout the survey area.

An important Nabataean site is Site 620 which appears to be a caravanserai. The main structure at the site measures *ca.* 50.00 (N-S) x 60.00 (E-W) m. There appears to have been a courtyard within the structure and pieces of alabaster were collected there. An alabaster quarry, Site 1046, was found 3.5 km. west of the caravanserai and seventeen Nabataean sherds were found there. This could be the source for the alabaster found at Site 620 and Site 725, Umm Hraga, (Pl. LXXI, 1) where seven Nabataean sherds were collected. One km. north of Site 620 and just to the south of Site 725, Umm Hraga, where seven Nabataean sherds were collected. One km. north of Site 620 and just to the south of Site 725, Umm Hraga is the large Nabataean fortress of Er Ruweiḥi, Site 674 (Pl. LXXI ,2), located at the confluence of the Wadi el Ḥasa and the Wadi er Ruweiḥi (Glueck, 1934: 69, 77; 1935: 106).[2] The major part of the site appears from a distance to be in the form of an inverted triangle. This part of the site is located on the southwest-facing slope and is hidden from view from the north and the east. A large stone platform is located to the north at the highest point of the site. It is probably a tower and it provides an excellent view in all directions. This fort could have been associated with a caravan route going east-west and perhaps another route going northwest along the Wadi el Ḥasa. Another large Nabataean site is located on a terrace immediately west of the Wadi el Ḥasa. This is Site 892 where 198 Nabataean sherds plus sherds from the Nabataean to Byzantine periods were collected. It was probably a village.

Other Nabataean sites were found throughout the Wadi el 'Ali, the Wadi Aḥmar, the Wadi Abu ed Diba' as well as along he Wadi el Ḥasa and the Wadi er Ruweiḥi. Terracing, especially in the Wadi el 'Ali and the Wadi Aḥmar, e.g., Sites 753, 756, 965, and 1053, could possibly be the result of Nabataean activity. Tower/tomb Sites 616, 858, 859, 869, 976, and so forth on ridges and plateaus are also probably associated with Nabataean presence in the survey area.

Pompey conquered Syria-Palestine in 64-63 B.C. In southern Jordan, the Nabataeans avoided conquest in 63 B.C. and they remained independent of Rome until A.D. 106, when they were annexed by Trajan. All of Jordan then became a part of the Roman province of Arabia, with the exception of the eastern desert areas, where Arabic-speaking Thamudic and Safaitic tribes were located.

Besides the Roman period (*ca.* 63 B.C.-A.D. 324) pottery found in association with Nabataean pottery, Early Roman (*ca.* 63 B.C.-A.D. 135) pottery was found at two sites, namely Sites 665 and 870, Late Roman pottery at ten sites,

[2] Er Ruweiḥi is located incorrectly on the map Qal'at Ḥasa (225/025). It is located on the map as being north of the Wadi er Ruweiḥi rather than south of it where it actually is.

namely Sites 571, 577, 580, 581, 602, 623, 674, 706, 733, and 774, and what we are reading simply as Roman pottery was found at six sites, namely Sites 656, 812, 833, 859, 892 and 992. Moreover, Roman period pottery was found in association with Byzantine period pottery.

The largest number of Roman period sherds was found at Site 892, mentioned above as a predominantly Nabataean site. Along with 198 Nabataean sherds, twenty-four Roman and fifty-one possible Roman sherds, as well as one Nabataean/Roman sherd were collected at the site.

What may be a very large Roman period tower is Rujm Bakher, Site 716 (Pl. LXXII,1) (Glueck 1935: 106-107). Six Late Roman-Byzantine sherds, thirty-three Ottoman, and thirty-two undetermined sherds were found at the site. The tower measures *ca.* 24.00 x 24.00 m. at the base and near the top there is a stepping-in giving the impression of a one-step pyramid. The structure still stands at least three metres high. It is located on the plateau between the Wadi el 'Ali and the Wadi Aḥmar. It provides an excellent view in all directions. It can be seen from the *Via Nova,* Site 429, *ca.* 7.5 km. to the west, and the Roman Camp, called Umm Untuli by the Bedouin presently living in the area, located on the north slope of the Wadi el Ḥasa, *ca.* 4 km. to the east.

For the first time in the three-year history of the project Parthian sherds (2nd-4th centuries A.D.) were found in the survey area, namely at Sites 623 and 662 where one sherd was found at each site. Both sites are located immediately west of the Wadi el Ḥasa and within 1 km. of each other. They are located in the vicinity of Site 620, a Nabataean caravanserai, and Site 674, Er Ruweiḥi, a Nabataean fort-site.

Constantine I, a convert to Christianity, founded Constantinople in A.D. 324 as the eastern counterpart to Rome. Throughout the Byzantine period *(ca.* A.D. 324-640), Jordan continued to enjoy the Pax Romana, with the desert frontier still intact and the desert tribes under control.

Besides the Roman period pottery mentioned above, what we are reading as Late Roman-Byzantine (*ca.* A.D. 135-640) pottery was collected at fourteen sites. Besides the Byzantine pottery associated with Roman and Nabataean pottery, Byzantine Period (*ca.* A.D. 324-640) pottery was found at thirty-four sites. Early Byzantine (*ca.* A.D. 324-491) and Late Byzantine (*ca.* A.D. 491-640) pottery was found at two and three sites respectively, moreover. Byzantine-Umayyad pottery was found at one site and Byzantine-Early Islamic pottery at two sites. Moreover, what is possibly or probably Byzantine pottery was found at a number of sites.

There are no sites in the survey area which have a large and predominant number of Byzantine sherds. A great number of the sites at which Byzantine pottery was found are camp-sites, e.g., Sites 623, 715, 893, 1013, and 1030, sherd scatters, e.g., Sites 724, 726, 734, 756, and 775, hamlet sites, e.g., Sites 656, 755, 763, and 892, and circular or rectangular structures on the plateau between the Wadi el 'Ali and the Wadi Aḥmar, e.g., Sites 728 and 1050. The Byzantine material is, therefore, not restricted to any particular type of site or to any definite area within the survey territory. Generally speaking the quantity of Byzantine pottery present at any one site was not large—the largest number was sixteen sherds at Site 647, Er Ruweiḥi, and Site 859, a circular tower (?) and rectangular structure on the ridge immediately east of the Wadi el 'Ali.

Jordan fell to Islam between A.D. 630 and A.D. 640. Shortly thereafter, Arabic gradually replaced Greek as the dominant language, and Islam replaced Christianity as the major religion.

Very little pottery that is dated to the Early Islamic period (A.D. 640-1187) was found in the survey area. Fatimid period (A.D. 969-1071) pottery was found at three sites, namely Sites 663, 724, and 775 but no more than three sherds from this period were found at any of these sites. One Umayyad/Ayyubid sherd was found at Site 800. The fact that the pilgrimage route to Arabia was located further to the west probably accounts in part for the lack of Early Islamic presence in the area.

The Late Islamic period (*ca.* A.D. 1187-1918) is well represented in the survey area. The Ayyūbid-Mamlūk period (*ca.* A.D. 1187-1516) was supposedly a period of great revival of occupation in Jordan because Jordan was now in a vital position between Egypt and Syria. However, the territory surveyed this season is likely too far east to have benefited or felt the effects of this revival. Pottery from this period was found at five sites and with the exception of Site 662, a cemetery-site and tower-site, where thirty-nine sherds were collected, in very small quantity.

Following the defeat of the Mamluks by the Ottoman Turks in A.D. 1516, Jordan remained in the Ottoman Empire until 1918. During this time Jordan was of interest to the Turks primarily because the pilgrimage route to Arabia passed through it. During this period the old "King's Highway" was found to be too difficult because of the many *awdiyah* (wadis) it intersected. Therefore, a new route was laid out farther to the east, closer to the desert, where the wadis were less pronounced. This route needed to be protected from the Bedouin tribes of the desert, and thus the Turks built forts along its line. Both a segment of this road and one of these forts, Sites 1073 and 1074 (Qal'at el Ḥasa) (Pl. LXXII,2) respectively, were within this season's survey area. The Ottoman bridge which crosses the Wadi el Ḥasa at Qal'at el Ḥasa was surveyed as Site 1072. Moreover, village-sites, namely Sites 1063, 1064, and 1066, close by Qal'at el Ḥasa, and a huge enclosure measuring *ca.* 240.00 m. in diameter and located to the southwest were all probably associated with the fort and the road to Arabia.

Besides these very large sites, Ottoman Period pottery was found at fifty-eight sites while what we are reading as Ottoman-Modern pottery was collected at ten sites, Late Ottoman pottery at one site, and Ottoman/Modern pottery at forty-five sites. This last type of pottery is found at many camp-sites throughout the survey area and is more numerous, sherd-count-wise, than Nabataean pottery. However, many of these sites are probably nothing more than Bedouin camps and were inhabited probably only temporarily and perhaps after 1918. Moreover, there are twenty-three sites at which our pottery reading is merely Late Islamic without attribution to any particular period within this four-hundred year period.

Conclusion

More study is required on the sites along with their related lithics, sherds, and so forth of the 1982 season. This work will be undertaken by the team members and other specialists in preparation for a final report. This report will attempt to understand more clearly the relationship among the sites and related artefacts of the three seasons of work along the south bank of the Wadi el Ḥasa. It will set out settlement patterns for the various periods represented in the area and try to understand the environment exploited by the people who lived in the area. The final report will hopefully result in the writing of a preliminary archaeological history of the area. It will point out to interested individuals and parties the rich archaeological remains in the area surveyed by the Wadi el Ḥasa Archaeological Survey.

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Acknowledgements

The authors of this report express sincere gratitude to Dr. Adnan Hadidi, Director-General of the Department of Antiquities of Jordan, and the members of his staff who have so graciously supported the work of the Survey in all ways possible. A special expression of gratitude is owed to Mr. Nabil Bega'in the representative of the Department during both the 1979 and the 1982 seasons. For her invaluable work on the site sheets, maps, artefacts, and photographs as well as her interest in all aspects of the survey we owe Dr. Rosemarie Sampson very special words of thanks. Finally, without the assitance of Dr. James A. Sauer and Dr. David McCreery of the American Schools of Oriental Research, Philadelphia, and the American Center of Oriental Research, Amman, respectively, this work would not have been so fruitful and enjoyable.

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PRELIMINARY REPORT ON THE FOURTH SEASON OF EXCAVATIONS AT PELLA, 1982

by
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Introduction

A team from the University of Sydney conducted excavations at Pella between December 15th, 1981 and February 25th, 1982. We are indebted to the Director-General of the Department of Antiquities, Dr. Adnan Hadidi and the Department representatives, Dr. Ghazi Bisheh and Mr. Sultan Shraideh, for their invaluable assistance. Work was continued in Areas III, IV, VI and XIV, while Area XI on the NE summit of Tell el Ḥusn was investigated after an hiatus of some seasons. A major new area containing a late mosque, was opened up in the centre of the main mound as Area XVII.

The report will deal with the season's results in chronological order.

Late Chalcolithic Settlement

Area XIV

An area of some 450.00 square metres upslope of the 1981 excavation (McNicoll, Smith and Hennessy, 1982: 31-34) was cleared of topsoil, exposing two single room structures half dug out of the bedrock (Pls. LXXIII, LXXIV) and a stone wall associated with a hardened earth surface on a level platform beside a rocky escarpment jutting out over the slope. Half the exposed area showed no evidence of use in antiquity: such widely-spaced settlements have been found in the Golan (Epstein, 1978: fig. 1 and 1981, fig. 1).

The two adjacent rooms had been roughly cut directly into the hill to a depth of 1.50 m. at the rear. The western room had the natural surface levelled and raised to a depth of 0.23 m. with a plaster and earth floor, filled out with stones, plaster bricks, a brocken basalt quern, sherds, flaked stone, and chert axe heads, On top, two subsequent mud floors had been laid and, at some time, side walls of rough mudbrick and stones had been constructed against the bedrock face. The area was partially enclosed by a stone wall which rested on the bedrock on two sides of the room. Mudbrick and stone tumble in the fill of the room suggest the wall was several courses higher. A flattish bedrock outcrop in the north corner of the room showed strong evidence of burning, and was probably used as a hearth during all three phases of occupation.

Debris from the final phase included a basalt bowl and five ceramic vessels beside the hearth (fig. 2: 1, 10, 12), grinding stones and worked flaked stones, including a pierced flint disc (fig. 3: 8) of the type common at Neve Ur (Perrot, *et. al.* 1967: fig. 8) and the Golan, and found at Safadi (ibid. fig. 9, 1) and Deraá (Nasrallah, 1948: pl. 5).

To the west of the room, a pit dug 0.70 m. into the bedrock, was filled with ceramic debris, notably fine ware bowls, flaked stone and bone. Slightly beyond, a (natural?) declivity in the friable bedrock had been half blocked by a bedrock and plaster retaining wall forming a shallow circular pit at the head of two contiguous bedrock depressions draining down the hill side (Pls. LXXIII, LXXIV). The bedrock here is almost clay-like in substance, particularly on the floor of the declivity. Nodules of such rock were found in the upper two floors of the room, and it is possible that this pit was used for puddling to make floors, bricks and mortar. Such pits were found at Ghassul (Hennessy, 1967: 7).

The second room was separated from

the first by a metre of bedrock. It was even closer to the surface, and much affected by erosion. There was some evidence of side walls against the bedrock, lying on a single plaster floor containing Chalcolithic sherds, but no enclosing wall around the edge of the room. In each of the two far corners was a circular niche, over a metre wide, protruding out of the room, the base of one level with the floor of the room (but with no plaster), the other forming a shallow basin some 0.20 m. deep. Both had been excavated from the fill of the room and used, the one as a dump for late Hellenistic pottery (including a fine painted imported pedestal vase) and bone (mandible of *Sus),* the other as a fire pit into which a late Hellenistic jar had been dropped.

The small bone assemblage comprised mainly *Caprovines* and gazelle. A single olive pit was found in a sealed layer.

Pottery (Fig. 1, 2)

The finds from the first two seasons in Area XIV would suggest that the pottery types remained uniform throughout the life of the settlement.

The majority of the pottery is of medium-fired buff ware, handmade, with grit, chert and/or limestone temper. Much of the pottery has painted decoration applied after firing, characterised by a band of reddish-brown slip of widely varying width both inside and outside the rim, and down the shoulders and sometimes body of the vessel. The application is often deliberately slapdash, some times wildly so, leaving flecks and dribbles over the unpainted part of the vessel. Some of the ware, particularly the fine ware bowls and vases, show signs of being finished on a wheel. Applied thumb impressed decoration is common around the necks of the large storage jars. Incised decoration is rare, consisting of rows of dots or short vertical incisions on the neck. The fine ware almost never has incised, and never applied, decoration. All bases are flat, sometimes coil bases, but never with mat impressions. The large storage vessels commonly have broad loop handles on the larger vessels. Small horizontal pierced lug handles are common on the shoulders of the smaller cooking vessels, and vertically pierced button-like handles are characteristic of the fine globular bowls.

The base of a cornet cup, and part of what may be a small bird vase, were also found. No ceramic pedestal bowls nor spouted vessels were found.

Four broad types of vessels may be distinguished, within which the form and fabric vary considerably: storage vessels, holemouth jars, small fineware wide-rimmed bowls, vases and jars and large wide-rimmed bowls, vases and jars.

1) Storage vessels: 13% of total rim assemblage: normally very large (rim diam. up to 60 cm.), thick coarse ware with strong filler content. Typical shapes are the ubiquitous flaring rims with applied bands of thumb-impressed decoration at the neck (Fig. 1:7) and large globular open-rim vessels with loop handles on the shoulders.

2) Holemouth jars: 32% of total rim assemblage: three basic rim shapes: straight, concave, and convex. The ware is normally medium fine to medium coarse with high filler content, often showing signs of burning. Occassionally there is incised decoration on the rim. Painted decoration is rare. Noteworthy are a few examples of fine ware with concave rim.

3) Fine ware bowls, vases and jars: 39% of total rim assemblage: ranging from flaring rim vases to globular jars, but without clear categories (Fig. 2: 1-11). Rims are frequently painted (inside and out) and bodies (outside). The vessels are often finished on a wheel. Distincitive are the high number of small globular jars with vertically-pierced button-like handles half way down the body. Similar jars are common at Neve Ur (Perrot, *et. al.,* 1967: fig. 15. 11, 12, 14 and 16), and present at Meser (Dothan 1957, fig. 2.5).

4) Large bowls?, vases and jars: 16% of total rim assemblage: particularly vases with straight sides. Some short broad lug handles (Fig. 2: 12).

The closest ceramic comparisons are undoubtedly from Neve Ur, some five miles upstream on the west bank of the

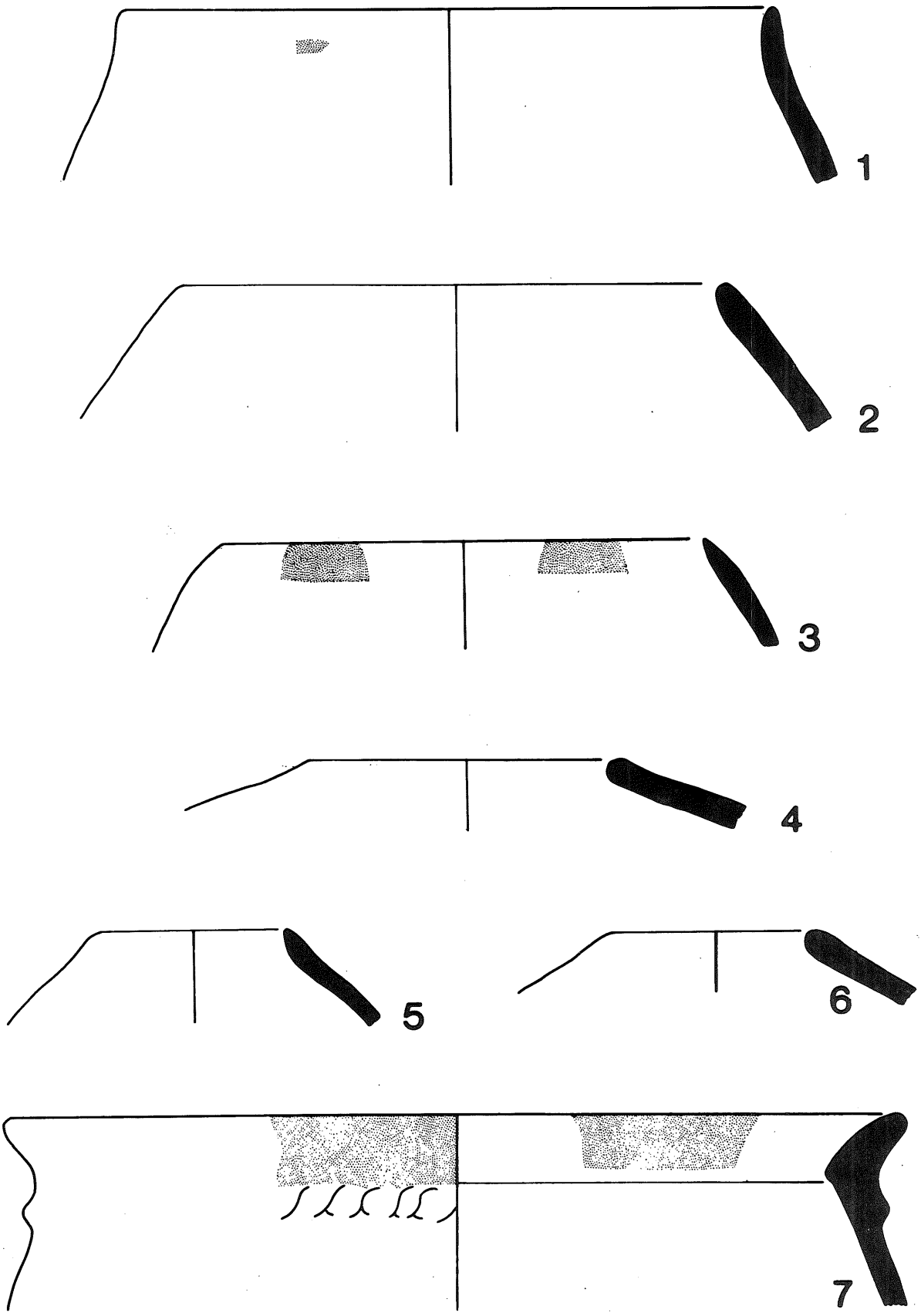


Fig. 1: Pella Area XIV Late Chalcolithic Pottery

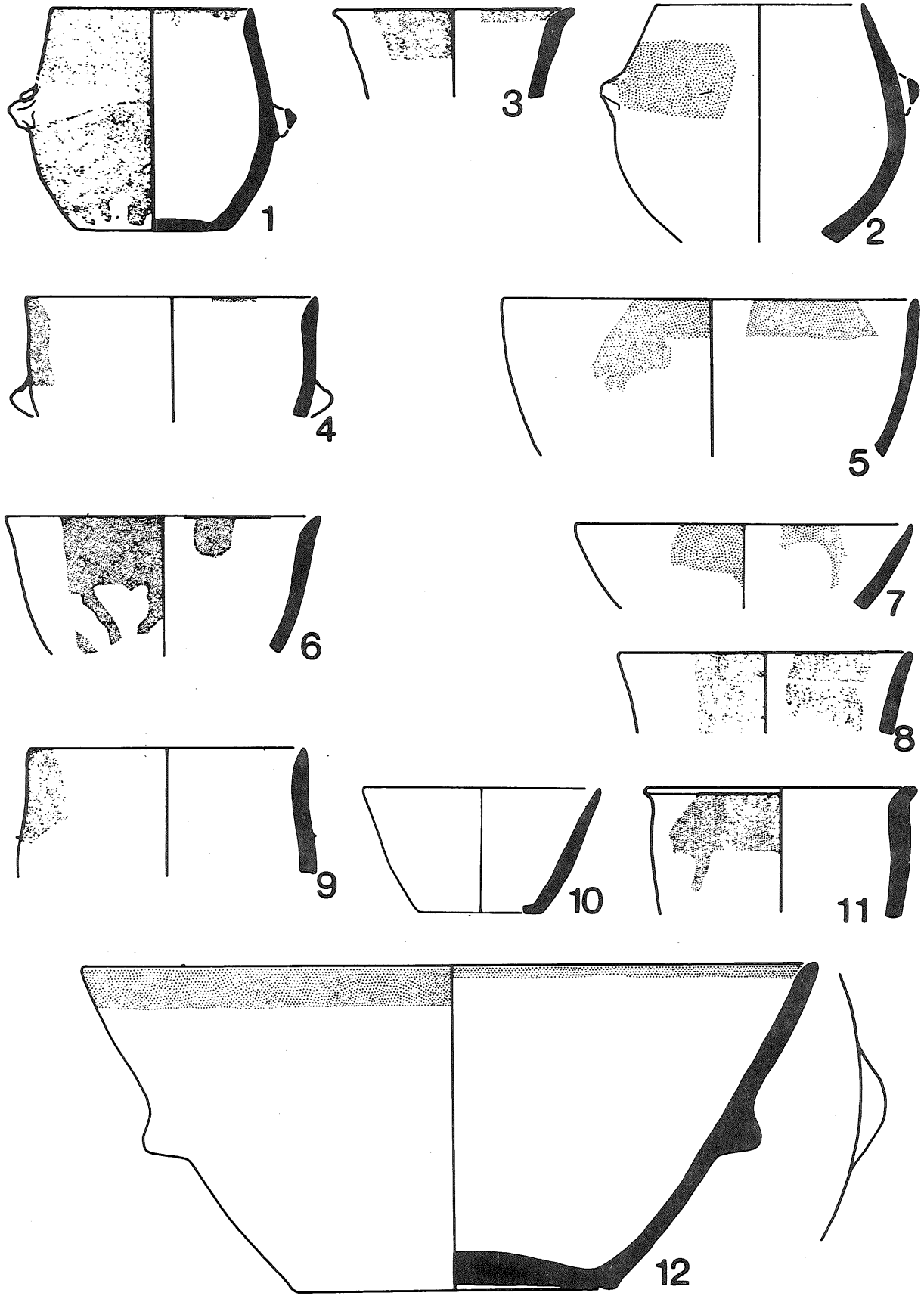


Fig. 2: Pella Area XIV Late Chalcolithic pottery

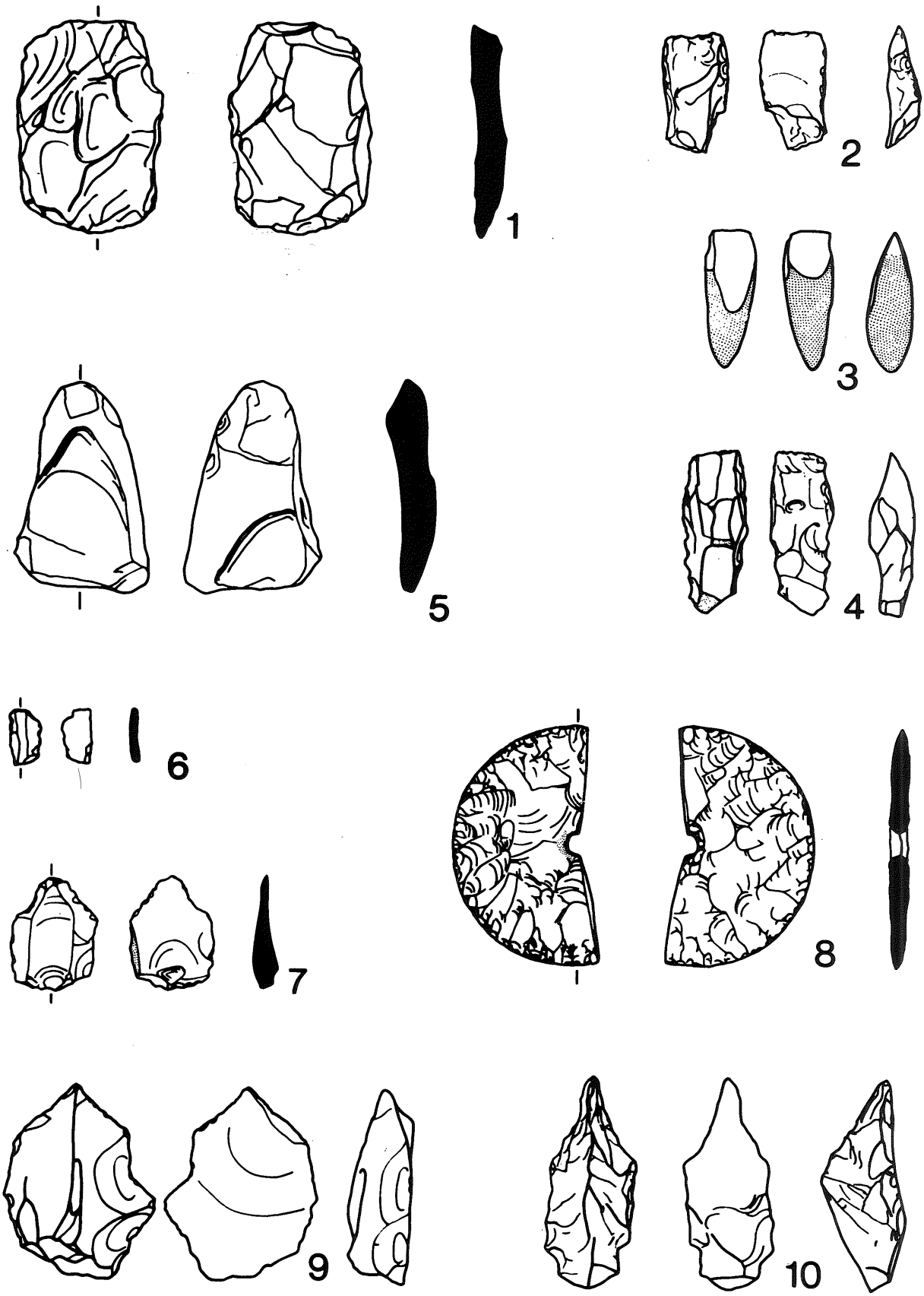


Fig. 3: Pella Area XIV Late Chalcolithic Flaked Stone

Jordan, particularly in the bowls and vases (Perrot, *et. al.,* 1967: fig. 15. 1-8, 11, 12, 14, 16) and storage vessels (ibid.: fig. 17, 1, 6). The most notable discrepancy is the few holemouth jars at Neve Ur, which do, however, include medium fine concave-rimmed vessels (ibid.: fig. 16.3).

There are general ties with Megiddo XX and Beth Shan XXVIII-XVI in applied thumb-print decoration (Fitzgerald, 1935: pl. 1.3 4, 13, 16) and (Loud, 1948: pl. 2.44-49), in the stubby ledge handles (ibid.: pl. 2.13, 26, 27), and fine bowls (ibid.: pl. 2.1-7), but broad comparison here is somewhat suspect. More useful are the parallels with the upper layers at Ghassul, the holemouth jars (Hennessy, 1967: fig. 5.7), the rounded rim vases (ibid.: fig. 6.2; fig. 7a. 10, 12; fig. 7b. 1), and jars (ibid.: fig. 5.3; fig. 6.3, 8) and the vertical lug handles (Mallon, *et. al.,* 1934: pl. 42.13, 14, 19 and pl. 43.34-36).

Similarities with Meser are restricted to the fine ware bowls and jars (Dothan, 1957: fig. 2.5; fig. 9). Beersheba has general similarities in holemouth jars (de Contenson, 1956: fig. 3.1-6, 10-17), fine ware bowls and jars (ibid.: fig. 6.7, 8, 17-20, 23-25) and larger bowls (ibid.: fig. 7.8, 10-12), but the fabric is very different and the ware is rarely painted (ibid.: 169) and, when it is, the decoration is distinctly patterned (ibid.: fig. 11. 17-23). Incised decoration (ibid.: fig. 12) is also very different.

The scarcity of cornet cups, the churn the basalt bowls and the basalt chalice of the 1981 season, provide chronological ties with Beersheba, but the cultural tradition is clearly late Ghassulian, and clearly local. There is evidence for strong Chalcolithic occupation of the area, on the low hills of the Jordan Valley (Zori, 1948: 46 ff., and Glueck, 1951: 139 ff. passim).

Flaked Stone (Fig. 3)

The flaked stone assemblage is both small (420 pieces) and undistinguished (two-thirds unretouched). Much of the material suggests a relaxed approach to tool manufacture and usage: unretouched cores and flakes show evidence of use, and secondary working is often very slight, and unrestricted to specific shapes.

The assemblage is, without exception, from the local chert. While multiple subdivisions are possible, a classification of seven distinct kinds of retouched flakes seems useful.

1) Core tools: flakes removed, the core then restruck and reused for some mechanical purpose. Size variability 5 x 1 — 10 x 7.5 cm.
2) Points: include awls, burins, borers. Some flakes have a serated edge, some are very crude. Size variability 3.5 x 2 — 6 x 4 cm. Also present are small triangular flakes with pronounced bulbs. Similar to PN arrowheads, and identified as 2a.
3) Core scrapers: a scarab-like rounded core, no cortex, with some rough retouch on the base to provide an effective scraping edge. Size variability 4.5 x 3 — 7 x 4.5 cm.
4) Flake scrapers: a thick primary flake, often with the cortex retained and a strong bulb, sharply retouched at the end to provide an effective scraping edge. Not to be confused with the Ghassulian fan scrapers, of which none were found. Size variability 1.5 x 1.5 — 9.5 x 7 cm.

The use of backed blades (Koeppel, *et. al.,* 1940: pl. 110), unretouched blades (ibid.: pl. 108, 109), and points with a retouched blade on one edge (Mallon, 1934: pl. 32.8-10) is paralleled at Ghassul, as well as the comparative scarcity of points (Hennessy, 1967: 19). Of the most significant categories at Pella, the retouched flakes are not repeated at Ghassul, and the core and flake scrapers, though frequent in the early phases, decline rapidly with the appearance of fan scrapers in Level D (ibid.: 18). At Neve Ur, the point (Perrot, *et. al.,* 1967: fig. 7.3), the backed blade (ibid.: fig. 7.4) and the amorphous - looking "hachette" (ibid.: fig. 7.5) are reproduced at Pella. It is clear that the basic flaked stone industry has a long local tradition, stretching in part to the Wadi Rabah phase (Kaplan, 1969: Fig. 12, 13), and is pragmatic.

Quite clearly related to Ghassul,

where they have no chronological significance, are Ghassulian chisels, picks, hammers, ground pebble and chert axe heads, flaked chert axe heads, and a hoe. These are all paralleled at Neve Ur, as is the aforementioned pierced flint disc.

Bronze Age

Area IIIC (Fig. 4)

Excavation in previous seasons had revealed a massive stone wall (W3) running north-south through the centre of the trench. It divides IIIC into two independent and stratigraphically unconnected halves.

East of W3 (Phase A), a large east-west mudbrick wall (W10) partitions the area into two rooms. W11 and W23 form the northern and southern boundaries of these rooms. By the end of the 1981-82 season, signs of other architectural remains were beginning to appear in the area. However, as excavation this season was concentrated west of W3, their precise date and significance will have to await further excavation.

As previously noted,[1] Phase V had only been uncovered in the north-western corner of the plot. Continued excavation west of W3 has, however, revealed further architectural remains of this phase. They are as follows.

Bonded to the western side of W3 are two parallel east-west walls (W17, W15). W16 divides the area into two rooms connected by a doorway. There appears to be another doorway leading to a third room further north. The remaining architecture (Walls 24 and 25) defines a fourth room in the south of the plot. W24 abutts the southern face of W15 and comes to a 'T' intersection in the south (W25). This latter wall is bonded to the western side of the massive defense wall (W3). A narrowing, midway along W25 would appear to be the only possible entrance to this room.

A number of floors and surfaces can be associated with the architectural remains of Phase V. The earliest level was a white plastered floor which extended over the entire area. It ran up to walls 3, 15, 16 and 17, south beyond the limits of the locus, and west into the western baulk. W25 was built directly on this surface. The impressions left in the plaster by the stones of W25 would seem to suggest that this latter wall was built while the plaster was still wet. Post holes in the floor of the room south of W15 indicate that its ceiling was originally supported by sturdy posts. A second plastered floor was laid immediately over the earlier one. As there was no evidence of any significant build-up between the two surfaces, the temporal interval involved need not be more than a few years. The pottery too is best considered as virtually contemporary. W24 was built on the new plastered floor level except its northernmost extent (1.50 m.) which rested on soil packing. The extensive weathering or wearing away of the plaster west of W24 and south of W25 suggests a possible open area (courtyard). Above these floors, a number of varying deposits could be traced: mudbrick collapse, plastered floors and trampled earth surfaces.

There was approximately half a metre of collapse debris and build-up separating the architectural remains of Phase V from those of Phase IV.

Pottery (Fig. 5-7)

The pottery associated with the earliest plastered floor and the levels immediately above it, points to a date in the early Late Bronze, i.e., 1550-1500 B.C., for its construction.[2] Of the characteristically early Late Bronze I types, the cooking pots (Pl. LXXIII: 1, 3, 4; Fig. 2. 1-3) may be noted. The presence of chocolate-on-white (Fig. 2. 8-10) also supports a mid to late sixteenth century date. Pottery from the later levels of Phase V (Pl. LXXIII: 2, 5, 6; Fig. 1. 11) suggests that the structure was still in use in the Late Bronze II period.

Figure 5

[1] McNicoll, Smith & Hennessy, 1982: 24

[2] Good parallels can be found, for example, from Megiddo Str. IX-VIII; Lachish Temples I and II; Hazor (LB I).

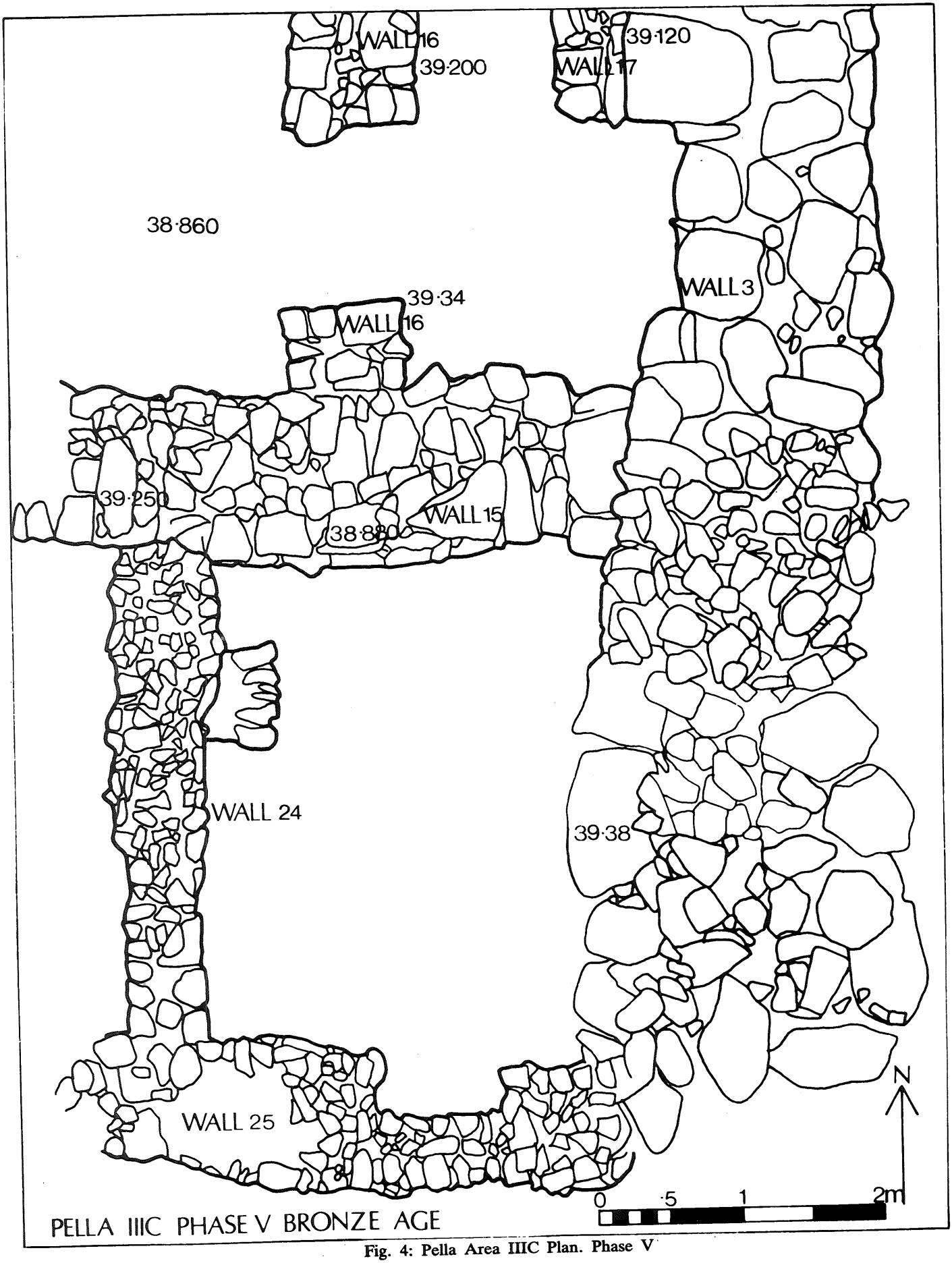


Fig. 4: Pella Area IIIC Plan. Phase V

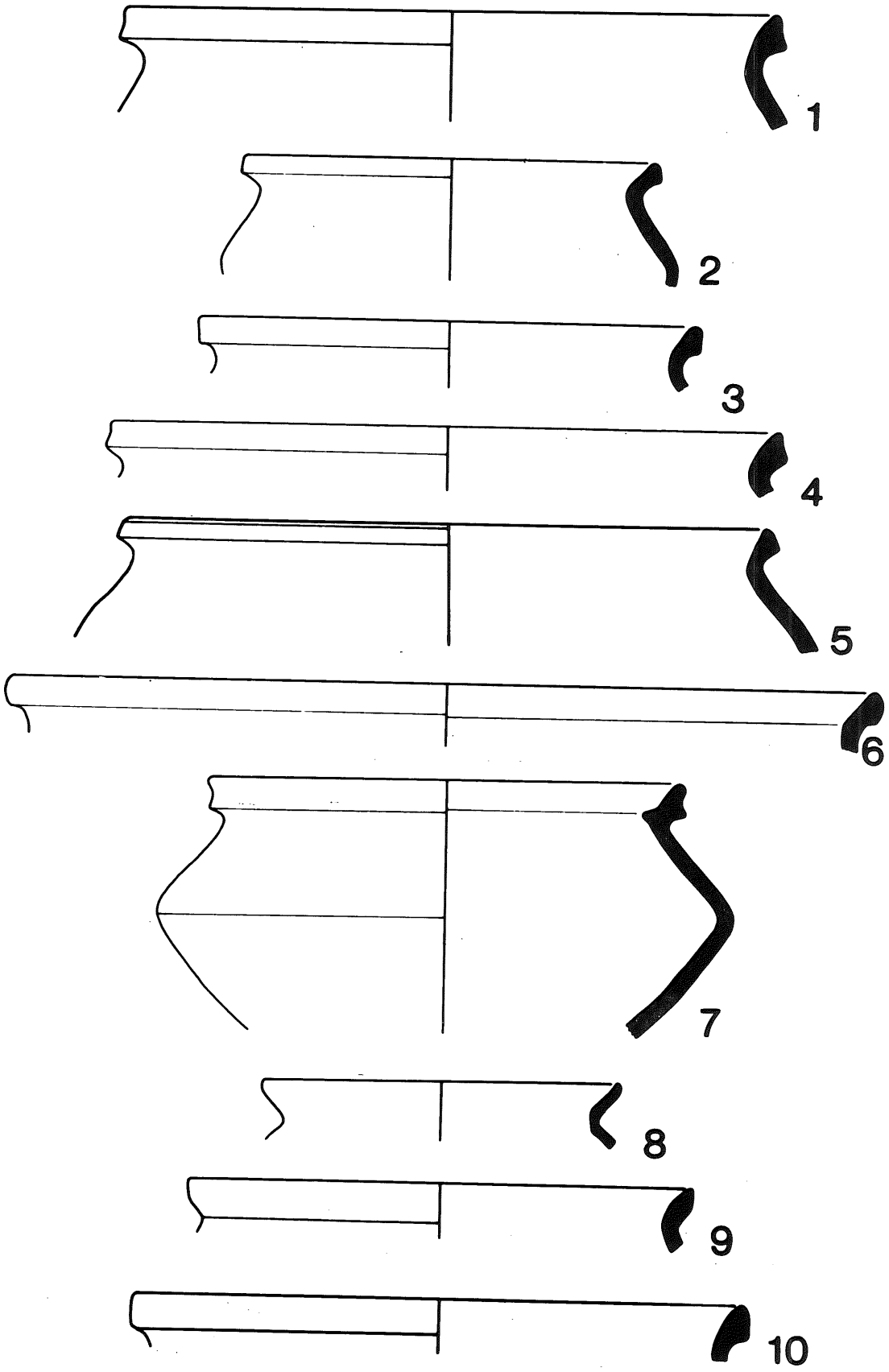


Fig. 5: Pella Area IIIC Phase V Pottery

1. CN 2498. IIIC 24.14. Cooking pot rim. Coarse ware fired brownish-buff throughout. Black-grey core. Many small to large chert grits. Some chaff. Self slip.
   Parallels: Lachish II, Pl. LV. 353 (Temple 1). For a clearer representation of the Lachish parallel, see Amiran, Pl. 42. 6.
2. CN 2717. IIIC 35.1 Cooking pot rim fired brown throughout. Many small to large chert grits, blackened rim and body below shoulder.
   Parallels: Megiddo II, Pl. 55.4 (str. IX-VIII) Megiddo II, Pl. 61.27 (str. IX-VIII).
3. CN 2583. IIIC 24.16. Cooking pot rim. Finely levigated clay with numerous tiny and medium grits, fired brown with grey core. Self slip.
   Parallels: Lachish II, Pl. LV. 356 (Temple I). Similar to Hazor I, Pl. CXXXVIII. 10 (L.B. I).
4. CN 2583. IIIC 24.14. Cooking pot rim. Coarse ware fired brown exterior, grey-black core, many medium to large chert grits, blackened rim. Self slip inside the rim.
   Parallels: Very similar to CN 2498 (IIIC 24.12). Similar to Lachish II, Pl. LV. 353 (Temple I).
5. CN 2497. IIIC 24.14. Cooking pot rim. Well levigated clay, fired orange-buff throughout with yellow-buff core. Many tiny to medium chert grits, few chaff inclusions. Self slip, lightly blackened inside the rim.
   Parallels: Hazor I, Pl. LXXXV. 21 (Str. lb). Similar to Ain Shems IV, Pl. LVIII.29 (str. IV).
6. CN 2695. IIIC 35.1. Cooking pot rim. Fairly coarse clay, fired orange-buff throughout with black core. Many tiny to large chert grits.
   Parallels: Lachish II, Pl. LVI. 371 (Temple III). For a clearer representation of the Lachish parallel, see Amiran, Pl. 42.16.
7. CN 2494. IIIC 24.14. Cooking pot rim. Coarse ware, fired brown throughout with black core. Many medium chert grits. Blackened rim and lower body.
8. CN 2928. IIIC 24.18. Cooking pot rim. Fairly coarse clay, fired brown throughout with grey-brown core. Small to medium chert grits, darkened rim. Similar to MB/LB cooking pot types.
9. CN 2927. IIIC 24.18. Cooking pot rim. Coarse clay, fired brown throughout, many small to medium chert grits. Blackened rim.
   Similar to MB/LB cooking pot types.
10. CN 2582. IIIC 24.16. Jar/cooking pot rim. Well levigated clay, fired brownish-buff, thick buff core.
    Parallels: Hazor I, Pl. CXXXVIII. 9 (LB I).

Figure 6

1. 2003. IIIC 17.1 Cooking pot rim. Well levigated clay, fired brownish-buff. Many tiny to medium chert grits.
   Parallels: Hazor I, Pl. CXXXIX.16 (LB I). Similar to Ain Shems LVIII. 27 (str. IV).
2. CN 2391. IIIC 31.1. Cooking pot rim. Fired brown exterior, grey-brown interior, with black core. Many large chert grits.
3. CN 3017. IIIC 34.6. Bowl rim. Well levigated clay with medium and tiny grits, fired dark buff. Thin matt light brown slip interior and exterior.
   Parallels: Megiddo II, Pl. 29.24, 26 (str. XII-IX). Megiddo II, Pl. 37.14 (str. XIII-IX).
4. CN 2713. IIIC 35.3. Bowl rim. Finely levigated clay, fired orange-buff exterior, yellow-buff interior. Many small to medium chert grits. Self slip.
   Parallels: Megiddo II, Pl. 29.7 (str. XIV-IX); Megiddo II, Pl. 38.2 (str. XII-IX); Lachish II, Pl. XXXVII.5 (Temple 1).
5. CN 3023. IIIC 24.18. Bowl rim. Well-levigated clay with many medium and tiny grits, fired greyish-buff. Self slip.
6. CN 2114. IIIC 30.3. Bowl rim. Well-levigated clay with many medium and tiny grits, fired greyish-buff. Self slip.
   Parallels: Lachish II, Pl. XLI. 106, 107 (Temple 1).
7. CN 3022. IIIC 24.18. Bowl rim. Finely levigated clay with a few large and many medium and tiny grits, fired orange-brown with grey core. Interior

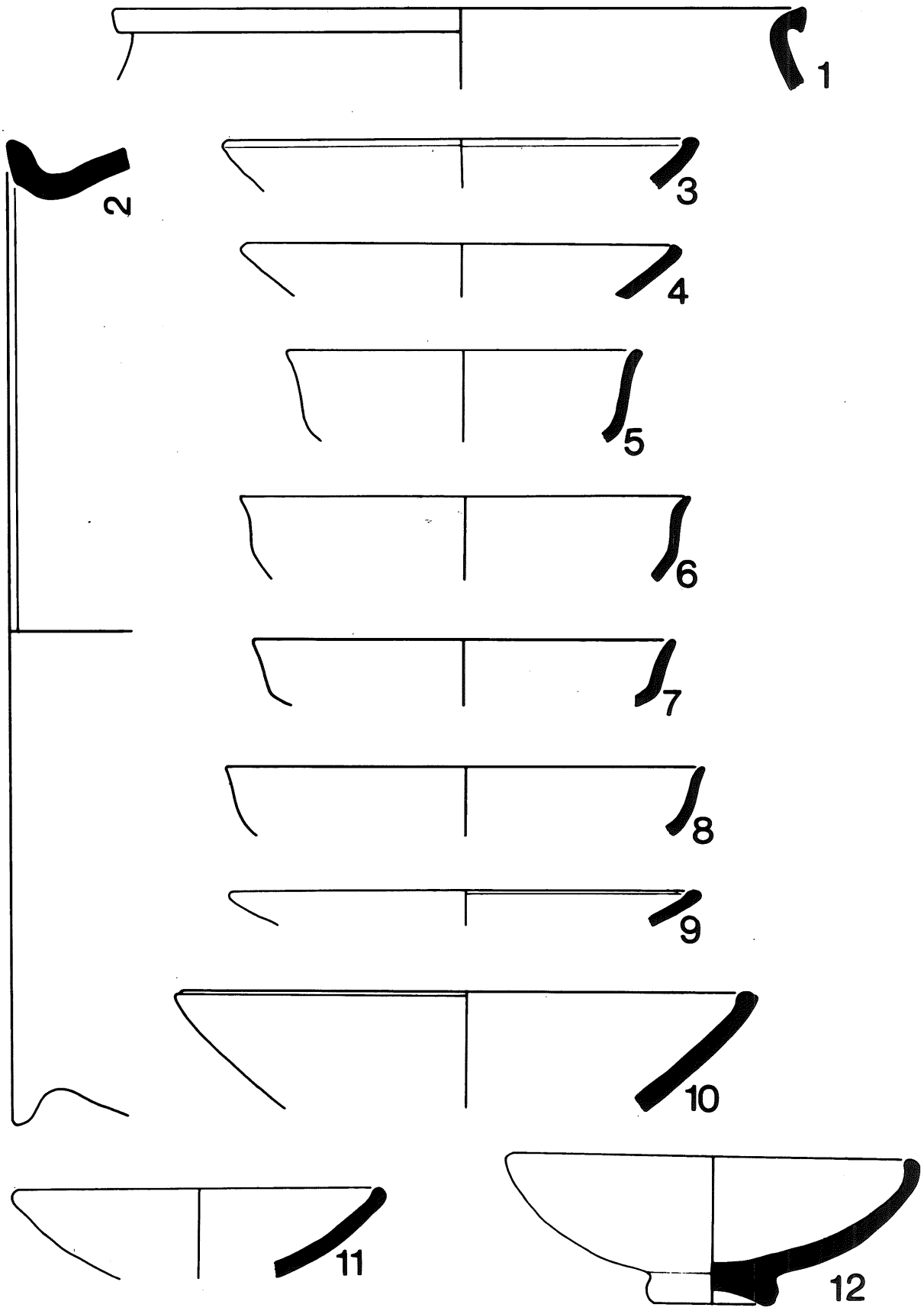


Fig. 6: Pella Area IIIC Phase V Pottery

and exterior is covered with a burnished orange-buff slip.
Parallels: Lachish II, Pl. XLI.111 (Temple 11).

8. CN 2914. IIIC 34.3. Bowl rim. Well levigated clay, fired brownish-buff, tiny chert grits. Similar to 3022.
Parallels: Lachish II, Pl. XLI.111 (Temple 11).
9. CN 3007. IIIC 24.18. Bowl rim. Well-levigated clay with a great many medium and tiny grits, fired buff throughout. Self slip. Similar to CN 3017 (fig. 2.3).
10. CN 2502. IIIC 24.14. Bowl rim. Well levigated clay, fired orange-buff throughout, grey-brown-buff core. Tiny to medium chert grits.
11. CN 2703. IIIC 35.1. Bowl rim. Finely levigated clay, fired pinkish-buff throughout, small to large chert grits.
Parallels: The Bronze Age cemetery at Gibean, fig. 28.1 (Tomb 20); Lachish II, Pl. XXXVII. 31 (range Temple 11 and 111).
12. CN 2586. IIIC 24.14. Bowl. Finey levigated clay, fired light brown-buff throughout, small to medium chert grits. Self slip.
Parallels: Lachish II, Pl. XXXVIII. 41 (Temple 11).

Figure 7

1. CN 2493. IIIC 24.14. Bowl. Fine, well-levigated clay, fired dark grey-brown throughout, tiny to medium lime and black grits. Cream slip interior and exterior discoloured to greenish grey.
No exact parallel has yet been found. This type of carinated bowl does, however, occur in MB II/LB I period: Lachish II, Pl. XLI.100 (Temple 1).
2. CN 2829. IIIC 24.18. Bowl. Finely levigated clay, fired light brown to orange-buff throughout with grey-brown-buff core. Many small to medium chert and lime grits.
3. P 50015. IIIC 24.18. Bowl. Well-levigated clay, fired brown throughout with dark grey core. Many small to medium chert grits. Similar to CN 2829.
4. CN 2496. IIIC 24.14. Bowl base. Well-levigated clay, fired yellowish-buff throughout, small to medium chert grits. Self slip interior.
5. CN 3015. IIIC 36.2. Jar rim. Well-levigated clay with a great many medium and tiny grits, fired greyish-buff. Self slip.
6. CN 2712. IIIC 24.15. Bowl base. Finely levigated clay, fired orange-buff throughout, grey-buff core. Many small to medium chert grits. Thick white slip.
7. CN 2913. IIIC 34.4. Bowl base. Well-levigated clay, fired brown throughout, dark-grey core, few small chert grits.
8. CN 2883. IIIC 30.3 Jar rim. Chocolate-on-white. Fairly well levigated clay, fired orange-brown core. Thick cream slip. Matt purple painted decoration.
9. CN 2910. IIIC 34.4. Bowl rim. Chocolate-on-white. Very well levigated clay, fired light-brown-buff throughout, very few tiny grits. Thick, burnished cream slip on the interior and exterior surface. Very finely made.
10. CN 2911. IIIC 34.4 Bowl/jar rim. Chocolate-on-white (Imitation?). Fairly coarse clay, fired light brown-buff with a grey-buff core. Thick cream slip on the interior and exterior surface, burnished. Matt purple-brown painted decoration covering the exterior. Crudely made and decorated — possible imitation. Many small to medium chert grits.

Iron Age
Area IIIN (Figs. 8-14)

Iron Age material has now been found in a stratified context in a second plot, N, of Area III, the East Cut. It is situated next to IIIC on the steep southern edge of the eastern side of the mound.

Unfortunately, like IIIC, IIIN has suffered considerably from water erosion. To the south, a large gully formed and eroded a considerable depth of deposit from the edge of the *tell* (Gully 11.3). Excavation in this area has revealed much unstratified Iron II material. Further

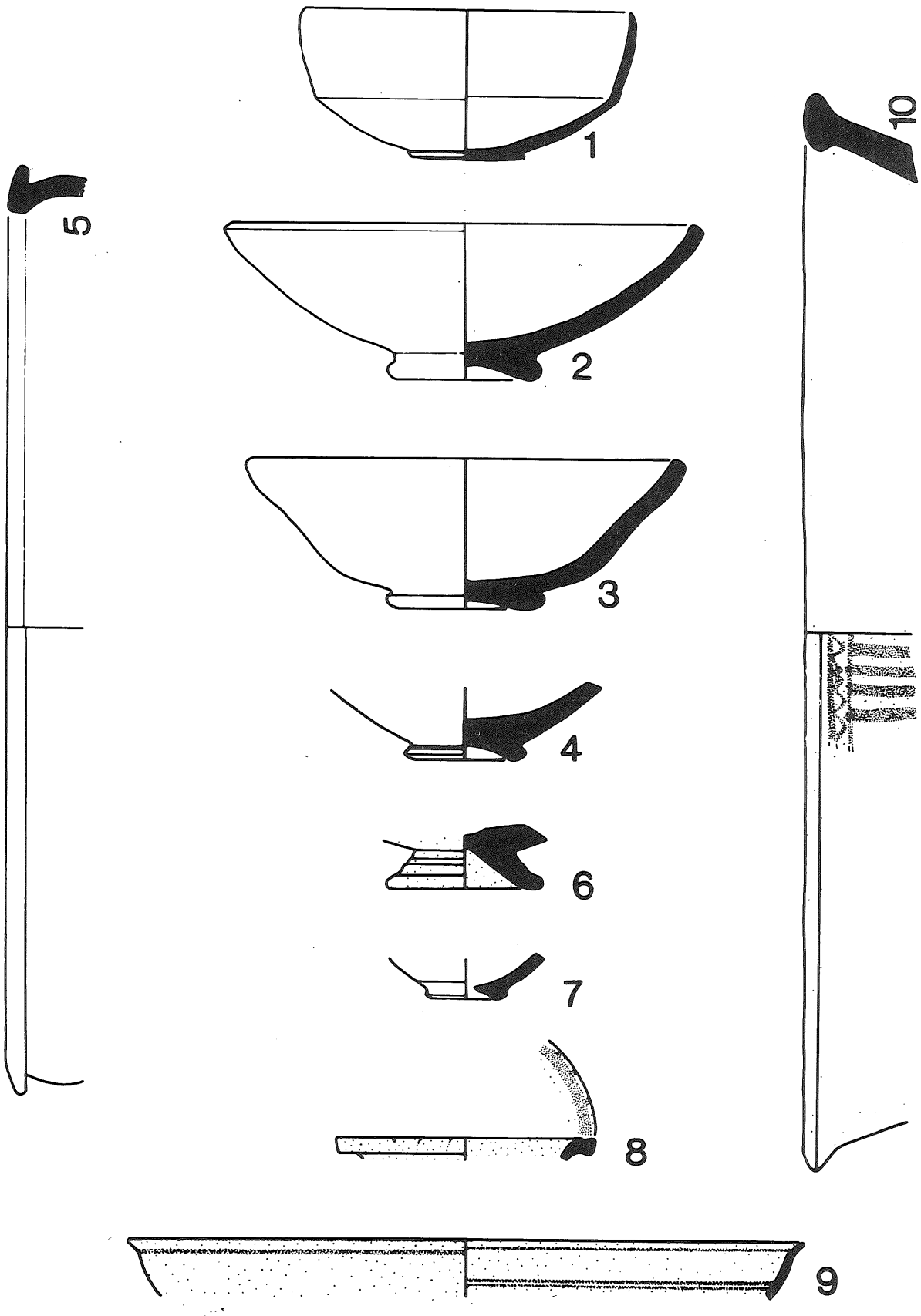


Fig. 7: Pella Area IIIC Phase V Pottery

north, a second gully has also cut through the Iron Age deposits (Gully 9.13). As a result, a proportion of both architecture and original stratified deposits have been disturbed.

At this stage of excavation, IIIN can be divided into three architectural phases:

Phase III: Apsidal House (Early Phase) (Fig. 8)

The architectural remains of Phase III[3] include a sturdy east-west wall which formed a truncated semicircle at its western end (W19). Within the room, there was a circular hearth pit sunk into the floor (F.49). Bonded to the eastern end of W19 was a second stone wall (W11) running approximately north-south. To the east of this wall was a paved room. There was a single step up to another paved area to the north, which had been partially destroyed by the IIIC Hellenistic gully. No paving was evident west of the gully. The floor surface consisted simply of packed earth. The paved room in IIIN represents the western half of the paved house already known and excavated in IIIC in 1979. W11 and W18 (respectively), form the western and southern boundaries of this structure. The pottery associated with the stone paved house is contemporary in both trenches (Fig. 12: 1, 3-5, 10; Fig. 13: 1-3, 5).

A low row of stones (W25) abutts the north face of W19. It divided the area to the north of W19 into two rooms (loci 18 and 19). Both rooms were contemporary with the whole apsidal and paved structure. Unfortunately, however, the floor surface west of W25 was cut by architecture from a later phase.

The architectural remains west of the apsidal house include two walls (W40, W41) running east-west from the widest points of the apse. W40, the north wall of this room, extends from a mudbrick bench (which abutts W19) to the west baulk. There was evidence of a second room south of W41 (W43, W44). The effects of erosion in this area have, however, made it difficult to determine the original nature and extent of the architecture.

The associated pottery from Phase 3 (Fig. 12; Fig. 13. 1-5) suggests that the apsidal and paved structure were in use in the early Iron Age, i.e., 1200-1050 B.C.

Phase IIa: Apsidal House (Late Phase) (Fig. 9)

Phase IIa is marked by the construction of W26 directly above and in line with W41. It also included the addition of a group of stones (F. 53) at the western end. The temporal interval involved, however, need not be more than a few years. W26 is only two courses high and, like W41, abutts the end of apse W19. The pottery too is best considered as virtually contemporary with that from the apsidal house (early phase).

Throughout the entire occupational phase of the apsidal house, the area west of apse 19 suffered repeated minor rebuildings. Phase IIa is the most extensive example of a rebuilding in the Iron I period.

The relevant architectural remains have been cut by a gully (9.13) in the north and gully (11.3) in the south. Again we must content with the effects of erosion.

Phase IIb (Fig. 10)

Further architectural additions were made to W26. These include W23, running north-south from its south face, and W24, running west.

A 0.20 m. deposit of hard mudbrick separated Phase IIb from Phase IIa. It surrounded the western extension of W26 and ran under W23. This deposit showed no evidence of any significant build-up. The temporal interval involved then, need not be more than a few years. Walls 23 and 24 were simply architectural additions made to W26 within the period of occupation of the apsidal house.

Unfortunately, these levels were cut by a cooking pit from Phase I. The area also suffered heavily from water erosion.

[3] Because excavation is still in progress and earlier phases will presumably be found, the phases have been numbered from latest to earliest.

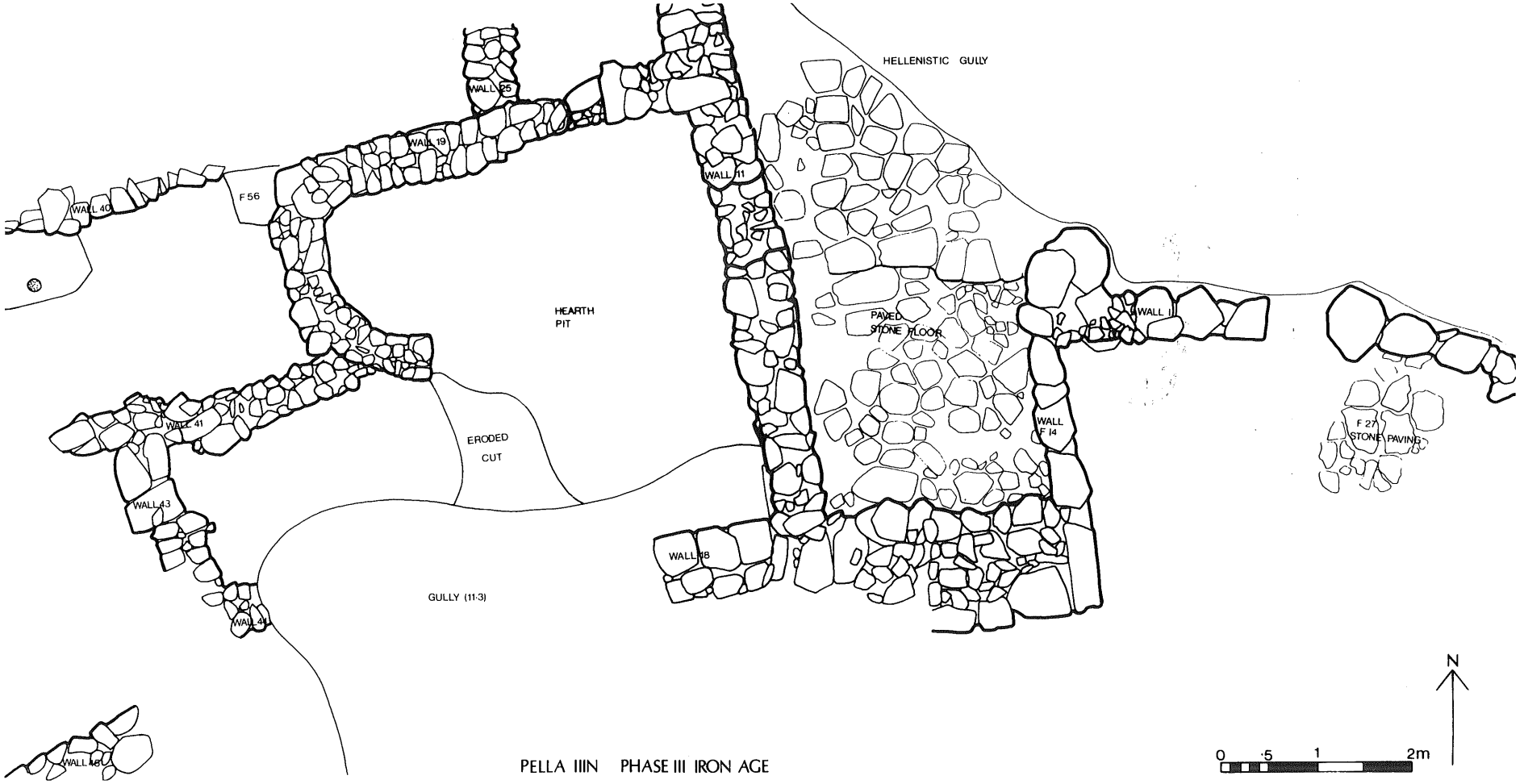


Fig. 8: Pella Area IIIN Plan. Iron Age Phase III

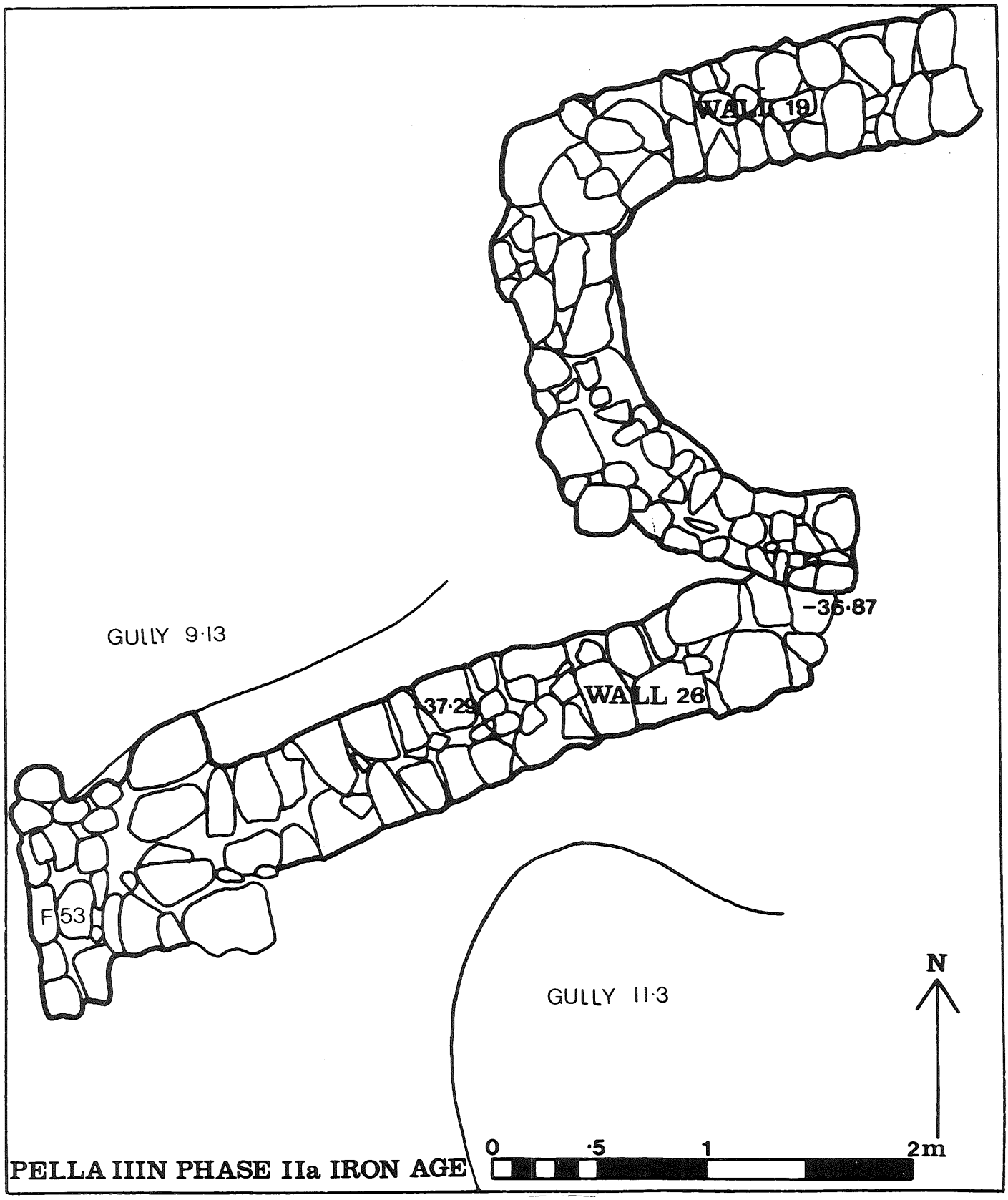


Fig. 9: Pella Area IIIN Plan. Iron Age Phase IIA

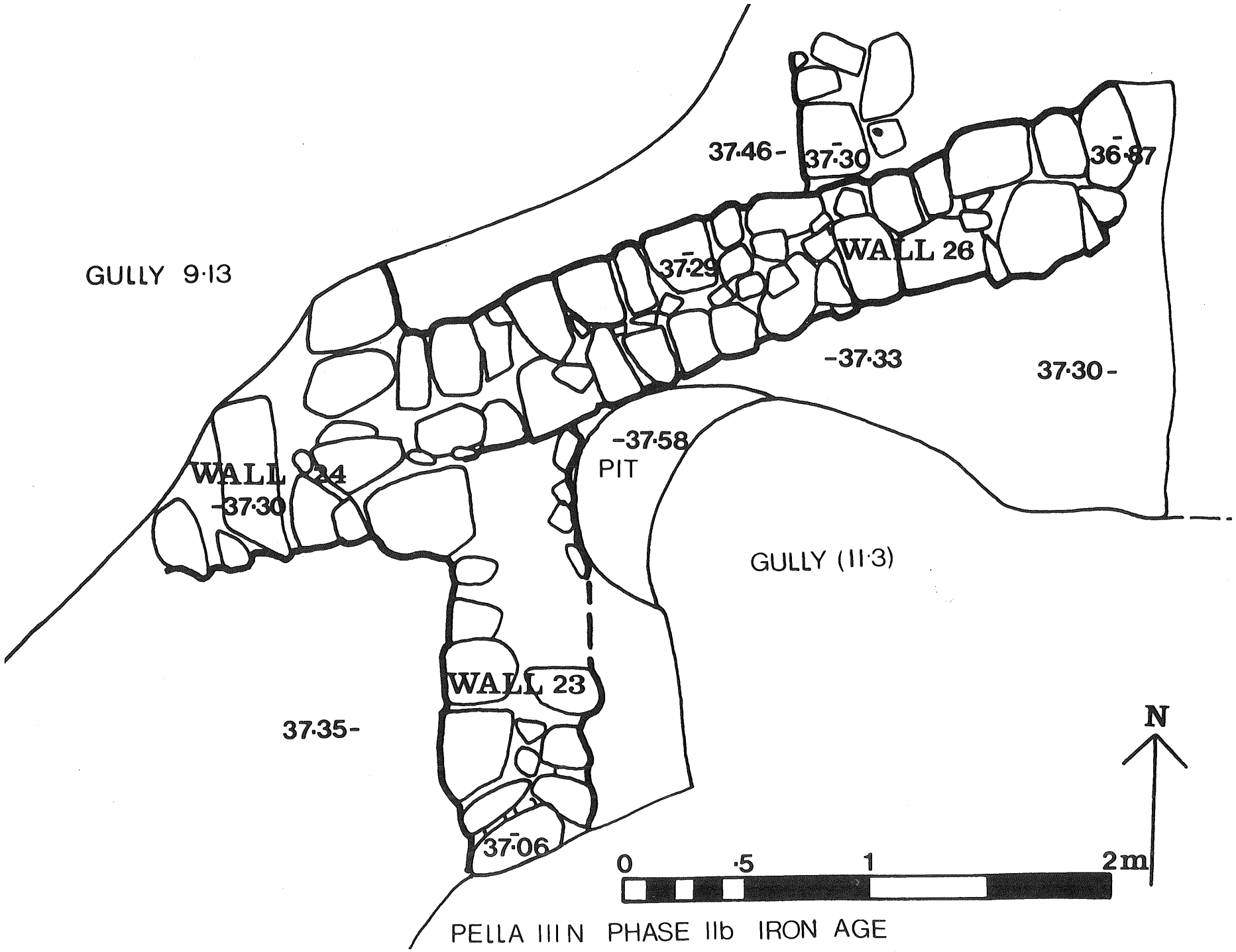


Fig. 10: Pella Area IIIN Plan. Iron Age Phase IIB.

As a result, the original architectural situation is rather difficult to reconstruct.

There was approximately half a metre of collapse debris overlaying Phase II. This covered all of the apse, the paving and the architecture in the north-west.

Phase I: The Plastered House Phase (Fig. 11)

A new north-south wall was built on this collapse (W12). It crossed over W19, coming to a 'T' intersection in the south (W16). A well-plastered house was built in the north-western corner of the trench. A floor (10.5) connects this house with walls 12 and 16.

As previously noted in Phase 11b, a deep cooking pit was cut into these levels. The southern extent of this floor was also destroyed by a gully (11.3).

The whole area appears to have suffered a destruction associated with much burning. On this surface lay a group of broken pots, including a number of jars (Fig. 14: 4, 6-10) and a krater (Fig. 14: 5).

The architectural remains east of W12 are minimal. They include a *tabun* cut into the floor and the highest stones of W11 are just visible through the destruction.

Pottery

As the parallels cited below indicate, the pottery of Phases III-IIb (Fig. 12; Fig. 13. 1-5) appears to date to the early Iron I period, i.e., *ca.* 1200-1050 B.C.[4] Of the characteristically Iron Age I types, the cooking pot (Fig. 12: 1) and the various bowls (Fig. 12: 2-8) and jar forms (Fig. 12: 9, 12, 13) may be noted. Close associations can be made with the pottery of Phases II-Ia from IIIC. No imported fabrics are present.

The stratigraphical evidence would suggest no significant gap in the sequence. At present, it would appear that Phase III covers a wider span than Phase II.

The pottery associated with the architectural remains of Phase I, points to a date extending from late Iron I-Early Iron II, i.e., *ca.* 1050-800 B.C.[5] Of the characteristic types, the storage jars (Fig. 14: 4, 6-8) and cooking pots (Fig. 13: 7; Fig. 14: 1-3) may be noted.

Iron Age Pottery (Figs. 12-14)

Figure 12

1. CN 2396. IIIN 14.2. Cooking pot rim. Well-levigated clay with many medium and tiny grits, fired creamy-buff throughout. Self slip.
   Parallels: Deir 'Alla I, Fig. 46.1 (Phase A).
2. CN 2377. IIIN 16.1. Bowl rim. Well-levigated clay with medium and tiny grits, fired brownish-buff with light grey core. Self slip. Decoration in thin matt reddish-brown paint on both the interior and exterior surface of the rim.
   Parallels: Gezer II, Pl. 28.11, 12 (Field II, str. 10); Gezer II, Pl. 25.18 (Field II, str. 12); The Northern Cemetery of Beth Shan, Fig. 44a.7 (Tomb 90); Deir 'Alla I, fig. 54.53 (Phase C).
3. CN 2477. IIIN 15.2. Bowl. Well-levigated clay with many medium and tiny grits, fired brownish-buff throughout. Self slip.
   Parallels: Megiddo II, Pl. 84.19 (str. VI).
4. CN 2476. IIIN 15.2. Bowl. Well-levigated clay with many medium and tiny grits, fired brownish-buff throughout. Self-slip. Deocration in thin matt reddish-brown paint over rim.,
   Parallels: Pella, Prelim. II, fig. 14.2 (IIIC 1.15 Phase Ia); Megiddo II, Pl. 74.1 (str. VIIB-VI).
5. CN 2484. IIIN 15.2. Bowl rim. Well-levigated clay with numerous medium

[4] Good parallels can be found, for example, from Beth Shan level VI and lower level V; Iron Age tombs from the Northern Cemetery; Deir 'Alla Phases A-D; Megiddo str. VIIB-VIA; Gezer field 11 str. 12-10; Ain Shems str. III, Pella IIIC Phases 1a, ib, 2.

[5] The dates for the end of Iron I and beginning Iron II, and the Megiddo, Deir 'Alla levels follow R.H. Dornnemann, *The Cultural and Archaeological History of the Transjordan in the Bronze and Iron Ages,* p. 65, 169. Good parallels can be found, for example, from Megiddo str. V, IV; Horvat Haluquim; Gezer field II str. 7; Hazor str. IX-VII; Beth Shan Upper level V.

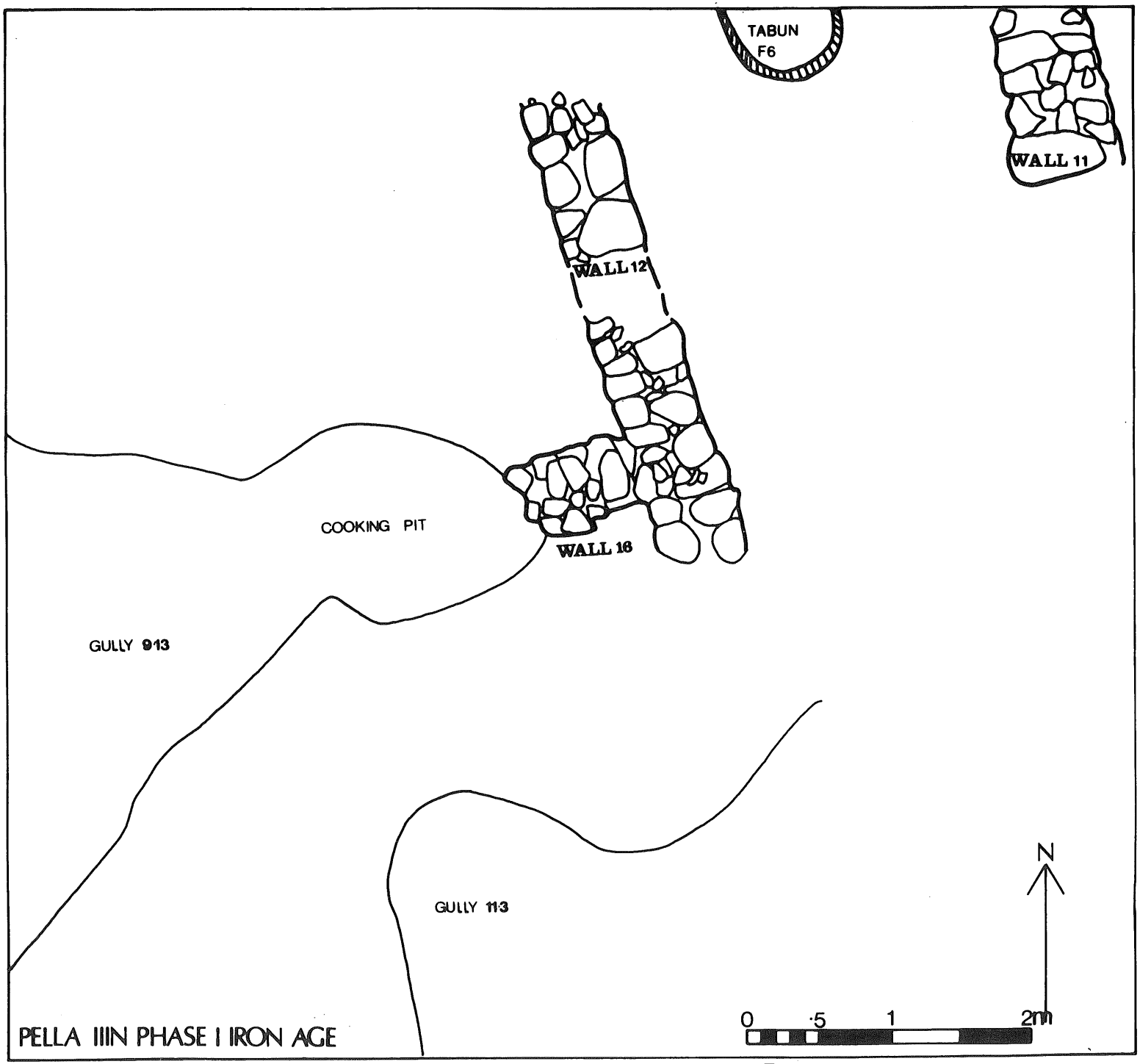


Fig. 11: Pella Area IIIN Plan. Iron Age Phase I

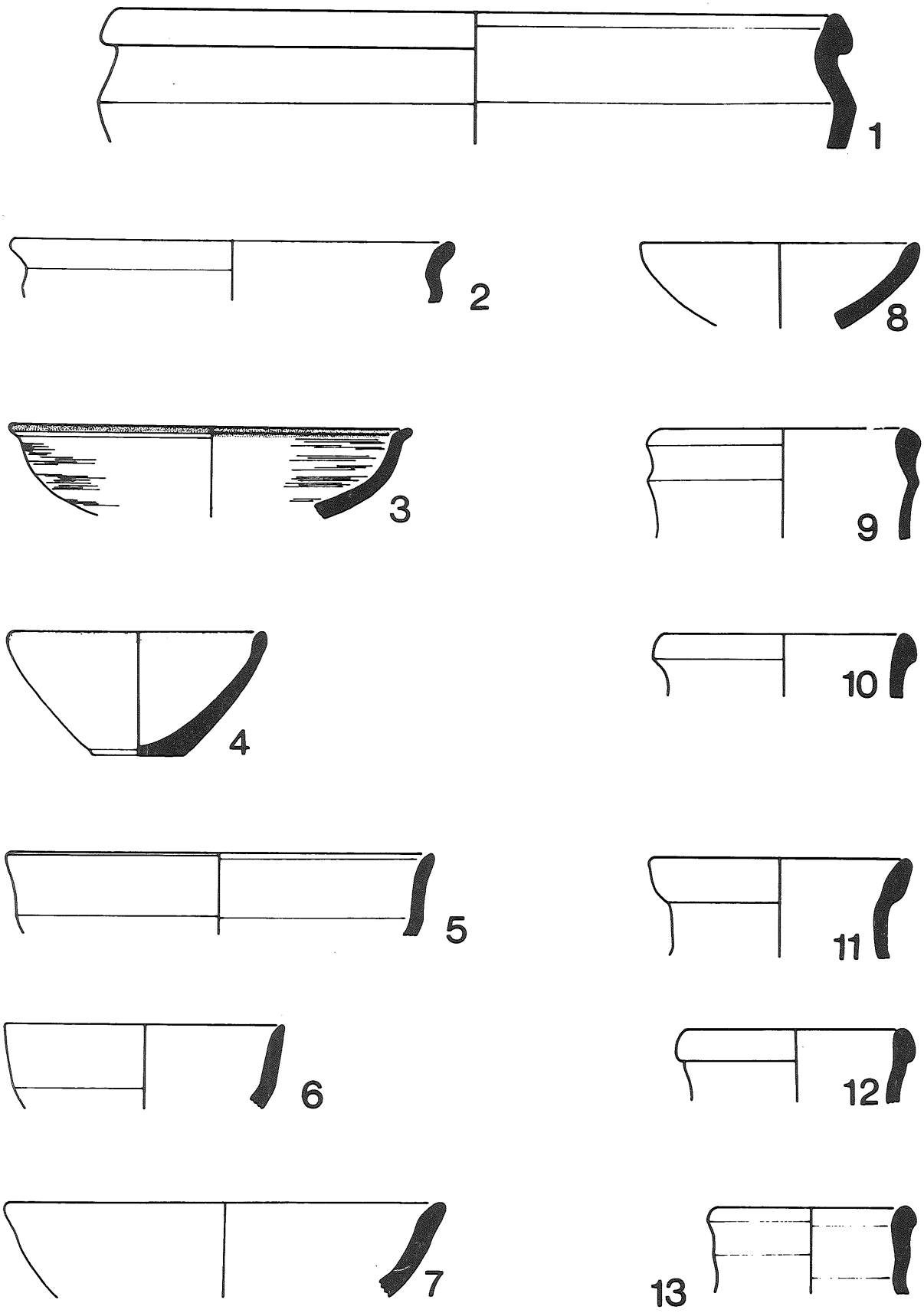


Fig. 12: Pella Area IIIN Pottery. Early Iron Age.

and tiny grits, fired buff throughout. Self slip.
Parallels: Deir 'Alla I, Fig. 46.24 (Phase A); Deir 'Alla I, Fig. 54.27 (Phase C).

6. CN 2321. IIIN 12.1 Bowl rim. Well-levigated clay with many medium and tiny grits, fired brownish-buff. Self slip.
Parallels: Pella in Jordan, Pl. 123.7 (IIIC 13.3, Phase Ia).
7. CN 2210. IIIN 12.2. Bowl rim. Well-levigated clay with some large, medium and tiny grits, fired grey-buff with darker grey core. Wet slurry.
Parallels: Megiddo II, Pl. 79.10 (str. VIIB-VIA); Ain Shems IV, Pl. LXII.18 (str. 111).
8. CN 2213. IIIN 12.2. Bowl rim. Well-levigated clay with some large, medium and tiny grits, fired grey-buff with darker grey core. Wet slurry.
Parallels: The Iron Age at Beth Shan, fig. 59.6 (Lower Level V).
9. CN 3117. IIIN. 11.11. Jar rim. Well-levigated clay with a great many medium and tiny grits, fired buff throughout. Self slip.
Parallels: The Iron Age at Beth Shan, Fig. 53.12 (Level VI).
10. CN 2402. IIIN 14.2. Jar rim. Finely levigated clay with medium and tiny grits, fired buff with thin brownish-buff faces. Self slip.
Parallels: Deir 'Alla, fig. 50.94 (Phase A).
11. CN 3039. IIIN 18.2. Jar rim. Well-levigated clay with a great many medium and tiny grits, fired brownish-buff with grey core. Self slip.
Parallels: Pella Prelim. II, Fig. 16.7 (IIIC 11.1, Phase Ib); Hazor I, Pl. CXLVI. 1; Megiddo II, Pl. 73.11 (str. VIB).
12. CN 3082. IIIN 11.5. Jar rim. Well-levigated clay with medium and tiny grits, fired orange and buff throughout. Self slip.
Parallels: Deir 'Alla, fig. 50.94 (Phase B).
13. CN 2378. IIIN 16.1. Jar rim. Well-levigated clay with a few medium and many tiny grits, fired greyish-brown. Self slip.
Parallels: Megiddo II, Pl. 76.4 (str. VIIB - VIA).

Figure 13

1. CN 2399. IIIN 14.2. Krater fragment. Finely levigated clay with many medium and tiny grits. Densely compacted clay, fired chocolate brown with very distinctive buff faces. Wet slurry.
Parallels: Megiddo II, Pl. 69.15 (str. VIIA-VIA).
2. CN 2324. IIIN 14.1. Body sherd. Well-levigated clay with numerous tiny grits and sand, fired buff throughout. Self slip. Decoration in thin matt reddish-brown paint.
3. CN 2479. IIIN 15.2. Chalice. Finely levigated clay with some medium and many tiny grits, fired buff with thin brownish-buff faces. Self slip. Decoration in thin matt brown paint above, outside carination. Distinctive shape - as yet unparalleled.
4. CN 3045. IIIN 9.14. Jar/jug rim. Well-levigated clay with many medium and tiny grits, fired orange-buff. Self slip.
5. CN 2483. IIIN 15.2. Handle. Well-levigated clay with a few large and many medium and tiny grits, fired buff but with dark brown patches. Self slip. Decoration in thin matt orange-brown paint.
6. CN 2172. IIIN 11.2. Deep bowl/jar rim. Well-levigated clay with many tiny grits, fired buff. Wet slurry.
Parallels: Megiddo I, Pl. 31.153 (str. V).
7. CN 2168. IIIN 11.2. Coking pot rim. Well-levigated clay with many tiny grits, fired light brown with thin variable grey core. Wet slurry.
Parallels: Horvat Haluquim, fig. 10.3 10th Century B.C.

Figure 14

1. CN 2331. IIIN 11.4. Well-levigated clay with numerous medium and tiny grits and sand, fired grey-brown with thin inner and outer faces. Self slip.
Parallels: Horvat Haluquim, fig. 10.3 10th Century B.C.

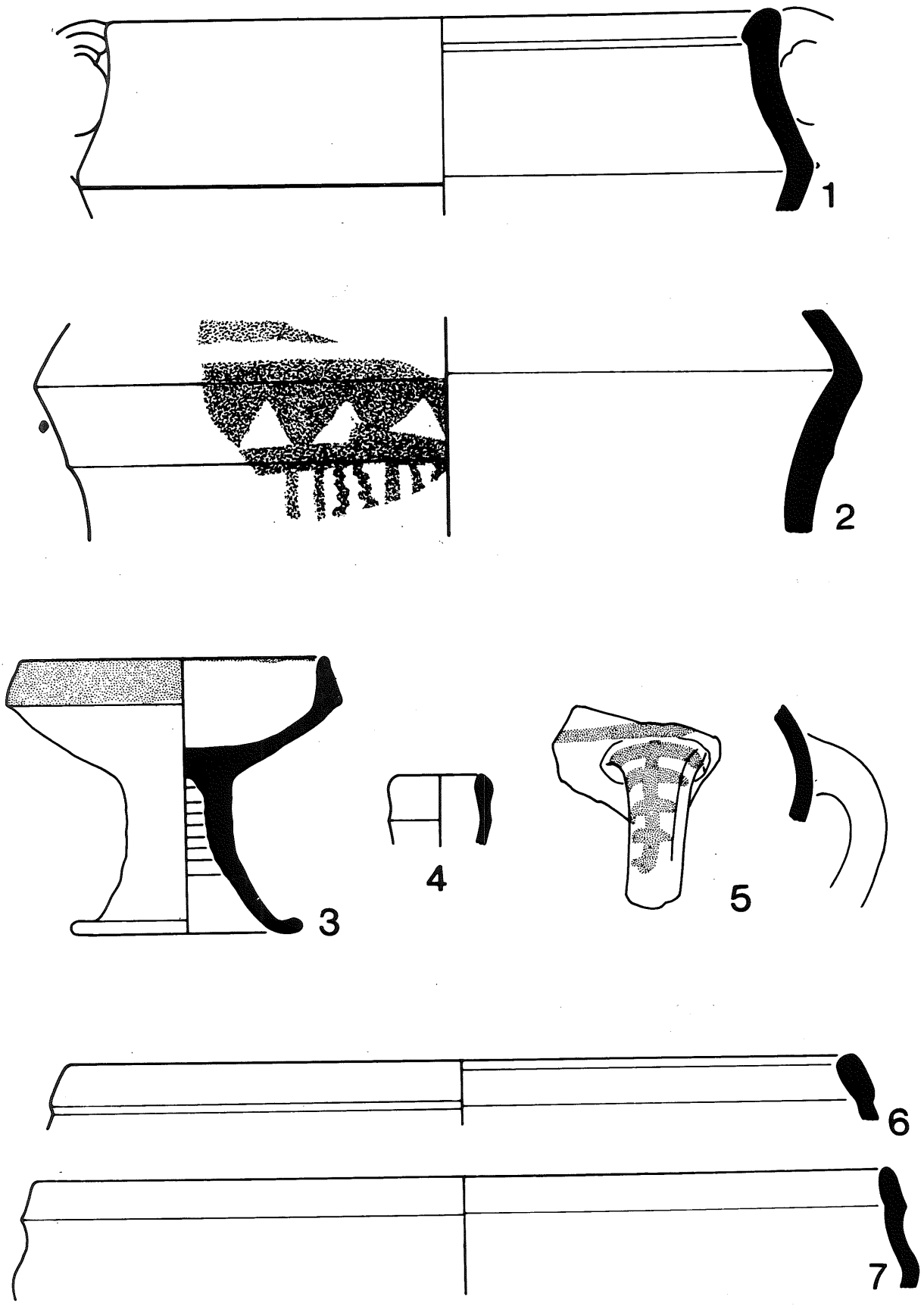


Fig. 13: Pella Area IIIN Pottery. Early Iron Age

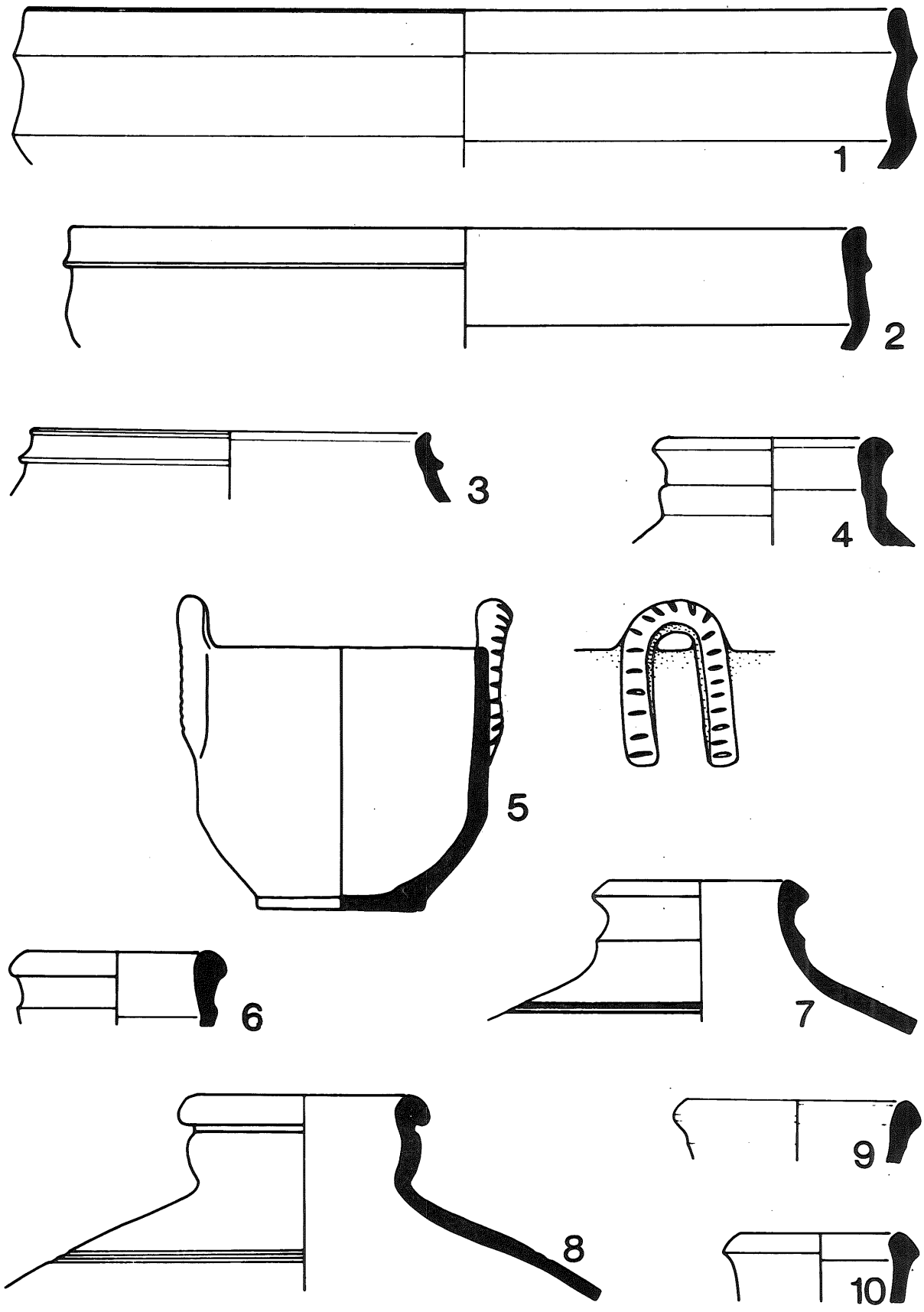


Fig. 14: Pella Area IIIN Pottery. Early Iron Age

2. CN 2166. IIIN 11.3. Cooking pot rim. Well-levigated clay with many tiny grits, fired light brown with thin variable grey core. Wet slurry. Parallels: Horvat Haluquim, Fig. 10. 1,3 10th Century B.C.
3. CN 2167. IIIN.2. Cooking pot rim. Well-levigated clay with some medium and a great many tiny grits, fired brown with thin grey core. Wet slurry. Parallels: Hazor III-IV, Pl. CCIX.1 (str. IX).
4. CN 2433. IIIN 10.4. Jar rim. Well-levigated clay with numerous medium and tiny grits, fired orange-brown with thin brownish-buff faces. Self slip. Parallels: Deir 'Alla I, fig. 67.35 (Phase H); The Iron Age at Beth Shan, fig. 49.10 (Upper Level V); Megiddo I, Pl. 15.76 (str. IV-II).
5. CN 2076. IIIN 10.4. Krater. Very shallow ring base, outward swelling lower wall with angle to upright upper wall, simple lip. Two handles — applied loops, projecting above the lip at the curve of the loop. Incised decoration on the handles exterior. Very coarse gritty ware, fired brown. Self slipped exterior. Distinctive shape. Possible Assyrian connections.
6. CN 2437. IIIN 10.4. Jar rim. Fired orange-buff throughout, grey-buff core. Tiny and medium chert grits. Parallels: Hazor I, Pl. L.34 (str. VII); The Iron Age at Beth Shan, Fig. 49.10 (Upper level V); Megiddo I, Pl. 15.76 (str. IV-II).
7. Not catalogued as yet, IIIN 9.11. Jar rim. Parallels: Megiddo I, Pl. 14.70 (str. IV-III); similar to Hazor I, Pl. LXVI. 18 (str. VII).
8. Not catalogued as yet. IIIN 9.11. Jar rim. Parallels: The Iron Age at Beth Shan, fig. 64.3 (upper level V).
9. CN 2488. IIIN 9.11. Jar rim. Well-levigated clay with a great many medium and tiny grits, fired buff throughout. Self slip. Parallels: Megiddo I, Pl. 21.124 (str. V).
10. CN 2489. IIIN 9.11. Jar rim. Well-levigated clay with many medium and tiny grits, fired dark buff inside, reddish-brown outside. Self slip. Parallels: Megiddo I, Pl. 11.52 (str. V? IV filling).

Hellenistic/Roman
Area XI

High on the north-east slope of Tell Ḥusn a trench, initially intended to investigate a possible tomb, was opened. It soon became evident that beneath the thick wash layers in the south-west corner of the trench there were walls of a structure which had originally stood above ground. Short lengths of two walls forming a right angle were uncovered. They were built of rubble bound with mud mortar and measure between 1.20 m. and 1.50 m. wide. Inside the structure, i.e., on the south, upslope side, a smaller wall constructed in similar style was unearthed. The nature of the building is not yet clear, but it is possible that it was a tower of Pella's fortifications.

The pottery from the strata sealed by the wash layers is consistently late Hellenistic and early Roman. Large quantities of storage jar and cooking vessel sherds of second and first century date were found, along with several bow-spouted ('Herodian') lamp fragments.

Roman
Area VI

The excavations of the dromos of Tombs 39A and 40, commenced in the third season (McNicoll, Smith and Hennessy, 1982: 84-101), were recommenced and extended northwards and westwards. Several columns, which lay up to twenty or so metres north of the entrance of Tomb 39A, 'to all appearances like a cluster of uninscribed milestones' (ibid.: 87), were disengaged from the soil and cleaned. All are extremely weathered, but on three of them traces of inscriptions can be seen. They are evidently the same columns observed by Germer-Durand at the end of the last century (1899: 31). In his day, as when Schumacher visted the site some ten years earlier (1895: 59), one of the columns remained upright; on it

Germer-Durand observe I/A. He deduced that this point marked the formal completion of the first thousand paces from the centre of Pella: 'Le point de départ était sans doute au centre de la ville haute, appelée aujourd'hui *Tabghat Fahl* ....' The problem is that from the milestones to the top of the *tell* of Tabaqat Fahl, even by the most zig-zag route, is scarcely more than 700 m.

The three inscribed milestones are now set up in the dig-house courtyard. Brief inscriptions and tentative readings follow:

1. Hard limestone, weathered. Cuboid base, tapering shaft, total height approx. 2.17 m. Inscription obliterated, except I/A at bottom of shaft (Germer-Durand 1899: 31).
2. Limestone, weathered. Shaft with ovolo moulding at bottom, height approx. 2.20 m. Broken in two and mended with Tenax.

   CAES[
   HAD[
   PONTMAX[
   POTESTXIIICOSIII
   MP I
   A

   The milestone is dated to A.D. 130 when Hadrian visted Transjordan.
3. Limestone, very pitted and weathered. Cuboid base, irregular tapering shaft, total height approx. 2.07 m. Shaft cracked.

   1 [ ]
   SEPSEV
   EROPIO[
   ERAVGAR[
   5 ADIPARBR
   ITMAET
   MAVRAN
   TONINOE[
   //////

10 ΑΠΟΠΕΛ
ΛΩΝ
A
On base

The form Pellōn (11.10-11) appears clear. It is not attested elsewhere. Could the settlements on Tabaqat Fahl and on Tell Ḥusn have been considered in some sense twin towns? Or was the inscription cut by someone with little Greek, and possibly less Latin?

Geta's name following Caracalla has probably suffered *damnatio memoriae.* The milestone was presumably erected some time after A.D., 210 if the reading BR/ITMA for *Britannico Maximo;* is correct.[6]

Two more milestones remain to be unearthed and examined.

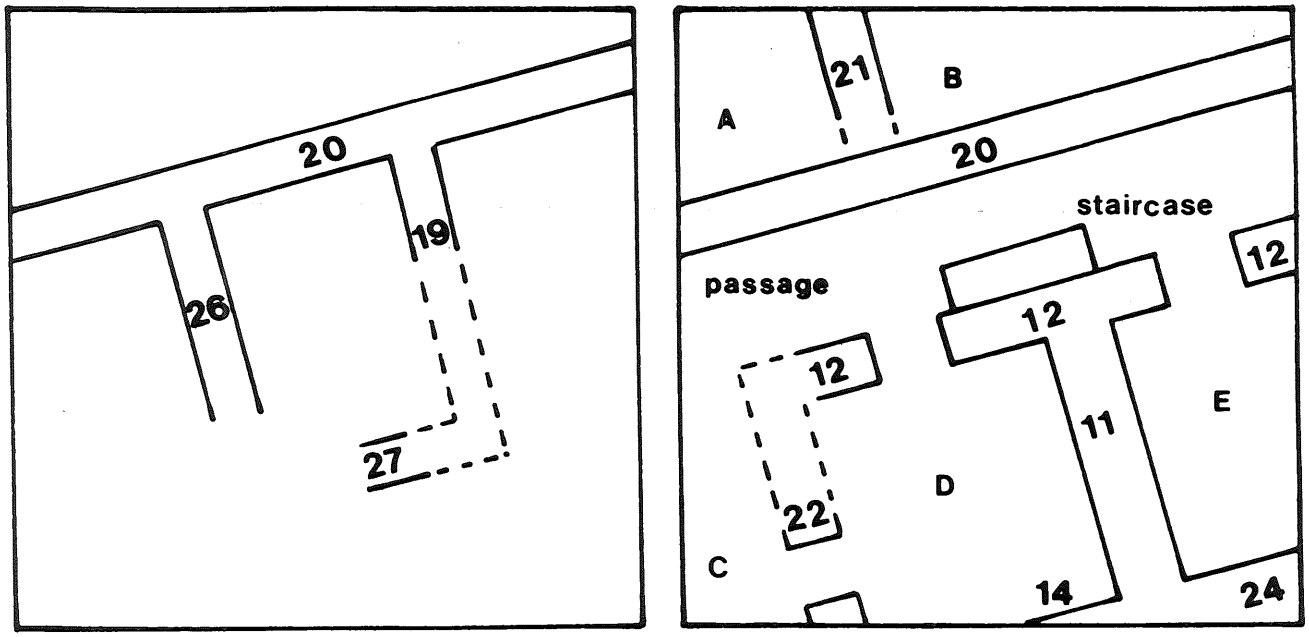
Byzantine
Area IV

Excavation of domestic settlement of the Byzantine period has continued in Area IV on the eastern side of the mound. Work has been concentrated in plot E, although a new plot was opened adjacent and to the south of IVE, designated as IIIP. In this plot the earliest Umayyad phase has been reached revealing buildings to the south of the courtyard in IVE.

A number of architectural phases preceding the Umayyad period have been identified in IVE. These are shown schematically in Figure 15. Phases III and V are fully illustrated in Figures 16 and 17. The earliest, phase I, was superficially exposed at the end of the season. No deposits associated with walls of this phase (19, 20, 26 and 27) have yet been excavated and little can be said about their date. Walls 19, 26 and 27 appear to have been demolished almost to floor level in preparation for new construction work in the area.

Wall 20, however, was retained and in

[6] Thanks to Dr. Dexter Hoyos, Department of Latin, University of Sydney, for help with the reading of inscription No. 3.



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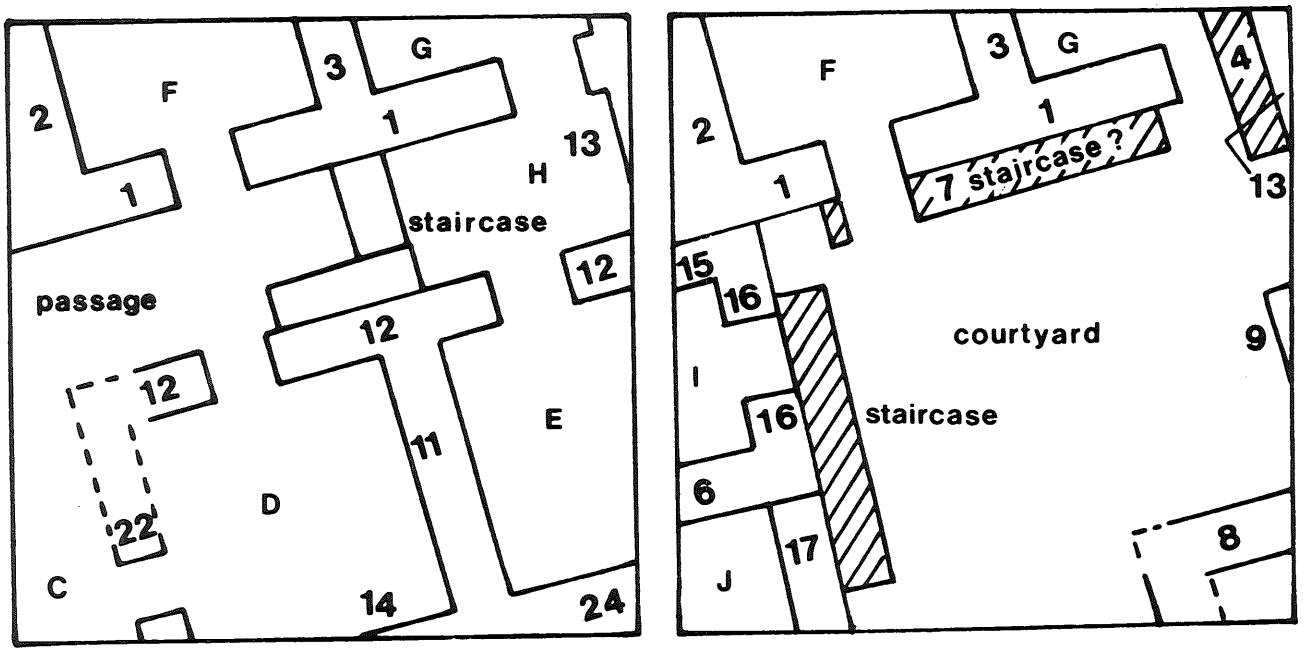

III IV

V

AREA IV PLOT E

SCHEMATIC REPRESENTATION OF BYZANTINE – EARLY UMAYYAD PHASES

PELLA

Fig. 15: Pella Area IVE Byzantine-Umayyad Phases

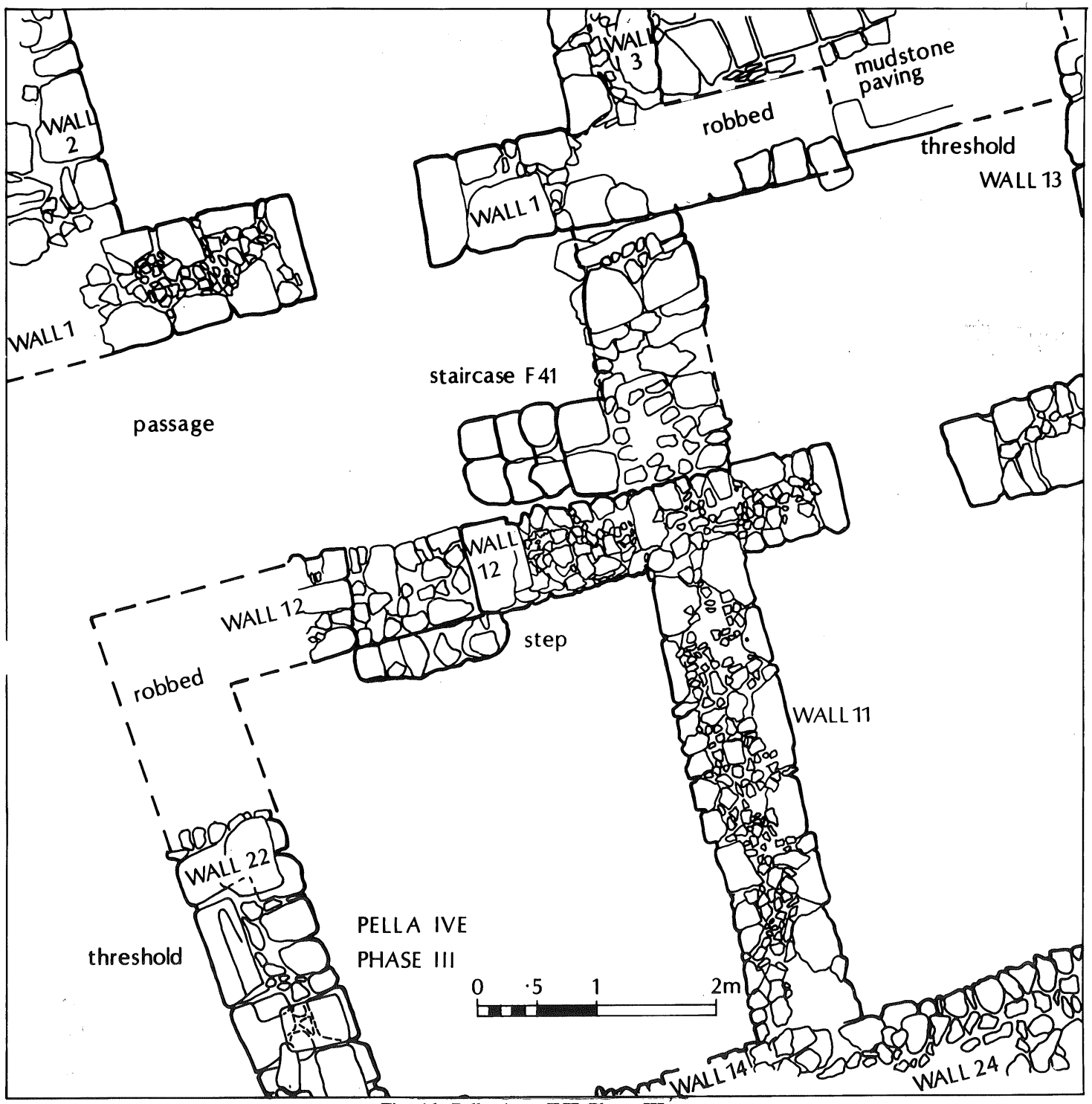

Fig. 16: Pella Area IVE Phase III

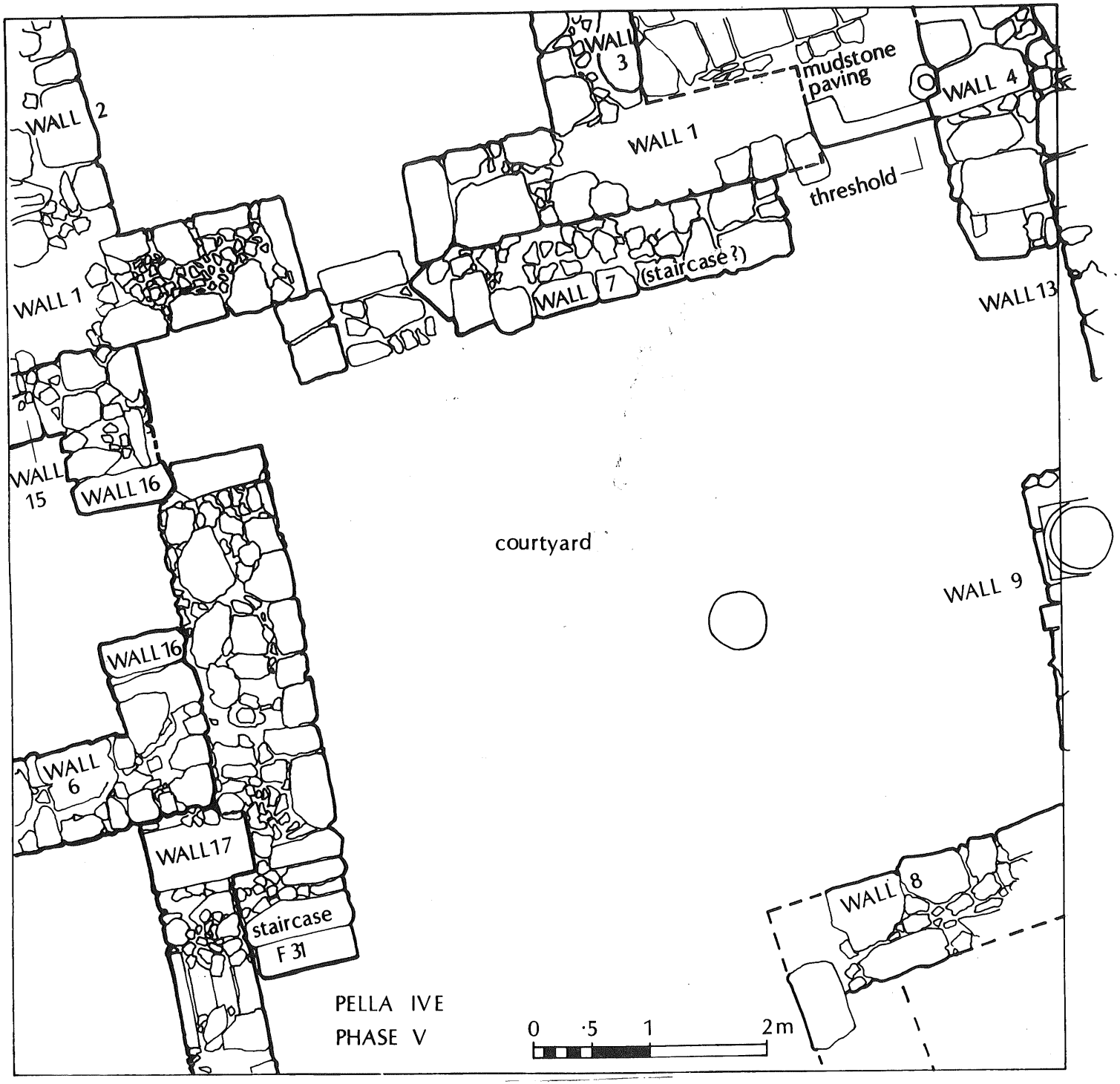

Fig. 17: Pella Area IVE Phase V

Phase II, wall 21 was added without foundations to divide the space (A and B). A small area of two successive floor levels associated with wall 21 has been found, the remainder being destroyed in the extensive trenching undertaken in the construction of phase III. In phase II a completely new building (walls 11, 12, 14, 22 and 24) was erected to the south. Between its north wall 12 and wall 20 was a small passage, probably unroofed. Two complete rooms of the building have been exposed (D and E), both opening onto the passage. Room D also opened westward to locus C, the precise nature of which is yet to be determined. The floor of room E was approximately 0.30 m. higher than the floor in D. The walls, which had virtually no foundations, reflect this terracing and the lowest course of wall 12 is higher on the east side of wall 11 than on the west. An exterior staircase abutting wall 12 probably provided access to the roof rather than an upper storey, in view of the lack of foundations for the walls. The floors in these rooms were simply beaten earth flecked with white lime.

In phase III the building north of the passage was demolished. A new building was erected in its place with higher surfaces north of wall 12. The new building is represented by walls 1, 2, 3 and 13. Wall 20 was dismantled to below the surface level of phase II and this involved extensive trenching. Substantial foundations were laid for the new walls. Wall 1 sits partially upon wall 20 and is offset somewhat to the north. The gravelled earth floor for the new room F runs over the top of wall 21 which was demolished to a level half a metre higher than wall 20. Exaggerating the terraced system, the floor of room G was set 0.75 m. above the floor level in F and was neatly paved in mudstone flags.

In order to match this raised occupation surface in the north, the passage was built up level with room F. Layers of large stones and earth were used in the packing and the surface was slicked with yellow clay. A north-south leg abutting wall 1 was added to the staircase and effectively blocked the passage at this point. The floor levels in the southern building remained as established in phase II. However, the level of the north doorway in room D was raised by a stone packing and two steps led up to the new surface of the passage. The doorway in room E involved a similar step upwards to the north.

Living arrangements were substantially altered in phase IV. A new room (I) represented by walls 6, 15, and 16, was built in the west abutting wall 1 of the northern building. Originally wall 16 extended further south, defining room J. It partly covered wall 22 of phase III, which had been dismantled to threshold level. The rest of the southern building of phase III (rooms D and E) was dismantled to a uniform level approximately 1.00 m. above the surface of room D. Rooms D. E, H and the remaining passage areas were then filled to the height of the dismantled walls and the resultant large surface was slicked with a yellow clay. Thus an internal courtyard had been created onto which opened rooms F, G and I. Walls 8 and 9 were built on top of the courtyard fill and helped define the south-east boundary of the enclosure. A substantial *tabun* and a nearby column base, (useful in breadmaking activities?), are associated with this courtyard.

At a later stage, phase V, the south extension of wall 16 was replaced by wall 17, cutting through two floor levels in room J. An external staircase was built alongside walls 16 and 17, blocking the doorway in wall 16. It sat directly upon the courtyard surface. At the same time a "wall" (7) was added alongside wall 1. Only one course of this structure remains and it may have been a staircase. Finally, wall 4 was constructed alongside wall 13. Access between rooms F and G and the courtyard was maintained. A roughly constructed feature partly exposed in room F may have have been a feed-bin and could indicate a change in function in the latest use of this room, from human habitation to stable. Such occurrences have previously been noted at Pella.

Although the finds from deposits associated with these phases are still to be analyzed in detail, some remarks can be made concerning phases III and IV. A

study of some of the pottery from the fill beneath the courtyard in phase IV was made by Walmsley (report on the 1981 season, *ADAJ; Pella in Jordan* I, p. 152 ff.). Two fragments of red slip ware as classified by Hayes *(Late Roman Pottery,* 1972) suggest a date for this courtyard construction in the early seventh century A.D. Whether this change was due to the Islamic take-over or occurred earlier is still debatable. Aside from these two fragments (African Red Slip ware, Form 105 and Late Roman C/Phocaean Ware, Form 10A), the numerous remaining examples of red slip ware from the studied deposit and other contemporary deposits date uniformly to the first half of the sixth century at the latest. The vast majority belong to Late Roman C/Phocaean Ware Form 3.

Two vessels of interest are illustrated here from these phase IV deposits. They are supplementary to those published as "assemblage 2" by Walmlsey. Fig. 18: 2 is a small open bowl of well levigated terracotta. Extensive chisel decoration covers the exterior body below the slightly everted rim. The interior is decorated with thick wavy vertical bands in yellow paint. No parallel to this piece has been found. Fig. 18: 1 is a two-handled open cooking pot in coarse terracotta. The straight side sloping inward to a sharp carination then curving to a dimple base is an unusual variant within this common form.

At this stage the only indications of date for phase III are again provided by the red slip wares. A fragment of Late Roman C Form 3 Type C is dated according to Hayes' chronology in the second half of the fifth century. An African Red Slip Ware Form 67 (with no decoration visible) could date as late as A.D. 480.

The two types of cooking pot characterized by Walmsley in assemblage 2 (the open variety and the jar with two vertical handles from rim to body), are also found in phase III. The ware is predominantly coarse terracotta although one example of the open form is in medium terracota, a ware generally restricted to the typical Byzantine ribbed cooking pot with an upright neck of S-shaped profile and two handles from rim to shoulder. Water jars in dark brown, white painted ware with collared rim and a ridge just above the join between neck and shoulder, also extend back into phase III. The absence of the handmade flat based bowls and jars in dark grey to buff ware (cf. *Pella in Jordan* I, p. 154) seems to indicate that they begin in phase IV. However, the remarks concerning the finds from phase III are based on a single deposit. Examination of all related deposits may necessitate a revision of the chronology.

Islamic

Area IV

Introduction

In the last two decades the rapidly growing interest in the archaeology of Islamic Jordan has led to a major change in attitude towards the excavation and preservation of Islamic sites. At Pella, known as Fihl after the Islamic conquest, excavations by the University of Sydney have exposed more than 1700.00 square metres of Umayyad domestic settlement. In addition to architecture the excavations have produced a wide range of objects in daily use at Pella during the Early Islamic period, particularly an excellent corpus of pottery and other objects of glass and bronze from the A.D. 747 earthquake destruction of the site (McNicoll, Smith and Hennessy, 1982: Chs 7 and 8). This season further investigations into the Umayyad occupation at Pella have turned up spectacular evidence of the destructive nature of the A.D. 747 earthquake, as well as confirming the mid-eighth century date for the end of Umayyad occupation at the east end of the main mound.

The later Islamic history of Pella, until now known from burials and a surface scattering of pottery, has been greatly augmented this season by the excavation of a village mosque constructed in the thirteenth century A.D. Although designed to serve a small community probably of no more than 140 at its greatest extent, the mosque confirms late Medieval settlement at Pella.

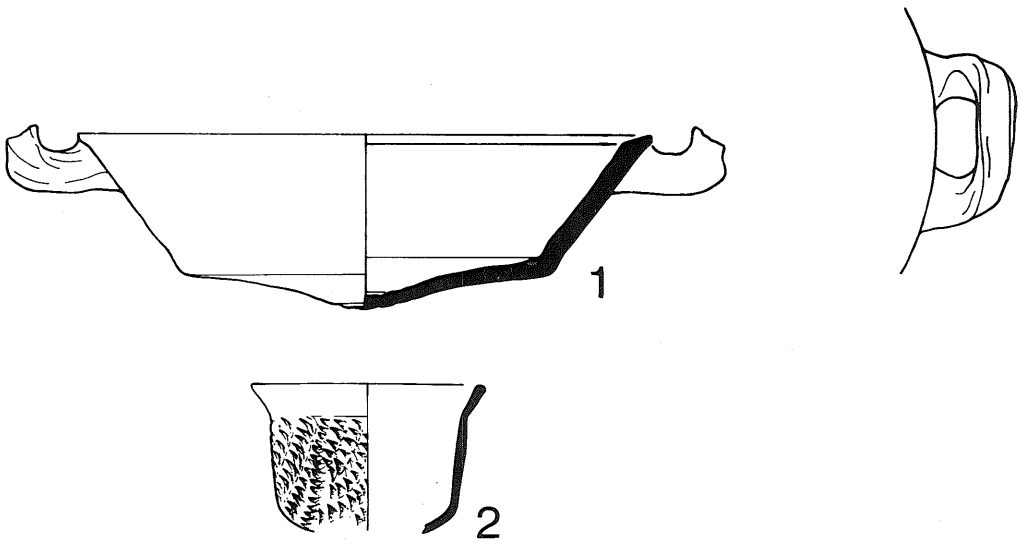

Fig. 18: Pella Area IVE Pottery

The Early Islamic Period (A.D. 635-750)

At the end of the 1981 season, most of Plot IVP, comprising two large rooms and half a stable, remained to be excavated. In the 1980 and 1981 seasons adjacent rooms had turned up a considerable amount of material, e.g., pottery, iron and bronze objects, reused marble pieces, coins, skeletons of animals and a human skeleton. This season the destruction level of the house revealed a continuing list of earthquake victims: three more horses, six chickens, one squashed underneath a basalt quern that had fallen from the floor above, a cat and a charred human. More pottery, mostly cooking ware, was recoverd, as well as six more *dinars,* two of the year A.H. 94/A.D. 712-3, and others of years A.H. 110/A.D. 728-9, 112/730-1 and 122/739-40, the last just seven years prior to the A.D. 747 destruction of the house.

Following the earthquake the debris of the dwelling caught alight, generating sufficient heat to crack the fallen columns and fire the unbaked bricks from the upper storey walls. Also recovered from the collapse layer were charred beams, many large white tesserae and sizable lumps of a pebble and white plaster mix, in one case with tesserae still attached. The full effect of the earthquake is apparent here — collapse, burning, loss of wealth, personal tragedy!

With the completed excavation this season of IVP and the removal of all baulks the Umayyad house in plots IVM, P and S can be viewed as one dwelling of three occupied in Area IV in the second quarter of the eighth century A.D. Initially it was suggested that the organization of this dwelling was of a number of rooms around a central peristyle courtyard. It now seems that the large central room was roofed over, above which was another large room with a plain white mosaic floor. The roof of the upper room was flat, made of pebbles and cement and like the mosaic floor laid on wood beams and cane.

The Late Medieval Settlement

Work on Islamic remains this season was also conducted in a new area, Area XVII (Fig. 19). Surface indications of a major structure located to the north-west of the modern cemetery were noticed by the Sydney team when visting the site in 1977. This building appears on Schumacher's map of 1888 and Richmond's map of 1933, both reproduced in Smith (1973: 6, 11) in which book the ruin can also be clearly seen in the endpaper photographs. It was concluded that this structure was most likely a mosque, the excavation of which was decided upon in order to ascertain the date of construction.

Stratigraphy and architecture

The walls, visible on the surface, extended for a depth of around a metre to floor level. The excavated deposit from ground surface to floor was a homogeneous dark topsoil, disturbed in two areas by a robber pit and a late Bedouin burial. Objects recovered included bone, glass and assorted pottery. The whole of the mosque was exposed, and stratigraphical soundings sunk through the floor to investigate both construction techniques and the possibility of an earlier building. From the floor and its makeup a considerable amount of pottery was recovered and nearly two metres below an earlier structure was discovered, this being a house of the Umayyad Period.

The primary building material utilized was stone, much of it reused. Large, well squared blocks were used to strengthen the corners of the outside walls, but generally the two-faced dry rubble core walls were constructed of undressed stone, each being carefully chosen to fit in with adjacent stones.

The mosque was built on a flat, open area to the south of the Late Medieval village. Facing the village was the only entrance into the mosque, this doorway being flanked on either side by three narrow windows. The doors and window shutters were most likely of wood, with no evidence of iron grills in the windows. A portico, constructed in light materials such as wood and reeds, may have existed in front of the mosque, although this was

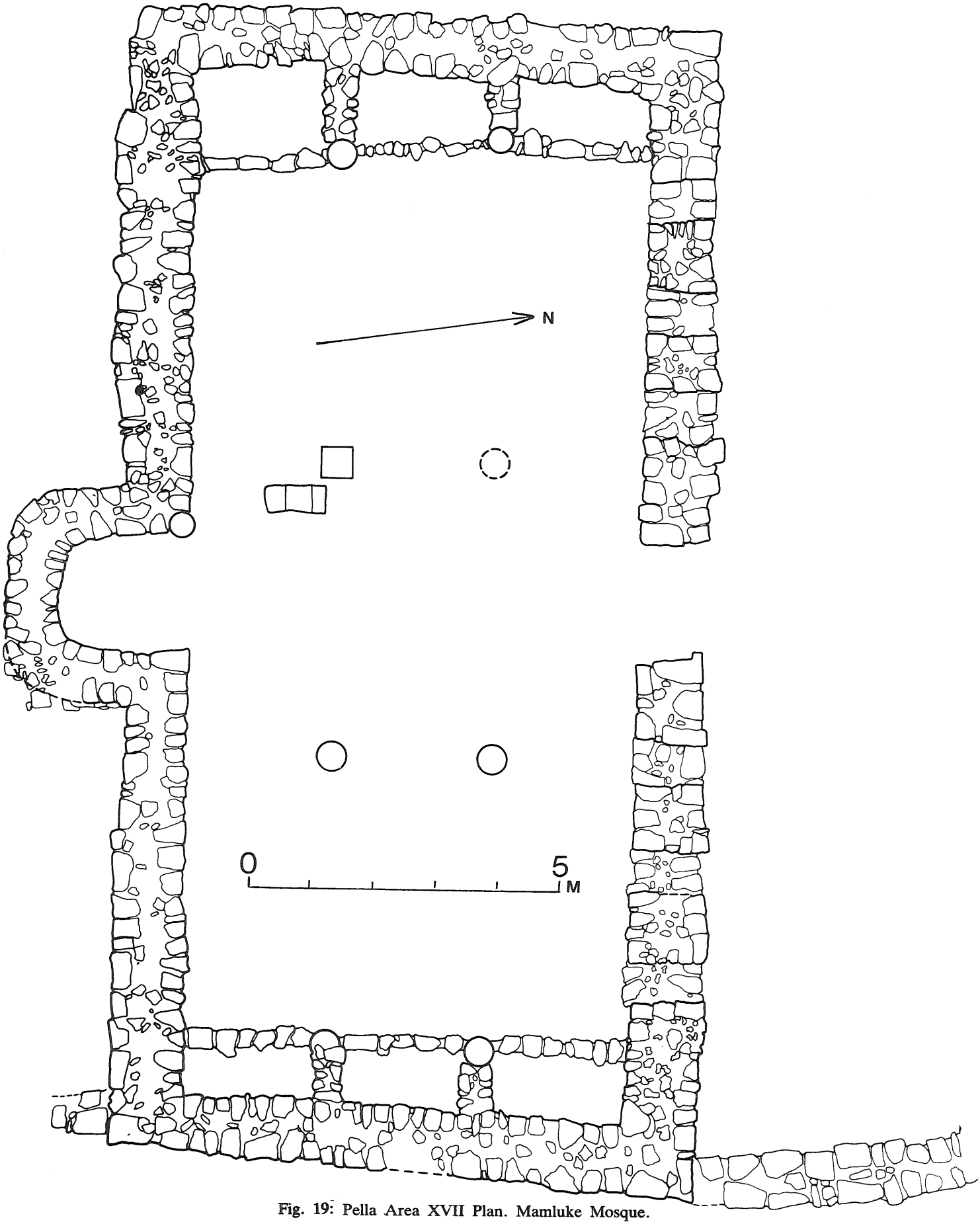

Fig. 19: Pella Area XVII Plan. Mamluke Mosque.

hardly necessary as the prevailing winter wind comes in from the south-west. The internal arrangement of the mosque was centered on a deep column flanked *mihrab* in the south wall, idicating the *qibla* or direction of prayer. To the west of the *mihrab* was a *minbar,* of which three stone steps remain. The super-structure of the *minbar* was probably of wood, abutting the south wall. The rows of four columns each provided support for the steep-sloping pointed arches on which the roof, also it is suggested of wood and reeds, was carried. Between the columns, which on average stand only a metre above floor level, voussoirs from collapsed arches were recovered, the width of which indicate the roof was not of any considerable weight. Rather surprisingly the floor appears to have been simply packed mud, although in the vicinity of the *mihrab* a chippy white plaster surface was located. This may have originally spread over the whole floor inside the mosque, but if this was the case, it is surprising that no evidence was found for the plaster floor close to the walls in other parts of the mosque.

The soundings below floor level provided interesting information on the techniques utilised in the construction of the mosque. While the north, west and east walls were trench built, the south wall had been constructed almost straight onto the ground surface. This arrangement can be explained by the design of the building, where the north wall was weakened by the doorway and six windows, while the east and west walls were required to carry the thurst of the arches, on the outermost columns through short buttress walls. The *qibla* wall was neither pierced nor required to carry extra weight, so accordingly less effort was made in securing good foundations. The *mihrab,* in any case, provided a convenient buttress in the centre of the wall.

Conclusions

Because of the apparent consistency of Ayyūbid and Mamlūk ceramics between the thirteenth and fifteenth centuries A.D., and the lack of a foundation inscription or coins, any estimate of the date at which the mosque at Pella was constructed must be largely guesswork. We know that up to the time Izz ad-Din was appointed by Salah ed-Din in A.D. 1184-1185 to secure the Ajlun region, northern Transjordan and Damascus was open to frequent raiding by the Latins (Johns, 1932: 21-33). It is likely that up to this time and probably until the Battle of Hattin (A.D. 1187) Pella was abandoned, being no-man's land between Crusader held Beisan and the Ayyubid defenses against the much reduced Latin Kingdom, although more likely resettlement took place in that period of stability and prosperity which followed the repulsion of the Mongols by Baybars at Ain Jalut in A.D. 1260. Certainly the second half of the thirteenth and the beginning of the fourteenth centuries was a time of considerable building activity; for example the shrine at Maqam an Nebi Musa (A.D. 1269-70), renewal of a mosque at Nabulus (A.D. 1273-4), the Red Mosque at Safad A.D. 1275-6), a shrine at Tiberias (A.D. 1295) and the caravanserai Khan al Ahmar at Beisan in A.D. 1308 (Mayer, 1933: 27-32; Mayer 1932a: 37-39; Stephan, 1935: 160; Mayer, 1932b: 95).

The literary sources indicate, in so far as they specifically refer to Pella (as Fiḥl), that by around A.D. 1300 Fiḥl had been reoccupied. Yaqubi and Ibn Faqih at the end of the ninth and beginning of the tenth centuries A.D. refer to Fiḥl as a district of the military province of Jordan (Smith 1973: 75; Ibn al Faqih: 16-17, 116). By the end of the tenth century, Ibn Haukal and Maqaddasi both omit Fiḥl from their description of the Jordan Province, as does Yaqut in A.D. 1225 (A.H. 623). Most likely from the mid- to late tenth century A.D. until the mid-thirteenth century A.D. Pella was correspondingly unoccupied. Then about A.D. 1300 Fiḥl once again is mentioned in the literary sources in the work of Dimashqi, suggesting repopulation of the district in general probably specifically the site as well and its re-establishment as an administrative district in esh-Sham (Smith, 1973: 76).

Some confirmation of a thirteenth century construction date is found in the similarity of plan between the mosque at Pella and the supposed Ayyūbid mosque at Azraq. As at Pella, the Azraq mosque is rectangular in plan with the long axis parallel to the *mihrab* wall, although overall the Azraq mosque is shorter with two instead of three arches per row. Other variations are that the arches rest on pilasters where they met the end walls, rather than on buttressed columns as at Pella, the doorway of the Azraq mosque is located in the short east wall, and the windows are two elevated openingS flanking the *mihrab* in the south wall. But the underlying concept is the same, and construction techniques similar. These include two-faced rubble core walls built from undressed stone and deeply sunk load-bearing pillars. More interesting is that the arch spans in both mosques are within five centimetres of each other; at Azraq 4.25 metres and at Pella 4.20 metres. Consequently, it seems very likely that these two mosques were constructed within a generation or two of each other.

Because of the similarity in design between the Azraq and Pella mosques, an accurate estimate of ceiling height is possible for the mosque at Pella. The arches at Azraq stand to a height of 2.50 metres from their springing on the columns to underneath the arch keystone. For Pella this would give a floor to under keystone height of 3.50 metres, onto which the thickness of the arch should be added, some 0.35 metres to give a total floor to ceiling height of 3.85 metres.

The available floor area of the mosque allows some estimate to be made of the total population of Pella in the Late Medieval period. The mosque could take up to 35 persons comfortably, perhaps a few more, and it as it can be expected that one-third to one-quarter of the total population attended Friday prayers, the size of the mosque suggests it was built for a village of around 105 to 140 people. Most likely, however, numbers never reached this maximum and Pella was, during much of the Late Medieval period, a village of approximately 100 persons.

A surface investigation of the main mound at Pella has located the remains of village houses contemporary with the mosque. These are situated to the north of the mosque in the centre of the main mound. House walls of the medieval village show quite clearly in the aerial photograph of the site published by Smith (1973: Endpaper) and cover an area of roughly 110 metres by 80 metres. It is unlikely that this was concentrated settlement, but rather individual units of house and courtyard with a surrounding wall. Associated with these house remains is a surface scatter of pottery of the types recovered from the mosque. Unfortunately, none of this medieval village has been excavated to date.

Also associated with the mosque are the copious Late Medieval burials at the eastern end of the main mound. Up to the end of the 1982 season over 200 skeletons had been excavated, although this does not represent the whole cemetery. Burials were nearly always in simple grave pits, the body in an extended position on its right side with the head to the west, facing south. Many burials were stone capped, and frequently women were buried with jewellery of some sort, especially bronze ear- or finger rings. Similar burial grounds are known for a number of Palestinian sites, of which the burials at Tell el Hesi, dated to the fourteenth to sixteenth centuries, are the most thoroughly studied (Eakins, 1980: 89-96).

It is unclear at what time Late Medieval occupation at Pella came to an end. Following the final expulsion of the Crusaders (A.D. 1291, the fall of Akka), the threat of further Latin expansion in north Palestine was averted and the strategic position of Pella no longer of importance. From the mid-fourteenth century onwards the depopulation of Palestine which started with the black death of A.D. 1348 became a serious problem, and by the end of the century Mamluk Syria and Egypt had descended into political and economic chaos which was further complicated by the Turco-Tartar invasion lead by Timur (A.D. 1400-1401).

As Lewis remarks:
"Plague, locusts and the depredations of the unleashed Bedouin completed the work of the departed Mongols, and the Mamluke Sultanate suffered a blow to its economic and military strength from which it never recovered." (Lewis, 1970: 157).

We can expect that by this time Late Medieval occupation of Pella/Fiḥl had come to and end.

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PRELIMINARY REPORT ON THE 1983 SEASON OF THE SYDNEY/WOOSTER JOINT EXPEDITION TO PELLA (SPRING SESSION)

by
Robert H. Smith

Introduction

The spring session of the 1983 field season at Pella was carried out from 23 March through 24 May under the auspices of The College of Wooster. The staff numbered twenty-five persons.[1] The session was funded largely by a grant from the National Geographic Society, with additional financial support from The College of Wooster. Field work was carried out under license from the Department of Antiquities, with the endorsement of the American Schools of Oriental Research and the cooperation of the American Center of Oriental Research in Amman.

By design, this was the last spring that a Wooster team would be in the field at Pella. Consequently, efforts were directed towards the obtaining of maximal information from the two major areas, VIII and IX, where the Wooster team had been conducting excavations since the inception of the Joint Expedition in 1979.[2] The only new exploration was a small probe, given the designation Area XXV, on the southern crest of the mound (Fig. 1) which yielded significant new information about the early occupation of the site. In as much as operations in these three areas required the full utilization of staff, no tombs were excavated.

Area XXV

South Slope Excavation

This small probe, carried out over a seven-week period by a single crew of workmen under the direction of Dr. Ellen McAdam, was exceptionally productive of information about the history of Pella. Begun as a 3.00 x 3.00 m. square on the crest of the south slope of the mound, the excavation was extended by two more squares to the north, with 1.00 m. baulks (later removed) between the squares, for a total area of 3.00 x 11.00 m. Staff geologist Dr. Frank Koucky had noticed that reddish natural gravels were visible quite high on the steep slope, and that just above the gravel and cut into it were pits containing Chalcolithic sherds. Upon examination, the pottery exposed by the continuing erosion of these pits down into the Wadi Jirm proved to be in phase with the pottery found by the Expedition at the Chalcolithic site excavated during 1981-1983 on Jebel Sartaba (Area XIV).

Just beneath the surface several walls of poor quality appeared. These proved to be the remains of a simple habitation, the floor of which had been paved with mudbricks. The potsherds recovered in association with this occupation ranged

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[1] The staff consisted of Dr. Robert H. Smith, director; Mr. Omar Reshaidat and Mr. Hefzi Haddad, representatives of the Department of Antiquities; Dr. Leslie P. Day, supervisor of Area IX; Dr. Cherie Lenzen, supervisor of Area VIII; Dr. Ellen McAdam, supervisor of Area XXV; Mr. Peter Donaldson, assistant supervisor of Area IX; Ms. Alison McQuitty, assistant supervisor of Area VIII; Mr. Douglas Kuylenstierna, photographer; Mrs. Beryl Jolowicz, registrar; Dr. Frank Koucky, geologist; Mr. Curtis Marean, surveyor; Mrs. Kathleen Baker, draughtsperson; Ms. Barbara Hughes, camp manager; Mr. Dale Martin, Dr. B. Narasimhaiah, Ms. Ann West, Ms. Margaret Mook, Mr. Robert Merrill, Ms. Gretchen Shearer, Ms. Lizanne Sprowls and Mr. David Benson, excavators; Mr. Badri Madi, foreman; and Mr. Mohammed Qaraeen, cook.

[2] For previous archaeological work in these areas, see A. W. McNicoll, R. H. Smith and J. B. Hennessy, *Pella in Jordan; Interim Report on the* 1979-1981 Excavations, Canberra, 1982. Annual preliminary reports have also appeared in *ADAJ*, and in *BASOR*.

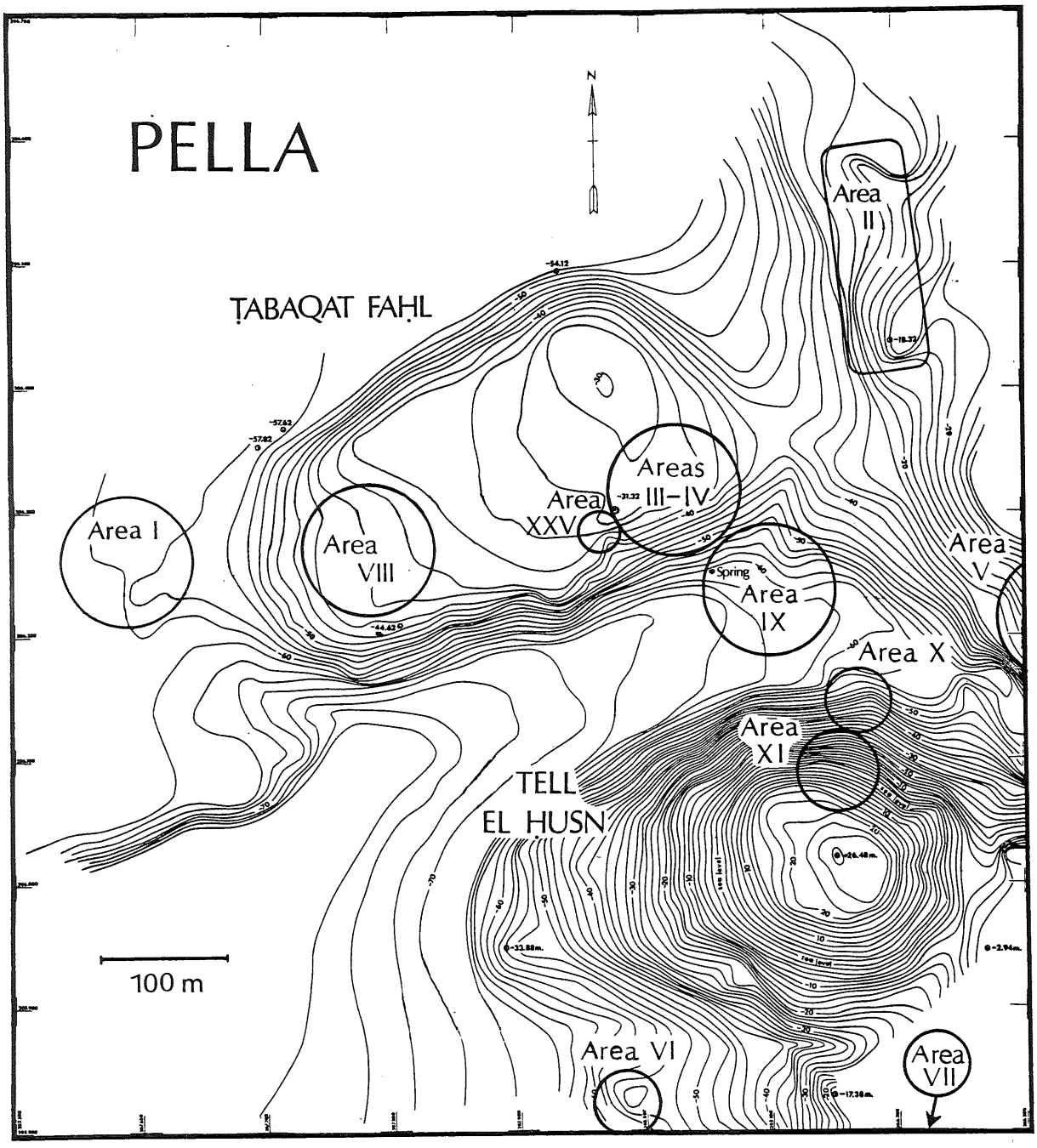

Fig. 1: Map of Pella, showing excavations. Some areas lie beyond the map.

typologically from MB IIC into early LB I, with a very few stray Iron Age sherds that probably had entered the stratum through rodent holes. Immediately below the building was a fill as much as 2.00 m. deep, containing a mixture of three typologically separate corpora of potsherds: Middle Chalcolithic, Early Bronze I, and Middle Bronze IIA, each chronologically separated from the other by six or more centuries. The fill had been cut by numerous pits of the MB IIC-LB IA occupation, but was otherwise largely undifferentiated and had generally been deposited in relatively level layers. The quantity of Early Bronze I postsherds was noteworthy, particularly the abundance of grain-wash ware which (as several massive sherds that could be reassembled indicated) came from large storage jars.

At the bottom of the excavation, a shallow stratum was encountered which represented Middle Chalcolithic domestic occupation. Aside from a few bits of wall, the chief feature was a group of round pits of various depths and sizes dug into the gravel (Pl. LXXV,1). The pits and associated soil layers contained a large number of chert implements and debitage, the latter indicating that the rock had been flaked and knapped on the spot or a very short distance away. Only a few fragments of basalt vessels were found, and relatively few ceramic vessels which could even be partially restored. It is evident that the Chalcolithic levels had suffered disturbance prior to and during the early phases of the deposition of the fill.

In the Chalcolithic stratum were a few Late Neolithic sherds. Particularly significant was the fact that in two of the pits the few potsherds were mostly Neolithic, in phase with the Late Neolithic pottery excavated in 1979 in the fill beneath the West Church.[3] It would seem that when the Chalcolithic inhabitants began to occupy the crest of the mound there were remains of Neolithic occupation on the surface, which became mingled with the debris of the Chalcolithic occupation. Some of the chert implements found in the Chalcolithic levels may be of Neolithic date, probably both pre-pottery Neolithic and pottery Neolithic.[4]

From this probe new dimenstions have been added to our knowledge of Pella's history. The discovery that the occupational deposition on the mound is relatively shallow at some places has made it possible for excavators to probe to the very earliest occupation of the mound with a minimal amount of excavation. At certain times in both the Neolithic and Chalcolithic Ages habitation sprawled shallowly across the gravel mound above the spring. The gravel provided excellent drainage for occupation, a factor of some importance in view of the likelihood that at this early date people occupied the site only during the rainy winter season. At this early time annual precipitation was probably much greater than it is today.

Since no evidence of Early Bronze Age structures was found between the Chalcolithic and Middle Bronze Age habitations, some spot higher on the mound can be assumed to be the source of the large number of EB I potsherds found in the fill. There is not much ground on the mound that can be supposed to have been higher than the top of the fill, but if the topography of the gravels had somewhat the same contours as the present mound the Early Bronze Age town lay to the north and east of Area XXV. The same may be said for the MB IIA occupation represented in the fill. It will not be surprising if excavation someday reveals the existence of a walled Early Bronze or Middle Bronze IIA city covering a small area of high ground in that part of the city. How significant the gaps between the Chalcolithic, EB and MB IIA pottery in the fill are remains to be seen, but it would appear that the periods found in this probe correspond to phases of greatest vigor in the city's early history.

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[3] Ibid, p. 27ff.

[4] Pre-pottery Neolithic chert tools are, in fact, to be found at several occupational sites along the northern crest of the Wadi Jirm between Pella and the scarp overlooking the Jordan Valley.

Area VIII

The West Cut

The Wooster team first began the excavation of Area VIII in 1979, and has continued to deepen this major stratigraphic probe with each passing season. The area supervisor in 1983 was Dr. Cherie Lenzen. Originally 39.00 m. long, the area of excavation was somewhat reduced at each end in 1980 and 1981. In order that greater depths could be reached, in 1983 the area was further reduced at the southern end and that portion of the trench was backfilled. As a precaution against the possible collapse of the baulks as greater depths were reached, the width of the trench was reduced by 1.00 m. The resulting area of excavation was 4.00 x 17.50 m., a size which permitted excavation to progress downward at a relatively rapid rate, though with the inevitable concommitant that only portions of any surviving structures would be exposed in so limited an area. If there was any regret at the end of the season, it was that an even more restricted area had not been chosen for excavation, so unexpectedly deep did the Iron Age deposits prove to be.

In the 1981 season, excavation had stopped in Stratum 5, an Iron IIC and early Persian Period context. Occupation and soil layers were almost level across the trench, as they had also usually been in higher strata. At a depth of approximately 4.50 m. almost all architectural features (which were never more than flimsy throughout the stratum) had ceased, leaving the entire bottom of the excavation almost bare and level. Early in the 1983 excavations it became apparent that this almost featureless level represented virtually the end of Stratum 5. Although largely devoid of architectural features, the levels of this straum were relatively rich in potsherds and by the end of the 1981 excavations it was clear that a street occupied much of the length of the area (Pl. LXXVI,3).

Unpaved, poorly laid out and frequently lacking sharp architectural boundaries, the street proved to have had an extremely long history, being fround successively in Strata 6 through 8. Consisting of successive layers of gravel mixed with soil and sherds, the roadway became a source of frustration, not only because of its lack of architectural features but also because of abundant potsherds within it constituted fill rather than narrowly stratified domestic occupation. Only rarely were restorable vessels found within the levels of the roadway.

As the excavators proceeded through Strata 6, 7 and 8, the ceramic corpus underwent gradual changes. Each stratum appeared, however, to span a relatively wide range in time, particularly in the street. Preliminary study suggests that the latest pottery in Stratum 6 was from about the 9th or possibly 8th century B.C., that the Stratum 7 (a relatively small stratum) from around the 11th-10th century, and that of Stratum 8 from the 13th-12th centuries. In all three strata there was a considerable amount of pottery of LB IIB date, and occasionally earlier sherds. Small finds, though not abundant, included a cylinder seal (Pl. LXXVI,1) and a Horus-eye pierced faience amulet (Pl. LXXVI,2).

The ceramic and architectural evidence suggests that Pella was particularly vigorous at the end of LB and the beginning of Iron I, and thereafter went through a long phase of somewhat lower population and cultural decline in the Iron IB-C and Iron IIA-B periods, from around 1150-1100 B.C. to perhaps 800-750 B.C. This circumstance finds support in the fact that in Area III on the eastern side of the mound the Sydney team has found occupation from both the beginning and end of the Iron Age, but little between those times.

The corner of a domestic courtyard was exposed at the extreme southwest end of the trench. Inside the angle formed by two stone walls which had been successively rebuilt were numerous levels, some of which contained burned brick fragments and dung, *tabun* fragments, and other evidences of domestic activities, including a broken but largely complete cooking pot. In the packed-earth floor about 0.50 m. away from the walls several

postholes about 0.12 m. in diameter were found, containing fragments of charred wood. Their placement suggested that a narrow roof had been constructed close to the wall at one phase. The postsherds recovered from the various levels of the courtyard showed no typological changes, hence it is likely that the use of the courtyard may have extended over little more than a quarter-century or half-century, around 1200 B.C.

Relatively unencumbered in the roadway by any architectural features, excavation proceeded rapidly to a depth of 8.00 m., at which point there was still no end to Stratum 8. At this depth a total of some 4.50 m. of Iron Age deposition had been removed. It was decided at that point to utilize the remaining time of the spring session to concentrate efforts on a probe at the northern end of the excavational area, where there already existed a baulk that would give good continuity between the probe and the rest of the excavations in the area.

The probe rapidly demonstrated its utility by revealing that Stratum 8 continued for another 2.50 m., without any walls, floors or other features being encountered. At 10.50 m. below the surface a large stone wall oriented north-south appeared in the middle of the probe, and was soon joined by a cross wall that disappeared into the eastern baulk. At a depth of 12.20 m. a stone paving was encountered that abutted the north-south wall (Pl. LXXV,2). The potsherds that were found just above the paving and in the course of the walls which were removed, though not large in quantity, dated to the Late Bronze Age. This a new stratum, 9, was notably lacking in imported ceramics except for a few fine-ware sherds of north-Canaanite provenience.

The walls represented a fairly large building which had been used from MB II into LB. Beneath the paving was found a Canaanite wine jar that had been used for the burial of a neonate. The jar contained, along with the bones of the infant, an MB IIB burnished juglet. In the 1.60 m. of soil excavated beneath the paving were MB II sherds, none of them apparently later than MB IIB. The corpus of pottery of this new stratum, 10, included, along with MB IIB sherds, a notable admixture of MB IIA pottery of the same horizon as that found in Area XXV.

Excavation continued to a depth of 14.00 m. below the surface, with MB IIA-B sherds continuing to predominate but an increasing number of Chalcolithic sherds mingled with them. The increase in proportion of Chalcolithic sherds amid the MB II sherds suggests that Chalcolithic occupation may exist below the Middle Bronze city. There was no ceramic evidence of Early Bronze occupation, and indeed the findings in Area XXV suggest that the Early Bronze Age city may well not have extended so far west on the mound.

At the end of the 1983 season, the excavators in the West Cut still had not reached the natural gravel which underlies the mound of Pella, but the excavations in Area XXV suggest that it is unlikely that the Chalcolithic stratum, if indeed there is such below the Canaanite at this place on the mound, is thick; in that case, natural gravels can be expected only a few metres below the depth at which excavation ceased in the West Cut. The topography of the gravels, so far as it is visible in the eroded south slope of the mound, tends to support this conclusion.

Area IX

The Civic Complex

The Wooster team began the excavation of the Civic Complex in 1979 under area supervisor Dr. Leslie Day, and has continued in each of the subsequent seasons that it has been in the field. By the end of the 1981 season, the church which dominates the area had been identified and its atrium excavated, the small theater had been excavated, and buildings or chambers on both the north and south sides of the church had been partially explored. Many questions remained, however, and it was to answer these, so far as possible, that in 1983 emphasis was placed on excavations in this area. Over half of the spring session's excavators and

the greater portion of the hired workmen were assigned responsibilities in the Civic Complex, where six locations were under excavation throughout the spring session.

One of the requirements for excavation in this area was that of heavy machinery. The earthquakes of A.D. 717 and 746 had left heaps of architectural stones lying about. A few of these had been moved during the excavations of 1979-81, and several times the Department of Antiquities had brought in crews of workmen between seasons to remove some of the stone debris, reset columns and other architectural features in their proper places, and consolidate the surviving walls. This season Dr. Hadidi agreed to provide heavy equipment and skilled workmen to work at the site while excavation was in progress, so that excavation could proceed more efficiently and restorations could be made more promptly. The result was that excavation proceeded at least twice as effectively as previously and considerable architectural restoration was completed (Pl. LXXVII,1). It is to be hoped that the Department can continue clearing, consolidation and restoration at selected places in the future.

One goal of the spring excavations in 1983 was to obtain as much information as possible about the form and history of the Civic Complex Church. Since the entire building could not be cleared, efforts were focused on the western and eastern ends of the sanctuary. By the end of the season all three apses and approximately one-fourth of the floor space of the aisles had been excavated, and several of the columns of the central aisle had been entirely or partly reset on their proper bases (Pl. LXXVII,2). The columns, numbering twenty in all, were not of uniform manufacture, but appear to have been taken from various Roman-period buildings at Pella or elsewhere. Their height, exclusive of their capitals (which also varied in size) was approximately 4.10 m., about the same height as the columns of the atrium.

Where unrobbed, the paving in the aisles showed a mixture of kinds of flagstone, the assortment apparently having been the result of repairs made to the floor during the church's three hundred years of existence. The earliest paving in the wide central aisle, so far as excavated, consisted of large, thin pavers of fine marble that varied in size but averaged approximately 0.35 m. on each side; it is possible, however, that some other form of paving lies in the unexcavated central part of the aisle. After the earthquake of 746, most of the marble paving was robbed; the only places where it was left were those where the paving was crushed or hidden by fallen architectural blocks (Pl. LXXVIII,1). A sounding made in the southwest corner of the sanctuary, where pavers had been robbed out, showed no evidence of any earlier kind of paving. In the south aisle the paving ranged from designs made of small marble squares about 0.15 m. on each side to mosaic paving, and against showed signs of considerable repair. Wherever it appeared, the repair was less attractive and skillfully done than the earlier workmanship.

An unexpected discovery in the sanctuary of the church was the presence of heaps of pre-746/47 trash at several places on the floor. Careful study of baulks showed that the debris had accumulated in several successive stages. The lowest accumulation was chiefly aeolian soil a few centimetres thick (except near some walls, where it accumulated more deeply), which suggested a period of disuse of the sanctuary. Above this soil were piles of debris from the church itself, consisting particularly of coarse white mosaic tesserae, roof tiles and pieces of decorative stone (Pl. LXXXI,1). On top of this was debris from the earthquake of 746/47. This sequence suggests that the church suffered extensive damage in the earthquake of 717, after which a protracted attempt was made to clean up and repair the sanctuary so as to make it once again serviceable. When indigence, political factors or other reasons made the renovation of the church impossible, the church's leaders removed all of the ecclesiastical fittings they could and abandoned the building. The earthquake of 746/47 completed the destruction of the structure.

A sounding was made at the southwestern corner of the central aisle of the church, where paving no longer survived. The bedding for the paving of the sanctuary was relatively thin and poor, and the foundation for the church's walls was small and shallow. The potsherds found in the first half-metre beneath the floor were mostly small body sherds of Roman and Early Byzantine types, plus a few earlier strays. From a half-metre depth onward there was no pottery later than the Eary Roman period. At that depth a modest wall was encountered, running at an angle quite different from the church's orientation. The sounding thus showed that there was no major structure beneath that part of the sanctuary, and that there was no construction of any kind from a point some time in the Early Roman Period.

By diligent effort, all three apses of the church were excavated (Pl. LXXVIII,2). There was evidence of extensive and frequent repairs of them, like all other parts of the church. In all cases, the modifications were of lower quality than the original workmanship. Small soundings revealed that the east wall of the church had in an earlier phase been straight, and only subsequently been massively rebuilt with curving walls for each of the apses. No inscription was found which would date the church precisely, but preliminary architectural comparisons suggest a late fourth-century or early fifth century date.

The earlier form of the building had apparently had a *prothesis* in the southeast corner, *a diakonikon* in the northeast corner, and a single altar at the eastern end of the central aisle. These two side chambers would have had entrances opening onto the church's north and south aisles, respectively. The *prothesis* was also entered by a doorway in the south church wall that opened outward and led to a vestry or other ecclesiastical chamber, all traces of which have disappared because of erosion on the steep slope down to the wadi. All other doors in the church's north and south walls were larger and opened inward into the sanctuary in the customary fashion. In the prothesis the eastern half of a square mosaic paving was found *in situ,* its presence having been concealed since the fifth-sixth century beneath a new floor, 0.42 m. higher than the original floor level (Pl. LXXIX,1). The later floor, a simple flagstone paving that was largely robbed following the earthquakes of the first half of the eighth century, had been installed at the time of the remodelling of the east end of the sanctuary. The earlier mosaic floor had a multi-coloured geometric pattern of considerable intricacy.

The *diakonikon,* on the north side of the sanctuary, had no corresponding exterior doorway. It, too, had originally had a multi-coloured mosaic, although of somewhat simpler pattern, which had probably had approximately the same dimensions as that in the south chamber (Pl. LXXIX,3). This chamber had also had its floor raised 0.42 m. and repaved with simple flagstones during the rebuilding of the eastern end of the sanctuary. Subsequently there were various repairs to the apses, often accompanied by the reuse of earlier decorative stone from the church.

A similar phenomenon was found in the central apse, where the floor level was either originally raised or had been raised at the time of the elevation of the floors in the north and south apses. In any case, the original straight eastern wall had later been replaced by a massive curved apse wall. It may be that this wall was made exceptionally thick because the builders feared that its shape and size would make it unstable. At a later time builders had constructed a low, curving buttress against the apse, possibly because tremors had raised new fears about the structure's stability. The excavators did not dismantle any part of this construction, so there is no way of knowing if it conceals any previous earthquake damage to the lower portion of the apse wall.

Because the eastern end of the church was built against the hillside, the wall of the central apse survived to window-level. The curved wall had three large windows, one at the centre one on each side. Many fragments of window glass were found in the vicinity of the windows, the panes originally having been large rectangles.

Parts of the stone windows, the panes originally having been large rectangles. Parts of the stone window jambs were found, as well as the base and plinth of a small column that may have flanked one of the windows (Pl. LXXX,1). The window frames were of wood, and hence no trace of them was found. Numerous small peices of lead which were probably used to hold the window glass in place were found, and the panes retained traces of putty.

No trace of a mosaic floor was found in the central apse. There was, however, a crescent-shaped platform about 0.30 m. high, later concealed by the raising of the apse's floor level, which originally may have provided a base for the altar. Embedded horizontally in clay and mortar in the centre of the platform, on the central east-west axis of the church and flush with the raised floor, was a marble chancel screen that had been reused. It had been laid in a carefully-prepared bedding, directly below the place where the altar stood. At the time of its discovery portions of the screen were missing, presumably having been robbed after earthquake damage to the church in A.D. 717 or 746/47. Like others found at Pella and elsewhere, the slab had been designed to stand upright between two marble posts between the altar and the rest of the worshippers. It had a heavily moulded border on each side, and on its reverse (which could not have been seen after the screen was installed in the floor) was a simple cross with its lowest arm longer than the other three. The design on the obverse was both more elaborate and more finely executed; it consisted of a large cross in the center, flanked by two rams with lowered heads, each the virtual mirror-image of the other. These well-known symbolic representations of Christ and his followers had at some time offended someone, possibly one of the Muslim conquerors after A.D. 635 who adhered strictly to the Prophet Mohammed's proscription of images, for the animals' figures had been carefully hacked away, leaving only their out-lines. The screen, which has dimensions similar to those of other altar screens from Pella, was cleaned and repaired prior to the end of the 1983 spring session.

Excavation was also continued in the paved area north of the atrium of the church. At one spot on the paving a pile of trash was found which contained a sledge-hammer, a pick, a bolt for a lock, a small wheel rim, a pair of shears, a door socket, and assorted nails—all of iron. These objects seem to have been refuse from a blacksmith's shop. Other kinds of debris also had been tossed on the pile, including glass windowpane fragments and an Umayyad ceramic funnel. The most significant aspect of this refuse heap is not its contents, interesting though they are, but the fact that the trash had already been accumulating on the paving at the time of the earthquake of A.D. 746/47. This along, with the trash heaps in the sanctuary of the Civic Complex Church, provides clear evidence of the growing abandonment of portions of the city and the increasing decay of the city generally — a circumstance that excavations in previous years have already tended to indicate.

Archaeological investigation was continued in a limited fashion in the structure adjoining the church on the north, where in 1980 and 1981 the "hall of the camels" was excavated. It was not feasible to engage in extensive excavation in this building, but probing was carried out east of the "guard-room" of the chamber, where the system of drains in the courtyard north of the church had lead to suspicions that there might be a cistern. Dark earth similar to the Roman-period bedding for the seats in the theater appeared below the level of the paving, containing virtually no pottery, but there was no evidence of a cistern and probing was discontinued. During excavation two more skeletons of domestic animals, a cow and a donkey, were found (Pl. LXXXI,2).

It now appears likely that the entire area occupied by the building north of the Civic Complex Church was a courtyard prior to Late Roman or Byzantine times. The courtyard may have been laid out by the leaders of Pella in the Early Roman Period to create a forum-like area between the Old City and the new, or planned, Roman-style theater and nymphaeum or

baths that flanked the wadi. This theory affords for the first time an explanation as to why it is that no major Roman buildings underlie the Civic Complex Church, for the spot chosen for the church was probably on one side of this forum-like area. The ecclesiastical leaders chose that spot for the church precisely because there were no other available large areas inside the city. Forum-like areas were perhaps also constructed during the Roman period in the wadi itself, but as that part of the city is inaccessible because of the high water table nothing further can be said at present.

The purpose and history of the structure that adjoins the Civic Complex Church on the north still cannot be more than conjectural. The indifferent manner in which the Ionic columns were installed shows that the structure is not pre-Roman, but rather a fairly late construction in which the builders utilized columns that they took from some earlier building. A possible hypothesis is that this structure was constructed in Late Byzantine or even Umayyad times, as the old forum area north of the church was gradually being encroached upon for assorted commercial purposes.

The spring session saw the completion of the excavation of the monumental stairway, built late in Pella's history, which led to the atrium of the Civic Complex Church (Pl. LXXXII). The stairway came to an abrupt termination at its northern end, with a potentially dangerous drop-off to the level of the lower paving. The late paving at the foot of the stairway terminated at its northern end in a stairway that ascended to the Old City via the saddle that lies to the north of the Civic Complex.

Another major structure in the Civic Complex that was the object of archaeological investigation during the spring session was a semicircular wall which had been discovered just west of the monumental stairway at the end of the 1981 season. This large, well-constructed wall was the subject of considerable interest, since it was located close to the theater and the wadi. In the interests of efficiency it was decided to excavate only the northern half of the *exedra*. Excavation showed that on its north side the wall extended for several metres toward the west before terminating in a short stub that extended in the direction of the wadi. This extension represented a modification of the original form and function of the structure. Like the other buildings excavated in the Civic Complex, the *exedra* had undergone extensive modification in the Byzantine Period, and possibly in Umayyad times as well.

The uppermost surviving course of the wall proved to be only one to two metres above the water table in the Wadi Jirm, and pumps had to be used constantly while excavation was in progress. No one anticipated the increasingly large volume of water that flowed in as excavation proceeded. Water began to trickle into the interior of the *exedra* after the first metre of debris had been excavated, and as excavation probed more deeply it began to gush in through the water-worn corners of individual wall stones, until pumps pulling the equivalent of a 0.20 m. column of water were insufficient to withdraw all of the water. For days the excavators and their workmen waded hip deep in water attempting unsuccessfully to reach the floor of the structure.

Two metres below the top of the surviving wall of the *exedra* a 0.50 m. wide stone bench came to light. This buttress-like addition to the wall of the *exedra* was surmounted by several layers of mudstone pavers, on top of which was a channel made of fired-clay paving blocks designed to conduct water on a semicircular path along the *exedra's* wall. This bench probably was not part of the original design of the *exedra*. The period during which the channel functioned could not be determined precisely, but it clearly was late in Pella's history.

The quality of the *exedra's* construction is excellent, and can be compared with little else in the Civic Complex but the theatre, which almost certainly is of Early Roman date. The function of the building remains uncertain. It is possible that it is a remnant of the *nymphaeum* of Pella which is shown on several of the city's coins; it may be,

however, that it was a part of the public baths at Pella. Whether *nymphaeum* or bath, the *exedra* was designed to have something to do with water. Its very position beside the wadi suggests that water figured in its use, and the presence of a water-channel running around the wall of the *exedra* attests that in fairly late times it continued to be involved with the spring. During the course of excavation fragments of scores of funnel-like, ribbed ceramic jars, open at both the large and the small ends, were found amid the soil and mud. Although these vessels bear some resemblance to ones used in Roman times to construct barrel vaults, the presence of two of them virtually *in situ* at the southern end of the water channel suggests that they were intended as water-supply pipes, the tapering end having been designed so that each pipe could fit into another and at the same time the entire line of them could be bent to any necessary curve. (Pl. LXXIX, 4)

Whatever its original function, the structure underwent adaptation at the hands of Late Byzantine or Umayyad inhabitants of Pella, and as usual the workmanship was of much lower quality. A westward extension was made to the north side of the *exedra,* and other walls were built so as to form a partial enclosure west of the *exedra.* It was during this period that the water channel was constructed. This secondary construction was related to three barrel vaults which were discovered adjoining the *exedra* on the northwest. The vaults were built parallel to one another and, so far as they could be measured, had similar dimensions. They shared a common back wall, although that wall may have had more than one phase of construction or reconstruction. Regrettably the water table precluded excavation much below the springing of the arches, and it was impossible to measure the distance to the floors. No stairway leading to the floor of the vaults was found, nor fittings of any sort. The south wall of the vault nearest the *exedra* had its wall in common with the extension of the *exedra's* wall toward the west, a fact which indicated that the extension of the *exedra* and the vaults were constructd at the same time, which was probably the same time as the installation of the bench and channel in the *exedra.*

The purpose of the vaults may have been to provide cisterns for the storage of water from the spring. A plausible context in which the people of Pella would have had to husband their water supply so carefully was one of drought. The date of this construction cannot be determined closely, but we increasingly know that cisterns were being constructed, or improvised from existing structures, during the Late Byzantine Period beginning of the Umayyad Period, i.e., around A.D. 575-675.[5] It may be that it was during this time that the *exedra* underwent extensive alterations related to the changed hydrological conditions at Pella.

Contributions to the History of Pella

As has been mentioned previously, the spring excavations of 1983 provided significant information related to Pella's history. Our knowledge of several early periods at the site has been considerably enlarged. There are indications of both a pottery Neolithic phase and possibly a pre-pottery phase as well, which was not limited to the mound proper but also extended to some of the hills in the vicinity of what later was to be Pella. Only one period in the Chalcolithic Age has been clearly identified, but that one is clearly represented on the mound as well as in the somewhat more distant in Area XIV. Again only one period in the Early Bronze Age, EB I, is strongly represented by the 1983 findings, although occasionally EB II-III sherds have appeared in the West Cut and elsewhere.

The new MB IIA evidence is

[5] Note the cistern excavated in 1980 which had been constructed about this time north of the large West Church (*op. cit.,* p. 126-127). Early in the 1983 season a cistern was discovered not far from down the slope from the south apse of the Civic Complex, which had been devised by the plastering of a vaulted chamber similar to the barrel vaults under discussion here.

important for our knowledge of Pella in Canaanite times. Egyptian texts name the city over a period of several centuries from the nineteenth century onward, but these allusions alone are insufficient warrant for the assumption that the city was rich and important throughout the second millennium B.C. The evidence from the probe in the West Cut, the discoveries in Area XXV, the findings of the Australian team in Area III, and the Canaanite tombs that have been excavated at Pella over the years, constitute sufficient data to warrant some conclusions. Pella had a vigorous, if undistinguished, existence during the MB IIA period, around 1900-1750 B.C., the time when the earliest known historical allusion to the city occurred in the Egyptian execration texts.[6] Pella was also certainly occupied during MB IIB, but the extent of the city's vigor at this time cannot yet be fully ascertained. The lack of strong evidence for MB IIB thus far, both on the mound and in tombs, suggests that the eighteenth century may have brought a slight decline in both population and prosperity. For the seventeenth century and transitional MB/LB period of the sixteenth century archaeological evidence excavated in previous seasons suggests fairly robust civic health. There appears, however, to have been a decline in vigor during several centuries of the Late Bronze Age, as the relative absence of strong LB strata in the excavated areas at Pella tends to suggest. By LB IIB the city was again in the ascendancy, though still without extensive international trade.

Strata 5 though 8 in Area VIII suggest that the inhabitants on the western side of the mound of Pella were relatively impoverished and culturaly uninventive throughout much of the Iron Age. In view of the findings of the Sydney team in Area III, it is doubtful if the eastern side of the mound will prove to have been much different from the western. Pella's material life in the Iron Age was much like that of many other Iron Age sites in Palestine and Transjordan, but without any evident enriching features. It was distinctly provincial, neither materially rich nor culturally sophisticated. The city did not exist on trade at this period, as the virtual absence of distinctive imported goods indicates. Whatever religious traditions the city may have had have not yet been revealed by excavation. The absence of reference to the city in the Old Testament may well be due to the fact that from at least the end of the twelfth century onward the city was in a depressed state, from which it did not recover until near the end of the Iron Age. Even in the seventh century Pella's growth in population, indicated by the increase in occupation on the mound, was not accompanied by increased trade or other evidences of greatly increased prosperity. The city's vicissitudes in subsequent periods have already been extensively illuminated by excavations in previous seasons.

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[6] Robert H. Smith, *Pella of the Decapolis, Vol. I: The 1967 Season of The College of Wooster Expedition to Pella,* Wooster, 1973, p. 23-24.

ETHNOARCHAEOLOGICAL SURVEY IN THE BEIDHA AREA, SOUTHERN JORDAN

by
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and
Ilse Köhler-Rollefson

Introduction

Due to prevailing environmental conditions which do not encourage the pursuit of sedentary agriculture, by far the larger part of Jordan has hosted only nomadic inhabitants throughout its human history. Archaeological investigations, however, have dealt almost exclusively with the remains of the settled population which occupied the Ghor/Jordan Valley and the mountain ridge to the east of it. This is a predictable consequence of the fact that sedentary people tend to leave the more eye-catching remains like *tilal* (tells) and *khirbat* behind, but one should be aware that limiting archaeological investigations to these ruins necessarily results in the systematic rejection of evidence for an important part of Jordanian prehistory and history.

The Beidha Ethnoarchaeological Survey was intended as a first step towards understanding if and how nomadic occupation is reflected in the archaeological record. Its aim was to collect data on the activities of modern pastoralists and to establish what sort of material remains they leave behind.

The study area was selected primarily because of its apparent richness in abandoned campsites. It also had the advantage of being a well circumscribed area inhabited only by one cultural entity, and being relatively easily accessible. Situated about 5 km. northwest of Wadi Musa, Beidha is an area centering on the Wadi Beidha (Fig. 1), which running in a NE/SW direction, collects the drainage from the Jebel Hishah and then, after merging with the Wadi Siq el Ghurab, drops down to the Wadi ʿArabah. Beidha is thus flanked by the Jebel Hishah (part of the Shera'a mountain range) in the east and by the Wadi ʿArabah in the west. The northern edge is delineated by the Siq Umm al Ḥiran, and in the south Beidha is bordered by the Petra basin.

Objectives

The goal of the Material Remains Survey and the ethnographic work which accompanied it was to answer a number of questions concerning the locations and material culture of camp sites. These questions were directed primarily to the problems of finding such sites archaeologically and distinguishing them from the sites of settled agriculturalists.

Location: What makes a location suitable as a tent site? Which factors determine a specific location for selection asa campsite? We would expect the location of pastoral sites to be dependent on a number of factors affecting the welfare of herds and the comfort of tent dwellers. Sucessful identification of these factors should provide some indication of where ancient campsites are likely to be located and, in combination with other (post-depositional) factors, where there is a high probability of finding such sites.

Material Culture: What sort of remains ("architectural", faunal, ceramic, or other artefactual) are left behind and how are they distributed spatially? Is there any impact on the environment? The goal here is identification of archaeological features which signal nomadic or pastoral occupation.

In order to correlate these findings with the specific processes responsible for the deposition of the material remains, it was also necessary to take a close look at the present economy and daily activities of

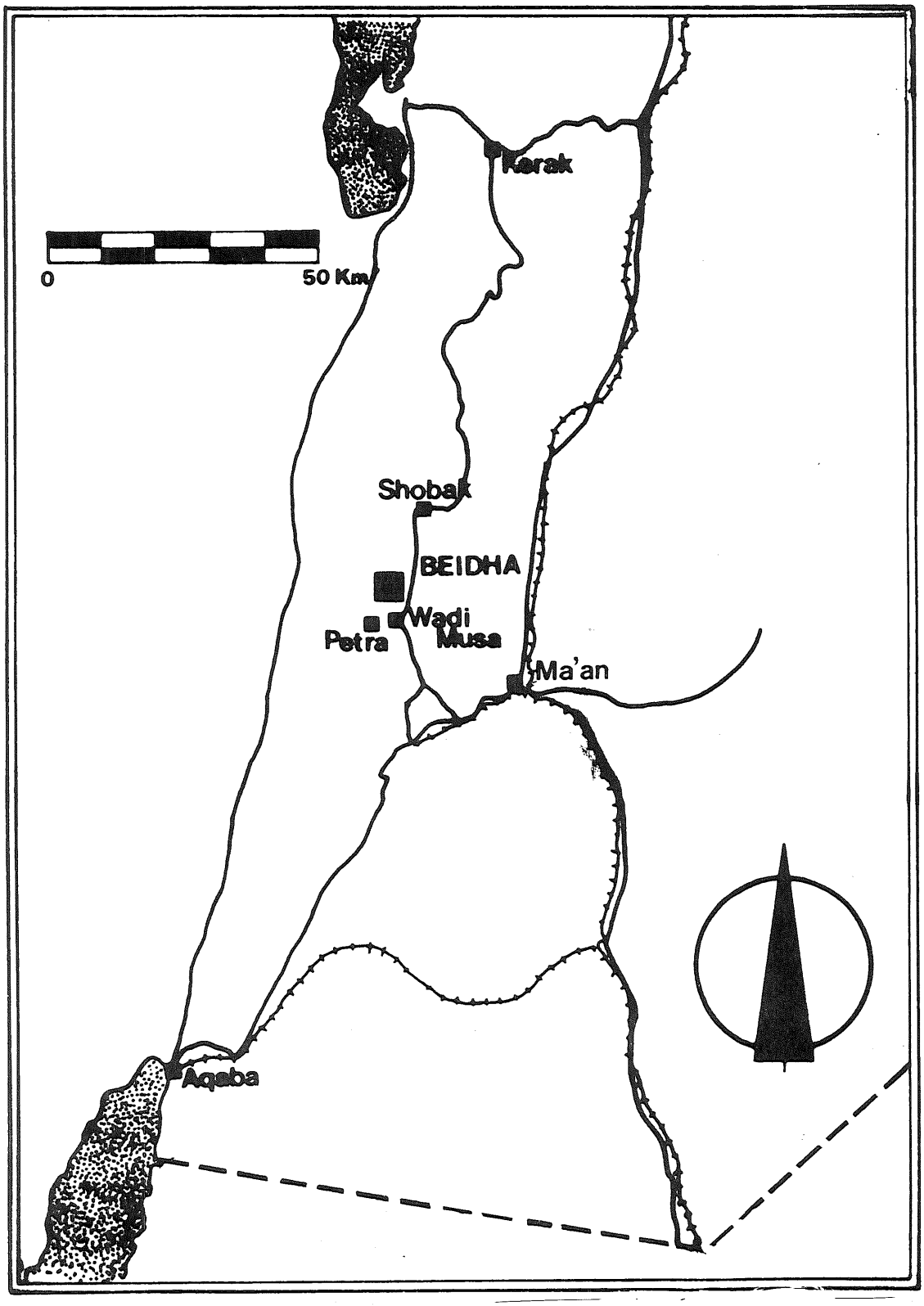

Fig. 1: Location of the Beidha area in Southern Jordan.

the people living in the area.

Methods

Material Remains Survey: We carried out a regional survey aimed at sampling the numerous abandoned camps in the Beidha area. The sampling universe was bounded on the west by the edge of the escarpment falling down to the Wadi 'Arabah, on the north by the Wadi Jabu, on the south by the north scarp of the Jibal ed-Deir, and on the east by the YU73650 line on the K737 map sheet 3050-I. The universe was stratified into two strata, one of which was very rocky and dissected. The other stratum, athough rough in parts, was easier of access with a smaller amplitude of relief. Using a spatially random design, four points were selected within the "rough" stratum and six points within the other. We recorded each campsite within a 100.00 m. radius of these points according to the following scheme:

1. The location of each camp was marked on a 1:50,000 map.
2. A sketchmap was drawn of all "architectural" features (i.e., hearths stone-and-earth bed platforms, pits, ditches, stone cairns, stone chicken houses, and fire-blackened *hefaiyiz* (stones from hearths). In some cases detailed scale maps were drawn by triangulation.
3. All artefacts, such as Ottoman/modern sherds, bones, batteries, cans, cloth, rope and tent fittings, were recorded. Some remarkable artefacts, like broken saddle or dense concentrations of bone, were also marked on the sketch maps.
4. The surface gradient was measured over a 7.00 m. section.
5. Soil samples for analysis by grain-size distribution, colour, and chemical composition were collected from the camps themselves and from nearby locations without visible campsites.

All archaeological sites, including the numerous Nabataean rock-cut cisterns, wine or olive presses, houses, tombs and monuments, which we noticed during our survey walks we also recorded, photographd and often sketch-mapped.

Ethnography: This part of our project proceeded almost automatically, as we had the good fortune of living under the direct care of the local Shaikh Huwaimil and his family, and could not help but be integrated into their daily life. We were taken along to all festive occasions and thus visited most of the tents in the area. On our walks one of our hosts sometimes accompanied us and was always more than pleased to answer any questions we had about length of occupation of particular camps, time since abandonment, use of pottery, reasons for particular choices of camp locations, or tendency to reuse old campsites.

Results

Modern campsites were abundant within the survey universe (Fig. 2) and contained considerable evidence for the reconstruction of activities within them. Contrary to most archaeologists' assumption that pastoralists leave too little behind for their camps to be recognizable, these camps invariably exhibited particular architectural features — hearths, bed platforms and storage platforms — as well as concentrations of dung and bone, scattered cans, batteries and cloth fragments. Most of the camps also had small stone pens, chicken houses and ovens, and some had such obtrusive remains as broken saddles and piles of stored goods. A large number of campsites we surveyed had moderate concentrations of Ottoman or early twentieth century pottery on their surfaces, coinciding closely with the spatial boundaries of the camps. In one instance a scatter of sherds from the Roman period similarly coincided with the area of a poorly preserved and overgrown camp which had a bed-platform of unusual shape. It is possible that this site belonged to "Paleobeduin" of about the third century A.D. In another instance we found indisputable evidence for the stratification of a tent site which must have had periodic reoccupation. Layers of clear sand separated at least four thin, black living floors.

Some of the sites we discovered,

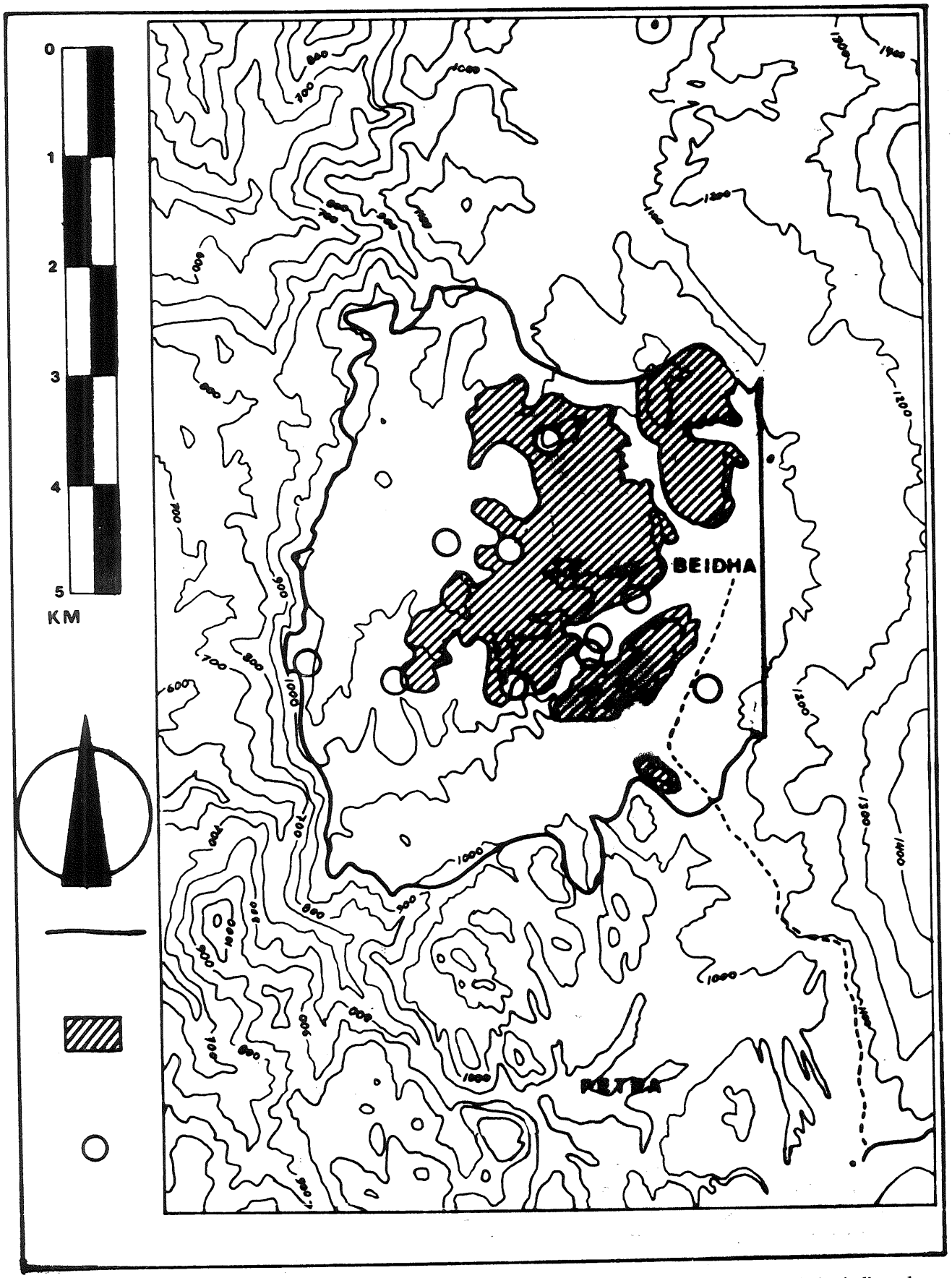

Fig. 2: The Beidha Survey universe (within solid line) with "rough" stratum shaded and random circles indicated.

rather than being typical tent sites, consisted of stone circles, singly or in pairs and each eight to twenty metres in diameter. Sometimes a tent site appeared 20.00 or 30.00 m. away from these circles. The most likely interpretation for these sites is that they are the foundations for thorn fenced paddocks, occasionally seen throughout Jordan today (Pl. LXXXIII, 2), and that pairs of such enclosures permitted the separation of kids and lambs from their mothers.

A few of the sites were rock shelters furnished with simple stone screen walls and hearths. Often they were fairly close to stone circles, and probably they served as temporary shelters for herdsmen watching the grazing flocks.

The survey also documented a large number of archaeological sites (Fig. 3), almost all of which belonged to the Nabataeans, including rock-cut tombs, one large settlement, numerous farmsteads (some of these in a remarkable state of preservation), many wine presses, a few inscriptions, and some dams and reservoirs. Terracing of slopes was noted through much of the area, and some terraces were almost certainly associated with the Nabataean occupation as well. One Chalcolithic site and a number of Roman/Byzantine ones appeared in the course of the survey, but only a few scattered lithics, apart from one site (Nr. 52) with chert flakes dating Epipalaeolithic or later and the sites previously reported by D. Kirkbride (1966) showed any evidence for earlier occupation of the Beidha area.

A list of both, ancient sites and modern Bedouin camps, is presented in the Appendix.

Conclusions

Unfortunately it is not possible here to give a more detailed account of our material culture survey and to present the results of our ethnographic study, but our survey convinced us that Bedouins leave a variety of architectural and material remains behind, which correlate closely with their economic activities and social circumstances and can thus be read and interpreted by the initiated to provide an array of information on the former occupants of a tent site. This array may include the season of occupation, social situation, social status of the owner, festivities and others. There is no reason why nomadic occupation and habitations should not be recoverable by the standard practices of archaeological excavation. As in other archaeological sites, recovery depends on the specific locational characteristics of each camp site, whether its architectural remnants have been eroded away or covered up by sand and preserved for a long time. Future test excavations will no doubt confirm this.

Appendix I

Catalogue of Sites

1. Recent Bedouin Camp (RBC), Purposive Sample (P)
2. RBC, P, (Pl. LXXXIII,1)
3. RBC, P
4. Nabataean site, probably farm house, with wine press on western slope (with tesselated floor), on north bank of the Wadi Siq el Ghurab (338/617) P
5. RBC in small flat field with plowing (3335/615) P
6. RBC and probable Nabataean caves, P
7. Circular stone enclosure on West Bank of small wadi and RBC on east bank a little to the north (332/618). Just south of random point within about 100 m, Random Sample (R)
8. Rockshelter on east face of same small wadi as last, including RBC (R)
9. Circular stone enclosure, probable RBC, at least 150 m. nw of random sample point (330/6205) P
10. RBC with modern coin "hoard" on saddle near edge of escarpment of 'Arabah rift (323/622) about 100m. from random sample point R
11. Circular stone enclosure near many ancient-looking terrace walls on small

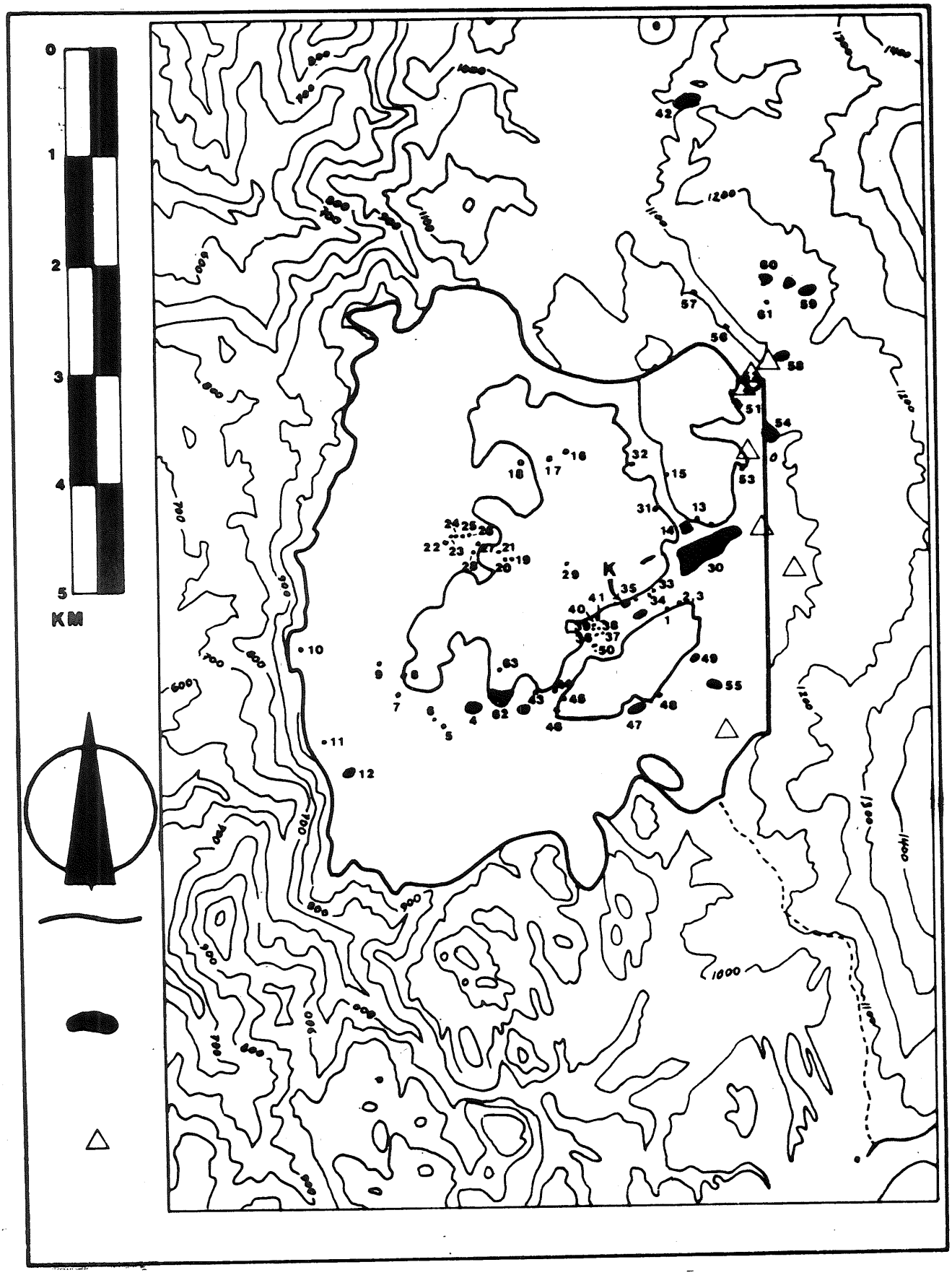

Fig. 3: Sites (marked in black) recorded during the Beidha Survey, August 1982.

branch wadi near mouth of Wadi Siq el Ghurab (325/6125) P. (Pl. LXXXIV, 1).

12. Nabataean structure, possibly tower or farmhouse, on north bank of Wadi Siq el Ghurab (3275/610) P
13. Group of rock-cut tombs on east side of flat wadi running north from Khirbet Beidha (site 30), and just ESE of "caravanserai' or forum, site 14. (359/633) P
14. Possible Nabataean caravanserai or forum, very large, just north of Khirbet Beidha (site 30) and occupying flat agricultural land (due to be planted with olives?) in wide wadi. (358/633) P
15. Site of rock-cut stairs, leading to drains and more stairs high up on rock on east side of last-mentioned wadi, possibly former (now destroyed?) Nabataean house. (356/6375) P
16. Probable Nabataean farmhouse up on table on top of mountain, about 100 m. SE of random sampling point (347/640) R
17. Probable Rom-Byz camp-site a little to west of last (345/640) and within about 100 m. of random sampling point R
18. Nabataean farmhouse, still standing to height of door-lintel, with large vaulted cistern (vault collapsed but niches for arch springers observed), on west bank of upper Wadi Aqlat (3425/639). A number of dams cross the wadi near here. P
19. Stone cairn of unknown purpose. (3415/630) P
20. Probable Roman period camp-site with bed-like feature and low-density sherd scatter next to rocks in small branch of wadi Aqlat on southwest bank (341/630) P
21. Small rockshelter on the east bank of the same wadi as the last two (3405/6305), with modern walls, 3 x 5 m. against the rock face, on sandy soil. Hearth stones within the shelter and one modern sherd. P
22. A small Nabataean sherd scatter up on top of one of those table mountains again, which probably represents a ruined farmhouse (336/6315). R
23. RBC around some trees, with bed-platform, etc. Within about 60 m. of the random sampling point of last site (337/632) R
24. RBC very similar to last and only about 20 m. farther to east (3372/632) R (Pl. LXXXIV,2).
25. RBC similar to last (3375/632) R
26. Another RBC similar to last (338/632) P
27. Large circular stone enclosure, like animal paddock, with some Arabic graffiti and a couple of stone cairns as well. (339/6315) P
28. Nabataean farmhouse, with cistern to west of it, sitting on a small knoll on the top of the same table mountain as the last six sites. Noticed at least one column base in the house ruins, and a good door threshold. (3385/6305) P
29. Ruined house in Wadi Aqlat, on the east bank, middle section (345/629), with lower part of square room cut into bedrock. P
30. Khirbet Beidha, large Nabataean settlement with many rock-cut rooms, including a possible temple on the top of a big rock outcrop, immediately south of a large Nabataean cistern still used by the 'Ammarin. Also seems to have house ruins over a large area as well as a small cemetery with at least some Christian (Byzantine?) burials (one had a stone-carved cross). The site is at least 600 m. in length and 400 m. in width. Its location is (360/630). There is also a large reservoir at about (361/630) with aqueduct channels and a very large rock-cut tomb near it. The Siq al Bard, with its tombs, is immediately to the west. P.
31. Rock inscription on wall of small siq leading southwest from Wadi el Amthi, reading in Greek letters, "ARSALLO", P
32. Rock drawings of camel, dog, ibex, tally marks, and inscriptions on flat natural face above artificially flattened face cut by Nabataeans (with "herring-bone" quarrying marks). Some Greek letters read "RORIETH". P
33. and 34. are two RBCs ont he north side of Wadi Beidha (3545/6275) right

next to one another and just ENE of Kirkbride's site about 150 m. away. They're also within 50m. of a random sample point. R

36. RBC next to low rock scarp on north bank of small branch of Wadi Beidha, west of Kirkbride's campsite (349/622) R
37. RBC on east bank of branch wadi, only about 30 m. east of last (3493/623) R
38. RBC about 30m north of last, on opposite side of Wadi, included a broken wooden donkey saddle, (3492/6226) R
39. RBC about 30m west of last (3489/6226) R
40. RBC about 30m northeast of 39 (3491/623) R
41. RBC about 30m northeast of 38 (3495/623) R
42. Kirbat Badj, a ruined mediaeval village P
43. RBC north of meander in Wadi Siq al Ghurab (344/6175), about 130m ESE of random sample point P
44. Retaining wall of stone on north bank of channel of Wadi Beidha, probably Nabataean (346/617) P
45. Nabataean farmhouse, with lower part of square room cut into bedrock. (3465/6165) P.
46. Miniature tomb cut into face of rock at western point of mountain at (3455/6155) near place where Wadi Beidha and Wadi Siq al Ghurab merge P
47. Chalcolithic sherd scatter in sandy area south of mountain mentioned in connection with the last site, about 400m west of the road at (353/617). Noticed one fan-scraper (not collected) and low density sherd scatter. P
48. Strange rock-cut T-shaped installation which is probably Nabataean in date, with some rock-cut aqueducts very near (355/6175). P
49. A few Nabataean structures, possibly part of a hamlet, some partly cut into bedrock, one with a room completely cut into bedrock, and a number of wine presses (359/6205) P
50. RBC on edge of a large sand dune in Wadi Beidha, with at least five living surfaces observed in 25 cm. depth. R
51. RBC used for a wedding mansaf, next to the cliff at (3625/645) P
52. Flint scatter just about 60m east of last at (3625/645) P
53. Unifinished rock-cut tomb. P
54. Modern hamlet with large ancient wine press. P.
55. Nabataean rock-cut hamlet with installation (grave?) similar to site 48. RBC occurs immediately north of the rock. Aqueducts and cisterns also occur in the rock. R
56. Dushara monument on cliff-face. P
57. Nabataean and Arabic graffiti, near possible ruined Nabataean house. P
58. Sherd scatter (possible Nabataean hamlet). P
59. Nabataean hamlet and modern building (Abu Debaiyah?). P
60. Nabataean hamlet with tombs and rock-shelter houses. P
61. Key-shaped rock-cut installation, possibly with function similar to that of site 48. P
62. Nabataean quarry on top of high hill on the north bank of the Wadi Siq al Ghurab (341/618). P
63. Hearth from shepherd's temporary camp. P

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Acknolwedgements

We would like to express our appreciation to Dr. Adnan Hadidi, Director General of the Department of Antiquities of Jordan, for supporting our project on short notice, and to Ms. Maha Jeyousi of the Department of Antiquities for help at all stages of the work. Mr. Niazi Shaba'an Antiquities Representative at Petra, was very helpful in facilitating our arrangements to live with the Bedouin at Beidha and throughout the field season. We are, of course, much indebted to our Ammarin hosts Sheikh Huweimil, Musa Huweimil, Ibrahim Salim and Mohammed Huweimil, as well as Fatima, Hedeia and Sabha (who supplied our water!). We thank Dr. Gary Rollefson of Yarmouk University for supplying photographic equipment, and Dr. David McCreery, American Center of Oriental Research, for lending us a tent. Part of the funding for the project came from the Deutsche Morgenlandische Gesellschaft. We would also like to thank Mr. Abdul Aḥad Ḥanawy for checking our Arabic transliterations although we accept responsibility for all errors or inaccuracies in the paper. Dr. Burton MacDonald kindly proofed the manuscript.

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SURVEY OF BYZANTINE AND ISLAMIC SITES IN JORDAN SECOND SEASON REPORT, 1981

by
Geoffrey King, C. J. Lenzen,
Gary O. Rollefson

Part I: Field Report (Geoffrey King)

Introduction

The survey of which this constitutes the second report was conceived as a re-examination of material remains in Jordan relating to the transition between the Byzantine and the early Islamic periods. The survey concentrated initially on those regions of the country where the distribution of well-known Umayyad sites implied that it might be useful to search for others; the results of earlier surveys also suggested that the re-examination of certain sites and districts could be of value from the viewpoint of this transitional phase and helped to determine the areas and sites on which to lay stress. Our main intention has been to place the familiar early Islamic desert sites into a wider framework, and although other regions were surveyed during the second season, the desert and its immediate perimeters were the principle focus of our attention. The character of the early Islamic sites in the desert and their surroundings suggests that it is quite inadequate to treat them as isolated phenomena constructed in desolate areas by Umayyad rulers and *amirs* interested only in creating an environment for their personal frivolities — the desert retreats and "pleasure palaces" of a half-bedouin régime. The results of our work in and along the edges of the Jordanian desert over the past two seasons indicate that a different view should be taken: the distribution of sites begins to suggest a process of establishing new settlements and improving old ones in the desert and marginal lands, while occupation in villages close to the desert often continued from the Byzantine period. In part, the Umayyad site distribution may reflect a concern with communications within their Arabia and Bilād al-Shām oriented state, but their practical developments in eastern Jordan must also be seen in context of political factors within the Caliphate.

The Second Season

The survey team concentrated during the second season on the following areas:

1. Sites in the eastern Jordanian desert towards Wādi al-Sirhān and the Sa'udi Arabian frontier were examined to continue our researches begun during the first season (1980). During the second season, we further investigated Qasr al-Mushāsh, as well as the site at Wādi al-Jilāt and Qasr Bāyer.
2. The Hawrān was examined once more as additional work remained to be completed from the previous season. In addition, the area between Umm al-Quttayn and Azraq was traversed and further to the east, Wadi Muqat was followed southwards from H4 as far as the Sa'udi Arabian border.
3. A number of sites south of Madaba and north of Wadi al-Mūjib were surveyed in order to determine the degree of Byzantine and Islamic period occupation immediately west of the desert. Work remains to be done in this region before our report on this area can be published, [1] and only the mosque at Umm al-Walīd will be discussed at this stage.
4. As an extension of our fieldwork in the

1. The third report of the survey will deal with sites in the southern Ghawr and the Wadi ʿAraba. The fourth report will deal with sites north of Wadi al-Mūjib and west of Mafraq.

Ḥawran, a limited number of sites west of Mafraq towards Jerash were surveyed. A certain amount of fieldwork remains to be carried out in this region and the results will be published in a subsequent report.

Section 1: Eastern desert

(Note: Throughout sections 1 and 2, for references to ceramic tabulations and stone artefacts, see Part II: C. J. Lenzen and Part III: G. O. Rollefson, respectively).

Qaṣr al-Mushāsh (Fig. 1: Plan)

Several visits to Qaṣr al-Mushāsh[2] allowed more extensive observations of the area surrounding the main site than had been possible during the previous season and more detailed notations of the structural remains were made. While the various installations that constitute the site were sherded, more precise dating is to be hoped for from the excavations initiated at the complex subsequent to our second season by Dr. Ghazi Bisheh. In view of the additional information now available to us, the installations at Qaṣr al-Mushāsh noted in 1980 will be discussed followed thereafter by descriptions of other remains located in 1981.[3].

I. Smaller enclosure *(qaṣr);* II. Circular *birka;* III. Larger enclosure/*birka* (?)

These structures were all seen in 1980, situated close to the north bank of the Wādi al-Mushāsh flood channel. The small enclosure, the *qaṣr* (I), measures a little over 26.00 x 26.00 m. and it is oriented towards the cardinal points. Stones from the enclosure wall of the *qaṣr* had fallen into the Wādi al-Mushāsh since 1980. Most of the sherds collected were found around graves to the east of the *qaṣr* rather than within it. Nearby is the small circular stone-lined tank II, formerly roofed with stone slabs supported by three stone arches, and measuring 4.20 m. in diameter; of the roof-supporting arches, only two remain intact, with a number of *wushum* cut into the masonry. Roofing slabs still rest on these arches on the south-east side of the *birka.* Some traces of plaster survive on the interior surface of the *birka* wall, a feature shared with other

2. Qaṣr al-Mushāsh has been noted by earlier travellers, although none but G. L. Harding has associated it with the Arabs, Alois Musil visited the site on 15th June, 1901, *(Kusejr ʿAmra,* I, Textband mit einer Karte von Arabia Petraea, Kaiserliche Akademie der Wissenschaften, Vienna, 1907, p. 115, with Fig. 104 and 105). Thereafter, B. Moritz visited the site in 1905-1906 *(Ausflüge in der Arabia Petraea, Mélanges de la Faculté Orientale,* Université Saint-Joseph III, fasc. 1, 1908, p. 425-427, Taf. VII). Their accounts are given in an appendix to this report. Sir Aurel Stein visited Qaṣr al-Mushāsh on 19th March, 1938, unaware that it had been described by Musil and Moritz (Stein Limes Report in D.L. Kennedy, *Archaeological Explorations on the Roman Frontier in North-East Jordan, BAR* International Series, Oxford, 1982, p. 254-255; Kennedy also gives a short reference, p. 302). Stein regarded Qaṣr al-Mushāsh as a part of the Roman road and *limes* system from ʿUwaynid and Azraq through to ʿAmman (Philadelphia). G. L. Harding referred to the site in his unpublished *Notebooks* held at the Registration Centre of the Department of Antiquities in ʿAmman: "Qasr Amshash (# 60 in "Sites Register Trans-Jordan Vol. 'A')
District: East
Map Ref: 2745 1364
Date: Arab(?), Prehistoric
Description: "Ruined Castle"
"Rolled Abbevilean (sic) (Chellean) flints in the wady bed"
Remarks: Sch. OG 621
SM I, 28
"Flints in wady to N."
Harding thus was the first to make the connection between the *qasr* and the Arabs: it is mentioned in the Prehistoric, Chalcolithic and "early & medieval Arabic & Crusaders" maps in the *The Archaeological Heritage of Jordan,* Amman, 1973, part 1. See also G. King, Preliminary Report on a Survey of Byzantine and Islamic sites in Jordan 1980, *ADAJ,* XXVI (1982) p. 86-88, and note 8 for map references; and, Byzantine and Islamic sites in northern and eastern Jordan, *Proceedings of the 13th Seminar for Arabian Studies* 13 (1983), p. 83-84. Although the name is generally given as Qaṣr al-Mushāsh, we have heard it described by the local people as Umm al-Shāsh, close enough to Harding's "Amshash". Moritz knew the site only as "al-Qusayr". Qaṣr al-Mushāsh must be distinguished from Qaṣr al-Mushaysh which lies south-south-east of al-Qatrāna in the desert.

3. Qaṣr al-Mushāsh was visited on 27th July, 10th August and 17th August, 1981.

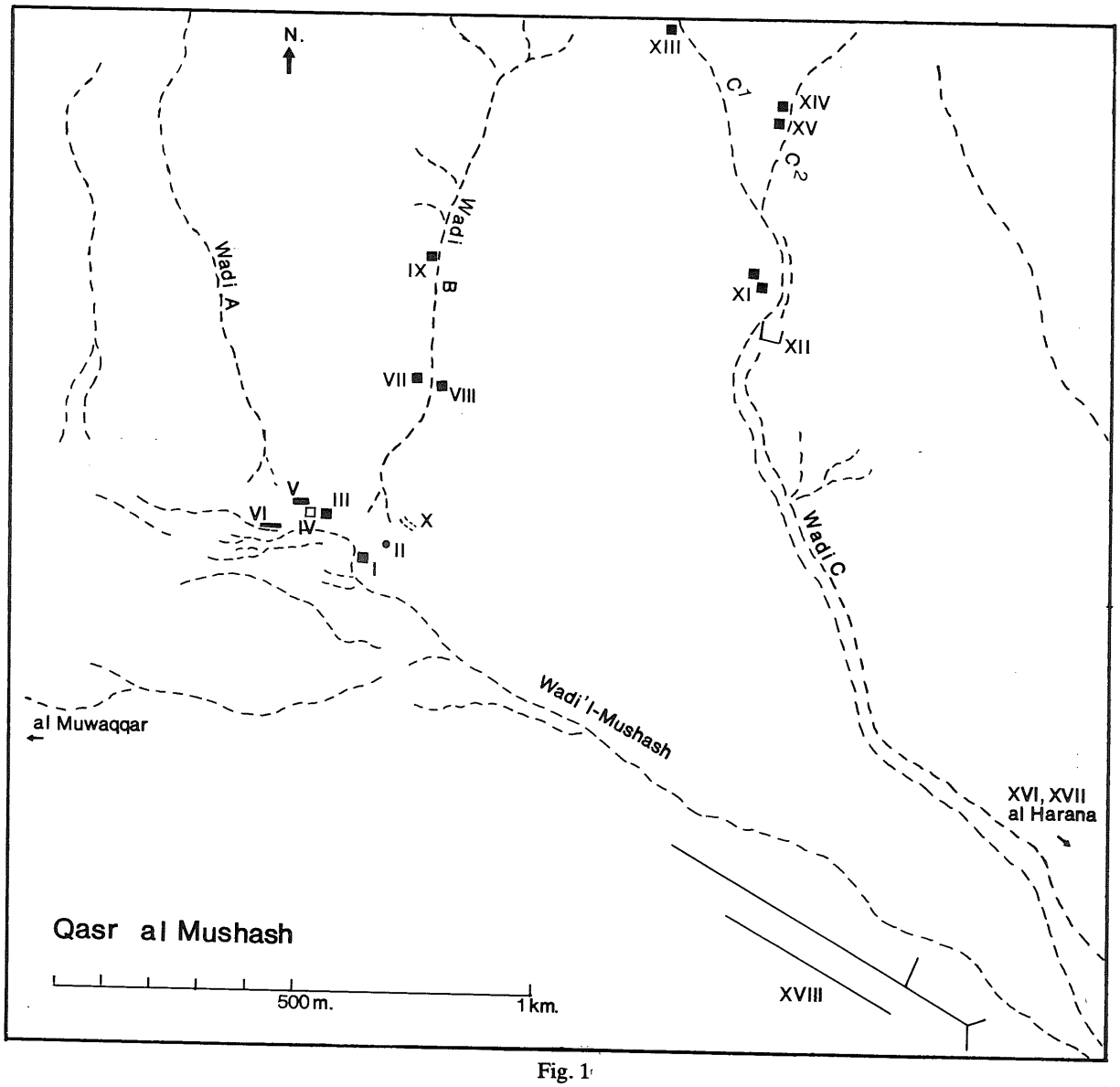

N.
Wadi A
Wadi B
Wadi C
Wadi 'l-Mushash
al Muwaqqar
Qasr al Mushash
500 m.
1 km.
I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
XIII
XIV
XV
XVI, XVII
al Harana
XVIII
C1
C2

Fig. 1

birak at the site. On the eastern side of the round *birka,* at the base of the lining wall, is a small square feeder pipe which is plastered and which must have drawn its water supply from somewhere to the north-east. Although other *birak* at al-Mushāsh are plastered, this, the smallest, is the only one to have been roofed. In view of this precaution to keep the water stored in the *birka* clean, it is suggested that the small tank was intended to provide the occupants of the *qaṣr* with drinking water. Piled just to the south-east of the *birka* is the earth excavated when the *birka* was dug.

The large enclosure (III) is outlined by earth banks, measuring about 33.00 m. x 34.00 m. and it is oriented towards the cardinal points. Dr. Bisheh is probably correct in suggesting that it was a *birka,* for contrary to our original impression, the central area of the enclosure is without feature. A piece of broken marble slab lying on the surface within the western part of the enclosure must have originated in the bath (IV) just to the west.

IV. Furance, bath and related structures

These installations, immediately west of the large enclosure III, appear as little more than surface wall-traces delimiting the eastern and western sides of a small building. At the northern end, where an ashy pit with clay piping, fired brick and marble fragments were found in 1980, unauthorised digging had taken place by August, 1981. This had revealed yet more ashy deposit and freshly broken marble slabs. Among the fragments was a piece of baked brick, plastered on one face, and a fragment of worked basalt, a stone not found in this area. The speculation that the installation had been a furnace and a bath has been confirmed subsequently by Dr. Bisheh's excavations.

V. *Birka*

The *birka* to the west of installation IV was first noted in 1980. It measures 17.98 m. x 6.81 m. and has its longer sides on an east-west axis. Its depth to the present floor level is 2.56 m. A stepped course at the base of the stone walls on three sides (and probably originally on all four sides) suggests that the floor level towards the eastern side of the *birka* approximates to the original depth. At the best preserved point, the stone walls lining the *birka* are nine courses deep, including the step-like foot. In each of the three intact corners of the *birka* there is a single stone laid on angle, set half-way up in the wall, as if to act as a brace. The interstices between the stones lining the *birka* are filled with a cementing plaster which must have coated the entire surface. Similar plaster appears on the walls of other *birak* in the Qaṣr al-Mushāsh complex. In the centre of the *birka*-wall, at the summit on the west side, is a shallow stone-lined channel running from the west; it extends 3.40 m. in that direction, as far as can be judged from the surface. The water to feed the *birka* was clearly drawn from the west, where there are several wall-traces. The position of *birka* V indicates that it was related to the furnace (IV) to the east. Further wall traces lie to the south of the furance IV and *birka* V, and one of these walls can be seen in section in the face of the north bank of the Wadi al-Mushāsh flood channel.

Tributary awdiyah north of Wadi al-Mushāsh (Fig. 1: Plan).

There are several tributary *awdiyah* running into Wadi al-Mushāsh from the north with their outlets in the vicinity of the Qaṣr al-Mushāsh installations described above. *Wadi* A marks the westernmost channel across whose course a further installation was noted; no other structural remains were located to the west of this *wadi.* Further east lie *awdiyah* B and C, beside and in which other installations were found.

VI. Wall in the north bank of Wadi al-Mushāsh (Pl. LXXXV,1)

A wall was noted for the first time by this expedition in 1981 to the west of the main installations: it measures some 23.60 m. in length, lying across the mouth of the small tributary *wadi* channel A (Fig. 1:

Plan). This wall was entirely silted on its north face when found and our observations are limited to the south face. It appeared that water was intended to collect on the north side. Just east of this area there are two low mounds. It was speculated that water from here may have fed *birka* V which in turn supplied installation IV.

The exposed south face of wall VI stands to only three or four courses of stone above the present Wadi al-Mushāsh bed, with each course some 0.30 m. high. The face of the wall is plastered; the plaster has flat stones mixed into it, a system found elsewhere in the Qasr al-Mushāsh complex. The summit of the wall is capped by a stone course 0.05 m. thick which levels it off. To the west of this wall is a water channel with stone sides and hard cement-like lining forming the floor of the channel. The channel continues westwards to terminate in a substantial rectangular structure whose original form cannot be determined without excavation (Subsequently this structure was cleared by Dr. Bisheh).

Wadi B: Installations VII, VIII and IX (Pl. LXXXV, 2)

The second tributary *wadi,* B, flows towards Wadi al-Mushāsh and debouches to the north of the *qaṣr* (I). About 400.00 m. northwards along the *wadi* B channel, two further occupation areas were noted (VII and VIII). Installation VII lies to the west of the *Wadi* B flood channel on the slope. It consists of a number of wall traces and stone rubble, with scatters of sherds which are Late Byzantine/Umayyad or clearly Umayyad wares. The walls outline several rectangular structures whose limits can be quite readily defined. Opposite, on the east bank, is installation VIII (Pl. LXXXV,2), a small rectangular enclosure described by earth ramps. A fragment of finely polished white marble panel was found on the surface, 18 mm. in thickness.

Just under half a kilometre north of installations VII and VIII, along the course of *wadi* B is a very large *birka* (IX), situated on the west side of the flood channel. Immediately south and south-east of the *birka* is an earth barrage set east-west across the channel, cut by the modern track in the *wadi* bed. The purpose of the barrage was apparently to deflect water back into the *birka* from this channel, as it flowed south to the Wadi al-Mushāsh. The barrage and mounds south and north of the *birka* were built from the material excavated when the *birka* were built from the material excavated when the *birka* was dug. The *birka* measures 19.35 m. north-south and 18.35 m. east-west and to present floor level has a depth of 4.69 m., which is probably its original maximum. The *birka* walls are stone-lined with fifteen courses and a sixteenth course forming an overhanging ledge that runs around the north, west and south sides. This ledge once must have continued along the east side as well. The *birka* has a staircase of projecting stone slabs which have snapped off: these commence at the west end of the north wall and descend to the east to provide access to the water in the *birka.* From the north, the *birka* was fed by a channel which debouches precisely above the staircase. This channel is stone-lined with a central stone ridge which in effect creates a double mouth. The channel is a total of 0.94 m. wide and it can still be traced for a distance of 5.40 m. towards the north. The corners of the *birka* are curved rather than squared off and the sides are coated with a plaster in which small stones are mixed as described above for installation VI.

X. Barrage

Just east of the mouth of tributary *wadi* B, to the north-east of the *qaṣr* (I), a small gulley in a hill-side has been closed off by an earth barrage at its southern end to collect the water running off the slopes.
Wadi C, C1, C2: Installations XI, XII, XIII, XIV, XV.

East of *wadi* B is a third tributary *wadi,* designated as *wadi* C. Before it debouches into Wadi al-Mushāsh the track from the Qaṣr al-Mushāsh complex to Qaṣr al-Ḥarāna crosses its course. In the northern reaches of *wadi* C, the main channel divides, with a channel C1 branching to the north-west and a second channel, C2 branching to the north-east.

In both upper tributaries further installations are located in addition to those downstream in *Wadi* C.

XI. Rectangular foundations

Installations XI lies on the west bank of *wadi* C, set a little above the flood channel, and it consists of a group of rectangular outlines formed by low ramps and wall traces on the slope, arranged in terraces.

XII. Wall traces

A short distance south and east of installation XI are walls describing a large rectangular outline in the bed of *wadi* C.

XIII. *Birka, Wadi* C1

A further water storage *brika* is set into the south-western slope above *wadi* C1 (XIII). It appears to be a natural cavity which has been widened into a T-shaped reservoir. The walls are of the natural rock, made smooth, and where cavities existed, they have been filled with stones. The entire surface was then plastered in two layers, the under layer mixed with stones, and the surface provided by a finer finish; this is the same system as that used to plaster the large *birka* IX and the wall VI. It is now difficult to estimate the depth of this T-shaped *birka* XIII as rubble conceals the floor. It must have been fed primarily by *wadi* C1 for there is an earth barrage to the east intended to deflect water flowing in the flood channel back into *birka* XIII. The *birka* is partly covered on its western side by a natural roofing of rock, presumably to reduce evaporation. A number of stone artefacts were found in this vicinity.

XIV and XV. Blocked *birak, Wadi* C2

On the west bank of the *wadi* C2 channel, a further two *birka*-traces were idenitified, XIV and XV, although both were blocked. They appear originally to have been similar to *birka* XIII in *wadi* C1. Of the two, *birka* XIV is more clearly defined: it consists of a blocked reservoir, choked with soil and reduced to a mere depression. There is a barrage nearby which once served to deflect water from the flood-channel into the *birka,* although the barrage is eroded. The earth for the barrage probably came from the excavation of the *birka. Birka* XV, just south of *birka* XIV, is of the same nature, although apparently smaller and much less clearly defined. All that is visible is the trace of an earth deflector barrage and a slight depression in the ground. It was identified only because we were already familiar with the significance of these remains after examining *birak* XIII and XIV.

Installations east and south of the main complex

A number of related installations were located beyond the main concentration of structures and *birak* at Qaṣr al-Mushāsh. Although some were discovered in 1981, others were found during the third season in the field in 1982: it is more convenient to describe them here, rather than to await the publication of the report for the third season.

XVI. *Birka* (Pl. LXXXVI, 1)

This installation is situated well beyond the principle occupation areas of the main Qaṣr al-Mushāsh complex, although it was without doubt a part of the overall system. The installation is south-east of the main site and just north of the track from Qaṣr al-Mushāsh to Qaṣr al-Ḥarāna; at first sight, it appeared to be no more than a mound of white soil but this proved to be yet another barrage to deflect water into an excavated *birka.* This *birka* is set on the edge of a small tributary *wadi* running into Wadi al-Mushāsh channel.

Two massive circular piers support a roof of natural rock which covers much of the excavated *birka* to reduce evaporation. These piers and the sides of the irregularly shaped *birka* are plastered in the same manner as already noted in the cases of installations VI, IX and XIII.

XVII. Blocked *birka*[4] (Pl. LXXXVI, 2)

On a subsequent visit to Qaṣr al-Mushāsh in 1982 a further blocked *birka* and barrage of white excavated soil were identified a short distance east of *birka* XVI in another tributary *wadi* running into wadi al-Mushāsh from the north. This blocked *birka* is separated from *birka* XVI by a spur from the hills lying to the north. The traces of this *birka* XVII relate it to others of the main Qaṣr al-Mushāsh complex.

XVIII. *Qanawāt* (Pls. LXXXVII, 1-2)

Exploring the area south of the Wadi al-Mushāsh channel to investigate lines noted on aerial photographs [5] it was found that the lines are parallel ridges, the remains of *qanawāt* running north-west to south-east. The northern line has a secondary branch running off towards the Wadi al-Mushāsh and two branches forking at the eastern extremity. A further line runs southwards from the southern of the two parallel ridges. Unfortunately, the ends of the systems either peter out or have been destroyed by the Wadi. Along the sides of these *Qanat* traces there are circular mounds of small stones (Pl. LXXXVII, 2) set at intervals, especially beside the southern ridge line. A similar phenomenon is recorded at Nessana in the Naqab[6] where P. Mayerson concluded that the stone mounds were for cultivating vines or trees, referring to them as "tuleilat el-ʿanab" and "rujūm el-kurūm". Dr. Bisheh put forward a similar suggestion at the time of the discovery of these mounds. This is the clearest evidence of cultivation as opposed to pastoralism based on water storage found so far at al-Mushāsh.

An Installation Towards Qaṣr al-Ḥarāna (Pl. LXXXVIII,1)

Continuing 1.5 km south-east from *birka* XVI at al-Mushāsh, a number of walls were noted south of the track:[7] beyond, the track continues on to Qaṣr al-Ḥarāna, which can be clearly seen on the distant horizon from high points around the al-Mushāsh site. The installation had recently been used by the Army to judge by the tracks and debris left behind. While the standing enclosure walls are probably recent, the underlying wall-traces indicate that there were earlier structures. The ceramic tabulation for this site is extremely interesting: the majority of the sherds collected are Byzantine, with far fewer Late Byzantine and Umayyad wares. Since the evidence of Byzantine occupation is so pronounced, it would be unwise at this stage to associate the site too closely with the Qaṣr al-Mushāsh complex which is principally Umayyad, judging from the sherd evidence. This ruined structure is important not so much for its continued use in the Umayyad period-lying between the complex at al-Mushash and Qaṣr al-Ḥarāna this is to be expected-but for the evidence that it presents of Byzantine use of this area. G. W. Bowersock[8] has suggested that there may have been some Nabataean and Roman presence that preceded the Umayyad development of sites like Qusayr ʿAmra, Qaṣr al-Ḥarāna and Qaṣr al-Tuba. He also mentions Qaṣr al-Ḥallabāt where the case is now very clear following Dr. Bisheh's recent excavations. The sherd reading from our small site south-east of Qaṣr al-Mushash, implies that such a pre-Umayyad use of the sites in the desert may have also occurred in the Byzantine period. At Qaṣr al-Mushāsh the number of Byzantine sherds is too small to interpret the site as pre-Umayyad, but even here the presence of these Byzantine sherds may take on some importance in view of the

4. Installations XVII and XVIII were located on 6th September, 1982 when we accompanied Dr. Ghazi Bisheh to the site. Dr. Bisheh described his recent excavations there and kindly made his plans available to the author, for which I am most grateful.
5. IGN-78-JOR-16/250 no. 476, 1:25,000 Series, Jordanian Geographical Centre, Zarqa.
6. Philip Mayerson, The ancient agricultural regime of Nessana and the central Negeb, *Excavations at Nessana (Auja Hafir, Palestine)*, ed. H. Dunscombe Colt, London, 1962, vol. 1, p. 249-257 and plates XLI.5 and XLII.6.
7. Located 10th August, 1981.
8. G. W. Bowersock, A report on Arabia Provincia *Journal of Roman Studies*, LXI (1971) p. 242.

Byzantine use of the installation *en route* to al-Ḥarāna.

It is clear from the foregoing that Qaṣr al-Mushāsh was a complex of great scale and that one of its main purposes was to collect water in considerable quantities. Even if the small circular *birka* (II) was intended as a drinking water supply for the residents of the *qaṣr* (I) and *birka* VI was employed in conjunction with furnace IV for the bath, there still remain between seven and ten additional water collection and storage points. Of these, *birka* X has a capacity of 165 cu. m. It is to be presumed that after a wet winter, a certain amount of water would remain in some of these reservoirs for quite a long period as long as they were maintained. Qaṣr al-Mushāsh lies on the edge of the present 100 mm. annual average precipitation area, [9] but the heavy winter and spring rainfall and flooding of the *awdiyah* that has taken place since we first saw the site in 1980 suggests that there would be little difficulty in filling the *birak* during a wet winter: the lack of water in the *birak* in summer today is probably because of the deterioration of the sealing plaster lining them, as much as evaporation. Meanwhile, the heavy rainfall of recent years has ensured that the Wadi al-Mushāsh flood channel and its surroundings have remained well covered with thick foliage through the high summer: this situation must have been as likely to occur in ancient times as today and provided grazing.

It should be noted that the majority of the water catchment systems at Qaṣr al-Mushāsh are in the tributary *awdiyah* north of Wadi al-Mushāsh. It is possible that the flow of these northern tributaries was more manageable than that in the main Wadi al-Mushāsh channel and less damaging to the constructions themselves. However, Dr. Bisheh has found some indication that there may have been an attempt to harness the water in the main Wadi al-Mushāsh itself.

Why were so many *birak* required? No field traces seem to exist in the aerial photographs available to us, nor could any be identified on the ground, although the transformation of the morphology of the area through flooding may account for this. The existing *qanāt* and *rujm ʿanab* system (XVIII) are very restricted within the overall complex. Rather than serving cultivation, it seems more likely that the storage of large quantities of water was intended to support herds of animals, sheep and goats in particular; this issue will be returned to below in the context of the dams at Wadi al-Jilāt. The pottery tabulation of the Qaṣr al-Mushāsh installations shows that we are dealing in the main with a large scale Umayyad desert development to be seen not only in the context of the other early Islamic sites in east Jordan, but also to be compared with other Umayyad water-control and storage installations in Bilād al-Shām.

Dams in Wadi al-Jilāt (Pls. LXXXVIII, 2; LXXXIX, 1-2)

The dams at Wadi al-Jilāt were visited after our examination of Qaṣr al-Mushāsh[10] approaching the site from the east via Qaṣr al-Ḥarāna. The dams in Wadi al-Jilāt are 26 kms. south-south-west of al-Ḥarāna, although the route that we followed was by no means so direct. The dam site has been visited by several expeditions, the earliest being that of Henry Field, who reached it on May 8, 1928, on the way from ʿAmman and Mshāṭta to Qaṣr al-Ṭuba and Bayer.[11] Field called the site "Birkat Tuba", a name unknown to the Bani Sakhr bedouin with whom we stayed. Field described the site, which coincides very clearly with that which we saw, as follows:

> "At mile 64 we arrived at a large dam, perhaps 100 feet wide, which

9. *National Water Masterplan of Jordan,* The Hashemite Kingdom of Jordan, National Resources Authority, Amman/Federal Republic of Germany, German Agency for Technical Cooperation, Ltd., Frankfurt, Essen, Hanover (July, 1977), Map SW-4.1.
10. Map ref. BQ 539 882, Sheet 3253 II, series K737. Aerial photograph: IGN-78-JOR-16/250 No. 413; Scale 1:25,000, Jordanian Geographical Centre, Zarqa. Visited 11th August, 1981.
11. Henry Field, *North Arabian Desert Archaeological Survey, 1925-50,* Cambridge, MA. 1960, p. 75.

must have held an extremely large reservoir before it became silted up. Three deep buttresses sustained the dam, but their faces had fallen away in time of earthquake under the pressure of the masonry and silt behind them. The masonry was of hewn blocks with a filling of small stones. The wall of the dam was not vertical but very steeply stepped to break the force of the overflow. There was no visible sluice. The wall was about 15 courses high... About 200 paces further down the wadi, a smaller dam controlled the flow of a minor watercourse into the stream bed. This was of rougher workmanship, and was perhaps built by poorer rulers after the great dam had been silted up and neglected."

The next account of this site is given by J. d'A. Waechter and V. M. Seton-Williams,[12] although they say little of the dams. They mention a small bedouin mosque above the Wadi which still remains.

N. Glueck subsequently visited the site,[13] describing it as being in "Wâdi Dhôbai":

"We came across such a dam, built probably by the Romans, in the Wâdi Dhôbai, far from any permanent settlement, to catch the freshets caused by occasional rains and thus provide water for numerous flocks. This dam is about 85 km. n.w.-n.n.w. of Bayir, and some 58 km. w.s.w.-s.w. of ʿAmri in the Wâdi Sirhân, and 38 km. s.w.-s.s.w. of Qaṣr Kharâneh. The main wall of the dam is still in excellent condition on the whole. We made no attempt to measure it exactly, being able to spend only a very few minutes in the vicinity. The width of the top of the dam is 5.50 m., and its length on the top is about 57.8 m. The top of the outer s. face of the wall is flush with the silt which has filled up the *wâdi*-bed on that side. There is a drop of some 6 m. on the inner side down to the bed of the *wâdi,* ennabling 15 courses of stones to be seen. The rows of stones are set back successively about 12 cms. from each other. There are 3 piers buttressing the inner side of the dam. Many of the stones of these buttressing piers have been dislodged and fallen to the ground.

"There are supposed to be the remains of another dam, much less well preserved, farther down the *wâdi.* We were unable to locate them in the time at our disposal. The analogy thus with the dams at Kurnub becomes a compelling one. About 500 m. from the main dam, the Wâdi Dhôbai bends eastwards, and there is a deep drop in its bed, with a great hole scoured out as if by a strong waterfall. This waterfall probably exists for a brief while when the *wâdi* is in flood. At the time of our visit on May 8, 1944, there was a pool of putrid water in it. No greater testimony to the dynamic quality of the population and rulers of the country in the first centuries A.D., and to the peace and enterprise which prevailed, could be furnished than by dams such as these. The impounded rainwater served great flocks long after the brief rainy seasons had passed."

In fact, the correct name of the Wadi in which the two dams are situated is Wadi

12. J. d'A. Waechter and V. M. Seton-Williams and colleagues, The excavations at Wadi Dhobai, 1937-1938 and the Dhobaian Industry, *The Journal of the Palestine Oriental Society,* XVIII (1938: nos. 3-4) p. 173-174 and plan 1.
13. Nelson Glueck, Explorations in Eastern Palestine IV, Part 1, text, *AASOR,* XXV-XXVIII (1945-1949) p. 49-53 and figs. 39-41, plate entitled "Dam in Wâdi Dhôbai". To the above references should be added a brief outline in G.L. Harding's unpublished *Notebooks,* Registration Centre, Department of Antiquities, ʿAmman:
"Wady Dhobai"
Dist.: Desert
Map Ref.: 288145 approx.
Date: Prehistoric, Roman
Biblio. JPOS (Journal Pal. Orient. Soc.)
"Many small prehistoric sites and a Roman Dam in the Wady." Accompanying Harding's entry is a photograph of the main dam: it is identical with that which we saw in Wadi al-Jilat.

al-Jilāt, although Waechter and Seton-Williams, Glueck and Harding all consistently confused the Wadi with Wadi al-Dabʿi into which Wadi al-Jilāt flows before the united channels run towards the Azraq basin in the north-east. Dr. G. Rollefson visited al-Jilāt in October 1981 and was told by the bedouin that one of the dams is "*rujm* Jilāt" and they pointed out two tailed cairns and some smaller cairns south of the main dam, describing these as "Qaṣr Jilāt".[14] The present author was assured by the Bani Sakhr that there were no other antiquities in the vicinity except the two dams described here, and the various *rujūm*. There is no Qaṣr al-Jilāt as such.

The Wadi al-Jilāt at the site of the dams is very striking in its topography. It cuts through a broad valley with ranges of low hills on either side. Within this depression, a rocky gorge drops steeply below the level of the valley floor by some 6.00 m. so that the gorge is invisible from a distance. This gorge commences at the western end at the main dam which is silted on its western face up to the summit, as Field and Glueck have said. Thereafter, the rocky gorge continues as a narrow channel with small tributaries flowing in from either side. The gorge moves in a generally north-easterly direction with sharp turns before it eventually broadens out and the steep cliff sides cease. The second dam mentioned by Field was located at the mouth of a tributary in the south side of the main gorge. Not far beyond the main dam there are water-holes in the bare rock of the stream-bed.

The principle dam at al-Jilāt could only be examined from the eastern face, that is, downstream, because of the total silting upstream. The eastern face of the dam is constructed of excellently cut limestone and banked with regularly stepped courses. Each step in the dam face is set back about 0.05 m. from the step below it, so that the summit of the dam slopes steeply back from the base. The dam is 28.85 m. long and 5.80 m. high measured at the centre of the eastern face to bedrock. At the north end the slope of the gorge-bank reduces the height of the dam from its base. The eastern face of the dam consists of seventeen courses of ashlar including the lowest course visible, submerged at the time of our visit in a pool of water. A bearing taken along the line of the dam gave an alignment of 309° (by Mag. N.). The eastern face of the dam is reinforced by three rectangular buttresses which project 2.12 m., measured at the summit. Although consistently well cut, the limestone ashlar blocks of which the dam is constructed vary in their dimensions: representative measurements of accessible masonry are as follows:

0.77 x 0.41 m.
0.75 x 0.29 m.
0.51 x 0.35 m.
0.53 x 0.34 x 0.51 m.
0.90 x 0.34 x 0.25 m.
0.57 x 0.35 x 0.28 m.

The filling of the dam as a whole could not be established but the buttresses on the east face have a rubble core between good ashlar facing when examined at the summit. The dam is covered heavily with *wushum* and graffiti but we noticed no sign of a dating inscription. At the top of the dam on the level ground on either side wall-traces were noticed but there was no opportunity to excavate them to test whether or not these are indicative of sluices.

A little further eastwards along the Wadi al-Jilāt gorge the second dam is located, built to block off a tributary gulley running into the main channel from the south. The second dam is ruined but was very much smaller than the principle dam. Such was the damage to this smaller dam that it can only be examined at the points at which it was built against the sides of the gulley: the rest of the structure has vanished. This dam survives on the eastern side to a maximum of sixteen courses, but the stone is far less well cut and laid than that of the principle dam. Its thickness at the base is 3.08 m.: at this point, the

14. Communication, 29th November, 1981. A "Qasr el Jilāt" is marked at the site on the 1:250,000 Archaeological Map, Sheet 2, Karak.

tributary gulley is 9.25 m. wide. The small dam was intended to trap water in the gulley but the quality of workmanship, such of it as remains, is so far inferior to that of the main dam that it is not difficult to accept Field's view that the smaller dam is pre-dated by the finely built principle dam. An alternative interpretation would be that less attention was given to the building of the smaller dam, and that the two dams are in fact contemporary.

On the cliff-top above the small dam is the simple mosque mentioned by Waechter and Seton-Williams outlined on the ground with stones, a type laid out by bedouin in this area and in Arabia. It has a rectangular *miḥrāb* projection of the *qibla* side. It would be quite foolhardy to assign a date to such a structure.

Further along the Wadi al-Jilāt, the gorge makes a turn, at which point the great natural cavity in the Wadi floor to which Glueck had referred was found. The sharp drop in the Wadi bed above this natural feature must form a spectacular waterfall when the Wadi al-Jilāt floods and the cavity itself probably retains a considerable quantity of water, afterwards. East of this cavity, the gorge is without signs of construction.

Along much of the course of the steep-side gorge of Wadi al-Jilāt below the principle dam, the stone floor of the water-channel has been washed smooth and clean. The circular water-holes in the stream-bed had water nearly to surface level at the time of our visit, although heavily polluted by animals. Water seeped and oozed in trickles from the sides of the gorge and the principle dam still held water in the silt behind it, for a small waterfall was flowing through a crack in the south end of the dam and the bedouin were drawing water from it: water had also pooled at the base of the dam on its east side. It must be stressed that our visit was in August after some months without rain, and yet the continuing importance of the dam as a watering place, albeit silted and damaged, is clear enough. In a wet winter, as that of 1980-81 had been in the region, enough water is caught to ensure that the gorge can be used as a place to draw water throughout the dry summer months. In the gorge animal droppings testified to the frequent use of the place by bedouin with their flocks, while the number of Banī Ṣakhr tents in the vicinity also reflected the importance of the site for them.

No sherds were found in the gorge below the main dam, which is hardly surprising in view of the amount of water that must flow through it after rain. However, a certain amount of pottery was located on the silted western side of the principle dam. A further scatter of sherds was found on the slopes of the hills just to the south of the gorge, overlooking the bedouin mosque. This scatter was greater in quantity than that by the principle dam but unfortunately we were unable to examine the area as closely as we would have wished as there were bedouin tents set up on the same site. We also found a number of flints around the dams and nearby. The exploitation of the place since early times is already known from Waechter's investigations with Seton-Williams, while Dr. Rollefson's study of the stone artefacts appended to this report indicates its use in Pre-Pottery Neolithic B. Dr. Rollefson has also noted Safaitic inscriptions on hilltops south of Wadi al-Jilāt.[15] For historical periods, the ceramic tabulation by Dr. C. J. Lenzen shows a span of occupation in relatively more recent times, and as we have seen this use of the gorge by the bedouin continues to this day. There is little in the sherd evidence to allow a confident association of the principle dam with the Romans, despite Glueck's dating of the construction, maintained also by Harding. There is some sherd evidence of Byzantine period use of the site, but it is quite meagre. The pottery collected at the site thus does little to support Glueck's belief that the dam is Roman, although Roman presence or influence in the area is by no means impossible in theory. Glueck based his dating on the similarity of the principle dam at al-Jilāt to the main dam at

15. Communication, 29th November, 1981.

Kurnub/Mampsis[16] in the Naqab: while it is a compelling view on the basis of the character of the masonry of the two structures, the paucity of Roman wares at al-Jilāt and the greater quantities of Byzantine, Late Byzantine/Umayyad and Umayyad sherds is disturbing. In view of this evidence, a better case could be made for a Byzantine-period — or Ghassānid — origin for the dam, or an early Islamic date. Whatever facilities already existed at al-Jilāt in the seventh-eighth centuries A.D., the use of the place by people using pottery had increased. The presence of this Late Byzantine/Umayyad and Umayyad pottery suggests that the use of the site in this period should be seen in context of the Umayyad exploitation of the eastern desert of Jordan that we have seen further north. The degree to which the early Muslims developed water storage and control facilities at Qaṣr al-Mushāsh and other sites[17] suggests that a naturally wet area like the Wadi al-Jilāt gorge would not have been ignored, especially when the place had been used since ancient times, and as it continues to be today.

Such an exploitation of the area by the early Muslims indicated by ceramics underlines the importance of the question of whether or not they actually built the dams. From the scant ceramic evidence, this seems as plausible as the Roman dating proposed by Glueck and by Harding, although as I have suggested, construction in the Byzantine period cannot be excluded. To state the case, however, for an Islamic period attribution, it should be recalled that the Umayyads built other dams to the south in the Ḥijāz, where there are several near al-Ṭā'if. Sadd Saysid, south-east of al-Ṭā'if, is 58.00 m. long and was built in A.H. 58/A.D. 677-678 by ʿAbd Allāh b. Sakhr for the Caliph Muʿawiya b. Abi Sufyān according to the inscription close by.[18] The dam is

16. C. Leonard Woolley and T. E. Lawrence, *The Wilderness of Zin,* London, 1915; new ed. 1936, p. 139-140 and Plate XXX(2) "Kurnub: Great Dam". George Eden Kirk, Archaeological Exploration in the Southern Desert, *PEQ,* (1938) p. 219-220. He describes the Great Dam at Kurnub as being 26.00 m. long, 8.30 m. high and 7.00 m. thick, and observes that there are at least six dams in the *wadi* south-west of the town of Kurnub/Mampsis. A. Negev, Mampsis: a report on excavations of a Nabataeo-Roman town, *Archaeology,* 24 (1971) p. 166-171. M. Avi Yonah and E. Stern (eds.), *Encyclopaedia of Archaeological Excavations in the Holy Land,* OUP III (1977) p. 722-735 with detailed bibliography. Kurnub/Mampsis flourished through the Nabataean, Roman and Byzantine periods, to decline shortly after the Arab conquest. It is to be noted that no Nabataean wares were found at al-Jilāt.

17. Examples of major Umayyad hydraulic systems for controlling water and for farming occur at Qasr al-Hayr al-Sharqi (Oleg Grabar, Renata Holod, James Knustead and William Trousdale, *City in the Desert: Qasr al-Hayr east,* Cambridge, MA, 1978, i, 100ff.), at Qaṣr al-Ḥallabat (Ghazi Bisheh, The second season of excavations at Ḥallabat, 1980, I", *ADAJ,* XXVI (1982) p. 133-143), and elsewhere. The remarks by George C. Miles, Early Islamic inscriptions near Ṭā'if in the Ḥijāz, *Journal of Near Eastern Studies,* VII (Jan.-Oct., 1948) p. 236-242, are illuminating in this context. H. Gaube *(Ein arabischer Palast in Südsyrien: Hirbet el-Baiḍa,* Beirut, 1974, p. 22-24) raises an important question regarding the use of the desert site of Khirbat al-Bayda in southern Syria, expressing his doubt that it would have been in use all year, since hydrological and climatic conditions were only suitable in March-May. The point is relevant to the other desert *qusur* in eastern Jordan: would water trapped in winter and spring regularly have remained after evaporation in the hot dry months? With unmaintained *birak,* their plaster fallen, it is now difficult to say. At Burquʿ, deep in the desert, water was trapped behind the dam in May 1974, when Gaube studied the site; water from the rains earlier in the year had vanished by August, 1980, to be replaced by thick mud. In April 1928 the Field expedition had found the lake-bed behind the dam bone-dry.

18. George C. Miles, *loc. cit.,* p. 237-241; K.S. Twitchell, *Saudi Arabia,* Princeton, NJ, 1958, 3rd ed., p. 134.
A. Grohmann, *Expedition Philby-Ryckmans-Lippens en Arabie,* IIe partie *Textes épigraphiques,* tome 1, *Arabic inscriptions,* Bibliothéque du Museon, vol. 50, Louvain, 1962, p. 56-58, z 68: Shirley Kay, Some ancient dams of the Hejaz, *Proceedings of the 11th Seminar for Arabian Studies,* 8 (1978) p. 68-80. Sami Sakkar, The dams of Taif--an observation and comment, *Proceedings of the 11th Seminar for Arabian Studies,* 8 (1978) p. 66-67; *idem,* Note re the Saysad Dam near Taif, *Proceedings of the 12th Seminar for Arabian Studies,* 9 (1979) p. 113; Majeed Khan and Ail Al-Mughannam, Ancient Dams in the Ta'if Area 1981 (1401), *ATLAL,* 6 (1402/1982) p. 125-135 and plates 105-123.

stepped on the downstream face and M. Khan and A. al-Mughannam comment on the quality of its construction and resilience. Another dam system is located at Wadi Liyya, south-west of al-Ṭā'if and is known as Sadd al-Samallaqi. It is 212.00 m. long, and stepped on the downstream face. Early Kufic inscriptions are located nearby, and Mrs. Kay has referred to local association of the dam with Muʿawiya b. Abi Sufyan and ʿAmr b. al-ʿAs, while Khan and al-Mughannam favour an Umayyad date for several of the dams around al-Ṭā'if.[19] There are more dams further north, around Khaybar, but so far these are undated. In view of the epigraphic evidence of Umayyad dam building in the Ḥijāz, the Umayyad attribution of the al-Jilāt principle dam is at least as plausible as Glueck's Roman dating — especially when supported by the scatter of Umayyad sherds south of the site and the Umayyads' known interest in this particular area of eastern Jordan. Nevertheless, it might be objected that the Umayyad Sadd Saysid lacks the fine masonry of the al-Jilāt dam, for all its strength; yet this point may be countered by recalling that in Jordan and Bilād al-Shām generally, the Umayyads had at their disposal highly skilled stoneworkers, whose availability accounts for the well-cut blocks that form the eastern face of the al-Jilāt main dam: in the al-Ṭā'if area, a different tradition of stone-working prevailed.

Situated 37 kms. south of Qaṣr al-Mushāsh and 26 kms. south-south-west of Qaṣr al-Ḥarāna, 30 kms. east of Khan al-Zabib (occupied during the Umayyad period) and 25 kms. north-west of the Umayyad Qaṣr al-Ṭūba, the water caught by the al-Jilāt dams could indeed have supported large flocks, as Glueck has said, although in Byzantine or the early Islamic period on the weight of evidence rather than the Roman. This instance of yet another water storage point at least in use under the Umayyads is particularly important in view of the number of water storage points at Qaṣr al-Mushāsh, which we have already treated above as indicating an early Islamic period concern with pastoralism. In this context, a remark by Alois Musil is interesting.[20] Discussing the tribal history of the Wadi al-Sirḥān area, Musil points out that the Sirḥān has traditionally marked the boundary between the camel rearing tribes to the east and sheep and goat herders to the west, i.e., the area of the Jilāt dams and Qaṣr al-Mushāsh. Musil discussed this division in the context of the period of the Umayyad Caliph ʿAbd al-Malik b. Marwān and even in his own day as he travelled with the Āl Ruwallā, the Sirhan remained the boundary between camel herding tribes and those raising sheep and goats. Indeed, it is only in very recent years that the practice of bringing in water by tanker has allowed the formerly camel-herding tribes of northern Saʿudi Arabia to rear sheep south and east of the Sirḥān.[21] It must not be forgotten that much political support for the Umayyad Caliphate was based on the tribes of eastern Jordan; it seems quite plausible that the Umayyads would have improved the water supplies

19. An interesting description was made of sherds recovered in the vicinity of the al-Ṭā'if dams: "Several unique pieces were found with a buff slip and red to brown painted designs" (Juris Zarins, Norman Whalen, Mohamad Ibrahim, Abd al Jawad Mursi, and Majid Khan, Comprehensive Archaeological Survey Program: Preliminary Report on the Central and Southwestern Provinces Survey: 1979, *ATLAL,* 4 (1400/1980) p. 27. It would be useful if these sherds were to be published as they are strongly suggestive of Umayyad painted wares familiar from Jordan.

    The local connection of ʿAmr b. al-ʿAṣ and Muʿāwiya b. Abi Sufyān with the Sadd al-Samallaqi to which Mrs. Kay refers may be supported by the presence of inscribed gravestones in the names of descendants of ʿAmr from the mosque at ʿIkrima, 6 kms. south of al-Ṭā'if, dated to the 3rd/9th century (Grohmann, *op. cit.,* p. 9-11, p. 24-25, p. 27-28, p. 33-34). Grohmann's suggestion that ʿAmr's family owned land near ʿIkrima lends some credence to the association of a major dam in the area with his name.

20. A. Musil, *Arabia Deserta,* New York, 1927, p. 100, note 27; p. 335, note 81.

21. Dr. G. Knoess of FAO who specializes in camel rearing kindly made this point to me during a conversation in Sakākā, al-Jawf on September 26, 1982. The evidence of sheep herding as a current, but recent, activity is clear along the desolate highway between Tabūk and al-Jawf.

available for the herds of their supporters in the eastern Jordanian desert as an aspect of their policy on the desert margins, facilitating movement between Bilād al-Shām and Arabia, and exercising patronage in the area occupied by tribes crucial to their power base.

Qasr Bayer (Pl. XC,1)

In the context of our investigations of the eastern desert sites, we visited Bayer to examine the *qaṣr*[22] which has been attributed to the Umayyad period. If this were indeed correct, then its geographical position would be particularly significant in relation to other Umayyad sites in the neighbourhood. Fortunately two ground-plans of differing precision had been made of the *qaṣr* prior to and just after its demolition by Peake Pasha in 1931 to build the Arab Legion fort that overlooks Bayer wells from the hill above.[23] So thorough was Peake's demolition of the *qaṣr* that there was no point for us to measure the surviving ridges which are all that remain. We must therefore continue to rely on plans and photographs provided by earlier travellers. The main point emerging from our own work at the site and touched on by Mr. Scott Rolston is the question of the attribution of the *qaṣr*.

Bayer was mentioned by A. Jaussen,[24] B. Moritz[25] and A. Musil,[26] the latter associating the site with the "Ubajr" mentioned in the context of the Umayyad Caliphs: nevertheless, Musil implied that in his view, the *qaṣr* was already standing before Islam, referring to the fact that the Ghassanids under ʿAmr b. Ḥārith passed it *ca.* A.D. 620; indeed, Moritz mentioning the same incident, assumed the *qaṣr* to be Roman. H. Lammens[27] treated "Aba'ir" as one of the hunting areas of the Umayyads and Gertrude Bell took the *qaṣr* to be of Umayyad origin when she visited the site on her way to Ḥā'il on 20th January, 1914.[28]

> "And we came at two o'clock to the last of the castles, Baîr, as yet unplanned and unphotographed. The plan is a very old type and the place may be 8th century. It is very famous on account of its wells, and in summer and autumn, if the Sukhur are not camped here, all the ghazus pass this way".

D.G. Hogarth[29] was more specific still, saying that Gertrude Bell had "thought it an early Islamic castle like Tuba, and the last that the desert-loving Caliphs of Damascus had pushed out into the Syrian waste", E. Schroeder planned the site in 1928 in the context of one of the Field expeditions and compared it to Mshattā.[30] Since Gertrude Bell had treated the *qaṣr* as Umayyad and Schroeder had compared the arrangements of rooms and courtyards with Mshattā and since the latrines and disposition of the *buyut* in Schroeder's plan were like those of Mshattā, K. A. C. Creswell[31] followed this view. J. Sauvaget[32] concluded that the *qasr* was typically Umayyad, and Florance E. Day[33] also accepted the Umayyad attribution.

Like Moritz and Musil, other visitors to Bayer were proponents of an earlier

22. Map ref. BQ 777 057 (wells), Sheet 3351 IV, ed. 1. Other ruins are marked north-north-east in the *wadi* which we did not examine. This is presumably the *birka* mentioned by other visitors. Bayer was visited 24th-25th July, 1981 with Mr. Scott L. Rolston and Ms. A.V.G. Betts.
23. Creswell, *op. cit.,* I, part 2, p. 642. Stein in Kennedy, *op. cit.,* p. 255-257.
24. A. Jaussen, *Coutumes des Arabes de Moab,* 1908, p. 70.
25. Moritz, *loc. cit.,* p. 428, note 1.
26. Musil, *Arabia Deserta,* p. 324, note 76.
27. H. Lammens, La Bâdia et la Ḥîra sous les Omaiyades, *Mélanges de la Faculté Orientale, Université Saint-Joseph,* IV (1910) p. 102, note 7; p. 109.
28. Lady Bell (ed.), *The Letters of Gertrude Bell,* London, 1930, p. 269.
29. D.G. Hogarth, Gertude Bell's Journey to Hayil, *The Geographical Journal,* LXX (1927: no. 1) p. 6.
30. In H. Field, *Op. cit.,* p. 100: plan, Fig. 29, p. 98.
31. K. A. C. Creswell, *Early Muslim Architecture,* Oxford, 1969, I, part 2, p. 642-643.
32. J. Sauvaget, Remarques sur les monuments omeyyades, *Journal Asiatique,* CCXXXI (Janvier-Mars, 1939) p. 39-40. Notwithstanding the ceramic indications noted by Glueck to suggest that the *qasr* was Nabataean, Sauvaget categorically declared it to be that of al-Walid II on architectural grounds. He had not visited the site.
33. In H. Field, *op. cit.,* p. 158-160.

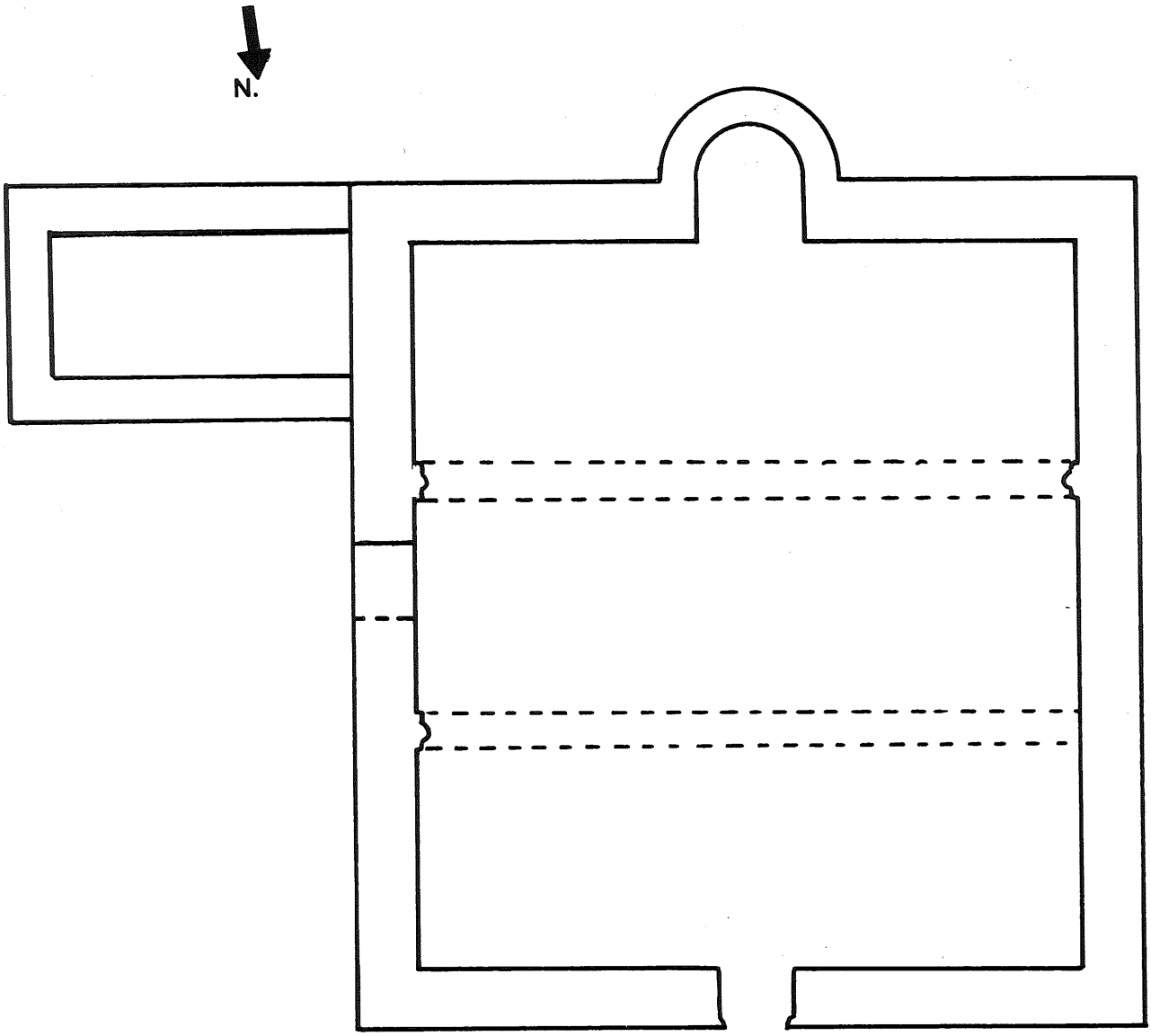
dating. D. Carruthers[34] was captured by a raiding party which was encamped at Bayer wells in 1909. He took the *qasr,* which he called a *khān,* or caravanserai, as proof of an ancient trade route between Egypt eastwards through al-Jawf to the Gulf. Since the route that he mentions he had extrapolated from the disposition of sites on the map of Ptolemy, it is to be inferred that, like Moritz, Carruthers regarded the *qasr* and the route through Bayer as Roman. T. E. Lawrence[35] described the site as Ghassanid without explaining why he held this view and Sir Aurel Stein[36] was inclined to agree with Lawrence. N. Glueck[37] treated the *qasr* as Nabataean and G. L. Harding[38] in a brief reference also dated the site as Nabataean, mentioning possibly Chellean flints in the *wadi* and ruined features.

The evidence of recent expeditions, including our own, to Bayer does not lend support to an Umayyad date for the *qasr,* nor has any traceable Umayyad use of this area of the site been identified. The sherding by Mr. Rolston[39] and our own show intense Nabataean use of the *qasr* and our tabulation also provides evidence of Roman and a possible Late Roman/ Early Byzantine occupation. Thereafter, according to the available sherd evidence, there was no further occupation at the *qasr* to leave traceable material remains. In these circumstances, it is difficult to maintain that Qasr Bayer is Umayyad in origin.

Musil[40] has referred to the fact that there were three routes from north-west Arabia into Jordan, one of which was poorly supplied with water and passed from Taymā' to Kilwa and thence to Bayer and the north. It was a route less favoured than that which lies further west or the Wadi al-Sirhān route in the east. On this more difficult dry central route, the wells at Bayer take on great importance for travellers. There is no reason to suppose that the wells were not used in the Umayyad period even if the *qasr* had fallen into disuse or short halts at the place left no material remains. Visitors to the site have referred to the use of the wells by the bedouin, and indeed, at the time of our visit a group of Huwaytāt were watering their camels: such a role which the wells must have always served would not necessarily leave any traces. If the Umayyad Caliphs indeed visited the site then their passing left no more indication than the bedouin. Unfortunately, we were unable to visit the other installations near the *qasr* and until these are examined it cannot be concluded whether or not there are any constructions in the vicinity to be dated to the early Islamic period. In broader terms, the present information from Bayer conforms with an apparent dearth in southern Jordan of the early Islamic ceramic types familiar in the northern half of the country. Yet a cautionary note must be struck, for Mr. A. Killick[41] has recently reported early Islamic material at Udhruḥ: more research is required in southern Jordan and the northern Ḥijāz before any conclusions can be drawn about the region in the early Islamic period, and especially under the Umayyads.

The Mosque, Umm al-Walid (Pls. XC, 2; XCI, 1; XCI,2; Figs. 2, 5).

34. D. Carruthers, A journey in North-western Arabia, *The Geographical Journal,* XXXV (March, 1910) p. 243-244.
35. T. E. Lawrence, *Seven Pillars of Wisdom,* Penguin ed., 1973, p. 288.
36. Stein in Kennedy, *op. cit.,* p. 257.
37. N. Glueck Explorations... I", *AASOR,* XIV (1933) p. 73-75; plate XXXIX; *idem* "Explorations... IV, *AASOR,* (1945-1949), XXXV-XXVIII, pp. 47-49.
38. Harding, Unpublished *Notebooks.* Bowersock, *loc. cit.,* p. 242 has also proposed a Nabataean date and a Roman use.
39. Scott Laird Rolston and Gary O. Rollefson, The Wadi Bayir Paleoanthropological Survey, *ADAJ,* XXVI (1982) p. 211-213. Although not primarily concerned with late periods, the sherds gathered at the *qasr* were read by Dr. James Sauer (p. 213) and proved to be 95% Nabataean indicators, with the remaining few sherds Early Byzantine and Ottoman: a second intensive sherding showed 100% Nabataean indicators.
40. Musil, *Arabia Deserta,* p. 516 ff.
41. A. Killick, Udruh--the frontier of an empire: 1980 and 1981 seasons, a preliminary report, *Levant,* XV (1983) p. 121; p. 125; fig. 10.



Umm al Walid: mosque

Fig. 2

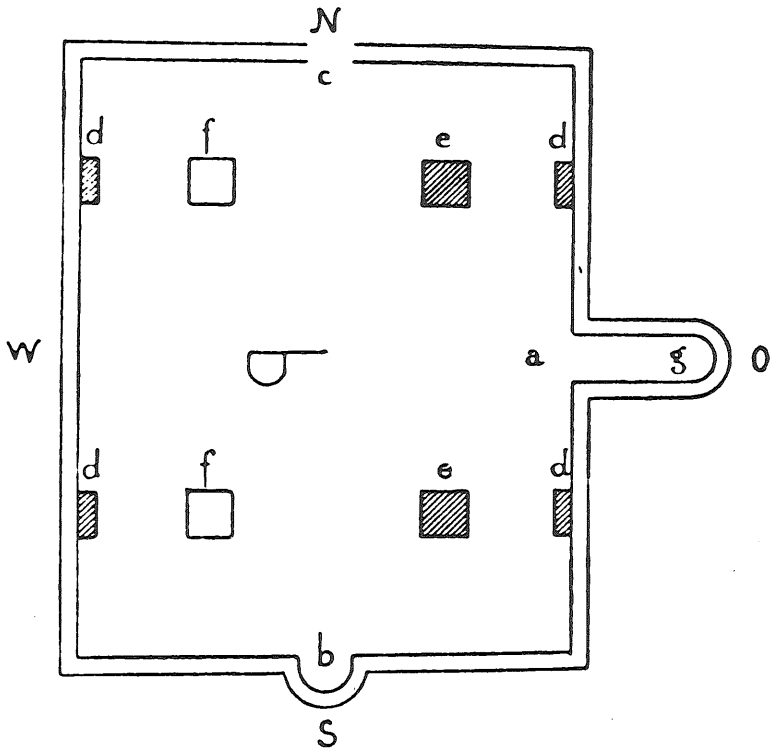


Fig. 5

In the context of surveying towns and villages to the west of the Umayyad sites in the eastern Jordanian desert, we visited Umm al-Walīd where we examined a mosque situated to the east of the walled ancient town.[42] Our re-discovery of this building is of interest as it does not appear to have been examined since H.B. Tristram visited Umm al-Walīd in 1872. Indeed, Creswell was inclined to think that the mosque had disappeared since he had failed to locate it. Tristram's account is worth quoting in full because it is the earliest and apparently the only first hand account, made at a time when Umm al-Walīd seems to have been deserted:[43]

> "Near the east end of the city we found a large open space, well paved with large square slabs, still perfect and clear, and surrounded by ruins and broken pillars, with a few fragments of capitals; as if it had once been encircled by a colonnade. It was 41 paces by 38 in extent inside, and may have been the old ἀγορά or *forum.* Immediately beyond was the line of the east wall of the city, built of Roman rustic-dressed stone, and the central gateway and street, still plainly to be traced.
>
> Just beyond the gate is a Doric temple, 12 yards, N. to S. by 10 yards E. to W. The door of the temple faced east, and, in the centre of the south wall, is a small semicircular niche or apse for the image. Inside the doorway the bases of two columns remain *in situ:* and four plain Doric capitals, and portions of shafts are lying about. This temple is exactly similar in all its arrangements to the old Doric temple near Khan Zebib. Are these the remains of an ancient Chemosh, or Baal-worship? We found afterwards several similar temples in various stages of ruin, all of them outside a city, always at its east end, and with the door to the east, and always Doric, whenever the architecture could be determined".

Subsequently, in 1897, Brünnow and von Domaszewski[44] noted the building, although Creswell[45] suggests that Brünnow did not actually see it, as he merely reproduced Tristram's ground-plan. E. Herzfeld[46] correctly re-interpreted this small building as a mosque and associated it with a mosque at Khān al-Zabib which Tristram had also taken for a temple. Herzfeld rightly pointed out the error made by Tristram and Brünnow in regarding the Umm al-Walid building as anything other than a mosque.

The location of the mosque noted during our survey accords precisely with the building described and planned by Tristram and there is no doubt that what we saw and the building that Tristram recorded are one and the same. The building is quite certainly a mosque and no credence can be given to Tristram's interpretation. It is due east of the east wall of Umm al-Walīd at just over 60.00 m. distance and towards the edge of the hill on which the town is situated. It is freestanding, with no structures anywhere near it. The mosque only survives in plan, defined by the lower courses of the walls, and built of fairly well-cut stone. The quality of the masonry is finest at the *miḥrāb* where it stands to three courses, and in the carving of the attached columns against the side walls (Pls. XCI,1; XCI,2). The walls are two stone blocks in thickness, a method of construction common in western and northern Jordan. The breadth of the walls (0.86-0.90 m.) is a dimension encountered everywhere in this

42. Map Ref. YA 747 052, Sheet 3153 II, ed. I-AMS, series K737. Visited 30th July, 1981: our plan was checked on 18th June, 1983.
43. H. B. Tristram, *The Land of Moab,* London, 1874, 2nd ed., p. 179-181 and Fig. no. 15.
44. R. E. Brünnow and A. von Domaszewski, *Die Provincia Arabia. Der Aussere Limes und die Römerstrassern* von el-Maʿan bis Bosra, Strassburg, 1905, zweiter Band, p. 89, fig. 671 and p. 90.
45. Creswell, *op. cit.,* I, part 2, p. 506, note 1.
46. E. Herzfeld, Mshattâ, Ḥîra und Bâdiya, *Jahrbuch der Preuszischen Kunstsammlungen* XLII (1921) p. 130.
    G. L. Harding also mentions the site in his unpublished *Notebooks* but without referring to the mosque.
    N. Glueck, Explorations... I, *AASOR,* XIV (1933) p. 10-12 also refers to the site, but not the mosque.

region and the Ḥawrān. Measured externally, the mosque is 11.67 m. east-west by 12.68 m. north-south, excluding the curved projecting *miḥrāb* niche set in the centre of the south *(qibla)* wall. This *mihrab* is 1.71 m. deep internally and is typical of Bilād al-Shām Umayyad *mahareb*. The mosque is oriented to 188° (by Magnetic N.). There is an entrance set centrally in the north wall on axis with the *miḥrāb,* with flying jambs, the raised rims being set on the outer edge as is common in western and northern Jordan in the Byzantine and the Islamic periods. There may well have been an entrance in the east wall mentioned by Tristram as being preceded by "sloping debris, evidently the ascent to the door". In fact this door is not very clear now although the ramp of debris is visible still. Built against the exterior of the east wall of the mosque, at the south end, are wall-traces which form a rectangle measuring 5.00 m. east-west and 3.50 m. north-south:[47] the walls are a mere 0.63 m. in thickness. Assuming that the structure to which these wall-traces belonged are original, it is possible that they are remains of a minaret, situated at the *qibla* end of the east wall. Too few early minarets survive—least of all attached to small mosques—to comment on this positioning.

Internally the mosque is filled with tumbled masonry; the only remaining features in position are the bases of attached half-columns, one towards the south end of the west wall, and one towards both the north and the south ends of the east wall. The remains of the attached half-column base from the north end of the west wall have fallen out of position on the floor of the mosque. All the attached half-columns are of the same form, consisting of a rectangular block set against or into the wall with the rounded half-columns facing into the mosque. The half-columns are carved as one with the rectangular stone blocks from which they project. From the disposition of these attached half-columns and their supports, it is obvious that the mosque was subdivided internally by two colonnades running parallel to the *qibla* wall, but the exact form of the upper part of the colonnade or the roofing is unclear. The Doric capitals that Tristram mentioned have disappeared, although column drums lie among the fallen masonry on the floor of the mosque. A stone beam measuring a maximum of 2.00 m. in length x 0.30 m. x 0.20 m. was found inside the mosque near the assumed eastern doorway.

The mosqe at Umm al-Walīd is close in plan and dimensions to the now vanished mosque at Khān al-Zabīb to the east, planned by Brünnow and von Domaszewski.[48] The descriptions of the Khān al-Zabib mosque by Brünnow and von Domaszewski and before them by Tristram[49] (who as already observed, had regarded it as a temple) confirm the similarity to the mosque at Umm al-Walīd. The Khān al-Zabīb mosque stood independent of two large complexes at the site, towards the south. Creswell reproduced the ground-plan of Brünnow and Domaszewski as he found that the building had been demolished during the construction of the Ḥijāz railway and had been reduced to four ridges of debris about 11.00 m. square when he saw the site.[50] According to Brünnow and Domaszewski, the mosque was 11.19 m. north-south and 10.38 m. east-west, measured internally. The presence of a doorway in both the east and the north walls at Khān al-Zabīb matched what can be understood of the doorways at Umm al-Walid. The deeply curved *miḥrāb* projection at Khān al-Zabīb (measuring 1.80 m. in depth) was also very similar to that at Umm al-Walīd. The internal support system at Khān al-Zabīb with its double attached columns, indicates that it too was subdivided by a colonnade system in two rows running parallel to the *qibla* wall, just as at Umm al-Walīd (Fig. 3).

47. This had not been noticed in 1981. Returning in 1983 to check our ground-plan, we found that the surface had been disturbed slightly, to reveal wall traces invisible two years earlier.
48. Brünnow and Domaszewski, *op. cit.,* zweiter Band, p. 82, fig. 666; fig. 665 (detail of attached double half-columns); p. 81 for a brief reference to the mosque as the third building of the complex.
49. Tristram, *op. cit.,* p. 173.
50. Creswell, *op. cit.,* I, part 2, p. 505, fig. 560.

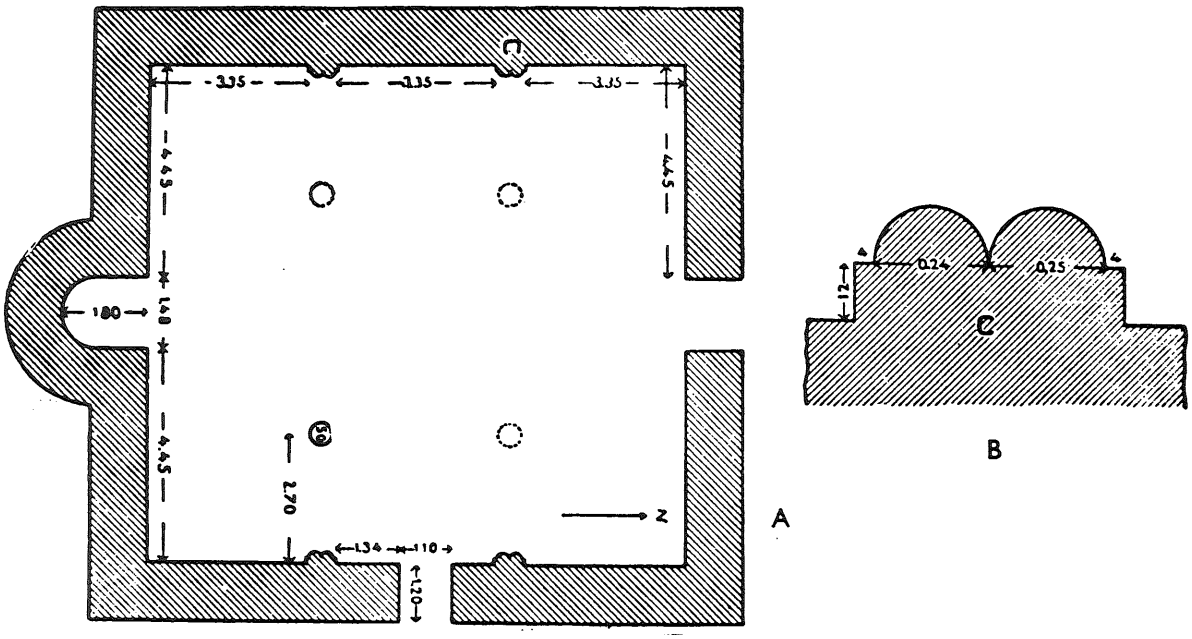


Fig. 3

A third very similar mosque measuring 9.34 x 9.48 m. internally stands 70.00 m. west of Qaṣr Jabal Usays (or Says) in southern Syria,[51] whose Umayyad occupancy is dated by graffiti to A.H. 93-113/ A.D 712-732. Like the Khān al-Zabīb mosque and, it seems, the Umm al-Walīd mosque, there is a doorway in the north and the east walls of the mosque at Jabal Usays, although internally the mosque is subdivided by a single colonnade parallel to the *qibla* wall. A somewhat more complex development of this type is represented by the mosque that lies east of the walls of Qaṣr al-Ḥallabāt,[52] dated to the Umayyad period (Fig. 6) Finally, a fifth mosque related to this group should be mentioned, namely the so-far unpublished mosque that lies to the north of the Umayyad Ḥammām al-Sarakh excavated by the Department of Antiquities of Jordan. Although somewhat different in proportion to the other mosques mentioned here, its freestanding position, to an extent its style of *miḥrāb,* and above all, its small scale, relate it to the others discussed above.

The mosque at Umm al-Walīd was created as Umayyad by Creswell, and now that it has been possible to re-examine the remains of the building, this attribution is likely in view of its similarity to other mosques in the area of the Umayyad period. The ceramic evidence allows for such a dating.[53] It seems that the mosque-type as a whole represents a very early form in Islam: the essentials of Islamic worship are present in the design with no extraneous intrusions, for being built as mosques from the first, these small structures needed no adaptation dictated by the existence of earlier structures on these sites. This form is so well-established and coherent in this area in the Umayyad period that it may be asked with justification whether the design of these mosques goes back to the practice of the Prophet Muhammad in Arabia, where he personally established a number of mosques apart from that in al-Madina itself.
itself.

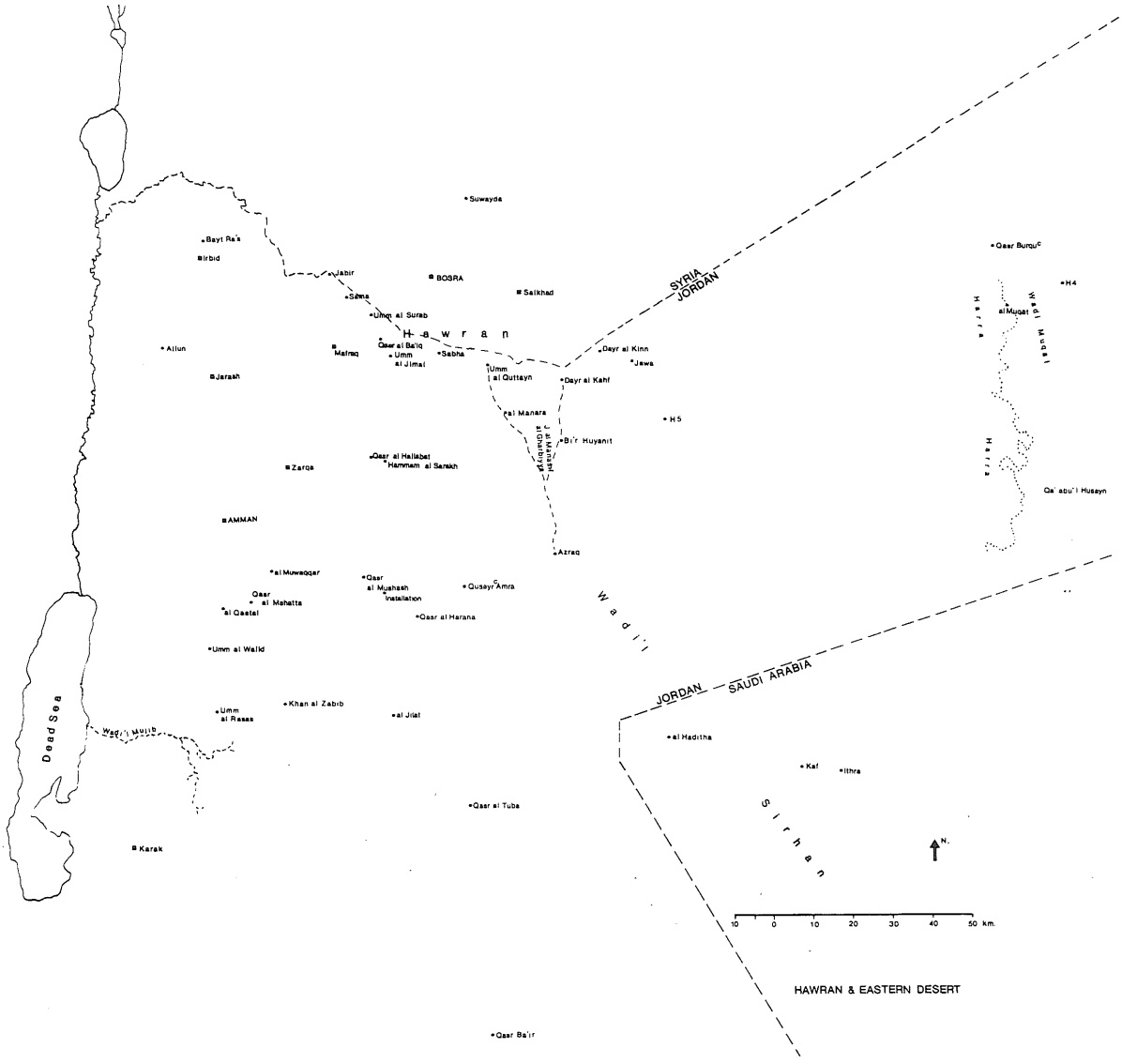
Section 2: The Ḥawrān (Fig. 4)

In the course of further survey work in the Ḥawrān of northern Jordan, a number of additional observations were made to complement our first report on our work in the area.[54] As in our previous report on the Ḥawrān, the description moves from west to east.

Jabir (Pls. XCII,1; XCII,2; XCIII,1; XCIII,2)

Jabir[55] lies north of Mafraq and north-

51. K. Brisch, Das Omayyadische Schloss in Usais, *Mitteilungen des Deutschen* Archäologischen *Instituts, Abteilung Kairo,* 1963, Band 19, 141-187; *idem,* Le Château omeyyade de Djebel Seis, *Les Annales Archéologique de Syria,* XIII 1963 p. 135-158; *idem,* Das omayyadische Schloss in Usais II, *Mitteilungen des Deutschen Archäologischen* Instituts, Abteilung Kairo, 1965, Band 20, p. 147-149. Creswell, *op. cit.,* I, part 2, p. 476 and fig. 538.
52. H. C. Butler, *Publications of the Princeton University Archaeological Expedition to Syria in 1904-1905,* Leyden, 1907, II. A. 2, Southern Syria, p. 74-77 and illus. 57-58, and Appendix, pp. xvii-xix and illus. 57a-58a.
Creswell, *op. cit.,* I, part 2, pp. 502-505.
Ghazi Bisheh, Excavations at Qaṣr al-Ḥallabāt, 1979, *ADAJ,* XXIV, (1980), p. 73-75.
Kennedy, *op. cit.,* p. 53.
53. Harding (unpublished *Notebooks,* entry "Um el Waleid") regarded the site as Nabataean and records finding Nabataean painted wares. Glueck (Explorations... I, *AASOR,* XIV (1933) p. 10) mentions Nabataean, Roman, Byzantine and mediaeval Arabic wares. S. Thomas Parker (Archaeological survey of the *Limes Arabicus:* A Preliminary Report, *ADAJ,* XXI 1976 p. 23) gives a far more precise reading which includes the following: 11 Ayyubid-Mamluk/ 16 Umayyad/14 Early Byzantine/22 Late Roman III-IV/26 Late Roman I-II/10 Late Roman/112 Nabataean. Although we found sherds on the main site in 1983, none were located in the vicinity of the mosque.
54. King, Preliminary Report..., *ADAJ,* XXVI (1982) p. 88-95.
55. Map Ref. BS 371 009, Sheet 3255 III, ed. 2 (Khirbat Jabir) Visited 6th and 14th July, 1981.
H. C. Butler, *op. cit.,* II. A. 2, Southern Syria, p. xv-xvi.
E. Littmann, D. Magie, Jr., D. R. Stuart, *Publications of the Princeton University Archaeological Expeditions to Syria, 1904-1905 and 1910,* Leyden, 1910, III. Greek and Latin Inscriptions in Syria, Section A, Southern Syria, part 2, p. 50.
N. Glueck, Explorations... IV, *AASOR,* XXV-XXVIII (1945-1949) p. 2.
S. Mittmann, *Beitrage zur Siedlungs-und Territorialgeschichte des nordlichen Ostjordanlandes,* Wiesbaden, 1970, p. 190-195.


Suwayda
Bayt Ra's
Irbid
Jabir
BOSRA
Salkhad
Sama
Umm al Surab
Hawran
Qasr al Ba'iq
Umm al Jimal
Sabha
Mafraq
Allun
Jarash
Umm al Quttayn
Dayr al Kinn
Jawa
Dayr al Kahf
al Manara
Bi'r Huyanit
Qasr al Hallabat
Hammam al Sarakh
Zarqa
AMMAN
Azraq
al Muwaqqar
Qasr al Mushash
Installation
Qusayr Amra
Qasr al Mahatta
al Qastal
Qasr al Harana
Umm al Walid
Khan al Zabib
Umm al Rasas
al Jilat
Dead Sea
Wadi Mujib
Qasr al Tuba
Karak
Qasr Ba'ir
SYRIA
JORDAN
Qasr Burqu
H4
al Muqat
Wadi Muqat
Harra
H5
Qa' abu'l Husayn
Wadi
JORDAN
SAUDI ARABIA
al Haditha
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HAWRAN & EASTERN DESERT

Fig. 4

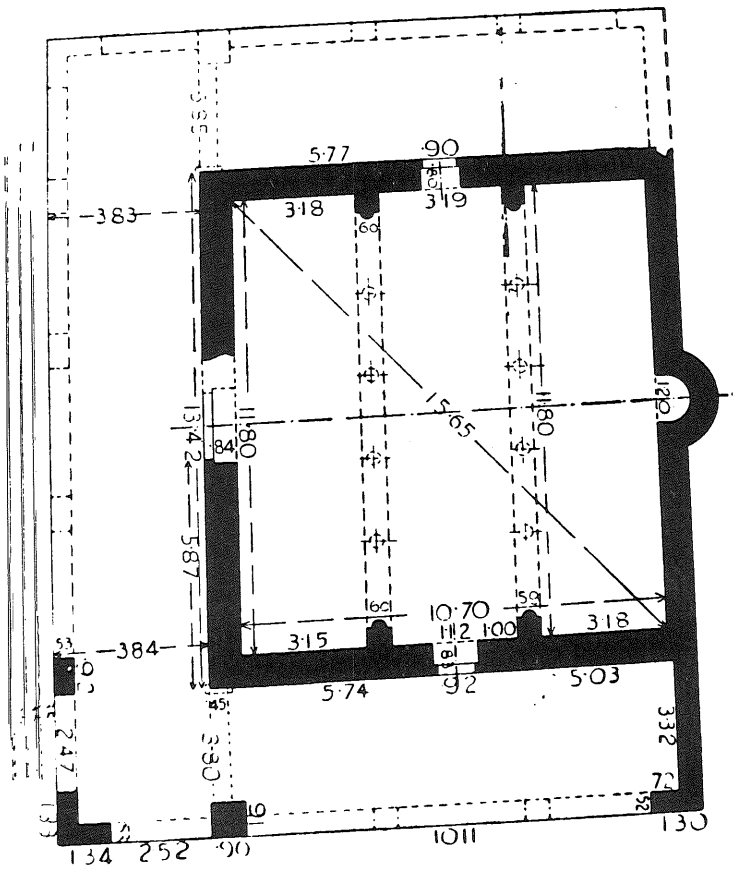

5·77
·90
3·18
3·19
383
384
15·65
11·80
11·80
13·42
5·87
10·70
1·12
1·00
3·15
3·18
5·74
·92
5·03
3·32
3·80
2·47
1·34
2·52
·90
1·011
1·30

Fig. 6

west of Samā, very close to the Syrian frontier. In this area it marks the furthest westerly limit of our survey in the Ḥawrān. The site stands on high ground overlooking the surrounding agricultural land. Immediately south of Jābir, just east of the road from Samā, is a substantial stone wall in well-cut massive masonry, described as a dam.[56] The village itself had clearly grown in recent times, although H.C. Butler[57] mentions that already at the time of his visit, the ancient site had been badly damaged and that a small village stood there. The construction of the railway track from al-Dirʿā to ʿAmman probably had had a serious effect on the ruins of Jābir before Butler's visit, for the railway runs quite close to the village. In subsequent building, a great deal more of the ancient masonry was re-used. S. Mittmann studied the site in the course of fieldwork between 1963 ad 1966 and provided an important description: unfortunately, much of what Mittmann described has been destroyed since, particularly the mosaics. A mosaic with an inscription dating the work to the Bishopric of Agapios in January, A.D. 531 has now vanished along with the remains of the church to which it belonged.[58] Our Department of Antiquities Representative, Mr. Mufleḥ al-Gharayba, said that the demolition took place less than twenty years ago; that is, not long after Mittmann's recording of the inscription. Traces of a plaster floor were still to be seen in section by 1981 on the site where the church had stood. Just north-west of the site of the lost church is a modern mosque.

On the summit of the hill of which Jabir stands is a building constructed with ancient masonry, including a lintel over a door on the north side of the structure bearing a carved cross in a circle, and raised motifs in each of the quadrants (Pl. XCII, 2). The threshold of the same doorway has a simple cross incised in it (Pl. XCIII, 1). Various pieces of ancient stonework, including basins and column fragments, are scattered across the site while there are graves in the hillside caves. Although greatly damaged now, the ancient site of Jābir appears to have been a fair-sized town in ancient times. The modern building and occupation has disturbed the surface and this may account for the paucity of sherds, although those few we found suggest that the place followed the usual pattern with a Roman period use followed by Byzantine and Umayyad continuum.

Umm al-Surab

In 1980, the survey team had paid considerable attention to the Church of Sts. Sergius and Bacchus and the alternations carried out on it in the Islamic period. In the 1981 season[59] our attention was drawn to two further churches in the village. No previous visitors to the site seem to have recognized these two buildings as churches, although Butler referred to "two... apsidal buildings": these were presumably the churches which we identified during the second season.[60]

The West Church (Pls. XCIV, 1; XCIV, 2; XCV, 1)

This church is south of the asphalt road through Umm al-Surab, to the south and west of the Church of Sts. Sergius and Bacchus. The church is built of basalt and internally measures 9.55 m. east-west by 7.88 m. north-south, exclusive of the curved apse which is 3.24 m. deep. The exterior of the church is largely obscured by the rise in ground-level all around it and by the accumulation of subsequent buildings, especially on the south side. The west facade has a triple entrance, the main central doorway being embellished with a lintel decorated by a cross in the centre and two waving lines extending out from the Cross to descend to the corners to right

56. Marked as "Roman Dam", due south of Jabir at BS 364 001, Sheet 3255 III, ed. 2.
57. Butler, *op. cit.*, II. A. 2, p. xvi.
58. Mittmann, *op. cit.*, p. 190-194.
59. Re-visited 11th-12th July, 14th July, 20th July, 1981. For the Church of Sts. Sergius and Bacchus, see the author, Two Byzantine Churches in Northern Jordan and their Re-use in the Islamic Period, *Damaszener Mitteilungen* I (1982) 1983, p. 111-136.
60. Butler, *op. cit.*, II.A.2, p. 95.

and left (Pl. XCIV, 2). There are rough openings in the north wall, but the original principal lateral entrance is in the south side. The apse has been walled off, the wall being rough later work pierced by an entrance. Only the bases of the chancel arch survive. To the south of the apse is a small sacristy entered from inside the church itself and also from the exterior, from the south. The church is in a sadly ruinous state but sufficient survives of the masonry to indicate that it once was a building of the finest craftsmanship from the area.

The North Church (Pl. XCV, 2; XCVI, 1)

The North Church lies north-north-west of the Church of Sts. Sergius and Bacchus on a low rise. Like other churches and houses in Umm al-Surab, it is built of basalt, and measures 16.37 m. east-west by 14.01 m. north-south internally. A second structure abuts the east wall of the church but it does not bond with it. This is taken to be a later addition. The church itself is reduced to foundation courses except at the west and where it still stands to some height.

There is a single entrance in the west facade and another in the south side of the church. It is divided internally into three aisles and at the east end, the entire church is squared off. The apse in the centre is flanked by two rectangular sacristies. Although the central apse is now a rectangular chamber, sufficient survives to show that within this rectangle, the apse itself was curved. The church is well-built, although without the very fine workmanship that marks the West Church at Umm al-Surab.

Date

It is premature to hazard a date for either church at Umm al-Surab. Sts. Sergius and Bacchus in the same town is dated by an inscription to A.D. 489 (384? Prov. Arabia). The evidence of the pottery collected in the vicinity of the West Church and north of Sts. Sergius and Bacchus is somewhat inconclusive, with Early Byzantine and Late Byzantine ceramics fairly evenly represented. The construction of Sts. Sergius and Bacchus in the late fifth century A.D. is by no means evidence that the other churches belong to the same date, but the existence of three finely constructed churches in Umm al-Surab indicates that the place was of some importance in the Byzantine period as a whole. In contrast with Sts. Sergius and Bacchus, there is no evidence of any monastic or ecclesiastical buildings attached to the West or the North Church, or that they were transformed into mosques in the Islamic period as is our contention with the Church of Sts. Sergius and Bacchus and with St. George at Samā.

Sīrat al-Arnab

Sīrat al-Arnab is a diminutive site with modern houses lying to the east of Umm al-Jimal.[61] It is located on a low rise with a good view of the surrounding area: around the site is a certain amount of agricultural land under cultivation. The houses are constructed for the most part with re-used ancient basalt blocks, although there are relatively few stones still *in situ* to idicate the disposition of the ancient site: nevertheless, a number of wall traces were identified. Mr. Gharayba reported that there had been a monumental tomb at the site some thirty years ago; it had stood in elevation and had borne inscriptions. This tomb had entirely vanished by 1981, although we were shown where it had stood. The Druze are said to have taken the inscribed stones to Syria. We have heard a similar explanation of the loss of inscriptions at Umm al-Quttayn to the east. A number of ancient tombs at Sīrat al-Arnab had been opened in recent times. The sherd evidence at the Site from surface collection was limited, showing Iron II, Late Roman, Byzantine and Umayyad use of the site, the nature of which cannot be defined on the available evidence.

61. Map ref. BR 598 789, Sheet 3254 I (Khirbat el Arnab). Visited 15th July, 1981.

Khirbat ᶜAmra wa ᶜAmira

This site[62] had been visited in 1980. It is south-west of Sīrat al-Arnab. When visited in 1980, traces of the curved apse of a church had been identified under field-walls but it had been impossible to discern enough of the wall-traces to make a ground-plan. When the site was re-visited in 1981, the field-walls had been entirely removed and so too had all sign of the church foundations, except for a single wall-trace on a north-south alignment. The masonry of the church had been used to construct a new house in basalt nearby. This episode illustrates a constant threat to the monuments of the Ḥawrān as the population increases and the villages and towns expand, despite the efforts of the Department of Antiquities to prevent this destruction.

Sabaᶜ Asir

In 1980 we had visited Sabaᶜ Aṣīr (the name was also given to us as Sabaᶜ Siyār),[63] when we had been shown a building said to have been a church and tentatively treated as such in our first report. On a subsequent visit to Sabaᶜ Aṣīr in 1981[64] we re-examined this church site in the central area of the village and were assured that there had been traces of an apse visible in the recent past, although we could not identify it. There were said to have been floor mosaics, but we could find no trace of them.

It was suggested that there had been more than one church at Sabaᶜ Aṣīr. A putative church site was pointed out on the summit of a low rise although only the indistinct foundations of a large building could be seen, with nothing to identify them as belonging to a church. Several houses in the vicinity, of modern date, were constructed of particularly well-cut ancient basalt, the quality of which may indicate that they once had belonged to the vanished church. Mr. Gharayba showed us yet a third place where he thought, with some hesitation, that there may have been a church, but there was nothing remaining visible on the ground. No inscriptions or carved crosses were found at Sabaᶜ Aṣīr, although the sherd evidence makes it quite clear that there was a significant occupation of the ancient site in the Byzantine period following on from a Roman period use which has left fewer sherds. The Late Byzantine period seems to have marked the end of settlement at the site and we located no evidence of a subsequent Islamic-period use of Sabaᶜ Aṣīr until modern times. Most of the sherds located were on the south-east slope of the rise on which the site is situated, washed off the summit. In the loss of its ancient church remains, Sabaᶜ Aṣīr is comparable to other sites in the neighbourhood.

Salaṭīn (Khisha Salaṭīn, al-Manshiyya)

The site lies between al-Dafyāna and Umm al-Quṭṭayn, north of the asphalt road:[65] the site and the immediate vicinity are known variously as Salaṭīn, Khisha Salaṭīn or al-Manshiyya, the latter being the more recent name. It consists of a natural rocky promintory with massive tumbled masonry towards the north end. The nature of the building material and construction technique is quite distinct from that of the finer structures of Roman, Byzantine or later periods in the Ḥawrān. The surface sherds located point to an Early Bronze (?) use of the place with slight evidence of Iron II(?) and far greater sign of activity in the Roman period. The presence of other indications of Early Bronze period occupation in the Ḥawrān should be borne in mind, while there is a recurrent, if limited suggestion here and elsewhere of Iron Age occupation in the region.

62. King, Preliminary Report..., *ADAJ*, XXVI (1982) p. 92. Returning to the site on 15th July, 1981, residents explained that since the two villages of Khirbat ᶜAmra and Khirbat ᶜAmira had grown into one, the double name was applied to the place as a whole.
63. *idem*, p. 92.
64. Revisited 15th July, 1981.
65. Map ref. BR 738 801, Sheet 3354 IV, series K737, ed., 1. Visited 19th July, 1981.

Hawshiyān

Just to the east of Umm al-Quttayn, we were shown a site named Hawshiyān.[66] It is immediately beyond the buildings on the eastern periphery of Umm al-Quttayn and consists of an extensive area of low mounds and wall-traces. The site is empty and uninhabited, contrasting in this with the heavily populated town of Umm al-Quttayn. Numerous surface sherds were found at Hawshiyān, indicating a significant Early Bronze and Iron I occupation. The quantity of Roman material collected is also interesting, in so far as our sherd collection at Umm al-Quttayn produced rather small quantities of Roman ceramics overall. By contrast, Byzantine and Umayyad sherds at Hawshiyān were few in the first case and not represented in the second, whereas there is a great deal of Byzantine and Umayyad pottery at Umm al-Quttayn. The presence of four churches and a *Dayr* at Umm al-Quttayn mentioned in our previous report for 1980[67] reflects the extent to which the site flourished during the Byzantine period. It may be that Hawshiyān was the centre of occupation during the Roman period and that the settlement extended or shifted westwards to the present site of Umm al-Quttayn under the Byzantines but it would probably be as well to treat Umm al-Quttayn and Hawshiyān as a double site for the Roman-Byzantine periods, distinguished now by the modern settlement at Umm al-Quttayn and the contrasting emptiness of Hawshiyān.

Al-Qis (Al-Qays, formerly ʿAynayn) (Pls. XCVI, 2; XCVII, 1).

Al-Qis, or al-Qays[68] lies nearly 4 kms. south-west of Umm al-Quttayn. The site is located on a crescent-shaped ridge running round to a volcanic crater. The position provides a view over most of the district and commands the approaches to Umm at-Quttayn from the south. From the lofty position of al-Qis there would have been no difficulty in signalling over a considerable distance to points in all directions. The Jabal al-Qis remains visible on the horizon as far as al-Manāra to the south-south-east, for instance.

The ruins on the summit of Jabal al-Qis are built of basalt, reduced to a mass of tumbled masonry for the most part, although some traces of structures and their foundations can be identified. The cut stone matches the work in the churches of Umm al-Quttayn and the rest of the Ḥawrān. There are bedouin graves in and around the ruins. The site of al-Qis appears to have consisted of several buildings but their form or extent is impossible to determine accurately without clearing the great quantity of fallen stone that obscures them. At the east end of the ruins two corners of a building were identified, the related walls forming the eastern, southern and northern sides of a structure, but only the foundations remain. The east wall is 4.85 m. in length, the south wall 13.90 m. but the north wall only could be traced for an insignificant distance. The east wall lies on a bearing of 170° (Mag. N.). In the north-west part of the ruins a further corner was identified; unfortunately, again there is too much fallen masonry to make even a rudimentary ground-plan. In the central area of the ruins this is particularly the case, although there are occasional stretches of wall visible under the tumbled basalt blocks. A number of corbels from the roofing system and door jambs are scattered about, while in the centre is a massive basalt door with a large cylindrical pivot projecting from it (Pl. XCVII, 1); most of the door is concealed by debris. There were once similar doors in the rest of the Ḥawrān and the type still can be seen in place at Azraq, but in general these ancient basalt doors have been removed.

66. Map ref. BR 777 781, Sheet 3354 IV, series K737, ed. 1. Visited 26th July, 1981.
67. King, Preliminary Report.., *ADAJ*, XXVI (1982) p. 94.
68. Map ref. BR 740 746, Sheet 3354 IV, Series K737, ed. 1. Visited 21st July, 1981. L. W. B. Rees, The Transjordan Desert, *Antiquity*, III (1929) p. 398, refers to "Tel Keis", but only mentions it as an observeration point from which he viewed the landscape to the north.

Al-Qis, because of its remote location, has not suffered at the hands of stone looters like village sites elsewhere in the area.

In the ruins and on the slopes immediately below, a number of mosaic cubes were found. The dimensions of these stone and marble cubes suggest that they constituted a floor mosaic rather than wall decoration, although apparently a patterned pavement, judging by the colour range. There were also several pieces of fallen plaster with a thick coarse base embedded with basalt pebbles, while a smooth white plaster constituted the exposed surface. Similar plaster has been found elsewhere in the Ḥawrān, notably at Umm al-Surab and Umm al-Jimāl. On one of the bedouin graves a basalt block with a hollowed groove or channel had been used as a headstone: another stone bears the inscription "bism Allāh al-raḥmān al-raḥim", although this is probably of no great antiquity.

The site is rich in surface sherds. The date-ranges suggested by these for the occupation of al-Qis tend to match those for Umm al-Quṭṭayn and Hawshiyān, taken together, immediately to the north-east. There is also a similarity to Parker's tabulation for Dayr al-Kahf to the east.[69] The quantity of Late Byzantine/Umayyad and of Umayyad ceramics points to a significant use of al-Qis perhaps just before, and most assuredly during the early Islamic period until about the fall of the Umayyads in A.H. 132/A.D. 750. This occupation of al-Qis under the early Muslims and the Umayyads corresponds to the pattern at Umm al-Quṭṭayn, of which al-Qis was a dependency or outpost, as well as to al-Dafyāna to the west, and Dayr al-Kahf to the east. By contrast, Dayr al-Qinn, which lies to the north-east, shows no sign of Umayyad use. There seems to be an intensive early Islamic utilization of the eastern settlements of the Ḥawrān that corresponds to the emerging evidence from Umm al-Jimāl, and al-Bā'iq to the west, although the later is only attested by ceramic evidence.

The purpose of the small structure on Jabal al-Qis is not readily identifiable from the ruins. Although it must have served as a lookout point, the presence of a polychrome mosaic pavement, however limited, suggests a degree of luxury not expected in the functional circumstances of a fortified watchtower: it was also more extensive and complicated than the small Roman tower that we visited opposite to the Late Chalcolithic site at Jawa. While the orientation of the walls running east-west and the mosaic floor might suggest a chapel, no Crosses were found to confirm this, while the east end of the site is too strewn with masonry to allow the presence of an apse to be ascertained.

Muqā'is

Muqā'is is located on a hill west of al-Qis.[70] There is once again a good view of the surrounding country from the site. Traces of a single thick wall were noted and a large mound of basalt, very weathered and coated with lichen. The only artefact found is a possible Neolithic punch blade. There is no evidence of Roman, Byzantine or Islamic occupation.

Umm al-Quṭṭayn to Azraq (Fig. 7)

In 1980 we had been informed by Shaykh Muhammad Bakhit of Umm al-Quṭṭayn of a track that had been in use among people of the area to Azraq from Umm al-Quṭṭayn and al-Qis. Major points along the route were mentioned as follows:
Umm al-Quṭṭayn
Al-Qis
Al-Manāra
Bi'r Ḥūyanīt
Al-Manāsif
Al-Usaykhin
Azraq

In fact the route seems to have been adapted to use the IPC pipeline road between al-Manāra and a junction south to Bi'r Ḥūyanīt, while al-Usaykhin is too far

69. Parker, *loc. cit.*, p. 23.
70. Map ref. BR 723 746, sheet 3354 IV, series K737, ed. 1. Visited 21st July, 1981.

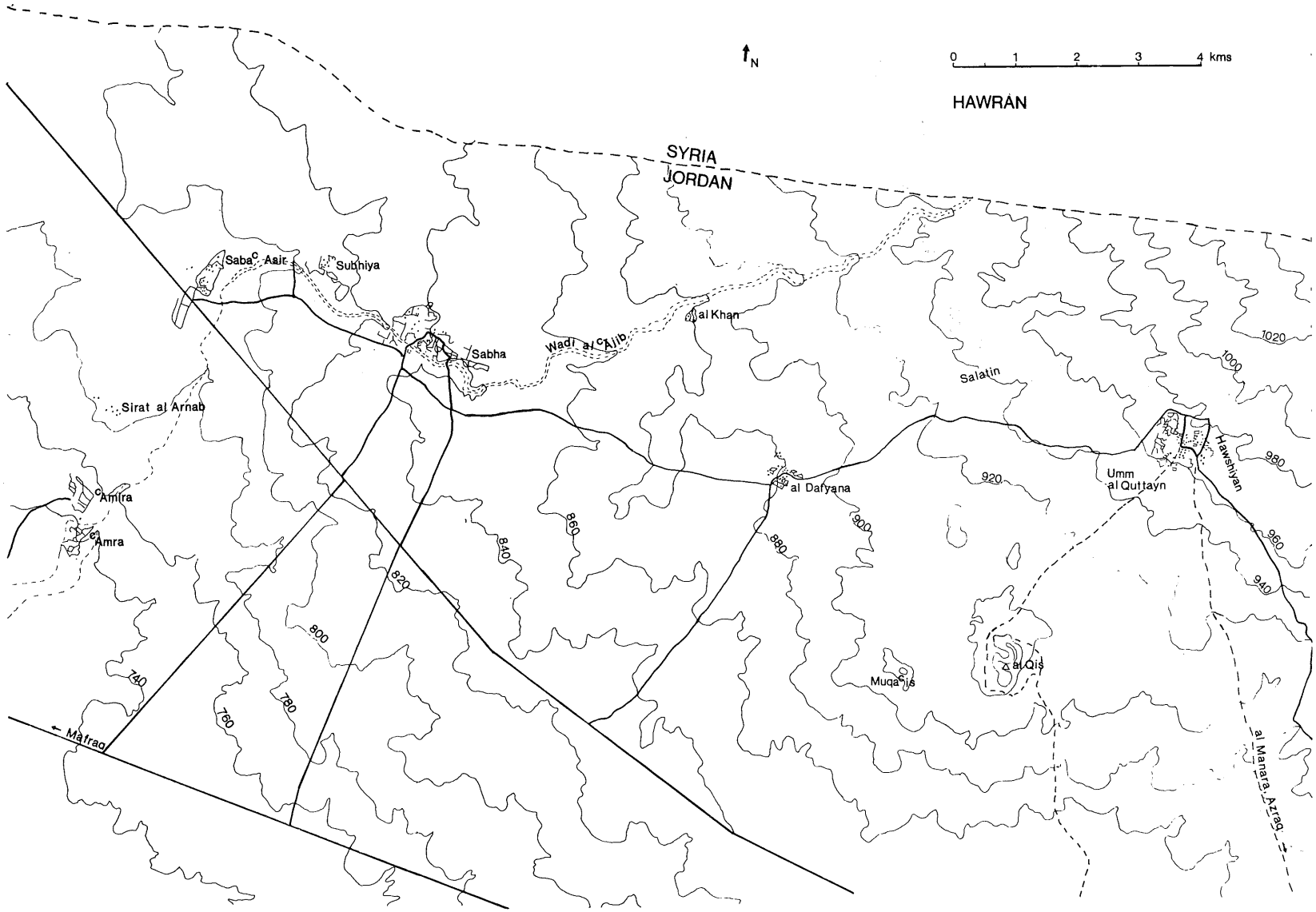

N
0 1 2 3 4 kms
HAWRAN
SYRIA
JORDAN
Saba ᶜAsir
Subhiya
Sabha
Wadi al ᶜAlib
al Khan
Salatin
Sirat al Arnab
ᶜAmira
ᶜAmra
al Dafyana
Umm al Quttayn
Hawshiyan
Muqaᶜis
al Qis
Mafraq
al Manara, Azraq
740
760
780
800
820
840
860
880
900
920
940
960
980
1000
1020

Fig. 7

east to be a place on the route rather than a position able to observe it. Shaykh Muhammad stressed to us that the route was comanded by points on high ground as it indeed is from al-Qis and al-Usaykhin and as it could be in the al-Manāsif area. We seem to be dealing with two separate routes, both possibly in use in antiquity. The north part of the route from Umm al-Quṭṭayn to al-Manāra seems to constitute a segment of a direct track from Umm al-Quṭṭayn to Azraq. The southern part of our route, following a track from the IPC pipeline road beside a raised water pipe to Azraq, is very rough as it crosses the *ḥarra* that stretches north and north-east of Azraq. This southern part of our route seems to follow the general alignment of a direct route from Dayr al-Kahf to Azraq and to which A. Poidebard referred as a Roman road between the two *castella.* [71] As to the route between Azraq, Umm al-Quṭṭayn and beyond, this has been discussed by Dr. D. L. Kennedy since our field expedition.[72]

On 21st July, 1981, we followed the route given to us by Shaykh Muhammad Bahkit from Umm al-Quṭṭayn to al-Qis and al-Manāra: we then continued along the asphalt road between Mafraq and H5 as far as a branch at Map Ref. BR950 595 where we followed tracks south-south-west past Bi'r Ḥuyanīt and east of Jabal al-Manāsif al-Gharbiyyah towards Azraq, generally beside the elevated water pipe: we omitted only al-Usaykhin which has been examined by Parker and Kennedy in recent years.

Al-Manāra

Al-Manāra[73] is 11.5 km. due south of Umm al-Quṭṭayn, on the north side of the Mafraq-H5 asphalt road: it lies north-west of Azraq at a distance of 48 kms. Al-Manāra consists of a modern building in basalt, two concrete buildings and a *birka.* Mr. Gharayba said that there had been more foundations of walls but these have now vanished: only a broken basalt threshold stone was noted and some wall-traces. Of the tower that the place name implies, there is no sign. However, it is important to note that Jabal al-Qis is visible in the north at 304° and Jabal a-Usaykhin can be seen to the south-south-east where the Roman *castellum* is one of the points controlling the northern Wadi al-Sirḥan and Azraq. Everything indicates that al-Manāra was a post for relaying signals between the Azraq area and the Ḥawrān and a way-station on the route from Azraq to Umm al-Quṭṭayn. The surface sherd evidence suggests that the site could have played these roles in the Roman, Byzantine and Islamic periods. The presence of numbers of sherds of the Roman and Early Byzantine periods accords with the notations of ceramics from Umm al-Quṭṭayn'/ Hawshiyān, al-Qis, and the evidence from Dayr al-Kahf and Azraq. This lends suport to Kennedy's association of Khirbat Umm al-Manāra (we were given only "al-Manāra") with Basiensa, a place on the Roman road from Azraq to Umm al-Quṭṭayn. It is important to stress that we found a *birka* at the site which Kennedy had assumed to have existed from a Latin inscription that he discusses.

The presence of Late Byzantine and Umayyad sherds at al-Manāra accords with the tabulation we have from the eastern Ḥawrān and the eastern desert of Jordan, and with the utilization of this entire desert area under the early Muslims. There is every reason to believe that a route from the northern Wadi al-Sirḥān and the Azraq basin through Umm al-Quṭṭayn and beyond was important for the Umayyads, given the disposition of their sites in eastern Jordan and Syria. The scatter of Mamlūk sherds conforms with the fact that, for them, Azraq and the Ḥawrān were quite important frontier areas, and a place like al-Manāra may well have continued to serve the Mamluk administration as a staging post when necessary.

71. A. Poidebard, *La Trace de Rome dans le Désert de Syrie,* Paris, 1934, p. 96-97 and map; also p. 54; p. 121.
72. Kennedy, *op. cit.,* p. 177-183.
73. Map ref. BR 764 669, sheet 3354 III, series K737. Visited 21st July, 1981.
N. Glueck, Explorations... IV, *AASOR,* XXV-XXVIII (1945-1949) p. 25.
Kennedy, *op. cit.,* p. 184-185.

Bi'r Ḥūyanīt (Pl. XCVII, 2)

The only site located in this vicinity is known as Bi'r Ḥūyanīt: there was no sign of a "Qasr el-Ḥuweinit"[74] mentioned on the 1:50,000 map of the area, and the bedouin knew of no such *qaṣr*. Bi'r Ḥūyanīt is a natural cavity in the rock lying to the east of the track. The cavity was dry at the time of our visit, but the smooth rock surface around the hole bore witness to the flow of water here in the rainy season. When the crevice fills with rainwater, a considerable amount must stand afterwards. A very tentative dating of stone artefacts from Bi'r Ḥūyanīt by Dr. Rollefson suggests a Chalcolithic or Early Bronze origin. Otherwise, the use of the water-hole over centuries has left no material record.

Rujm opposite Jabal al-Manāsif al-Gharbiyya

We had understood that there was a site or a posting place in the area of Jabal al-Manāsif al-Gharbiyya but we were unable to locate anything but a *rujm*[75] east of the Jabal in Wadi al-Manāsif. It is 18 kms. north of Azraq. Nothing further was noted on our route to Azraq.

East of the Ḥawrān: Wadi Muqāt and Qā' Abu al-Husayn

In the easternmost area of Jordan beyond the Ḥawrān and Azraq only a limited amount of field-research has concentrated on Roman and later periods. The most detailed analysis of a post-Roman buidling is that by Dr. H. Gaube dealing with Qaṣr Burquᶜ, reconstructed by the Umayyad Caliph al-Walīd b ᶜAbd al-Malik in A.H. 81/A.D. 700, while still *Amir* during his father's Caliphate.[76]

In the course of the first season,[77] we had examined Dayr al-Qinn to the north-east of Dayr al-Kahf. Although a cross was found incised on a stone, the sherd tabulation shows far more Roman material than Byzantine. In contrast with the other sites in the eastern Ḥawrān, Dayr al-Qinn shows no indication of Umayyad use. Continuing on to Jawa we noted a basalt-built rectangular tower on the summit of a hill north of the Late Chalcolithic site.[78] The tower is well constructed and appears to be Roman, judging by the predominance of sherds, with a few Early Byzantine wares; this accords with the reading for Dayr al-Qinn, Dayr al-Kahf, al-Hawshiyān, al-Qis and al-Manāra, although without the later occupations testifed at most of those other sites. The tower at Jawa, which very recently had been used for a bedouin burial, seems to have served as a forward position in the desert, well beyond the principle settlements and forts. A number of other towers seem to have existed further west: apart from the sites of al-Manāra and al-Qis which could have both served

74. Map ref. BR 948 583, sheet 3354 II, series K737. Visited 21st July, 1981.
75. Map ref. BR 919 469, sheet 3354 II, series K 737. Visited 21st July, 1981.
76. H. Gaube, An examination of the ruins of Qaṣr Burqu, *ADAJ,* XIX (1974) p. 93-100. See also; Aḥmad M. H. Shboul, On the later Arabic inscription in Qasr Burquᶜ, *ADAJ,* XX (1975) p. 95-98.
The present survey team visited Qaṣr Burquᶜ on 25th August, 1980 during the first season in the field.
77. Visited 27th August, 1980, during the first season in the field. See King, Preliminary Report..., *ADAJ,* XXVI (1982) p. 95.
78. Visited 27th August, 1980 during the first season in the field. S. W. Helms, Jawa excavations, 1975: third preliminary report, *Levant,* IX (1977); p. 23, mentions that a ground survey in the Jawa area as follows: "aceramic" flint sites; pre-Islamic sites indicated by Safaitic inscriptions and Roman Byzantine sherds; and Islamic sites indicated by bedouin occupation up to the present. F. V. Winnett (An epigraphical expedition to north-eastern Jordan, *BASOR,* 122 April, 1951 p. 49-52) noted Safaitic and Kufic inscriptions in the area around Jawa and argued that some Safaitic inscriptions from the district date to warfare with the Sassanians over Bosra in A.D. 614. The most recent fieldwork in the Jawa region attests Byzantine, early ᶜAbbāsid and later Islamic activity (M. C. A. Macdonald with a contribution by Ann Searight Macdonald, The inscriptions and rock-drawings of the Jawa area: a preliminary report on the first season of field-work of the corpus of inscriptions of Jordan project, *ADAJ,* 1982 p. 159-172).

effectively in a signalling system, a tower site was examined in 1980 at al-Jubaiya,[79] west of Dayr al-Kahf, where Butler had reported what he called a monastery tower: unfortunately it has collapsed or has been demolished. Butler also referred to a site called "Kôm il-Menârah", north of Umm al-Jimāl, and now in Syria:[80] there was a tower there which Butler regarded as being of great age. If these sites were indeed related, did they constitute a series of watch-towers or signal towers throughout the desert frontier district? If true, then the tower at Jawa represents one of the most advanced positions in the desert.

Wadi Muqāt and Qā' Abu al-Ḥusayn

In the first season in the field in 1980 we had examined Qaṣr Burquᶜ on the eastern edge of the *ḥarra*. Since it had been a residence of al-Walīd b. ᶜAbd al-Malik, it seemed useful to examine the country to the south. The practical exploitation of the desert areas by the Umayyads that we have seen elsewhere suggested that al-Walid's re-use of Qaṣr Burquᶜ with its water storage system might have had less to do with a princely desire for solitude in the basalt wasteland than with command of the route between northern Arabia and central Syria, and with the political relations of tribes with the Caliphate. Poidebard had proposed the existence of a route passing through Burquᶜ out of Arabia and into Syria in the Roman period, and if this putative route was of importance to the Romans, then it would have had still more relevance to the early Muslims, given the axis of power in the Umayyad state, and the concentration of their desert establishments in eastern Jordan and further north at Jabal Usays and Qaṣr al-Bayḍa, beyond which lay Damascus. There seems to be good reason for thinking that Burquᶜ itself and the area in which it is situated was regarded by the Umayyads as of major importance since it was al-Walid, eldest son and successor of the Caliph ᶜAbd al-Malik, who rebuilt it according to the inscription in his name. Burquᶜ was in a region that had belonged to the Bani Kalb, a tribe with whom the Umayyads had maintained close relations, although by the time that al-Walīd established himself at Qaṣr Burquᶜ, the Kalb may well have withdrawn to the southern Ghawr at the south end of the Dead Sea under Qaysite attack. The maintenance of the Umayyad alliance with the tribes of Bilād al-Shām required Umayyad family presence in and around the desert areas where their tribal power base rested: hence the Umayyad concern for eastern Jordan and water points like that at Burquᶜ. Routes out of Arabia like those from the Wadi al-Sirḥān through to the west and the north would have received attention in such an Umayyad alliance system. Within this proposed framework of a political geography of the area in the Umayyad period, it was decided in 1981 to make a preliminary exploration in the area south of Qaṣr Burquᶜ, following Wadi Muqāt (known locally as Wadi Umqat) to Qā' Abu al-Ḥusayn and as far as the Saᶜudi Arabian border.

Wadi Muqāt is a broad stream bed running south of H4, skirting the eastern edge of the *ḥarra* which extends westwards towards Azraq and the Ḥawrān. In summer the surfaces of the Wadi and the *Qiᶜan* of the area are hard and easy to cross by car, but in wet weather the entire region must become a quagmire, a view confirmed by those who have travelled in the district in winter. Eventually, the track southwards opens out into the Qā' Abu al-Ḥusayn. It is quite clear from our journey that passage from Arabia to the north along this route is indeed practical in dry weather and preferable to the difficulties of the *ḥarra* terrain to the west. Qaṣr Burquᶜ occupied an important position along this route into central Syria, with its dam holding water for much of the year after rain: however, by August 1980 the lake behind the dam had evaporated and the flies drawn by the mud were pestilential. To the south of Wadi Muqāt,

79. King, Preliminary report..., p. 94.
80. Butler, *op. cit.*, II. A. 2, p. 100.

two *rujum* were examined.

Rujm I

The more northern *rujm*[81] examined is set immediately west of Wadi Muqāt on the top of the *ḥarra.* It is surrounded by Safaitic inscriptions and drawings on the rocks. The stone artefacts collected are discussed by Dr. Rollefson below.

Rujm II

The Second *rujm* to the south[82] overlooks Qā' Abu al-Ḥusayn itself, prominently set on the edge of the *ḥarra.* This *rujm* is also surrounded by Safaitic inscriptions and rock drawings, and a number of stone artefacts were also located. The ceramics collected were particularly important: although only a limited scatter of body sherds was found, the reading is very interesting, including Roman, Byzantine and Umayyad material. Among the Umayyad wares is a sherd with red paint on white wash. Obviously such a small scatter of of body sherds must be treated with reservation, but nevertheless, evidence is provided of Umayyad period use of the area. This evidence takes on greater significance in view of the presence of al-Walīd's Qaṣr Burqu' to the north and the possible Umayyad date of a ruined building at Dawqira to the south within Sa'udi Arabia.[83] Despite the fact that a Ghassanid date has been recently suggested for the Dawqira building,[84] the possibility that it remained in use in the early Islamic period is also plausible. If this is indeed the case, then it would be possible to relate Dawqira and Qaṣr Burqu' to a route running east of the northern Wadi al-Sirḥān from the general direction of al-Jawf and along the edge of the *ḥarra,* rather than to the Umayyad sites to the west in the immediate vicinity of Azraq. As far as desert routes into central Syria are concerned, the area of Wadi Muqāt and and Wadi al-Sirḥān seems to have retained importance into recent times. The activities of the Wahhābi forces in the late 18th century and their successors, the Ikhwan, in the early 20th century, are still recalled in the region and reflect the importance to any Arabia-centric power of these internal desert routes into Bilād al-Shām. The use of these routes in recent times must have been matched in the early Islamic period by an Arab Caliphate that could range freely in the marginal and desert areas in a way that neither Romans nor Byzantines had been able. In this respect, the Umayyads were the successors of the Nabataeans and Ghassanids who had both exercised their power in very different circumstances over districts that the Mārwanis subsequently were to favour.

Part II: Preliminary Pottery Report, First (1980) and Second (1981) Seasons (C. J. Lenzen)

This preliminary report on the pottery from the Survey covers the material from the Ḥawrān and the areas of the eastern Jordanian desert. The Survey was objective-specific in nature as regards the collection of sherds, although sherds were also gathered comprehensively to avoid a distortion of the occupation horizon or the sites examined. Where the architectural features of a site were distinctive, the pottery was collected in association with that particular structure. By definition, none of the pottery originates in a controlled stratigraphic context. The dating of the pottery is therefore dependent on comparison with published corpora. At the same time it should be noted that there is a lack of published parallels relating to much of the Byzantine and Umayyad pottery from stratified sites

81. Map. ref. DR 149 539, sheet 3654 III, ed. 1. Visited 22nd July, 1981.
82. Map ref. DR 144 516, sheet 3654 III, ed. 1. Visited 22nd July, 1981.
83. Florence E. Day, in Field, *op. cit.,* 158-160; E. V. Winnett and W. L. Reed, *Ancient Records from North Arabia,* Toronto, 1970, p. 4-5.
84. Robert McC. Adams, P. J. Parr, Muhammad Ibrahim, 'Ali S. al-Mughannum, Saudi Arabian Archaeological Reconnaissance 1976: the Preliminary Report on the first phase of the Comprehensive Archaeological Survey Program, *ATLAL,* I (1397/1977) p. 37.

in Jordan and Syria, the areas where there would be the closest comparisons with the Ḥawrān pottery in particular. As for the Mamlūk calls, some of these may eventually prove to be Mamlūk/Ottoman, but at this stage it seems premature to so designate surface collected sherds without established stratigraphy. Because of the preliminary nature of this report, broad categories are used for the identification of periods. The dates are those proposed by Dr. James A. Sauer.[85] It is intended to publish drawings and photographs as well as comparative material at a later date. (See also "Observations on the ceramics" [G. King] below.)

Abbreviations

EB	Early Bronze
MB	Middle Bronze
LB	Late Bronze
I^1	Iron I
I^2	Iron II
Nab.	Nabataean
R/Nab	Roman-Nabataean
R	Roman
ER	Early Roman
LR	Late Roman
Byz	Byzantine
EByz	Early Byzantine
LByz	Late Byzantine
LByz/Um	Late Byzantine-Umayyad
Um	Umayyad
Ay/Mam	Ayyūbid/Mamlūk
Mam	Mamlūk
Ot	Ottoman
Mod	Modern
UD	Undifferentiated or unknown

Tabulation

Section 1: Eastern Desert

1. Qaṣr al-Mushāsh

I. Small enclosure, *qaṣr,* QM1
UD: 4 (body sherds)
Byz/Um: 35 (32 body sherds)
Um: 4 (3 body sherds)
Total: 43
Body Sherds 91%

IA. Vicinity of graves, east of small enclosure, *qaṣr,* QM4
UD: 11 (body sherds)
Um: 114 (107 body sherds)
Total: 125
Body sherds: 94%

III. Large enclosure/*birka* QM2
UD: 1 (body sherd)
Byz/Um: 3 (body sherds)
Um: 23 (21 body sherds)
Total: 27
Body sherds: 93%

IV. Furnance, bath QM3
UD: 1
Byz: 2 (body sherds)
LByz/Um: 14 (body sherds)
Um: 42 (29 body sherds)
Mod: 1

85. James A. Sauer, *Heshbon Pottery 1971,* Andrews University Press, Michigan, 1973, p. 1-5. idem, The pottery of Jordan in the early Islamic Periods, *Studies in the History and Archaeology of Jordan,* ed. Dr. Adnan Hadidi, Amman, 1982, I, p. 329-337.

Total: 60
Body sherds: 75%

IVA. West of bath QM5
UD:1
Um: 33 (body sherds)
Mam: 1 (body sherd)
Total: 35
Body sherds: 97%

V. *Birka*
UD: 1 (body sherd)
Um: 30 (28 body sherds)
Total: 31
Body sherds: 94%

VI. Wall, north bank of Wadi al-Mushāsh
Um: 5 (body sherds)
Total: 5
Body sherds: 100%

VII. Wall traces, *wadi* B
LByz/Um: 21 (19 body sherds)
Um: 12 (body sherds)
Total: 33
Body sherds: 94%

VIII. Rectangular enclosure, *wadi* B
UD: 1 (body sherd)
Um: 11 (body sherds)
Total: 12
Body sherds: 100%

XI. Terraced enclosures, *wadi C*
UD: 2 (body sherds)
UM: 14 (12 body sherds)
Total: 16
Body sherds: 88%

XIV. Water Storage tank, *wadi* C^2
Um: 1 (body sherd)
Total: 1
Body sherds: 100%

2. An installation towards Qaṣr al-Ḥarāna
Byz: 53 (50 body sherds)
LByz/: 6 (5 body sherds)
LByz/Um: 3 (1 body sherd)
Um: 6 (body sherds)
Ot: 1 (body sherd)
Total: 69
Body sherds: 91%

3. Al-Jilāt

I. South of dams
UD: 1
Byz: 3 (body sherds)
EByz: 2
LByz: 3 (body sherds)
LByz/Um: 35 (body sherds)
Um: 4 (3 body sherds)
Total: 48
Body sherds: 92%

II. Principle dam
R: 1 (body sherd)
Byz: 1 (body sherd)
Um: 9 (body sherds)
Total: 11
Body sherds: 100%

4. Qaṣr Bayer
UD: 42 (40 body sherds)
I²: 1 (body sherd)
Nab: 94 (59 body sherds)
R/Nab: 86 (82 body sherds)
R: 192 (176 body sherds)
ER: 8 (body sherds)
LR/EByz: 64 (58 body sherds)
Total: 487
Body sherds: 87%

5. Umm al-Walid (eastern sector of ancient town)
UD: 10 (9 body sherds)
I²: 7 (body sherds)
R: 6 (body sherds)
ER: 5 (2 body sherds)
LR/EByz: 32 (body sherds)
Byz: 4 (body sherds)
EByz: 15 (11 body sherds)
Um: 4 (body sherds)
Ay/Mam: 1 (body sherds)
Mam: 26 (13 body sherds)
Mod. 1 (body sherd)
Total: 111
Body sherds: 81%

Section 2: The Ḥawrān

6. Jābir
UD: 3 (body sherds)
ER: 2 (body sherds)
Byz: 5 (body sherds)
EByz: 1 (body sherd)
LByz: 1 (body sherd)
Um: 6 (5 body sherds)
Mam: 1 (body sherd)

Total 19
Body sherds: 95%

7. Samā

I. Area of St. George's Church (SamI)
UD: 2 (body sherds)
I²?: 1 (body sherd)
R: 4 (1 body sherd)
ER: 3 (2 body sherds)
LR: 1 (body sherd)
Byz: 21 (19 body sherds)
EByz: 3
LByz: 10 (7 body sherds)
LByz/Um: 5 (body sherds)
Um: 9 (body sherds)
Mam: 2 (body sherd)
Ot: 2 (body sherds)
Mod: 2 (1 body sherd)
Total 65
Body sherds: 79%

II. Area south of St. George's Church (Sam2)
UD: 2 (body sherds)
ER: 2 (1 body sherd)
LR: 1 (body sherd)
Byz: 6 (body sherds)
EByz: 1
LByz: 1
Um: 5 (body sherds)
Mam: 15 (10 body sherds)
Ot: 1 (body sherd)
Total 34
Body sherds: 77%

III. Apsidal building, north sector, Samā (Sam3)
UD: 1 (body sherd)
I²: 1 (body sherd)
ER: 2 (1 body sherd)
Total: 4
Body sherds: 75%

8. Umm al-Surab

I. General central area (US4)
UD: 3 (body sherds)
R: 1 (body sherd)
EByz: 8 (5 body sherds)
LByz: 7 (5 body sherds)
Byz: 2 (1 body sherd)
Um: 3 (body sherds)
Mam: 3 (body sherds)
Mam/Ot: 1 (body sherd)
Total: 28
Body sherds: 79%

II. Southeast area (US6)
UD: 2 (1 body sherd)
R: 15 (13 body sherds)
ER: 3
LR/EByz: 4 (body sherds)
Byz: 2
EByz: 17 (body sherds)
Um: 7 (4 body sherds)
Mam: 7 (6 body sherds)
Mod: 1
Total: 58
Body Sherds: 78%

III. Building complex north of Sts. Sergius and Bacchus (US2)
UD: 18 (body sherds)
R: 1 (body sherd)
Byz: 4 (2 body sherds)
EByz: 8 (1 body sherd)
LByz: 5 (4 body sherds)
Byz/Um: 1 (body sherd)
Um: 2 (body sherds)
Mam: 9 (7 body sherds)
Total: 48
Body sherds: 75%

IV. Sts. Sergius and Bacchus (US3)
Um: 1
Mam: 5 (4 body sherds)
Total: 6
Body sherds: 67%

V. West Church area (US1)
UD: 21 (19 body sherds)
MB/LB: 1 (body sherd)
I²: 1
R: 14 (body sherds)
ER: 5 (body sherds)
LR: 13 (12 body sherds)
LR/EByz: 15 (13 body sherds)
Byz: 74 (59 body sherds)
EByz: 21 (3 body sherds)
LByz: 21 (18 body sherds)
LByz/Um: 8 (4 body sherds)
Um: 9 (4 body sherds)
Mam: 42 (31 body sherds)
Ot: 1
Mod: 2
Total: 248
Body sherds: 74%

VI. House-courtyard, w.s.w. of West Church (US5)
R: 2 (1 body sherd)
Byz: 40 (37 body sherds)
EByz: 1
LByz: 4 (3 body sherds)

LByz/Um: 1 (body sherd)
Mam: 8 (body sherds)
Total: 56
Body sherds: 89%

9. Ṣīrat al-Arnab
UD: 25 (body sherds)
I²: 4 (body sherds)
LR: 4 (body sherds)
Byz: 18 (body sherds)
EByz: 4
Um: 4 (3 body sherds)
Total: 59
Body sherds: 92%

10. Saba^{c} Aṣīr/Saba^{c} Ṣiyār
UD: 3 (body sherds)
R: 7 (6 body sherds)
ER: 1 (body sherd)
LR: 8 (7 body sherds)
LR/EByz: 1
Byz: 71 (64 body sherds)
EByz: 14 (7 body sherds)
LByz: 15 (13 body sherds)
Mod: 4 (3 body sherds)
Total: 124
Body sherds: 84%

11. Ṣabḥa

I. Southern area (Sab1)
UD: 4 (3 body sherds)
R: 1 (body sherd)
Byz: 6 (3 body sherds)
EByz: 1 (body sherd)
LByz: 2
Byz/Um: 2 (1 body sherd)
Um: 10 (8 body sherds)
Mam: 2 (1 body sherd)
Mod: 1
Total: 29
Body sherds: 62%

II. Vicinity of South Church (Sab2)
UD: 21 (20 body sherds)
R: 5 (body sherds)
LR: 3
LR/EByz: 55 (54 body sherds)
Byz: 37 (31 body sherds)
Ebyz: 8 (1 body sherd)
LByz: 11 (7 body sherds)
LByz/Um: 4 (3 body sherds)
Um: 16 (10 body sherds)
Mam: 9 (6 body sherds)

Ot?: 1 (body sherd)
Total: 170
Body sherds: 81%

III. Vicinity of North Church (Sab3)
UD: 9 (body sherds)
R: 13 (12 body sherds)
ER: 3 (2 body sherds)
LR: 2
LR/EByz: 28 (27 body sherds)
Byz: 10 (3 body sherds)
Ebyz: 14 (3 body sherds)
LByz: 5 (2 body sherds)
LByz/Um: 14 (11 body sherds)
Um: 9 (8 body sherds)
Mam: 1 (body sherd)
Mod: 2 (1 body sherd)
Total: 110
Body sherds: 72%

IV. Northern area (Sab4)
Byz: 11 (10 body sherds)
EByz: 1
LByz: 3 (body sherds)
Um: 1 (body sherd)
Total: 16
Body sherds: 88%

12. Al-Khān
UD: 4 (body sherds)
R: 59 (48 body sherds)
ER: 1 (body sherd)
LR: 1
LR/EByz: 19 (8 body sherds)
EByz: 19 (18 body sherds)
Total: 92
Body sherds: 86%

13. Al-Dafyāna
UD: 16 (body sherds)
R: 11 (8 body sherds)
ER: 3
LR: 1
LR/EByz: 1 (body sherd)
Byz: 6 (body sherds)
EByz: 18 (14 body sherds)
LByz: 18 (15 body sherds)
LByz/Um: 38 (body sherds)
Um: 32 (26 body sherds)
Ay/Mam: 2 (body sherds)
Mam: 3 (body sherds)
Total: 149
Body sherds: 87%

14. Salatīn (Khisha Salatīn, al-Manshiyya)
UD: 4 (3 body sherds)
EB?: 15 (body sherds)
I²: 2 (body sherds)
Nab: 2 (body sherds)
R: 105 (104 body sherds)
ER: 5
LR: 20
R/EByz: 2
EByz: 10 (body sherds)
Mod: 1 (body sherd)
Total: 166
Body sherds: 83%

15. Umm al-Quṭṭayn

I. Vicinity of "Dayr" (UQ1, UQ2, UQ5)
UD: 30 (28 body sherds)
EB: 3 (body sherds)
I²: 1
R: 5 (3 body sherds)
LR: 5 (2 body sherds)
LR/EByz: 75 (74 body sherds)
Byz: 75 (68 body sherds)
EByz: 21 (10 body sherds)
LByz: 12 (9 body sherds)
LByz/Um: 2 (body sherds)
Um: 69 (52 body sherds)
Mam: 25 (24 body sherds)
Mod: 3 (2 body sherds)
Total: 327
Body sherds: 85%

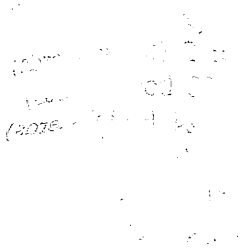
II. West of "Dayr" (UQ3)
UD: 8 (7 body sherds)
Byz: 2 (body sherds)
EByz: 2
LByz: 5 (1 body sherds)
Um: 13 (8 body sherds)
Mam: 9 (6 body sherds)
Ot: 1 (body sherd)
Mod: 2 (1 body sherd)
Total: 42
Body sherds: 62%

III. South Church Vicinity (UQ6)
UD: 5 (body sherds)
I²: 1 (body sherd)
R: 26 (23 body sherds)
ER: 1
LR: 8 (3 body sherds)
LR/EByz: 36 (body sherds)
Byz: 24 (23 body sherds)
EByz: 8 (1 body sherd)

LByz: 22 (20 body sherds)
LByz/Um: 11 (10 body sherds)
Um: 18 (5 body sherds)
Ot: 1
Total: 161
Body sherds: 79%

IV. East Church (UQ7)
Byz: 3 (1 body sherd)
EByz: 6 (5 body sherds)
LByz: 1
Total: 10
Body sherds: 60%

V. North-east Church (UQ8)
UD: 2 (body sherds)
I^2: 1 (body sherd)
R: 3
LR: 1
LR/EByz: 5 (body sherds)
Byz: 15 (body sherds)
EByz: 1
LByz: 3 (1 body sherd)
LByz/Um: 1 (body sherd)
Um: 5 (4 body sherds)
Ay/Mam: 1
Mam: 8 (7 body sherds)
Mod: 1
Total: 47
Body sherds: 77%



16. Hawshiyān
UD: 4 (body sherds)
EB: 138 (body sherds: 9 EB^1 grain wash body sherds)
I^1: 4 (3 body sherds)
I^1/I^2: 93 (88 body sherds)
R: 88 (body sherds)
LR/EByz: 11 (10 body sherds)
Byz: 4 (body sherds)
EByz: 8 (6 body sherds)
Ay/Mam: 1 (body sherd)
Mod: 1 (body sherd)
Total: 352
Body sherd: 97%

17. Al-Qis (al-Qays)
UD: 58 (body sherds)
R: 21 (19 body sherds)
ER: 5 (body sherds)
Byz: 36 (32 body sherds)
EByz: 15 (12 body sherds)
LByz: 5 (2 body sherds)
LByz/Um: 45 (44 body sherds)
Um: 27 (23 body sherds)

Mam: 1 (body sherd)
Mod: 1
Total: 214
Body sherds: 92%

18. Dayr al-Qinn
UD: 11 (body sherds)
I²: 2
R: 51 (44 body sherds)
ER: 6 (body sherds)
LR: 61 (36 body sherds)
LR/EByz: 3 (2 body sherds)
Byz: 3 (body sherds)
EByz: 8 (5 body sherds)
Total: 145
Body sherds: 74%

19. Al-Manāra
UD: 10 (9 body sherds)
R: 10 (8 body sherds)
LR: 2
LR/EByz: 19 (body sherds)
Byz: 50 (body sherds)
EByz: 27 (24 body sherds)
LByz: 1 (body sherd)
LByz/Um: 10 (7 body sherds)
Um: 8 (body sherds)
Mam: 5 (body sherds)
Total: 142
Body sherds: 92%

20. Bi'r Ḥuyanīt
UD: 4 (body sherds)
Ot: 1
Total: 5
Body sherds: 80%

21. Jawa
I. Tower
UD: 6 (body sherds)
R: 5 (3 body sherds)
LR: 32 (27 body sherds)
LR/EByz: 1 (body sherd)
EByz: 5 (body sherds)
Total: 49
Body sherds: 86%

II. Tower vicinity
UD: 14 (body sherds)
EB: 2 (body sherds)
I²: 13 (body sherds)
R: 7 (5 body sherds)
Total: 36
Body sherds: 94%

22. Qā' Abu al-Ḥusayn, Rujm II
R: 3 (2 body sherds)
LR/EByz: 2 body sherds)
Byz: 1 (body sherd)
Um: 4 (body sherds)
Total: 10
Body sherds: 90%

Other Material Cultural Remains

1. Qaṣr al-Mushāsh
3 UD glass body sherds

Installation IV:
Fragmentary white to greyish white marble panels, one piece coarse finished, the remainder polished on each face, in the following thicknesses:
1 piece 9 mm.
1 piece 12 mm.
2 pieces 14 mm.
1 piece 15 mm.
6 pieces 16 mm.
7 pieces 17 mm.
4 pieces 18 mm.
2 pieces 20 mm.

24 pieces (total)

Of the above, 2 pieces with flat edges; 3 pieces with rounded edges; 1 piece with one rounded edge and 2 flat edges.
White plaster (3 pieces). Thickness 18 mm.; 31 mm; 34 mm.

Installation VIII:
Fragmentary white to greyish white marble panel, polished on each face, thickness 18 mm.

Installation XI:
Fragmentary marble panels, polished on each face, in the following thickness:
1 piece 17 mm. (white with greenish grey veining)
1 piece 20 mm. (greyish; flat edge)

2 pieces (total)

7. Samā

Mosaic cubes:
Area of St. George's Church (Sam1)
All stone or marble: 1 white; 1 grey; 2 light grey; 2 pink; 2 pinkish white; 3 pinkish grey; 1 v. pale brown; total 12.

"Apsidal" building, north sector, Samā
(Stone: 1 pink; total 1)

8. Umm al-Surab
1 UD glass body sherd
Goblet base fragment (LByz?)
2 Cobalt blue body sherds
1 base, glass (Mod.)
Mosaic cubes:
South-east area (US6)
All stone or marble: 1 white; 2 pink; 2 v. pale brown; total 5
West Church area (US1)
All stone or marble: 1 white; 3 light grey; 2 pink; 3 pinkish white; 4 v. pale brown; total 13.

From the roofing of a room in the ecclesiastical structure against the north face, tower of Sts. Sergius and Bacchus:
Stone, marble and glass: 3 white; 7 grey; 13 light grey; 2 dark grey; 1 v. dark grey; 10 pink; 55 pinkish white; 10 red; 24 weak red; 3 pale red; 3 light

red; 1 dusky red; 15 reddish yellow; 1 reddish brown; 2 v. pale brown; 7 light brown; 2 pale blue (glass); 1 dark blue (glass); 2 green (glass); total 162.

11. Sabḥā
Mosaic cubes:
I. Southern area (Sab1)
Stone; 1 v. pale brown; total 1
II. Vicinity of South Church (Sab2)
Stone; 1 pink; total 1
III. Vicinity of North Church (Sab3)
All stone or marble: 3 grey; 6 pink; 7 pinkish white; total 16

15. Umm al-Quṭṭayn
South Church
Brick or roof tile, reddish brown; maximum thickness 46 mm.

Mosaic cubes:
Vicinity of *Dayr* (UQ5)
Stone or marble; 1 pink; 1 light green; total 2.
North-east Church (UQ8)
Stone: 1 pink; total 1.

17. Al-Qis
2 UD glass body sherds
2 glass base fragments (goblets?), LByz?
1 UD metal fragment

Plaster:
6 pieces, smooth surface; basalt pebbles mixed in. Maximum thicknesses; 6 mm.; 13 mm.; 15 mm.; 28 mm.; 32 mm.; 34 mm.

Mosaic Cubes:
All stone or marble: 3 white; 1 grey; 1 light grey; 1 pink; 1 pinkish grey; 2 weak red; 1 light reddish brown; 1 v. pale brown; total 11.

19. Al-Manāra
1 glass rim, Byz?

20. Bi'r Ḥūyanīt
1 Turkish pipe fragment

Observations On The Ceramics (Geoffrey King)

Some comment is necessary on the procedure of sherd collection adopted, its limitations and some of the implications of the material tabulated here. The fact that the Survey is directed towards the transition between the Byzantine and early Islamic periods in Jordan and the subsequent occupation of sites later in the Islamic period, has obviously influenced to some extent the process of surface sherd collection. Nevertheless, it must be stressed that, to achieve a coherent historical overview, we have gathered sherds in the field without differentiation as much as possible. Given the nature of many of these sites, with partial re-occupation established in modern times, and very often with localized scatters of wares of a certain period, it has not been practical to adopt a procedure involving random squares: indeed, this would have been especially fruitless for the collection of later Islamic wares, which frequently occur in limited scatters in restricted parts of the sites.

Any survey results from work in Jordan now must consider that in certain instances, the field team is dealing with a residue of surface sherds left by earlier expeditions, or even a residue left after amateur sherding. Modern activity on the sites disturbs the surface still more. The effects of this process are not so obvious in the desert areas examined, or in most Ḥawrān sites, but are more pronounced in other parts of the country. These caveats

are important to add for they introduce variable elements between the results of this Survey and those done in the past over and above emphases that may arise from period-specific interests.

As the sherd evidence from the desert sites has been discussed in Part I of this Report, no further remarks are necessary. Some additional points should be made concerning our work in the Ḥawrān where a quite consistent picture of the occupation range emerges. There is sporadic indication of Early, Middle and Late Bronze occupation, with Early Bronze wares particularly prevalent at Hawshiyān. A very slight, but nonetheless persistent indication of Iron I and II occupation appears at certain sites in the area. This Bronze and Iron ceramic evidence suggests that the Ḥawrān deserves examination from this earlier historical perspective. The lack of Nabataean wares in the same area is remarkable and surprising in view of the epigraphic evidence of Nabataean occupation: Glueck had long ago discussed this issue after finding none of the distinctive Nabataean wares that he had expected at Umm al-Jimāl. Throughout the Ḥawrān sites surveyed there is evidence of Roman period settlement followed by major Byzantine period occupation. The dated churches at Umm al-Jimāl, Umm al-Surab and elsewhere in the area are well-known and the indication of an efflorescence in the fourth and fifth centuries A.D. that they provide is reinforced by numerous undated churches and epigraphic evidence: the quantity of Byzantine sherds found matches this impression of great activity throughout the period, in both the Early and the Late Byzantine phases. Sherd evidence also demonstrates Byzantine period occupation at sites lacking architectural or epigraphic remains. In general, the proportion of Early and Late Byzantine wares is too evenly balanced to permit a fine distinction of the more important phase within the period as a whole.

Sites still occupied in a substantial way in the Late Byzantine period were often still occupied in the Umayyad period; major examples of this situation are to be identified at Samā, Umm al-Surab, Ṣabḥā, al-Dafyāna, Umm al-Quttayn and al-Qis. This significant occupation of the Ḥawrān sites in the Umayyad period is a point that has received little or no attention hitherto in discussions of the Umayyad presence in the region. It seems likely that in many cases, this early Islamic occupation was a direct continuation of Late Byzantine settlements: such may be the case at Umm al-Quttayn, al-Dafyāna and Ṣabḥā, all quite large places in the Byzantine period. These eastern Hawran sites are stressed because of the weight of evidence available from them, but the same situation probably occurred in the western sites of the Ḥawrān, where the excavations at Umm al-Jimāl have revealed an unexpected Umayyad settlement.[86] Nor is this evidence of early Islamic urban occupation restricted to the Ḥawrān, for increasing information is emerging of a major Umayyad occupation at Jarash and at Abila/Qwailbah in northern Jordan.[87] In the Ḥawrān the evidence for the early Islamic period is too sustained to be treated as the consequence of small-scale settlement or the result of the passage of mere itinerant groups. It seems very likely that our understanding of the extent and degree of habitation in the early Islamic period in the district and its neighborhood will develop considerably in the coming years with important consequences for our view of the early Caliphate and its settlement pattern.

Finally, some comment should be made on the later Islamic ceramics, mainly Ayyūbid/Mamlūk or Mamlūk as far as presently understood, although as Dr. Lenzen points out, some sherds tabulated may prove to be Mamlūk/Ottoman. First of all, the quantities of later Islamic wares

86. Bert de Vries, The Umm el-Jimal Project 1972-1977, *ADAJ,* XXVI (1982) p. 97-116.

87. W. Harold Mare, C. J. Lenzen, Michael J. Fuller, Myra A. Mare and Abrahm Terian, The Decapolis Survey Project: Abila, 1980, *ADAJ,* XXVI (1982) p. 37-65.
The latest excavations at Jerash are unpublished, but I am indebted to Dr. Asim Barghouthi for his observation on his own work there.

are far fewer than those of earlier periods; the centuries of non-occupation or vastly reduced occupation that seem to have intervened in the Ḥawrān from about the time of the ending of the Umayyad Caliphate to the Ayyūbid-Mamlūk period are followed by scant and limited later Islamic occupation at the ancient sites, to judge by the ceramic evidence. For example, at Umm al-Surab, a certain number of Mamlūk wares were located throughout the site, but in general in lesser quantities than in earlier periods, the Byzantine in particular: however, a concentration of Mamlūk sherds was found in the vicinity of the West Church, in the neighbourhood of well-preserved buildings in the western part of the site. A similar local distribution of Mamlūk sherds within the site as a whole was noted at Samā in the area south of St. George's church; a second more sparse scatter of Mamlūk and Ottoman wares was noted at another locality near the church of St. George. Further east at Ṣabḥā scatters of Mamlūk wares seem to reflect a use of the site that was more limited than earlier occupations, while a still slighter scatter of these later Islamic wares was found at al-Dafyāna. At certain *loci* within Umm al-Quṭṭayn, there is a sparse distribution of Ayyūbid/Mamlūk and Mamlūk wares, whereas in the vicinity of the *Dayr* at the same site an exceptional concentration of Mamlūk sherds was noted. It is to be hoped that this issue of Later Islamic occupation will eventually be elucidated by excavations in the area; so far, there is a *prima facie* case for suggesting that the later Islamic re-occupation of these (abandoned?) sites was often slight and limited; where more concentrated, the later occupation was usually confined to a particular part of the ancient site, rather than spread over the site as a whole. In certain cases, we have found Later Islamic wares in association with well constructed buildings of the traditional Ḥawrān type. In the Ḥawrān, one rapidly learns caution in dating domestic architecture, deceiptfully well does later construction, so even of the 20th century, imitate the Roman and Byzantine structural techniques with re-used ancient materials. Notwithstanding this caution, the persistent coincidence of Later Islamic wares with well-constructed buildings in a good state of preservation, leads one to suppose that some of these structures may indeed belong to the same period as the sherds around them: buildings in this category were noted at Umm al-Surab, Umm al-Quṭṭayn and sites south of Madaba.

Part III: Report on Chipped Stone Artefacts from Certain Sites from the Second (1981) Season (G. O. Rollefson)

Qaṣr al-Mushāsh:

Qaṣr I:

A. 3 blades and 3 flakes (total = 16). No tools. On the blades, two have punch platforms and one has a steep cortical platform.
The age of this collection is not clear, but certainly it would be Neolithic or later, most likely the latter.

Installation XI:

1 punch flake... Pre-pottery Neolithic B (PPNB) or later.

Installation XII:

1 probably Neolithic blade.

Installation XIII:

1 flake: 4 blades (1 bidirectional; 1 punch platform, 2 plain steep platforms). Probably all are Neolithic or later.

Wadi al-Jilāt Dams:

A. 5 cores: 1 microblade core
3 keel-backed bidirectional blade cores
1 "Neo-Levallois" flake core.
29 blades
9 flakes (2 pieces exhibit heat treatment)

43 pieces total

B. Of the 43 pieces, 7 are tools which

include:
1 core tool...a chopping tool
5 burins... 1 dihedral straight burin (graver)
2 opposed burins on concave. truncations
1 burin on straight truncation
1 bilateral burin on an unknown platform (broken)
1 projectile point... possibly a shouldered point, but there is a proximal snap with a distal impact burin.

C. Comments:
All of the above pieces are PPNB in date, *ca.* seventh millenium B.C. Three of the flakes are *lames de degagement* (core renewal flakes), one of which may have been utilized in some unknown manner. On the blades, 10 exhibit punch platforms and one has a steep simple facet platform (the other platforms are broken off). 5 of the blades are naturally backed (i.e., one lateral edge is sharp, but the opposing edge is vertical and covered with cortex).

In addition to the 43 pieces discussed above, there is also one blade which is much older in appearance, with evidence of heavy rolling or wind erosion and a dark patina. It is triangular in cross-section, and has a steep single-facet platform. Possibly this piece dates to the Upper Paleolithic (probably somewhere between 30-15,000 B.C.)

Sirat al-Arnab:

1 blade, unidirectional and naturally backed, with plain platform. This blade has been retouched to produce a combination tool: an endscraper plus a lateral denticulate.
The age of the specimen is not certain, but it is possibly Neolithic.

Muqaʿis:
1 punch blade, Neolithic (?)

Bi'r Ḥūyanīt:

A. 1 flake
3 blade fragments
2 pieces debris
6 pieces total

B. Of the above 6 pieces, there is one tool:
1 serrated end-scraper + sidescraper... this piece has double patina.

C. Comments: The age of these pieces is quite uncertain, especially since the sample is so small and the tool is not diagnostic. Since none of the pieces exhibits desert varnish, this may indicate a Chalcolithic or Early Bronze Age date, yet this would be a very tenuous assignment.

Qā' Abu al-Ḥusayn, Rujm I:

A. 12 blades
6 flakes

18 pieces total

B. Of the above 18 pieces, 4 are tools:
2 endscrapers...one is a double endscraper
1 scraper...double convex racloir, which exhibits double patina, indicating re-use long after an original discarding.
1 burin...a bilteral burin on an unknown platform (broken). Two of the blades *may* be natural and therefore not artefacts at all.

All of the material seems to be PPNB in age although the double racloir (scraper) may be older originally, and the multi-faced blade may in fact date to the Middle Paleolithic (probably in the 50-35,000 years range).

Qā' Abu al-Ḥusayn, Rujm II:

A. 5 blades and blade segments
7 flakes

12 pieces total

B. Of the above 12 pieces none are tools or cores.

C. Comments: Because there are no diagnostic elements in this small

collection, it is difficult to determine a date for the material. On the basis of the desert varnish patina (which has affected 10 of the pieces) and the comparisons of the lithic technology with other "dated sites" in the area, it might be predicted that they are PPNB in age, although this would have to be tempered with some skepticism.

One of the flakes is a *lame de degagement.* One flake has a punch platform, and all other platforms are single facet and steep. All of the blades were produced by normal blade technique.

Two of the flakes are of a glossy, butterscotch coloured flint. The glossiness may indicate heat treatment of the core before these pieces were detached, although there might also be outcrops of such material occurring naturally in the vicinity.

In addition to the 12 pieces discussed above, there is also one older blade (Upper Paleolithic? Epipaleolithic?) with a triangular cross-section and a steep single-facet platform.

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King Sa'ud University
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Irbid, Jordan.

hier war die Thurmruine in 0 20° S, Charâne in S 56° O sichtbar; Muoggar konnte ich wegen des Flimmerns der Luft nicht mehr erkennen.

Die Ruine liegt in einem von dem Wadi geblideten rechten Winkel, in dessen Scheitel zwei Quermauern unter stumpfem Winkel zusammenstossen, eine N 20° O, die andere W 20° S, offenbar mit der Bestimmung das Wasser des Wadi aufzustauen; in dem Bett selbst war die Mauer zerstört. Das Wadi hat an dieser Stelle steile Wände und etwa zwei Meter Teife. Etwa 50 Schritt oberhalb dieser Stelle wendet sich das Wadi wieder unter rechtem Winkel nach W und ist nach weiteren 200 Schritt oberhalb abermals von einer 1 m. dicken und ca. 100 m. langen Quermauer in grader Linie durchshitten, die an beiden Enden Flügelmauern nach W entsendet, anscheinend um das autgestaute Wasser am Austliessen in die Ebene zu verhindern. Unfern vom Nordende befindet sich ein gemauertes rechteckiges Bassin von 22 Schritt Länge (O-W) und 8 Schritt Breite, das nach innen eingebrochen ist, anscheinend unter dem Druck des Regenwassers, das von einer Hügelreihe dicht nördlich hiervon herunterkam. Um das Bassin herum, namenlich an der West- und Osteseite, befinden sich Beduinengräber, mit Steinen und Säulenresten gekennzeichnet, die aus der Ruine stammen. Als Name der Ruine gaben die Beduinen nur el Gesêr an; es ist wohl möglich, dass ein wirkliches nomen proprium dafür existirt.

Die Anlage ist offenbar römischen Ursprungs wie das östilich von ʿAmra gelegene ʿAuênid, und hatte wie dieses die Bestimmung, die grosse von Azraq über ʿAmra und Muoggar nach ʿAmman führende Strasse zu sichern."

"Ausflüge in der Arabia Petraea", *Mélanges de la Faculté Orientale, Université Saint-Joseph* III, Fasc. I, 1908, p. 425-427.

Appendix

i. Qasr al-Mushāsh: Musil's account (15th June, 1901)

"Al-Mšejiš, wo wir um 10 Uhr 42 Minuten anglangten ist ein 200 bis 300 Meter breites Talbett und mit einer hohen Kalkschichte bedecket, auf welcher jedoch die Kelu-Pflanzen sehr gut fortkommen. Es streicht von Südosten aus dem ǧebel al-Kâʿade und verbindet sich im Nordwesten am Südfusse der Bodenwelle Dejkat al-Kuṭrâni mit dem Tale as-Sulṭâni. Das linke Ufer des wâdi al-Mšejiš, steight ziemlich steil zu einem grauern unfruchtbaren Hochplateau auf. Wir besteigen diesen Abhang und erreichten um 11 Uhr die Anlage ḳaṣr al-Mšejiš, bei der wir die Kamele niederknien liessen. Die Anlage besteht aus einem festen Hof, einem Wartturm und einigen Zisternen. Der feste Hof ist 36 Schritte lang, 34 Schritte (Richtung 232°) briet, seine Mauern 1 bis 2 Meter stark. Alles ist vollkommen zerstört und in Hürden verwandelt, so dass man die innere Einrichtung kaum feststellen kann. Bei der Südecke der Ostmauer scheint ein tor bestanden zu haben. An der Südwest- und Nordwand waren acht Schritte im Geviert messende Kammeren angelegt, die durch 0.56 Meter starke Mauern getrennt waren. Vor der Nordmauer standen noch einige andere Gebäude. Von der Süwestecke sieht man in der Richtung 242° die Nordöstecke des Turmes. Auf ihn zughend, gelangt man nach 86 Schritten zu einem seichten Wasserbette, in dem sich etwa 50 Schritte nordöstlich drei halb verschüttete Zisternen befinden. Ihre Offnungen haben die Form eines Viereckes von 0.9 Meter Länge, 0.7 Meter Breite. Nach weiteren 116 Schritten erreicht man den Turm.

Dieser steht in der Südostecke eines von einer 0.8 Meter starken Mauer umgebenen, 34 Schritte langen (Nord-Süd) und 29 Schritte breiten Hofes. Der Turm ist 16 Schritte lang und 12 Schritte (Richtung 90°) briet und seine Mauerstärke misst 1 Meter".

Kusejr ʿAmra, Vienna (1907), I, p. 115.

Musil had passed by Wadi el-Mushash on 7th June, 1898 but did not see the *Qasr* on that occasion *(Kusejr ʿamra und andere Schlö*sser östlich von Moab. Topographischer Reisebericht, I. Theil, Sitzungsberichte der Kais. Akademie der Wissenschaft in Wien, Philosophisch-historische Classe, Vienna, 1902, Band CXLIV, vii, p. 18.)

ii. Qasr al-Mushāsh: Moritz's account

"Nach 2 3/4 Studen erblickten wir links, etwa 3 km. entfernt, Charâne. Eine halbe Stunde später erreichten wir den Westrand des hier etwa 20 m. über der Ebene sich erhebenden Plateaus. Auf einer vorspringenden Spitze lag ein jetzt verfallener Thurm, daneben eine verschüttete Cisterne; von hier liegt Charâne in S 40° O, Muoggar W 10° und ʿAmra in etwa O-Richtung. Dann ging, es in die Ebene el Genâb hinab auf die weithin sichtbare Ruine el Geṣêr (قُصَيْر) zu, an deren Fusse sich Wasser finden sollte. Etwa 3 km. westlich von der Thurmruine befand sich die Wassertelle "Meschâsch", in dem bett eines kleinen Wadi. Das Loch wurde von den Beduinen bis auf ca. 2 m. Tiefe mit den Händen ausgegraben, bis sich das rothgelbe Schlammwasser zeigte. Es wurde auf die "rauje" (راويه) ein grosses rundes Lederstück, das sonst als Tisch diente, gegossen, von den Kamelen aber trotz ihres Durstes erst nach einigem Widerstreben genommen. Das Wadi endigt kurz unterhalb dieser Stelle in einer flachen Vertiefung, ergiesst sich also nicht in das Wadi el Charâne. Während die Kamele getränkt wurden, besuchte ich die Ruine, die 880 Schritt N W von der Meschâsch liegt. Es ist ein quadratischer Bau von 29 Schritt Durchmesser aus grossen Kalsteinblöcken mit je 3 Zimmern an den Seiten, die sich nach dem jetzt verschutteten Innenhofe öffneten; die Thür liegt an der Süd- (der dem Wadi zugewandten) Seite. Von Inschriften oder Ornamenten war nichts zu bemerken. Von

hier war die Thurmruine in 0 20° S, Charâne in S 56° O sichtbar; Muoggar konnte ich wegen des Flimmerns der Luft nicht mehr erkennen.

Die Ruine liegt in einem von dem Wadi geblideten rechten Winkel, in dessen Scheitel zwei Quermauern unter stumpfem Winkel zusammenstossen, eine N 20° O, die andere W 20° S, offenbar mit der Bestimmung das Wasser des Wadi aufzustauen; in dem Bett selbst war die Mauer zerstört. Das Wadi hat an dieser Stelle steile Wände und etwa zwei Meter Teife. Etwa 50 Schritt oberhalb dieser Stelle wendet sich das Wadi wieder unter rechtem Winkel nach W und ist nach weiteren 200 Schritt oberhalb abermals von einer 1 m. dicken und ca. 100 m. langen Quermauer in grader Linie durchshitten, die an beiden Enden Flügelmauern nach W entsendet, anscheinend um das autgestaute Wasser am Austliessen in die Ebene zu verhindern. Unfern vom Nordende befindet sich ein gemauertes rechteckiges Bassin von 22 Schritt Länge (O-W) und 8 Schritt Breite, das nach innen eingebrochen ist, anscheinend unter dem Druck des Regenwassers, das von einer Hügelreihe dicht nördlich hiervon herunterkam. Um das Bassin herum, namenlich an der West- und Osteseite, befinden sich Beduinengräber, mit Steinen und Säulenresten gekennzeichnet, die aus der Ruine stammen. Als Name der Ruine gaben die Beduinen nur el Gesêr an; es ist wohl möglich, dass ein wirkliches nomen proprium dafür existirt.

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"Ausflüge in der Arabia Petraea", *Mélanges de la Faculté Orientale, Université Saint-Joseph* III, Fasc. I, 1908, p. 425-427.

THE FORTIFICATIONS OF QAL'AT 'AMMAN ('AMMAN CITADEL): PRELIMINARY REPORT

by
Alastair Northedge

Introduction

Qal'at 'Amman ('Amman Citadel) has always been one of the more poorly understood archaeological sites in Jordan. On the whole the state of the remains reflects that in being unclear to the visitor. One reason is that the site is a very complex one, with remains from a variety of different periods. A second is that the attractive architecture of the Roman period, the foundations of the Temple of Hercules, and the *temenos* of the Northern Temple (Fig. 1), which interested an earlier generation of scholars, are by no means the latest structures of architectural significance at the site. Rather, as recent archaeological work, by the late Mr. G. L. Harding, Dr. Fawzi Zayadine, Mrs. C.-M. Bennett, the Spanish Archaeological Mission, and the present author, have tended to show,[1] the successive occupations of the Early Islamic period represent a considerable degree of change in the character of the settlement, change which was largely ignored by Butler and Bartoccini.

One way to study the nature of the change is to examine the sequence of the fortification wall, in as far as periods of work on the fortifications reflect periods of development in the city. The genesis of the project lay in the discovery, during the course of Mrs. Bennett's excavations in Area C, that one sector of the wall at least (Sector 8: Fig. 2) was dateable to the Umayyad period (41/661 - 132/750), and was not Roman, as had long been thought.[2] Even apart from the question of sequence, this was an important prospect: no other urban fortifications of the Umayyad period have yet been discovered.

Our plan then was to work out the sequence of the fortification wall, and plot how much of the wall was Umayyad. A second dimension was added to the project in the course of the first season by the discovery of the well-preserved plan for a gate of Roman date (Gate C: Figs. 8-10), apparently belonging to the *temenos* of the Temple of Hercules. The *temenos* turned out to be closely connected with the fortifications, and, by the kind permission of Dr. Adnan Hadidi, Director General of Antiquities, we hope to include a treatment of the temple and its *temenos* in the final report.

Two seasons of fieldwork for the project were conducted: September 8th-October 25th 1979, and August 22nd-October 4th 1981, under the joint sponsorship of the Department of Antiquities and the British Institute at Amman for Archaeology and History. The workmen were supplied by the Department of Antiquities, and financial support was generously supplied by the British Academy, the British School of Archaeology in Jerusalem, Ashmolean Museum, the Palestine Exploration Fund, and the Seven Pillars of Wisdom Trust. I would like to record my thanks to Dr. Adnan Hadidi, Director-General of the Department, for his kindness and cooperation, and to Mrs. C.-M. Bennett, Director of the British Institute, for her willingness to cooperate between her excavations at the Qal'a and ours. My thanks also to the staff of the two seasons: (1979) Virginia Northedge, Andrina Bamber, Neil Mackenzie, and Susan Balderstone (architect); (1981) Elizabeth Errington (pottery), Abigail Jones, Timothy Crump and Jason Wood (fortification survey), also for additional work by Richard Brotherton (survey) and Judith Mackenzie (architectural fragments).

The present article sets out the immediate results of the fieldwork, in terms

[1] Harding, 1951; Zayadine, 1977; Bennett 1975, 1979; Bennett & Northedge, 1977; Northedge, 1977, 1980; Almagro & Olavarri, 1982.

[2] Bennett & Northedge, 1977: 173-5.

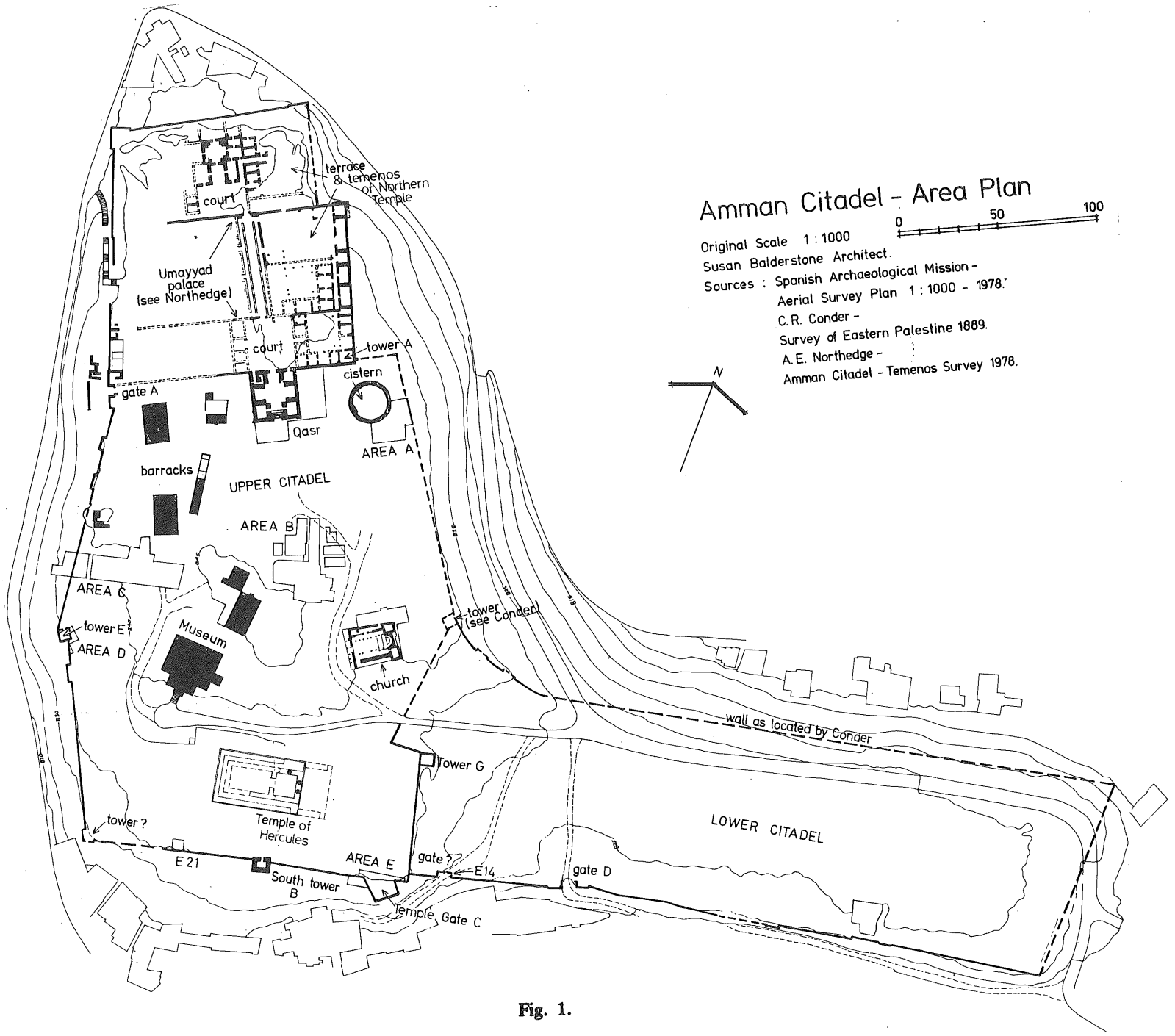

Amman Citadel - Area Plan
0
50
100
Original Scale 1 : 1000
Susan Balderstone Architect.
Sources : Spanish Archaeological Mission -
Aerial Survey Plan 1 : 1000 - 1978.
C.R. Conder -
Survey of Eastern Palestine 1889.
A.E. Northedge -
Amman Citadel - Temenos Survey 1978.
N
court
terrace & temenos of Northern Temple
Umayyad palace (see Northedge)
court
tower A
cistern
gate A
Qasr
AREA A
barracks
UPPER CITADEL
AREA B
AREA C
tower E
AREA D
Museum
church
tower (see Conder)
wall as located by Conder
Tower G
Temple of Hercules
tower ?
E 21
South tower B
AREA E
gate ?
E14
gate D
LOWER CITADEL
Temple Gate C

Fig. 1.

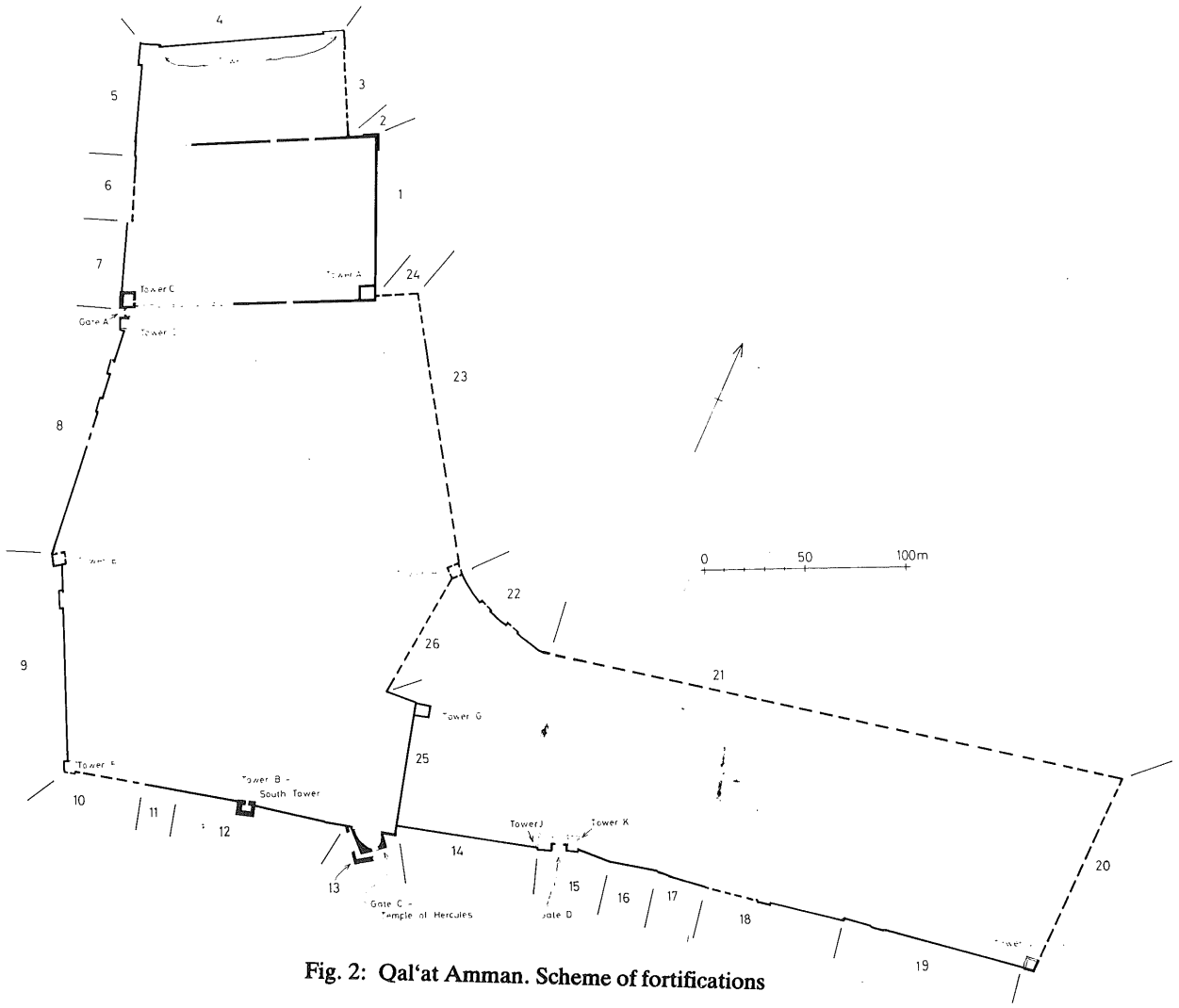


Fig. 2: Qal'at Amman. Scheme of fortifications

of the development of three sectors of the fortifictions, each with a different history, and gate C — the gate of the Temple of Hercules; it concludes by discussing the *temenos* of the Temple of Hercules, and the overall development of the fortifications from the second century A.D. onwards.

The Fortifications

Fortification of the Qal'a has had a long history. The junction of two walls, possibly belonging to a citadel and fortification wall, was excavated outside the line of the platform of the Northern Temple in the 1960's, and suggested to be Middle Bronze in date.[3] There are several fragments of an Iron Age wall, particularly in the southeast corner, where Dr. Fawzi Zayadine has uncovered a sequence of walls from the Iron II, Early and Late Hellenistic periods.[4] The present project concentrated on the fortifications that form part of the present wall line.

The fortifications are complex, with many changes of construction and line, In addition traces of rebuilding are visible at many points. The fortifications were divided, for the purposes of analysis, into twenty-six sectors of curtain wall, which differ in line or construction. Ten towers (including gate-towers) and three gates could be identified or implied from constructional features. The schema is presented in Figure 2.

(1) Sector 14 (Fig. 3)

Approximately 20.00 m. to the east of the *temenos,* on the south wall of the lower terrace of the Qal'a, a track cut for the approach to a house on the slope below Gate C has exposed a cross-section through the fortifications at a point where the wall stands to a height of 3.70 m. The section was cleaned and drawn, and a sondage 1.50 m. x 1.50 m. dug.

We distinguished four phases:

(i) Pre-Wall Building: The exterior wall (1.34 m. wide) of a building had been used for the inside face of the fortification wall. In this wall a doorway 1.00 m. wide, which was cut by the track, is exposed. The construction is of unmortared rubble with cut stone door-jambs. Outside the door part of a surface of paving-stones and cobbles was preserved under the rubble fill of phase (ii). The style of construction and a few sherds from above the paving suggest a Roman date.

(ii) Wall Construction: Width 3.40 m. excluding phase (i).

1. Foundation: Only a foundation for the façade was built. This is a free-standing rubble wall 1.42 m. deep, and not more than 2.40 m. wide, packed with dark grey-brown puddled clay. The foundation filled a narrow vertical-sided trench.

2. Superstructure: The façade has a base-course of large cut limestone blocks 0.60 m. x 0.60 m. x 1.20 m., and above that a facing, two blocks thick, of dry-laid limestone ashlars averaging 0.34 x 0.34 x 0.70 m. The fill of the wall is of undressed limestone with a greyish brown soil fill, probably the deteriorated remnants of puddled clay similar to the foundation.

3. Dating: The pottery of the wash deposits predating the foundation, as excavated in the sondage, resembles closely the *temenos* fills, and may be tentatively dated to the first-second centuries A.D. Following construction of the wall, a dump of pottery and organic materials accumulated against the outside face of the wall. The pottery of this dump is comparable with, or slightly later than, the third century tomb in Amman excavated by Harding, say third/fourth centuries.[5] As we shall argue later, the construction may well be related to that of the *temenos* in the second century.

(iii) Refacing: Following phase (ii) the façade of the wall was cut back down to the third course above the foundation; and a new facade of limestone ashlars pointed with a grey lime plaster added. The new facade does not bond with the old structure. The only evidence for dating is the stylistic similarity of the plastering to other Umayyad work at the Qal'a. However it

[3] Dorneman, 1970: 51.
[4] Zayadine 1975: 12.
[5] Harding, 1950d

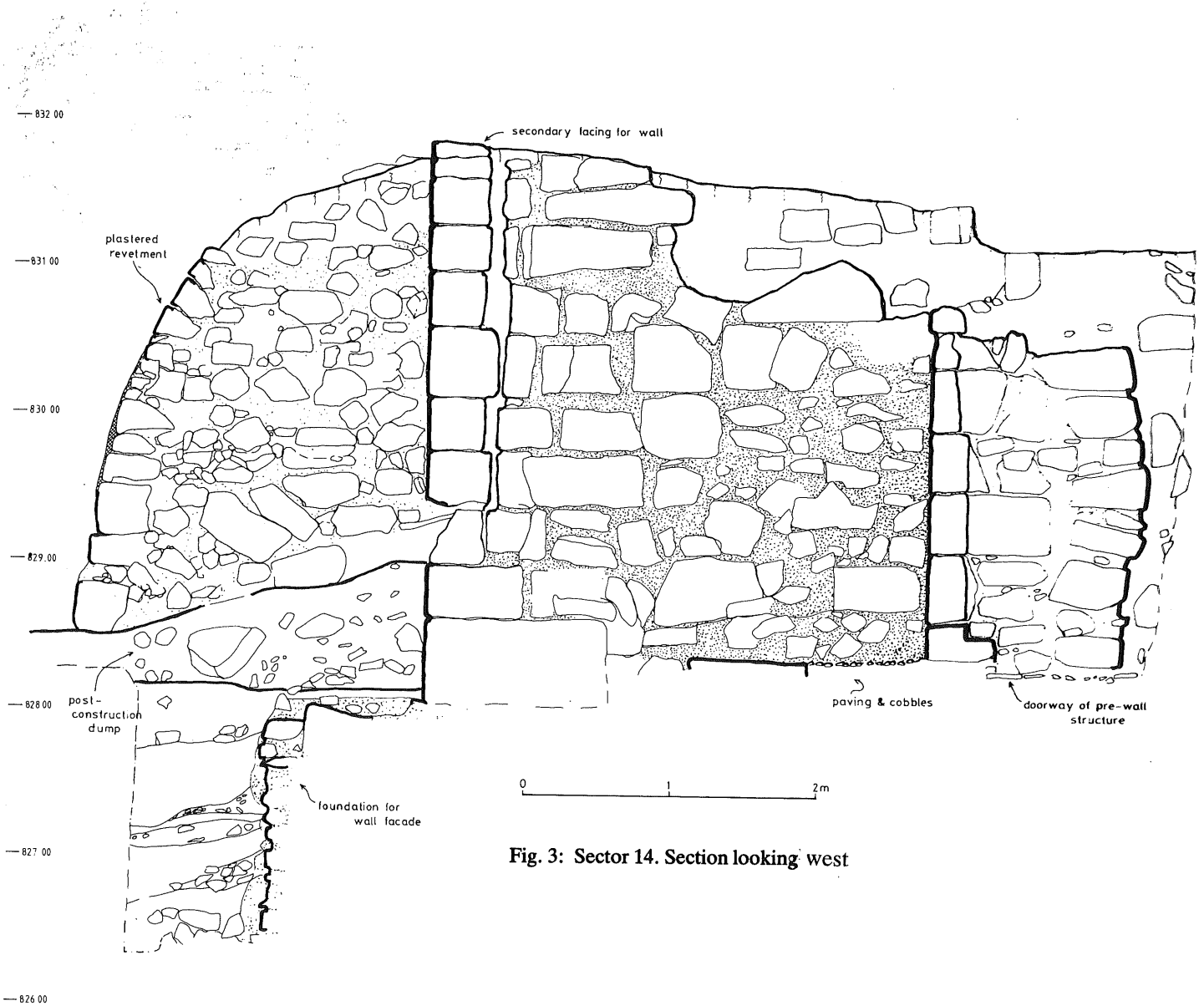


Fig. 3: Sector 14. Section looking west

obviously belongs to the same construction project as the rather better dated refacing of sector 12 in the Umayyad period (on which see below).

(iv) The Revetment: Lastly a revetment with a curved sloping façade was added, 2.40 m. wide at its base, and preserved to a height of 2.60 m. The revetment is built of medium rubble and faced with a coating of grey lime plaster, which is inset with lumps of chalk. In Area D a similar section of revetment (of rather smaller dimensions) was shown to postdate damage to the Umayyad wall, and to predate a house built over it in the 'Abbasid period, at a date when splash glaze ware had already been introduced.[6] The revetment probably belongs to the beginning of the 'Abbasid period, that is, the second half of the second/eighth century.

(2) Sector 25 And Tower G (Figs. 4 and 5)

Tower G was excavated and a sondage dug behind the reentrant in the sector 25 wall. On the south side of the tower a trench had been dug by Dorneman against the face of the wall in the late 1960's to test the theory of Conder that column drums visible in the surface were part of a gate between the upper and lower terraces of the Qal'a.[7] Dorneman did not find a gate, and the gate between the two terraces has yet to be found.

Sector 25: Sector 25 is built mostly on top of the east wall of the *temenos,* which is visible towards the southern end. However we did not find any trace of the *temenos* wall in the area of Tower G, and we are forced to assume at present that the northeast corner of the *temenos* had been almost totally destroyed before the building of sector 25. The fortification wall is 1.20 m. wide, of reused ashlars laid dry, without any foundation. Its striking feature is the incorporation of seven column drums from the temple of Hercules. Six had been visible on the surface or excavated by Dorneman, and we found a further drum, built into the wall.

Dating: On the dating we reached the same conclusion as Dorneman, namely that Umayyad pottery is found down to the base of the wall. There was no evidence of Byzantine rubbish dumps along the base of the wall, such as were found in sector 14; rather the stratigraphy of the sondage changed straight from Roman deposits into Umayyad. Therefore we thought the wall must be Umayyad in date, although it differs from other Umayyad construction.

Tower G: The tower is a square of 5.80 m. added on the face of sector 25. The north and south walls are 0.90-1.05 m. thick, but the east façade is thickened to 1.30 m. The construction is of cut lime - stone masonry for the facade, and rubble walling for the inside, all mortared with patches of grey lime plaster on the face. There is also a built rubble foundation. In the northeast corner a doorway, opening surprisingly from outside the defended area, leads into an interior room with an earth floor. The springers of an arch across the centre may be reckoned to have supported another floor 2.50-3.00 m. higher. If this floor belonged to a second room which opened onto a rampart walk, then the total height would be approximately 8.50-9.00 m. including parapet.

The internal room was occupied up to the Ayyubid period, indicated by the rim of a large jar of Pseudo-Prehistoric ware,[8] and a second partition.

Dating: The *terminus post quem* for dating the tower is the Umayyad date of sector 25, and the *terminus ante quem* a dump of Umayyad pottery laid against the north wall of the tower under the doorway and sealed by a later Ayyubid surface. Thus we are limited to an Umayyad construction, or one of the period of the revetment, early in the Abbasid period. Similarity of construction to Tower E[9] shows that the former choice is the right one; the tower was perhaps added as an

[6] Bennett, 1979: Appendix B.

[7] Dorneman, 1970. See also a report in the Registration Centre of the Department of Antiquities in Amman.

[8] The common handmade painted ware of the Ayyubid-Mamluk period in Jordan is often called in excavations in Syria, e.g. Qasr al-Ḥair East, 'Pseudo-Prehistoric' ware. As this seems a singular appropriate name for the pottery, it has been adopted here.

[9] Bennett, 1979: Appendix B.

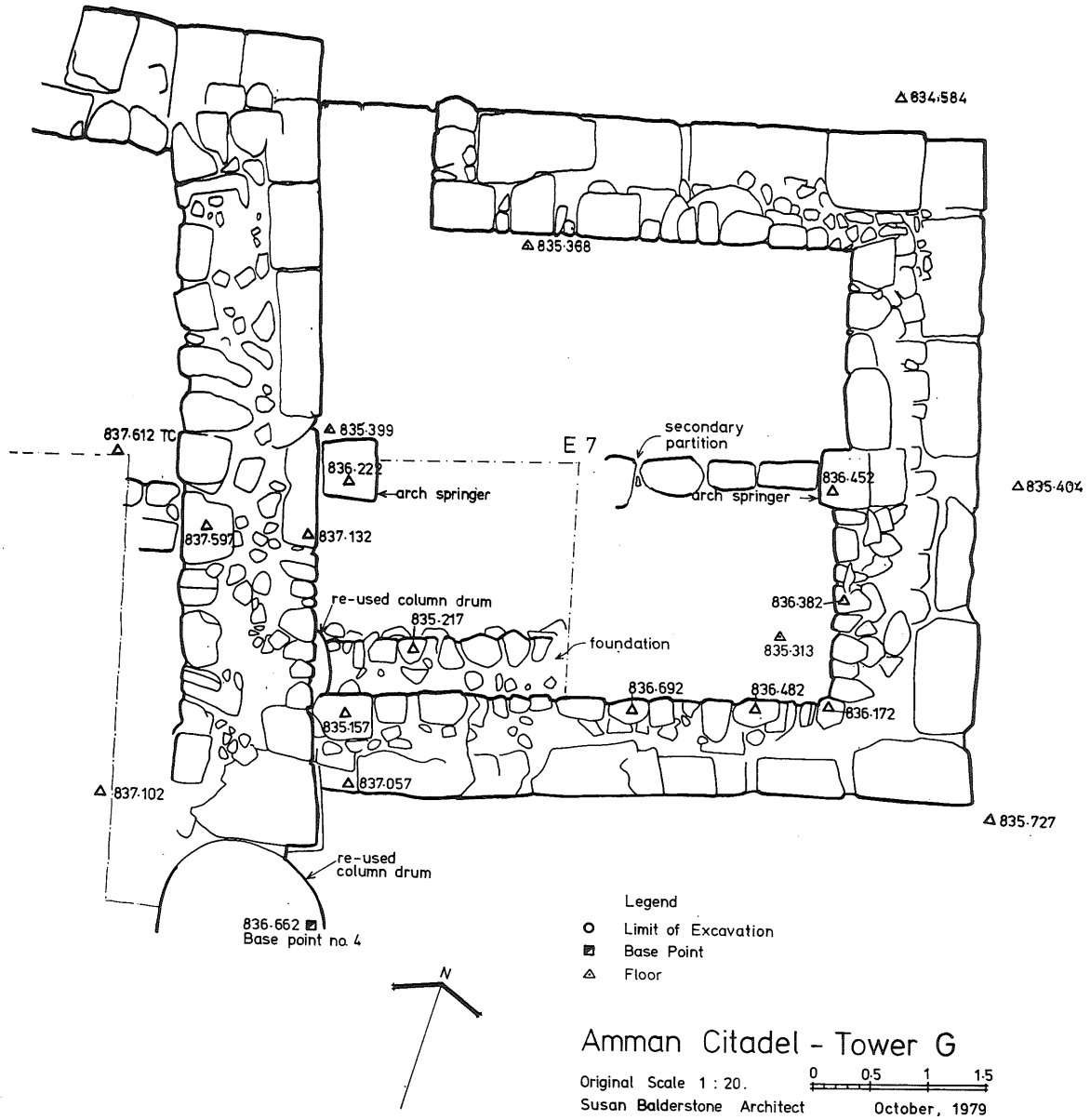

834.584
835.368
837.612 TC
835.399
836.222
arch springer
837.597
837.132
E 7
secondary partition
836.452
arch springer
835.404
re-used column drum
835.217
foundation
836.382
835.313
836.692
836.482
836.172
835.157
837.057
837.102
835.727
re-used column drum
836.662
Base point no. 4
N
Legend
Limit of Excavation
Base Point
Floor
Amman Citadel - Tower G
Original Scale 1 : 20.
0 0.5 1 1.5
Susan Balderstone Architect
October, 1979

Fig. 4.

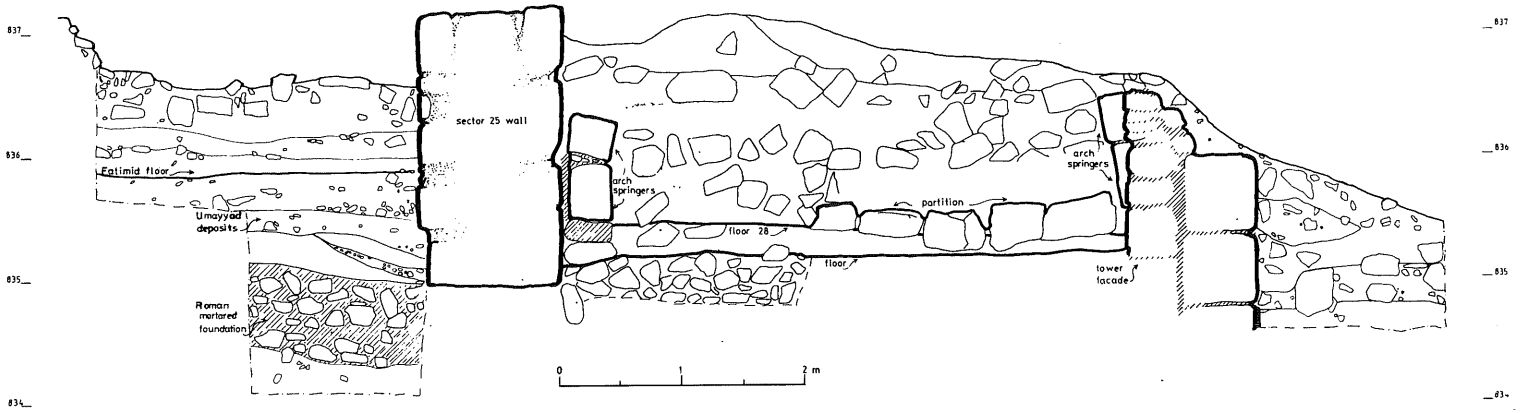


Fig. 5: Tower G, Section looking North.

afterthrought to sector 25, from which it differs in construction.

(3) Sectors 11, 12 And Tower B (South Tower **(Figs. 6, 7)**

The sector 11/12 wall incorporates the south wall of the *temenos*. Traces were uncovered at four places: at its eastern end adjacent to Gate C (Square E5), into square adjacent to Tower B, and at its western end (Square E21). In addition clearance work had been carried out on the outside of the wall line, possible in the 1960's, and we did some cleaning to explain the developing of the façade.

The five phases of construction that were distinguished were:

(i) Pre-wall: A number of rubble-built walls at different angles are visible at the base of the clearance. These appear to belong to occupation broadly datable by Square E3 (see below) to the late Hellenistic and Early Roman periods.

(ii) The Temenos Wall: Width 3.20 m. Max. Height 2.60 m.

1. Foundations: None of the foundations of the exterior façade survives; the interior is a free-standing rubble wall up to 0.60 m. wider than the superstructure, and 2.40 m. deep. The core is of limestone and flint packed with small stones and brown clay.

2. Superstructure: The inside façade has a base-course of large limestone ashlars 1.20 x 0.60 x 0.30 m. Above that both façades have smaller limestone ashlars 0.70 x 0.35 x 0.40 m. two blocks thick. The core is rubble and brown clay.

(iii) The Fortification Wall: (Sectors 11/12)

Before the construction of the fortification wall, the *temenos* wall at its western end in E21 (Fig. 6) had been destroyed down to its foundation, with the exception of two blocks. In the other squares the lack of evidence for a foundation of the fortification wall similar to E21 suggests that much of the remainder of the *temenos* wall may still have been standing.

Our evidence for fortification work consists of a new wall at the western and (sector 11), with a foundation of rubble and *terra rossa* 2.50 m. wide, and a refacing of the *temenos* wall in sector 12.

As in sector 14 the façade was cut back 0.50-0.60 m. Some of the headers of the original façade were cut through, and remain *in situ*. A new rubble-built foundation for the façade was put in, up to 1.20 m. deep. The new façade is largely composed of reused ashlars, including a number of architectural fragments from the temple of Hercules, and is finished with a pointing of grey lime-plaster. There is no attempt to bond the new facing with the original work, and in places it starts from a lower level than the earlier superstructure.

Three rectangular buttresses were added to the outside face, with average dimensions of 6.08 x 0.52 m., perhaps to strengthen the new façade.

Dating: The continuation of the *terra rossa* and rubble foundation in Gate C is dated to the Umayyad period (see under Gate C).

(iv) The Revetment: The western buttress was rebuilt. Only the core of rubble and *terra rossa* survives, but it no doubt supported a sloping façade (cf. sector 14).

(v) Tower B (South Tower) **(Fig. 7)**

By the time Tower B was built the combination *temenos* fortification wall had collapsed down to its present height; Tower B is founded upon, but does not take account of the earlier phases.

The tower is rectangular, 7.60 x 9.30 m., set slightly askew to the sector 12 wall, from which it projects. A door in the north wall leads to a single interior room, 3.10 x 4.80 m. A staircase in the thickness of the north wall leads to the roof. There is a single arrow slit in each of the west, south and east faces, and these are set into rectangular recesses. The arrow slits have flat tops, but any arch over the recesses has disappeared.

The south façade still appears to stand to its original height of 8.10 m. and rests on a line of column drums, which in turn rest upon bedrock. The north wall is no longer complete, especially in the area of the doorway. However in 1881 the Palestine Exploration Fund survey, headed by C. R. Conder, found the tower complete: the door had a flat lintel with a *tabula ansata* in relief, and a segmental relieving

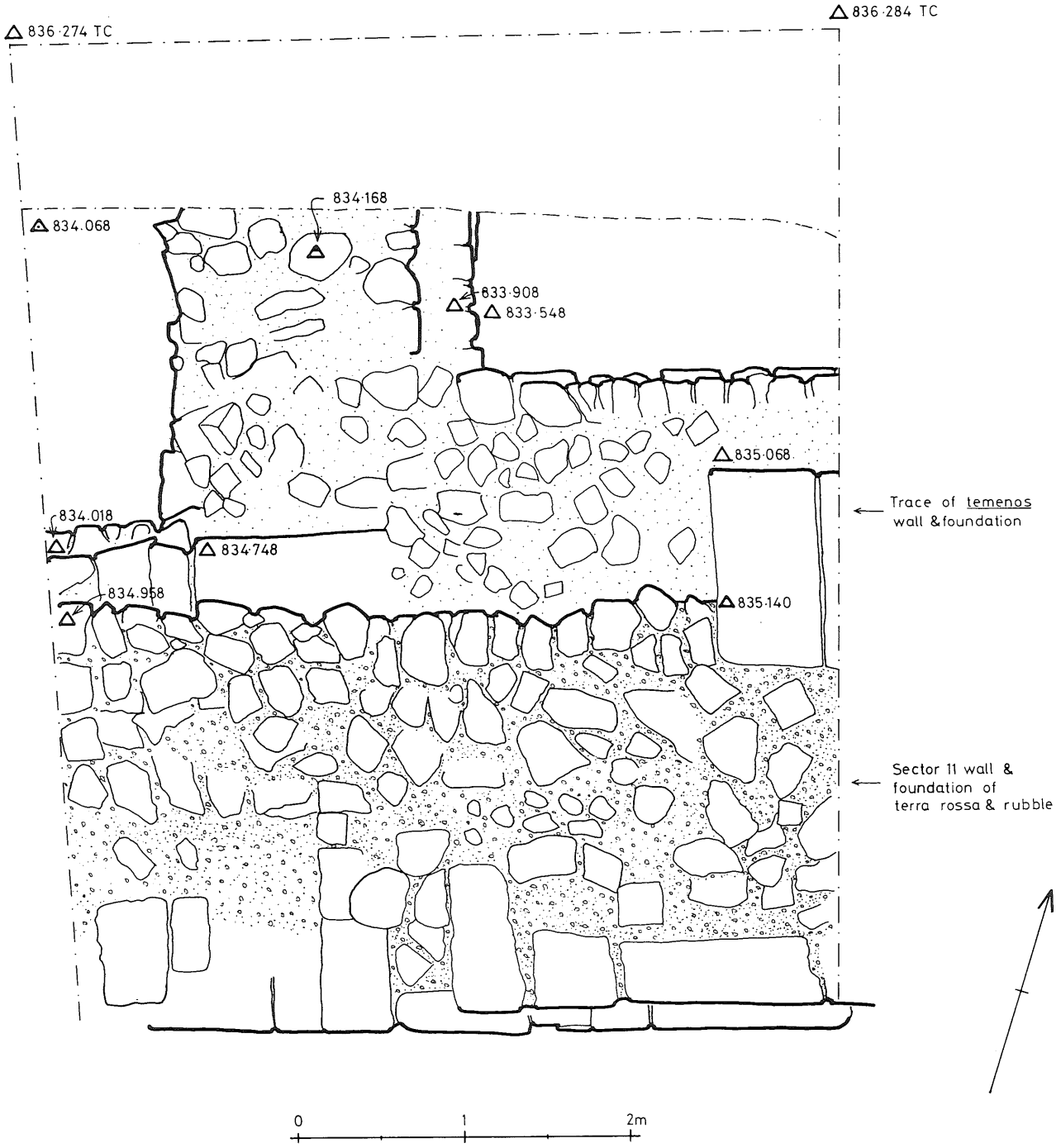
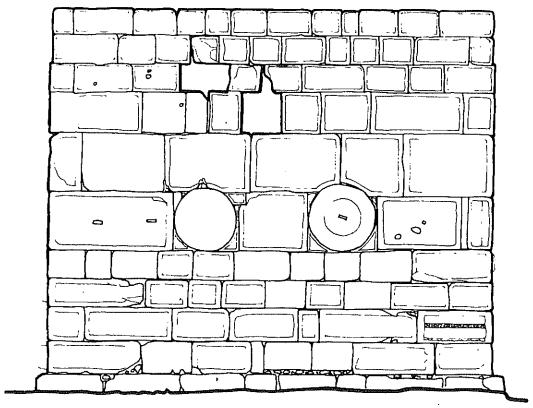
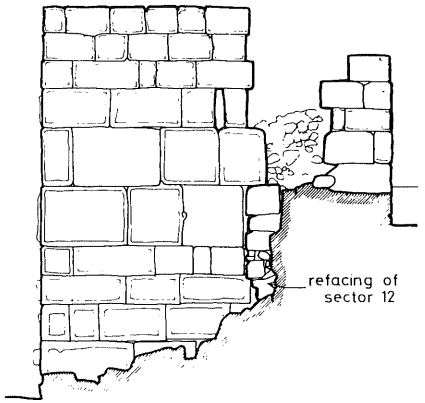


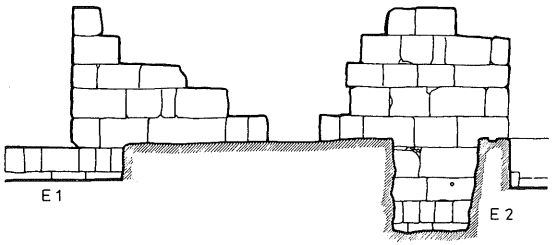
Fig. 6: Sector II, Wall overlying the South-west corner of the Temenos (E21)



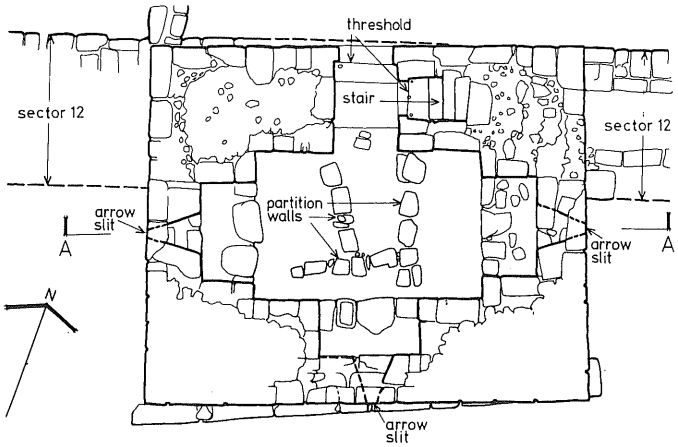
South Elevation



East Elevation



North Elevation



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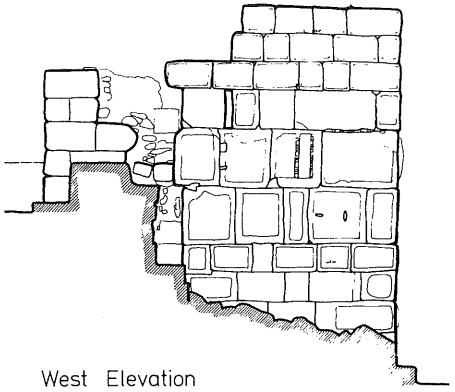
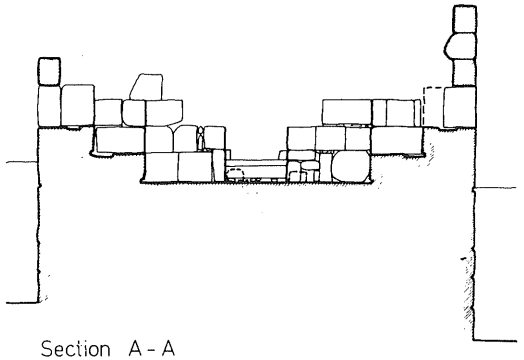


West Elevation



Section A - A

Amman Citadel - South Tower (B)

Original Scale 1 : 50. 0 1 2 3 4

Susan Balderstone Architect October, 1979

Fig. 7

arch of five voussoirs.[10] The interior room seems to have been vaulted.[11]

Construction is of limestone ashlars, of varying dimensions, but with two courses of 1.25 m., the largest block measuring 2.70 x 1.25 x 0.70 m. Many of the stones on the south, west and east faces have narrow drafted margins, while the interior and north walls have plain dressed masonry. There are eleven Roman architectural fragments, many of which have been recut. The south façade has two column drums from the temple, placed symmetrically. These are wedged in position with triangular blocks, purpose cut with drafted margins.

Dating: An Ayyubid bronze of Damascus was found in an ash patch overlying the rocky and uneven floor of the interior. As the ash could not have been deposited long after the construction of the tower this provides us with a *terminus post* of the late sixth/twelfth century or early seventh/thirteenth century. We have no clear *terminus ante;* nevertheless the large size of the masonry makes it unlikely that the tower is late Mamluk or Ottoman.

Rather, we suggest that it is in fact Ayyubid. The arrow slits and their recesses resemble the first period at Qal'at ar-Rabad, 'Ajlun.[12] The drafted masonry, with a narrow draft and a large flat boss, was popular at about the beginning of the seventh/thirteenth century, and is found in datable structures at Pilgrims Castle, Athlit (*ca.* 1218)[13] Ba'albak (Ayyubid),[14] and as far afield as the castle of Anavarza in Cilicia (*ca.* 1189).[15] The squat, square proportions of the tower might be a smaller version of the towers of the citadel at Busra, built under al-'Adil between 599/1202 and 615/1218-9, and added to under as-Salih in 647/1249-50.[16] The tower might also be related to Ayyubid occupation at the Qal'a.[17]

(4) Gate C (Figs. 8-10)

The gate is located at the southeast corner of the *temenos,* and from it the ground falls away steeply to the lower city. Our work on the gate consisted of the excavation of the gate itself and the southeast corner of the *temenos,* a sondage outside (E3) and inside (E5) the *temenos* wall line.

Seven constructional periods were seen in the area of the gate, including deposits that predated and postdated the gate itself:

(i) Pre-Gate Occupation (E3): A sondage measuring 3.50 x 6.00 m. outside the wall line. The surface had already been cleared of deposits down to the foundation level of the *temenos* wall. The sondage revealed a structure with four surfaces. The second of these produced a Nabataean bronze coin of Aretas and Shaqilat (9 B.C.-40 A.D.). It seems likely therefore that the later parts of this sequence belong to the first century A.D., and the earlier parts possibly also to the first century B.C. In the northwest corner the structure was overlaid by a further wall that predated that *temenos* wall.

(ii) Plastered Wall Building: Gate C was mounted directly on top of an earlier structure, which it used as a foundation. This was apparently a rectangle measuring 13.30 x 13.60 x 16.00 m. (the north wall was not found), built partly of rubble and partly of cut limestone. It was plastered with a white lime plaster. We understood it to be a platform, but we did not find conclusive evidence of its purpose. It is possible that it was an earlier version of Gate C, or that it was the podium of a small temple. At a later date a buttress was added to the west wall, possibly as part of the foundations of Gate C, and this postdated the abandonment of the E3 sequence. While the buttress prevented conclu-

[10] Conder, 1889: 33-4. The tower is attributed by Conder to the Byzantine priod on the basis of the *tabula ansata.*

[11] The tower appears in the background of photographs nos. 546 and 548, taken in 1881 and 1882 respectively, in the archives of the Palestine Exploration Fund.

[12] I am indebted to Brian Bowen, who worked on the consolidation of 'Ajlun, for this information.

[13] Johns, 1931.

[14] Kohl, 1925.

[15] Hellenkemper, 1976: 291 & Taf. 46.

[16] Abel, 1956.

[17] Bennett, 1979: 161.

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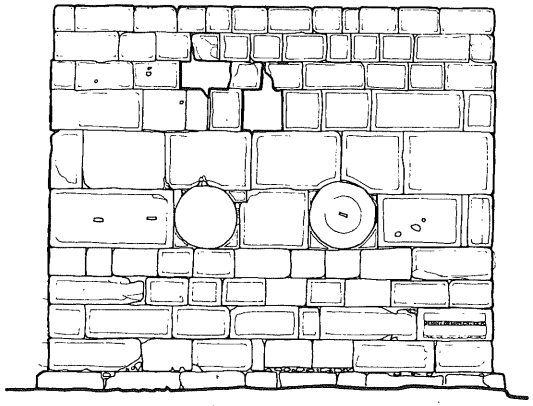
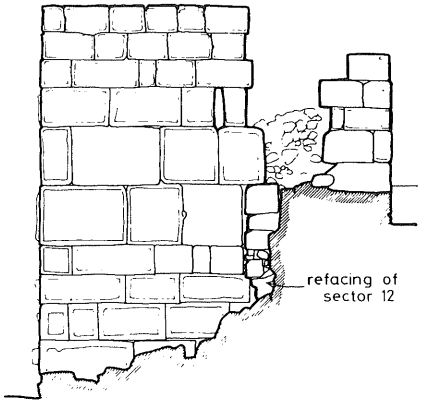
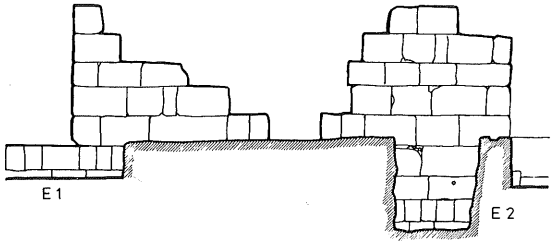


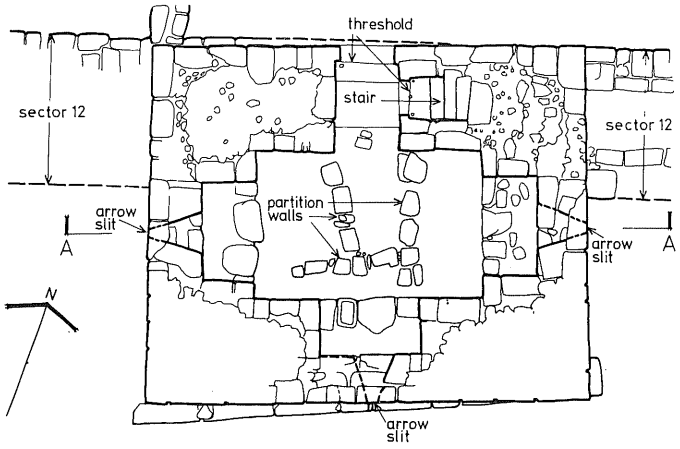
South Elevation



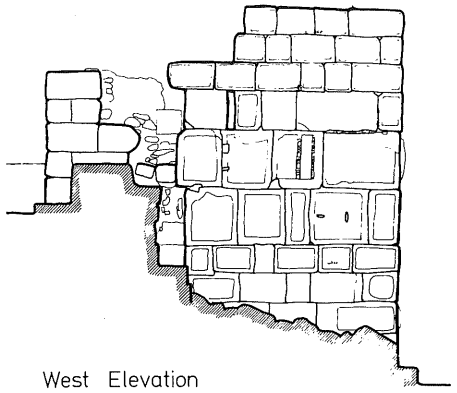
East Elevation



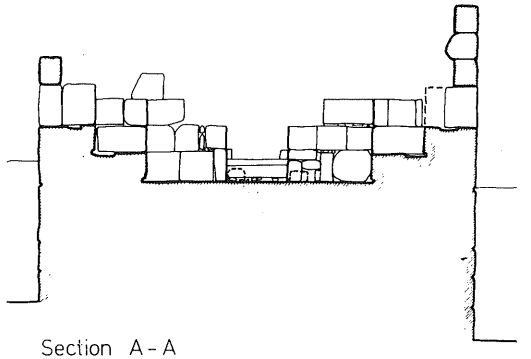
North Elevation



Plan



West Elevation



Section A - A

Amman Citadel - South Tower (B)

Original Scale 1 : 50. 0 1 2 3 4

Susan Balderstone Architect October, 1979

Fig. 7

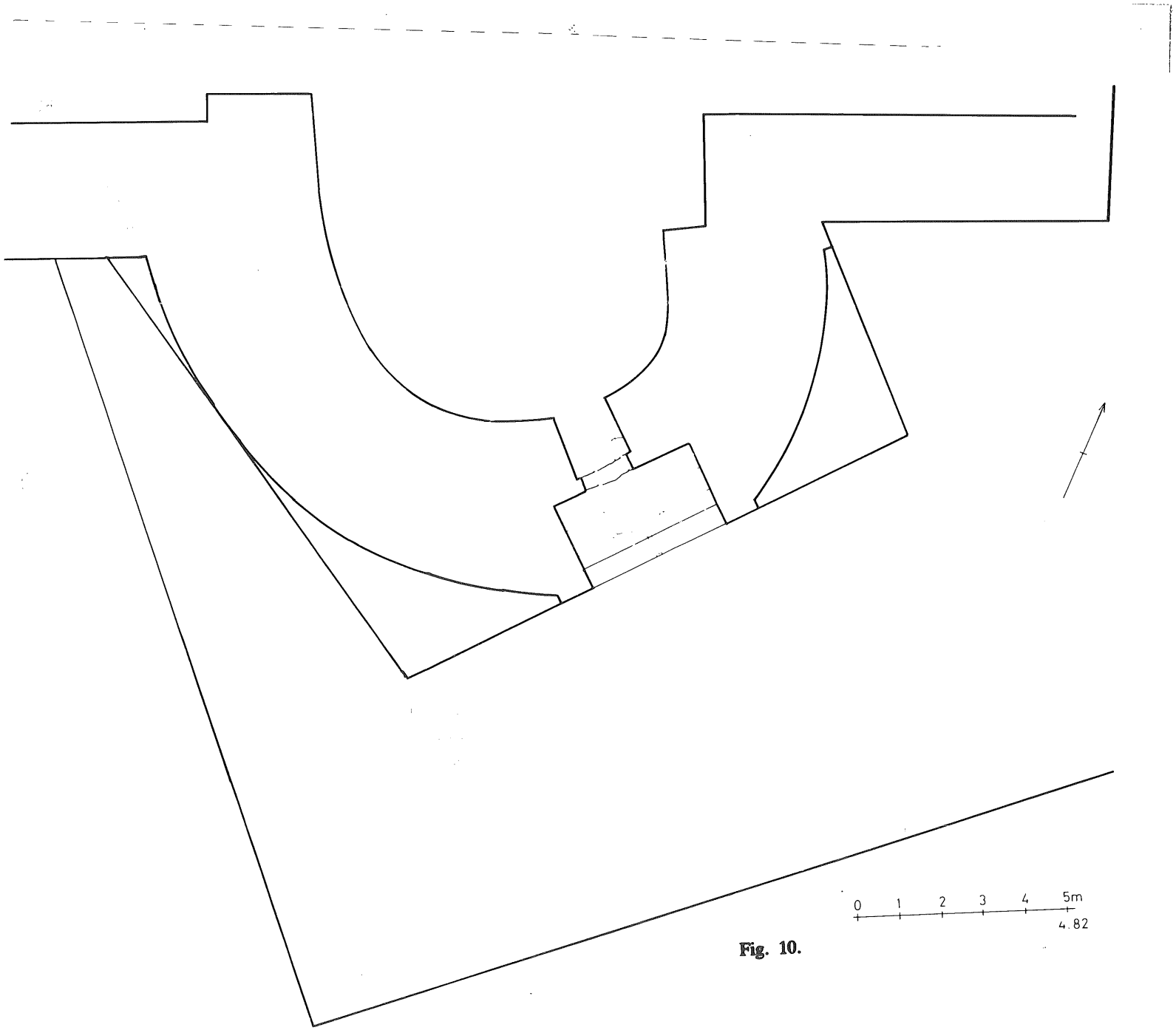


Fig. 10.

sive dating of the plastered wall building, it was evident that the building was either contemporary with or postdated the E3 sequence, and therefore is probably datable to the first century A.D.

(iii) Construction of Gate C (Figs. 8, 9)

The gate survives only to the ground level course, and the surface of the stylobate. On the west and south sides remains outside the line of the plastered wall platform have been denuded. The exception is a corner of masonry visible below the southwest corner of the gate (sector 13). While because of the difficulties of excavation,[18] it was not possible to prove that this wall was contemporary with the gate (it may be later), some sort of structure on this line would have been necessary to suport a landing outside the gate.

The gate consists of a rectangular exterior set at an angle of 55° to the line of the *temenos* wall, with which it is contemporary. There is a threshold 4.10 m. wide with six bolt holes. The interior is semi-circular, and leads up to a stylobate.

Traces of a paving of cut limestone and cobbles were found adjacent to the threshold. However, over most of the area we found surfacings of *huwwar* (chalk gravel), and mounds of *huwwar* over the latest surface, perhaps prepared for laying, but never used. A curious feature was the provision of two blocks of limestone for a rough step up onto the stylobate.

On the east side a second smaller threshold opens into a side room with an earth floor firmed up with cobbles. The outer line of the room has been eroded; presumably it continued the facade of the gate to join the east wall of the *temenos*.

The Architectural Form of Gate C: (Fig. 9): The rectangular exterior and semi-circular interior of the gate is unusual, but we have no direct evidence of the superstructure other than this. However the curved foundation of phase (v) (see below) implies that the rectangular exterior may have been the plinth for a semi-circular superstructure. For if the exterior had been rectangular such a curved strengthening wall would not have been appropriate: rather an attempt would have been made to restore the gate in a rectangular form. In any case, a rectangular plinth was forced upon the builders by the rectangular shape of the "plastered wall" building underneath. We concluded therefore that the original form of the structure had probably been semi-circular, resting on a rectangular plinth.

On the inside of the gate, the reconstruction of the stylobate can be derived from traces of wear, and chisel marks for fitting structures onto the flat surface. There is the mark of one column base 1.05 m. square; a second matching column could have sat on a section which was robbed out. The side walls projected 1.15 and 1.60 m. respectively over the surface, presumably for pilasters.

Tiling recovered from the gate area suggested that the semi-circular area had originally had a beam and tile roof. Although there was a possibility that the tile roof had been limited to the side room, the two-column portico told us that the whole was roofed, and the tiles gave us the most likely evidence of how it had been done.

There should have been a landing outside the gate. As the masonry outside the line of the threshold has disappeared, we thought at first that the landing, and stairway or ramp that approached the gate, had been cut away deliberately. However it was equally possible that a collapse could remove any construction not securely mounted on the "plastered wall" platform. In either case the landing should have been supported by a wall on the line of the sector 13 wall, or that wall itself.

While the evidence does not exclude the possibility of a straight monumental stairway down to the lower town, the overall gradient of 39% would have been a difficult climb. The line of sector 13 diverges from the façade of the gate, and would permit a stairway 6.00 m. wide to lead down to the east from the landing. If

[18] At the time of writing the slope is in a dangerous condition, with a surface containing quantities of building masonry eroded from the Qal'a. Excavation of the 'landing' base (sector 13) was decided against on the grounds of danger to inhabited houses below.

this was the case, then a winding stair led down to the lower city. A possible line is shown in Fig. 11, but no trace of either a winding stair or a straight staircase is visible in the surface of the slope. Our suggestion is based on the modern staircases and alleyways that wind up the slopes of Jabal al-Qal'a.

To summarise, the gate thus had apparently a portico with a pair of columns on the inside line, and a semi-circular exterior set on a rectangular plinth with a single 4.10 m. passageway. This opened onto a landing with a stairway leading down intially to the east, and then twisting down the slope.

Dating: Excavation inside the *temenos* wall (square E5) penetrated the fills that backed the south wall of the *temenos* and Gate C itself. These earth fills were homogeneous and apparently constituted the levelling fill of the *temenos* courtyard. This levelling fill was put in after the building of the *temenos* wall and gate. The gate and *temenos* are thus contemporary. Dorneman, in an unpublished excavation on the site of the steps of the Temple of Hercules, encountered a jumbled fill of earth and limestone masonry, also representing the levelling fill of the courtyard. Bartoccini, in excavating the Temple found the limestone bedrock of the hill immediately under the base of the *podium.* At the moment we do not have conclusive evidence that the *temenos* was built for the present temple, and is thus contemporary with it (A.D. 161-180), but it seems very probable.

(iv) Secondary Events:

A floor deposit of sherds in the side room indicated an abandonment possibly in the third or fourth century. Part of the top course of the stylobate was also robbed out: the consequent robber trench contained the sherds of two Late Byzantine ribbed cooking pots. While these two pieces of evidence suggest the termination of maintenance in the Byzantine period, passage up the stairway and through the gate may well have continued.

(v) Rebuild of the Gate (Fig. 10):

As the superstructure of the gate has disappeared, there is now only a little evidence for the reconstruction of the gate in its later days. That evidence is a curved foundation of medium rubble and *terra rossa,* 2.50 m. wide and surviving up to 1.00 m. deep, following the line of the wall on the west side, and in part on the east. In all probability the walls of Gate C were still standing, and the foundation was for a 2.50 m. wall intended to strengthen them.

A secondary threshold behind the main Roman threshold may also belong to this period. Although it lacked a provable relationship with the foundation because of denudation of the deposits, it is well-placed to be linked with it.

The form of the gate therefore we suggest changed from an enclosed gate with a 4.00 m. passageway to an open semi-circular bastion with a small postern gate.

Dating: Umayyad, from sherds of red-painted ware in the foundation.

(vi) The Revetment: The sloping revetment (cf. sector 14) was added to the outside of the 'landing' wall (sector 13), visible on two sides in the southwest corner. An additional section runs from the southeast corner of the gate; this revets not a wall, but a mass of rubble. By this period the gate may have been entirely blocked off.

(vii) Later Construction: A wall overlying the east end of the stylobate, and a threshold.

Discussion

The *Temenos* of the Temple of Hercules

The temple, dated to the reign of Marcus Aurelius (A.D. 161-180) by an inscription,[19] has been studied and excavated several times,[20] but little attempt has been made to assess its *temnos* and approaches. In 1981 we replanned the

[19] Littmann, et al., 1921: insc. 4, the dedication inscription from the Temple of Hercules, refers definitely to Marcus Aureius (A.D. 161-180), but the authors also suggest that it refers to the co-emperorship of Marcus Aurelius and Lucius Veru, between 161 and 169.

[20] Conder, 1889: 31-3; Butler, 1919: 38-41; Excavations of the Italian Archaeological Mission 1927-38, reported in Bartoccini, 1938; Joint Expedition of the University of Jordan, American Center of Oriental Research, and Department of Antiquities, 1969, Dr. R. Dorneman (Unpub.)

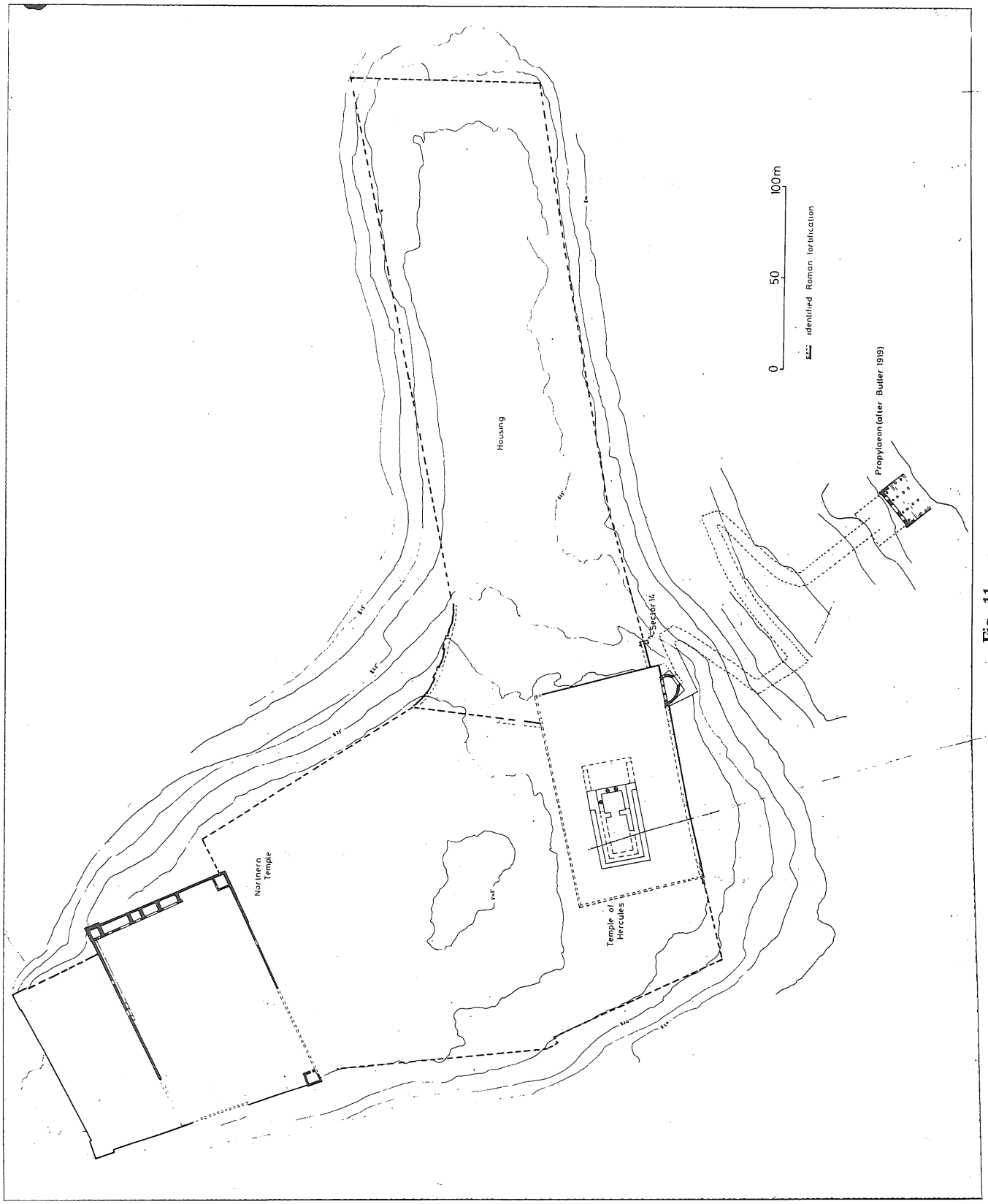

Housing
Sector 14
Northern Temple
Temple of Hercules
Propylaeon (after Butler 1919)
0
50
100m
identified Roman fortification

Fig. 11.

temple (Fig. 12) and drew up the architectural details, in addition to the excavations described earlier.

From air photographs the flat terrace of the *temenos* can be seen clearly, raised above the lower Qal'a. The *temenos* was rectangular, as far as can be judged. The southeast and probably the southwest corners have been located, to give a length of 119.00 m.[21] The temple itself, with a surviving podium base measuring 43.50 x 27.5 m., is set, as is to be expected, at the west end of the *temenos* facing east. Its centre line is also offset to the north from a symmetrical position by 8.00 m. A section of stylobate for the colonnade was discovered some years ago in the northwest corner of the *temenos*.

Gate C appears to have been the principal gate, but there may have been a second gate opposite on the north side for access to the Northern Temple. Gate C was approached from the lower town. Butler identified a ruin below Gate C as a Propylaeon, and compared it to the Propylaeon at Jerash.[22] Although the building is now long gone, we have a survey by Butler, and photographs. There is little doubt that Butler's identification was correct, but his proposal that the Propylaeon and Gate C were linked by a straight monumental stairway, perhaps similar to the approach to the Temple of Artemis at Jerash, underestimates the difficulties of the slope. That difficult and the arrangement of the 'landing' wall outside the gate suggest rather that there was a winding stair that fitted the contours of the hill.

Development of the Fortifications

In the course of the excavations we have so far identified four different periods of work on the fortifications of the Qal'a:

1) Roman Wall:

A Roman wall, identified in sector 14. Note also that the wide south wall of the *temenos* (3.20 m.), and the single passageway of Gate C appear to have been designed as part of a fortification system. By contrast sector 1, 0.90 m. wide, part of the *temenos* wall of the northern Temple, ought to have been similarly designed, as it faces away from the city, but it was not.[23] While not closely dated, the Northern Temple should belong to either the first or second centuries A.D., more probably the latter. The Northern Temple then predates the Temple of Hercules, and the Roman fortifications must have been built either between the construction of the two temples, or in the same project as the temple of Herucles, and finished between A.D. 161 and 180, or slightly later. Of the two we prefer the latter hypothesis: the foundation work, sizes and styles of the masonry of the sector 14 wall are almost identical to the south wal of the *temenos* (Sector 12).[24]

2) An Umayyad Wall:

We have not yet found any conclusive evidence of wall construction in the Byzantine period.[25] It is evident that by the time of period (2) the Roman wall was in a ruinous state, but the date or cause of its collapse is not clear.

Period (2) marked a major reconstruction of the defences. The work included both new construction, and refacing of standing sections of the old wall. The pattern of the walling appears to be a 2.50 m. or a 4.00 m. wall with shallow rectangular buttresses. The buttresss appear to have been added to strengthen areas where only a new façade was put on. The square towers were into the thickness

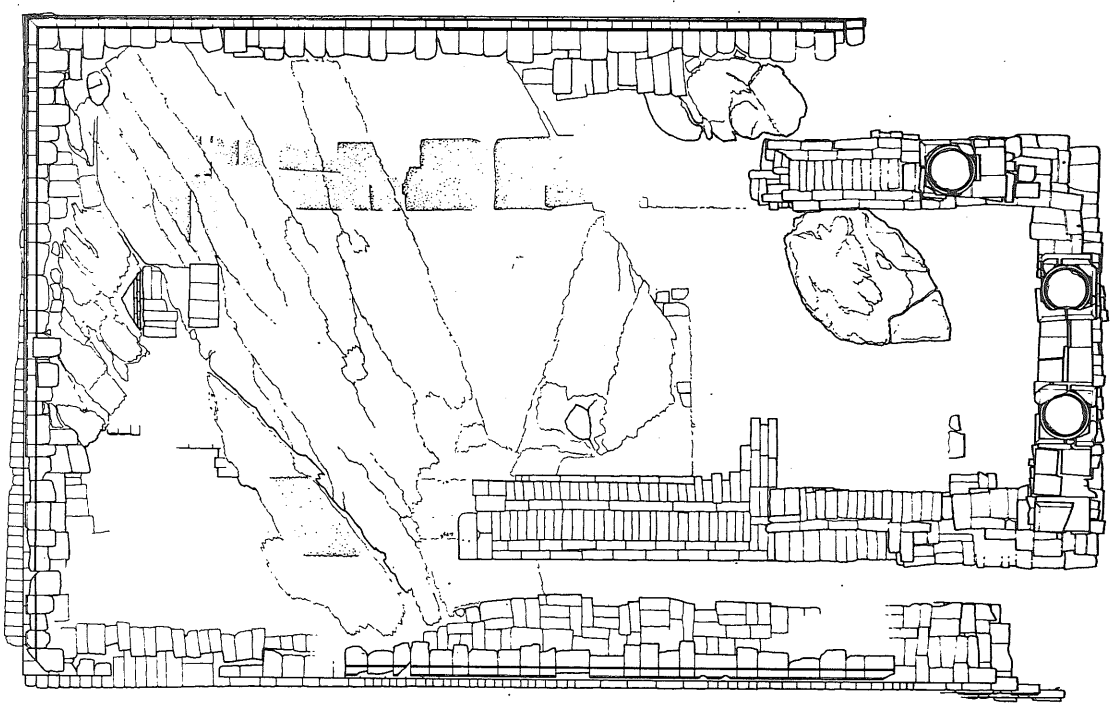
[21] Sector 26 of the fortifications may be Roman in date, from its width of 3.20 m., and have abutted the *temenos* wall originally. The curious dog-leg in the wall at this point may represent an attempt to join the Umayyad sector 25 with the Roman sector 26, after the northeast corner of the *temenos* had collapsed. An earlier suggestion, that the dog-leg was the site of a gate, was disproved in 1981.

[22] Butler, 1919: 43-6.

[23] Northedge, 1980: 141.

[24] The width of sectors 12 and 14 is not the same; possibly because of the earlier wall incorporated (sector 12: *temenos*, 3.20 m.,; sector 14: 3.40‡1.34 m.). However two other sectors, 22, which has evidence of refacing, and 26 are 3.20 m. in width, and probably Roman. The Umayyad wall is 2.50 or 4.00 m. wide (except sector 25).

[25] Dr. Fawzi Zayadine informs me that he dates a part of sector 23, excavated in Area A, to the 6th century A.D. I am indebted to him for this information.



PHILADELPHIA THE TEMPLE OF HERCULES

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

Only exposed in situ masonry and rock are shown. Leveling of the rock for foundations is indicated by stippling.

Fig. 12.

of the wall, with only a limited projection. Tower G is an exception, because it was an addition.

Of the sectors of wall described two, sector 25 and Gate C, have evidence that this work is to be dated to the Umayyad period. Elsewhere, in Area C, the construction of sector 8 was also dated to the Umayyad period.[26] With the exception of Tower B, the towers whose dates are known belong to the Umayyad period, that is, Tower A[27], Tower E[28] and Tower G.

Tower A gives us the closest dating: it is bonded with the palace, and thus may be dated by it, i.e., to the late Umayyad period (105/724 - 126/744).[29] Indeed it is most likely that Umayyad construction in the fortifications would belong to the same project as the palace, for the Umayyad period is a very short one. The implication of this, of course, is that much of the Umayyad occupation of the Qal'a represents a single architectural development — an Umayyad fortress or citadel (presented in Fig. 13), and we hope to explore this idea further in the future.

3) Restoration:

Traces of the revetment, and the rebuilding of buttresses with sloping facades, are visible at many points around the walls (Sectors 5, 8, 9, 12, 13, 14, 20, 22, 23). However the only point apparently where the revetment is overlaid by later construction is adjacent to Tower E in Area D: the first buttress in sector 9 was rebuilt with a sloping façade to cover an apparent collapse; and tower, wall and revetment had been covered by a house built in the 'Abbasid period.[30] Thus the revetment and rebuilding of buttresses should be a response to damage to the Umayyad wall. It is likely that the damage stemmed from the earthquake of 130/747,[31] and the revetment is an early 'Abbasid restoration. The same evidence also tells us that the fortifications collapsed in the 'Abbasid period, perhaps in the third/ninth or fourth/tenth centuries.

4) Tower B (South Tower):

Tower B is a solitary addition to the Qal'a, of the Ayyubid period. As such it must have been a watch-tower to oversee the town. If our dating of the first half of the seventh/thirteenth century is correct, one might link the construction of the tower with the period of castle building that followed the battle of Hattin (583/1187). We may note the castles at Azraq, Qal'at as-Salt, 'Ajlun and Busra. It is surely significant for the Islamic history of Amman that only a watch-tower was built on a site that would have been ideal for a castle.

This fortification sequence has two new items for Jordan: firstly an Umayyad fortification wall. While the design is obviously related to Roman-Byzantine fortification, it is different from other Umayyad work, for example the square for plan with half-round towers. So far we know of only one parallel: Anavarza (Ar. 'Ain Zarba) in Cilicia is perhaps the best preserved of the cities of the *thughur,* the Early Islamic frontier against Byzantium. Two Early Islamic wall lines have been

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[26] Bennett & Northedge, 1977.

[27] Briefly described in Northedge, 1980: 140 as Room SE. This structure, 8.10 m. square, in the southeast corner of the *temenos* of the Northern Temple, appears to be a complex rebuild of a Roman room into a later tower, with the lower part of the tower filled up, and a new floor inserted 3.00 m. higher. The rebuild bonds with the palace.

[28] Bennett, 1979: Appendix B.

[29] Northedge, 1979.

[30] Bennett, 1979: Appendix B.

[31] Two Umayyad houses have been excavated, which collapsed on their contents (Harding, 1951; Bennett & Northedge, 1977). In the house excavated by Mrs. Bennett the skeleton of an individual apparently killed by the collapse was found. Our reasons for suggesting that the cause was the earthquake of 130/747 are (1) that the Umayyad construction at the Qal'a belongs to the end of the Umayyad period, that is, to the reigns of Hisham b. 'Abd il-Malik (105/724 - 125/743) or al-Walid b. Yazid (126/744); (2) doubts about the sources for Creswell's sequencing of the Aqsa Mosque (1940: 120), which appear to suggest more than one severe earthquake in the middle of the 2nd/8th century. Conflicts between Hamilton's archaeological sequencing (Hamilton, 1942), and the textual sources of Creswell's work cast doubts upon the idea that there was more than one earthquake of severe proportions. (3) the archaeological evidence that has recently emerged of the 130/747 earthquake, e.g. at Pella (McNicoll, et al. 1982).

[32] Hellenkemper, 1976: 380.

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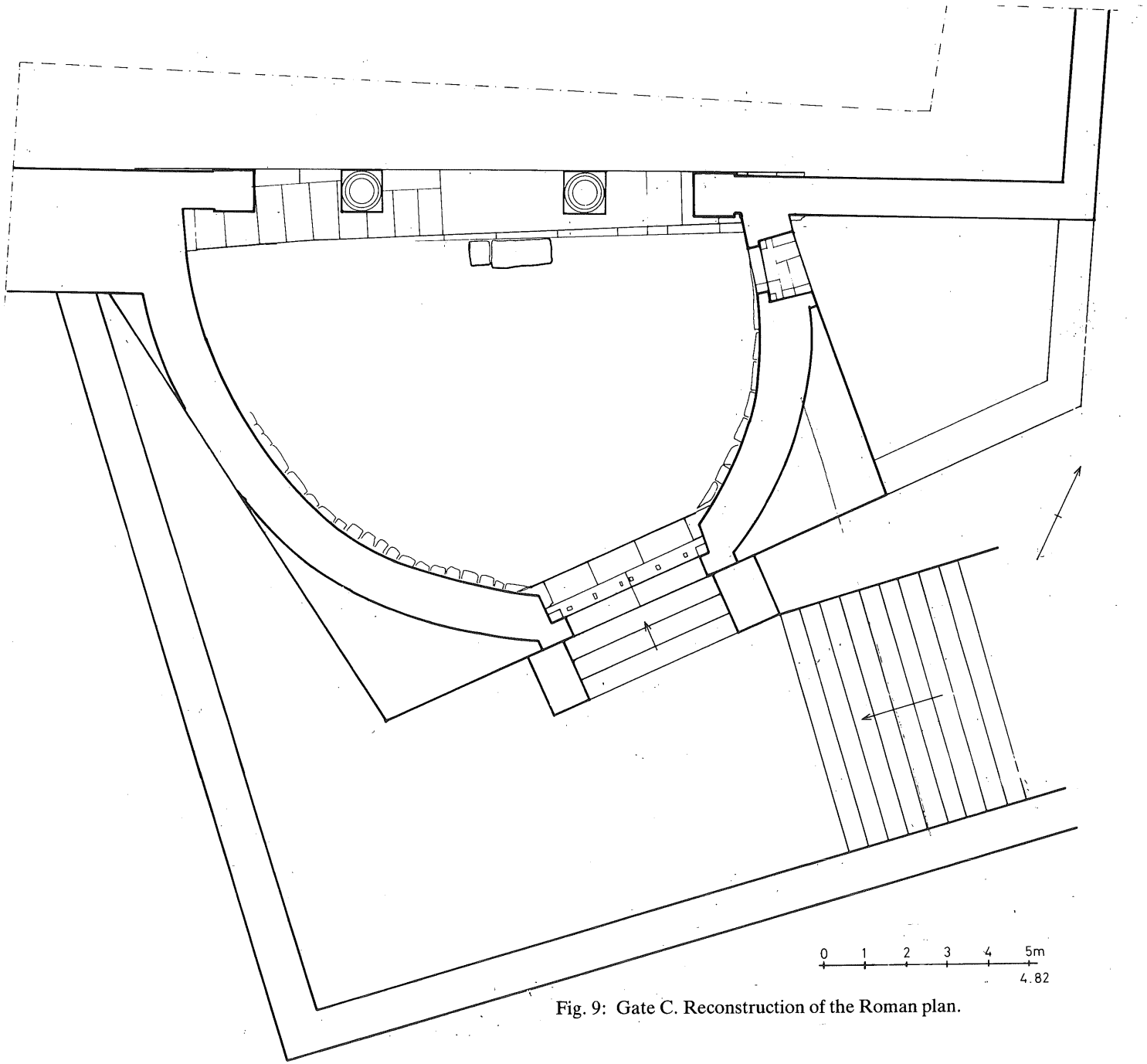

Fig. 9: Gate C. Reconstruction of the Roman plan.

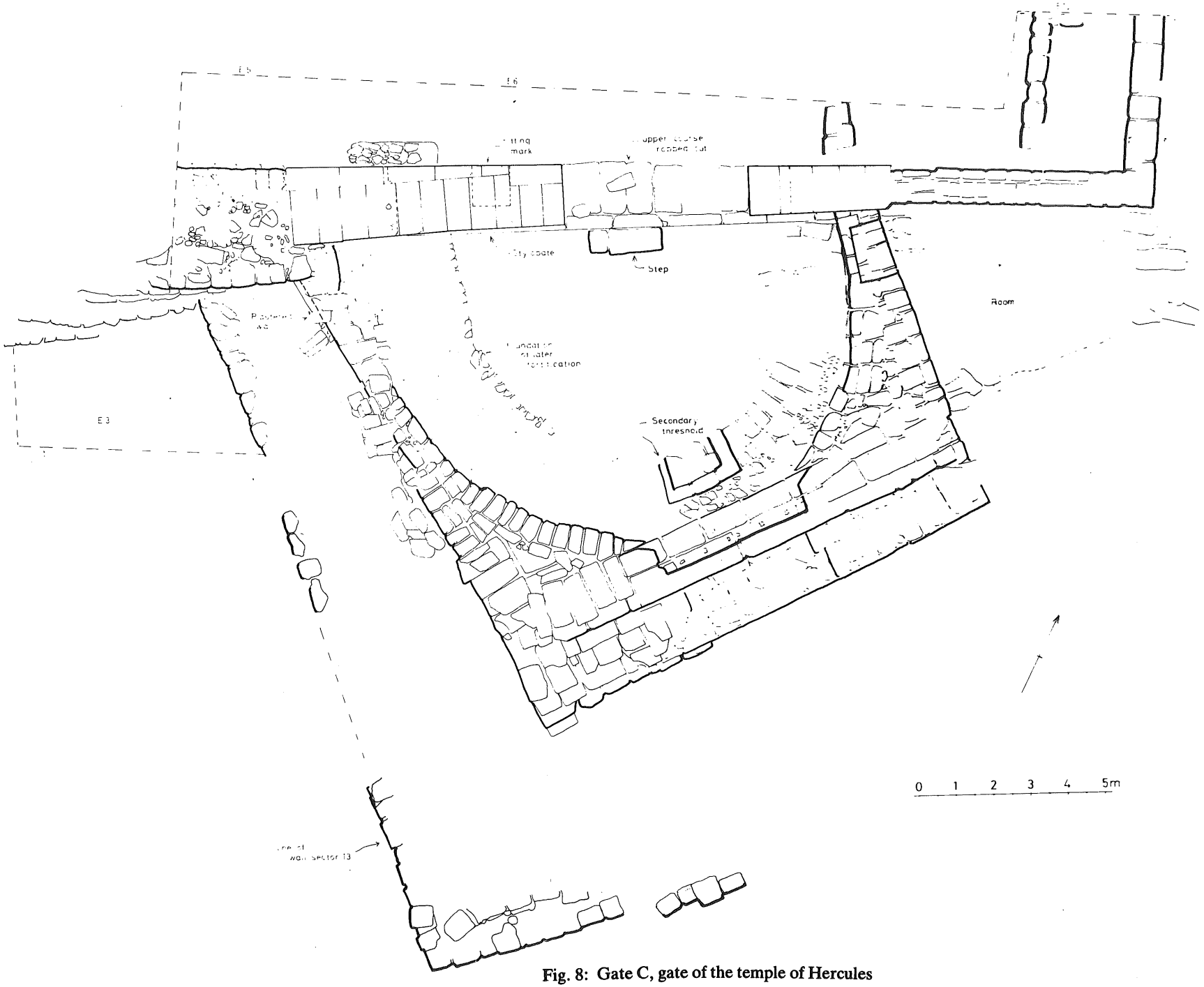

Fig. 8: Gate C, gate of the temple of Hercules

TECHNOLOGICAL ANALYSIS OF BLADES AND FLAKES FROM 'AIN GHAZAL

by
Gary O. Rollefson
and
Khaled Abu Ghaneima

Introduction

The analyses of chipped stone assemblages from later prehistoric periods in the Near East have until very recently concentrated primarily on typological grounds, effectively ignoring the vast amount of information contained in the unretouched flakes and blades commonly subsumed under the "waste" rubric. While the focus on the objects of a stone industry (i.e., the tools) is understandable in terms of cultural stability and change (cf. Mortensen, 1970), the means of production of these tools are of equal importance in cultural meaning. In fact, technological features become crucial when dealing with assemblages in which tools are rare (e.g., chipping stations), for there is little other information that can be used to determine cultural-temporal affinity.

The wealth of chipped stone tools from the 1982 excavations at 'Ain Ghazal provides an excellent opportunity to examine features of lithic manufacture which characterize this PPNB assemblage. It will also serve as a foundation for comparing techniques of flint knapping used by social groups at contemporary sites elsewhere in the Near East, and such an analysis can be used to detect similarities and differences in stone tool production in periods preceeding and following the PPNB.

A number of chipped stone artefacts were selected "semi-randomly" from one excavation trench (Sq. 3079) which, it was felt, would be representative of at least one part of the excavated areas at 'Ain Ghazal. The "semi-random" character of the sample should be understood to mean that while the artefacts were not selected in a statistically rigorous manner, the bags of artefacts were selected with no conscious bias or knowledge of what specific artefacts they contained.

In this preliminary analysis, several factors were chosen for monitoring which were deemed important in detecting specific methods and selected options which they may have cultural-temporal bearing. These features include artefact classes, platform types, "directionality" of blade production (see below), presence or absence of natural backing, relative amounts and location of cortex, skew angles, and raw material colour. While several authors have noted some of these features as distinguishing early Neolithic technologies from others (e.g. Mortensen, 1970; Stekelis, 1972; Moore, 1973), there are no published numerical treatments which allow quantitative comparisons among any assemblages. Furthermore, recent analyses of so-called PPNB burin sites (Betts, 1982, and personal communication; Rollefson and Frohlich, 1982) have called into question the reliance of strictly typological determinations of cultural-temporal associations, especially when diagnostic projectile points are not found in a particular site's inventory.

The features selected for this analysis obviously are not exhaustive, but with the limited time available, it was felt that this was the maximum amount of information we could monitor efficiently. Artefact dimensions are of prime importance for future analytical work, particularly measurements of specific flake landmarks such as the width and thickness of striking platforms. Additional features, such as relative platform reduction and platform angles, and finer classification of flake and blade forms are also called for in more detailed analyses.

Artefact Classes

Table 1 presents a breakdown of the general artefact classes in the sq. 3079 sample. The relative frequencies show close correspondence with those for the site as a whole (Rollefson, this volume, Table 1), suggesting that the "semi-randomness" of the sample is adequately representative for the technological features to be discussed below. In Table 1, the "crested elements" refer to core preparation flakes of various aspects (primary and secondary crest blades in Mortensen, 1970: 17-18) which are lumped here for the sake of brevity. The "Other" category includes flakes of rare but specifically recurring (in other samples) shapes or features. In the Sq. 3079 sample, one of these flakes is a primary core tablet (Mortensen, 1970: 17), two are burin spalls, one is a flake of bifacial retouch, another is an angular flake with very steep lateral edges, and the last is a "pseudo-primary crest blade" whose surface is covered with more than 50% cortex. All of the crested elements and "other" flakes are included in the Flake category for the tabulation of artefact classes for the entire site. In subsequent discussions, the debris and indeterminate material (effectively "large debris") will not be included.

Table 1. Absolute and Relative Frequencies of Artefact Classes from the Sq. 3079 Sample from 'Ain Ghazal

Class	*n*	%	%
Core	6	1.1	
Flake	194	35.7	41.8
Blade	309	56.9	58.2
Crested Element	28	5.2	
Other	6	1.1	
Subtotal	543	100.0	100.0
Debris	134	(19.5)	
Indeterminate	11	(1.6)	
Total	688		

Platform Types

The platform types monitored in this analysis are listed in Table 2. The plain platform type has a single facet and may be cortical or non-cortical. Dihedral platforms have two facets, and the multiple facet platform displays three or more facets.

For blades, punch platforms are normally punctiform in shape and usually display a heavy degree of platform reduction on the exterior edge. Occasionally the punch platform may be rather broad (usually with evidence of a single facet), but this is most likely a result of the vagaries of placing the punch on the core and is not a reflection of direct percussion near the edge of a core. For flakes (and some blades), the use of indirect percussion is evidenced solely by extreme platform reduction on the exterior edge of a thin but wide platform. On very thin flakes and blades, punch platforms frequently shatter; such shattered platforms were counted among the punch platform type.

The figures in Table 2 show substantial differences in flake and blade production. Of the flakes, only 36% had punch platforms, and these may relate primarily to the initial preparation of the crest on a blade core. In contrast, punch platforms dominate the blade class, with only 15% of the blades possessing other kinds of platforms. It is possible that plain platforms indicate a special kind of blade production, resulting in thicker pieces for particularly heavy-duty work. This subjective impression requires additional investigation involving correlations of blade measurements, platform dimensions, and specific tool types made on blades.

For the "Other" category in Table 2, crested elements and diverse flake forms were combined because of their small numbers. The angular flake had a plain platform, the core tablet and flake of bifacial retouch revealed multiple facet platforms (to be expected), and both burin spalls had crushed platforms (included in the punch type).

The frequencies of missing platforms reveals the amount of damage that occurred to the various elements either during the detachment from the core or after the pieces were discarded. One other factor involving missing platforms involves intentional removal while forming retouched tools, something that was not monitored for this particular analysis. The difference in missing platforms between flakes and blades may relate to the relative delicacy of the latter, although the high incidence of missing platforms among the normally robust crested elements tends to refute this interpretation.

"Directionality" of Blade Production

It has been noted that bidirectional blade cores are characteristic of the early Neolithic (Moore, 1973: 51), yet single platform cores are by no means unpopular (Rollefson, 1982). Although the typological classification of the cores from 'Ain Ghazal is still in progress, some indication of the popularity of blade core types might be revealed on the blades themselves.

In most cases, the negative scars on the exterior surface of a blade will show whether earlier blades from the same core were removed from a single platform or whether they were detached from opposed platforms. One factor can affect this "second-hand" determination, however, and in this respect the figures in Table 3 may be misleading: if a bidirectional blade core is very long, short blades removed from either platform may not extend far enough along the core to interesect negative scars originating from the other platform. Many of the blades in the Sq. 3079 sample are, in fact, rather short, and many were broken.

Strictly, the determination of directionality using negative blade scars should be limited to pieces, broken or complete, that are at least as long as half the median length of bidirectional blade cores in the assemblage. It has been acknowledged that time constraints affected the present analysis, yet a subjective attempt to abate this source of error was applied: if a complete blade was quite short (*ca.* 4 cm. or less) or if the broken blade was so short that any evidence of bidirectionality was unlikely to have been preserved, the case was deemed "indeterminate". This was the case in 20% of the blades in the sample.

However rigorously the figures in Table 3 are to be viewed, the nearly two-to-one ratio for unidirectional blades still is strong evidence for the popularity of single platform cores in the PPNB period. However, a third of the blades exhibit definite evidence of bipolar blade production, and this may have important consequences for assessing the probable age or socio-cultural affinity of many of the burin sites in the eastern deserts of Jordan, where unidirectional blade production is

Table 2. Absolute and Relative Frequencies of Platform Types on Flakes and Blades in the Sq. 3079 Sample from 'Ain Ghazal

	Flakes		*Blades*		*Other*	
Type	*n*	%	*n*	%	*n*	%
Plain	59	45.7	21	12.5	1	5.9
Dihedral	16	12.4	2	1.2	—	0.0
Multiple facet	7	5.4	2	1.2	2	11.8
Punch	47	36.4	143	85.1	14	82.4
Subtotal	129	99.9	168	100.0	17	100.1
Missing	65	(33.5)	141	(45.6)	17	(50.0)
Total	194		309		34	

Table 3. Absolute and Relative Frequencies of Evidence for "Directionality" Involved in Blade Production in the Sq. 3079 Sample from 'Ain Ghazal.

	Blades		*Flakes*		*Other*	
	n	*%*	*n*	*%*	*n*	*%*
Unidirectional	168	67.5	31	91.2	11	64.7
Bidirectional	81	32.5	3	8.8	6	35.3
Subtotal	249	100.0	34	100.0	17	100.0
Indeterminate	60	(19.4)			8	(32.0)
Total	309				25	

the norm (Rollefson and Frohlich, 1982; Rollefson and Muhaisen, n.d.).

The figures for directionality among the flakes in the sample reflect attempts at blade production that failed. In thirty-four instances, negative scars indicated previous removals of blades from a blade core, but in these cases efforts resulted in pieces with meandering lateral edges. Since all of these pieces are accidental products, the nine-to-one ratio of directionality is not very telling. In the "Other" category (considering only the crested elements), the correspondence with the blades is quite close, suggesting again that unidirectional blade production was popular.

Natural Backing

Attention to the production of naturally-backed elements (flakes and blades which have one steep edge covered with cortex) has not been very intense concerning Neolithic stone tools, but the influence of particular forms of raw material and specific methods of lithic manufacture adopted for tool production have been shown to be of particular importance for earlier prehistoric periods (Rollefson 1981a; 1981b). Analysis of materials from Jebel Uweinid (Rollefson and Frohlich, 1982) and the Kharaneh area (Rollefson and Muhaisen, n.d.) showed a dominating reliance on natural backing during the PPNB, although other contemporary assemblages from southern Jordan suggest a different approach to tool production (MacDonald, Rollefson, and Roller, 1982).

In all cases at 'Ain Ghazal, natural backing constitutes a minor element in the lithic techniques used at the site (Table 4). For finished tools (which have not been adequately sampled in this analysis), natural backing is even less evident.

Table 4. Absolute and Relative Frequencies of Cases of Natural Backing on Flakes and Blades from the Sq. 3079 Sample from 'Ain Ghazal.

	Flakes		*Blades*		*Other*		*Total*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Backed	7	3.6	23	7.4	2	5.9	32	6.0
Not backed	187	96.4	286	92.6	32	94.1	505	94.0
Totals	194	100.0	309	100.0	34	100.0	537	100.0

Cortex

The amount of cortex which occurs on the exterior surface of chipped stone artefacts is one measure of the efficiency of lithic production, although interpretations of this efficiency can become quite complicated due to the complex interrelationships among desired end-products (tools), available resources (tabular or nodular cores, or non-cortical flint/chert outcrops), methods employed in flake and blade production (especially direct vs. indirect percussion), resource abundance, and temporal-cultural development.

Among the flakes in the sample, some 15% are mostly cortical (Table 5), indicating preliminary preparation of cores for subsequent removal of flakes and blades. While nearly half of the flakes have little or no cortex, this contrasts sharply with the blade category, where nearly 88% of the pieces are relatively cortex free. In a Chi-Square comparison, this difference is significant at beyond the .001 level of significance. While some of the flakes produced in the early stages of core reduction at 'Ain Ghazal were intended for use as tools (as cortical scrapers, for example), the presence of even small amounts of cortex on blades made them unsuitable for conversion into tools.

Colour

Moore has noted a prevalence of, if not a preference for, purple-colored flint in the early Neolithic, and honey-colored flint was also a prized resource (Moore, 1973: 47). Certainly this must take into account the local availability and costs of obtaining such resources. While purple flint is relatively abundant in northwestern Jordan, for example, it is quite rare in parts of the eastern deserts of Jordan (cf. Rollefson, 1982).

The artefacts from the Sq. 3079 sample were sorted according to the colours listed in Table 6. This process was not simple, since there is a subtle gradation from one hue to another, and subjective assessments were sometimes necessary to distinguish between the categories. The use of a system similar to the Munsell colour charts would be preferable, yet the colours in the Sq. 3079 sample ranged far beyond the Munsell charts commonly used in Near Eastern archaeology. In other cases, more than one colour was present on an artefact; in these instances, the predominant colour was selected.

The prevalence of purple and pink flint, characteristic of the early Neolithic, is reflected in the figures in Table 6, where these colours account for a majority for all flakes, blades, and other material. A survey of the immediate vicinity of 'Ain

Table 5. Absolute and Relative Frequencies of Cortex Categories Among the Flakes and Blades in the Sq. 3079 Sample from 'Ain Ghazal. ("c.p." stands for cortical platform).

	Flakes		*Blades*		*Other*	
	n	%	*n*	%	*n*	%
No Cortex	87	44.8	243	78.6	27	79.4
None except platform	6	3.1	3	1.0	—	0.0
1-10% Cortex	14	7.2	20	6.5	3	8.8
1-10% with c.p.	8	4.1	2	0.6	—	0.0
10-50%	44	22.7	36	11.6	2	5.9
10-50% with c.p.	5	2.6	1	0.3	1	2.9
50-90%	14	7.2	4	1.3	—	0.0
50-90% with c.p.	2	1.0	—	0.0	1	2.9
100% except platform	9	4.6	—	0.0	—	0.0
100% with c.p.	5	2.6	—	0.0	—	0.0
Total	194	99.9	309	99.9	34	99.9
Cortical platforms	26	(13.4)	6	(1.9)	2	(5.9)

Ghazal is necessary to determine whether this selection reflects locally available resources, or whether special efforts were necessary to obtain this flint from farther afield. (Such a survey is planned for 1983).

The other colours are less meaningful at this stage of the analysis, although the rare occurrence of butterscotch flint is restricted to blades. (A similar situation was noticed at 'Ain el-Assad; cf. Rollefson, 1982). We have the subjective impression that gray flint is generally grainier and less homogeneous than the other materials, and its relative popularity among the flakes may relate to the manufacture of generally cruder tools used in heavy-duty tasks. In some cases, however, gray flint is an excellent material, used in many cases for projectile points.

Skew Angles

Attention to this feature of lithic technology is a relatively recent development (Leach, 1969), and its importance in assessing the selectivity of specific blades and flakes for use as tools has been shown to be critical in earlier prehistoric periods (Jelinek, personal communication, 1977). The skew angle classes used in this analysis measure the divergence of the direction of force applied to the core (the axis of force) and the resulting axis of the flake or blade relative to the platform. Normally, the axis of force is applied 90° (perpendicular) relative to the plane of the platform, but the longest measurement from the point of percussion to the terminal point of the flake or blade is not along that 90° axis in all cases. The angle classes in Table 7 are taken from the Tabun Cave analysis (Jelinek, personal communication, 1977).

The results of the skew angle analysis are presented in two forms in Figure 1. In absolute counts (the numbers of flakes and blades for which this feature could be measured), the orthogonal products (Class 5) are the most frequent for both flakes and blades. The histograms (Fig. 1, bottom) indicate a more random distribution of divergent flakes, with a slight right-handed skew. Blades, on the other hand, show a much more marked kurtosis in the orthogonal class with a narrower range of divergence from the axis of force. The graph showing percentages of flakes and blades in each skew angle class (Fig. 1, top) reflects these differences more markedly.

Figure 1 demonstrates the high degree of skill and careful attention paid to blade and flake production at 'Ain Ghazal. For blades, in particular, the heavy reliance on indirect percussion resulted in predictable shapes, reflecting the efficiency of this

Table 6. Absolute and Relative Frequencies of Colours Among the Artefacts in the Sq. 3079 Sample from 'Ain Ghazal.

	Flakes		*Blades*		*Other*	
	n	%	*n*	%	*n*	%
Brown	33	17.8	60	21.5	2	6.9
Tan	20	10.8	36	12.9	3	10.3
Butterscotch	—	0.0	8	2.9	—	0.0
Pink	11	5.9	7	2.5	4	13.8
Purple	89	48.1	141	50.5	19	65.5
Gray	30	16.2	24	8.6	1	3.4
White	2	1.1	3	1.1	—	0.0
Subtotal	185	99.9	279	100.0	29	99.9
Indeterminate	9	(4.9)	29	(9.4)	5	(14.7)
Total	194		309		34	

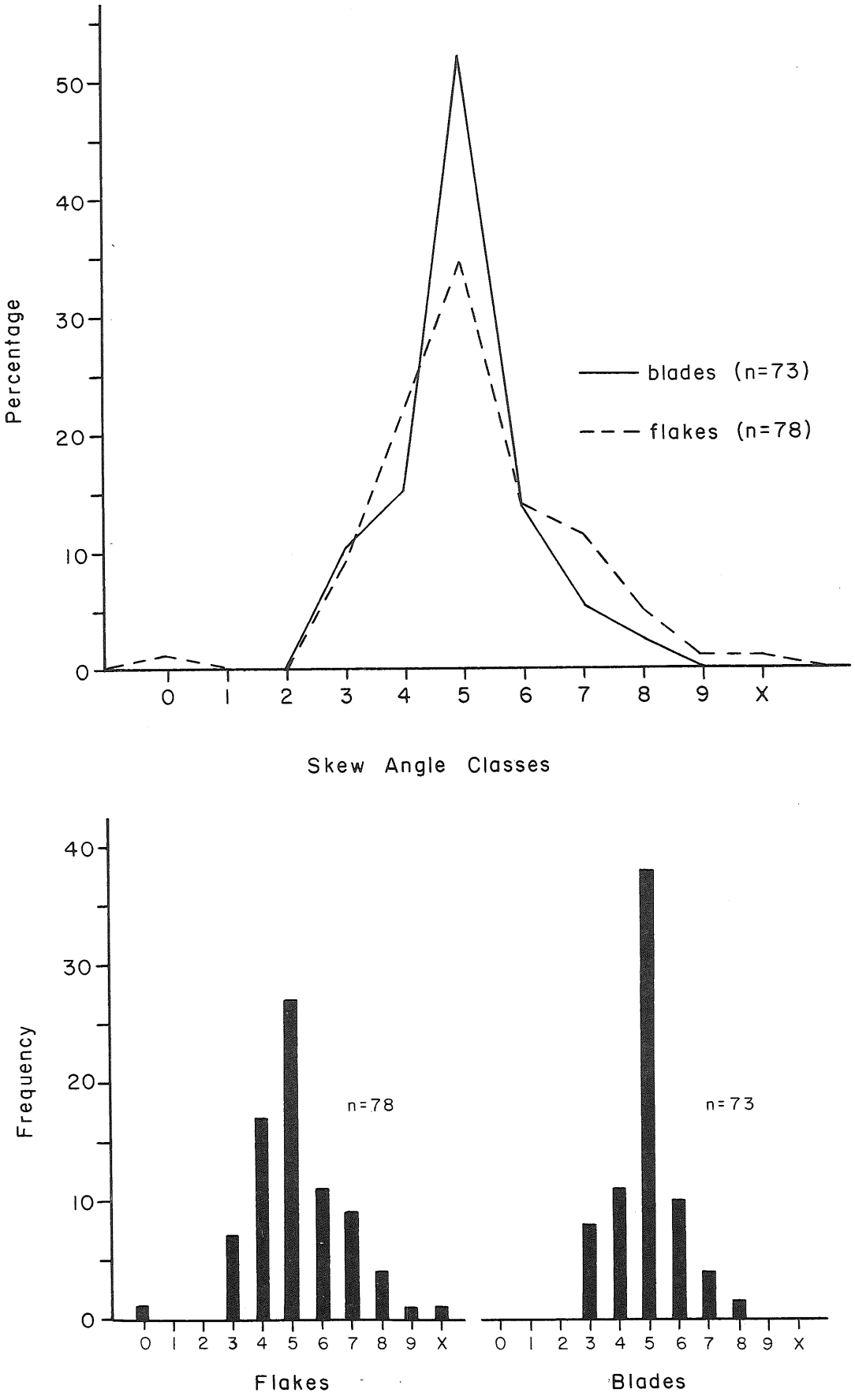

Fig. 1 Relative (top) and absolute frequencies of skew angle classes among blades and flakes in the Sq. 3079 sample from Ain Ghazal.

Table 7. Skew Angle Classes Used in the Analysis of the Sq. 3079 Sample of Flakes and Blades (after Jelinek, 1977).

Class	*Degree Range*	*Class*	*Degree Range*	*Class*	*Degree Range*
0	0-30	4	75-85	8	120-135
1	30-45	5	85-95	9	135-150
2	45-60	6	95-105	X	150-180
3	60-75	7	105-120		

method of blade production. In contrast, the blades and flakes from the Jebel Uweinid and Kharaneh burin sites was more haphazard, probably because direct percussion techniques were used so predominantly. Similar cases of the correlation of punch techniques and orthogonal blades have been noted at other Neolithic and Epipaleolithic sites in Jordan (Rollefson, n.d.).

Summary

The technological analysis of flake and blade production in the Sq. 3079 sample from 'Ain Ghazal provides a first step for developing a systematic foundation of comparing lithic technologies used by early Neolithic flintworkers in the Near East. Although little comparable material is now available from larger villages from this time period, future investigations utilizing this approach could add to our understanding of the degree of sharing of lithic traditions among contemporary peoples.

Whatever may be the traditional relationships among the permanent populations of the area during the PPNB, certainly the occupants of the specialized PPNB camps (burin sites) from the eastern deserts of Jordan used more diverse methods of stone tool manufacture. In some cases the diversity is of a magnitude to call into question whether the PPNB assignation is legitimate: although the desert sites may be of comparable age, the traditions of chipped stone tool manufacture evident in the assemblages from the eastern areas suggest a cultural milieu and resource exploitation quite different from the more established social groups of the western highlands.

Within the 'Ain Ghazal area itself, it is apparent that the flintknappers demonstrate a sophisticated and efficient set of methods for producing stone tools. How closely the traditions at 'Ain Ghazal are related to other major population centres in the area remain to be determined.

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SURVEY OF PPNB STRUCTURES AT 'AIN GHAZAL

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Introduction

In March 1982 a survey was conducted to identify, describe, and record PPNB structures exposed in roadcuts and bulldozer terraces at Ain Ghazal. Summary descriptions of each structure are provided below.

Several details of the architecture noted during the survey are redundant from structure to structure. Although some instances were noted in the sections that resembled decayed mudbrick *(libn)* (H. Franken, personal communication), there was no clearcut evidence that this material was used consistently for wall construction. Instead, all walls were constructed of undressed stones set in mud mortar. Based on the results of the excavations this season, the interior surfaces of the walls were coated with a layer of mudplaster and finished with a thin *laminum* of fine white plaster which was sometimes coloured with red ochre.

In almost every case floors were made of fine lime plaster (often mixed with gravel) with a final finish of highly burnished lime plaster. The finishing of the floors was generally characterized by the addition of pulverized red ochre and fine clay, producing a result very similar to highly sophisticated portland cement (F. Koucky, personal communication).

In many cases, as noted below, floors were replastered one or more times, with "repairs" extending across the entire surface. Often this repair work appears to correlate with subfloor burials, although more excavation is necessary to substantiate this hypothesis.

Walled Commercial Compound

Nine buildings were located in a commercial compound cut into the southern section of the site. Because of the nature of the construction in this area, as well as on-going commercial activity, it was not possible to determine precise locations for the PPNB structures in this part of the site. The positions of the buildings in this section in (Pl. XCIX, 1-2) (Rollefson, this volume) are approximate.

Structure 1:

(S1). North-south running wall which disappears into the west and south baulks of the bulldozer cut. This is evidently the west wall of a building with a plaster floor which bore no evidence of the use of red ochre. Floor thickness ranges from 0.04-0.06 m., with one possible repair. Wall stands to *ca.* 1.40 m.; length of exposed structure is *ca.* 7.00 m.

S2. Located approximately 11.00 m. north of S1.

a) Traces of two stone walls with a 0.04-0.06 m. thick plaster floor running N-S between them. Length of structure is *ca.* 4.50 m.

b) Remains of a packed mud surface (floor?) approximately 2.00 m. in length occurs 0.10-0.15 m. below the floor in a), not associated with any visible walls.

S3. Located *ca.* 1.00 m. north of S2. N-S running wall *ca.* 8.00 m. long standing *ca.* 1.40 m. high. Associated with two floors:

a) Upper floor *ca.* 0.6 m. thick with one possible repair. No evidence of red ochre.

b) Lower floor *ca.* 0.25 m. below the Upper floor, in very poor condition. Possibly one or more repairs. No evidence of red ochre. Thickness undetermined (at ground

level).

S4. Located *ca.* 25.00 m. north of S3. N-S running wall abuts with E-W wall on south end. N-S wall *ca.* 2.00 m. long and 0.40 m. high; E-W wall *ca.* 0.50 m. wide and 1.20 m. high. No floors visible in the section.

S5. Located approximately 1.00 m. north of S4. An E-W wall of obscured dimensions stands at least 0.50 m. high, at the southern end of a 2.00 m. length of plaster floor *ca.* 0.10 m. thick. At least three repairs in this floor, at least two of which bear a red ochre finish.

S6. Located 1.50 m. north of S5. Remnants of a N-S wall *ca.* 2.40 m. long, standing 1.60 m. high. No associated floors visible in the section.

S7. Evidently a SE corner of a building, with one wall running into the north section, the other into the west section. The latter wall may abut or bond the wall in S6. Height of both walls is approximately 1.00 m. No floors visible in the section.

S8. Located *ca.* 1.00 m. east of S7. A single wall running into the north section, *ca.* 0.50 m. wide and 0.65 m. high. No floors visible.

S9. Located *ca.* 1.50 m. east of S8. Wall parallel to S8, *ca.* 0.50 m. wide and 1.50 m. high. No associated floors visible. It is possible that S8 and S9 are walls of a single structure.

Parking Lot Area

Structures visible in this and other sections of the site could be located according to our 5.00 x 5.00 m. grid system.

S10. (Sqs 3445/3645). E-W wall 2.50 m. long, 1.20-1.30 m. high. Possibly the north wall of a building. No floors visible.

S11. (Sq 3645). Fallen wall lying on its thin white plaster facing. Length of fallen wall 2.50 m. No floor visible, but there is a "pebble pavement" located *ca.* 0.80 m. below the fallen wall. (This could be a stabilized erosional surface).

S12. (Sqs 3846/4046). NE corner of a building, with one wall running into the south section, the other into the west section. Height of both walls *ca.* 0.50 m. Small exposure of a plaster floor *ca.* 0.08-0.10 m. thick visible in the corner. No evidence of red ochre.

S13. (Sq 4246). Small exposure of a poorly preserved plaster floor. Southern wall is *ca.* 0.40-0.45 m. thick; the mud mortar has changed to an orange-pink colour by fire. The northern wall is poorly preserved, but stands *ca.* 1.25 m. high in places. The two walls may represent the SE corner of a building.

S14. (Sqs 4046/4246). Possibly part of S13. Exposure of a 0.04 m. thick plaster floor finished with red ochre. North wall is severely damaged.

S15. (Sqs 4247/4248). Southern E-W wall 1.20 m. high and *ca.* 0.45 m. thick. Only traces of a northern wall remain. Between them is a 0.14 m. thick floor with at least three repairs. All phases of this floor were finished with red ochre. Length of structure: 7.40 m. *Note:* this building may be associated with the manufacture of polished stone bracelets.

S16. (Sq 4249). Southern E-W wall is quite thick (0.80 m.) and may be two abutting walls; height 1.00 m. Northern wall is also thick (0.77 m.), standing 0.82 m. high. The mud mortar in the Latter wall has changed to an orange-pink colour due to fire. Between these walls is a series of three floors:

a) Upper floor. 0.055 m. thick, 1.13 m. long. At least one repair. Both surfaces finished with red ochre.

b) Middle floor 0.40 m. below the upper floor, 0.13 m. thick and *ca.* 1.00 m. long. Two repairs; all surfaces finished with red ochre.
c) Lower floor *ca.* 0.50 m. below the middle floor. Short exposure (0.30 m.), 0.6 m. thick. Finished with red ochre.

Because the distance between the walls is so small (1.70 m.), it is possible they represent the NE corner of a building. The lowest floor may not be associated with the walls.

S17. (Sq 4250). The southern wall of this structure is the northern wall of S16. The northern wall of S17 is 0.45 m. thick and 1.31 m. high. A plaster floor 0.13 m. thick and 2.86 m. long extends between the two walls. The floor, finished with red ochre, has at least two repairs. *Note:* S16 and S17 are probably two rooms of a common building. The floor in S17 appears to be contemporary with the middle floor of S16.

S18. **(Sqs 4250/4251).** N-S running wall (the western wall of a building) 4.55 m. long and *ca.* 0.80 m. high bonds with a small exposure of an E-W wall that runs into the west section on the south. Two floors are visible:
a)Remnants of a 0.06 m. thick plaster floor finished with red ochre. Length undertermined.
b)Remnant (0.75 m. long) of a 0.03 m. thick plaster floor finished with red ochre, *ca.* 0.45 m. below the upper floor. *Note:* remains of a child burial found in the SW corner of this building, but due to severe damage by a bulldozer, it cannot be determined definitely with which floor it is associated. However, although the upper floor is poorly preserved, the thickness suggests a repair, often associated with subfloor burials.

S19. **(Sqs 4452/4454).** A "building complex" 15.00 m. long with four rooms. Southernmost wall 0.69 m. thick, the northernmost wall at least 0.60 m. thick (partially obscured); interior walls of comparable thickness. The southernmost room is 5.50 m. long between the walls; south central room is 2.50 m. long; the north central room is *ca.* 3.50 m. long; and the northernmost room is 2.50 m. long between the walls. A single floor exists in each room, varying from 0.04-0.10 m. in thickness, with at least one repair in all rooms. Red ochre finish evident in all but the northernmost room.

S20. (Sqs 4454/4455). Three plaster floors adjacent to S19. (Possibly a fifth room of S19?).
a)Uppermost plaster floor is poorly preserved, dimensions not determinable.
b)Middle floor also poorly preserved, 0.05 m. thick and 0.97 m. long. This floor is possibly contemporaneous with S19.
c)Lowest floor appears only as remnants in the section, dimensions not ascertainable.

None of the floors bears evidence of the use of red ochre, but it must be emphasized that all are severely damaged. Approximately 2.50 m. north of the northern wall of S19 is a plaster-lined pit filled with fine ash, although it is located in the center of a large ash filled deposit. This jug-shaped plaster feature is 0.37 m. wide, 0.44 m. deep, with walls 0.06 m. thick. *Note:* a sub-adult burial was excavated from beneath the middle floor, but it may not be associated with this floor since it was an extended burial in an ashy rubble deposit.

S20A. (Sq 4455). A wall 0.60 m. wide and 0.40 m. high north of the floors and plaster feature may be associated with either the upper or middle floor, although neither floor runs up to the wall.

S21. (Sqs 4457/4458). A N-S running wall located high in the bulldozer cut. Stands up to 1.00 m. high at the

southern end, but is badly preserved to the north. Length: 4:00 m.

Stone Pavement. (Sq 4457). Large, flat, and angular stones along a level stretch extend approximately 5.00 m. No other structures appear to be associated with this feature. (S21 is located more than a metre above the pavement and was constructed after a period of severe erosion and deposition that covered the pavement).

S22. (Sq 4460). Remnants of a poorly preserved southern E-W wall, dimensions not discernable. Associated with remains of a plaster floor 0.06 m. thick and 1.10 m. long, finished with red ochre. The floor was repaired at least twice.

S23. (Sq 4462). Southern wall 0.60 m. thick and 1.55 m. high. Northern wall is badly damaged but quite thick: *ca.* 0.90-1.00 m. No floors were visible between the two walls. Distance between the walls is 4.80 m.

S24. (Sqs 4462/63). Possible collapsed wall high in the section, running N-S for 2.50-3.00 m. No visible floor. Does not appear to be associated with S23.

Structures S21-S24 are all located high in the bulldozer cut and appear to be later in date than the other buildings in the parking lot area. They also occur in and above heavy concentrations of ashy rubble deposit, a phenomenon that begins in the area of S20. It should also be noted that north of S20 the underlying Pleistocene deposits are quite undulating in contrast to the flatter and more regular surface in the southern area of the parking lot. The floors of "building Complex" S19 are heavily buckled and sinuous, attesting to either severe mudslides or earthquakes after the construction (and the possible reason for abandonment?).

Southern Highway Cut

Although dense ashy deposits and artefact scatters characterize the road cut east of the parking lot, only one structure was visible in the section.

S25. (Sqs 2864/65). A thin (0.02-0.04 m.) plaster floor extends for just more than 1.50 m., but no associated stone walls are visible. No evidence of the use of red ochre.

Central Highway Cut

S26. (Sq 3067). Bulldozers removed all traces of the southern wall(s), and severe erosion in antiquity obliterated the northern wall(s) of this structure. A series of three floors is visible.
a)Upper floor 0.08-0.10 m. thick with two repairs. Extensive use of red ochre. Sunken plastered fireplace. Length *ca.* 2.40 m.
b) Middle floor *ca.* 0.50 m. below the upper floor. *Ca.* 0.07 m. thick, with one repair. Extensive use of red ochre. Sunken plastered fireplace.
c) Lower floor 0.13 m. below middle floor, 0.07 m. thick with two repairs. Extensive use of red ochre. Sunken plastered hearth.
Note: One burial pit appears to exist beneath the far southern end of the lower floor.

S27. (Sq 3068). Southern wall 0.60 m. thick, 0.60 m. high. Only traces remain of a northern wall. A plaster floor 0.07 m. thick and 4.30 m. long between the walls. One floor repair. Extensive use of red ochre.

S28. (Sq 3069). Only a short section (1.25 m.) of a 0.07 m. thick plaster floor is visible, one repair. No evidence of red ochre.

S29. (Sq 3069). Located to the north and higher in the section relative to S28. Thick plaster floor (0.12 m.) with up to four repairs, length 1.50 m. Extensive use of red ochre.

S30. (Sqs (3070/71). Only remnants

m. thick. Between them is a plaster floor section, 0.015 m. long and 0.06-0.07 m. thick, with one repair and no apparent use of red ochre.

S49. (Sq 3499). Two plaster floors with no associated stone walls.
a) Upper floor is thin, with some use of red ochre.
b)Lower floor is also thin, some 0.50-0.60 m. below the upper floor.
Note: Due to the position of these floors high in the cliff face of the bulldozer section, further details were not obtainable.

S50. (Sq 3703). South wall is 0.50 m. thick and *ca.* 1.00 m. long; northern wall is 0.85 m. high and 0.60 m. wide. Badly damaged plaster floor with red ochre finish is 0.08-0.10 m. thick (with one possible repair) and at least 1.40 m. long. Possible human burial in the area (surface bones downslope were human).

S51. (Sq 5319). Few details were obtainable due to the location of this structure high above a precipitous road cut. Stone walls are visible as well as extensive use of red ochre.

S52. (Sqs 5319/5320). For the same reasons as S51, little information was obtainable beyond noting traces of walls and a relatively thick floor with extensive use of red ochre (based on plaster chips found below along the road cut).

Northern Highway Cut

Much of the surface of the area in this triangular section between the E-W road cut, the highway cut, and the NW-SE highway cut was removed to bedrock, yet a section of archaeological deposits of an ashy gray colour are deep and extensive all the way to the interchange overpass. Surface artefacts are PPNB, as well as the details of architecture and burial practices noted in a cut created for a water pipe.

S53. (Sq 3120). Southern wall is extremely thick (0.96 m.) and stands 0.80 m. high. The northern wall is 0.67 m. thick and 0.50 m. high. A plaster floor *ca.* 0.07 m. thick with one repair and finished with red ochre extends for 1.65 m. between the walls. This is evidently the SW corner of a building. A burial was excavated from beneath the floor near the SW junction of the floor and southern wall (Pl. XCIX, 2).

S54. (Sq 3122). No walls were visible in this section, but a thin (0.03 m.) undulating plaster floor extended for 1.44 m. No evidence for the use of red ochre.

Summary and Observations

Fifty-four buildings were noted in the survey, some of which may have been components of common structures (e.g. S8 and S9, S16 and S17, S19 and parts of S20, etc.). Floor elements in these structures add a measure of complexity in terms of the contemporaneity of occupations: Seventy-one separate floors are scattered among the fifty-four buildings (several of which have no associated floors). In thirteen areas the same location was used at least twice for subsequent inhabitation, and in the case of Sqs. 3073/3273, six major occupational episodes are evident.

The pressures involved in the salvage nature of this season's work precluded the use of a theodolite to determine absolute elevations of floors and wall bases in this survey. Such information would have been useful for establishing at least a rough stratigraphic correlation for many of the structures. Enough time is available for future determinations of these values which, coupled with controlled excavation sampling, will provide much more useful data than were obtainable under the limitations of the 1982 season.

Some subjective generalizations can be made on the basis of the present evidence, however, although they are tentative and require substantiation in future excavation.

1) Although floor thicknesses are quite variable, it apears that the common thickness for unrepaired floors centres between 0.03 and 0.04 m. It is possible that the earliest inhabitants at 'Ain Ghazal made even thinner floors, averaging 0.02-0.03 m. in thickness.

2) Unrepaired floors thicker than 0.06 m. are rare, at least in those structures built directly atop undisturbed Pleistocene clay. Floors in the Uper Bulldozer Section, Central Highway Cut (S41-S47), presumably later in part than the buildings in the lower section (S26-S40), are generally thicker, but this may be due to the thick rubble "floor foundation" on which the plaster was spread.

3) Where stratigraphic relationships are distinct (especially S32A-S32B and S39-S39A-S40), it is clear that the earliest floors are very thin compared to later constructions. Although these earliest floors are poorly preserved, there is no evidence of the use of red ochre or of the sophisticated, highly burnished portland cement finish.

4) Dimensions cited in the summary descriptions should be treated with great caution. In some cases, walls which were interpreted to relate to exposed floors did not, in fact, touch them, so some of the extreme dimensions mentioned above may be inaccurate. On the other hand, wall lengths of 8.00 m. (e.g., S3) do occur.

5) Another factor concerning structure dimensions should be raised at this point. Although several rectangular structures excavated this season (especially S32A, S39, and S40) were aligned in an approximate N-S direction, other buildings had other orientations (cf. S13 and S46). Since diagonal measurements across corners would reflect misleading dimensions, this factor must be kept in mind. Nevertheless, even if the principal axis of the S19 complex were not coincident with the exposure along the bulldozer cut, the building would still have minimum dimensions of 10.00 x 11.00 m. if the 15.00 m. was measured on the diagnoal (larger dimensions if S20 is included).

6) Several instances of multiroomed structures are evident in the exposures (especially S19), a construction technique confirmed by the excavations in S40 (See 'Ain Ghazal preliminary report, this volume). The presence of possible single-room buildings at the site cannot be determined on the basis of the present data, whether from this survey or from the excavation sample.

7) There is some evidence to suggest that the buildings at 'Ain Ghazal cluster into two or three (or more) groups. A number of facets of three-dimensional site geography remain to be tested on this score, however, especially the natural stratigraphic relationships of the buildings.

If the positions of S21-S24 high in the parking lot area can be attributed to a later period than those buildings farther to the west (which is a complicated issue in view of the contours of the Pleistocene substratum in this vicinity), three general clusters emerge: The Southern Cluster includes S10-S20; the Central Cluster is comprised of S26-S48 (and posssibly S25); and a poorly defined Northern Cluster is made up of S49-S54. The association of S1-S9 with the rest of the site is not entirely clear, although presumably they would relate to the Southern Cluster if they do not constitute a separate cluster by themselves.

If these clusters are real in a contemporaneous sense, the implications are difficult to assess. Presumably they could reflect socio-cultural distinctions among the inhabitants, perhaps based on kinship. The relatively large numbers of polished stone bracelet fragments found near S15 could indicate economic specialization, an interpretation supported by the near-industrial proportions of ashy deposits that dominate the space between the southern and Northern Clusters.

8) The S19 complex does not appear to have any parallels at other PPNB villages in the Near East. Artefacts collected from the surface near this structure were not diagnostic enough to indicate the function of the building, but the sheer size of it compared to other structures at the site suggests some public role in the community.

This survey has demonstrated the density of domestic and possibly public buildings throughout six or more major

remain of a southern wall, and the northern wall is also severely damaged. Two floors are associated:
a) Upper floor is 0.08 m. thick with one repair and no evidence of red ochre. Length 4.30 m.
b) Lower floor is thin (2.5 cm.) 0.25 m. below upper floor. Extends under the southern wall. No evidence of red ochre.

S31. (Sqs 2871/3071). Southern wall is severely damaged, and only traces remain of the northern wall. Thick plaster floor (0.10-0.12 m.) with at least one repair and extensive use of red ochre. Floor extends for 4.30 m. *Note:* a cache of 84 blades (no tools) was found under the floor, but no evidence of a pit cutting through the earliest phase of the floor was visible.

S32A. (Sqs S3072/73). The earliest evidence of construction in this complex is a thin (0.02-0.03 m). plaster floor with no evidence of red ochre. No walls associated with this floor, which is 1.65 m. long.

S32B. S32A was cut for the construction of a house 6.15 m. long. Southern wall is *ca.* 0.45 m. thick; the northern wall is barely detectable. N-S running western wall stands a metre high in places. All walls were covered with mud plaster and finished with white plaster stained with red ochre. Post molds at the south and north ends as well as the centre of the western wall. Two floors associated:
a) Upper floor is 0.02-0.03 m. thick with spattered use of red ochre.
b) Lower floor is 0.60 m. below the upper floor. Similar thickness and designs.

Both floors used the same walls and posts.

S32C. Located approximately 1.00 m. above the upper floor in S32B. Thin *(ca.* 0.03 m). plaster floor with extensive use of red plaster. Curbed plaster feature near the centre of the floor extends under the western baulk; function is speculative, but it resembles a drain. No walls in association.

S33. (Sqs 3074/75). Two-roomed structure 5.70 m. long. Southern wall 0.60 m. thick and poorly preserved; centre wall 0.48 m. thick, 0.50 m. high; northern wall 0.40 m. thick and 1.40 m. high. Distance between south and centre wall is 0.90 m.; between centre and north walls 3.70 m. Plaster floor extends *under* all three walls, 0.08-0.12 m. thick with two repairs. Extensive use of red ochre. (Pl. XCIX, 1).

S34. (Sq 3076). Only traces remain of the southern wall; the northern wall is not visible. Plaster floor 4.75 m. in length, up to 0.12 m. thick with at least one repair. Possible re-plastered sunken fireplace. Extensive use of red ochre.
Note: burial excavated from the southern end of the structure.

S35. (Sq 3077). Southern wall 0.50 m. thick and 0.70 m. high; only traces remain of a northern wall. One plaster floor (one repair) extends 5.50 m., 0.06 m. thick. No evidence of red ochre.

S36. (Sqs 3078/79). Southern wall 0.75 m. thick; only traces remain of a northern wall. An 0.08 m. thick plaster floor with one probable repair extends 5.70 m. No evidence of red ochre.
Note: Burial excavated from beneath the southern end of the floor.

S37. (Sqs 3079/80) Only two stones remain of a possible southern wall; northern wall is also severely damaged. A plaster floor 0.08 m. thick (with at least one repair) extends 5.20 m. Use of red ochre is not intensive.
Note: Four sunken plastered

fireplaces associated with four sub-floor burial pits, three of which were excavated.

S38. (Sqs 3080/81). Only traces of a southern wall exist, and the northern wall appears to have been completely destroyed. Traces of a 0.05 m. thick floor are visible, as is the use of red ochre. A pit exists beneath the floor, although it is not clear if this is a subfloor burial or simply a feature antedating the construction of S38.

S39. (Sq 3082). Possible southern wall is very obscure, but northern wall is 0.50 m. thick and stands 0.60 m. high. Plaster floor 6.30 m. long, up to 0.12 m. thick with one repair. Extensive use of red ochre on both surfaces. Two super-imposed sunken plastered fireplaces associated with two burial pits (one excavated) near southern end of floor.

S39A. (Sqs 3082/83). A thin (0.02-0.03 m.) plaster floor extends for more than 0.60 m. cut by the construction of S39 and S40. No evidence of the use of red ochre. Analogous to the floor of S32A.

S40. (Sq. 3083). Two-roomed structure. See 'Ain Ghazal preliminary report, this volume.

Upper Bulldozer Section, Central Highway Cut

S41. (Sqs 3267/68). N-S running wall 0.40 m. high, 4.25 m. long. No floors visible.

S42. (Sq 3272). No walls are visible associated with a small section of a plaster floor that extends 1.00 m., thickness 0.06 m. One repair of the floor, both surfaces with red ochre finish. Another floor, poorly preserved, appears to exist approximately 0.10-0.15 m. below.

S43. (Sqs 3274/75). N-S running wall up to 0.80 m. high, broken in several places, extends for more than 2.00 m. No visible plaster floors visible in association, although a stabilized surface under a thick deposition of rubble exists.

S44. (Sq 3278). Only traces of a southern wall exist, but 3.00 m. to the north is a wall 0.45 m. thick that stands 0.45 m. high. Between them is a plaster floor with one possible repair (0.09 m. thick). Heavy ash accumulation on the floor near the northern wall. No evidence of red ochre.

S45. (Sq 3279). Only traces of possible southern and northern walls exist. Plaster floor up to 0.06 m. thick has one repair and extends 4.20 m. Use of red ochre is evident but not pronounced. One sunken plastered (and repaired) fireplace is evident just north of a robbed-out sub-floor burial (some human ribs and vertebrae are visible in a scoopedout pit beneath *ca.* 3.00 m. of overburden).

S46. (Sqs 3283/84). A wall running SW-NE is 0.60 m. high and *ca.* 3.00 m. long. To the north in the section is a wall 0.53 m. thick and 0.40 m. high. Between the walls is a plaster floor 4.00 m. long and 0.05-0.06 m. thick with some use of red ochre. Distance between the two walls is 8.70 m. *Note:* It is possible that the SW-NE wall is not associated with the northern wall and floor.

S47. (Sq 3284). Possibly a room of S46, since a plaster floor apears to be associated with the northern wall of that structure. The floor is very poorly preserved, up to 0.06 m. thick with one possible repair. Use of red ochre is evident. Some stones to the north of the floor sections may be a collapsed northern wall of the room.

S48. (Sq 3287). A N-S running wall is 3.85 m. long and badly damaged. A northern wall is 0.70 m. high and 0.44

phases of occupation at ʿAin Ghazal. But the information retrieved during this facet of the investigations at the site is only a first step in the process of extracting the wealth of prehistoric data still contained in the deposits on the banks of the Wadi Zarka.

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NELSON GLUECK AND EARLY BRONZE AGE MOAB

by
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Effort to reconstruct the historical and chronological framework of the Levant's Early Bronze Age (hereafter EBA) has increased markedly since World War II (Callaway, 1978: 46). Major excavations of EBA remains have been conducted in Palestine at sites such as Tell el-Far'ah (North), Jericho, Arad, and 'Ai (et-Tell); less intensive investigations have been carried out at the Transjordanian sites of Ader, Khirbet Iskander, Iktanu, Ara'ir, and more recently (and more extensively) at Bâb edh-Dhrâ' and Numeira. These excavations and a large number of archaeological surveys on both sides of the Jordan River have resulted in a much better understanding of the EBA.

Particular attention has been given to the beginning and end of the third millennium and to the people movements and/or indigenous developments that are associated with these transitions. Much has been written about EB IV-MB I (Dever's EB IVA-C), especially with regard to its alleged connection with the "Amorite invasion" of Palestine (for discussion and bibliography on this issue, see Dever, 1980: 53-58; Richard, 1980: 8-12). The non-urban character of this period and its relatively impoverished level of material culture are well known. Indeed, since Palestine's urban culture came to an end during EB III, a gap existed in the archaeological record following this period, and there was little material that could be placed in EB IV even as late as 1971. This situation prompted Wright (1971: 285) to predict that this dark age would be penetrated through the exploration of cemeteries (Dever, 1973: 41-56).

In an essay written in honour of Nelson Glueck, Dever (1970: 136) emphasized the material poverty of EB IV by pointing to the few deposits of post-destruction (or post-abandonment!) period remains that were known in 1970: Tomb 351 at Jericho, Tell Beit Mirsim Stratum J, artefacts from the soundings at Ader and Bâb edh-Dhrâ', and surface materials from the Jordan Valley, Transjordan, and the Negev. Of course, the data on EB IV are now available in greater quanitity, largely as a result of Dever's research and the excavations at Bâb edh-Dhrâ', especially in the EBA cemetery (for an up-to-date analysis of the available data, see Dever, 1980). It is still interesting to notice that the early understanding of this enigmatic period pointed to the importance of Transjordanian sites (e.g., Ader, Bâb edh-Dhrâ', and Glueck's sites in Moab and Edom). Indeed, well over a decade ago Dever (1970: 136) made this suggestion:

> The uniqueness of Bâb edh-Dhrâ' may be due simply to the fact that it is precisely to Transjordan and the Negev—the fringe areas of the country—that one must turn to trace the vestiges of this elusive culture, and these areas are as yet barely known.

In light of recently recovered data from Transjordan, Dever's statement raises at least three important issues. First, the pace of archaeological research in Transjordan is increasing very rapidly; perhaps most notable are those projects that are supplementing and correcting Glueck's pioneering work. Second, new data have led certain scholars to disagree with the reference to Transjordan as a "fringe area" (see, for example, Dornemann, 1970; Prag, 1974; Thompson, 1974). Third, in spite of the new evidence, archaeologists and historians still have little to say about the EB I-III culture of Transjordan. With the notable exception of Bâb ed-Dhrâ' (cf. Schaub, 1982), it is only with reference to the EB IV transition that this region is mentioned with any frequency.

A consideration of the issues mentioned above inevitably leads one to ask a number of questions concerning

EBA Transjordan. Have scholars said so little about EBA Transjordan because most of it stands outside the historical and geographical scope of the biblical narratives? Is it possible that Transjordan was such a backwater in EB I-III that there are no remains to be found in this region? Is this lack of interest in Transjordan's EB I-III culture simply the result of a lack of excavations in the territory east of the Jordan? Or, is there so little discussion about the EB I-III culture of this region because scholars, for the most part, continue to rely upon the monumental, yet outdated, surface survey that Glueck conducted in Transjordan between 1932 and 1947? More pointedly, did Glueck overlook or fail to recognize the EB I-III pottery of Transjordan, at least in the early years of his survey, and did this oversight or failure lead him to emphasize the region's "EB IV-MB I" civilization? In other words, is the emphasis that is placed on the EB IV culture of Transjordan an artefact of Glueck's early mistakes and the failure of the archaeologists and historians to note that Glueck later changed his ideas about the EB I-III occupation of Transjordan? These questions can be answered, in part, by examining Glueck's conclusions on EBA Transjordan and comparing his results with those of more recent investigators. For the purposes of this study, special attention will be given to Glueck's work in central Moab, but the same questions and perhaps similar answers are also applicable to the whole of eastern Palestine.

In his first major report on the survey of Transjordan, a report that focused primarily on Moab, Glueck (1934: 81-83) set forth five general conclusions, which read, in part, as follows:

1) There was a strong Bronze Age civilization in ancient Moab between the twenty-third and the eighteenth centuries B.C., when it completely disappeared.
2) Between the eighteenth and thirteenth centuries B.C. there is an almost complete gap in the history of settled communities in the region visited.
3) There was a highly developed Moabite civilization, which seems to have flourished especially between the middle of the thirteenth and the end of the ninth centuries B.C.
4) In general from about the end of EB II, but in many sites in Moab from about the eighth century on, there is another gap in the history of the settled communities in the regions visited.
5) By the fourth century B.C., the Nabataeans had swung themselves into power by gaining control of the trade routes leading northward from the Gulf of 'Aqabah.

Most scholars have concentrated on Glueck's second conclusion, the one in which Glueck postulated that there was an occupational gap in central and southern Transjordan during the Middle and Late Bronze Ages. Although Glueck reiterated similar conclusions for all of Transjordan in subsequent reports, several important modifications became apparent in his later syntheses. Of particular interest are Glueck's changing opinions concerning the EBA occupation of the Kerak plateau, the territory between Wadi Mujib and Wadi el-Hasa (i.e., ancient central and southern Moab). Glueck explored the region between Wadi Mujib and the Kerak-Qatrana highway (i.e., central Moab) for approximately one week in 1933. This same area was examined in the summers of 1978 and 1979 by a survey team under the direction of J. Maxwell Miller of Emory University (Atlanta, GA).[1] The balance of this article will compare the data collected in this region by the Emory University team with Glueck's conclusions on this same section of the plateau.

In his initial report on central Moab, which was included in *Explorations in Eastern Palestine I,* Glueck made no reference to any occupation in this region

[1] Preliminary reports on the Central Moab Survey are found in Kautz, 1981; Miller, 1979a, 1979b, 1982; Pinkerton, 1979. For more discussion on the EBA sites of central Moab, see Mattingly, 1980 and the writer's forthcoming article on the EBA sites of central and southern Moab in the *Near East Archaeological Society Bulletin.*

prior to the twenty-third century. As can be seen in Gluecks first general conclusion of Transjordan, he did postulate the existence of a strong civilization in Moab between the twenty-third and the eighteenth centuries. Glueck (1934: 44-63) initially listed eight sites in central Moab that yielded pottery from this broad period: el-Lejjun, Ader, Khirbet el-Medeiyineh, Balu', Rujm Umm el-Qleib, Mis'ar, Freiwan, and el-Misnaᶜ. For the basis of comparison, it is fortunate that Glueck was more specific in his dating of the pottery from Baluᶜ and el-Misnaᶜ. He assigned the oldest sherds from these two sites to the period between *ca.* 2200-1800, i.e., from the end of the EBA "to the end of the first phase of Middle Bronze I" (Glueck 1934: 55, 63). If Glueck's dates for this pottery are accepted the chronology and nomenclature followed by the Emory University survey would place Glueck's sherds into EB IV, MB I, and MB IIA, with these three periods stretching from *ca.* 2300-1800 (Pinkerton, 1979: 27). Unfortunately, the recently collected sherds do not indicate that central Moab's sites were occupied over this specific period.[2] As is often noted, Glueck explained the abrupt termination of Transjordan's Bronze Age civilization by pointing to the Genesis 14 account of the invasion of the eastern kings (Kautz, 1981: 34). Regardless of the date that is attached to this episode, it is more likely that Moab's "strong Bronze Age civilization" came to an end in EB IV, perhaps *ca.* 2150 (Pinkerton, 1979: 71). While there may be a few Middle Bronze Age sherds in Glueck's pottery collection, as there are in the collection made by the Emory University team, it must be stressed that Glueck's early reports recognized no occupation in central Moab prior to the twenty-third century.

In *Explorations in Eastern Palestine II* (1935: 137-140) and the first edition of his more popular work, *The Other side of the Jordan* (1940: 114-123), Glueck continued to date the earliest culture of Moab to the period between the twenty-third and the eighteenth centuries.[3] By the time that he had completed *Explorations in Eastern Palestine III,* however, Glueck (1939: 268) had modified his position: "The Bronze Age civilization in Eastern Palestine south of Wadi Zerqa extends for the most part between the 23rd and 20th centuries B.C., i.e. between EB IV and MB I." Not only had Glueck accepted the "EB IV" nomenclature and chronology of Albright and Wright (Glueck, 1939: xxiii, 251; cf. Dever, 1973: 39, n. 4), but he had also acknowledged the existence of Transjordanian sites that antedated EB IV: "There is evidence that the history of some of the Bronze Age sites south of the Wadi Zerqa also precedes EB IV, and excavations would probably reveal that their history begins with EB I" (Glueck, 1939: 268). Moreover, by the writing of *Explorations in Eastern Palestine IV,* Glueck was speaking about Neolithic and Chalcolithic remains in the Jordan Valley, Western Palestine, and Transjordan (1951: 423). Glueck's recognition of pre-EB IV occupation in central Moab is even more obvious in the second edition of *The Other side of the Jordan,* in which he referred to abundant EB I-IV pottery in central Moab at the sites of Ader and el-Lejjun (1970: 149-151). In this same volume (152-153), Glueck also suggests that the history of el-Misnaᶜ and Khirbet el-Medeiyineh began in EB I.

In the second edition of *The Other*

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[2] Pottery collected by the Central Moab Survey was read by Dr. James Sauer and/or Ms. Robin Brown. We have not examined Glueck's pottery collections. It is likely that Glueck picked up a small amount of Middle Bronze Age pottery in Central Moab, as did the Emory University team. Indeed, the Central Moab Survey found a small number of possible or probable Middle Bronze Age sherds at several of the sites that yielded large amounts of EBA pottery. In only one case were the sherds identified as MB I, and no pottery was dated to MB II. In other words, Glueck's desire to include the MB I and MB IIA periods in his "strong Bronze Age civilization" does not seem warranted.

[3] Inexplicably, on p. 148 of *Explorations in Eastern Palestine II,* Glueck assigned his sites that pointed to a "strong Bronze Age civilization" to EB III-MB I. Furthermore, Glueck had decided that Freiwan should not be on his list of Bronze Age sites, and it did not appear on the map for this period in *Explorations in Eastern Palestine III,* Map IIb.

Side of the Jordan (1970: 145-152), Glueck emphasized the possible role that agriculture could have played in the EBA economy of Moab, an acknowledgement that has enormous implications for the reconstruction of the plateau's cultural patterns.The shift in Glueck's understanding of the duration and economic base of EBA Transjordan is often overlooked, but it is precisely Glueck's willingness to modify his positions in light of new evidence that has helped pave the way for much of the current research in Transjordan.

During the 1978 and 1979 seasons of the Central Moab Survey, evidence was recovered that clearly demonstrates that this part of Transjordan was occupied throughout the entire EBA. In his 1979 thesis, a study that was based on the findings of the first season of the Emory University Project, Pinkerton (71) reached this conclusion:

> A total of 289 EB I-III sherds were found at four sites whereas only 247 EB IV sherds were found at three sites. Even such preliminary results as these would suggest that a 'strong Bronze Age civilization' also existed in Moab prior to 2200 B.C... Thus the dates for a 'strong Bronze Age civilization,' at least in the early part of the Bronze period, would seem more likely to be 3200 B.C. to 2150 B.C.

At the conclusion of two seasons of archaeological reconnaissance in central Moab, the Emory University team had recorded a total of 275 sites, twenty-four of which yielded EBA sherds. The diagnostic pottery from these two dozen sites reconfirms Pinkerton's observation by spanning the entire range of Early Bronze history.[4] The pottery readings from these sites are provided below. Each of the central Moabite sites that yielded four or more EBA sherds is identified by a map number (which locates each site on Map 1), an English transliteration of the site's present name, Palestine Grid coordinates, the percentage of pottery from the site's total collection that dates to the EBA, and the number of diagnostic sherds from each subdivision of the EBA. Even such basic information indicates that the EBA occupation of central Moab varied in duration and density from one site to another. It should be pointed out that a collection of surface sherds does not represent an exact microcosm of a site's contents.

Pottery Readings from Central Moab's EBA Sites (Fig. 1)

1. Balu^{c} on the northern rim of Wadi Qurri, PG 245/860 (81% EBA): 136 EB IV
2. Rujm Umm el-Qleib, PG 233/920 (88% EBA): 7 EB I, 187 EB II-III, 95 EB IV
3. Ruins on Wadi Suwar, PG 255/879 (56% EBA): 5 EB IV
4. Mis^{c}ar, PG 215/900 (18% EBA): 54 undifferentiated EBA
5. Rujm Umm Awarwareh, PG 190/914 (33% EBA): 20 undifferentiated EBA
6. Balu^{c} on the southern rim of Wadi Qurri, PG 245/855 (1% EBA): 2 undifferentiated EBA, 5 EB II-III, 1 EB IV
7. Imra^{c}, PG 153/845 (8% EBA): 13 EB II-III, 20 EB IV
8. el-Misna^{c}, PG 223/767 (15% EBA): 18 EB II-III, 15 EB IV
9. Humeimat Northwest, PG 226/803 (41% EBA): 17 undifferentiated EBA, 1 Chal/EB I, 59 EB IV.
10. Humeimat Southwest, PG 227/798 (4% EBA): 7 undifferentiated EBA, 1 EB IV.
11. Dolmen north of ed-Dimnah, PG 167/794 (61% EBA): 39 EB II-III, 1 EB IV
12. Humeimat Northeast, PG 235/799 (2% EBA): 4 undifferentiated EBA
13. Umm el-Habaj, PG 230/810 (17% EBA): 2 EB I, 3 EB II-III, 106 EB IV

A Preliminary examination of the ceramic evidence from southern Moab indicates that the full range of Early Bronze history is represented on the Kerak plateau. An additional twenty-eight EBA sites from southern Moab brings the total number of EBA sites between Wadi Mujib and Wadi al Hasa to fifty-two.

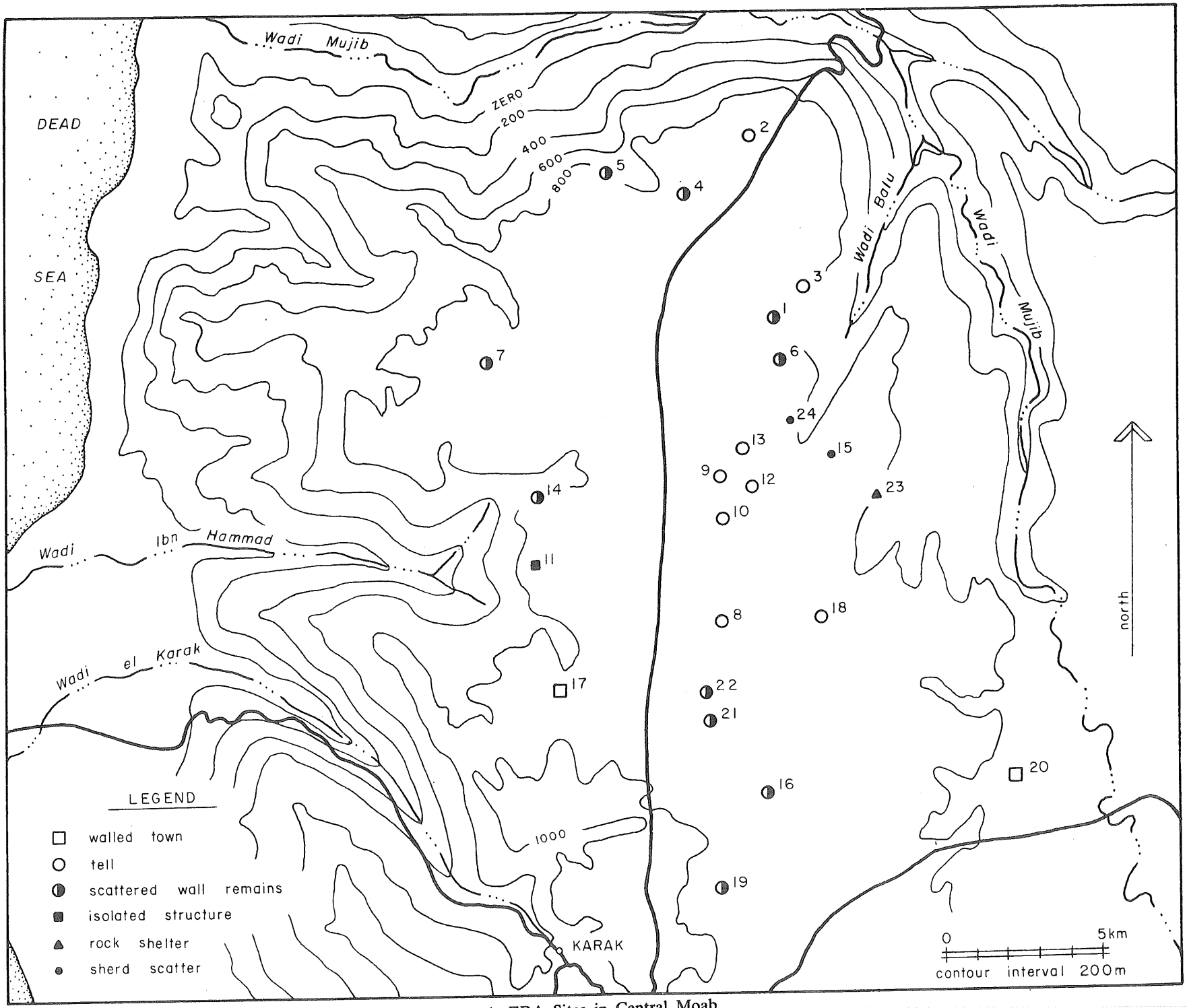

Fig. 1. EBA Sites in Central Moab

14. Khirbet Harzia, PG 180/792 (15% EBA): 1 EB I, 6 EB II-III
15. Karyyah, PG 264/815 (61% EBA) 35 EB II-III 24 EB IV
16. Hujfa, PG 244/710 (13% EBA): 2 EB I, 5 EB II-III
17. Khirbet Birjes, PG 172/737 (82% EBA): 6 EB I, 209 EB II-III, 14 EB IV
18. Rujm Mensahalt, PG 258/773 (92% EBA): 6 Chal/EB I, 160 EB II-III, 9 EB IV
19. Ader, PG 225/685 (57% EBA): 67 EB II-III, 99EB IV
20. el-Lejjun, PG 317/719 (50% EBA): 2 Chal/EB I, 6 EB II-III, 28 EB IV
21. Muharakat South, PG 217/729 (25% EBA): 14 EB IV
22. Muharakat North, PG 216/733 (32% EBA): 5 EB II-III, 18 EB IV
23. Rock Shelter on the upper Wadi Mujib, PG 315/803 (96% EBA): 68 EB I
24. Balu^{c} South, POG 257/843 (64% EBA): 9 EB I, 8 EB II-III, 39 EB IV

Now that the findings of the 1978 and 1979 seasons of the Central Moab Survey have been given in synoptic fashion, it is necessary to compare Glueck's results with the more up-to-date information on the Kerak plateau's EBA occupation. Out of the eight sites in central Moab that Glueck identified as having sherds from the EBA or the EB IV-MB I period, there were two sites that yielded no Early Bronze sherds to the Emory University team, Khirbet el-Medeiyineh and Freiwan. As noted above (cf. note 3), even Glueck dropped Freiwan from his list of Bronze Age sites. The Central Moab Survey found that 95% of the pottery from Khirbet el-Medeiyineh dated to Iron Age I, and the other 5% of the sherds from this site came from the Early Roman period.

Of the six sites at which the Emory University team found undifferentiated EBA sherds, Glueck recognized two, Balu^{c} on the southern rim of Wadi Qurri and Mis^{c}ar, as having been occupied in the Early Bronze period. The more recent survey also recovered undifferentiated EBA sherds from three other sites that Glueck did not visit, Humeimat Northwest, Humeimat Southwest, and Humeimat Northeast. The final site in the Central Moab Survey's list of undifferentiated EBA sites, Rujm Umm 'Awarwareh, was located by Glueck, but he did not mention any pottery in his description of the site, probably because he did not make the arduous climb down to its out-of-the-way location.

With reference to EB I sites in central Moab, Glueck's second edition of *The Other Side of the Jordan* assigned sherds from Ader, el-Lejjun, and el-Misna^{c} to this period. The Emory University team found only one Chalocolithic/EB I sherd at el-Lejjun, while no EB I pottery was recorded at Ader or el-Misna^{c}. Glueck did not visit eight sites that yielded EB I pottery to the 1978-1979 surveyors (Humeimat Northwest, Umm el-Habaj, Khirbet Harzia, Hujfa, Khirbet Birjes, Rujm Mensahlat, Rock Shelter on the upper Wadi Mujib, and Balu^{c} South). Another site found in the Central Moab Survey's EB I list, Rujm Umm el-Qleib, was examined by Glueck, but he never assigned it to any period other than EB IV-MB I.

Of the fifteen EB II-III sites identified by the Central Moab Survey, Glueck's second edition of *The Other Side of the Jordan* agreed that Ader, el-Lejjun, and el-Misna^{c} had sherds dating to this period. Three sites that Glueck examined in the course of his survey, Rujm Umm el-Qleib, Balu^{c} on the southern rim of Wadi Qurri, and Imra^{c}, yielded EB II-III diagnostic pottery to the Emory University team, but Glueck never made this assignment. This is difficult to understand in light of the 187 EB II-III sherds that the recent survey found at Rujm Umm el-Qleib. More interesting is Glueck's failure to locate nine other sites with EB II-III pottery on their surface (Dolmen north of ed-Dimnah, Umm el-Habaj, Khirbet Harzia, Karyyah, Hujfa, Khribet Birjes, Rujm Mensahlat, Muharakat North, and Balu^{c} South).

The Cental Moab Survey found EB IV sherds at five of the sites that Glueck assigned to EB IV-MB I, el-Lejjun, Ader, Balu^{c} on the southern rim of Wadi Qurri, Rujm Umm el-Qleib, and el-Misna'. On the other hand, Glueck failed to locate twelve sites that the Emory University

team identified as having EB IV occupation (Balu^{c} on the northern rim of Wadi Qurri, Ruins on Wadi Suwar, Humeimat Northwest, Hmeimat Southwest, Dolmen north of ed-Dimnah, Umm el-Habaj, Karyyah, Khirbet Birjes, Rujm Mensahlat, Muharakat South, Muharakat North, and Balu^{c} (South). One Glueck site, Imra^{c}, yielded EB IV pottery to the recent surveyors, but Glueck never made this assignment.

Aside from the obvious explanations used to account for the differences between two surveys in the same area (e.g., erosion, building activity, farming, thoroughness or haste of the survey, etc.), what can be said about the different results obtained by Glueck and the Emory University team?

Although earlier geographers and explorers had published accounts of their travels in Transjordan, the major contribution toward an understanding of this region's antiquities came with the surface survey of Nelson Glueck. His four-volume *Explorations in Eastern Palestine* is a benchmark in the history of research on ancient Transjordan. Although the general reliability of much of Glueck's work has stood the test of time, various errors and biases are now known to have entered into his field methodology and analysis of the collected data (Mattingly, 1980: 74-75, n. 13).

Basically, Glueck's survey and the conclusions based on this work can be critiqued in three ways. First, given the size of the territory covered and the time alloted to this task, Glueck's survey was too superficial. Second, Glueck possessed an inadequate knowledge of Transjordan's pottery traditions. Third (and most important for the present study), too many of the theories that Glueck produced were based on what he did not find on his survey (Weippert, 1979: 28).

Glueck's own awareness of these weaknesses led him to modify many of his earlier conclusions in later publications. Much can be read between the lines in this candid statement that Glueck made in the introductory paragraph of *The Other Side of the Jordan:*

> I have kept the book within the compass of the original edition in 1940, that was reprinted in a paperback edition in 1945. I have, however, exercised the privilege of changing certain opinions and conclusions in the light of greater experience and knowledge since they were first written and on the basis of restudy of everything involved (1970: 1).

To be sure, Glueck's "restudy of everything involved" resulted in several far-reaching changes. Unfortunately, Glueck's recent positions remain unnoticed (Mattingly, 1983).

The failure to recognize that Glueck made a significant shift in his evaluation of the economic base, density, and duration of the EBA occupation in Moab has led scholars to maintain that there was a sharp dichotomy between Palestine's agriculturally-based urban society and the non-sedentary pastoral nomadism of Transjordan (Mattingly, 1980: 152-155). Glueck's early writings give the impression that there was very little population and certainly no sedentary occupation in Moab until EB IV-MB I, and this view has been followed, in one way or another, by scholars such as Van Zyl (1960: 102-103), Anati (1963: 15), Baly (1974: 93), and Aharoni (1979: 36, 137). The ethnographic evidence, Glueck's final reconstruction of Transjordan's EBA culture (1970: 145-157), data from Bâb edh-Dhrâ' and Khirbet Iskander, and the evidence recovered by the Central Moab Survey raise doubts about a theory that describes the EBA Moabite lifestyle as totally non-sedentary. As Dever (1980: 56-58) points out, this simplistic model betrays a lack of understanding about the character of pastoral nomadism. The new evidence seems to indicate that Moab's ancient population was involved in a variety of economic pursuits, an economic diversity that produced a spectrum of settlement types on the Transjordanian plateau.

Just as the culture of EBA Palestine was not the result of a homogeneous evolution from tribal bands to urban society, it is unlikely that ancient Moab was marked by a single economic activity

and lifestyle throughout its Early Bronze history. On the contrary, while certain segments of the Palestinian and Transjordanian population lived in walled towns during the EBA, other segments of the population lived in villages, isolated farmsteads, and tents. Semi-nomadic peoples wandered between the more sedentary farming communities and sustained themselves with pastoral, trading, and hunting activities. This reconstruction of a contemporaneous diversity of socioeconomic activities and the resultant continuum of settlement types is more compatible with the archaeological and ethnographic data that are currently available on Transjordan. While this understanding of EBA Moab's culture is far removed from Glueck's early synthesis, it is harmonious with his latest reconstruction of Transjordanian history and subsequent archaeological investigation in this region, including the data collected by the Central Moab Survey. It is hoped that future research into Transjordan's EBA civilization will provide specific details for the picture that is just beginning to appear.

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EL MABRAK: AN ARCHITECTURAL ANALOGUE OF THE AMMAN AIRPORT BUILDING?

by
Khair Yassine

The el Mabrak building was first noted by Mr. Thomas R. Pickering, the former American ambassador to Jordan, in a helicopter overpass. Subsequently, ground exploration and surface sherding was done by the writer and Dr. Patrick E. McGovern. Dr. McGovern also arranged to have a ground plan of the structure surveyed and drawn by Mrs. Susan M. Balderstone through the kind auspices of the Department of Antiquities and its Director-General, Dr. Adnan Hadidi.

El Mabrak is located about 4 kms. southeast of the Amman Airport on the north side of the greenbelt highway linking Amman with Zarqa. From its siting on a flat terrace of exposed bedrock at the top of a hill, the Late Bronze (LB) Amman Airport Building (now covered over by a runway) would have been visible. The building appears to be isolated from other ancient remains, although a fuller survey of the area is needed.

The outer walls of the structure are of uniform thickness *(ca.* 2.00 m.), and comprised of two lines of roughly shaped boulders (up to a metre in length) with dry cobble chinking (Fig. 1; Pl. C). The inner walls are similarly constructed, and bonded into the outer walls except on the northwestern side of the building where wall stubs or blocking walls exist between rooms 2/3, 3/4, and 4/5. Only a single wall course remains apart from the four outer corners, which have two or three courses built up with larger boulders (over a metre in length). In view of the lack of any other boulders in the immediate vicinity, perhaps the building was never finished. Alternatively, the stones may have been removed to another site, or a super-structure of mudbrick and/or wood has completely deteriorated and been washed away. Only a few patches of soil accumulation are now to be found inside and outside the building. The several non-descript body sherds recovered from the surface, which can be broadly dated to the Late Bronze-Iron Age, are unreliable indicators for either the date of construction or use of el Mabrak.

The ground plan of el Mabrak (Fig. 1) is rectangular (*ca.* 18.00 x 24.00 m.) and oriented northwest-southeast. The internal space is divided up into six rooms around a central court. A stairwell (8 and 9 on the plan) with several stretchers still in place opens off the main hallway (10), which leads to the court and whose entrance is off centre in the southeastern wall. The hall is undercut by a bedrock depression, several metres deep, which appears to have been intentionally hewn out. A channel, now silted up, possibly connected the depression with a bedrock hollow, outside the southeastern corner of the structure. if so, the depression may have served as a cistern, which was filled by water runoff collected in the outside hollow. Since the depression extends into the central courtyard, it was accessible from here.

Except for rooms 3 and 4, all the surrounding rooms can be accessed from the court. Assuming el Mabrak was never finished, perhaps the intention was to cover the interior bedrock with a layer of soil or paving stones (cf. the Amman Airport Building -- Hennessy, 1966: 157), and then provide entrances above the lower wall course to the back rooms. More likely, the wall between rooms 4/5 was probably a stub to begin with, like that between rooms 3/4, which was later filled in. In that case, rooms 3 and 4, which may have served as storerooms, would be reached through room 5.

The similarity of the el Mabrak structure to the Amman Airport Building is all the more striking because of the physical proximity of the two buildings. Common features include general layout, orientation, and wall construction technique (lines or roughly shaped

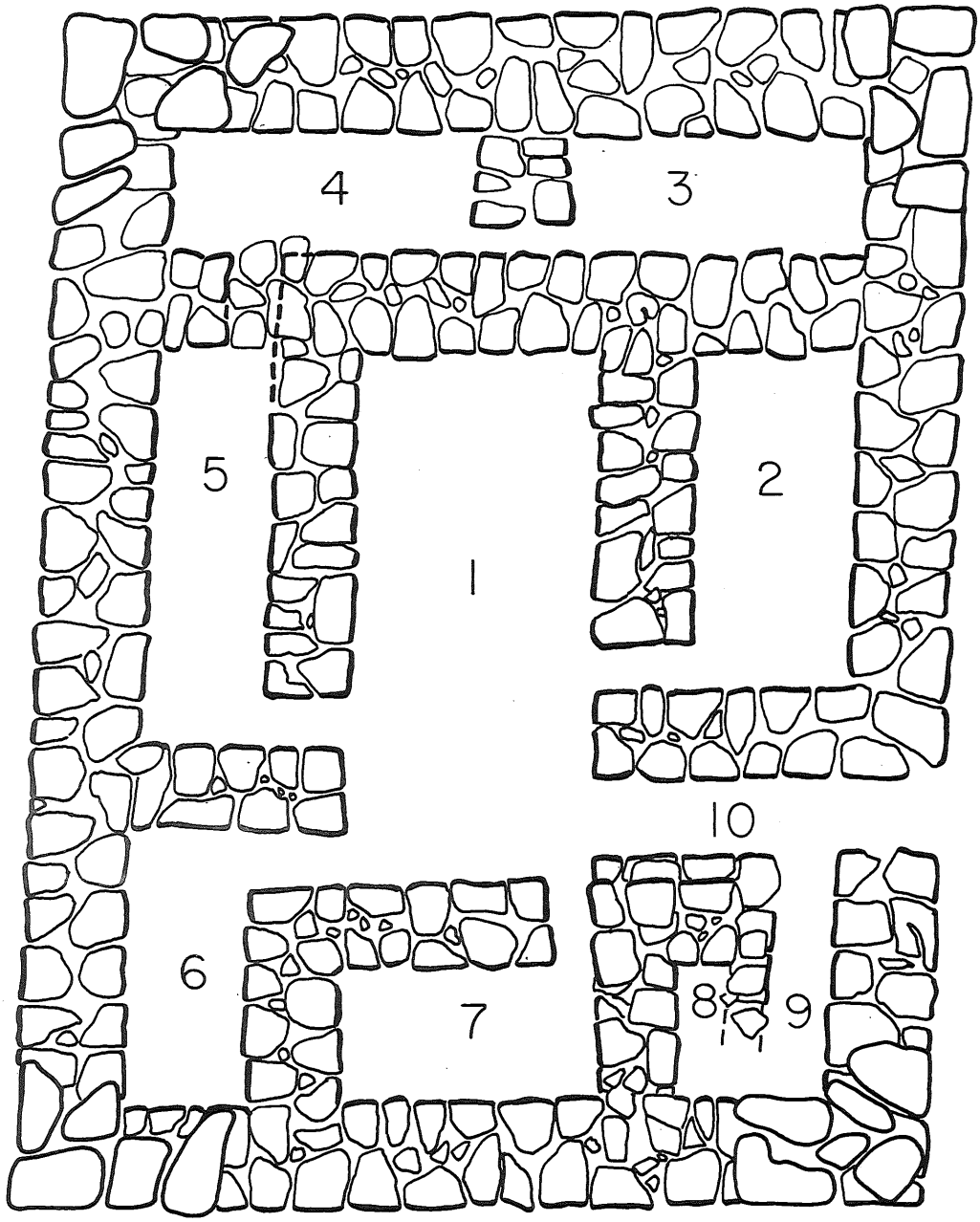

Fig. 1: Overview of the el Mabrak structure looking west. The central courtyard is at the middle of the picture with rooms 4 and 5 in the background.

boulders with dry chinking). A more detailed examination, however, reveals that the Amman Airport Building has (1) a smaller (15.00 x 15.00 m.), square layout, (2) only a single entrance to the surrounding rooms off the central court, and (3) apparently no staircase to an upper level.

Without dateable intact loci, any exact determination of the relationship of the el Mabrak structure to the Amman Airport Building and its function (e.g., an isolated tribal shrine) is impossible. On the basis of architectural analogies, however, it may be suggested that el Mabrak was a domestic structure. The *Quadratbau* or middle courtyard house type (Type IV in Yassine, 1974) has a long history in Palestine. Beginning as early as Middle Bronze at Megiddo (Area AA, Strata XII and X--Loud, 1948; Yassine, 1974: 378-80) and on Mt. Gerizim (Boling, 1975), the type continued through the Late Bronze Age and into later periods (Fritz, 1971). Recent excavations at Rujm al-Ḥenu East and West (McGovern, this volume) further support such an architectural tradition, especially in the Amman region. Parallels from further afield might also be cited. For example, the so-called Assyrian Open-Court Building (Amiran and Dunayevsky, 1958) is found at Assur (Preusser, 1954: 20) and Tell Halaf (Albright, 1956: 74). A Neo-Babylonian example occurs at Babylon (Reuther, 1926: 77ff). Considering its earlier occurrence and longer history in Palestine, however, el Mabrak should probably be viewed as yet another example of a native architectural type. In general, the archaeological materials which have been recovered from *Quadratbau* structures point in the direction of domestic use rather than a limited cultic function. Systematic survey is urgently needed in the Amman region to document all examples of this building type.

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Acknowledgements

The writer would like to thank P. McGovern for suggesting that he write a note on the el Mabrak structure to accompany the articles on Rujm al-Ḥenu, as well as for carefully reading and commenting on the manuscript.

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TELL EL MAZAR, FIELD I
PRELIMINARY REPORT OF AREA G, H, L, AND M: THE SUMMIT

by
Khair Yassine

Introduction

This article is intended as a preliminary report for Field I: The Summit. It has resulted from four seasons (1977-1981) of excavations. Another article will be written dealing with Field 2: The Southern Slopes. A summary of the results of the seasons are given by reporting the material found for each stratum involved, beginning with the latest (designated by Roman numerals). The areas excavated were:[1]

Ge7, Gf7, Gg7, Gh7,
Ge8, Gf8, Gg8, Gh8,
Ha7, Hb7, Ha8, Hb8,
Le1, Lf1, Lg1, Lh1,
Le2, Lf2, Lg2, Lh2,
Le3, Lf3, Lg3, Lh3,
Le4, Lf4, Lg4, Lh4,
Le5, Lf5, Lg5, Lh5,
Ma1, Ma2, Ma3.

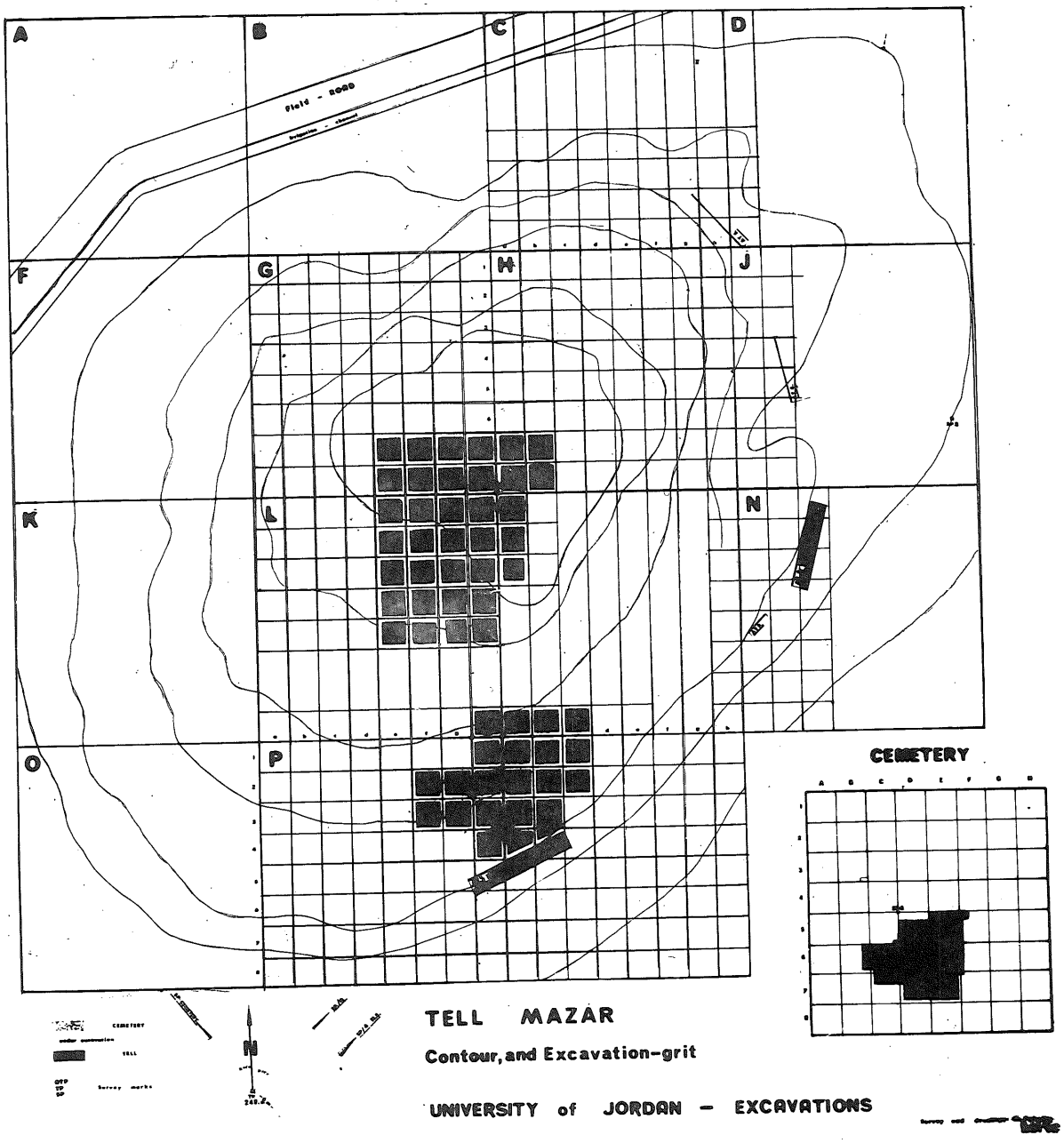
(Fig. 1, 2)

As early as 1969, the University of Jordan arranged to begin its own excavation at a major site so as to provide its students with practical archaeological training. Furthermore, the University had plans to develop its facilities ultimately in the various phases of archaeological research; e.g., restoration and conservation; laboratory analysis; documentation; the building up of its own archaeological artefacts and archives.

The first project for the University was the joint expedition with Leiden University of Holland and Dr. Hanke Franken, to excavate the site of Jalul, 5 km. east of Madaba. Unfortunately, the excavation was interrupted because of the constant Israeli bombing of the area during the summer of 1969. In 1977, a full agreement of a joint expedition was drawn between the University of Jordan, the Department of Antiquities and the University Museum of the University of Pennsylvania to resume excavating Tell es-Sa'idiyeh. Dr. James Pritchard, of the University Museum and I were named co-directors. After ten days of excavation, Dr. Pritchard became aware of the possible danger

[1] The 1977 campaign was sponsored by the University of Jordan, while the campaigns of 1978, 1979, and 1981, were sponsored by the University of Jordan and the Department of Antiquities, as a joint expedition. The staff was comprised of students from the University of Jordan and from abroad, and the employees of the Department of Antiquities, consisting of between ten and fifteen individuals in all seasons. Volume I is assigned to the "cemetery of Tell el Mazar - Mound A" of the fifth century B.C. This volume will be sent to the publisher very soon, and hopefully, will be out at the same time when this article appears in this annual. An article on the "Ammonite Seals from Tell el Mazar" was published in *Studies in the History and Archaeology of Jordan I* (ed). A. Hadidi 1981: 189 ff. The Aramic Inscriptions from Tell el Mazar will appear in *BASOR* 1984, and "The Iron Age I Open Court Sanctuary from Mound A" will appear in the forthcoming issue of the *ZDPV*. Carbon-14 dating will be conducted by the University of Pennsylvania, and the animal bones will be analyzed by Dr. David Reese.

The staff consisted of the following people:
1977: Father Pierre Proulx, SJ; Dr. A. Hopper; Barbara Porter; Elizabeth Simpson; M. Mac Clinan; Foad Hassan; Imjahid Mohesen; Omar Yunis; Rabha Yassine; Janiet Millen; Dr. Zeidan Kafafi.
1978: Father Pierre Proulx, SJ; Emsaytif Suleiman; Nabil el Qadi: Khairiyh 'Amer; M. el Muragtan; Frida Stoll; H. Rothe; Anne Rossell; M. Mayer; Rabha Yassine; 'Aiesh Abu Helal.
1979: Dr. A. Hopper; E. Suleiman; Al Abu Daiyah; Ali Sa'aidi; I. Haj Hassan; I. Tayeb; 'Aiesh Abu Helal
1981: E. Suleiman; A. Abu Daiyah; Ali Sa'aidi; Helda Ayub; Hanan 'Azar; Sabah Abu Hadaib; Abdel Nasser; Hamad Qatamin; Nesfat Mohmoud; 'Aiesh Abu Helal.
Architects: Langer de Polaski and Mahmoud Adam
Photographic Processing: Sarkis Labejian.
Also students from the course of Archaeological Training.


A
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CEMETERY
TELL MAZAR
Contour, and Excavation-grit
UNIVERSITY of JORDAN - EXCAVATIONS

Fig. 1

involved at the site, due to many unexploded artillary shells from the Israeli campaigns against the area from 1968 to 1972.

I was encouraged by the Dean of the Faculty of Arts, Dr. Ghrayba, the Assistant to the President of the University, Dr. Samra, and my colleagues at the University and the Department to choose yet another site. The late Mr. Y. Oweis, then Director of Antiquities, and Dr. A. Hadidi, provided much assistance and kindness.

The site of Tell el Mazar was chosen as a location which would be ideal for student training. It provided us with complex and challenging stratigraphy because its architectural complexes and installations had been constructed almost entirely of mudbricks.

The climatical conditions of the location are ideal for excavation during the school's winter semester, fitting in perfectly with that semester's curriculum. Furthermore, students graduating in the fall are encouraged to join the expedition, since most jobs and army recruiting usually do not begin until June or July. The University Farm in the Jordan Valley and its facilities, e.g., classrooms, laboratories, kitchen and dormatories, are well-suited for the use of the expedition, serving both as a camp and a teaching facility.

Tell el Mazar is situated between Wadi Rajeb-north (1.5 km.) and Wadi Zarqa-south (3.5 km.), in the mid-Jordan Valley (map. 1959 - 1718). Although the mound does not exceed 30.00 square metres in size, it rises to a height of some 24.00 metres above its surrounding (Fig. 1, Pl. C1: 1). The Tell is a man-made mound with no natural hill. The location of the site lies in an area plotted with several sites dated roughly to the same period. Those already excavated are Tell Deir 'Alla, 3 km. south, and Tell es Sa'idiyeh, 6.5 km. north.

The source of water for Tell el Mazar would have been the steady stream driven from the Zarqa River. Old maps show several canals were driven from the Zarqa River, running north along the foothills, then turning west, passing the Tell on the north side, and one at the south side. These canals ceased being used and finally disappeared after the reploting and changing of the grids occurred during the deployment of a newer system of irrigation (East Ghor Canal Project) in 1966. Presently, a new cemented canal runs at the northern side of the Tell.

During excavations the mound was found to contain occupations of different installations dating as early as the Late Bronze II age and continuing to the Hellenistic Period. From the second half of the thirteenth century to the Middle of the fourth century B.C., the site underwent several clear-cut destructions, which terminated the strata. Though no historical source explicitly mentions the destruction or seizure of Tell el Mazar during these periods, we may rather confidently relate the various strata with well-known historical events, based on the material culture and its typological chronological sequence.

We must emphasize that our relatively small mound was not identified (at least to the present day) in ancient texts. Furthermore, we believe Tell el Mazar was connected at all times to the main towns of the district in this part of the Jordan Valley. The entire existence of the site was dependent on the internal administrative organization of the district and the degree of security it provided. The historical stratigraphy of Tell el Mazar corresponds to that of Tell Deir 'Alla (phases A-M) (Franken, 1969) and Tell es Sa'idiyeh (unpublished). We assume that Tell el Mazar had no independent existence and although smaller, should be considered a sister town to them.

As we stated above, our knowledge of history and of historical geography is lacking. The present day name must have been derived from the near-by burial and Mosque of Mazar of Abu 'Ubidah, the commander of the Arab Muslim Army in A.D. 622. Parts of the summit were covered with late (modern) graves, which might have been considered contemporary with those graves of Mazar Abu 'Ubidah (1.5 km.), east of Tell el Mazar. These graves contained no artefacts, so we cannot fix the date of these graves with any real certainty.

Stratum I: Fourth Century B.C. (Fig. 4)

Installations 100: The uppermost stratum in the mound dating to the first half of the fourth century B.C., was damaged in parts by erosion during the long period of abandonment as well as by the late (modern) graves. These graves might have been contemporary with the graves of Mazar (Mosque) Abu 'Ubidah. In the area excavated several graves were discovered, however, none contained artefacts. Since no objects were found in these burials, we cannot fix the date of these graves. However, the striking features of Straturm I were the deep, circular pits and silos found in every excavated area. In other words, the distinctive feature of this stratum was the dozens of rounded storage pits and silos. In several cases, these cut through walls and deposits of Strata II, III, and IV. Some of these are just over 2.00 m. in diameter and more than 4.00 m. deep (Fig. 4).

There are various sizes, shapes and construction types; material also varies, some had a brick lining preserved to a height of nearly 3.00 m (Pl. C1: 3, 4). In a few cases stones were used within the lower courses, or mudbricks at the lower courses and then at the top stones were used (Fig. 3, 4). Many were dug and found without any lining either of stones or bricks (Pl. C1: 2). In shape they range between cylindrical or barrel shape, while others were cone-shaped, especially those dug without any brick lining or stones (Fig. 4). These were found to have been used for chaff only, and not for grain. The floor of one silo, built of mudbrick, was found to be paved with small flag stones. Another floor was paved with mudbricks, while many others were found to be of hard clay. The rounded (barreled) shape of the grainaries suggest that the roofs were conical shaped (Fig. 2). Deposit of the collapsed mudbrick conical roof was found in some of these soils. The deposits in these grainaries do not necessarily represent the initial, original, use, for it appears that people used them for different purposes, since the content of deposit in them, ranged from charred grains, chaff, pottery, copper, stone vessels, rubbish (stones, animal bones, pottery fragments, loom fireworks, charcoal, etc.).

The construction of these installations on the summit of Tell el Mazar for grainaries (also Deir 'Alla and Tell es-Sa'idiyeh) was for a good reason: the dry climate of the Jordan valley; the lack of rain; the high altitude of the tell; and the steep slope and its compacted deposit, all would create the right atmosphere for grain storage. The above ground water table allows rain to run off quickly, thereby, permitting the interior deposit to stay dry. (We were able to resume excavation immediately after a couple of hours of heavy rain). The presence of the silos and the grain pits suggest that they were built without proper protection or permanent installation; that is, it was safe to store without proper protection.

The presence of these deep pits with the contents of heavy chaff and grain indicates massive grain storage, used as a security against famine, as a tax gathering facility, or as support for a military force. The site in this period apparently served as a supply depot.

The settlements of the Iron Age II in this part of the Jordan Valley became very thin at the end of the fourth century B.C., despite the dense chain of settlement of the Iron Age II, (Ibrahim, Sauer, Yassine, 1970: 26). No open spaces between the various towns and villages were within sight. The settlement of the Hellenistic Period was found at the foothill of the East Jordan Valley. During the Hellenistic Period our site might have been connected with the urban centre situated 3 km. east of Tell el Mazar, and is called 'Ammata. During the survey of the Jordan Valley, the site had been labelled as Hellenistic (Ibrahim, Sauer, Yassine, 1976: 58).

The material artefacts recovered from inside these pits were dated to the Early Hellenistic Period (Pl. CX: 1-5). P. Lapp dated the storage jar to 333 B.C. (Lapp, 1970: 179). The abandonment of the site apparently occurred at the time of Alexander the Great (333 B.C.) This is also confirmed in Palestine from Tell Abu Hawam (Hamilton, 1935: 1-69) Megiddo and Samaria and also from our ceramic chronology, (Pl. CX: 1-5).

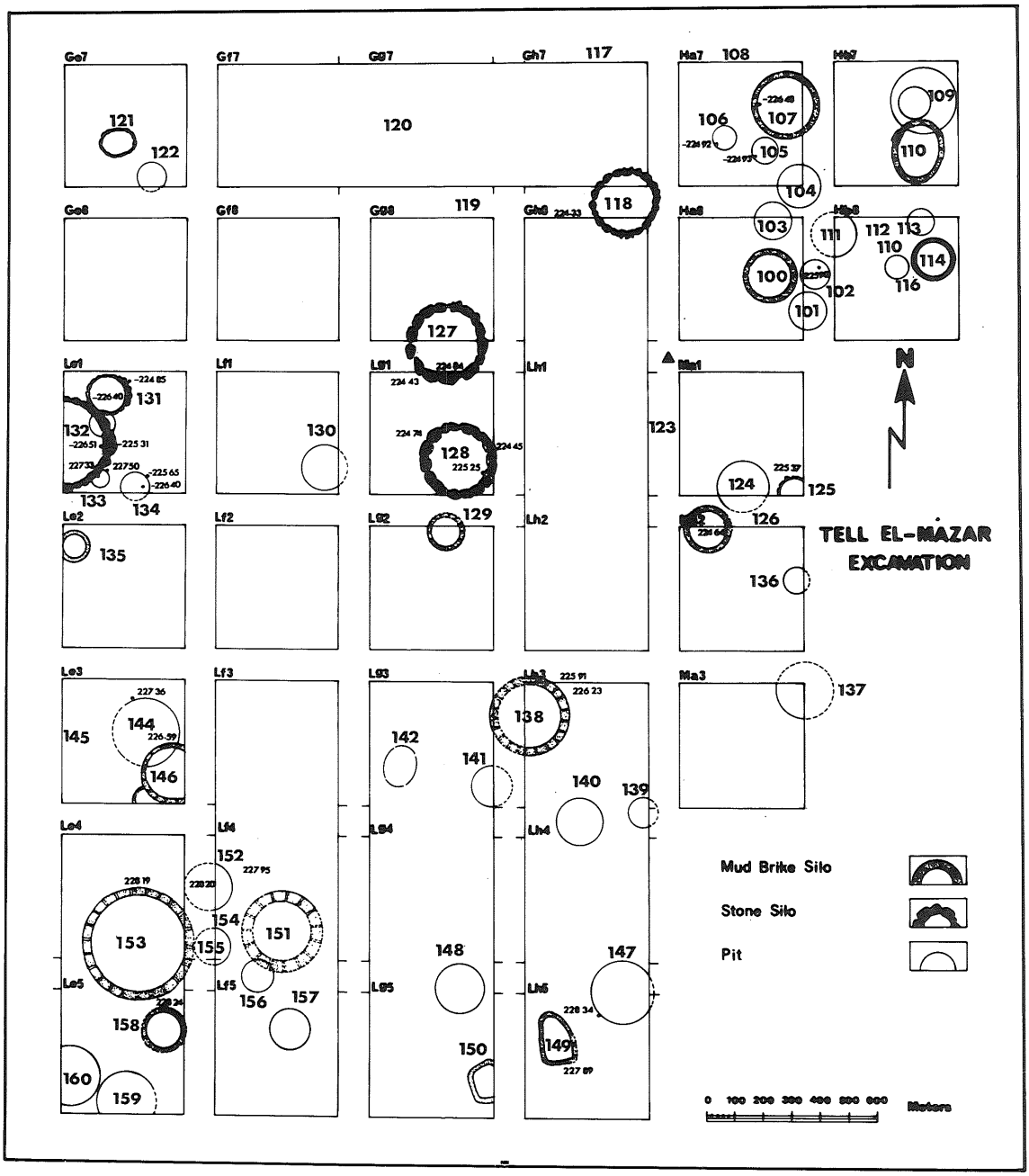
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Fig. 3

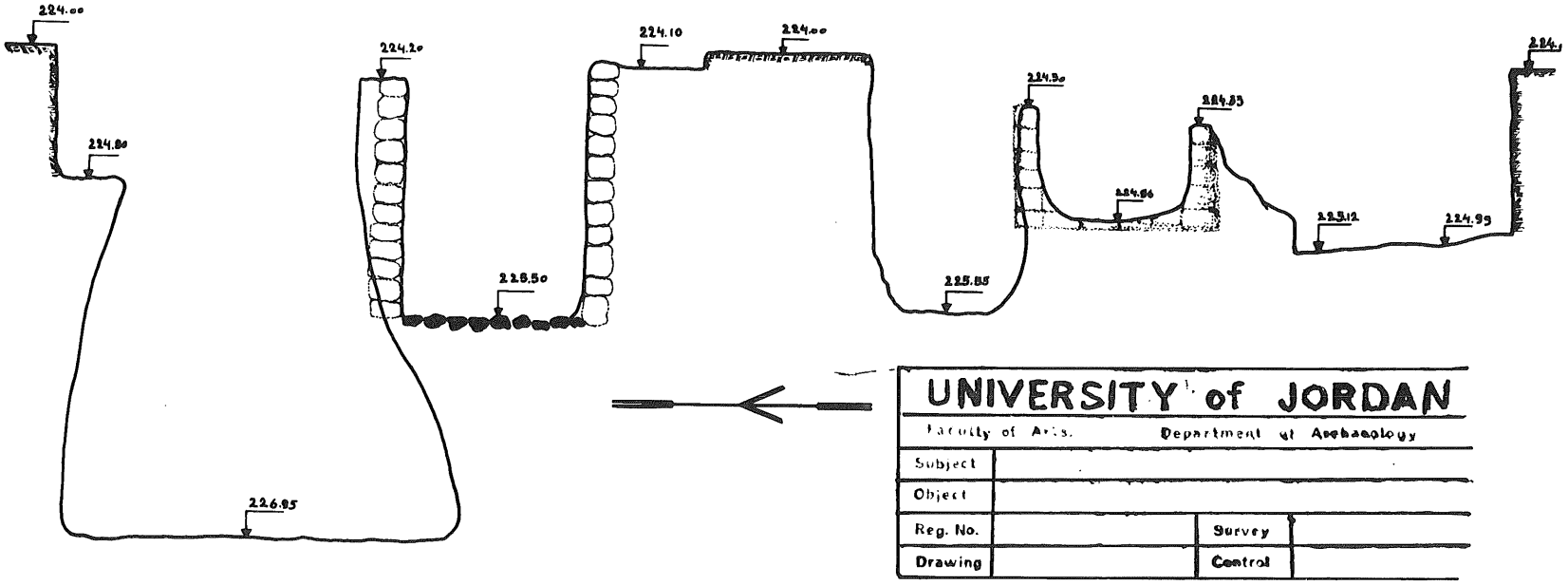
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Fig. 4

Stratum II: Fifth Century B.C. (Fig. 5)

Installations 200: The division of strata used in this context is based on the architectural stratigraphy. The beginning of this period is marked by a massive filling operation (especially in squares Gf7, Gg7, Gh7, Ha7, and Hb7), designed to cover and level off piles of debris and stumps of walls. Evidence of an intensive destruction was found wherever trenches reached below the level of Stratum II (this debris represents the destruction of Stratum III). The filling's deepest area was at the northern and eastern extremity of the excavated areas. Since those were in Stratum III and were lower than the area in squares Lf1, Lg1, Lh1, Lf2, Lg2, and Lh2, protection was achieved for the northern installations by a stone retaining wall extending from the southeast corner of square Ge8 to the middle of square Gg8. The northern face of the stone wall was lined with upright stones at a straight line; however, the southern face was merely a filling of irregular stones, since this side of the wall was below the ground level of the middle open courtyard in squares Lf1, Lg1, Lh1, Lf2, Lg2, and Lh2, (Fig. 5, Pl. CII: 1). The levelling fill was covered by a thin floor of clay.

In plan, the buildings of Stratum II consisted of a central open courtyard enclosed on two sides by architectural units. There may also have been a row of units (rooms) on the south side of the courtyard, however, since this area was very much eroded, we can only hypothesize that possibility (Fig. 2). Stratum II extended over the entire excavated area, however, much of the different parts of these buildings had been removed in the process of digging the silos, the grainaries, the modern graves, and the natural erosion, during the long period of abandonent. To this effect, some errors were made since the excavators recorded that they found no floors, in some parts, and since some areas of this upper level were not clearly stratified, some vessels may have actually lain beneath the floors, and were included in the above loci only because of their discovery within their four walls.

The major installation of this stratum was the area to the north of the raised open courtyard, occupied by three units: (1) 201, 202, 203, 204, 205; (2) 206, 207, 208, 209: (3) 210, 211.

To the east, different installations were built, but we are unable to establish the extent of their uniformity, partly because the area excavated was small, and much of it was devastatingly damaged by the construction of the silos and the grain pits of the Stratum I Period.

Unit 1 was built with a stone retaining wall to the south of room 201 and 202. It is not known if a mudbrick wall was superimposed on the stone retaining wall since this stone wall was protruding at the surface. It is also possible that the superimposed wall was totally washed away. In room 209 of Unit 2, two *tawaben* (tabuns) were found adjacent to the east wall. The western wall of room 207 has a stone foundation. The extent of those two units must extend to the northern unexcavated side of the mound. Rooms 210 and 211 seemed to have been paved in their early phase of use, for few stone patches were found, and the rest were lifted up when the silo and the grain pits were dug.

One *tabun* was found at the northeastern side of square Hb7, in room 211. It is only partly excavated since the other half extends to the eastern baulk (Pl. CIII: 2). The middle open courtyard did not reveal much of the type of activities it might have played because of great erosion that it had suffered. It is the highest on the mound. Aside from the two circular stone built storage installations, and the portion of paved working floor, much of the courtyard deposit was washed away. Circular installation 220 was built of big sized stones. It measures 2.00 m. in diameter, and 0.90 m. deep, the same as the circular installation no. 221, except that no. 220 has its upper courses built of mudbricks.

In summary, the special features of Straturm II's installations are that they show uniform planning, despite the leveling operation which proceeded the construction procedure. In comparison to the installations from Stratum III, IV, and V, the building materials of Stratum II were poor in quality. The brick clay was of

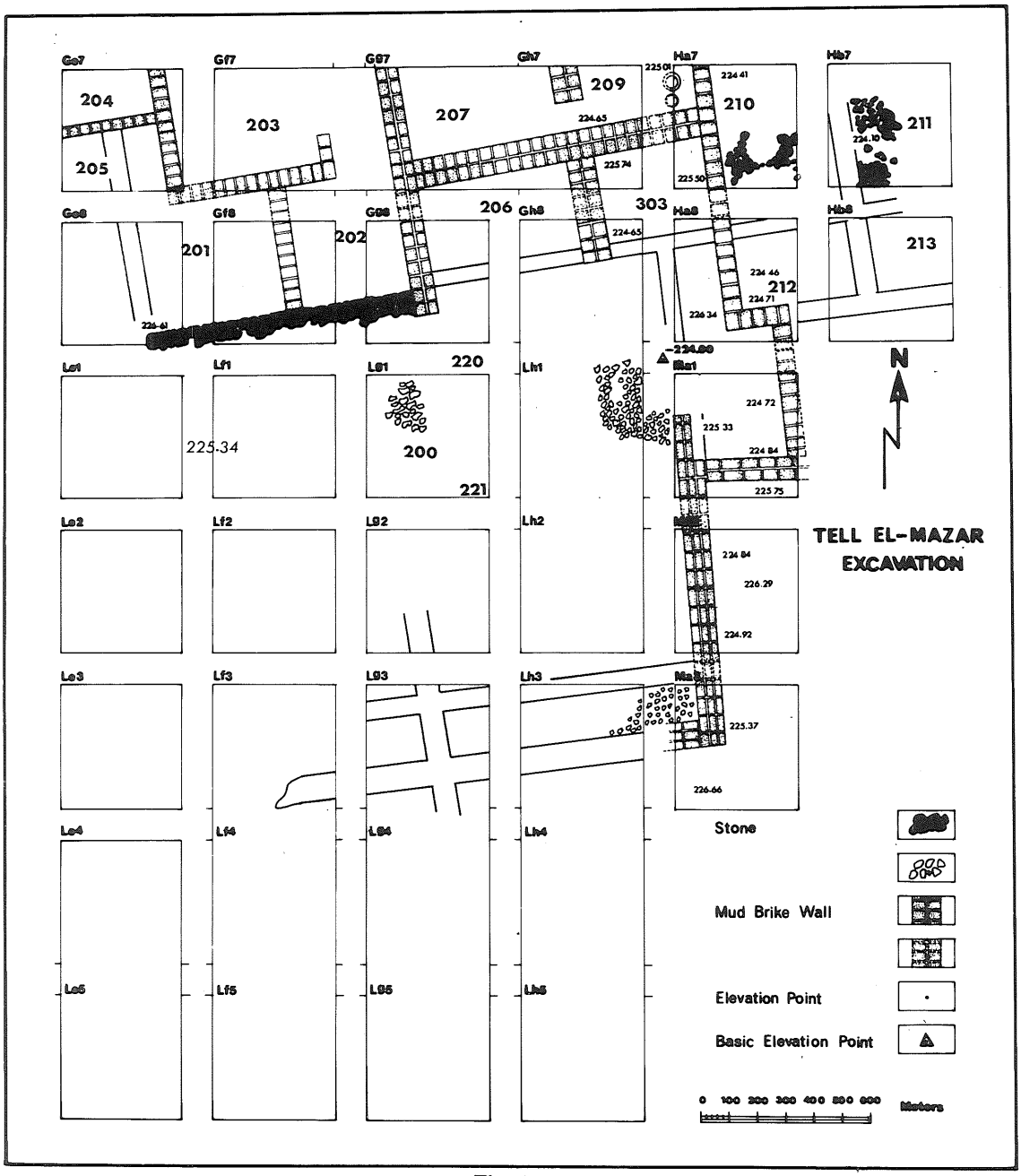
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Fig. 5

inferior quality which was improved with the use of better quality plant chaff. Clay apparently was collected from decomposed occupational deposits. It is composed of loose ash and clay wastage consolidated with water to make into hard-packed bricks. For this reason it was (at the beginning) very difficult to distinguish between the actual deposit and wall installations. From the study of the layout of Stratum II, it was certain that Stratum II buildings were built on the ruins of Stratum III structures, having the same orientation, but varied in planning, and nature.

In many cases reed mating was laid underneath the walls before the walls were built, apparently to prevent sinking and cracking of the walls. This reed matting provided a stable surface underneath the walls (as a foundation) since the mound composition is a deposit of decomposed occupational and building material which makes it vulnerable to sliding and cracking. The reed net consolidated the different installation units into one coherent joint architectural complex. In a few cases a stone foundation was used. The lining of bricks was in a header and stretcher arrangement (Pl. CII: 2, CIII: 1).

There is no doubt that these installations were used as private industrial houses. Most seem to contain domestic utensils and industrial artefacts; nevertheless, these installations indicate considerable planning. The buildings consist of a central open court enclosed on two or possibly three or four sides by architectural units.

This type of court building is common throughout the Near East, and is known in various periods (Yasine, 1974: 85). These later ones may have been of Mesopotamian origin (Amiran, 1958: 25).

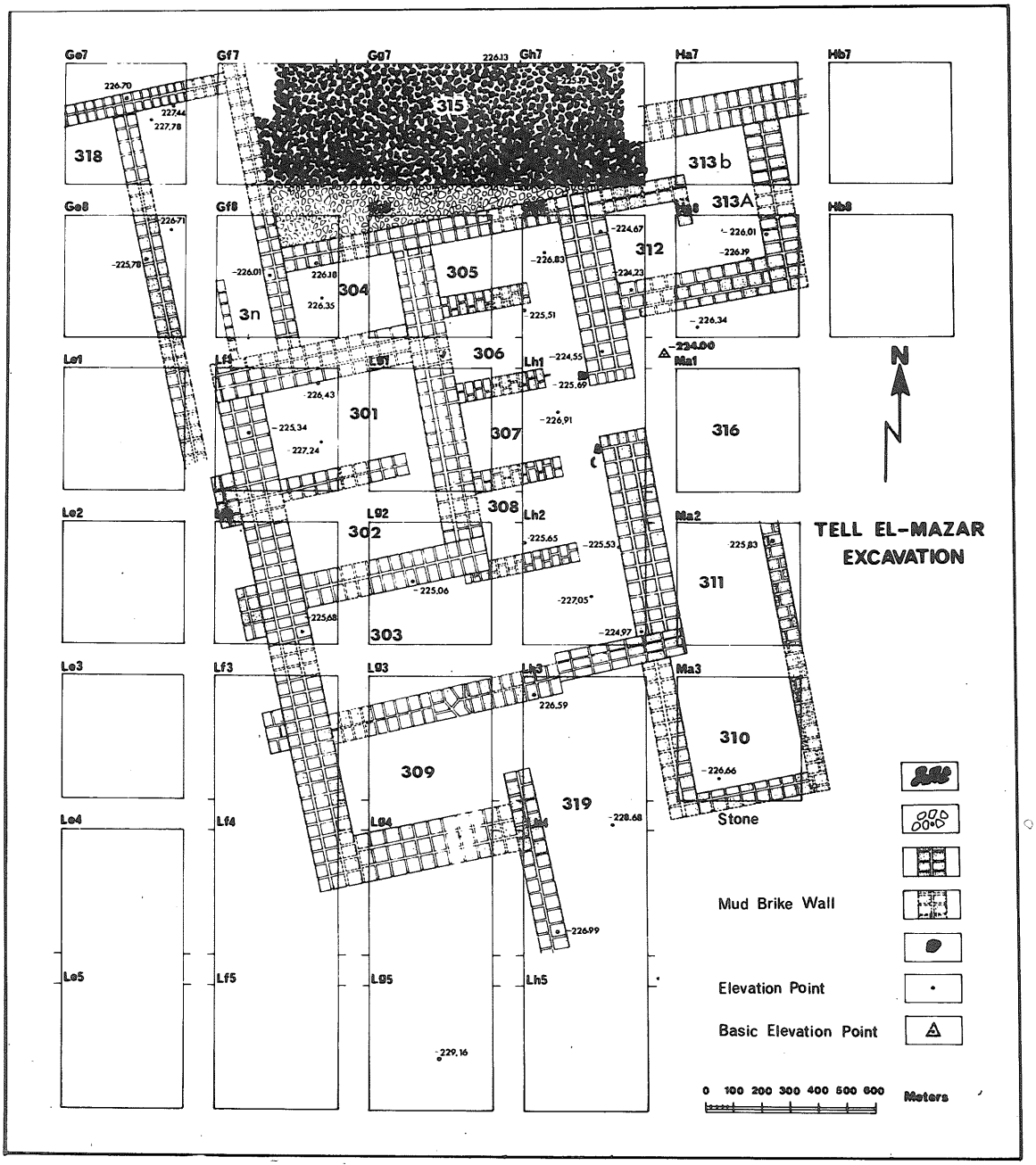
The Persian domination of Syria extended over 200 years beginning with the triumphant entrance of Cyrus the Great into Babylon in 539 B.C. and ending with the conquest of Syria by Alexnader and his officers beginning in 332 B.C.

From 400 B.C. onward, Syria was the scene of many military expeditions and conflicts. For more than fifty years (408-343), Egypt endeavoured to assert her independence of Persia, and with Artaxerxes II, Mnemou (404-358) and Artaxerxes III Ochus (358-337) fought her, across the natural obstacles which defended her from Asian invasion.

The Persian rule of Egypt required that the route should always be secured and controlled. The Syria-Palestinian met directly with the Persian. A true discovery of this level, from Tell el Mazar, and from other sites is still growing; however, the Perisan influence was geographically restricted and socially superficial in all but in a few areas over which they, (at one time or another) had authority. It is generally agreed, among scholars of Palestinian material, that the impact of the Achaemenid Persian upon the country was not extensive, (538-332 B.C.). In government and administration, they adopted and modified rather than radically changing what they had gained by conquest or annexation. Existing administrative hierachies were crowned and reinforced with imperial civil servants. Their rule is reflected in Tell el Mazar mainly with official stamps and stamp-impressions, military equipment and weapons, metal products, cups, jugs, bowls, ladels, and jewellery, made of bronze and silver as well as bronze fittings. These Achaemenid style metal objects were common in Syria, Palestine and Jordan. Recently, after the discovery of Tell el Mazar more parallels have been discovered at Umm Uzzainah in Amman. Scholars are still not in agreement as to whether these objects were all imported from Achaemenid centres or were locally made in various regions in imitation of Achaemenid prototypes. However, there can be no doubt that the popularity of the Achaemenid metal form in Jordan, led to many imitations of these types in various materials such as glass, faience, alabaster and also clay (for this historical reference see Bennett, 1978: 165; Cooney, 1965: 39 ff; Katezensteir, 1979: 23 ff).

Stratum III: Sixth/Seventh Century B.C. (Fig. 6)

Installations 300: The builder of Stratum II cleared the remaining walls and


TELL EL-MAZAR
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Elevation Point
Basic Elevation Point
0 100 200 300 400 500 600
Meters

Fig. 6

rubble of the installations and pushed things into different directions. Also, Stratum I builders had engaged themselves in disturbing the stratigraphical arrangements of this upper area. To this effect, the complete assemblage and plan of Stratum III could not totally be ascertained; however, from the frequent untouched stratification from a number of squares, it appeared to be a large structure consisting of a massive and most impressive building. Crowning the centre of the mound, it dominates the summit, situated on its most prominent heights. It has been called the "Palace Fort". The view from the Palace Fort is magnificent in all directions. When it was built, it must have been a central residence of the governor of this area.

The building complex (No. 300) of Stratum III was constructed according to a single plan, enjoying the natural protection provided by the height of the mound (*ca.* 23.00 m.). Its internal division was dictated by the function of each unit. One unit forms a large rectangular podium (rooms: 301, 302, 303, 304, 305, 306, 307, 308). It measures 10.00 x 15.00 m., encircled by a thick mudbrick wall. The interior of the podium was filled with a mass of soil up to *ca.* 1.20 m. Above the field soil and the earlier wall, the main interior walls were built. To the north of the raised unit there was a large stone paved open courtyard (315) partially excavated (Fig. 6, Pl. CV: 1). To the east a unit of rooms was built attached to the massive east wall of the podium (rooms: 310, 311, 312, 313), the floors of these and the open stone paved courtyard were lower than the podium unit. A flight of stone stairs (one was excavated) was built to make an axis from this lower unit to the podium unit. This lower unit apparently (at the last phase of the usage of the building) served as a storeroom, kitchen, weaving room, a meat preparation room and for other domestic tasks. The pottery rooms (312 and 313) (Fig. 6) clearly indicate that they served as a storage room for various food stuffs and industrial tools. A variety (presumably) of provisions were stored in each room. The variety of products and the presence of different vessels (bowls, jugs, juglets, cooking pots, jar-silos, looms and loomweights, point out that this building was in constant use (Pls. CXI: 1-12, CV: 2, 3). Products were brought in, measured, prepared, and then taken out according to the needs of the administrative unit (civilian or military) for which they were intended. Room 311 revealed great quantities of animal bones (cattle), a few show a sharp cut, which indicate that the room had been used for meat preparation.

The doorway leading to room 307 seemed to be the major one between the podium unit and the other units of the Palace Fort, (Fig. 6). The door must have been made of two rafts, opening toward the inside, since the two (one on each side) stone sockets were found at the inner side of the wall. The wooden frame of this door was found totally burned on the floor of room 307, (Pl. CV: 3).

Hall no. 316 might have been a middle courtyard (partially excavated), since the material deposit in its stratigraphical composition was totally different. No reed impressions used for the roof were encountered from this part, which indicates that this hall was not roofed. Also, the floor(s) of this hall shows different layers of compacted clay mixed with chunks of lime plaster. The different numerous floor phases are representatives of the annual seasons, and washed material of the daily activities. It is hoped that we will clear up this point in future excavations.

If this were the case, hall no. 316, as part of a middle courtyard, would strongly indicate Assyrian character. Since we know very little of the local architectural planning of this period, we are reluctant to comment on its local affinity; however, we cannot rule out the local original planning. We have to wait for the final publication of the architectural complexes from Busyrah, Sahab, Tawalan, Tell es- Sa'idiyeh, etc., sites having architectural installations of the same period (see bibliography). Further proof establishing the affinity of the Assyrian/Babylonian building and planning techniques is seen in the use of the buttresses in the west wall of rooms: 301, 303, and 309, (Fig. 6; Pl. CIV: 1).

The main entrance to a stone-paved open courtyard was from the west side

through a staircase, no. 318 (a few flights of stairs were uncovered). Room 317 had a compartment found full of chaff. In the middle of the room three huge stones were built on top of each other, possibly forming the lower part of a column, to support the roof. The intensity of the heat caused by the fire (see below) indicates that the room was full of material vulnerable to burning. Very little was recovered from room 309. The area here is very much eroded. On the south wall, only one course of its mudbrick wall was saved. The west wall in hall 319 was built on a slope, running south.

Two clear construction phases were evident in Installations 300. The doorway leading to the podium unit (room 307) was narrowed. In the first phase this doorway was leading to a long hall. The partition walls between the rooms: 305, 306, 308, and 303 were built at the second phase. These rooms at the second phase were used for daily domestic duties, e.g., cooking, weaving, and other domestic activities (Pls. CIV: 3, CV, 2,3). Some of the most useful contexts, archaeologically, are architectural. Structures, rooms, and features, all define the locations of certain activities, and corroborate inferences made from their contents. They contribute spatial, temporal and functional information in their own right. The changes took place in the second phase and the material culture was found in installations 300 before it was razed in a severe fire, indicating that a fundamental change took place in the function of the building, namely, the transformation of the "Palace Fort" into a domestic dwelling. This may also be reflected in the reduction of the size of the big hall, making it into four compartments (rooms:305, 306, 308).

This "Palace Fort" suggests that Tell el Mazar was probably a garrison rather than a large settlement of the usual type. Assuming this was built by one of the kings of Ammon, a name of Ammonite kings was written on one of the ostraca found in one of the rooms. The name is H S L', El delivers or protects, also attested by a Tell Siran inscription found in Amman (Cross, 1973: 15). This Palace Fort could be taken as evidence that the site now served as a centre for the Ammonite administration. The function of the building was primarily concerned with the official business activities of this part of the Jordan Valley. Thus, this defensive fort may have been commanded by "royal officials". It was equipped with foodstores, oil and grain, which were stored in large clay containers.

The fate of the Palace Fort came to an end when the whole building was put to fire. Every room was burned to the ground. The walls from the inside were baked and became very hard, an indication of the high degree of firing. A good number of the furniture pieces (in addition to other materials) were in the rooms before the building was set on fire (Pl. CIV: 2,3; CV: 2, 3). No skeletal remains were found inside the building which means the people had fled the place, but were unable to carry their belongings with them. Storerooms were stacked with vessels of all sizes and types. Figurines of horses were found in the debris, as well as figurines of other animals.

In its historical context, the Babylonian conquest that brought an end to the independence of the different state of Jordan has relevance here. The destruction of Tell el Mazar must have occurred before the end of the sixth century B.C.

We read in (Jer. 40: 14) that Ammon had played some part in plotting the assassination of Gedliah the Babylonian, appointed governor, and later he had given sanctuary to his murderers (Jer. 41: 1, 15). We can probably assume that Babylon would have retaliated sooner or later. The retaliation came probably in 582 B.C., according to Josephus... "on the fifth year after the destruction of Jerusalem, which was in the twenty-third year of the reign of Nabuchadrezzer, when he made an expedition against Goelesyria, and when he had possessed himself of it, he made war against the Ammonites and the Moabites, and when he had brought all of those nations under subjugation, he fell upon Egypt."

The references in Jeremiah (40: 11ff) and in Josephus indicate than up until about 586 B.C., the Jordanian states of Ammon, Moab and Edom, were in

existence and under the control of their own rulers who chose to direct their own affairs independently.

The seventh century witnessed a significant rise in the fate of Tell el Mazar. Jordan was a nominal Assyrian vassal, but it was permitted to have its own native ruler without the presence of an Assyrian provincial governor. Thus, the area enjoyed internal administrative freedom. Moreover, Assyrian protection meant a lessening of threats from external enemies. A striking literary documentation of Ammonite prosperity at this time occurs in one of the letters found at ancient Nineveh, (apparently written to king Esarhaddon). It says that the Ammonites were assigned the largest amount of tribute to be paid to the Assyrian monarch. This shows the relatively more affluent position of the Ammonite state during this period. Under beneficent Assyrian protection, the Ammonites were able to keep control of the lucrative caravan trade from the desert thereby enhancing their prosperity.

From later resources in the Assyrian Annals, it was not only tribute of gold and silver paid under Esarhaddon (680-669 B.C.) by his subjects of Qaus Gaber, king of Edom, Musuri king of Moab, and Puduil, king of Ammon together with nineteen other kings, they were also employed in transporting various materials to Nineveh for building of the palace.

In Assurbanipal's reign (668-627 B.C.) these subject peoples were either pressed into or perhaps volunteered for military service, Qaus Gaber of Edom, Musuri of Moab and Ammin Abdi of Bet Ammon are listed among the twenty-two kings who helped in his war against Egypt (for the historical references see Lindsay, 1976: 23ff; Bennett, 1978: 165 ff).

Stratum IV: (Fig. 8)

Installations 400: From the study of Stratum IV architecture it is certain that Stratum III buildings of the podium unit were built on the ruins of Stratum IV structures having the same orientation.

Stratum IV buildings represent an earlier stage of the Palace Fort of Stratum III. Stratum III is an installation of an architectural complex, less grand than its successor. Due to the alterations made for the construction of Installations 300, many features of the original planning of Installations 400 have been obliterated, and on the other hand, some parts were integrated into installations 300. The chronology of Stratum IV was retrieved from the area of the podium units of the Palace Fort, since this area was left without uprooting the remnants of 400 during the construction of the podium unit, and since it was built at a higher level than the other units.

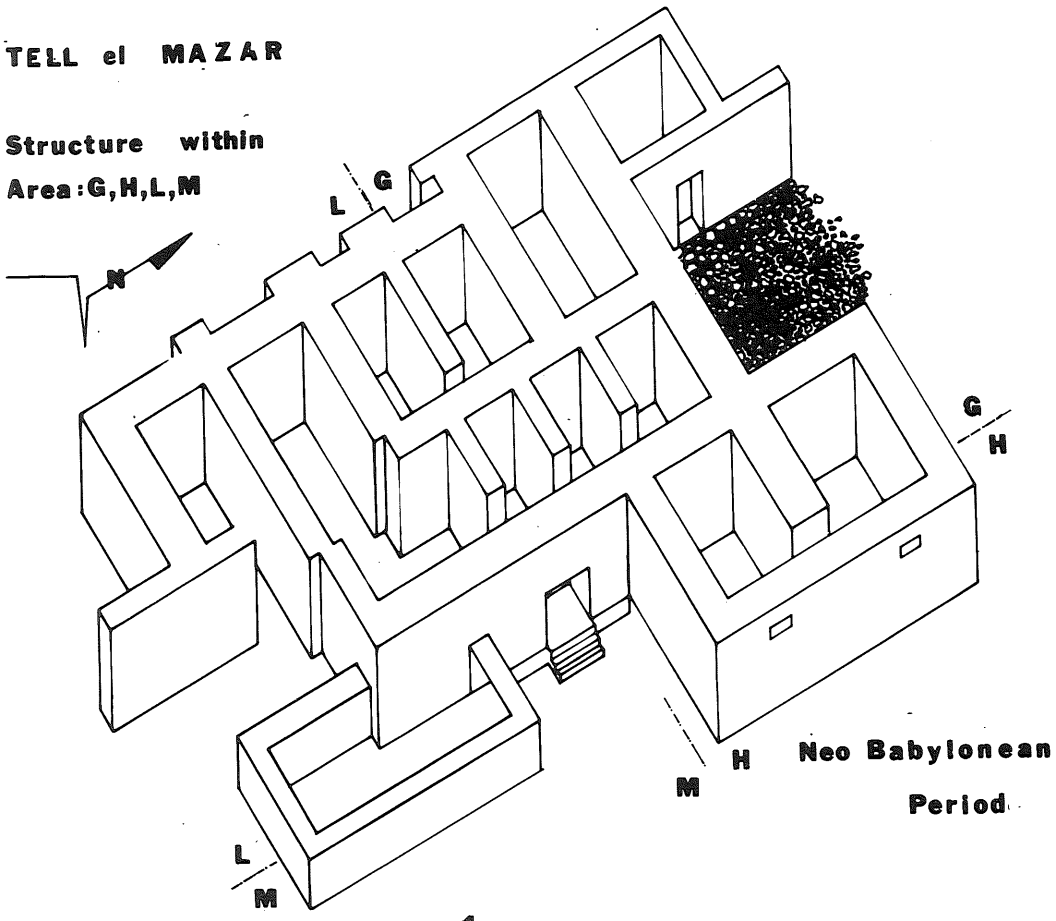
Deposits of pottery sherds from the floor of rooms 410, 411, 412, dated to the later period (Stratum III period). However, rooms 401, 402, 403, 404, 405, 406, 407, and 408, and their walls were only used in Period IV, and since they were filled with soil by the builders of Stratum III (to gain a higher altitude for the podium unit) these walls were left standing, reaching below the floors of the podium.

The layout of Stratum IV is very much like that of Stratum III, except that walls which were added for Stratum III are much thicker.

The plan of the excavated parts is that of a residential quarter. There is no doubt concerning the use of these installations for private houses, in which were found mainly domestic utensils. The complete plan of the houses could not be exactly ascertained, because the walls of Stratum III and the walls of Stratum IV, in addition to the 1.00 m. thick baulk were not removed during excavation, waiting to establish the relationship between those and their exact chronological sequence.

The pottery sequence of the last phase of Stratum IV is not clear because of the re-use of the installations by the builder of Stratum III. In the podium area, it seems that it was cleared out totally at the time of the filling operation. However, in the earlier phases, the deposits of the different loci revealed material and information that indicated the function of the installations.

As stated earlier, the nature of the settlement seemed to be that of a non-military one. The walls of Stratum IV are thinner than those of Stratum III, even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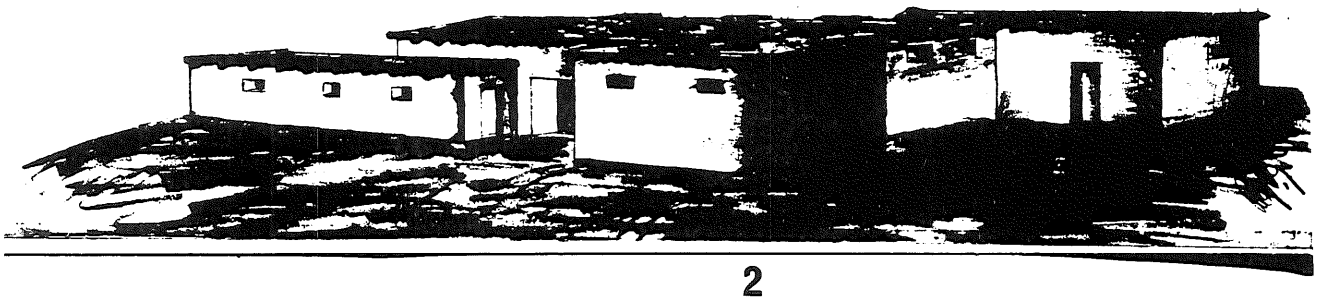

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Fig. 7

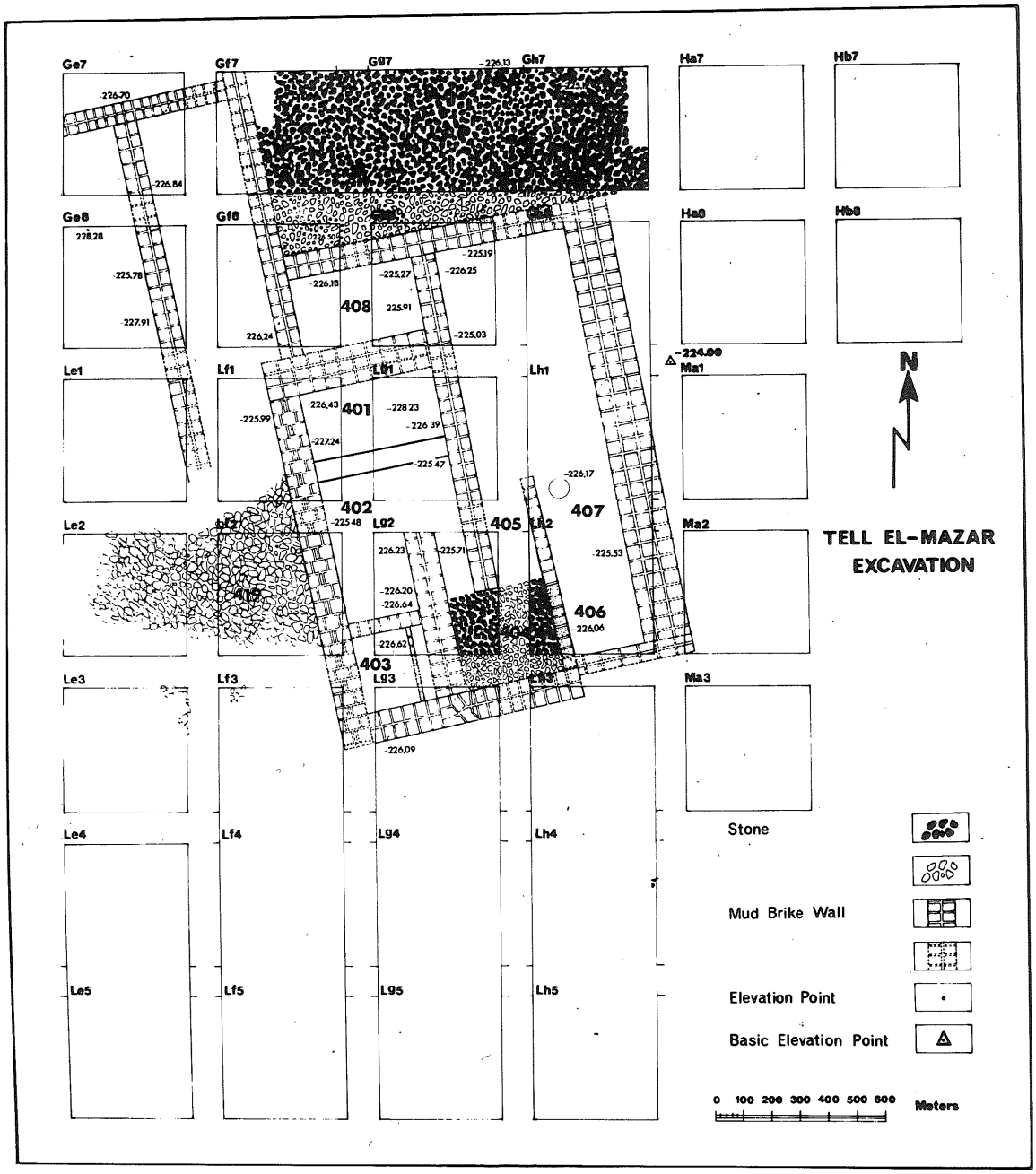
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Fig. 8

though the building technique and the building materials used were exactly the same. The orientation and general tradition of planning also was the same.

We are not yet able to speculate upon the extent of the installations of 400 to the east of the podium unit because we did not go below the floor levels of Stratum III and all of our speculation was based on the architectural analysis. For this same reason in our plan (400), this area is shown as a blank awaiting future investigation.

The available data of Stratum IV (building 400) indicates that it is comprised of a building whose plan is strongly reminiscent of building 300. The stone paved courtyard (no. 415) was used in both strata. Room no. 412 on the east side presumably was the same. The only changes were in the distribution and functions of rooms 408, 401, 402, 403, 404, 405, 406, and 407. Rooms 403 and 404 showed evidences of kitchen and storage rooms (Pl. CVI: 1). Numbers of cooking pots, storage jars, as well as a great deal of grain, were found in them. Room 407 has a *tabun* and heavy remains of ashes, and brushwood (Pl. CVI: 2). The area to the west of the building (area 419 and 420) was a stone paved open area with three *tawaben,* and a circular working area (Pl. CVI: 3). The main entrance to the summit seemed to be the same as that of Stratum III in Square Ge7, no. 418.

We would assume the changes which have taken place in Stratum III were presumably due to the changes in the administration in this part of the Jordan Valley. No evidence of any destruction or conflagration could be noticed for the termination of Stratum IV. We might anticipate (that is, in the last phase of occupation), that the city was probably abandoned.

Stratum V: Seventh/Eighth Century B.C. (Fig. 9)

Installations: 500: Stratum V on the summit was reached only in a few squares. Enough details of the architectural complexity were uncovered allowing us to draw a clear picture of the nature of the uncovered level.

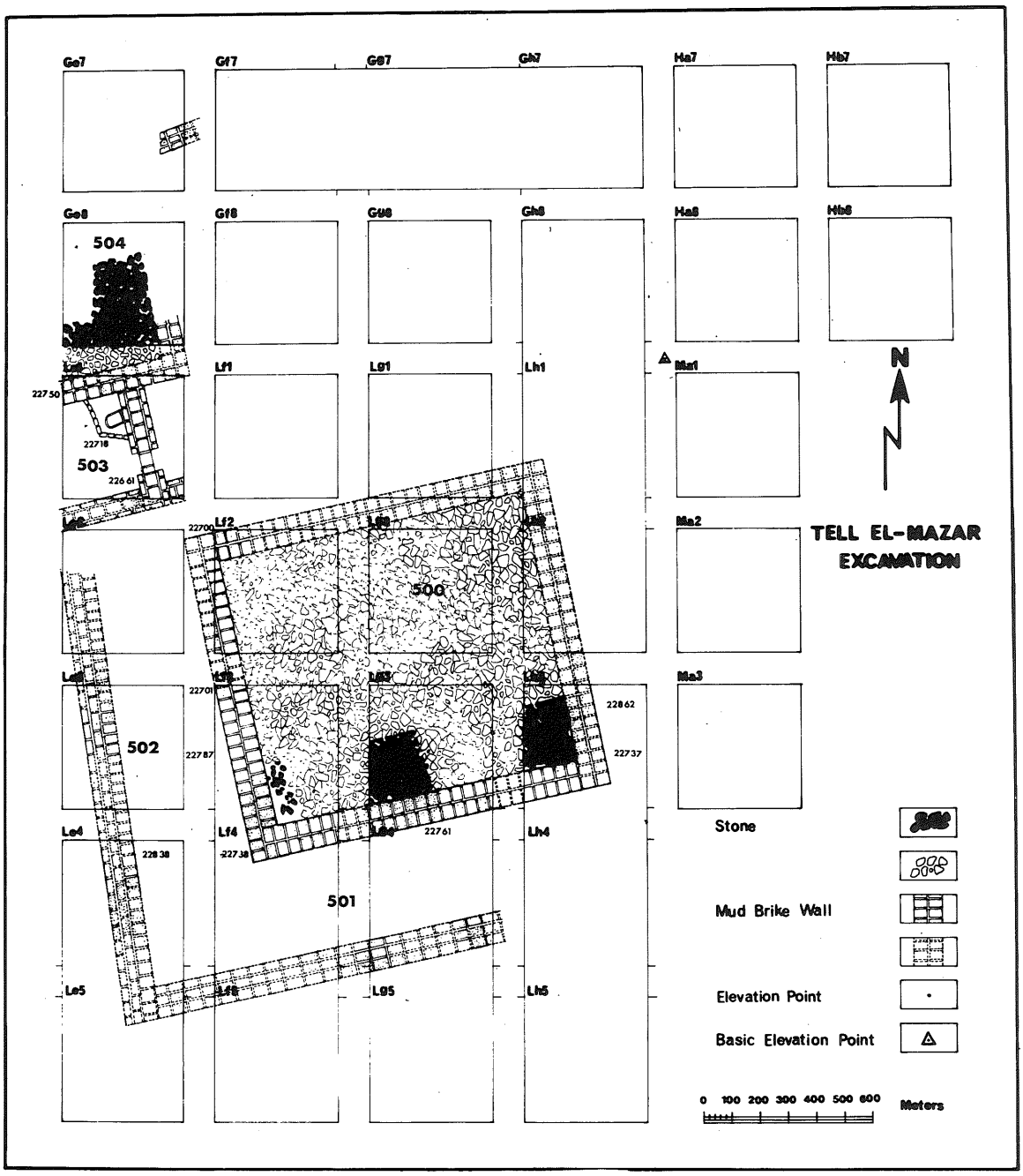
The stratum is characterized in one area as having a building with a middle square courtyard (Fig. 9; Pl. CVIII: 1). The floor was paved with flag stones. One room (No. 503) contained loom weights and storage jars filled with wheat grain. In one part of the room a bathroom was built where a bathtub was placed on a brick platform (Pls. CVII: 1, CVIII: 2; CIX: 1). Two sides along the square courtyard were uncovered. The silos of the Hellenistic period inflicted substantial damage to the stratigraphical and architectural composition of this stratum, but it is clear that the architectural affinities at least are closer to Syro-Hittite inspiration. It would be premature to begin to analyze the architectural plan, since the area uncovered is still very small. In one of the rooms (no. 504) a beer juglet was found having the relief of the goddess Astarti.

The square courtyard and the rooms were built on a lot used to house different kinds of animals, mainly gazelles. This animal yard extended and covered a large area on the summit of the mound (Pl. CIX: 2).

Our assumption is that the settlement of the eighth century B.C. was a centre for a much larger and more complex administration. The settlement of this level is destroyed. Rooms were destroyed by fire. From the end of the nineth century and including the eighth century B.C., the states of Ammon, Moab, and Edom already existed and from what little evidence is available, both in the Bible and in the Assyrian Annals, they had a treaty agreement with the Assyrians prior to Tiglath-Pileser III's (ed.) (744-728). On a stone slab found at Galah (Nimrud) which records Adad Nirari III's (810-783) expedition to Palestine, reference is made to the countries including Edom, in which he intimidated Sanipu of Bit Ammon, Salmanu of Moab and Kaush Malaku of Edom.

The destruction of level 5 has been attributed to the end of the eighth century B.C. It was a severe conflagration which actually signified the end of the settlement.

We may attribute this destruction as being connected with Sennacherib's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Meters

Fig. 9

campaign in 701 B.C. Sennacherib states: "forty-six of his strong city's fortresses, and countless small towns in the vicinity, I besieged and conquerred by earth-works, by bringing up seige engines with the help of assault troops by breaching the walls, by mines under the rampart and onsloughts with battering rams. I deported from among them and counted as spoil 200,150 persons, young and old, men and women, horses, mules, asses, camels, sheep and cattle, in countless number." (see, for the history part: Bennett; 1965: Lindsay 1976).

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TELL EL-MAZAR: STUDY OF THE HUMAN SKELETAL REMAINS

by
A. M. Disi,
W. Henke and J. Wahl

Introduction

The following report presents the results of a research on the anthropological material from Tell el-Mazar conducted by two of the authors (W. Henke, J. Wahl) in collaboration with Dr. Disi at the Department of Biology (University of Jordan, Amman). The material under study had been excavated by Prof. Khair Yassine (Department of Archaeology, University of Jordan) during three seasons in the Jordan Valley. The anthropological research in the laboratory of Dr. Disi of the Department of Biology was funded by the Deutshe Forsche Forschungsgemeinschaft and the Research Council of the University of Jordan. We make grateful acknowledgements to the financial assistance from both sources and to Prof. Khair Yassine and his Graduate student Mr. Msaytif Suleiman Msaytif (Department of Antiquities), who were so kind to give us all available archaeological information. Our special thanks are addressed to Mr. A. R. Badran, Director of Scientific Photography Section, University of Jordan, who helped us fully in the preparation of the figures given below. As the following notes on the human skeletal remains of the Tell el-Mazar graveyard form part of the larger excavation report, we will not give an exact description of the site, because this is already done in the archaeological report by K. Yassine (this publication), but we will only mention, that the skeletal remains come from the Iron age period and can be exactly dated to 550-450 B.C. The site is situated some kilometres northwest of Salt in the Ghor (Jordan Valley).

Section I

"Why Are Bones Studied?"

Bones are commonly unattractive to archaeologists, but intensive studies on skeletal remains have demonstrated that the human skeletal remains are not a less fruitful subject of research than pottery, metals, architecture, or any field of historical and prehistorical study. The "biological remains" may have information for answering the questions concerning the past human population, i.e., with respect to morphology, racial affinities and ethnic relationships, diachronic changes in a geographical region, their mortality rate, life expectancy and their diseases. To answer the above questions, a broad literature on methods of study of prehistoric anthropology has been established. The techniques and lines of inquiry which may provide us with some solutions are especially described in the manual textbooks of Brothwell (1968, 1972), Bass (1971, Krogman (1962), Martin (1927)) and Schwidetzky (1971). These special techniques which are applied to determine age and sex and used in the diagnosis as well as in the calculations of the life table are given in section 2.

To summarize the aim of studying human skeletal remains, we can say that the main goals are to reconstruct the past human population and to broaden our knowledge about the special ethnic and racial differentiations in the past as well as the inquiry into diachronic changes. For these reaons the study on the skeletons from Tell el-Mazar is important to our understanding of the past.

Iron Age Excavations in the Middle East

The Middle East is one of the most interesting prehistorical regions. Though a fairly large anthropological literature is available, we know very little of the physical anthropology of the early population. This is because most of the skeletal remains are badly preserved. As one can see from the large bibliographies of the Middle East, as have been compiled by

Boxton and Rice (1931), Krogman (1937), Field, (1956, 1961) Ferembach (1968) and from special papers (e.g., Kunter, 1977; Arensburg, 1973), most of the anthropological series consist of one or two skeletons, this means that they are in no way representative. Thus generalizations of ethnic and racial descriptions and diachronic processes cannot be made. Arensburg (1973) gathered all the available skeletal remains from the Middle East (especially Palestine and Jordan) from the Epipaleolithic period up till now to analyse the ethnic changes. These skeletal series, which belong to the same period as those of Tell el-Mazar are very scanty and listed below (Table 1).

* N is the number of skeletal remains

A newly studied series of the Persian period (alternatively Iron Age) was excavated in Syria in Kamid el-Loz (Kunter, 1977) and consists of about 94 skeletal individuals. Generally, the Iron age material especially human remains is not very rich, except Tell el-Mazar, Lachish and Kamid el-Loz. We thought that studying them may strengthen the previous findings.

Section 2
Methods:

Since most of the skeletons from Tell el-Mazar were damaged by the soil, morphometrical analyses were restricted to some well preserved skeletons. Measurements were taken according to Martin (1928) and Howells (1974).

Sex determination procedures were conducted by bone mohogenesis and measurements. We applied categories which gave the most significant information. The categorization is described by the European Anthropologists (N. N., 1979) and consists of the following sexual dimorphic features:
Cranial: Prominence of the *glabella*
arcus superciliaris
tubera frontalia and parietalia
inclinatio frontale
processus mastoideus
planum nuchale
protuberantia occipitalis externa
shape of the *processus zygomaticus*
os zygomaticum
crista supramastoidea
margo supraorbitale, forma orbitae
nentum mandibulae, angulus mandibularis
Postcranial skeleton:
sulcus praeauriculairs
incisura ischiadica major
angulus subpubicus
arc compose
os coxae
foramen obturatum
corpus ossis ischii
crista iliaca
fossa iliaca
Furthermore, we noticed general robustness and size of the teeth. As a metric attempt to classify an individual, we applied the discriminant functions of the *pars perrosa* for sex determination (Wahl & Henke, 1980; N. N. N. 1979; Holeop 1976; Breul 1974).

Age determination of subadults was based on tooth eruption and skeleton ossification. Our determinations followed the advice of Moorres et al. (1963) Maresh

Table 1: Iron Age Skeletal Remains from Palestine and Jordan (after Arensburg, 1973)

Site	*Excavator*	*(N)**	*Author*	
Megiddo	P. L. O. Guy, R. M. Engburg	7	Hrdlivka	(1938)
Lachish	O. Tufnell	634	Risdon	(1939)
Lachish	O. Tufnell	—	Giles	(1953)
Ain Shems	E. Grant, & G. E. Wright	1	Hooton	(1939)
Azur	M. Dothan	4	Perembach	(1961)
Gezer	R. A. S. Macalister	?	Macalister	(1911)
Gibeon	J. B. Prichard	2	Gloor	(1952)

(1955), and Wolf-Heidegger (1954). Adult and old skeletons were diagnosed by the polysymptomatic method of Acasadi & Nemeskeri (1970) using the tables of Sjovold (1974) (published in N. N., 1979). This method is based on a maximum of four age--specific variables: *epiphyses* of the proximal humerus and femur, obliteration of the cranial sutures and *facies symphyseos ossis pubis*. In those cases, where only little information was available the determination was based on the *ectocranial suture* closure after Vallois (1937) or the abrasion (attrition) of the teeth after Miles (1963), Lunt (1978) and Brothwell (1972). The calculation of the abridged life expectancy table of the Tell el-Mazar population was based on the methods described by Acsadi & Nemeskeri (1970). The diagnosis of pathological finding and special anatomical features were based on reports of Steinbock (1978), Bach & Bach (1971), Stloukal et al., (1971).

In addition to the metric data the epigenetical traits, a new system of observation, has been established during the last decade in order to analyse the relationship between ethnic and racial groups. Although the material was scanty, we could collect enough of it for our study. The following list of cranial epigenetical traits was taken into account. The numbers of the features in Section 3 are given in relation to this category (Table 2).

Table 2: Epigenetic Variants

1. *metopism*
2. *supra-orbital foramen* (complete)
3. frontal *foramen* (present)
4. *coronal ossicle* (P)
5. *bregmatic* bone (p)
6. *Sagittal ossicles* (p)
7. parietal foramen (p)
8. *Ossicle* at the *lambda*
9. *wormian* bone
10. *lambdoid ossicles* (p)
11. *ossicle* of the *asterion*
12. *parietal* notch bone (p)
13. highest *nuchal* line (p)
14. posterior *condylar* canal (p)
15. anterior *condylar* canal (double)
16. *condylar facet* (double)
17. *pharyngeal tubercle* (p)
18. *precondylar tubercle* (p)
19. *foramen ovale* (incomplete)
20. *foramen spinosum* (open)
21. *foramen* of Huschke (p)
22. *mastoid foramen* (p)
23. *mastoid foramen* (p)
24. *auditory torus* (p)
25. *epipteric* bone (p)
26. *frontotemporal* suture
27. anterior *ethmoid foramen (exsutural)*
28. posterior *ethmoid foramen* (absent)
29. accessory *infra-orbital foramen* (p)
30. *palatinal torus* (p)
31. *mixillary torus* (p)
32. accessory larger *palatine foramen* (p)
33. small *palantine foramen* (p)
34. accessory lesser *palantine foramen* (p)
35. *zygomatico-facial foramen* (p)
36. accessory *zygomatico-facial foramen* (p)
37. third *maxillary* molar (p)
38. third *mandibular* molar (p)
39. *mandibular torus* (p)
40. accessory *foramen mentale* (p)

The definition of most of the given traits is found in Berry & Berry (1967).

Section 3
Examined Materials

Scheme of Description

As the archaeologists systemic classification differs from one to another, new running numbers were used in order to synchronize the archaeological with anthropological inventory.

1) Conservation of human skeletal remains and description of identifiable cranial and postcranial material
2) Kind of burial-after graveyard map and by personal communication of Mr. Msaytif Suleiman (Department of Antiquities)
3) Age determination (individual age)
4) Sex determination (probability of classification): indeterminate, probably male (female), most probably male (female), nearly without doubt male (female).
5) Metrical and epigenetical data -- (see catalogue of anatomical variants)

6) Osteological diseases
7) Constitutional description (e.g., body height)
8) Special remarks
9) Archaeological hints concerning sex and age.

Individual description of the human skeletal remains of Tell el-Mazar and numbering the materials.

No. 1: Square E/6; Area 15; Locus 11 (floor 3) (8-3-1977); Burial 3 (?)

1) Bones were conserved in a block of gypsum (0.65 x 0.30 m.) *Viscerocranium,* (further *vc):* right part of the *mandible,* partly dentitioned, left *ramus* and *corpus manidublae* with M_1, fragment of the *maxilla;* parts of the cranial base.
Postcranial skeleton *(pcs):* parts of the vertebral column, *costae vertebrales in situ;* complete left *diaphysis* of the *humerus; ulna* and *radius* without *distal epiphyses.*
2) Crouching position
3) Dentition pattern of deciduous and permanent teeth were used in individual determining the skeleton of about 5 years old. Indixidnal age diagnosis was based on the length of the long bone *diaphyses* of about 4 years old. Total: late infant I
4) Indeterminate sex: Combination of the two categories places the skeleton as late infant I.
5) *diaphyseal* length of the left *humerus* 160 mm. left *radius* 117 mm. *clavicle.* (numbers are not given when no information is present). Sex determination: Female — according to maturation pattern (Sundick, 1977).
6) The fact that the dental age surpasses the skeletal age could be interpreted as an effect of malnutrition; after Sundick (1977) this also could be a hint for sexing. This maturation pattern would lead to the diagnosis of female.
9) Bronze gifts, three scarabs; following the hypothesis of the archaeologists, the crouching position is the typical burial of females. Sex determination; female — according to the presence of bronze gift, three scarabs and the crouching position (Yassine 1982).

No. 2: Square D/5, Burial 34

1) Bone fragments in blocks of gypsum *PCS* only; *fibula,* both *femora* which are crossed in an angle of 40°; *os ischium;* diverse fragments of the *vertebrae; distal* fragment of the right *radius,* some *phalanges,* situated in the thoracic region, fragments of the *oss sacrum.?*
2) Crouching position
3) No teeth preserved by *post mortem* loss; *proximal phalanges* without ossification of the *epiphyses* (14-16 years); no specific indicators preserved showing the age, probably age: Infant I
4) Sex is indeterminate.
5) Diameter below the *caput radii:* 7 mm.
9) Bronze earrings child; mother of this child possibly in burial 35.

No. 3: Bathtub, Burial 23 (Pl. CXVI, 1).

1) Incompete skeletal fragmets in a clay bathtub. *Cranium: neurocranium* (nc) — *glabella* of the *frontal* bone, both *ossa temporalia,* fragmented, *ossa parietalia, occipital* bone. *Vc:* right *zygomatic* bone; *processus zygomaticus* of the frontal bone; *alveolar* process of the *maxilla, mandible,* left *corpus and mentum);* about 12 complete teeth; *pcs:* shaft fragments of the *humerus,* the right *ulna* and *radius* and the right *femur;* 9 *metacarpals,* 17 *phalanges* and 4 *distal phalanges* of the fingers.
2) Crouching position in the clay bathtub.
3) Obliteration of the cranial sutures and the molar attrition (a mature/senile age).
4) The robustness, the *mastoid* process, the *processus frontalis ossis zygomaticus,* the *occiput* and the size of the teeth (masculine sex). Indifferent *mandible, glabella & arcus super ciliaris:* indifferent *protuberantia occipitalis externa;* orbital ridge (female ?).
5) *Proc. mastoideus* length 33 mm.
Proc. mastoideus breadth 13 mm. Measures of the *pars petrosa* (Wahl and Henke, 1980): 11.75 mm; 6.0 mm.; 9.75 mm.
Gnathion height 28 mm., height of the

corpus (foramen mentale) 27.5 mm.; nasal breadth - about 28 mm.
Humerus, maximum diameter at the *tuberositas deltoidea* 23.5 mm.
Sagittal diameter of the *caput femoris* 44 mm.
Epigenetic traits (see section 2).
1, 13, 21, 39 absent; 2, 19, 35, 37 present; 40 present- single 22 absent on both sides

6) The joints of the *phalanges* show slight *exostoses* and porous structures; *ankylosis* of the *distal radius* and the *carpilia* see plate CXVI, 1; healed fracture of the radius shaft with slight dislocation; tooth loss *intra vitam* (Schumacher and Schmidt, 1976): 3.2; 1.2; 2.2; 2.4; 2.5 The mandible shows advanced *paradentosis,* at least 5 teeth with carries at the crown or the neck
7) Tuberosities point out to a medium robustness of the skeleton
8) *Ligamentum mentale* highly ossified (4.3 mm.); at the *squama occdpitalis,* there are two *exostoses* on the *lamina externa* (2.0 mm.) above and below the *linea nuchae.*
9) Pearl *(careol),* glass-metal, bronze earrings; additions are of unspecific; child.

No. 4: Square D/3, Burial 76 (Pl. CXVI, 2-3).

1) The skeletal remains were put on grass and pieces of the skull and long bones were preserved with glue, i.e., they were badly preserved and damaged. *Cranium:* nc frontal bone with orbital ridge; both *petrous* portions; *vc-zygomatic* bone, *mandible* (right *corpus* with broken teeth) *pcs-distal epiphyses* of the *humeri; proximal ephyses* and shafts of the *radius* and *ulna* of both sides; *phalanges* of the fingers; fragments of the right *scapula; manubrium sterni; clavicle*-ribs- and vertebra-fragments.
2) Crouching position.
3) Progressive ossification of the cranial sutures; very low attrition of the molars; no intravital tooth loss; slight degenerative alteration of vertebral bodies (young adult)
4) Sex determination: male orbital ridge; *fossa genioglossi; corpus* of the *mandible; zygomatic* bone; *mastoid* process; *trochlea; manubrium sterni;* total robustness and the tuberoisities of the long bones.
5) *Mastoid* process - length 34 mm.
Chin height *(foramen mentale)* 33 mm.
Corpus breadth of the *mandible* (M_1) *petrous* portion Rt, side 16 mm.
Thickness of the *parietal* bone 7-8 mm.
Tibia, sagittal diameter, *foramen* nutrition right: 38 mm. left: 35 mm.
Transverse diameter, *foramen* nutrition right: 25 mm. left: 23 mm.
Patella, height 36.5 mm.
Patella, sagittal diameter 29 mm.
Epigenetic traits: 21, 35 absent; 11 right side present; 40 single.
6) *Cribra orbitalia* at the right *tectum orbitum* (Pl. CXVI, 2) (Hengen 1971); *Osteochondrosis vertebrae* of the *lumbal* spine.
7) Relatively robust: very prominent; *Linea aspera.*
8) Crouching position (female)

No. 5: Square C/3: 445-1979; Burial 78

1) Cranium: *nc* -fragments of the frontal bone, *parietal* and *occipital,* both petrous portion and *occipital* bone
pcs - humerus - right and left side, *distal epiphyses; radius-proximal,* right side; *distal ulna - proximal* left side; *clavicle, scapula* (right), *metacarpalia;* some *phalanges* of the fingers; total cervical column;
2) Crouching position.
3) Suture ossification: early mature; detention (molar attrition); late adult--about 40 years.
4) The chin and the *zygomatic* bone tends to be masculine; *glabella* and *arcus superciliaris* little developed (grade 1); postcranial skeleton *gracile;* (male ?)
5) Chin height - 34 mm.
Thickness of the *neurocranial* bones - 7 mm.
Petrous measurements: 14.6 mm.; 7.7 mm.; 7.55 m.; (right side) 14.6 mm.; 7.3 mm.; 8.8 m. (left side)
Diameter of the *capitulum radius* 20 mm.
Condyle of the mandible - breadth right

side 22 left side 18.5 mm. depth right side 10. left side 10 mm.
Transverse diameter of the *dens axis* 9.5 mm.
Sagittal diameter of the *dens axis* 11. 5 mm.
Epigenetic traits: *Fossa olecrani*
7 present on the right side
35 present; 40 single; 3 absent

6) Mental *foramen* enlarged (diameter 5.7 mm.)
Osteochondrosis vertebrae - cervical column.
Slight *paradontosis* of the frontal *alveolar* processes of the *maxilla* Schmort's nodules.
Hypertrophic spondylarthritis (cervical vertebra No. 4) (Pl. CXVI, 3).
7) More *gracile;* developed tuberosities midling.
8) Bronze additions; crouching position-female, child.

No. 6: Square D/7, Burial 53.2 Disarticulated Child Burial

1) Brown coloured skeletal remains
Cranium: incompletely preserved; *mandible:* present *pcs:* all long bones except *radii,* ribs *claviculae, scapulae* were preserved.
Teeth: crowns of the *deciduous* teeth i^1, i^2; 3 frontal teeth of the lower dentition are molar & canine.
2) Crouching position.
3) *Symphysis* of the *mandible:* not ossified
Dental status: *neonatus* ± 2 months (Fazekas & Kosa, 1978)
4) Indeterminate Sex
5) Length of bones *(diaphysis* lengths) right-left

Humerus	*65.5*	*65*	mm.
Ulna	62	62	mm.
Femur	73.5	73.5	mm.
Tibia	65	64.5	mm.
Fibula	61	61	mm.

6) Both *radii* absent
9) Two bronze foot-rings; Female by reason of squatting position.

No. 7: Square C/4, Burial 51, 2.4. 1978; Locus 4

1) Very little material distributed in three parts; frontal fragments *caput femoris* and parts of a *vertebra corpus* of the thoracic or lumbar part of the column.
2) Stretching position.
3) The ossification of the *proximal femoral diaphysis* and *epiphysis* indicates an age more than 19 years adult or old individual.
4) The thickness of the cranial bones and the robustness of the *femoral* head indicate: probably male.
5) Thickness of the cranial bones; 8.2 mm. Diameter of the *caput femoris;* 46.5 mm.
7) Robust - diagnosed from the long bone.
8) Possibly parts of a skeleton which is described under another running number.
9) No additions; male as indicated by the kind of the burial.

No. 8: Square E/3 - No. 448 (?) - 1979, Burial 84

1) Highly destroyed skeletal remains
Cranium: Parts of the *frontal, parietal* and *temporal* bone, the maxilla and mandible; fragments of teeth 2.1; 2.3; 3.4.
Postcranial: humerus, radius, ulna, and *femur.*
2) Obliteration of the cranial sutures; tooth abrasion: *early* mature.

3)

Male	indifferent	Female
Mastoid process	*Arcus/glabella*	General
Orbital ridge	Chin	robustness
	Tooth size	

Total: probably male
4) Thickness of the cranial bones 7.5 mm.
Mastoid process - height 30 mm.
Mastoid process - breadth 11 mm.
Transverse diameter of the *diaphysis* of the *radius* 14 mm.
Transverse diameter of the *proximal femur* shaft 26.5 mm.
Sagittal diameter of the *proximal femur* shaft 26.5 mm.
Epigenetic traits: 2 absent; 3 present on both sides.
5) Abrasion of the teeth markedly different

6) *PCS gracile,* only small stature.

No. 9: Square D3, Burial 79

1) *Cranium:* Frontal bone, *parietal, occipital* and *temporal* bones, *maxilla* and *mandible;* teeth: 2.4; 3.3
   PCS: Lumbar vertebrae, pelvis *(acetabulum);* long bones- *ulna, radius, femur, & tibia; Tarsalia - talus, & oslcuneus; matatarsalia*
2) Crouching position
3) Diagnosis of the cranial sutures: mature-senile. Deformed *spondylosis,* grade 2 indicates a late mature age.
4) Robustness and size of the caput and *collum femoris* as well as the trochanter major; tooth size; petrous portion and *mastoid* process indicate most probably male sex.
5) Petrous portion: 13.3 mm.; 6.0 mm.; 8.25 mm.; nasal breadth 26 mm.
   Mastoid process height 36 mm.; breadth 11 m.
   Thickness of the cranial bones
   Femur circumference of the midth of *diaphysis* 96 mm.
   Transverse diameter of the *collum* 33.5 mm.
   Sagittal diameter of the *collum* 26 mm.
   Transverse diameter of the *proximal* shaft 35 mm.
   Sagittal diameter of the *proximal* shaft 25.5 mm.
   Transverse diameter of te *caput femoris* 45 mm.
   Circumference of the *caput femoris* 153 mm.
   Epigenetic traits 1 absent; 7 present on the left side
6) Right upper canine; abscess *labial cavity.*
   Spondylosis deformed, grade 2.
   Hypoplasia of teeth.
7) Robust - very robust, strong attachments of the muscles; robust joints.
8) No additions; female as indicate by the kind of burial.

No. 10: Square F/8; Area G 13.4. 1978; Burial 11? Tell 341

1) *Cranium: frontal, parietal* and *temporal* bones (incl. petrous portion) *Deciduous teeth: 2.1; 2.6; 2.7*
   PCS: Complete long bones of the upper extremity
   Fracture lower extremity, ribs and parts of the vertebral column were preserved; bones of the pelvis; foot and hand bones
3) *Epiphyses* of the long bones were not ossified; dental status 6 years cervical *vertebrae* show ossification of *arcus* and *corpus vertebrae; pubis* and *ischium* are not already fused. Age after length of the *diaphyses:* Max. 3.5 - 4 years
4) Sex indeterminate
5) *Diaphysis* of the *humerus* 14.5 cm.
   Diaphysis of the *radius* 10.7 cm.
   Diaphysis of the *ulna* 12.2 cm.
   Length of the *clavicle* 8 cm.
6) The dental age surpasses the skeletal age (See no. 1)
7) Animal bones (goat/sheep?)

No. 11: Square ♀2 7.7. 1979; Burial 82; Tell 292

1) *Cranium: Frontial, parietal* and fragments of *temporal bone Maxilla, mandible* with teeth fragments
   PCS: 2nd thoracic vertebrae; humerus, ulna, femur, tibia Humerus, clavicle, and metatarsalia
3) Obliteration of the cranial suture indicates an age about 50 years

4) *Male* *In between* *Female*
   Mastoid process *Glabella/arcus* Robust
   Thickness of the Cranial bones Muscle attachments
   Chin region
   Joints
   Total: probably male
5) *Dens epistrophei* transverse diameter 11.5 mm. height 36.5 mm.
   sagittal diameter 11.0 mm.
   Bimental breadth of the *mandible* 39 mm.
   Femur: Proximal transverse diameter 30 mm.
   Epigenetic trait 40-single
6) The mandible shows a heavy atrophy in the frontal alveolar arch, and total loss of teeth (by infection ?)
7) Postcranial bones are more *gracile* than robust
9) Pottery, bronze rings, scarabs; sex?

No. 12: Square A/7 Locus 5 B-40 24.3. 77;

Tell 349

1) *Cranium:* fragments of the *frontal, parietal, occipital* bones, *maxilla* and *mandible*
   PCS: shoulder girdle *(scapula* and *clavicle),* ribs, *vertebrae,* shafts of the *humerus and femur*
3) Dentition indicates an age (about 6 months 3 months)
   Skeletal maturation (long bones): 0.2-0.4 years
4) Indeterminate sex
5) Length of the *humerus diaphysis* 90 mm.
   Scapula-lateral height 40 mm.
   Transverse breadth 35 mm.
   Clavicle 46 mm.
6) Skeletal maturation indicates a lower age than the dentition (See also nos. 1 & 10)

No. 13: Square ♀2 286 7.7. 1979; Burial 83

1) *Cranium: Frontal, parietal, temporal, occipital* bones *maxilla* and *mandible*
   PCS: Clavicle, vertebrae; right and left *acetabulum* of the pelvic girdle & *os ischium*
   Long bones: *humerus, radius, ulna, femur, tibia, tarsalia, metatarsalia* and *phalanges*
2) Crouching position
3) The *humerus* is distally ossified and the femur proximally indicates an age; older than 19 years
   The proximal femur shows a *spongiosa* structure like grade 2 following the scheme of Acsadi & Nemeskeri (1970): early adult: 20-29 years
4) Most probably male, as indicated by the following markers: *Incisura ischiadica* small; *sulcus praeauricularis* absent; are compose; *mastoid* process; gonial region; general robustness dental size; and orbital ridge shape
5) diameter of the *capitulum radii* 23 mm.
   Proximal transverse diameter of the *femur* 32.5 mm.
   Proximal *sagittal* diameter of the *femur* 24.5 mm.
   Transverse diameter of the *caput femoris* 44 mm.
   Petrous portion 11.6 mm.; 6.2 mm.; 8.7 mm.
   Epigenetic traits-7-on both sides
6) Vertebrae have slight *osteochondrosis*
7) Robust constitution
8) Animal bones
9) Silver-ring, earrings; pottery; as idicated by the squatting position is thought to be female

No. 14: Square ♀6 Locus 1 1.4. 1977; Burial 08

1) Fragments of 4 little bones *(phalanges* II, long bone fragment)
3) Phalanges show *proximal* ossification of the *epiphyses;* fragments of the long bones indicate an adult or old age.
4) Sex is indeterminate
6) Scanty material, scattered material?
7) Medium robustness to *gracile*
9) "Finger and animal bones", sex?

No. 15: F1 387 Tell 20.4. 1978..

1) Highly crumbled material; human and animal bones mixed
3) Distal ossification of the *femoral epiphysis* older than 19 years
4) Size of the *patella,* robustness of the pubic bone and general robustness indicate most probably male
5) Epicondyle breadth of the *femur* 86 mm.

patella height	42 mm.
Patella sagittal diameter	22 mm.
Talus length	61 mm.

7) Very robust and large bones medium, muscle attachments
8) Animal bones are of goats and sheeps

No. 16: Square ♂3 283 1979; Burial 72

1) Not identifiable small cranial fragments, *mandible* fragments
   PCS: Humerus, radius, ulna and *femur*
2) Crouching position
3) *Spongiosa* structure of the *proximal femur,* no intravital tooth loss between 3.1-3.7: adult/mature
4) Probably male as shown by the robustness of the *linea aspera,* dental size of general robustness
   The fact that the diagnosis is mainly based on the robustness of the *femoral* weakens the classification as male, because the individual is expected to be a dancer by the archaeologists
5) Transverse diameter of the *femur* head

46 mm.
6) Periodontal disease
7) Very robust constitution
9) Several foot-rings, dancer, female

No. 17: Square A7 8? Locus 2 24.3. 1977 421 Tell

1) Human and animal bones are mixed
   PCS: 4 vertebral bodies and 2 vertebral arches; *Ulna, radius* (right and left) *femur* and 3 *phalanges*
3) No dental remains, *diaphyses* of the long bones indicate an age of 0.4-0.6 years (possibly discrepancy to the dental age)
4) Sex is indeterminate
5) Greatest length of the *diaphysis-radius* 66 mm., *ulna* 74 mm.
6) *Femur* shaft shows a *proximal porous compacta* and an inflammatory disease
8) Calcaneus of a cow and several other animal bones

No. 18: Square D3 285 1979: Burial 80

1) *Cranium: Frontal, parietal, temporal* bones, *maxilla* and *mandible*
   PCS: Right and left *humerus, radius, femur, tibia* and fibula; hip bone *(acetabulum), vertebrae,* ribs, *calvicle metatarsalia* and *phalanges* of the foot.
3) Cranial sutures still open; dental abrasion indicates an age of around 20 years (after Brothwell, 1972)
   The median part of the *clavicle* is not ossified (23-26 years)
   Crista iliaca is ossified (19-22 years); Proximal *femur* is ossified (more than 19 years)
   No intravital tooth loss: early adult (20-21 years)
4) *Glabella* and *arcus superciliaris* (grade-2)
   Mandible small as well as petrous portion;
   Probably female
5) Petrous portion 11.2 mm., 6.8 mm., 7.6 mm.
   Nasal breadth (Probably 28 mm.)
   Epigenetic traits: 38 present
   Distortion of the molar-2.5 distortion
9) Female as indicated by the crouching position and crossed arms.

No. 19: Square E8 Locus 2 Burial

1) Only several bones, *phalanges, carpalia* of the right hand, and *patella*
2) Stretching position
3) Adult or old
4) Sex is indeterminate
7) Robustness: average
8) Bones belong to skeleton No. 56
9) Male as shown by the kind of burial

No. 20: Square E2 Locus 81 299 1979 Burial

1) Incomplete, fragmented material
   Teeth: 6 permanent teeth or parts of it (1 premolar and lower incisor), and 2 deciduous teeth
   PCS: Axis, ribs, *proximal radius, clavicle, femur* and *fibula*
2) Crouching position
3) Dental diagnosis indicates an age of 3 years (infant I), *Corpus vertebrae* are not already ossified
4) Sex is indeterminate
9) Child; as indicated by the kind of burial-female

No. 21: Square E4 26.4. 1978 129; Burial 48

1) Approximately damaged bones; maximum size-unidentified bones of the skull and long bones (shafts)
3) General impression: infant I
4) Sex is indeterminate
9) Bronze addition, child, female

No. 22: Square C7 16.4. 1978, 6 Cemetery A; Burial 52

1) Few bones of human and animal skeletons
   Skull fragments and parts of the pelvic girdle
2) Stretching position
3) Cranial sutures, ossification of the *iliac* crests of the hip bones early adult
4) Probably male as indicated by the thickness of the skull bones (misclassification is highly probable).
8) Animal bones, *distal phalanges* of horned cattle
9) Arrow head, spoon; male as indicated by the kind of the burial

No. 23 Square C2 ? Tell

1) One bone fragment of the *zygomatic*

arch
3) At least juvenile
4) Indeterminate Sex
7) *Gracile*
8) Scattered material, found beside animal bones

No. 24: Square H/7 Locus 2 26.2. 1977; Tell 138
1) Only dental remains of a human dentition
   Permanent teeth: 2 incisors, 3 premolars, and 4 molars
3) Teeth without any abrasion: about 20 years (late juvenile/early adult)
4) Size of the teeth indicates: possibly male
6) *Hypoplasia* of teeth

No. 25: Square F/6 Basket 2 8.4 1977; Burial 31
1) One bone or a child and *diaphysis* of the *tibia*
3) Determination of age by the length of the shaft: 2 months
4) Indeterminate Sex
5) Length of the *tibia* shaft 61 mm.
8) Possibly it belongs to burial no. 53

No. 26: Square E/6 28.3. 1977 100; Near Burial 1
1) Human and animal bones; only cranial fragments; *frontal* bone and *parietal* bones
2) Stretching position
3) As indicated by the robustness of the bones: adult or old
4) The thickness of the bones indicates a masculine sex (?)
5) Thickness of the cranial bones 9 mm.
8) Belongs to No. 54.

No. 27: Square D/3 1979 282; Burial 67
1) *Cranium:* neurocranial bones present; *mandible* and teeth
   PCS: Humerus, radius, 4 *phalanges,* and *femur*
2) Crouching position
3) Cranial suture closure and tooth abrasion indicate a mature/senile age
4) Most probably male as indicated by the extreme robustness of the *mastoid* process, orbital ridge curved, massive mandibula and *occipital* bone
5) Length of the *mastoid* process 35 mm. Breadth of the *mastoid* process 14.5 mm.
6) The third molar shows no attrition possible as shown of not having an antagonist, while the other teeth show a high degree of wear
7) Cranial bones very robust and not diagnosable *postcranium*
8) Chin is very prominent *(trignum mentale)*
9) Scarabs, bronze seal; female as indicated by the kind of burial

No. 28: Square G/1 Locus 5 Basket 13 20.2. 1979 Tell 314
1) Only postcranial fragments: ribs, *vertebrae, metacarpalia* and *tarsalia, phalanges, scapula, ulna* (incomplete). *Femur,* and parts of the pelvic girdle *(acetabula, sacrum)*
3) The *sacrum, femur spongiosa* and the *vertebrae* indicate an adult age (about 30 years)
4) Very robust hip bone and *femur* head indicate most probably male
5) *Ulna*

Maximal length	259 mm.
Physiological length	235 mm.
Circumference	31 mm.
Dorso-Volar diameter	14 mm.
Transverse diameter	14 mm.
Diameter of the midth	17.8 mm.
Femur, diameter of the *femur* head	48 mm.

No. 29: Square D/3 288 1979: Burial 66

1(*Cranium: frontal, parietal, occipital* bone, *zygomatic* bone, *mandible;* 8 teeth: 7 incisors, canines, premolars and 1 molar
   PCS: Clavicle, radius, femur, tibia and *fibula*
2) Molar attrition (Brothwell, 1972 grade ~~3~~1), cranial suture clusure: late adult
3) Weak expression of the protuberance of the occipital bone, chin *gracile, glabella* flat, orbital ridge sharp: probably female
4) Chin height 25 mm., thickness of the cranial bones 4.5 mm.
5) Very *gracile/gracile* constitution
6) Iron blade

No. 30: Square E/3 446 1979; Burial 77

1) *Cranium: frontal* bone, *parietal* bone and *occipital* bone
   PCS: left *humerus, radius, ulna;* ribs and *clavicle*
2) Suture obliteration: adult
3) Probably male as indicated by the general robustness the protuberance of the *occiput* (grade 2) and the thickness of the cranial bones
4) Thickness of the parietal bone 8-9 mm.
5) One very small and thin rib
6) Robust constitution of the preserved bones
7) Two bronze finger-rings; sex?

No. 31: Square D/3 1979 447; Burial 64 (Pl. CXVIII, 1)

1) *Cranium:* Neurocranium *occipital* the vertex-portion-plate preserved; *mandible,* 1 tooth
   PCS: Scapula, ribs, *phalanges,* and *femur*
2) Crouching position
3) Obliteration of the cranial sutures: adult (about 30 years)
4) Most probably male-as indicated by the tooth size, *occipital* bone protuberance, *linea nuchae,* and thickness of the cranial bones
5) *Femur* - proximal transverse diameter 34 mm.
   proximal *sagittal* diameter 23 mm.
   Epigenetic traits: 7 absent on both sides
6) The *nuchal* plane is sharply broken-down towards the *squama;* very thick bones.
7) Very robust *linea aspera*
8) Two trephine holes in the *lambda* suture of the *occiput,* and one in the left part of the lower *squama*
9) Bronze additions and pottery; female as indicated by crouching position

No. 32: Square C/3 Locus 65 287; Burial

1) *Cranium: frontal* and, *occipital* fragments, *mandible* and 1 molar several ribs and *phalanges, clavicle, humerus, ulna, tibia* and *femur*
2) Stretching position
3) Tooth abrasion and thickness of the neurocranium: early adult
4) Tooth size, very robust constitution, orbital ridge, and protuberance of the external *occiput* (1-2): most probably male
5) *Femur*-transverse diameter of the shaft 35 mm.
   Sagittal diameter of the shaft 31 mm.
   Radius-Transverse diameter of the shaft 17 mm.
   Sagittal diameter of the shaft 13.5 mm.
   Thickness of the *parietal* bone 7 mm.
6) Probably very tall individual: robust constitution
9) Stretching position: male

No. 33: Square D/3 449 1979; Burial 68 (Pl. CXIX).

1) *Cranium:* Neurocranium, and *mandible*
   PCS: vertebrae, ribs, several *phalanges, metatarsalia* and *carpalia, humerus, ulna, radius, femur* and *tibia*
2) Crouching position
3) Maturation of the skeleton and cranial suture closure: adult
5) Seems to be female: bones are *gracile,* no *preauricular sulcus, occipital* bone protuberance (grade 1)
6) Thickness of the cranial bones *(parietals):* 7.5 mm.
   Breadth of the *condylar* process of the *mandible* 19.5 mm.
   Minimal circumference of the *humerus* 58 mm.
   Epicondylar breadth of the *radius* 28 mm.
   Diameter of the *ulna* 14.5 mm.
   Transverse diameter of the *dens epistrophei* 8.5 mm.
   Sagittal diameter of the *dens epistrophei* 11.0 m.
7) *Phalanx* of the I. toe shows osteoarthritis
   Ribs with *osteoarthrosis costovertebralis*
   Vertebrae with *osteochondrosis*
8) Very *gracile* bones
9) Pottery, scarabs, female as idicated by crouching position

No. 34: Square C/3 1979 284: Burial 70

1) *Cranium:* partly preserved fragments of the *neuro*-and *splanchnocranium* 1 tooth.

PCS: Vertebrae, scapula, clavicle, humerus, ulna, radius, femur, tibia and *talus*

2) Crouching position
3) No obliteration of the sutures of the skull; molar attrition (after Brothwell, 1972) grade 2; proximal *tibia* is not ossified, apex of the P^3 still open: juvenile
4) Dental size, robustness of the long bones indicates: male
5) Transverse diameter of the *dens epistrophei* 9.5 mm.
   Sagittal diameter of the *dens epistrophei* 11.1 mm.
   Diameter of the *capitulum radii* 22 mm.
   Thickness of the *parietal* bone 7 mm.
   Breadth of the codyle of the *talus* 32 mm.
7) Very robust constitution on comparison with the age
9) Earrings, female as shown by the kind of the burial

No. 35: Burial?

1) *Cranium: parietal* bones, left petrous portion, and two M_3 (?)
   PCS: Atlas and axis; *phalanges* of the fingers, the toes, and *distal ulna;* both *femora, tibia* and *fibula*
3) Dentition: length of the long bones, ossification of the *femoral epiphyses* and the *phalanges,* and the *phalanges indicate an age about 15-16 years: juvenile*
4) Indeterminate
5) Transverse diameter of the *dens epistrophei* 11 mm.
   Sagittal diameter of the *dens epistrophei* 10 mm.
   Parietal arch 132 mm.
   Bregma-lambda-chord 110 mm.
   Maximum length of the *diaphysis, femur* 38.5 mm.
   tibia 31.5 mm.
   fibula 30.5 mm.
7) Very tall individual with respect to its age
8) Probaby belongs to skeleton No. 36

No. 36 (?)

1) *PCS:* Only postcranial fragments were preserved; *vertebrae,* ribs, *scapula,* pelvic bones, *phalanges, tarsalia, radius, ulna patellae, femora, proximal tibia* and *sacrum*
3) Sacral vertebrae not already ossified; ossifiestion of the long bones has not started; vertebral *epiphysis* opens and pelvic bones are not completely fused.
4) Most probably male as indicated by the greater *sciatic* notch and the arc compose.
5) Diameter of the head of the *radius* 190 mm.
   Length of the *diaphysis* of the *radius ulna* 212 m.
   Maximum length of the *humerus* 280 mm.
   Height of the hip bone 190 mm.
   Height of the *iliac* bone 86 mm.
   Breadth of the *iliac* bone 76 mm.
7) Relatively tall in comparison with his age.
9) Probably belongs to No. 35.

No. 37: Burial 19

1) Very badly preserved material in spite of the treatment with glue *Cranium: parietal, occipital* and *temporal* fragments
   PCS: Ribs, *vertebrae, carpalia, phalanges,* fragments of the pelvic girdle; right and left *humerus* and *ulna, radius*
2) Crouching position
3) Cranial suture closure indicates a senile (early senile) age
4) Probably female: The *mastoid* process is relatively robust but the *PCS* is more *gracile*
5) Proximal transverse diameter of the *femur* shaft 29 mm.
   Proximal *sagittal* diameter of the *femur* shaft 24 mm.
   Breadth of the *epicondyles* 58 m.
   Thickness of the *parietal* bone 8 mm.
7) Postcranial skeleton is more *gracile* than robust
9) Female as indicated by the type of the burial

No. 38: ?

1) Few pieces of the skull are not exactly identified 1 molar of the permanent dentition

3) Attrition of the upper M^2 (Brothwell, 1972-grade 2) and sutures of the *cranium* indicate an age about 30-35 years
4) Indeterminate sex
5) Maximum thickness of the cranial bones is 8 mm.
8) Probably belongs to No. 40.

No. 39: ?

1) *PCS* only: ribs, *sternum; vertebrae; humerus* and *radius* (both sides); *ulna; femur, tibia* and *fibula* (both sides); *tarsalia, metatarsalia,* and *phalanges*
2) Status of the skeletal maturation (long bones): late juvenile (18 years)
3) Most probably male as indicated by the robustness and size of the *PCS*
4) Epicondylar breadth of the *humerus* (right/left) 61 mm. /61 mm.
   Smallest circumference of the shaft 60 mm./59 mm.
   Diameter of the head of the *radius* 22 mm / 23 mm.
   Epiocondylar breadth of the *radius* 32 mm.
   Transverse and *sagittal* diameter of the shaft 15 mm./10 mm.
   Transvese and *sagittal* diameter of the ulna (width of the shaft) 15.5 mm./12 mm.
   Proximal transverse diameter of the *femur diaphysis* 30 mm.
   Proximal sagittal diameter of the *femur diaphysis* 24 mm.
   Diameter of the width of the *femur* shaft 27 mm.
   Diameter of the *femoral* head *(sagittal)* 45 mm.
   Maximum length of the *tibia* 375 mm.
   Physiological length of the *tibia* 360 mm.
   Smallest circumference of the shaft 68 mm.
   Sagittal diameter *(foramen nutritium)* 33 mm,
   Transverse diameter *(foramen nutritium)* 24 mm.
7) Very robust constitution, marked muscle attachments, body slight around 160 cm.
8) Since the material is very well-preserved, one can expect, that the skull is also preserved in the material

No. 40: Burial?

1) *Cranium:* frontal, *parietal* and *occipital* bone as well as temporal bones, *maxilla;* and 15 teeth
   PCS: Ribs, *vertebrae, clavicle,* hip bone, long bones of the upper extremity, *femur* and foot bones
3) Molar attrition and suture obliteration: adult (25-35 years)
4) Probably female as indicated by the small *mastoid* process, the *orbital* ridge shape and the general *gracility*
5) Thickness of the *parietal* bone 7.5 mm.
   Diameter of the *femoral* head 49 mm.
6) *Gracile* constitution
7) Animal bones, born; probably belong to skeleton No. 38

No. 41: Nos. 11/11a (?)

1) Damaged as a result of treatment with glue; no cranial fragments
   PCS: Long bones of the upper and lower extremities; *sacrum; vertebrae,* ribs, *phalanges* and *metatarsalia*
2) Burial 11 - Stretching position
3) Skeletal maturation indicates an age about 15-16 years (juvenile)
4) Indeterminate Sex
5) *Radius;* head diameter 21 mm; relatively robust
6) *Spina bifida*
7) The individual is very robust in relation to his age
8) Almost belongs to No. 51

No. 42: (?)

1) *Cranium:* Very small fragments of the skull and *mandible,* 1 molar
   PCS: Ribs, *vertebrae, distal humerus, femur, metatarsalia* and *phalanges*
3) Molar attrition indicates an adult age
4) *Mandible* and *patella* robust: probably male
7) Relatively robust constitution
8) Most probably belongs to No. 43.

No. 43: (?)

1) *Cranium: parietal* bone, two dental fragments
   PCS: Scapula, ribs, *vertebrae, phalanges, radius* and *femur*
3) Molar attrition and skeletal maturation

indicate an early adult individual of age (about 25 years)
4) *Occipital* plane markedly profiled: probably male
5) Transverse diameter of the *dens epistrophei* 10 mm.
Sagittal diameter of the *dens epistrophei* 13 mm.
Thickness of the *parietal* bone 7 mm.
Diameter of the *radius* head 21 mm.
8) Bones are relatively robust
9) Most probably belongs to No. 42

No. 44: ? - Burial 17 (see also running No. 45) ♂6

1) *Cranium:* petrous portion of the right and left side; *mandible,* and 5 teeth
PCS: Scapula, ribs, *vertebrae,* bones of the pelvic girdle (*ischium, acetabulum), humerus, radius, phalanges, femur, patella, metacarpalia* and-*tarsalia*
2) Stretching position
3) No clear attrition of the teeth; *(radius epiphysis* ossified: early adult (25-30 years)
4) Most probably female as indicated by the large *patella,* the presence of the *sulcus praeauricularis,* the U-shaped *sciatic* notch, the shape of the hip bone and the weak modelled chin
5) Petrous portion, left: 12, 5; 8.25 mm., 12, 1; 8.0 mm.; diameter of the *patella* 21 mm.
Epicondylar breadth of the *radius* 31 mm.
7) Robustness: average
8) Most probably belongs to skeleton No. 45

No. 45: Square ♂6 *1977 Burial 17*
1) No cranial fragments were preserved
PCS: vertebral column, third *thoracic vertebra* to the *lumbar vertebra,* ribs, *sacrum, acetabulum* of the hip bone, *sacrum, humerus, radius, ulna, femur,* and *tarsalia*
2) Stretching position
3) Proximal *spongiosa* of the femur (grade I); ossification of the *distal epiphysis* of the *humerus* and the *proximal epiphysis* of the *ulna* and the *diaphyses* indicate: an (early) adult age
4) Most probably female: though the skeleton is relatively robust, the sex specific features of the pelvis *(sulcus praeauricularis)* which are compose indicate a female sex
5) Transverse diameter of the *dens epistrophei* 9 mm.
Sagittal diameter of the *dens epistrophei* 12 mm.
Epicondylar breadth of the *humerus* 59 mm.
Proximal transverse diameter of the *femur* 34 mm.
Proximal sagittal diameter of the *femur* 26 mm.
Diameter of the *femur* head 47 mm.
6) Slight impression of the vertebrate bodies (Schmorl's nodules)
7) Athletic constitution
8) If the diagnosis was based on the postcranial skeleton, there is no doubt that the individual would be of male sex; the skeletal remains belong to the Nos. 44 & 59. Animal bones were found with this skeleton.
9) An arrowhead was found in the neck (killed ?), stretching position indicates a masculine sex

No. 45: Square D/7 Burial 21
1) *Cranium:* Parts of the *frontal, parietal, temporal* and *occipital* bones, the *mandible* and *maxilla,* 4 teeth
PCS: Vertbrae, ribs, *humerus, ulna, radius* and *femur*
2) Stretching position
3) Molar attrition and the ossified *hyoid* bone indicate a mature age
4) Most probably male as indicated by the very marked protuberance of the *occiput* (grade 4 after Broca), the *orbital* ridge, the *arcus superciliaris,* the jaw bow, temporal line and the *processus mastoideus* as well as the petrous portion
5) Petrous portion 13.2 mm., 7.2 mm., 8.3 mm.
Height of the *mastoid* process 35 mm.
Breadth of the *mastoid* process 15.5 mm.
Proximal transverse diameter of the *femur* 31.5 mm.
Proximal *sagittal* diameter of the *femur* 31. 0 mm.

9) Male, as indicated by the position of bronze plate

No. 47: Square D/6 Burial 6

1) *Cranium: parietal, temporal* and *occipital* bone, and 4 teeth
   PCS: Vertebrae, ribs, pelvis (acetabula), humerus, femur and *phalanges*
2) Stretching position
3) Molar attrition (3+, Brothwell, 1972), M_3 present, cranial suture pattern: late adult
4) Very large *mastoid* process, *occipital* plane robust, *humerus* large: Most probably male
5) Thickness of the *parietal* bone 6.5 mm.
   Height of the *mastoid* process 39 mm.
   Breadth of the *mastoid* process 12 mm.
   Proximal transverse diameter of the *femur* 32 mm.
   Proximal *sagittal* diameter of the *femur* 29 mm.
6) *Osteochondrosis vertebrae* of the cervical vertebral bodies
7) Athletic constitution, very robust
9) Arrowhead between the *femora,* bronze-axe, seal: male

No. 48: Burial (?)

1) Highly fragmented material: fragments of the *parietal, temporal* and *occipital* bones; *metatarsal* bone
3) Ossified *larynx* and cranial suture obliteration indicate a mature age (45 years ±).
4) Very robust and large size of skull fragments: most probably male
5) Thickness of the *parietal* bone 10 mm.

No. 49: Burial (?)

1) *Cranium: Neurocranial* bones preserved but fractured *zygomatic arch, maxilla* and *mandibula* preserved 13 teeth
   PCS: Vertebrae, ribs, pelvis, *scapula,* all four extremities, hand and foot bones
3) Molar attrition, cranial suture obliteration and *spongine* structure of the *humerus,* no intravital dental loss: adult (about 25 years)
4) Those bones under research show no sex relevant features: indeterminate sex
5) Petrous portion right/left 13.1/12.7; 7.95/7.85; 10.4/9.7 mm.
   Thickness of the *parietal* bone 8 mm.
   Mastoid process height 34 mm.
   Ramus breadth of the *mandible* 29 mm.
   Chin height 23 mm.
   Bimental breadth 44 mm.
   Corpus height *(foramen mentale)* 23 mm.
   Epicondylar breadth of the *radius* 29.5 mm.
   Sagittal diameter of the *patella* 19 mm.
   Transverse diameter of the *tibis* 21.5 mm.
   Sagittal diameter of the *tibia* 28 mm.
6) Flat processes *palatinus*

No. 50: Square D/6 Burial 37

1) *Neurocranial* bones, *mandibular* fragment and some teeth
2) Stretching position
3) Molar attrition (3+, Brothwell, 1972), M_3 present and not abrased; cranial stuture: adult (25-30 years)
4) Probably male as indicated by the massive *mandible* and the markedly modeled *gonial* region
5) *Orbital* height (approximately) 36 mm.
   orbital breadth (approximately) 39 mm.
   Thickness of the cranial bones 8 mm.
   Chin height 32 mm.
   Bimental breadth 49 mm.
   Thickness of the *mandible corpus* (M1) 14.5 mm.
   Petrous portion 11.8, 6.5; 8.4 mm.
7) Robust constitution
8) Blade of a knife, bronze needle
9) Bronze plate, pottery, "a big stone on the chest"; as indicated by the kind of the burial: male

*No. 51: Square E/6 10.5. 1977 Shaft Grave No. 1 III. Individual (*Pl. CXIII, 1-4)

1) *Cranium:* preserved by glue, almost complete skull, dentition also well preserved;
2) Shaft tomb, crouching position?
3) The eruption of the M_3 is not already completed; juvenile, 16 years
4) Chin is robust in relation to the individual age, orbital ridge smooth shaped: probably male
2) *Glabello-occipital* length 188 mm.

Maximum cranial breadth	134 mm.
Nasion-prosthion height	71 mm.
Nasal height	44 mm.
Nasal breadth	21 mm.
Facial height	120.5 mm.
Orbital height	38 mm.
Orbital breadth	38 mm.
Bimadillary breadth	84 mm.
Portion-bregma height	114 mm.
Ramus mandibula breadth (smallest)	32 mm.
Ramus-corpus-angle	123°

6) *Leptodolichomorphic* skull, *leptostaphylin* palate deep *fossa canina,* and slight overbite
8) "A snail was found in the oral cavity" Most probably belongs to No. 41

No. 52: Square E/5 Burial 10

1) Several broken pieces of the skull (neurocranium), 1 molar and a fractured clavicle
2) Crouching position
3) Cranial suture closure and molar attrition indicate a late adult or early mature age.
4) Sex is indeterminate: no specific sex traits are available.
5) Thickness of the *neurocranium (parietal* bone) 8 mm.
8) Most probably these skeletal remains belong to No. 62
9) The squatting position indicates: female

No. 53: SR 41 (?)

1) Skeletal remains in a block of gypsum: bones of the skeleton were preserved except the lower extremities below the knees.
   Cranium: Parietal bones, *occipital* bone and *mandible*
   PCS: Vertebrae, scapula, hip bone, humerus, radius, ulna and parts of the *femoral* bone.
3) Molar attrition and cranial suture closure idicate a late adult early mature age.
4) Probably female: as diagnosed from the chin region, the *occiput* and the long bones.
5) Left *humerus,* greatest length 295 mm.
   Body height by Bach (1965) 161 cm.
7) *Gracile* individual
8) A bronze and a bone needle were found near the shoulder girdle.

No. 54: Burial 1 (Pl. CXVI, 4)

1) *Cranium: Frontal, parietal* and *occipital* bone, *mandible,* and 7 teeth
   PCS: Scapula, ribs, hip bone, *metacarpalia* and-tarsalia, *ulna, femur* and *phalanges*
2) Stretching position
3) Dental and skeletal maturation indicate an early adult age
4) While the *occiput* is indifferent; the *mandible* is very robust, by teeth, the *ulna* and the petrous portion as well, probably male
5) Thickness of the *parietal* bone 6-7 mm.
   Mandible - corpus height *(foramen mentale)* 32 mm.
   breadth of the corpus M_2 19.4 mm.
   Petrous portion 13.85, 8.35, 10.8 mm.
6) Healed injury at the right *corpus* of the *mandible* (cut-injury,?)
7) Robustness: average
9) Female as indicated by the kind of the burial

No. 55: Square C/6 Burial 14

1) *Cranium:* only fractured material of the *neurocranium*
   PCS: Clavicle, phalanges, radius, femur and *fibula*
2) Stretching position
3) Skeletal maturation indicates age - adult or old
4) Probably female as indicated by the *gracility* of the bones and especially the *crista supramastoidea*
5) Petrous portion 12.06, 5.9, 8.7 mm.
   Thickness of the *parietal* bone 6 mm.
6) *Gracile* constitution
9) Male as indicated by the kind of burial

No. 56: Square E/6 Burial 2

1) The skull is only represented by a small *neurocranial* fragment
   PCS: Vertebrae, radius and *ulna, femur, tibia* and *fibula;* hand- and footbones
2) Stretching position
3) Skeletal maturation indicates an adult or old age
4) Sex is indeterminate
8) Belongs to No. 19 with a high probabil-

ity
9) Male as indicated by the kind of burial

No. 57: Square C/6 Burial 42 (Pl. CXVII, 2-3).
1) *Cranium:* Deformed *calvarium* treated with glue, preserved teeth
   PCS: Ribs, *humerus, femur, tibia* and fibula
2) Crouching position
3) All cranial sutures still open; slight attrition of the teeth indicate: early adult
4) Probably female because the *zygomatic* arch *(processes temporalis)* is very *gracile* as well as the *nuchal* plane and the teeth; and teeth are small
5) As the result of deformation no measurements could be taken
6) 4 trephine holes are seen in the right part of the *neurocranium*
7) Relatively robust postcranial skeleton
9) Female as indicated by the crouching position

No. 58: Square C/6 Burial 22 (Pl. CXVII, 1).
1) *Neurocranial* fragments were preserved with glue, bones deformed.
3) Cranial suture obliteration indicates an age of 30 to 40 years (adult)
4) Most probably male as indicated by the sex specific *neurocranial* features *(glabella, arcus superciliaris,* and *nuchal* plane)
5) Minimum frontal breadth 114 mm.
   Stephanial breadth 118.5 mm.
   Frontal chord 108.5 mm.
   Parietal chord 116 mm.
6) 12 trephine holes on the right side of the skull.

No. 59: Burial 17 C/6
1) Only some cranial fragments and two pieces of vertebral bodies were preserved
2) Stretching position
3) Suture closure indicates an adult age
4) Probably male as indicated by the *orbital* ridge shape, the marked robustness of the *zygomatic* process and the *nuchal* plane.
5) Thickness of the parietal bone 7 mm. Petrous portion, right side 17.0; 9.55; 10.55 mm.
7) Petrous portion hyperrobust as a result of pathological infection.
8) Bronze needle; most probably belongs to No. 45

No. 60: Square C/7 Burial 11
1) *PCS* only: *humerus tibia, phalanges*
2) Stretching position
3) Skeletal maturation and general robustness indicate an age of adult or old
4) Indeterminate Sex
7) *Gracile* constitution
9) Male as indicated by the kind of the burial

No. 61: Square E/6 Burial 4
1) *Cranium: Processus mastoideus, parietal* bone, *mandible,* and 6 teeth
   PCS: Humerus, ulna, radius, femur, ribs and *phalanges*
2) Stretching position
3) The crown of the M_3 is not already developed, *clavicle* is not already ossified: juvenile
4) Indeterminate Sex
5) The bones are very *gracile* compared with the teeth size.
9) Male as indicated by the kind of the burial

No. 62: Square E/5 Burial 10
1) *PCS:* Some fragments of the long bones
2) Crouching position
3) General impression: adult or old
4) No sex specific variables are diagnosable: sex is indeterminate
8) Animal bones; the human remains probably belong to No. 52

No. 63: Square E/6 Burial 3
1) *Cranium:* except for the mandible no bones are preserved; and 1 molar
   PCS: Long bones *(humerus, radius, ulna, femur, fibula,* ribs, hand and foot bones
2) Crouching position
3) Attrition of the molar; ossification of the *epi-* and *diaphyses:* early adult
4) With a high probability female as indicated by the *gracile* mandible and the very *gracile* long bones

5) *Mandible corpus* height (*foramen mentale)* 25 mm.
Mandible corpus breadth (M_2) 14 mm.
Diameter of the *radius* head 20 mm.
9) Female as indicated by the kind of the burial

No. 64: Square E/5 Burial 9? (Pl. CXVIII, 3)
1) Only a fragment of the *femur*
2) Stretching position
3) Adult or old
4) Sex is indeterminate
8) *In situ, tibial* fragments shows three trephine holes side by side
9) Male as indicated by the type of the burial

No. 65: Burial ?
1) Cranial fragments, only very small pieces
3) Obliteration of the cranial sutures indicates a late mature age
4) The robustness of the *nuchal* plane and the thickness of the cranial bones indicate a high probability of misclassification of a male sex
5) Thickness of the *parietal* bone 8.6 mm.
7) Robust constitution

No. 66: Burial ?
1) *Cranium: Neurocranial* fragments of the *parietals; mandible* and 2 molars
PCS: Several vertebral bodies (axis etc.), *clavicle, femur* and *phalanges* of the fingers
3) Molar attrition, cranial suture closure and *spondylosis deformans* indicate a mature age (about 50 years)
4) *Vertebrae gracile* and chin of mandible as well: most probably female
5) Thickness of the *parietal* bone 7.3 mm.
Transverse diameter of the *dens epistrophei* 10 mm.
Sagittal diameter of the *dens epistrophei* 10.7 mm.
Diameter of the *radius* of the head 19 mm.
6) *Spondylosis deformans* (grade 2); intravital dental loss of the 4.3; 4.7 and *alveoli* closed
7) *Gracile* constitution

No. 67: Square D/6 Shaft Tomb No. 2 Burial 7
1) *Cranium:* Fragments of the frontal, *parietal,* temporal and *occipital* bones are preserved; the *splanchnocranium* is represented by the *maxilla* and *mandible* with almost complete lower dentition
PCS: Scapula, clavicle, vertebral bodies, sternum, hip bones, *femur, fibula, tibia, metacarpalia* and *-tarsalia, clacaneus,* and *talus*
2) Stretching position
3) All the cranial sutures are still open, molar attrition (Brothwell, 1972; grade 2 tc 3+): early adult: 20-25 years
4) Most probably male as indicated by the shape of the mastoid process, the mandible robustness, the zygomatic arch and the orbital ridge
5) Petrous portion left side 12.8; 6.9; 6.95 mm.
Mastoid process - hight 34.5 mm.
Mastoid process - breadth 16 mm.
Height of the chin 16 mm.
Height of the *mandible corpus* 29.5 mm.
Height of the *mandible ramus* 57.5 mm.
breadth of the *condylar* process 22 mm.
Depth of the *condylar* process 8.5 mm.
Height of the *glendoid* cavity 36.2 mm.
Breadth of the *glenoid* cavity 26 mm.
Patella height/ breadth/depth 42.4; 41.5; 19.2 mm.
Transverse diameter of the *tibial diaphysis (foramen nutritium)* 22.5 mm.
Sagittal diameter 29.5 mm.
Condylar breadth of the *talus* 32 mm.
Maximum *calcaneus* length 81 mm.
6) Anomaly of the position of the incisors
Advanced caries of the upper molars
Osteoarthrotic disease of the *phalangeal caput*
7) Robust constitution
8) Animal bones
9) Male as indicated by the kind of the burial

No. 68: Square C/6 Burial 16
1) No skull fragments and only bones *(humerus, femur* and *tibia)*
2) Crouching position
3) General robustness indicates an adult or older age

4) No available sex specific variables: indeterminate sex
5) Minimum circumference of the *humerus* shaft 59.5 mm.
7) Indeterminate sex
9) Female as indicated by the kind of the burial

No. 69: Burial?
1) The skull is only represented by the *occipital* bone
PCS: Ribs, *femur* and *fibula*
3) The skeletal maturation idicates: an adult or old
4) No diagnosable sex specific variables indeterminate sex
5) Transverse diameter of the *femoral collum* 28.6 mm.
Sagittal diameter of the *femoral collum* 21 mm.
7) Indeterminate sex

No. 70: Burial II (?)
1) Nearly no preserved cranial fragments
PCS: Clavicle, ribs, hip bone, *humerus, radius, ulna, femur, patella* and hand bones.
3) General robustness, small pieces of cranial bones (suture closure) indicate an age about 40 (adult-mature)
4) Most probably male as indicated by robust post-cranial skeleton
5) *Patella* height, breadth, depth 45.0, 47.0; 23.0 mm.
Diameter of the *femur* head 47 mm.
7) Robust constitution
8) Arrowheads and dagger; teeth of goat/sheep

No. 71: Shaft Tomb Skeleton No. 1 (?) Burial 3 (Pl. CXIV, 1-6).
1) Relatively good preserved skeleton *(postcranium)* — skull (see No. 72) represented by *zygomatic* arches only
PCS: Almost complete vertebral column, *sacrum, sternum* ribs, hip bones and long bones of the skeleton, hand and foot bones
2) Stretching position
3) Age determination by polysymptomatic diagnosis (Acsad I & Nemeskeri, 1970): pubic *symphysis; femur* and *humerus spongios* structures), endocranial suture closure indicates a lower age (about 25 years) than the *PCS* (early mature)
4) Sex specific features of the pubic bone indicate probably male
5) Transverse diameter of the *dens epistrophei* 10.5 mm.
Sagittal diameter of the *dens epistrophei* 12 mm.
Humerus maximum length 313 mm.
Transverse diameter of the head 47.5 mm.
Sagittal diameter of the head 43.5 mm.
Maximum diameter of the *diaphysis* 21 mm.
Minimum diameter of the *diaphysis* 17 mm.
Minimum circumference of the shaft 60 mm.
Epicondylar breadth 61 mm.
Radius:
maximum length 265 mm.
Functional length 243 mm.
Minimum circumference 39 mm.
Transverse diameter of the shaft 15 mm.
Sagittal diameter of the shaft 11.8 mm.
Ulna:
maximum length 273.5 mm.
Minimum circumference 16 mm.
Transverse diameter of the shaft 14.5 mm.
Tibia:
Maximum length 376 mm.
Physiological length 353 mm.
Medial length *(condyl-malleoulus)* 367 mm.
Proximal epiphyseal breadth 73 mm.
Distal epiphyseal breadth 51 mm.
Maximum diameter of the shaft (midth) 35 mm.
Minimum diameter of the shaft (midth) 26 mm.
Sagittal diameter *(foramen nutr.)* 40 mm.
Transverse diameter *(foramen nutr.)* 24 mm.
Minimum circumference of the shaft 80 mm.
Fibula:
Maximum length 365 mm.
Minimum circumference 31 mm.
Femur:
Proximal transverse diameter 33 mm.
Proximal *sagittal* diameter 26 mm.

Horizontal diameter of the head	47 mm.
Circumference of the midth	148 mm.
Circumference of the midth (shaft)	90 mm.
Epicondylar breadth	79 mm.

6) Osteochondrosis vertebrae; slight *spondylosis deformans;* and *dorsoventral* deformation of the *tibial* shafts
7) Medium robustness; body height by Breitinger (1937): Tibia/168.6 cm.
8) Within the material there was a further radius of a 14 to 17 years old child, which belongs probably to No. 51. The *zygomatic* bones fit together with the skull fragments of No. 72.
9) Male as indicated by the kind of the burial

No. 72: Shaft Tomb Skeleton No. 1 Big Male Burial 3 (Pl. CXIV, 1-6)

1) *Cranium:* Well preserved skull which fits with some bones of skeleton No. 71; Neurocranium better preserved than the *splanchno-cranium,* dentition incomplete, and atlas
2) Stretching position
3) Molar attrition and the obliteration of the sutures indicate an age around 25 years (early adult)
4) Probably male from the set of sex specific features of the skull, but not "masculine male" as indicated by the archaeologists

3) Maximum length of the skull	183 mm.
Glabello-occipital length	177 mm.
Nasion-inion length	174 mm.
Minimum frontal breadth	98 mm.
Maximum frontal breadth	121 mm.
Stephanion breadth	109 mm.
Frontal arch	140 mm.
Parietal arch	134 mm.
Occipital arch	110 mm.
Sagittal arch	384 mm.
Frontal chord	117 mm.
Parietal chord	116 mm.
Occipital chord	97.5 mm.
Frontal fraction	54 mm.
Parietal fraction	56 mm.
Occipital fraction	45 mm.
Frontal subtense	29 mm.
Parietal subtense	27 mm.
Occipital subtense	26 mm.
Nasal breadth	25.5 mm.
Mastoid process breadth	25 mm.
Mastoid process breadth	12 mm.
Bimental breadth of the *mandible*	39.5 mm.
Depth of the *corpus*	79.5 mm.
Chin height	31.5 mm.
Corpus height *(foramen mentale)*	28.5 mm.
Ramus height	53 mm.
Minimum breadth of the *ramus*	34 mm.
Condylar breadth	19 mm.
Condylar depth	9.5 mm.
Angulus mandibularis	124°

6) The alveolar process of the *maxilla* shows markedly prominent tooth sockets
7) As shown in (Pl. CXIV, 1-6), the skull has a *dolichcephalic* shape
8) The skull belongs to the same individual as the skeletal remains from No. 71.
9) Male as indicated by the kind of the burial

No. 73: Square C/6 Burial 15 (Pl. CXV, 1-4).

1) *Cranium:* The *neurocranium* and the *mandible* are well preserved, and the upper facial skeleton is damaged
   PCS: One fragment of the vertebral body
2) Stretching position
3) Molar attrition and cranial suture closure indicate an adult age about 25 years
4) The cranial sex specific features indicate: male

5) *Glabello-occipital* length	185 mm.
Minimum frontal breadth	112 mm.
Bigonial breadth of the *mandible*	100 mm.
Depth of the *mandible*	70 mm.
Chin height	29.5 mm.
Height of the *corpus (foramen mentale)*	30.5 mm.
Minimum breadth of the *ramus*	31.5 mm.
Height of the *ramus*	58 mm.

Epigenetic trait no. 10 present

8) The shape can be diagnosed from (Pl. CXIV, 1-6).
9) Male as indicated by the kind of burial

No. 74: Square D/6 Burial 7

1) *Cranium: Neurocranial parietal* bone only; *maxilla* and *mandible*
   PCS: Clavicle, vertebrae, phalanges, ribs, hip bone fragments *humerus, radius, ulna, femur, tibia* and *talus*
2) Stretching position
3) Tooth abrasion indicates a late adult age about 35 years
4) Most probably male as indicated by the general robustness and the special sex diagnostic features *(mastoid* process, *zygomatic* arch, etc.)
5) Thickness of the *parietal* bone 7-8 mm.
   Minimum circumference of the *humerus* 65 mm.
   Minimum circumferences of the *tibia* 93.5 mm.
   Head diameter of the *femur* 46.5 mm.
   Patella height, breadth, depth 43-20.5 mm.
6) Robust constitution
8) The material does not belong to the individual of No. 67
9) Male as indicated by the kind of burial

Palaeodemography (Total number of individuals, sex and age distribution, life expectancy etc.)

In this section the palaeodemography of the Tell el-Mazar population study results are based on the sample given in Table 3. Here the survey on the total number of individuals is provided. The reader finds individuals identified with their estimated ages at death, sex attribution (anthropological diagnosis) and the archaeological sex diagnoses. We have studied a total number of seventy-four separately stored skeletal remains, but it was discovered that some of them belonged to the same individuals. Therefore, the number of excavated individuals diminished to a total of sixty-four individuals. We reason that this number seems to surpass the total number of individuals, because there is a lack of information in the archaeological records; and a lot of the material has been destroyed by packing and transport. This is indicated by the question-marks in Table 3. Besides nine individuals of the sample belonged to material which came from Tell itself and not from the graveyard. This means that fifty-five skeletons at most came from the burying place. Those individuals excavcated from the Tell are age-distributed as follows: 4 infants (I); 1 adult or juvenile; 3 adults; 1 mature. The four adults are all masculine. The result of the archaeological and anthropological sex determination is listed in Table 4.

As seen from the right column of the table there are eighteen indeterminate skeletons based on anthropological diagnosis and twenty-six indeterminate skeletons based on archaeological diagnosis because their bones in most of the cases belong to children or they are so scanty that no sex diagnostic features were present. In Section 2 we demonstrated how the anthropological diagnosis has been established. The method of the archaeologists is based on the assumption that females had been buried in a crouching position while male individuals had been layed to rest in a stretching position.

If we follow the archaeological diagnosis we find a feminity index of 80.95 which means that the females are better identified than the males. Just opposite to this result is the sex diagnosis by anthropological methods. If we regard only the skeletons from the graveyard, we find that double of the male skeletons are females. This means the masculinity index is 200. If we observe the differences in detail there are ten discrepancies out of twenty-seven comparable diagnoses between the anthropological and the archaeological determinations. In other words, the uncertainity is 37% within the discrepancies. Skeletons number 5, 16, and 34 are probably males. Those skeletons in which we have little doubt that our diagnosis could be wrong (skeletons 4, 9, 13, 27, 31) belong to the male group. In two cases we classified skeletons, 4 and 45, as females inspite of their stretching positions which classify them as males. How to overcome these controversial diagnoses is a problem. To solve this problem, we have to answer these questions: what are the facts that support the anthropological viewpoint?;

Table 3: Tell el-Mazar: Comparison Between Anthropological And Archaeological Data

No.	*Square*	*Burial*	*Sex. Anthrop.*	*Archaeol.*	*Age (Years)*
1	Tell E6	3	?	Female	4-5 Infant I
2	D5	34	?	Female	Infant I
3	Bath Tomb	23	Probably Fem.	Female	Mature Senile
4	D3	76	Male	Female	Early Adult
5	C3	78	Probably Male	Female	About 40
6	D7	53	?	Female*	Neonatus 2 months
7	C4	51	Probably Male	Male	Adult or Old
8	E4	84	Probably Fem.	?	Early Adult
9	D3	79	Male	Female	Late Mature
10	Tell F8	11?	?	?	3.5-6 Infant I
11	Tell C2	82	Probably Male	?	About 50
12	Tell A7	40	?	?	6 Months ± 3
13	C2	83	Male	Female	Early Adult
14	E6	8	?	?	Adult or Old
15	Tell F1	?	Male	?	Adult or Old
16	C3	72	Probably male	Female	Adult Mature Dancer
17	Tell A7	?	?	?	0.4-0.6 Infant I
18	D3	80	Probably Fem.	?	About 20/21
19=56	E8	? L2	?	Male	Adult or old
20	C2	? L81	?	Female	3 Infant I
21	E4	48	?	Female	Infant I
22	C7	52	Probably Male		Early Adult
23	Tell G2?	?	?	?	Juvenile /Adult
24	Tell H7	?	Probably Male	?	About 20
25	C6	31	?	?	0.2 Infant I
26=54	E6	Near B1	Male	Male	Early Adult
27	D3	67	Male	Female	Mature Senile
28	Tell G1	L5	Male	?	About 30
29	D3	66	Probably Fem.	?	Late Adult
30	E3	77	Probably Male	?+	Adult
31	D3	64	Male	Female*	About 30
32	C3	L65	Male	Male	Early Adult
33	D3	68	Probably Fem.		Adult mature
34	C3	70	Probably Male	Female	Juvenile
35=36	?	?	Male	?	15-16 Juvenile
37	?	19	Probably Fem.	Female	Early Senile
38=40	?	?	Probably Fem.	?	25-35
39	?	?	Male	?	18 Late Juvenile
41=51	D7	II/IIA?	Probably Male	?+ +	15-18 Juvenile
42=43	?	?	Probably Male	?	About 25
44=45	C6	17	Female	Male**	25-30
46	D7	21	Male	Male	Mature
47	D6	6	Male	Male	Late Adult
48	?	?	Male	?	Adult or Old
49	?	?	Probably Fem.	?	About 25
50	D6	37	Probably Male	Male	25-30
52	E5	10	?	Female	Late Adult/ Early Mature
53	SR 41?		Probably Fem.	?	Late Adult/ Early Mature

55	C6	14	Probably Fem.	Male	Late Adult/ Early Mature
57	C6	42	Probably Fem.	Female	Late Adult
58	C6	22	Probably Male	?	30-40
60	C7	11	?	Male	Adult or Old
61	E6	4	?	Male	Juvenile
63	E6	3	Female	Female	Early Adult
64	E5	6?	?	Male	Adult or Old
65	?	?	Probably Male	?	Late Mature
66	?	?	Female	?	About 50
67	D6	7 Shaft	2 Male	Male	20-25
68	C6	16	?	Female	Adult or Old
69	?	?	?	?	Adult or Old
70	?	11(?)	Male	?	About 40
71-72	D6	3 Shaft	Male	Male	About 25
73	C6	15	Probably Male	Male	About 25
74	D6	7	Male	Male	About 35

* Though the archaeologists are of the opinion that the individual was buried in a squatting position, the map indicates possibly a stretching position;
** See above, vice versa
+ Squatting (crouching) position
++ Stretching position?

Table 4: Sex Determination of the Skeletal Remains From Tell el-Mazar

Sex determination by	*Male* *	*Female*	*Indeterminate*		*n*
Anthropological methods	32(28)	14	18 (13)	64 (55)	
archaeological methods	17	21 (20)	26 (18)	46 (55)	
Discrepancies anthrop.	Male	anthrop. female		total	
archaeol.	female 8	arcaheol. male 2		10	
Coincidence both diagnoses male 11		both diagnoses female 6			17
Not comparable one diagnosis missing	30	both diagnoses missing 7			37
		Total sample			64

* Data within the brackets concern the graveyard except the Tell.?

and, what are the shortcomings of the archaeological hypothesis?

Anybody concerned with the osteological sex determination knows that the rate of misclassification depends, to a high degree, on both the completeness of the material under study and the methodological inventory that can be applied (see N. N. Henke, 1974, 1977, 1979; Eale & Henke, 1979). Since the bones of the Tell el-Mazar population are badly preserved there may be some mistakes in our diagnoses, especially concerning those skeletons that are determined as "probably" male or female. As we reviewed those diagnoses which differed from the results of the archaeological determination, we are sure that the anthropological diagnosis refutes the archaeological assumption that the kind of burial can serve as a sex diagnostic marker. We have doubt that this hypothesis can be maintained though it seems to be obvious that the archaeological diagnosis is correct in the case of burial No. 16 (female dancer). A good argument in contradiction with the hypothesis of the archaeologists that the squatting and stretching positions are in-

Table 6: The abridged life table of the Tell el-Mazar population; both sexes

Age (x)	*Distribution of death No. (D_x)*	*per cent*	*Survivors (l_x)*	*Probability of death (g_x)*	*Total No. of years lived between ages x and x + 5 (L_x)*	*Total after Lifetime (T_x)*	*Life expectancy (e^0_x)*
0-4	4.34	8.19	100.00	0.0819	479.525	3,347.575	33.48
5-9	0.67	1.26	91.81	0.0137	455.900	2,868.050	31.24
10-14	—	—	90.55	0.0000	452.750	2,412.150	26.64
15-19	5.00	9.43	90.55	0.1041	429.175	1,959.400	21.64
20-24	7.22	13.62	81.12	0.1679	371.550	1,530.225	18.86
25-29	9.22	17.40	67.50	0.2578	294.000	1,158.675	17.17
30-34	4.72	8.91	50.10	0.1778	228.225	864.675	17.26
35-39	4.72	8.91	41.19	0.2163	183.675	636.450	15.45
40-44	3.65	6.89	32.28	0.2134	144.175	452.775	14.03
45-49	3.15	5.94	25.39	0.2340	112.100	308.600	12.15
50-54	3.15	5.94	19.45	0.3054	82.400	196.500	10.10
55-59	2.65	5.00	13.51	0.3701	55.050	114.000	8.44
60-64	1.65	3.11	8.51	0.3655	34.775	58.950	6.93
65-69	1.65	3.11	5.40	0.5759	18.775	24.175	4.48
70 - x	1.65	2.20	2.20	1.0000	5.500	5.500	2.50
Total	53.00	100.00	100.00		3,347.575		

sex-differentiated lifetables, though it is well known from the literature that the average lifespan of women was apparently shorter in prehistoric times than that of men which means the sex ratio influences the results. The result of the sex mixed life table is given below and, in our opinion, this method can give us valuable demographic information though the basis is not quite correct in the sense of palaeodemography (Table 6).

The distribution of death is given in the left column of Table 6 and in Figure 2. It is obvious from the curve that the death rate of the infant I and infant II class is under-represented possibly due to the fact that selection has occurred in the preservation of skeletal material. Furthermore there is often a tendency not to save bones, especially of infants and children, thinking them of no particular interest and consequence; but, in the present study we are sure that the last cause has no relevance to our material. We think that the infants could have been buried in separate places as is possibly indicated by the high percentage of child-skeletons from the Tell. The deficit of infants II is usual because the high death rate concerns the youngest group (infant I). The peak of distribution is between 25-29 years and this is also in accordance with most of the palaeodemographic skeletal series.

If we look at Figure 3 we can conclude from the distribution of survivors that there is an obvious decline of survivors in the first class. After this period with a high risk from infectious diseases, malnutritions, etc., there is a stagnation in the survivorship; and, beginning with the adults, there is a steady decline with a flattening in the late adults and early mature phase. This is the normal pattern of distribution observed from several prehistoric populations to be seen from the different examples given by Acsadi & Nemeskeri (1970).

The probability of death in the Tell el-Mazar population (Table 6, column Qx) has a high rate in the first phase of life and decreases to zero in the infant II group (10-14). Then we have an increase to the 25-29 year-old individuals, a small decline and a stagnation in the late adults and early mature phase and a steady increase in the oldest phases.

Finally, we conclude from the last column (Table 6, Fig. 4) that the life expectancy of the Tell el-Mazar

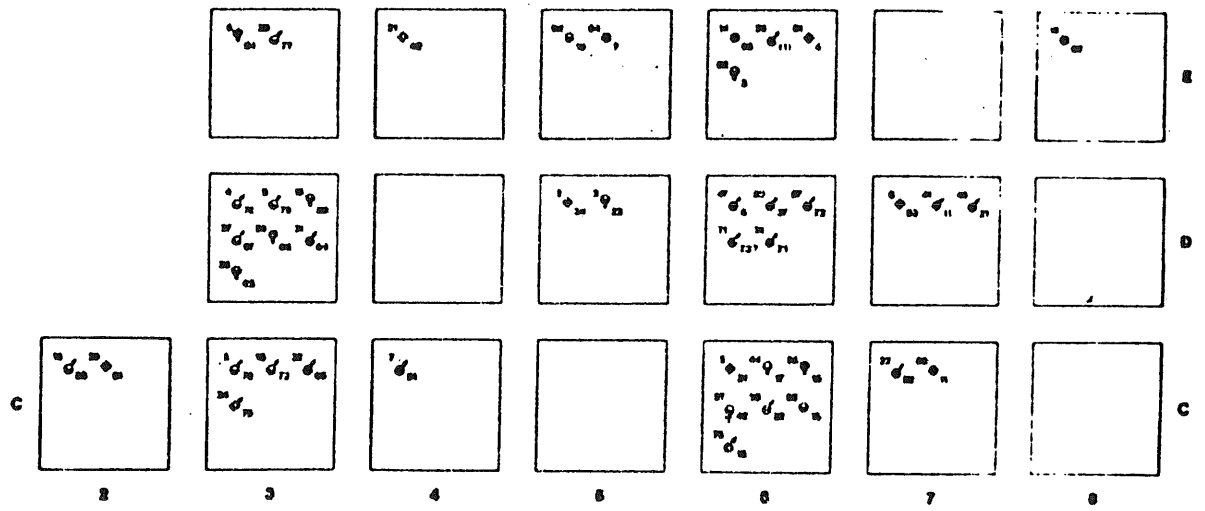

Fig. 1: Burial map of Teel el-Mazar (graveyard) signs ♂ male; ♀ Female, ○ undetermined, ◇ child (infant/Juvenile). Position of the skeleton: ● Stretching ⊖ unknown, ◒ squatting. Running nos.: 0 burial nos.. Identified skeletons n = 43.

Table 6: The abridged life table of the Tell el-Mazar population; both sexes

Age (x)	*Distribution of death* No. (D_x)	per cent	*Survivors* (l_x)	*Probability of death* (g_x)	*Total No. of years lived between ages x and x + 5* (L_x)	*Total after Lifetime* (T_x)	*Life expectancy* (e^0_x)
0-4	4.34	8.19	100.00	0.0819	479.525	3,347.575	33.48
5-9	0.67	1.26	91.81	0.0137	455.900	2,868.050	31.24
10-14	—	—	90.55	0.0000	452.750	2,412.150	26.64
15-19	5.00	9.43	90.55	0.1041	429.175	1,959.400	21.64
20-24	7.22	13.62	81.12	0.1679	371.550	1,530.225	18.86
25-29	9.22	17.40	67.50	0.2578	294.000	1,158.675	17.17
30-34	4.72	8.91	50.10	0.1778	228.225	864.675	17.26
35-39	4.72	8.91	41.19	0.2163	183.675	636.450	15.45
40-44	3.65	6.89	32.28	0.2134	144.175	452.775	14.03
45-49	3.15	5.94	25.39	0.2340	112.100	308.600	12.15
50-54	3.15	5.94	19.45	0.3054	82.400	196.500	10.10
55-59	2.65	5.00	13.51	0.3701	55.050	114.000	8.44
60-64	1.65	3.11	8.51	0.3655	34.775	58.950	6.93
65-69	1.65	3.11	5.40	0.5759	18.775	24.175	4.48
70 - x	1.65	2.20	2.20	1.0000	5.500	5.500	2.50
Total	53.00	100.00	100.00		3,347.575		

sex-differentiated lifetables, though it is well known from the literature that the average lifespan of women was apparently shorter in prehistoric times than that of men which means the sex ratio influences the results. The result of the sex mixed life table is given below and, in our opinion, this method can give us valuable demographic information though the basis is not quite correct in the sense of palaeodemography (Table 6).

The distribution of death is given in the left column of Table 6 and in Figure 2. It is obvious from the curve that the death rate of the infant I and infant II class is under-represented possibly due to the fact that selection has occurred in the preservation of skeletal material. Furthermore there is often a tendency not to save bones, especially of infants and children, thinking them of no particular interest and consequence; but, in the present study we are sure that the last cause has no relevance to our material. We think that the infants could have been buried in separate places as is possibly indicated by the high percentage of child-skeletons from the Tell. The deficit of infants II is usual because the high death rate concerns the youngest group (infant I). The peak of distribution is between 25-29 years and this is also in accordance with most of the palaeodemographic skeletal series.

If we look at Figure 3 we can conclude from the distribution of survivors that there is an obvious decline of survivors in the first class. After this period with a high risk from infectious diseases, malnutritions, etc., there is a stagnation in the survivorship; and, beginning with the adults, there is a steady decline with a flattening in the late adults and early mature phase. This is the normal pattern of distribution observed from several prehistoric populations to be seen from the different examples given by Acsadi & Nemeskeri (1970).

The probability of death in the Tell el-Mazar population (Table 6, column Qx) has a high rate in the first phase of life and decreases to zero in the infant II group (10-14). Then we have an increase to the 25-29 year-old individuals, a small decline and a stagnation in the late adults and early mature phase and a steady increase in the oldest phases.

Finally, we conclude from the last column (Table 6, Fig. 4) that the life expectancy of the Tell el-Mazar

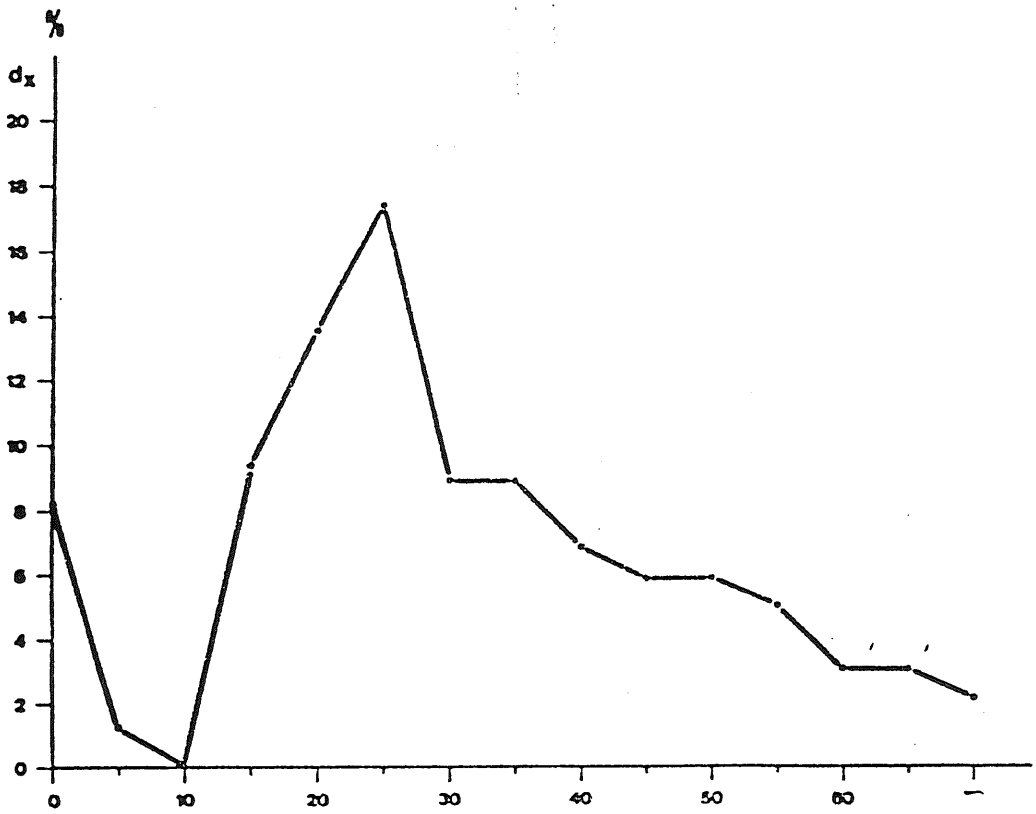

Fig. 2: Death rate of the Tell el-Mazar population

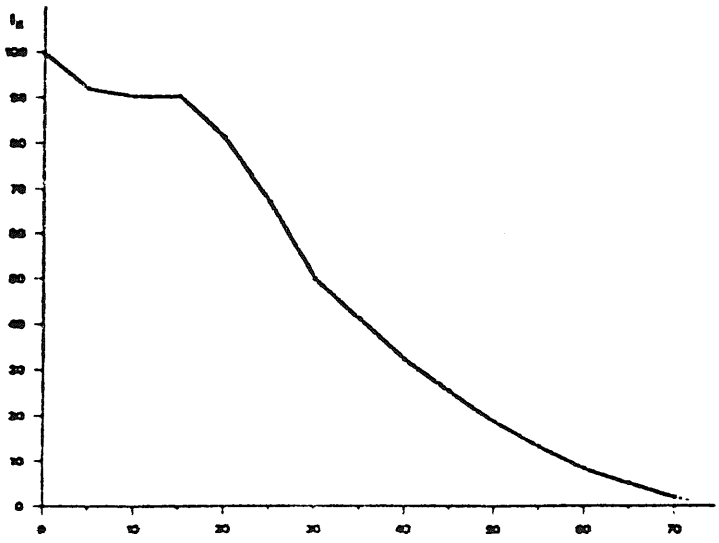

Fig. 3: Survivorship within the Tell-el Mazar population.

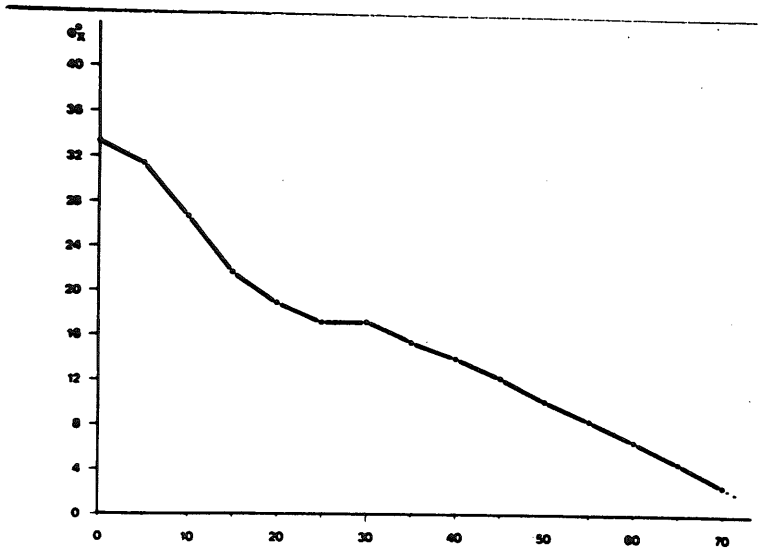

Fig. 4: Life expectancy of the Tell-el Mazzar population (both sexes).

Table 7: Diseases in the Tell el-Mazar Population

Type of Disease	*Running Number of the Skeleton*
Anthritic *exostoses (phalanges)*	3; 33; 67
Osteoarthritis *costovertebralis*	33
Osteochondrosis *vertebralis*	4; 5; 13; 33; 47; 71
Schmorl's nodules	5; 45
Arthritic *spondylosis*	5
Spondylosis deformans	9; 66; 71
Ankylosis of the *distal radius and the carpalia*	3
Fracture of the *radius*	3
Fracture of the *mandible*	54
Inflammatory disease of the *femur*	17
Spina bifida	41
Parodontal disease	3; 5
Periodontal diseases (incl. atrophy of the *alveolar* arch)	9; 11; 16
Malocclusion	51
Deflected teeth	67
Intravital dental loss	66
Caries	3; 67

It is obvious from the above given table that we cannot establish profound statistics of diseases because the skeletons are incomplete; but we can conclude that the observed bone diseases are mostly degenerative. Beside this main category we find a few inflammatory and inborn diseases as well as injuries.

One observation should be separately mentioned; that is, the dental age overwhelms the skeletal age. If we follow the hypothesis that the skeletal maturation depends to a high degree on the environmental factors while the dental maturation is more genetical, we come to the conclusion that there seem to be factors of malnutrition that induced the slower skeletal maturation (Sundick, 1977). One of the most interesting results from the skeletons from Tell el-Mazar are the cranial and postcranial trepannings, which are illustrated in Pl. CXVII-CVIII While trepanning of the vault is well-known from different places all over the world and has been undertaken since the stone age (Piggott, 1940; Stewart, 1958), Postcranial trepanning is very seldom. In the present cases, the holes are very small (about 405 mm. in diameter), but this is in no way an exception as can be shown from the example given by Mikic (1980) for a Yugoslavian skull (Pl. CXVIII, 2) of the Illyrian period (500-400 B.C.). In the demonstrated cases, the trephine holes are on the right cranial vault of skeleton No. 58 (Burial 22, male, adult), which has twelve holes and of the individual No. 57 (Burial 22, probable female, early adult), which has only four holes. In another case we could observe three holes in the occipital region of the skull (No. 31, probably male, adult). Two of the holes are situated in the *lambda* and one below the *nuchal* crest on the nuchal plane. The postcranial trephine holes are unpreserved material and we are very grateful to Professor K. Yassine, who took the pictures of the material *in situ.* While the *humerus* of the individual from Burial 9 shows only one hole in the *proximal diaphysis,* there are

population is, from birth, 33.5 (33-34) years. This age is about one-half of the life expectancy in an industrialized population (Acsadi & Nemeskeri, 1970). This result is very similar to that among contemporary people in other regions. If we would correct the data, since there seems to be a deficit of infant individuals in our sample, the life expectancy would be slightly lower.

Generally, we can say that the derived data fit well in to the theory that the prehistoric populations existed under conditions which are comparable with those in underdeveloped countries due to a high mortality rate in the youngest groups and a high death rate of early adults by traumatic diseases in males and death in association with childbirth in females.

Quantitative Morphology

To broaden our knowledge of the people in the past, we have to analyse their racial and ethnic affinities. Those methods that have been established for comparing populations are based on uni- and multivariate analysis of metric and non-metric traits (Schwidetzky, 1971; Howells, 1974). As we have mentioned, little is known about the racial and ethnic changes in the middle and Near East (Ferembach, 1959, 1960, 1970; Arensburg, 1973). It is not possible to demonstrate hypotheses of ethnic evolution in this region from the past to the present because the material gives no corresponding information.

The largest amount of ancient human remains ever discovered in the Middle East was unearthed at Lachish and reported by Risdon (1939). Risdon concluded from his anthropological data that the people from Lachish came from or were closely related to the upper Egyptian people of the same period. Arensburg (1973) came to the conclusion that there are strong affinities to local Mediterranean people especially from sites in Israel, and that the Iron Age groups do no differ markedly from the Middle Bronze age populations (Giles, 1953; Hughes, 1965). Another conclusion concerns the continuity of morphological characters from the past up to the present time. Most of the typological features of the Iron age people can be found in the recent Bedouin population and in some groups of modern Jews (Arensburg, 1973).

Though we can run no metric analysis of population comparison, we want to compare those scanty data given in the catalogue with the data published in the literature for people of the same period. The only crania from which we got some information (numbered by 50, 51, 71, 72 and illustrated in Figures 1-3) show characters that are very similar to those crania that are described as Mediterranean. The skulls are *dolichocrania* or with a tendency towards *mesocrany*. The vault is *orthocranic* and *metiocrania,* the orbits are *hypsiconch* and the nasal aperture is *mesorrhin.* The facial index varies within the *mesene* and *leptene* category that means the available skulls fit very well to those people which form a continuum from the Middle Bronze period up to recent Bedouin groups. A comparison with those skeletons of recent Bedouins which have been studied recently in Jordan, Henke and Disi (1981), confirmed this conclusion.

Palaeopathology (Including Injuries And Trepanning)

Paleopathology is defined as the study of diseases in ancient human populations as revealed by their skeletal remains (Steinbock, 1976). The term paleopathology was popularized if not invented by Sir Marc Armand Ruffer within the last century, while dealing with the pathological traits of the extensive collection of Egyptian mummies. The literature since then consists of a lot of casuistic reports on isolated specimens of bone pathology. The recent view of paleopathology highlights the question of reconstructing the social aspects of ancient societies. This means paleopathological studies contributie to the illumination of ancient population and their life conditions. To get some information from the skeletal material of Tell el-Mazar, we worked out the following Table 7, which gives an overview of those diseases that could be observed in the Iron age population.

three holes situated side by side in the tibia of skeleton No. 33.

One would ask what are the motives for trepanning the skeletons. We guess that in the present case that the holes were set shortly before death during life or after death because no healing process was observed. We do not know whether there are medical motives for this procedure or ritual implications. The possibility that these holes are man-made or have randomly developed is rendered remote by the fact that the archaeologists excavated an instrument (114.2 mm. long and 3.5 to 3.3 mm. in diameter) which had obviously served as a drill for trepanning the demonstrated holes.

Conclusions

The present paper deals with the skeletal material of the Iron age graveyard of Tell el-Mazar. A sample of sixty-four individuals has been studied and described, and the demographic, morphological and paleopathological results are presented. Because the material was not completely preserved there is a broad deficit of information, but it was possible to come to the following conclusions:

1) The anthropological sex determination of the skeletons indicates that there was a misproportion of male and female individuals within the population, which means that the masculinity index is about 200. This result is contradictory with the archaeological result. Based on the assumption that the type of burial can serve as an indicator of sex (squatting position= female; stretching position = male) the archaeologists found a balanced sex ratio. Possible misclassifications by the anthropological diagnosis are discussed along with the unproven hypothesis of the archaeologists. The conclusion of the discussion is that there is no evidence that the anthropological diagnosis is wrong though it might be correct in some cases. We are of the opinion that there is nearly no evidence that the archaeological hypothesis of sex differentiated burials can be maintained.
2) The paleodemographic analysis leads to the conclusion that there is a small deficit of children within the sample that may be due to preservation factors or to separate burying of children in some cases. The age distribution, probability of death and the life expectancy were calculated by an abridged life table. The results coincide with those from other contemporary populations. Especially the low life expectancy of 33.5 years (both sexes) is indicative of prehisotric populations with a very low life-standard and a high mortality rate in the childhood and adulthood.
3) The scanty morphological data (metric and non-metric) cannot serve as an extensive analysis of racial and ethnic relationships to other populations from the Middle and Near East; but it is obvious from the poor skeletal remains that there are typological affinities to the Meditteranean group as being described for the period of Middle Bronze age up to the present (especially Bedouin groups).
4) The ancient diseases are mostly degenerative and only in some cases due to injuries and inflammations. A reconstruction of a pattern of typical diseases cannot be given from the material.
5) Within the material under study there are three skulls; skulls fragments and

two postcranial skeletons with small (about 4 mm.) trephine holes. The instrument which could have served for drilling the holes has also been excavated, so that there is little doubt that these holes are real trepannings.

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A HOARD OF PTOLEMAIC SILVER COINS FROM AMMAN

by
Emsaytif Suleiman

Introduction

A hoard of twenty-nine Ptolemaic silver coins (Tetradrachma 4 drachma) was found at Moraba'at Mosa, west of Amman on September 25, 1979. The collection is now at The Jordan Archaeological Museum.

After Alexander the Great's invasion into the Orient in 332 B.C., Greek coins replaced the existing coinage.[1] The portrait of Alexander appeared on coins stuck by his generals, who claimed independence shortly after his death.[2] What concerns us in this article is the Ptolemaic kingdom which was established in Egypt.

The coinage of the Ptolemies has great historical significance because it is the first regular monetary currency made in Egypt in antiquity.[3] Ptolemy I (295-284 B.C.) struck issues in 306 B.C. bearing on the obverse the portrait of Alexander.[4] When Ptolemy I took the title of king in 305 B.C., he began to put his own portrait on the coinage instead of Alexander's.[5]

The coins, Nos. 1-5 (Pl. CXX: 2-5 and 7) belong to Ptolemy I (295-284 B.C.) and the rest of the hoard, twenty-four pieces, coin Nos. 6-29, Pl. CXX: 1, 6 and 8-29), belong to Ptolemy II Philadelphus (284-247 B.C.). Silver coinage seems to have formed the bulk of the ordinary currency of Ptolemy II in the second half of his reign.[6]

Coin Nos. 10. 14-20 and 23-26 present examples of the first coinage of Ptolemy II[7] which bear the inscription ΠΤΟΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ Coin Nos. 8, 9, 11-13, 21-22 and 27-29 present the second coinage of Ptolemy II, which were inscribed: ΠΤΟΛΕΜΑΙΟΥ ΣΩΤΗΡΟΣ The change of style from ΒΑΣΙΛΕΩΣ to ΣΩΤΗΡΟΣ occurred when the worship of Ptolemy I with the title Soter was introduced by Ptolemy II Philadelphus between *ca.* 262-255 B.C.[8]

The hoard is especially important because it presents the first evidence in Jordan of a large number of silver coins belonging to the reign of Ptolemy II Philadelphus. Most of the coins in this hoard were minted in the following cities: Alexandria, Joppa, Ptolemias, Tyre and Sidon.

The description and comparisons of the coins in this hoard were made on the basis of the book of Svorouos on the Ptolemaic coins (J.N. Svorouos, *The coins of the Kingdom of the Ptolemies,* Athens, 1904-1908, Greek). Special thanks are here given to Dr. Fawzi Zayadine, Dr. James A. Saur and Mr. Christian Auge for their help and useful remarks.

Catalogue: (Pl. CXX)

Abbreviations:

aeg.	:	eagis
Gr.	:	Gram
M.	:	Mint
r.,	:	right
W.	:	Weight
Dia.	:	Diameter
Hd.	:	Head
Ob.	:	Obverse

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[1] Darrel A. Amyx, ed., *Echoes From Olympus,* Berkley, 1974, p. 128.
[2] G. K. Jenkins, *Ancient Greek Coins,* London, 1972, p. 235.
[3] Jenkins, p. 235.
[4] Amyx, p. 128.
[5] Charles Seltman, *Greek Coins,* London, 1965, p. 240.
[6] R.S. Poole, *Catalogue of Greek Coins, The Ptolemies, Kings of Egypt in the British Museum,* Bologna, 1963, Pl. XXIV.
[7] Poole, Pl. XXXV,
[8] Poole, Pl. XXXV.

Stadg. : Standing
Diad. : Diademed
L. : Left
Rev. : Reverse
SV. : Svoronos

[3] Jenkins, p. 235.

Ptolemy I (295-284 B.C.)

No. 1 M. Alexandria
OB.
Hd of Ptolemy I facing r., diad. and aeg. on neck, two countermarks on front face.
(Sv. No. 247, Pl. IX: 1)
W. 13.54 Gr.
Dia. 28.6 mm.
REV. ΠΤΟΛΕΜΑ.. ΒΑΣΙΛΕΩΣ
Eagle stadg. L., on thunderbolt, wings closed.
In field L., P

No. 2 M.?
OB.
Hd. of Ptolemy I facing r., diad. and aeg. on neck, very small Δ behind ear.
(Sv. No. 256, Pl. IX: 12)
W. 14.000 Gr.
Dia. 24.5 mm.
REV.
ΠΤΟΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ
As above.
In field L., P

No. 3 M.?
W. 13.780 Gr.
Similar to No. 2
Dia. 24 mm.

No. 4 M.?
OB
Hd. of Ptolemy I facing r., diad., and aeg. on neck, four countermarks, small Δ behind ear.
(Sv. No. 245, Pl. VIII: 24)
W. 13.575 Gr.
Dia. 24.5 mm.
REV.
.....ΜΑΙΟΥ ΒΑΣΙΛΕΩΣ
As above.
In field L., M

No. 5 M.?
OB.
Hd. of Ptolemy I facing r., diad. and countermark ⊓
(Sv. No. 263, Pl. IX: 17)
W. 13.792 Gr.
Dia. 24. 9 mm.
REV.
ΠΤΟΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ
As above
In field L., p

Ptolemy II Philadelphus (284-24 B.C.)

No. 6 M. Alexandria
OB.
Hd. of Ptolemy I facing r., diad.
(Sv. No. 271, Pl. IX: 19)
W. 13.955 Gr.
Dia. 25 mm.
REV.
...ΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ
As above
In field L., A r., o (Countermark)

No. 7 M.?
OB
As above
W. 13.792 Gr.
Dia. 24.9 mm.
REV
ΠΤΟΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ

	Sv. No. 375-376, Pl. XI: 5)		As above In field L., EY KE A
No. 8	M. Ptolemias (Ace) OB. Hd. of Ptolemy I facing r., diad. and aeg. on neck. (Sv. Nos. 789-781, Pl. XXV: 14-15)	W. 14.700 Gr.	Dia. 25 mm. REV. ...ΛΕΜΑΙΟΥ ΣΩΤΡΟΣ As above In field L., Π r., ΛΕ ΜΕ ⊙ (year ΛΕ (35)=251 B.C.)
No. 9	M. Ptolemias (Ace) OB. As above Sv. No. 744, Pl. XXV. 10)	W. 13.790 Gr.	Dia. 25.5 mm. REV. ΠΤΟΛΕΜΑΙΟΥ ΣΩΤΗΡΟΣ As above In field L., Π r., ΑΛ ΜΕ ⊙ (year ΑΛ(31)=255 B.C.)
No. 10	M? OB. As above Sv. No. 528, Pl. XII: 2)	W. 14.140 Gr.	Dia. 26 mm. REV. ...ΛΕΜΑΙΟΥ ΒΑΣΙΛΕΩΣ As above In field L. Π r., ⛨ (sheild) ΚΛ
No. 11	M. Joppa OB. As above. Sv. Nos. 808-810, Pl. XXII: 11)	W. 13.950 Gr.	Dia. 23.8 mm. REV. As above. In field L., ΙΠ r., ΛΕ ΓΑ ⊙ (year ΛΕ (35)=251 B.C.)
No. 12	M. Joppa OB. As above (Sv. No. 800)	W. 14.145 Gr.	Dia. 26.1 mm. REV. ΠΤΟΛΕΜΑΙΟΥ ΣΩΤΗΡΟΣ As above In field L., ΙΠ R., ΑΛ ⊙ (year ΑΛ (31)=255 B.C.)
No. 13	M. Joppa OB. As above (Sv. No. 814, Pl. XXIII: 15)	W. 14.130 Gr.	Dia. 26 mm. REV. ΠΤΟΛΕΜΑΙΟΥ ΣΩΤΗΡΟΣ As above ΛΙ In field L., ΙΠ r., ⊙ (year ΛΙ) (37)=249 B.C.)

No. 14	M. Sidon OB. As above (Sv. No. 713, Pl. XXI: 2)	W. 13.300 Gr.	Dia. 28 mm. REV. ..... ΒΑΣΙΛΕΩΣ As above In field L., ΣΙ
No. 15	M. Sidon	W. 13.780 Gr. Similar to No. 14.	Dia. 25 mm.
No. 16	M. Sidon	W. 14.110 Gr. Similar to Nos. 14-15.	Dia. 26 mm.
No. 17	M. Sidon	W. 14.005 Gr. Similar to Nos. 14-16.	Dia. 25.1 mm.
No. 18	M. Sidon	W. 13.815 Gr. Similar to Nos. 14-17, but on reverse counter-mark X.	Dia. 24.1 mm.
No. 19	M. Sidon	W. 13.915 Gr. Similar to Nos. 14-17.	Dia. 25 mm.
No. 20	M. Sidon	W. 14.150 Gr. Similar to Nos. 14-17	Dia. 25.1 mm.
No. 21	M. Tyre OB. As above (Sv. Nos. 650-704, Pl. XIX: 2-28, Pl. XX: 1-13).	W. 11.345 Gr.	Dia. 27 mm. REV. ....ΡΟΣ As above In field L., . r., obscure I
No. 22	M. Tyre OB. As above Sv. No. 660).	W. 14.300 Gr.	Dia. 26.1 mm. REV. .....ΑΙΟΥ ΣΩΤΗΡΟΣ As above Between Eagle legs: M In field L., ✱, r., Λ B I (year Λ B and M (30)=256 B.C.)
No. 23	M. Tyre OB. As above (Sv. No. 646, Pl. XIX: 16)	W. 14.135 Gr.	Dia. 24.2 mm. REV. .....ΜΑΙΟΥ ΒΑΣΙΛΕΩΣ In field L. ✱., r., K I (year K (21) = 265 B.C.).

No. 24 M. Tyre
OB.
As above

(Sv. No. 644, Pl. XIX: 14)

W. 14.060 Gr.

Dia. 26 mm.
REV.
..... ΒΑΣΙΛΕΩΣ
As above
In field L., Ψ
I

No. 25 M. Tyre

W. 14.058 Gr.
Similar to No. 24.

Dia. 24 mm.

No. 26 M. Tyre

W. 13.920 Gr.
Similar to Nos. 24-25.

Dia. 28.5 mm.

No. 27 M. Tyre
OB.
As above

(Sv. No. 668)

W. 14.000 Gr.

Dia. 26.1 mm.
REV.
ΠΤΟΛΕΜΑΙΟΥ ΣΩΤΗΡΟΣ
As above but:
Between Eagle legs: M
In field L., Ψ r., ΛΒ
I M

(year ΛΒ (32) = 254 B.C.)

No. 28 M. Tyre
OB.
As above

(Sv. No. 686, Pl. XX: 4).

W. 11.950 Gr.

Dia. 24 mm.
REV.
.....ΑΙΟΥ ΣΩΤΗΡΟΣ
As above but:
Between Eagle legs: ⊕
in field L. Ψ r., ΛΕ M
(Year ΛΕ (35) = 251 B.C.).

No. 29 M?
OB.
As above

(Sv. No. 91, Pl. XVIII: 13)

W. 14.130 Gr.

Dia. 27.5 mm.
REV.
..... ΣΩΤΗΡΟΣ
As above.
In field L. Ρ

Φ1

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DEDANITE AND MINAEAN (SOUTH ARABIAN) INSCRIPTIONS FROM THE HISMA

by
David F. Graf

Introduction

During a survey of the Hisma region of Jordan in 1980, several Dedanite and Minaean inscriptions were discovered. Only a few other such graffiti were previously known from Jordan, so these new finds are an important addition to our existing corpus and our knowledge of the northern activities of the inhabitants of the ancient kingdoms of Dedan (modern al-ᶜUlā) in the Hijaz and Maʿīn in South Arabia.

These new inscriptions were found in the area northeast of Wadi Ram, the famous oasis where several other South Arabian inscriptions were discovered almost half a century ago (G. Ryckmans 1934). Two of the new texts are from a cave named Abu al-Dbaᶜ located on the southern side of Jebel ᶜAtra just 4 km. east of the modern village of Disa (K737, 3149 III, 478815) and may be classified as Dedanite. The other is a Minaean graffito discovered in the Khrum al-Ghuzlān, about 15 km. southeast of Disa (3149 III, 582739). (Fig. 1) These texts are clearly foreign to this region, where the indigenous pre-Islamic inscriptions are normally in Nabataean Aramaic and Thamudic Arabic. As the photographs of nos. 1 and 2 make clear, these inscriptions have suffered greatly in the process of time and at the hands of subsequent generations. The proposed readings that follow are primarily based on the copies made at the time of recording. As the following discussion will indicate, several alternative readings are clearly possible, although the word dividers in nos. 1 and 2 are of great help.

The difficulties of the texts were mitigated by the generous and helpful advice of Professors A. F. L. Beeston, W.W. Müller, J. Ryckmans and F. V. Winnett, who greatly facilitated my entry into the field of pre-Islamic epigraphy. Any mistakes or inaccuracies in the discussion that follows are no doubt the result of my stubborn resistance to their counsel. My thanks must also be expressed to Ms. Christine Leonard for the hand drawings of the inscriptions and Mr. O'Connor for several valuable suggestions that immensely improved this presentation of the material. Finally, I am greatly indebted to Dr. Adnan Hadidi, Director General of the Department of Antiquities of Jordan, and Mr. Khalid Abu Ghaniemah of his staff, for their gracious support and assistance. The archaeological research was made possible by a National Endowment for the Humanities fellowship grant, made available through the American Schools of Oriental Research.

No. 1 (Abu al-Dbaᶜ) (Fig. 2; pl. CXXI, 2)

[']*bgr wkn'l* *'Abgar (son of) Wakan'il*
byt blwh dl wasm *built his tomb, Dall.*

The name *'Abgar* appears in Nabataean Aramaic (CIS II, 698), but is better known in Safaitic (where it is found 91 times) and Syriac (as a dynastic name for the kings of Edessa). *Wakan'il* is new, but the element *wkn* is probably from the root "to be firm, or strong" attested in the Sabaean cognate name *'Awkan,* and in Arabic *tawakkana* glossed as *tamakkana* in the Qamus; the form is derived from the Arabic verb *kana,* "to be." This reading is preferred to taking *w(kn'l)* as "and," as another individual would present problems with the singular pronoun that follows.

The verb *byt* (Ar. *bata)* appears in Minaean (WR Min. 10) and Safaitic (CIS V, 28 and SIJ 139), and in the contracted form *bt* in Thamudic (BIT, p. 512). In these contexts, it is usually rendered "to spend the night" or "to pitch a tent," but here must have the meaning of "to make,

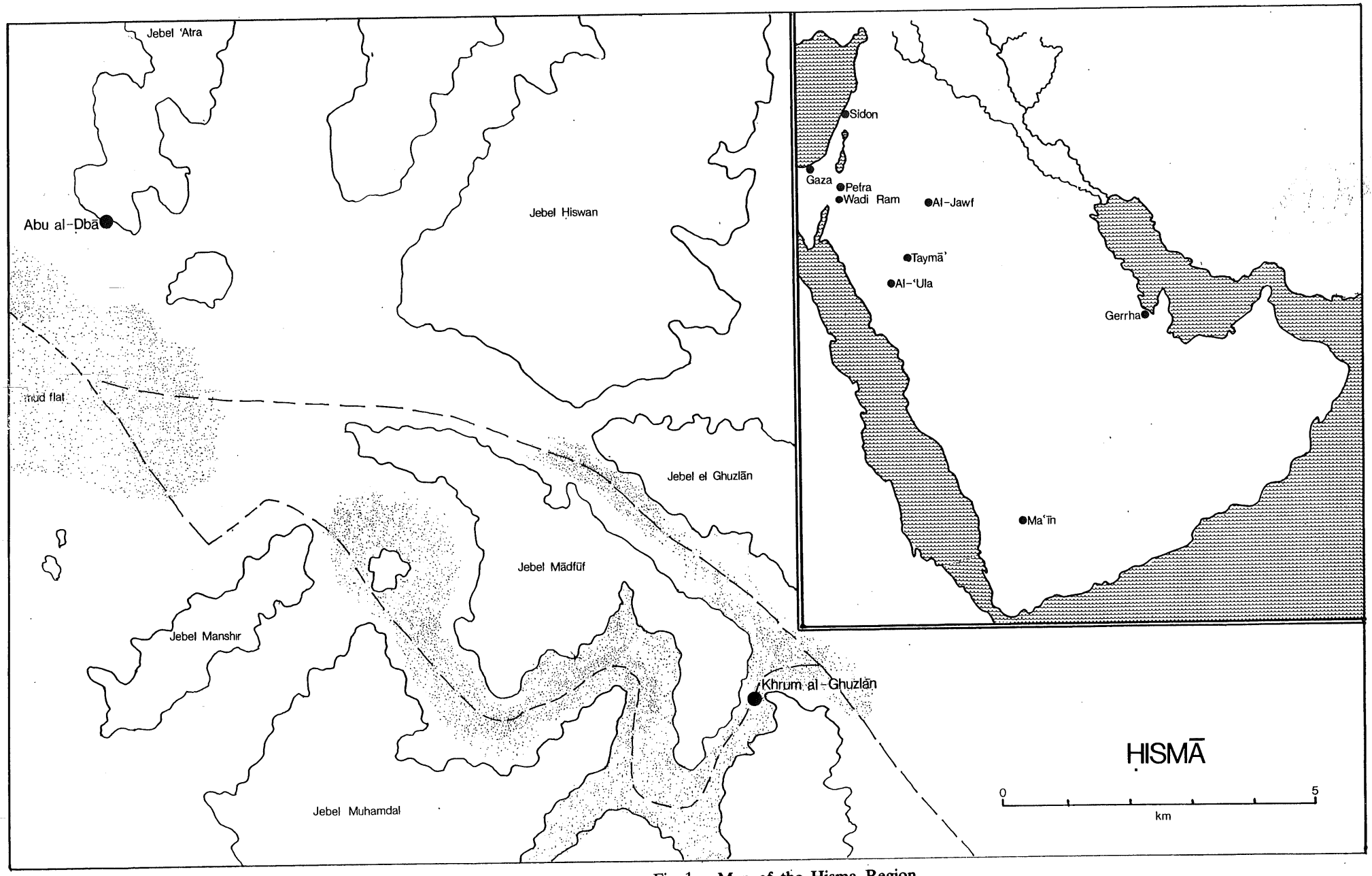
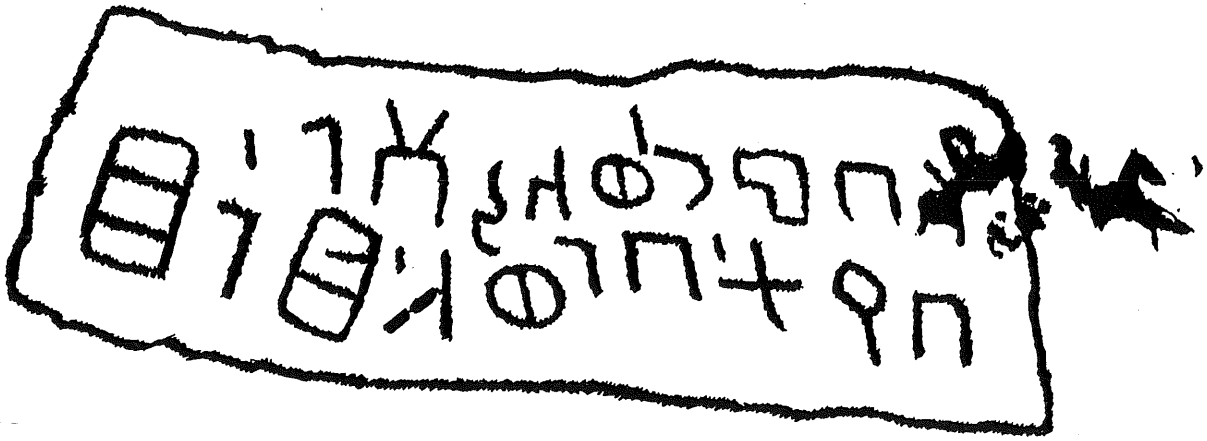


Fig. 1 **Map of the Hisma Region**



5 cm

Fig. 2

build" (cf. LP 595 with comments), as it is followed by *blwh* "his tomb" (see Beeston, *et al.*, 1982: 29, and Biella, 1982: 43 for the cognate Sabaean fem. noun *blwt,* "funerary monument" and cf. the rare Safaitic *bly,* "tomb" in WH 163, 165 and 166). The noun *byt* is well attested in funerary contexts; see the Late Aramaic (Nabataean and Palmyrene) expression *byt ʿlm* "grave" (cf. Heb. Eccl. 12.5 and Punic CIS i, 124/1), a term now also known from the Deir ʿAlla plaster inscriptions of the eighth/seventh centuries B.C. (Hoftijzer and van der Kooij, 1976: comb. ii, 6 *byt ʿlmn;* cf. Levine, 1981: 202). The absence of any of the familiar Lihyanite words for "tomb" (e.g., *kfr, khf, gbr, or mtbr)* also reflects the peculiarity of the language in this graffito. It may then be proposed that the phrase *byt blw* has the idiomatic meaning of "to construct a tomb."

Ḏāll (from Ar. "to wander, err") appears as a personal name in Safaitic (CIS V. 3066). Here it may be the name of the individual who constructed the tomb or, as Professor A. F. L. Beeston suggests to me, the name of the tomb itself, in which case the phrase should be rendered "The house of his monument is (called) Ḏāll" (cf. JS Lih. 306). The final mark to the left of *ḍl* appears to be another *ḍ,* but *ḍlḍ* would be a strange reading; later hands also have altered this sign, which is best understood as a *wasm,* and not to be taken as part of the name *ḍall.*

It should be observed that personal names beginning with *Ḍl* appear to be restricted to South Arabic and Safaitic, providing some support for W. W. Müller's suggestion that *(b) lwh* could be understood as either a place name (*lwh)* or associated with the Aramic verb *lwa, lwi, lawwi* ("to accompany," or "to join"), i.e., as *b-lw-h,* "in his company." The sense of the inscription would then be "Abgar and Kann(a)'il. He (Abgar?) has spent the night in his (Kanna'il?) company (or cave) when he was lost (understanding *ḍl* as a verb)." The inscription is located on the eastern side of the entrance to a cave, (pl. CXXI, 1), directly opposite the following inscription (no. 2). Such a rock formation would be ideal for a burial or a camping site.

No. 2 (Abu al-Ḍbaʿ) (Fig. 3 Pl. CXXII, 1).

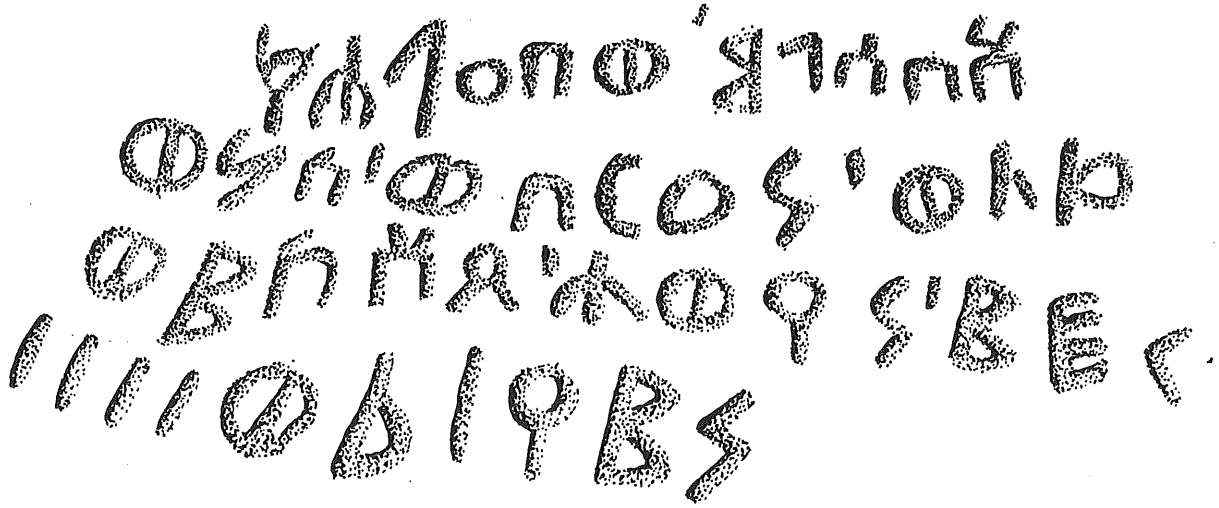
'bslm wbʿlḥy
wnk wbrʿn whd
wmk'ṣ ḥwyn mṭr
//// wd ymn

'Absalim and Baʿlhayy
and Nāk and Barʿān and Hadd
and Muka'is. Show us rain,
O Wadd! Good fortune.

The inscription begins in boustrophedon fashion, but the third line is retrograde, destroying the pattern.

The name *'Absalim* is known in Lihyanite (JS nos. 21 and 144 = BID nos. 15 and 63), Nabataean (JS no. 313), and Thamudic (MNM no. 1); cf. Heb. *'absālom* (II Sam. 3.3). *Baʿalḥayy* ("The Lord lives") is new in the pre-Islamic inscriptions. *Nāk* is known in Safaitic (SIJ 771). *Barʿān* is new, but probably derived from Ar. *baraʿa, "to surpass."* *Hadd* is known from Safaitic (16 times) and Thamudic (only in TIJ 351). *Muka'iṣ* is new, but the name *mk',* is known in Nabataean (CIS 478; Cantineau II, 114, observes that the name by unfinished; cf. *Muka'il* in Thamudic). It could be derived from Ar. *Ka'aṣa,* "to subdue, to humiliate" or an otherwise unattested byform *k'ṣ;* cf. *kiṣ,* "to be greedy."

What these six individuals express appears to be a petition to Wadd, the South Arabian Moon-god. For *ḥwyn,* see Aramic *ḥwy* and Syriac *ḥawwi,* "to show." Beeston suggests that there may be metathesis of the *w* and *y* and that the verb *ḥywn* is derived from Ar. *ḥyy,* "to live," and here a II form, to be rendered "vivify us," which would give excellent vocative sense. If *-n* is an object pronoun, the inscription provides one of the few non-3rd person pronouns in the North Arabian corpus. As for *wd,* the *d* is not certain (cf. the *d* in *hd* in line 2), but the petition seems to require a deity and the clear preceding *w* and the following word divider make likely the reading *Wadd.* A



5 cm

Fig. 3

temple of Wadd at Dedan is known from later inscriptions (Eut. 24) and an Early Lihyanite inscription mentions an offering by the priest of Wadd to the Lihyanite god Dhū-Ghābat (JS 49 = CLL 9), reflecting the harmonious relations that existed between the Dedanites and Minaeans (van den Branden, 1957: 16). The Syrian god Baʿalsamīn (CLL 12 = WLT 17), the North Arabian Lāt (CLL 104 in Dedanite script) and the Edomite Qōs are also attested in Dedan; for the latter deity see the personal names of *ʿbdqs* (JS 143 and 363), *gltqs* (CLL 30, an early Lihyanite governor), and *slmtqs* (JS 117). The appearance of Wadd in a Dedanite inscription, though it is unique, is not without explanation in the cosmopolitan context of a commercial centre like Dedan. See also the personal names of *'rswd* (BID 18, which appears to be in Dedanite), *'grwd* (RES 3371 = M335, a Minaean graffito from Dedan) and *zdwd* and *ʿbdwd* in Lihyanite (CLL 9.1 and 4).

The word *ymn* may be derived from Ar. *yumn,* "prosperity, good fortune, good luck" (Lane VIII, 3064); derivatives of the root in Arabic, as frequently elsewhere in the Semitic languages, have the sense of "right." The use of *ymn* as "good luck" is not found elsewhere in pre-Islamic texts to my knowledge. The only possibility I know of is in Safaitic (LP 1006). It is also rare as an element in personal names; cf. the Sabaean name of *ʿbd'ymn* (Garbini 1973: 43-45) and the more frequent *'ymn* (which occurs 18 times, but always as a second name). In pre-Islamic Arabian texts the expression normally used for "good fortune" in connection with prayers to dieties is *sʿd;* see especially the *ca.* sixth/fifth centuries B.C. Najdi Thamudic petitions to Nahy (BIT = Hu 207 and 271) and ʿAttarsam (Winnett and Reed, 1973: nos. 137, 160, 161, and 203 ff). In Lihyanite, the standard blessing formula is *frḏyhm w'ḥrthm wsʿdhm,* "(for) their successes, and their posterity, and their good fortune" (Caskel, 1953: 76). However, the sense of *ymn* in this text may be compared with that in the funerary inscription of Kabir'il b. Matʿ'il, the only known king of Dedan where *Gadd* (Aram. "fortune") appears to be summoned for a blessing of rain (JS Lih. 138 as interpreted by A. F. L. Beeston, *apud* Winnett and Reed, 1970: 115). The worship of such "fortune" deities was widespread in the ancient Near East and the Greco-Roman world, but for North Arabia is best known from the Safaitic inscriptions.

No. 3 (Khurm al-Ghuzlan) (Fig. 4; pl. CXXII, 2)

Tfynm (or Mnyft) *Tifyānm (or Munayfit)*

There is no clear indication as to which direction this name should be read; the *m* and the *n* face in different directions, but it seems more likely that the former is the reversed letter (cf. Ryckmans, 1934: nos. 2-4) and that therefore the inscription should be read from ground level to the top of the stone. The name can then be understood as *tfyn(m)* with the mimation found frequently in Minaean or in imitation of Minaean usage. The name *Tfyn* was formerly known only in Sabaean (Ja 651/2; CIH 40/1 and 41/1). For the vocalization Tifyān, compare the name Sifyān (CIK II, 515). It perhaps is derived from Ar. *tafan,* "to follow, drive away."

It is also possible that the name is to be read from the top of the stone to the bottom and understood as *mnyft* (derived from Ar. *nft,* "to spit, utter, discharge"), perhaps to be vocalized on the pattern of Ibn al-Munaydir, the name of the astronomer from the village of Sanʿā in Yemen mentioned in the famous *(Ṣifat Jazīrat al-ʿArab* (Müller, 1968: 56, line 11) of al- Hamdānī (b. 280 A.H./A.D. 893). However, since this name is unattested elsewhere in the North or South pre-Islamic onomasticon, the reading of *tfynm* is more likely correct.

Historical Commentary

The language, content and provenance of these inscriptions are unusual and deserve some explanation. Since the texts are devoid of historical references, the date and circumstances must be established by paleographical



Fig. 4:

comparisons and extraneous materials. As a result, only a relative chronology can be provided.

The Dedanite Texts

The first two inscriptions have been designated as Dedanite, perhaps the first evidence in Jordan of the script associated with the ancient inhabitants of the oasis of al-ʿUlā in the Hijaz. This classification is based on the general affinity of the inscriptions with the paleography established for this script, which is distinguished from Lihyanite by the circular form of certain letters (like the *ṣ*, *ʿ*, *w* and *y)* and the general uprightness of the script (Caskel 1953: 23 and WLT 10). Of note are the peculiar Dedanite *g* in *'bgr* (no. 1) and the enclosed base of the *m* and the vertical *ṭ* in *mṭr* (no. 2), which stand in contrast to the form of these letters in Lihyanite. The rounded letters of the Dedanite script have been viewed as a product of Minaean influence (van den Branden, 1962: 28-29), an observation that now receives some additional support in the mention of Wadd in the Abu al-Ḍbaʿ inscriptions. Previously, this supposition was dependent on the personal name of *'rswd* in what was termed a "minäisierende" Lihyanite graffito (Caskel, 1953: 31), which can now be considered as Dedanite (as van den Branden at BID no. 18).

A precise date for the Dedanite corpus is difficult to assign, but a chronological setting during the Persian Achaemenid period is to be preferred (van den Branden, 1957; Altheim and Stiehl, 1964; Winnett and Reed, 1970: 114-17) to one in the Hellenistic era (Caskel, 1953: 101-2). A possible *terminus a quo* for the Dedanite script remains elusive; the proposal of a date in the eighth/seventh centuries B.C. (van den Branden, 1962: 29-41) can be regarded only as approximate. Several vague historical allusions to a "war of Dedan" in Taymanite inscriptions from Jabal Ghunayma (WTay nos. 20-23) have been associated with the North Arabian campaigns of the Babylonian king Nabonidus in the sixth century B.C., when Dedan appears to have been a flourishing caravan centre (Albright, 1953). The similarity of Dedanite and Taymanite scripts (Caskel, 1953: 22) makes this a reasonable suggestion and offers some chronological index for the inscriptions. Another chronological factor is evidence that Dedan later fell under Persian control. This is indicated by a reference in a Lihyanite inscription to ʿAbd the "governor of Dedan" in language characterstic of Achaemenid rule (JS Lih. 349, *'bd fḥṭ ddn).* This text provides a rather loosely defined *terminus ad quem* for the Dedanite corpus in the late Persian period and a possible context for the Abu al-Ḍbaʿ cave inscriptions. The provenance of these newly discovered texts in the north of the Ḥisma is easily explained if the Hijaz was under Persian administration. The strange mixture of North Arabian names and South Arabian vocabulary in the Abu al-Ḍbaʿ inscriptions furthermore suggests the peninsular-wide orientation of the Hijaz oasis during this period.

The Minaean Graffito

The third inscription from the Hisma is engraved in monumental South Arabian style and may be considered Minaean for the reasons stated above. Only a handful of Minaean texts have been found this far north. In Jordan, the only other examples are the five graffiti at Wadi Ram previously alluded to (G. Ryckmans, 1934) and a bronze scarab with a Minaean inscription that was discovered in a ravine at Petra after a violent rain storm (B. M. 117812 = R 3927 = M 376). The more recently discovered Minaean text from al-Jauf (WMin 1) should be included in the small Minaean corpus from North Arabia. The only other known Minaean texts outside of the Arabian peninsula are from the Fayyum in Egypt (R 3427 = M 338), the island of Delos in the Aegean (R 3570 = ID 2320 = M 349), and perhaps Tell Jemmeh, about 10 km. south of Gaza (Van Beek, 1983: 19). These few texts cannot compare with the much larger collection of Minaean inscriptions that appear in the environs of al-ʿUlā in the

Hijaz (see Beeston 1972a for the most recent additions). Several other frequently cited examples also must be eliminated from consideration. The South Arabian letters on the large storage jar found in the excavations at Tell el-Kheleifeh near Aqaba must be of a different nature. The script cannot be Minaean (contra G. Ryckmans 1939), but must either be Dedanite (Albright, 1953: 3 and van den Branden, 1962: 35) or, perhaps more likely, Sabaean (note the *ḥ* is upside down for Dedanite; cf. Boneschi, 1961), if the reported seventh century B.C. stratigraphical context is correct. In addition, it appears that the South Arabian clay stamp found at Bethel, which has been mired in controversy, is clearly out of context and the initial suspicions about the stamp as a modern intrusion that were expressed appear to be justified (Cleveland, 1973). The new find from the Khurm al-Ghuzlān may now be added to the meagre, but significant corpus of non-peninsular Minaean inscriptions.

Although the chronology for the Minaean kingdom of South Arabia remains a vexed question, the basic horizon now is regarded to be late Persian and early Hellenistic. Indeed, there are substantial reasons for dating the majority of the northern Minaean texts to the early Hellenistic era. Such a date has been advanced on the basis of the paleography of the inscriptions (Pirenne, 1956: 212), but a problematic historical allusion in a Minaean text from Beraqish makes it impossible to limit the Minaean texts to the period after Alexander the Great. The troubling reference is to a "struggle between Media and Egypt" (RES3022/16, *mrd kwn byn mḏy wmṣr)*. This event seems more likely to be the invasion of Egypt by Artaxerxes III Ochus in 343 B.C. than any of the struggles betwen the Ptolemies and Seleucids of the Hellenistic period, as the term "Mede" was the characteristic designation for the Achaemenid empire in North Arabia and the Levant (Graf, 1984). This date would push back the origins of the Minaean kingdom to at least the fifth century and the establishment of its merchant colony at Dedan to the late fourth century (Winnett and Reed, 1970: 119). Since the Dedanite inscriptions from Abu al-Dḅaᶜ suggest the influence of the South Arabians in the Hijaz during the Persian period, some additional support is now provided for a pre-Hellenistic date. These internal factors form the basis for assigning the northern Minaean texts to the late Persian/early Hellenistic period.

Minaean presence outside of Arabia Felix becomes especially clear, however, only in the third century B.C., when Greek sources provide some firmly based chronological data. The first Greek literary reference to the Minaeans is that of the Hellenistic author Eratosthenes (*apud* Strabo 16.4.4 [768], whose information is probably derived from Ptolemy II's Arabian expedition of *ca.* 278/277 B.C. [Tarn, 1929: 16]). From the same source, Eratosthenes probably gained his knowledge of the aromatic trade of the Minaeans and Gerrhaeans that was centered on an island near the entrance to the Gulf of Aqaba (*apud* Strabo 16.3.18 [768]). In contrast, the earlier classical Greek sources reveal no knowledge of the Minaeans, although they are familiar with the aromatic trade of the East, which they designate as "Syrian" for the ports where the items were obtained (see *Surion aglaisma* in Aeschylus, *Ag.* 1312; *Surias libanōton* in Hermippus, *The Porters apud* Ath. 1.27 f = Edmonds FAC 63 [425 B.C.]; *Surias d'ōs libanou kapnos* in Europides, *Bacch.* 144 [405 B.C.]; and *smurnēs ek Surias odmai [kai?] libanou te pnoai* in Anaxandrides, *Protesilaus apud* Ath. 4.131a/36 = Edmonds FAC 41 [*ca.* 372 B.C.]). Greek emporia like al-Mina on the Orontes in Syria were engaged in these transactions and no doubt furnished the basis of such designations. Such eastern associations make it unlikely that this terminology can be attributed to ignorance among the Greeks about the sources of these products.

There rather appears to have been general awareness that South Arabia was the actual source of these goods (see Müller, 1978 and Groom, 1981). For example, in the late fifth century B.C., Herodotus certainly was cognizant that frankincese and myrrh were the monopoly

of this distant region and that these items were transported to the Levant by the Phoenicians (Hdt. 3.107). His information about the Arabian peninsula also appears to be precise and accurate. The references to the cults of Orotalt and Alilat in his discussion of the religion of Arabia (3.8) are quite clearly allusions to Ruḍa and al-Lat (Teixidor, 1977: 69-70). In addition, recent discoveries of drawings of "fat-tailed sheep" in the rock art of central Arabia (Anati, 1968: pt. 1) have provided support for the reliability of his information about even Arabia's strange animal, life, (Hdt. 3.113). The absence of the Minaeans in these classical sources then suggests that they had not yet arisen as a major factor in the aromatics trade. On the other hand, by the early Roman principate, the Minaean commercial achievements are part of the past (Pliny, N.H. 12.30 and Ptolemy, *Geog.* 6.7.23). Minaean expansion into North Arabia can then be assigned to a date no earlier than the late fourth century B.C.

The impression provided by these literary sources is confirmed by documentary sources: it is only in the third century B.C. that Minaean involvement in the commerce of frankincense and myrrh can be extensively documented in the Greek sources. Among the most important of these sources are the Zenon papyri (for general discussion see Tcherikover, 1937 and Mittmann, 1970). In these administrative records of the Ptolemies (Bagnell, 1976), there are a number of references to the purchase of Minaean and Gerrhaean frankincense and myrrh in Syria and Palestine. These transactions begin in 261 B.C. (P. Cairo Zeno 59536/11-12, *libanou Minaiou ta(lanta) d kai Gerraiou ta(lanta) e smurnēs;* cf. 59011, II/15, and PSI VI, 628/5; cf. Agatharchides apud Photius 87 and Pliny N.H. 12.35.68) and include the memorandum of a purchase of such items from a Moabite named Malichos (P. Cairo Zeno 59009, frag. f in IV, p. 285). These papyri also indicate that Gaza was the most important centre for the aromatic trade during this period; some archaeological evidence supporting the prominence of this port under the Ptolemies is provided by the Minean inscription reading *'bm* on a potsherd recently discovered in the late third/early second centuries B.C. granaries at Tell Jemmeh (Van Beek, 1983: 19). This name is known only from South Arabian texts, such as the Minaean inscriptions from Maʿīn (R 2778 = M 33) and alʿUla (R 3835 = JS 191). Since Tell Jemmeh is located just 10 km. south of Gaza, the major Hellenistic commercial port, it seems likely that this find is to be connected with Minaeans engaged in aromatic traffic. Another indication of the general influence of the Minaeans in the Hellenistic Levant is reflected in the LXX rendering of Job 2.11; which transforms Zophar the Naʿamathite into *Sōphar o Minaiōn basileus.*

These Greek literary and documentary sources correlate well with the information contained in the Minaean texts themselves. Of utmost importance in this regard are the so-called "Hierodulenlisten," found by J. Halévy on steles at the temple of Maʿīn, the ancient capital of the Minaeans. These inscriptions record the offering or consecration of foreign women to the temple by Minaean merchants, evidently as part of the public building liturgy that they had not been able to provide because of their involvement in foreign trading ventures (J. Ryckmans, 1961). Along with the ancestry and clan of the dedicant, these texts also record the specific origins of the foreign women (Mlaker, 1943 = M 392-398). The places named include Sidon *(ṣydn),* ʿAmmōn *(ʿmn),* Moab *(m'b),* Qedar *(gdr),* Medā'in Ṣāliḥ *(hgr),* Dedan *(ddn),* Liḥyan, Wadi al-Qurā, the oasis south of Dedan *(gryn),* Gaza *(gzt),* Egypt *(mṣr),* and perhaps Greece *(ywnm,* with mimation), revealing the scope of Minaeana commercial activity in North Arabia and beyond. On the basis of paleography, these dedications have been assigned to the late third centry by Albright (1953: 23 n. 12) or spread out from 290 to 180 B.C. by Pirenne (1956: 212 n. 4-5), which seems more likely. Some basis for this date can be found in the Minaean inscription on the Gizeh sarcophagus dated to the 22nd year of

Ptolemy that commemorates Zaid'il, son of 'Zid, of the clan of Ẓayrān, who had imported aromatics for the Egyptian temples (R 3427 = M 338). As J. Ryckmans (1961: 54) astutely observed, this merchant is probably identical with the *zyd'l bn ʿbd dzyrun* who offered an Egyptian women in the Hierodulen texts (M392/C39). If the ruler referred to in the Gizeh text is Ptolemy II Philadelphus (282-246 B.C.), the date of the inscription would be 263/262 B.C., but the long-reigning Ptolemaic rulers make such synchronization only a possibility; Ptolemy III Euergetes (246-222 B.C.), Ptolemy V Epiphanes (204-180 B.C.), Ptolemy VI Philometor (180-145 B.C.), and Ptolemy VII Eurgetes 145-116 B.C. provide equally suitable candidates for the ambiguous reference. Nevertheless, this text provides at least some basis for the chronological development of the Minaean script and the activities of the colonists in the Mediterranean region, especially in Egypt and Gaza (R 2771/3 = M 27).

In recent decades, the organization and institutions of this foreign commerce of the South Arabian kingdom have been substantially clarified (J. Ryckmans, 1957-58), particularly in reference to the Levant. Of greatest importance for our knowledge of these developments is the mercantile code of the Minaean colony at al-ʿUla, which indicates that the trading centre at Dedan was called the *Bayt Wadd* and the goods that were transported were considered the "property of Wadd" *(qnyh wd* in R 3695 = M 356 with the discussion of Beeston 1978). This close association of the Minaean national deity with the aromatic trade is reflected also in the formula "Wadd is father" that appears in Minaean inscriptions at the capital cities of the kingdoms of Qataban and Hadramaut, the main suppliers of frankincense and myrrh, and explains the expression "perfumes of Wadd" *(mṯʿyt wd)* that appears in the Beraqish texts (Doe, 1979). The trade itself appears to have been the monopoly of a number of prominent Minaean families, such as the Gebbanitaea mentioned by Pliny (Beeston, 1972b). The widespread activities of these international merchants were all intimately connected with the capital at Maʿīn and highly organized. In the case of the Minaean colony at Dedan, two officials called *kabirs* were the administrators for the settlement (Winnett and Reed, 1970: 117). Since Dedan is desginated the Maʿīn of Muṣran (see now Sayyed, 1982), the intimate relations of the settlers with their mother city and Ptolemaic administration appears pat, but similar connections may have existed with other Minaean merchants who were operating in the Levant. In this connection, it is attractive to connect the name of the modern village of Maʿān in southern Jordan with Minaean colonist activity, a notion that Jaussen and Savignac once entertained, especially because the southern suburbs of the settlement are called "Maʿān of Muṣran" (1909: 33-42). Unfortunately, they found no traces of the ancient period at the town, and its rapid growth in recent years may now conceal what did exist.

The range of the trading pattern and nature of the activities reflected in the *Hierodulen* texts fit remarkably well into the context of the Zenon papyri. The traditional slave trade of the Levant was well known among the Greeks, as is reflected in the common name of *Suros* for slaves in the classical (ML 79/A37 and 47; Antiphanes, *The Chick* = Edmonds 168 = Ath. 3.108e) and Hellenistic periods (LSJ 1732). In addition, there was the old Eastern custom of sacred prostitution in which women were sold to foreigners, a practice that classical authors viewed with some distaste (Hdt. 1.199; Strabo 16.1.20; and Lucian, *De Syria Dea* 6). The Ptolemaic rulers attempted to regulate and restrict such commerce in the region (Liebesny, 1936 and Landau, 1966), but, if Zenon's activities as a high ranking official are typical, without much success; included in his memoranda are the records of a number of slave purchases in Syria-Palestine (P. Cairo Zen. 59003, 59015, 59018, 59076a and b, 59804, PSI 648). Furthermore, Syrian slaves appear quite frequently in the households and businesses of the Greek aristocracy in Egypt (P. Cairo Zen. 59011 and 59077) and it appears that Syrian villages were scattered throughout the country (59404,

59497). Private Syrian merchants appear to have facilitated this traffic and even served as agents for Apollonius (59006 and PSI 324-325), the financial minister for Ptolemy II, whose estates were administered by Zenon.

Although Zenon's agents encountered occasional difficulties with custom agents in attempts to export slaves (P. Cairo Zen. 59292), slave trading still appears to have been widespread and the officialdom either indifferent or corrupt. The tolerance of the Ptolemaic bureaucracy to the slave trade is illustrated by the report of one of Zenon's agents about the activities of two vagabond brigands named Drimulos and Dionysius (PSI 406). At Pegais they turned over a slave girl to the border guard after abusing her, sold in Ptolemais a slave girl they had purchased in Amman, made a similar transaction in Joppa for a priestess or temple prostitute *(hierea),* carried away another slave girl to the Hauran in southern Syria to sell for 150 drachmai, and purchased a fifth slave girl in Transjordan. The only difficulties that these two scalawags encountered was with the Nabataeans.

These Greek sources provide a vista from which to interpret the activities of Minaean merchants reflected in the *Hierodulenlisten* and the scattered Minaean graffiti outside Arabia Felix. Of the 74 foreign women mentioned in these texts, 27 are from Gaza, 8 from Egypt, and 9 from Dedan. Although in certain instances these women are of free status and the wives of the dedicants (e.g., M 392, B44-47, Ḥayū's Lihyanite *ḥrt* or wife), most of them were probably of a status similar to that of the slave girls Zenon and his agents sought from the same regions. The Minaean inscriptions in Palestine and North Arabia appear at the termini of the major caravan routes intersecting these trade centres: Tell Jemmeh (near Gaza) Petra, and Jauf at the entrance to the Wadi Sirhan (Bowersock, 1983: 154-59). Those from the Ḥisma are strung along the routes leading to these major commercial centres, either at the large oasis at Wadi Ram or, in the case of the new graffito at Khurm al-Ghuzlān, along the desert track cutting SE from Quweira to Mudawwara. They probably are the product of Minaeans involved in the frankincense and myrrh trade, perhaps merchants like those of the *Hierodulenlisten* who returned to their homeland with women they had purchased at the various towns of Syria and Palestine where they conducted their transactions.

The last dateable piece of epigraphic evidence for Minaean activities in the Mediterranean region is the Greek-Minaean bilingual inscription found at Delos, which contains a dedication for an altar to Wadd and the other divinities at Maʿīn (R 3570 = ID 2320 = M 349). This dedication must date after 166 B.C., when Delos was transformed into a free port by Rome, but before the Mithridatic wars of the early first century B.C. During this period, foreign immigration was drawn to the island, which became an important commercial centre under Athenian administration (Bruneau, 1970). Several Delian inscriptions from *ca.* 140/139 B.C. mentioning Gerrheans (ID 1439 ii, 1142 A82, 1449 A ii 28, and 1450) furnish an approximate date for the dedication.

The new graffito from Khurm al-Ghulzlān, as well as the other North Minaean texts, may be assigned a date in the period between the establishment of Ptolemaic rule in North Arabia and the Delian inscription. As archaeological activity continues to increase in Jordan, it may be anticipated that other such discoveries will be made to further attest to the international commerce and far-reaching activities of the little known and frequently neglected, but significant kingdoms of the Arabian peninsula. The Dedanite and Minaean wayfarers reflected in these graffiti from this arid region of the Ḥisma certainly point in that direction.

Abbreviations

The references to the occurences of names and abbreviations for publications are derived from G. Lankester Harding, *An Index and Concordance of Pre-Islamic Arabian Names and Inscriptions,* Near and Middle East Series, vol. 8 (Toronto: University of Toronto, 1971). M = the

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finding solutions to some of the lexicographical problems of Safaitic in local dialect usage.

Our increased contact with the *bedu* led to our receiving more reports of inscriptions and drawings in the surrounding area. We were able to investigate these at week-ends and some of the interesting discoveries made are discussed below in the Appendix.

The first part of the season was spent in finishing off work in Area A (Fig. 1), most of which had been covered in 1981, and re-photographing some of the inscriptions and drawings there. The value of our methods of recording the provenance of finds was again demonstrated by the ease with which we were able to re-discover even those texts on small stones in the midst of the basalt scatter.

After completing work on Area A, we went on to Area B (Fig. 1). This section stretches from the junction of the feed wadi with Wadi Rajil, half a kilometre upstream from Khirbet Jawa, to the downstream end of the site, where Wadi Jawa and Wadi Rajil meet, with a more or less narrow band along the "north" bank of Wadi Rajil and a much broader band along its "south" bank, taking in most of the course of Wadi Jawa as well as the Khirbah.[3] Our work this year was concentrated on Wadi Rajil and we covered its whole course through Area B from its junction with the feed wadi to its confluence with Wadi Jawa. We continued to use the techniques described in last year's report, with considerable success, as may be seen from the fact that we made 890 finds this season. This together with the 1219 finds of last year means that within an area of roughly two and a half square kilometres we have found 2109 inscriptions, drawings and *wusum*. All this material is unpublished with the exception of six Safaitic inscriptions recorded at the end of the season at the point where Area B meets the western limits of Professor Winnett's 1951 survey, at the south-east corner of the site. It was interesting to be able to study these inscriptions *in situ* and to photograph them, especially since the published copies of some of them are incomplete.[4]

Among the 314 Safaitic texts discovered this season were a number containing unusual words and phrases. For instance, we find in one text *w r'y h ḫwrt* ("and he pastured the unweaned camels") and in another *w ṯẓr h 'jd w r'y h 'nḫl* ("And he watched over the young male kids and pastured the valleys"). Both *'jd* and 'nḫl are previously unattested plurals as is *'ẓby* (gazelles) in another text. We also found two clear examples of the type of inscription where a statement appears between the author's name and that of his father,[5] e.g. *l N. h dmyt bn N.* ("By N. - is the picture - son of N.") Among other finds was the first example of an author laying claim to *h 'ṯr* (usually interpreted as "the inscription") rather than recording that he found them, as well as several rather puzzling expressions on which further work will need to be done. There were a significant number of previously unattested names, many of which had unusual forms, and we also found inscriptions by different members, and successive generations, of the same families - something paralleled in the Modern Arabic graffiti of the area.

One of the features of this season's work was the discovery of many more Arabic inscriptions than last year, *viz.* 209 as compared with 65. Many of these were modern and added considerably to our stock of local names and genealogies, as well as providing information on inscribing techniques, the adaptation to stone-carving of a script habitually used on soft materials, and, in some cases, patina comparison. Among the Kufic inscriptions it was particularly interesting to find that some authors had left several texts in different parts of the area. Since this scatter of texts by one author is exactly what the Safaitic and modern *bedu* have left us, it is tempting to see the writers of

[3] See the 1981 Preliminary Report, p. 162-163, for a more detailed description of the area.

[4] As explained in the 1981 Preliminary Report (p. 160), it is the Project's policy to record previously published texts in the context of new finds.

[5] See F. V. Winnett and G. Lankester Harding, *Inscriptions from Fifty Safaitic Cairns,* Toronto, 1978, p. 15, paragraph 16, on this type of text.

INSCRIPTIONS AND ROCK-ART OF THE JAWA AREA, 1982 A PRELIMINARY REPORT

by
M. C. A. Macdonald
with a contribution by Ann Searight

The Corpus of the Inscriptions of Jordan Project[1] returned to the Jawa area for its second season of field-work between 9th May and 19th July 1982. The Project is one of the research programmes of the Centre for Jordanian Studies of Yarmouk University, which provides the bulk of its finance and its permanent staff, and is run in close co-operation with the Department of Antiquities of Jordan. We are most grateful to the Director-General of Antiquities, Dr. Adnan Hadidi, and his staff, as well as to Professor Mahmud al-Ghul, Director of the Centre for Jordanian Studies, and Dr. Mu'awiya Ibrahim, Dean of Humanities and Science of the Yarmouk University, for their continuous help and support. We should also like to thank the Royal Jordanian Army not only for permission to work in the area, but also for their help in supplying us with water, in pitching and striking camp and in transport. In particular we are grateful to Colonel Awdah Abd al-Nabi al-Nahar, Major Abd al-Karim Majali, Major Arshid Ali Salam and the officers and men of Princess Basmah Battalion of Tank Brigade 92. Finally, I should like to express my gratitude to my staff in the field for their tremendously hard and conscientious work in often very trying circumstances.[2]

Two days after we arrived at Jawa, the heavens opened and it rained for forty-eight hours virtually without stopping. Although this delayed our work, it was very exciting since it was the first time we had seen the wadi in full spate and we were able to photograph the water cascading over the waterfall (Pl. CXXIII, 1). Apart from the general interest of the event, it showed very clearly the relationship between the distribution of the inscriptions/drawings in the Wadi and the periodic presence of water (Pl. CXXIII, 2).

This year we were able to increase our contact with the *bedu* of the area and continue our study of local names, customs and genealogies. This was almost entirely the work of Miss King through whose tireless efforts we now have a rich fund of information on the place names of the region, the tribal divisions of the Ahl al-Jabal, their personal names and customs, etc. She also identified the authors (mainly still living) of almost all the Modern Arabic inscriptions, as well as

[1] For a description of the Project and its aims see the Preliminary Report on the 1981 season, in *ADAJ,* XXVI, (1982) p. 159-172 and Pl. L. Apart from minor misprints, consisting mostly of the omission of diacritical marks, there are a small number of errors in the text of this report as printed, which should be corrected as follows:
p. 167a: line 11: the *h* should have a dot under it
p. 168b: note 27: for p. 7 read p. 165.
p. 169a: note 28: delete entire sentence after *passim*
p. 170: caption to fig. 4: for *Drawings of human figures with "comb" head-dresses* read *Drawings of human figure with "comb" head-dress.*

[2] Apart from myself, the 1982 field staff was, in alphabetical order: Dr. Sabri Abbadi (Department of Antiquities) who helped record the Safaitic and Kufic texts; Mr. Mifleh Ghuraibeh (Department of Antiquities) whose extensive contacts with the local people were invaluable to the Project; Miss Geraldine King (Yarmouk University) who tirelessly and meticulously searched out and recorded the majority of the inscriptions; Ms. Ann Searight (Yarmouk University) who, single-handed, continued the comprehensive rock-art survey; Mr. Isa Madi (Department of Antiquities) who helped record the *wusûm* as well as some of the Arabic texts: and Mr. Ibrahim Zuhbeh who was our Department of Antiquities Representative for the first three weeks. Our cook, 'Ajlouq, deserves special mention for his loyalty and the great interest he showed in our work. The team was completed by the University driver, Mr. Ahmad Maryn, our camp servant, Mr. 'Ali Khazali, and Mr. Khalaf Khreishi, now working for the University, who joined us from time to time in the first part of the season.

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Our increased contact with the *bedu* led to our receiving more reports of inscriptions and drawings in the surrounding area. We were able to investigate these at week-ends and some of the interesting discoveries made are discussed below in the Appendix.

The first part of the season was spent in finishing off work in Area A (Fig. 1), most of which had been covered in 1981, and re-photographing some of the inscriptions and drawings there. The value of our methods of recording the provenance of finds was again demonstrated by the ease with which we were able to re-discover even those texts on small stones in the midst of the basalt scatter.

After completing work on Area A, we went on to Area B (Fig. 1). This section stretches from the junction of the feed wadi with Wadi Rajil, half a kilometre upstream from Khirbet Jawa, to the downstream end of the site, where Wadi Jawa and Wadi Rajil meet, with a more or less narrow band along the "north" bank of Wadi Rajil and a much broader band along its "south" bank, taking in most of the course of Wadi Jawa as well as the Khirbah.[3] Our work this year was concentrated on Wadi Rajil and we covered its whole course through Area B from its junction with the feed wadi to its confluence with Wadi Jawa. We continued to use the techniques described in last year's report, with considerable success, as may be seen from the fact that we made 890 finds this season. This together with the 1219 finds of last year means that within an area of roughly two and a half square kilometres we have found 2109 inscriptions, drawings and *wusum*. All this material is unpublished with the exception of six Safaitic inscriptions recorded at the end of the season at the point where Area B meets the western limits of Professor Winnett's 1951 survey, at the south-east corner of the site. It was interesting to be able to study these inscriptions *in situ* and to photograph them, especially since the published copies of some of them are incomplete.[4]

Among the 314 Safaitic texts discovered this season were a number containing unusual words and phrases. For instance, we find in one text *w r'y h ḫwrt* ("and he pastured the unweaned camels") and in another *w ṯẓr h 'jd w r'y h 'nḫl* ("And he watched over the young male kids and pastured the valleys"). Both *'jd* and 'nḫl are previously unattested plurals as is *'ẓby* (gazelles) in another text. We also found two clear examples of the type of inscription where a statement appears between the author's name and that of his father,[5] e.g. *l N. h dmyt bn N.* ("By N. - is the picture - son of N.") Among other finds was the first example of an author laying claim to *h 'ṯr* (usually interpreted as "the inscription") rather than recording that he found them, as well as several rather puzzling expressions on which further work will need to be done. There were a significant number of previously unattested names, many of which had unusual forms, and we also found inscriptions by different members, and successive generations, of the same families - something paralleled in the Modern Arabic graffiti of the area.

One of the features of this season's work was the discovery of many more Arabic inscriptions than last year, *viz.* 209 as compared with 65. Many of these were modern and added considerably to our stock of local names and genealogies, as well as providing information on inscribing techniques, the adaptation to stone-carving of a script habitually used on soft materials, and, in some cases, patina comparison. Among the Kufic inscriptions it was particularly interesting to find that some authors had left several texts in different parts of the area. Since this scatter of texts by one author is exactly what the Safaitic and modern *bedu* have left us, it is tempting to see the writers of

[3] See the 1981 Preliminary Report, p. 162-163, for a more detailed description of the area.

[4] As explained in the 1981 Preliminary Report (p. 160), it is the Project's policy to record previously published texts in the context of new finds.

[5] See F. V. Winnett and G. Lankester Harding, *Inscriptions from Fifty Safaitic Cairns*, Toronto, 1978, p. 15, paragraph 16, on this type of text.

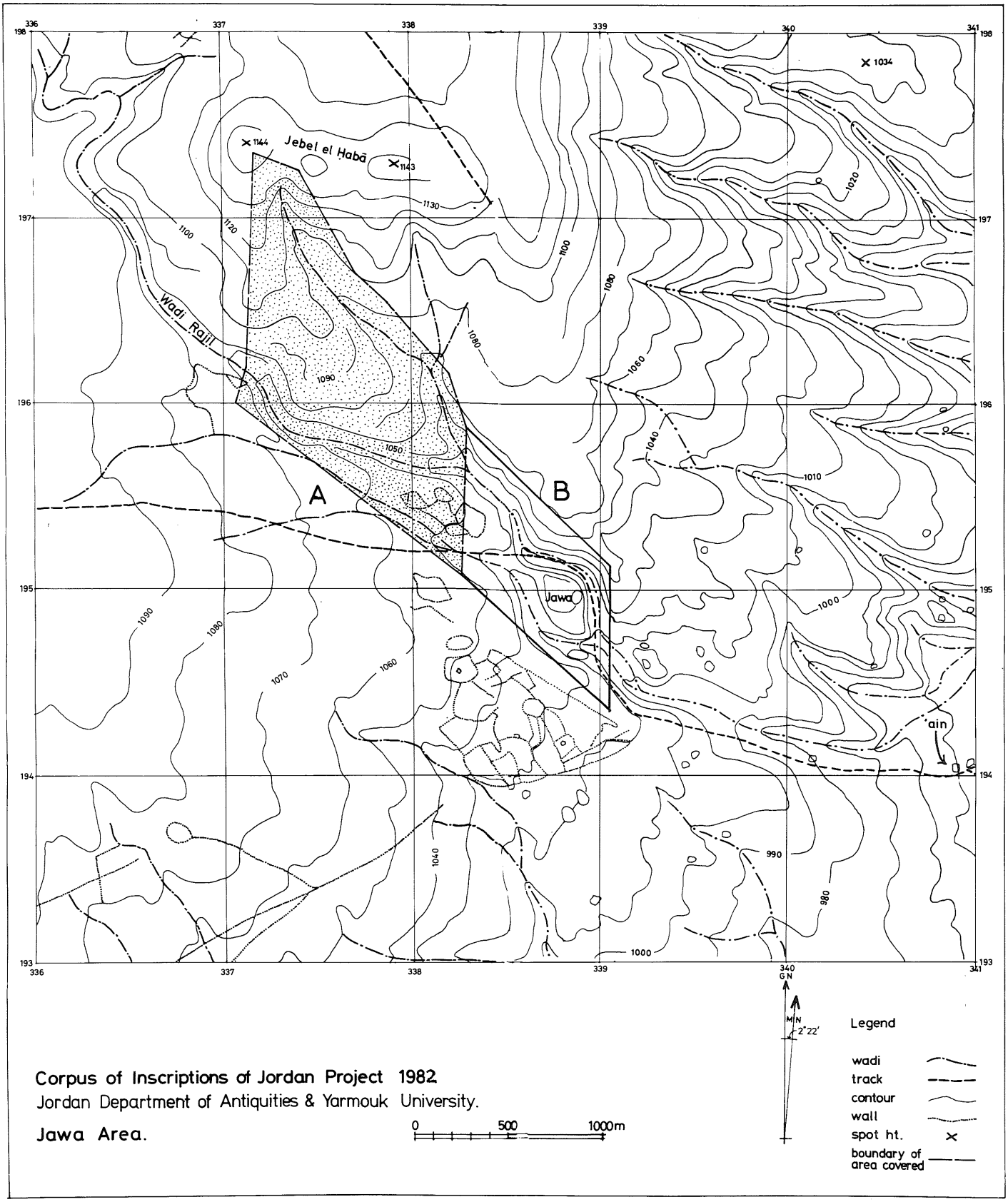
Jebel el Habā
Wadi Rajil
A
B
Jawa
ain
Corpus of Inscriptions of Jordan Project 1982
Jordan Department of Antiquities & Yarmouk University.
Jawa Area.
0 500 1000m
GN
MN 2°22'
Legend
wadi
track
contour
wall
spot ht.
boundary of area covered

Fig. 1

the Kufic graffiti as residents of the area rather than travellers through it. After all, it takes some considerable time to inscribe basalt and some of these authors have left seven or eight neatly carved inscriptions of four or more lines within an area of one square kilometre. This implies, therefore, that, contrary to the general assumption, literacy continued among the *bedu* well into the Islamic period, and, indeed, may never have died out entirely.[6] However, as Grohmann remarks,[7] the "very simple, unadorned Kufic" of these texts is of "a more or less non-descript type" and therefore extremely difficult to date. *Prima facie,* it would seem likely that in the remote fastnesses of the *ḥarra,* among the naturally conservative bedu, the old form of the script would remain in use far longer than elsewhere. But since it is extremely rare to find a date in these inscriptions, all this must remain conjecture. One thing, however, which these texts make very clear is the piety of their authors. Without exception they consist of prayers, quotations from the Qur'an, and pious statements.

Two groups of Greek graffiti were found, one on the "north" bank of Wadi Rajil, upstream from the Khirbah, and the other below the south-east corner of the site. The latter group was copied and photographed by Professor Winnett, but has never been published. The nine texts making up the two groups, consist entirely of names.

The 280 rock-drawings discovered this season will be discussed in Ann Searight's report below. Seventy-eight *wusum* were recorded, and Mr. Isa Madi and Miss King continued comparing them with those in use today. It should be noted that, according to our *bedu* informants, the various sections of the Ahl al-Jabal (and presumably other tribes as well) each have two quite different *wusum.* One is used as a mark of ownership on animals, and need not necessarily be a brand. It can, for instance, consist in clipping parts of the ear.[8] Moreover, the position of this mark on the animal's body is quite as important as its form,[9] and two brands of identical form but on different parts of the body will be considered as totally distinct *wusum.* These two factors mean that the *wasm* used on animals is not suitable for use on other things. Hence each section has another *wasm,* which they call the *wasm* for graves, [10] but which appears to be widely used to mark "immovable" property. We found them, for instance, not only on graves but over the mouths of caves which are used as animal pens during the winter months, near pools, and apparently indiscriminately on boulders within the grazing areas of each section.[11]

The last two seasons at Jawa have shown how much can be learned from studying inscriptions and drawings *in situ,* without the constant pressure of limited time. Moreover, prolonged contact with a particular area and its inhabitants has allowed an understanding of the milieu in which the material was produced wich it would be hard to gain in any other way. It is, therefore, greatly to the credit of the Yarmouk University and the Department of Antiquities of Jordan that they have understood this and have given the Project the time and the facilities needed to carry out its work as effectively as possible. To both institutions we are deeply grateful. We hope to continue the survey of the Jawa area in 1983.

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[6] A Grohmann, *(Arabic Inscriptions,* being *Expédition Philby-Ryckmans-Lippens en Arabie,* IIe Partie: *Textes Epigraphiques* Tome 1, Louvain, 1962, p. xx) had already questioned "the prejudice 'Arabs or bedu do not write or read'." I am most grateful to Professor A. F. L. Beeston for drawing my atention to this reference.

[7] *ibid.,* p. xx-xxi

[8] See H. Field, *Camel Brands and Graffiti from Iraq, Syria, Jordan, Iran, and Arabia* (Supplement to the Journal of the American Oriental Society No. 15, Baltimore, 1952), p. 29.

[9] Dr. Field himself points this out *(op. cit.* p. 2), although he does not follow up its implications for the marks found on stone.

[10] Dr. Field, *op. cit.* p. 2-3, found many of his examples on graves.

[11] Failure to distinguish these two types of *wasm* may account for many of the discrepancies in Field's lists (see Field *op. cit.* p. 2). The theory that the same "property mark" would be branded on an animal, tattooed on a wife and hammered on a well-head *(ibid.* p. iv) is therefore untenable. Moreover, while each section of a tribe may have its own traditional tattoo patterns, these appear, in our experience at least, to bear no relation to either of that section's *wusûm.*

THE ROCK-ART SURVEY 1982

by
Ann Searight

Although the finds of rock-drawings in the 1982 season were largely repetitious of those found in 1981, their distribution took on a different pattern.

Apart from the large outcrop of Khush'at al-Madhî, the finds were scattered and there were fewer areas with multiple compositions. This was probably due to the topography of the Wadi Rajil, whose sides became steeper in many places providing fewer points of access for watering flocks. There were fewer focus points, and those that existed contained scattered boulders or provided surfaces only large enough for a few drawings.

One of the most interesting techniques in engraving rock, last year found in connection with Safaitic drawings and inscriptions, was found again this year with a modern Arabic inscription and drawing. The "rocking blade" technique, producing a very narrow zig-zag outline was used to depict an equid, superimposed on an earlier scratched drawing of a horseman in combat with another. Although the inscription associated was only deeply engraved, both it and the drawing were in adjoining and similar cartouches with identical patina. The inscription was dated 1980. Lines of the earlier drawing could be seen in places where the later artist had decided to "improve" on the original (Pl. CXXIV, 1).

The practice of "cartouching" drawings has not been widely used at Jawa, but there was one particular drawing finely scratched by a devotee of the art. A simple Safaitic inscription with seven "magic" lines was written vertically in the central cartouche, flanked by separate cartouches containing, on one side a rayed sun disc, and on the other a stick man with his spear. The man had a bristly hairdo, and his limbs, projecting at right angles to his body had accentuated fingers and toes thus producing more bristle effects.

The scratching technique continued to be used in our latest sequence of modern transport, with four finds of truck drawings: great care and attention was displayed in the chasis details and rope lashings.

Whilst researching and classifying some of the published material from this and other areas, it began to appear that there was a tradition of depicting female camels (referred to as *bkrt* in accompanying inscriptions) with their tails raised and curled up [Pl. CXXIV, 2]. Although only two of the inscriptions found this year at Jawa referred to female camels, and both had this characteristic, there were four at Wadi Irenbeh with references to *bkrt* and two at Ṣâjaʿ.

The reverse also seems to be true. At Sâjaʿ two drawings of camels with their tails hanging down were referred to as *jml* and *bkr* respectively, both male camels in the accompanying inscriptions.

Amongst the many other petroglyphs of interest at Sâjaʿ was a drawing of two camels mating; one of a battle scene with stick men carrying shields and a variety of weapons; and one of a woman with arms upraised holding her long, flowing hair.[12]

At Jawa, one of the few references to specific animals with a drawing was that mentioned by M. C. A. Macdonald as the unattested plural of gazelles. Beside the inscription was a drawing of four gazelles accompanied by a line of seven "magic" dots. The drawing and inscription are scratched within a cartouche.

Since hyenas are still present in Wadi Rajil, and indeed were seen on several occasions close to where we were working, it was appropriate to find a possible representation on one of the boulders in

[12] Other examples of this figure appear beside no. 4351 in *Corpus Inscriptionum Semiticicarum,* Pars V, and more recently in Winnett and Harding, *op. cit.,* nos. 442 and 568. For a discussion as to whether or not this represents a goddess, see F. V. Winnett and W. L. Reed, *Ancient Records from North Arabia,* University of Toronto Press, 1970, p. 75.

the area. Accompanied by drawings of ibex and caprovines, it was hammered carefully with the hyena's vertically striped markings, typical of the indigenous species of *Hyaena hyaena.* It is possible that some of the other representations of carnivores found here and elsewhere are also of this species.

Appendix

Incidental Finds

As mentioned above, several of our week-ends were spent exploring the desert around Jawa and following up reports of the presence of inscriptions. Our constant guide and companion in these excursions was our neighbour at Jawa, Shati Raja' al-Ja'riya, Abu Muhammad, who was a mine of information on all aspects of the area.

Of the many places visited, two were of particular interest.[13] One was Wadi Irenbeh, at a point in its course where it is joined by a tributary which plunges down in a series of small waterfalls. Both the main wadi and the tributary run through relatively narrow gorges, the walls of which are covered in drawings and Safaitic and Kufic inscriptions. We found, for instance, texts by members of the tribe of *Ḥẓy,* which seems to be confined to the Jawa/H5 area,[14] and another by a member of the tribe of *Kkb,* which has left inscriptions over a wide area from Jebal Sais to Wadi Miqat. Another text is interesting for the unusual form of two of its letters: *w* appears as ⊙ . as in some Thamudic texts, while *y* has the form 𐤉, almost as if the author had tried to make it resemble a hand. Yet another inscription tells us that its author *nẓr h my,* i.e., "guarded the water" which collects in the pools below the waterfalls. There was also a quantity of new names and some interesting new expressions.

The second place was even more exciting. It is called Ṣâjaᶜ and is a huge conical volcanic plug surrounded by wadis. As soon as we began to climb it we found inscriptions and drawings and, by the time we reached the summit, it was clear that the place was covered in hundreds of graffiti, many of exceptional interest. There is, for instance, in one small area, a sizeable group of texts starting *h rḍw sᶜd...,* a type of inscription which is relatively rare,[15] which raises the question of whether this place had significance in the worship of *Rḍw.* It would certainly make an impressive "high place". Another text tells us that the author watched the heavens *(tẓr h smy),* though this probably had more to do with the weather than with religious experience! There is also what appears to be an Arabic magical inscription rather similar to some of the charms carried about in the *ḥijâb* today. But perhaps the most exciting find was an inscription which reads *l N. w šty 'nzt nfr mn rm* ("By N. and he wintered at 'nzt while escaping from Roman territory"). In view of the fact that Sâjaᶜ is within sight of both Jebal 'Anâzah and Jebal 'Unaizah it seems highly probably that we have here the earliest reference to one or other of these mountains. Indeed the whole area may at that time have been known as 'Anâzah.[16] It would certainly have been inaccessible enough to discourage pursuit (we found a text by another fugitive close by), but it must have been a bleak place to spend the winter.

We intend to return to both these places next year, for much longer periods, to complete the systematic recording of all the inscriptions and drawings. These, like last year's incidental finds, will be published in a separate monograph.

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Yarmouk University

[13] Ann Searight deals with the drawings from these places in her report, above.

[14] See the 1981 Preliminary Report, p. 166, note 15.

[15] It has even been suggested (most recently by R. M. Voigt in *ADAJ,* XXIV, 1980 p. 82) that these texts may be more ancient than the other Safaitic inscriptions, though it is doubtful if the assumptions on which this view appears to be based can be justified.

[16] The Arabic *ᶜanzah* ("she-goat") is hardly appropriate in this context. It is worth noting that the name *ᶜAnâzah* presumably derives from Arabic *'anz* meaning a black and rugged hill (Lane p. 2173/1 and cf. p. 73/2-3 s.v. *'akamah),* an apt description of Sâjaᶜ itself.

EXCAVATIONS AT TELL DEIR ʿALLA, SEASON 1982

by
Moawiyah M. Ibrahim
and
Gerrit van der Kooij

Introduction

The fieldwork at Deir ʿAlla continued in 1982 after a break of more than three years. The excavations were carried out by the joint expedition of the Department of Antiquities of Jordan, the Leiden University (Holland) and, for the first time, the Yarmouk University, from 15 November till 20 December. For the more recent previous work at Deir ʿAlla, refer to the preliminary reports in *ADAJ,* XXII, (1977/78) p. 57-80, and *ADAJ,* XXIII (1979) p. 41-50. The short, intermediate, season was necessary in order to finish the work on the top phases in the digging area, and to prepare the excavation of phase M (IX), see below, in the following major seasons.

For this season's and future work at Deir ʿAlla, we are in the fortunate position of having a "dighouse", or, more appropriately an "Archaeological Research Station" at our disposal. The building is placed at the S.W. foot of the *tell* and has all the necessary lodging facilities as well as space for much of the work associated with fieldwork. Apart from that, a small permanent exhibition concerning the archaeology at Deir ʿAlla and its surroundings will be organised for the interested visitor. The architecture of the house — originally sketched by Mrs. Susan Balderstone — was fully designed by the building department of the Yarmouk University, headed by Mr. R. Nijim. The contractor, Mr. M. Halbony, had a hard job, but the result is excellent (pl. CXXXIV, 1; the white building more to the right). The finances for the building as well as for furnishing the station came from the three parties cooperating in the archaeological work at Deir ʿAlla. In this respect it is important for us to express here our deep gratitude to Dr. Adnan Hadidi, Director-General of the Department of Antiquities, to Dr. Adnan Badran, the President of the Yarmouk University, and to Dr. Dick P. den Os, Director General of the University of Leiden with Mr. Wim F. H. Verver, Director of the Faculty of Arts and Literature. Several other people have to be gratefully mentioned because of their importance during the different stages of preparation for the foundation, especially Mr. Raouf S. Abujaber, Hon. Consul General of the Netherlands in Amman, and Mr. Sami Habayeb. December 15, 1982 the building was officially opened. This was done by H. R. H. Crown Prince Hassan, accompanied by H. R. H. Princess Alia. We are very thankful to him for this, and for his stimulating interest in the work at Deir ʿAlla. The building received the official name "Deir ʿAlla Station for Archaeological Study" and during this season it has already proved to be of invaluable importance for our work at the site.

The finances for the expedition came from the three parties involved. Apart from that some equipment was again put at our disposal by the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

The team consisted of Jordanian and Dutch members, and two British citizens on a voluntary basis. Dr. Moawiyah Ibrahim and Dr. Gerrit van der Kooij were the directors. Field supervisors were: Mr. Tom Deas (London, square B/A5), Mr. Mohammed Derwish (DAJ sq. B/A9 Mr. Ibrahim Haj Hassan (DAJ, sq. B/A7, 8), Mr. Mohammed Jamarah (DAJ, sq. B/B9 and C9), Dr. Zaidan Kafafi (Yarmouk U., sq. B/C8), Mr. Edward LaGro (Leiden U., sq. B/6), Mr. Steven Moors (L.U., sq. B/A6) Mr. Nabil Qadi (Y.U., sq. B/B7, 8), Miss Margreet Steiner

(L.U., B/C7). Housekeeping and administration: Miss Karin Braanker (L.U.), Mr. Faez Tarawneh (Y.U.) for surveying and restoration. Photography and drawing was taken care of by Mr. Hubert de Haas (Y.U.) and also by the two volunteers from London Mr. Tom Deas (drawing) and Mrs. Rita Deas-Wüthrich (photography). Chief cook was Abu Aref. Driver Rasras (Y.U.) was permanently available. Specialised foremen were: Ali Abdulrasul, Khamis Mohammad, Sadik Abdullah and Hassan et-Tayyib all from Amman — as well as Amin Kanaan, Gemil Kanaan and Ahmed Hawamdeh from Deir ᶜAlla. All the other people involved in the dig came from Deir ᶜAlla. Gratitude shold be expressed here to all the people mentioned, and especially to many of them for their willingness to help in preparing the furniture of the house during the beginning of our stay. The co-operation between the different parties and different nationalities again was felt as a good and stimulating working principle. This was also due to the interest and support we got from Dr. Adnan Hadidi, Dr. Adnan Badran, and Dr. Henk Franken, the Director of the Institute for Archaeology of Palestine and surroundings at the Leiden University.

The Archaeological Work

Rescue Work

Apart from the excavation some rescue work was done. Weather erosion, but also some bulldozer work had done some damage to the site. On the other hand, in this way something new was seen as well. So it became clear that at the E.N.E. foot of the *tell* a high terrace (at least 3.00 m.) was built, apparently in order to extend the natural hill, by dumping clay.[1] This happened according to pottery indications at the beginning of the LB period.

At the S.S.W. foot of the *tell* cross sections of two or three fire chambers of ovens were visible. Their precise function and period of use are still undetermined.

At a few places water erosion had excavated some complete or almost complete pots. They were saved and their contents recorded. See (Pl. CXXXIV, 2) for a nice example, a cooking pot, supposedly from the end of the MB period (reg. nr. 2764).

Excavations

The excavations were limited to the top of the *tell* and included three aims, which were more or less accomplished:

1) The almost complete removal of the partly or almost completely standing baulks (often with steps) between most of the squares. The baulks are part of the squares which were to their E. or N. side. This work was done in squares B/A5, 6, 7, 8, 9, B/B6, 7, 8, 9, B/C7, 9. (For the locations of the squares see previous reports in *ADAJ,* XXII & XXIII.) The baulks varied in width: most were 0.50 to 1.00 m. some 1.50 m. They, of course, had to be excavated in a careful way — The last check of the stratigraphy being removed. No important changes in the previous reconstructions of the phasing was necessary, but some details in the sections had to be redrawn.
2) Excavating deeper in some squares, so as to be as close to phase IX (M) as in other squares. This was done especially in squares B/A5, 6 and B/C9. For a description of the results see the phase description below.
3) In three squares (B/B6, B/C7, 8) the excavations went deeper. There the top of the burnt and well-preserved phase IX had to be touched and some of this phase had to be unearthed. The squares were bordering at the S. and E. sides of B/C6 where the phase was already largely excavated. In this way it became clear how phase IX continues to the S. and E. Its level, for example, was higher to the E. than elsewhere. (For further results, see below).

[1] Cf. the results of the previous excavations (1962, 1964) at the LB sanctuary area (see e.g., H. J. Franken, *Excavations at Tell Deir ᶜAlla I,* 1969, p. 19).

Results

The results of the excavations are perhaps best referred to by a preliminary description of some of the new data according to the phases distinugished. For the phasing system see *ADAJ,* XXII, p. 64; for descriptions of the phases see ibid. p. 71-73 and *ADAJ,* XXIII, p. 42-50. The phasing still is a complicated matter since the stratigraphy has a complex character because of the extensive digging which took place on the site, in this area, after phase VIII. Here preliminary reconstructions of the successive use of the site are maintained. Some changes concerning phase attributions of deposits are given, but definitive conclusions have to await the final publication of the top phases.

From the top the following phases were identified:

Phase I

The early Islamic graveyard at the top of the tell was hardly touched. Small parts of burial pits had been left in the baulks and excavated.

Phase II

Some parts of the characteristic pits of this phase had been left in the baulks. They were excavated. In several cases it did not become clear whether a pit had to be attributed to phase II or the preceding phase III. There the top-soil was too disturbed to give a stratigraphical clue. Some more digging was done in the very large pit B/A10.2,6. At a depth of 3.00 m. its bottom has not yet been reached. A very interesting find in it is a damaged chart model of clay (reg. nr. 2752, see Pl. CXXXIV, 3), recognisable from the remnants of the holes for two axes at the bottom.

Phase III

The scanty stone remains of some walls as described in previous reports are the clearest remnants of this phase, but some refuse pits and wash layers can also be attributed to it. In one of them (B/A7.8) an unusual type of figurine, a man's head (reg. nr. 2742, see Pl. CXXV, 1 and Fig. 1:1), was found. It was pierced at the back of the head, apparently in order to keep separate hair or a hat separate. Pit B/B6.98, 99 in the N. E. corner of B/B6, belongs to phase II or III. It measured 2.00 m. deep and 1.50 m. wide (in the middle), and especially important from its contents is a wide variety of small bones, which will be studied together with all the other faunal remains and with the floral remains at the Biological-Archaeological Institute at Groningen.

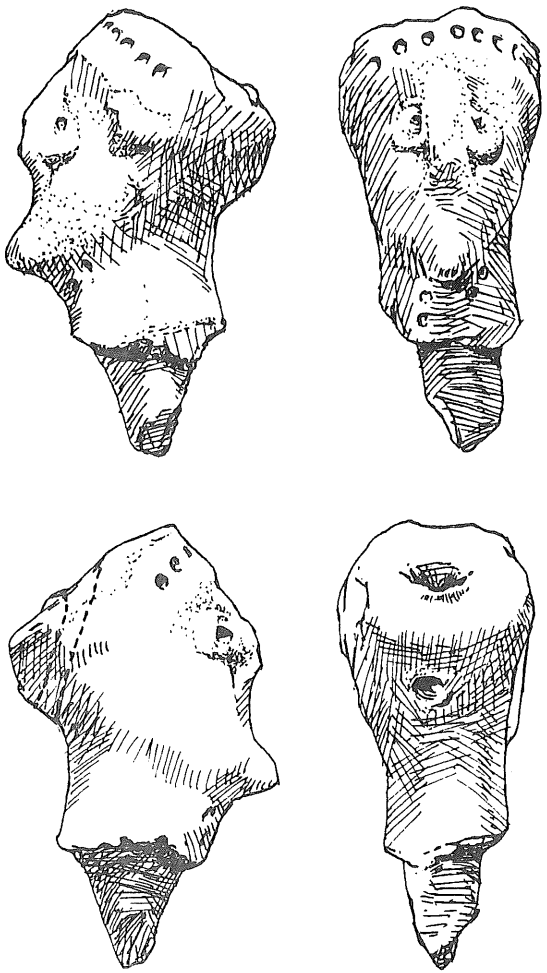
Phase IV

Some more removing was done of the "courtyard layers" of this phase, especially in the baulks of B/A8 and 9. Especially noteworthy is the small bronze Osiris statue (nr. 2777, see Pl. CXXV, 2 and Fig. 1: 2) from B/A9.3 which is the earlier part of the accumulation. The type is known, also from Palestine (Askelon collection, *QDAP,* V 1936 p. 61-68, but the two loops are rare — one at the back and one at the side of the right foot — especially in combination with the foot pin).[2]

Phase V

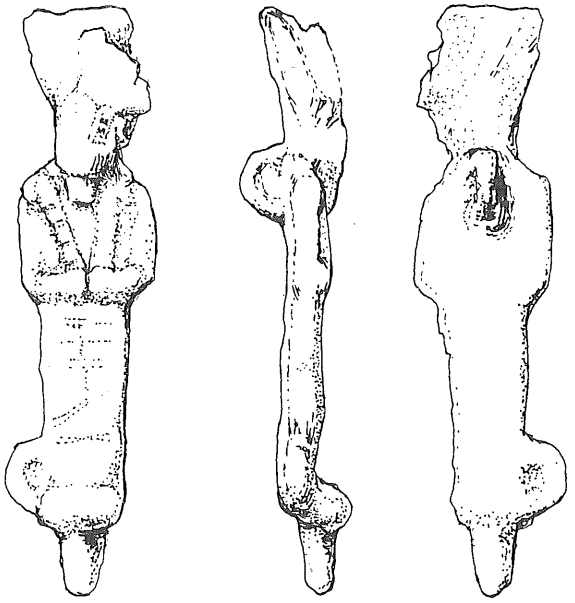
It became clear this season that the following features may be taken as the beginning of phase V, or as a separate phase. On top of the wash layers of phase V/VI some accumulation of courtyard layers had occurred before the building of phase V walls had started. Apart from that several silo pits were dug during the same time. They were often found filled with some kind of plant material. The existence of those pits was unknown to the builders of the phase V walls, because they placed their walls over several of them and the destruction of the walls was clearly due to sinking into the pits filled with "soft" (uncompressed) soil. One of the pits concerned was B/A5.71, and a very elongated narrow bottle (reg. nr. 2735, see Pl. CXXV, 3) was found in it. The same type of bottle, which had been found quite often in Transjordan, had come from two

[2]. Mr. Guido van den Boorn (State Museum of Antiquities, Leiden) was so kind as to give a preliminary description of the bronze figurine, in an uncleaned state, with some literature, e.g., G. Roeder, *Ägyptische Bronze figuren,* Berlin, 1956.



DA82 / 2742 Fig. 1:1

Pottery figurine: man's head phase III - drawing Mr. Tom Deas



DA82 / 2777 Fig. 1: 2.

Bronze figurine: Osiris phase IV - drawing Mr. Tom Deas

other pits of this phase as well as from a deposit of the beginning of phase IV (see *ADAJ,* XXII, Pl. XXXIII). Pit B/A5. 87, clock shaped, had, apart from a large number of bones and pottery, several finds of special interest (see Pl. CXXVI, 1) e.g., a black fired bowl fragment with an incised *'alef* on the base (reg. nr. 2747, see Pl. CXXVI, 2). Also two animal figurines were found in it, one (reg. nr. 2766) of a cow (part of mouth, horns, ears, and three legs broken off), with the body and legs painted white and neck and head dark red (see Pl. CXXVI, 3 and Fig. 2). Worth mentioning also is a "purple shell" found in pit B/A5.83.

Parts of the walls of phase V had been preserved in some baulks. They were removed. The collapse and rebuilding of some of the walls (in squares B/A-B. 5-6) may have happened still during phase V, or during phase IV or even III. From the beginning of phase V comes a complete ostracon (reg. nr. 2768, B/C9.36) with five lines of text in Aramaic writing, suggesting a date in the early fifth century B.C.

Phase V/VI

As indicated in previous reports phase V/VI, which had to be put in between phases V and VI, mainly consists of wash and courtyard levels. Some walls connected with it were excavated in square B/A6. They had heavy stone foundations. Elsewhere in the excavation area the deposits of this phase were excavated in the baulks only. Among the artefacts found, two sherds may be mentioned here, namely a fragment of a Cypriot milk bowl from B/B8.38 (reg. nr. 2745, see Pl. CXXVII, 1), and a sherd of a jar with a painted decoration, including camels (see Pl. CXXVII, 2). Both sherds probably originate from the LB settlements, and are an indication of how, especially through pit making, artefacts can travel through the strata.

Phase VI

Several buildings existed during this phase, but they all are fragmentarily preserved. See the previous report for a plan drawing (*ADAJ,* XXIII, p. 47).

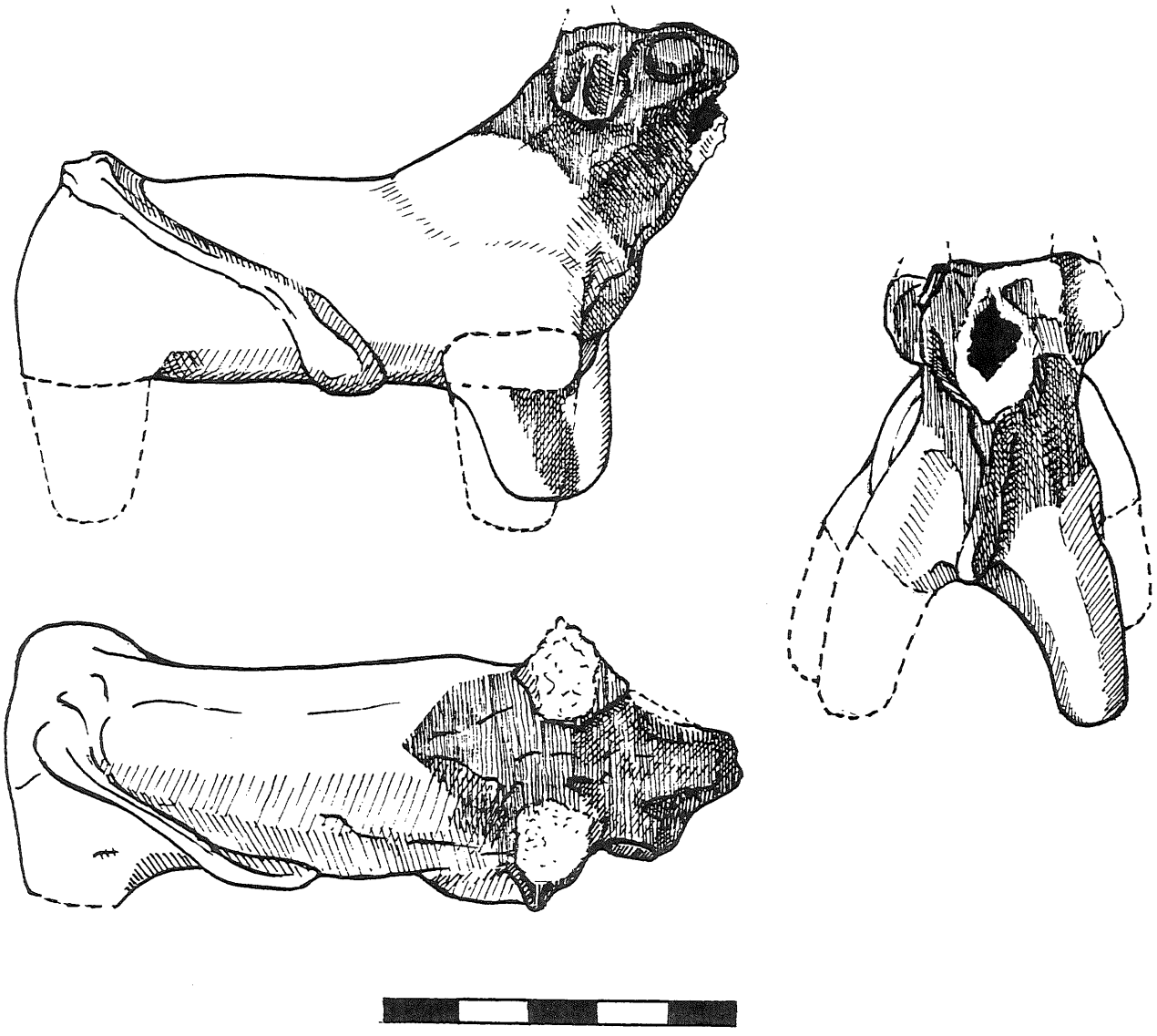
Newly discovered are parts of two N.-S. walls in B/A6. One of them (B/A6.77) was interestingly protected with stones standing up against the W. side of its mudbrick base, with clay plaster in between. A nearby hearth had blackened the sides of several of these stones (see Pl. CXXVII, 3) the cracked hearthstone is visible to the lower right; the mudbricks of the wall are partly excavated). Wall B/A6.70 is interesting because of the selective use of small rocks of its foundation.

The other digging in phase VI was done in B/A9 (courtyards), B/B9 (Clearing the stone foundations of wall 21), B/C9 (debris layers), but mainly the baulks. Concerning the artefacts found it may be interesting to add another small juglet to the collection found so far in this phase: reg. nr. 2771 in B/B5.34 (see Pl. CXXVIII, 1).

From parts of the debris of this phase's buildings (B/B7.31) came an ostracon (reg. nr. 2755, apparently almost complete). Curiously enough for its period the sherd is written on both sides (for the convex side of this small sherd, see Pl. CXXVIII, 2). The Aramaic script suggests a date in the seventh century B.C. This ostracon has a list of names and is the oldest one found at Tell Deir ʿAlla so far.

Dating phase VI is helped by two C14 dates produced by the laboratory for Applied Physics in Groningen from samples taken from deposits D/C7.20 and B/C7.15 during the 1978 season. B/C7.15 is a wash layer of unburnt grey soil with many carbonized grains of wheat, presumably originating from phase VI. The C14 age of the first sample was 2520 ± 25 BP, of the second 2540 ± 25 BP (i.e., with the new half life *ca.* 650 B.C., according to Masca correction *ca* 750 B.C.)[3]

[3] The results were given by Prof. Mook of the Laboratory in Groningen. We are grateful for his co-operation.



DA.82/2766.

Fig. 2: Pottery figurine cow phase V - drawing Mr. Hubert de Haas

Phases VII and VIII

The supposed phase VII can be taken as the upper part of phase VIII, as suggested already in the previous report. In B/A-B.5-6 it can be taken as phase VI. Phase VIII appears most clearly in the mudbrick construction discovered during the previous season in squares B/C6-8 (see *ADAJ,* XXIII, p. 48f.).

This season much of this phase was excavated in B/C7. The mudbricks are made of a solid yellow clay and they have a size of about 0.35 x 0.55 m. At places the remnants of the walls are only two courses high, elsewhere up to six or seven. The main wall, 1.10 m. wide, goes E.-W. through B/C7 and has a crosswall at both ends excavated (partly) in B/C6 and B/C8. For building the wall some of the burnt debris of phase IX (at the E. part) was removed in order to level the building surface after the destruction of phase IX. The feature is clearly visible at the N.W. corner of B/C8 (see Pl. CXXVIII, 3) and at the N.E. part of B/C7 (see Pl. CXXIX, 1). The debris and "courtyard" layers in between the three walls are not yet completely understood. The debris may be roof and/or wall tumble but it has many sherds and apparently also vegetable material. This type of debris also appeared in B/B6 as a phase VIII deposit.

As a special find a fragment of an alabaster vase may be mentioned (reg. nr. 2762, from B/C7.36, see (Pl. CXXIX,2). Interesting also is a horsehead figurine with fairly detailed indications of the harness (nr. 2783, B/B7.43, Pl. CXXIX,3, Fig. 3) Previous digging has shown remnants of VIII more to the W., e.g., pits with mudbrick lining, but no remnants of this phase were discovered nor expected now more to the S.E. of the walls mentioned. There the remnants of phase IX are, expectedly everywhere, at a higher level then more to the S.W.

Phase IX

Phase IX is identical with the heavily burnt phase M., much of which was excavated in 1967 (cf. also *ADAJ,* XXIII, p. 48f.). Further excavations and study of this phase is a major aim of the Deir ʿAlla research project. This season only a little digging was done in IX — just to see the character of its continuation to the S. (B/B6) and E. (B/C7-8) of the previously cleared parts of it. Next season excavation of a great deal of this phase is planned to be accomplished.

In B/B6 phase IX was just touched: a small part of the debris in presumably a room was excavated. Surprisingly no fire had occurred there, but the collapse apparently was as sudden there as in the fire destroyed rooms. (It may be useful to remember that an earthquake was the first cause of destruction to the buildings of this phase. Cf. p. 48.)

Two complete jars were laying together with a complete, about 0.65 m. long, antler of the Mesopotamian Fallow Deer (see Pls. CXXX,1; CXXX, 2). Interestingly the same type of antler was found, burnt, in a bordering room last season (Pl. XXI, 2). In square B/C7 the top of phase IX was uncovered in the N.E. part. The top of a N.-S. wall and of the burnt rubble inside a room became visible (see Pl. CXXIX, 1), which is part of the room excavated in B/C8. The E. wall of this room (B/C8.72) became visible up to square B/8 where part of the top of a cross wall was uncovered. A thin E.-W. wall forms the S. end of the room. The N. side is N. of square B/C8 and unexcavated. The mudbricks of the walls have the size common to the IX walls of the previous excavations (*ca.* 0.33 x 0.50 m.), many of them made of the yellow clay, others of grey soil. The walls still stand 1.00-1.50 m. high and, like elsewhere, had little width (one brick wide lying side by side, or even head to head). Mixed with the burnt roof and wall debris (see Pls. CXXXI, 1,2: CXXXII, 1); with to the right two of the complete bricks, with marks on the surface) were the contents of the room: several jars and more than thirty loomweights. The position of the loomweights suggests that they were in use in the room. Unexpectedly seven different types of weights were used together (see Pl. CXXXII, 2). It is noteworthy that one loomweight had clear remnants of thread (twisted vegetable fibres) inside the hole, others had different seeds. More interesting information may be added: an example

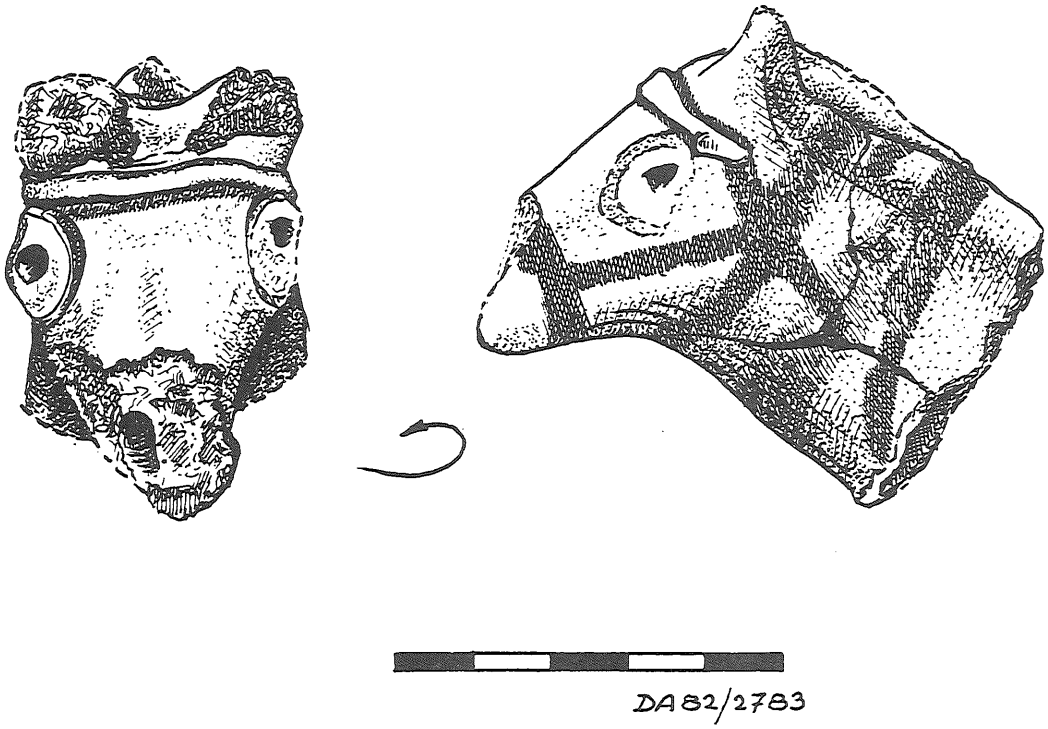


Fig. 3: Pottery figurine: horse head phase VIII - drawing Mr. Hubert de Haas

of the commonly known pointed and polished flat bone tool (see Pl. CXXXIII, 1; two more examples were found this season) was found inside one of the pots lying among the debris and loomweights. This is another indication of the often suggested function of weaving.

General Remarks

As stated above the reconstruction of the phasing is still in a preliminary stage, so is the chronology. Some C14 dating results are known, other samples still have to be analysed at the Laboratory in Groningen mentioned above. The study of the biological remains are being done at the mentioned Archaeological-Biological Institute by Prof. W. van Zeist and Dr. A. T. Clason. The Central Laboratory for Objects of Science and Arts in Amsterdam (Mssrs Mol, Mosk and Stambolov) are taking care of the analyses and conservation of the metal objects and samples. In this connection it may be mentioned that the important bronze objects discovered in 1976 (see *ADAJ,* XXII, p. 76, 78 and Pl. XLI, 2) are brought back in a new, treated, state to the Archaeological Museum in Amman. (Pl. CXXXIII, 2) shows one of them (reg. nr. 2539) which still had much solid bronze.

A final report on the top phases will include all of the specialists' studies. It will be published in the area concerned. However the area may have to be extended somewhat because of an appearing necessity to extend the excavations of phase IX beyond the area under study now.

The next season is planned for the beginning of 1984. Excavation will be concentrating on the unearthing of phase IX in parts of the 15.00 x 30.00 m. area near the top of the *tell.*

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SÜDSAFAITISCH

von

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Eine orthographische Eigentümlichkeit

1. In einer Reihe von altnordarabischen Inschriften, die von ihren Erstherausgebern entweder als safaitisch oder als (tabuki-) thamudisch klassifiziert worden sind, steht ث für etymologisches /g/ (die Angabe "belegt" usw. bezieht sich jeweils auf das Safaitische nach Harding, *Index):*

1.1 أثم für أجم (belegt): *TIJ* 257; /t̲/ ist nicht ausgeschlossen, aber weniger wahrscheinlich.

1.2. أثمع für أجمع (belegt): *TIJ* 195; 212 (أجمعو, so!); 315; 343; 354; /t̲/ ist ausgeschlossen.

1.3 أثمل für أجل (belegt): *TIJ* 287; *WAM.T* 56; /t̲/ ist nicht ausgeschlossen, aber weniger wahrscheinlich.

1.4. أميث für أميج (cf. موج *WiTh* 43): *ZDPV* 96:1 /t̲/ ist zwar ebenfalls möglich, doch spricht وثم (cf. 1.28) in der gleichen Inschrift dagegen.

1.5. ثأنت für حأنت (belegt): *TIJ* 21; /t̲/ erscheint ausgeschlossen.

1.6. ثحر für جحر (gut belegt, auch als Stammesname: *ADAJ* 20, 99:1): *WH* 3105 (Wohl so!); /t̲/ ist ausgeschlossen.

1.7. ثحل für جحل (gut belegt): *C* 1782 (so!); *TIJ* 128 (so!); *WH* 3927; 3531 + 3532 (ثحلم); *ZDPV* 96:5; /t̲/ ist ausgeschlossen.

1.8. ثحم إل für جحم إل (cf. جحم, gut belegt): *WH* 2322; /t̲/ ist ausgeschlossen.

1.9. ثدى für جدى "Böckchen": *WiTh* 11, deren Schluss zübersetzen ist: "Er fing (عار ?) ein Böckchen"; /t̲/ ergibt keinen Sinn.

1.10 ثرش für جرش (belegt): *TIJ* 141; /t̲/ ist ausgeschlossen.

1.11. ثرف für جرف (belegt, auch als Stammesname: *SIAM* 27; 29): *TIJ* 57; /t̲/ erscheint ausgeschlossen.

1.12. ثرم für جرم (sehr gut belegt): *JS* 252; 732; *Ph* 367p; *TIJ* 44; 58A; 113; 198; 219; 259; 333; 385; *WH* 44; 800; 809; /t̲/ ist nicht ganz ausgeschlossen, aber wegen der vier folgenden Namen unwahrscheinlich.

1.13. ثرم إل für جرم إل (ausserordentlich gut belegt): *TIJ* 349; /t̲/ ist ausgeschlossen.

1.14. ثرمع für جرمع (Hypokoristikon zu جرم عثتر o.ä.?): *TIJ* 75; oder in جرمو zu verbessern (cf. dann 1.12!)?

1.15. ثرمله für جرمله (جرم الله belegt): *TIJ* 483; *ADAJ* 24, 125:1a (man lese dort عمر statt "jmr"!); /t̲/ ist unwahrscheinlich.

1.16. ثرمنت für جرمنت ثور مناة 210 *TIJ*: (جرم مناة) ist unwahrscheinlich.

1.17. ثشم für جشم (gut belegt): *JS* 705; 710; *TIJ* 200; 415 und ثشمو (Stammensname) *JS* 695 + 696; /t̲/ ist ausgeschlossen.

1.18. ثمع für جمع (belegt): *TIJ* 58 (so, der Punkt ist sekundär, wie das Photo zeigt!); /t̲/ erscheint ausgeschlossen.

1.19. ثمل für جمل (sehr gut belegt): *TIJ* 33; /t̲/ ist möglich, aber angesichts der Belege weniger wahrscheinlich.

1.20. ثمهر für جمهر (belegt): *TIJ* 58 *WAM.T* 8; *TIJ* 225; /t̲/ erscheint ausgeschlossen.

1.21. ثث für ثج (sehr gut belegt): *TIJ* 221; 426; c 5335; /t̲/ ist nicht ausgeschlossen, aber angesichts der Belege wenig wahrscheinlich.

1.22. ثثث für ثجج (gut belegt): *JS* 55; *TIJ* 214; *WAM.T* 17; cf. 1.21.

1.23. ثملث für ثملج (gut belegt): *TIJ* 36; 58; /t̲/ ist ausgeschlossen.

1.24. ثرث für ثرج (gut belegt): *TIJ* 26; 90; 187; 346 (jeweils so, cf. Winnett zu *WA* 11472!); *WA* 11472; /t̲/ erscheint ausgeschlossen.

1.25. ثرثت für ثرجت (belegt): *TIJ* 32A; 69; 484 (jeweils so, cf. Winnett zu *WA* 10387!); *WA* 10387; *WAM.T.* 11; 15; /t̲/ erscheint ausges-

chlossen.

1.26. فلث für فلج (belegt): *TIJ* 323; 483; /ṯ/ erscheint ausgeschlossen.

1.27. نثح für نجح (unbelegt, doch cf. kl.-arab. نجيح): *TIJ* 360; 384; *WAM.T* 52; /ṯ/ erscheint ausgeschlossen.

1.28. وثم für وجم "trauern": *TIJ* 494; *ADAJ* 1,25:1; *WiTh* 11; *ZDPV* 96: 1-5; /ṯ/ ergibt keinen Sinn.

2. In keiner der angeführten Inschriften kommt ein ج vor. In keiner von ihnen steht ث zwingend für /ṯ/. Dabei beschränkt sich die Liste auf sichere oder doch sehr wahrscheinliche Fälle: عثر *TIJ* 223 könnte für عحر , عشى *TIJ* 96 könnte für عجى , مثر *TIJ* 17 könnte für مجر stehen, etc.

2.1. Bisher wurde bei "unerklärlichem" ث meistens ein Schreibfehler (für ا , ص oder ى) angenommen, so Winnett-Harding, *WH*:16f. Dies trifft sicher in einer Reihe von Fällen zu, so ist وسمثل *TIJ* 160 gewiss in وسم إل (gut belegt!) zu verbessern (cf. Littmann zu *TIJ* 160). Diese Annahme kann aber das häufige Vorkommen von أثمع (1.2.), ثشم (1.17) und وثم (1.28) nicht erklären.

2.2. E. Littmann (in seinen Bemerkungen zu *TIJ)* nahm an, dass im Dialekt dieser Gegend /t/ und /ṯ/ zusammengefallen seien und dass daher ث für ت verwendet werden konnte. Damit lässt sich aber nicht erklären, warum ج in diesen Inschriften überhaupt nicht und im Bereich des Tabuki-Thamudischen nur überaus selten vorkommt.

2.3. Doch führt Littmanns Beobachtung zu einer Erklärung des seltsamen Phänomens, dass in einem altnordarabischen Dialekt — der nunmehr als "Südsafaitsich" bezeichnet werden soll, damit er einen Namen hat — ث offensichtlich für /g/ steht. Aber zuerst die Belege für sein Theorie:

2.3.1. ث Steht für /t/ in عبدث *TIJ* 156; wenn die aramäische Aussprache dieses nabatäischen Namens gemeint sein soll, wäre عبذث zu erwarten. ت steht für /ṯ/ in تأر *TIJ* 280: ثأر "Rache", in تمد *TIJ* 105; 108 (cf. den Stammensnamen ثمود); in وتم *TIJ* 29; *WH* 1776 *(WH* 1896b ist kaum eine Inschrift), cf. وثم Ja 2169b *(RSO* 45, 1970, Pl. VII).

2.3.2. Auch scheint in den Inschriften dieses Gebietes /ḏ/ mit /d/ zusammengefallen zu sein. ذ steht für /d/ in زذ *TIJ* 490; in يذع *TIJ* 69; in يرذ *TIJ* 255 (يدع , زد und يرد sind gut belegt). In ذأل (nach *ADAJ* 24, 126:3 ذى آل zu vokalisieren!) liegt dann etymologische Schreibung vor.

2.3.3. Das Südsafaitische besass also kein /ṯ/ (und kein /ḏ/). Es konnte darum das ث des altnordarabischen Alphabets für /g/ verwenden / ذ war wegen des häufigen ذأل , ذكرت لت geschützt). Dass das Südsafaitische ث für /g/ verwendet hat, spricht dafür, dass in diesem Dialekt /g/ und /y/ einander phonetisch so ähnlich geworden sind, wie sich ث und ى graphisch ähnlich waren; mit anderen Worten: dass in diesem Dialekt /g/ zu [j] geworden ist (dieser Lautübergang findet sich in vielen Sprachen, auch in arabischen Dialekten). Ähnlich hat das Lihyanische das südarabische s_3 für sein /ṯ/ übernommen: für s_3 hatte es sonst keine Verwendung, und lihyanisches und minäisches /ṯ/ unterschieden sich offenbar in der Aussprache.

2.4. Auch die Inschriften der Gegend, die ein eigenes Zeichen für ج aufweisen, haben es durch einen Punkt in der Mitte gegenüber dem Proto-Safaitischen (s.u. 2.4.) verändert: das ererbte Zeichen für /g/ war verwechselbar!

Die safaitischen Schriften

1. "Safaitisch" ist eine Bezeichnung für eine Schrift, für eine Sprache und für eine Kultur. Diese drei Ebenen sind streng

zu trennen und müssen an sich nichts miteinander zu tun haben (Voigt, 1981: 179). Nicht jeder, der die safaitische Schrift benutzte, sprach darum auch safaitisch: *LP* 87 stammt von einem Angehörigen des Stammes حولت , der in der Gegend von Dûma oder Hâil gesucht werden muss; in seiner Sprache lautete der Artikel vor Laryngalen , anders als im Safaitischen. *LP* 82 hat ein Einwohner von Taymâ verfasst, der sicher kein Beduine war.

2. "Südsafaitisch" im engeren Sinn (s.o.1.2.3.) ist eine Sprache, die in zwei verschiedenen Schriften, der "tabuki-thamudischen" und der (nord) safaitischen, vorliegt. Wie verhalten sich diese beiden Schriften zueinander? Sie miteinander zu identifizieren (So Clark, 1980: 128), wäre angesichts der durchaus bestehenden Unterschiede eine zu grobe Vereinfachung (Macdonald, 1980; 188). Doch ist allgemein anerkannt, dass sich Safaitisch und Tabuki-Thamudisch näher stehen als Tabuki-Thamudisch und Tema-oder Neǧd-Thamudisch.

3. Man kann jedoch nicht sagen, die safaitische Schrift sei "merely a northerly extension" der tabuki-thamudischen (so Winnett zu *WiTh* 18), denn einige tabukithamudische Buchstabenformen sind jünger als die entsprechenden safaitischen (cf. 2.4 und Schon Winnett, 1937: 48; 53), wie in anderen Fällen die safaitischen Zeichenformen die jüngeren sind (cf. 2.5.). Die beiden Schriften sind voneinander ünabhängige Abkömmlinge eines gemeinsamen Vorläufers, des Protosafaitischen. Von daher erscheint die Bezeichnung "südsafaitische Schrift" für die tabuki-thamudische nicht unangemessen. Die safaitischen Schriften untersheiden sich durch ihr ذ - eine Innovation des Proto-Safaitischen - von allen anderen altnordarabischen Schriften.

Man darf beim Vergleich der Buchstabenformen keine zu engen Massstäbe anlegen, sondern muss von den belegten Zeichen abstrahieren zur gemeinten Form, die je nach Beschreibstoff (Sandstein, Kalkstein, Basalt) und Schreibgerät (Stein, Metall) unterschiedlich ausfallen kann. Unter diesen Umständen kann man sagen: die Formen des ب , ت , ث , خ , ص, ض , ع , ف , ق , ه , و , ى, sind im Norden und Süden gleich. Bei ا , ح , س, ك und ل treten im Norden wie im Süden ältere und jüngere Formen zugleich auf, die ältere Form des ا im Norden nur in der quadratischen Variante. Im Süden sind die älteren Formen des ك und des ل häufiger als im Norden (Fig. 1: 1).

4. Bei ج, der Variante des د mit den umgebogenen Enden, ذ , ش und ن ist die südliche Form die jüngere (Fig. 1: 2). Das punktförmige ن tritt im Norden als Variante auf, ist aber im Süden die Regel.

5. Bei ر , ز , ط , غ und م findet sich im Norden die jüngere Form (Fig. 2).

6. Ob man die Schrift des Südens nun "südsafaitisch" oder "tabuki-thamudisch" nennt, mag als Streit um Worte erscheinen. Ich ziehe es aber vor, eine Inschrift "südsafaitisch' '(im weiteren Sinn) zu nennen, wenn sie in südsafaitscher /tabuki-thamudischer Schrift vorliegt und ihre Sprache und ihr Formular (Voigt, 1980) nicht gegen ihre Zugehörigkeit zum Safaitischen sprechen, weil diese Bezeichnung zugleich eine sprachliche und kulturelle Einordnung dieser Inschriftengruppe vornimmt. Die Bezeichnung "tabukithamudisch" möchte ich den Inschriften in südsafaitischer/tabuki-thamudischer Schrift vorbehalten, deren Formular unsafaitisch ist (wie etwa *SIAM* 44) - besagt doch die Bezeichnung "thamudisch" nicht mehr, als dass eine Inschrift altnordarabisch ist, ohne safaitsch, lihyanisch oder hasaitisch zu sein.

Die Verbreitung des Safaitischen

1. Die datierten safaitischen Inschriften gehören dem 1. - 3. Jh. n. Chr. an, die ältesten dem Jahr 98 n. Chr. (Sumer, 20: 3; 6). Doch weist die Länge einiger safaitischer Genealogien weit über diesen Zeitraum hinaus (Jamme, 1971: 54 Anm. 11); nach J. T. Milik (1980: 45) sind die ersten Safaiten Anfang des 5. Jh. v. Chr. in Südsyrien eingewandert, also etwa zur gleichen Zeit, als sich die Nabatäer in Südjordanien etablierten. Aus dieser Zeit stammt auch ihre Religion, denn die bei weitem bedeutendsten unter ihren vielen Göttern sind Allât und Ruḍâ (Winnett-

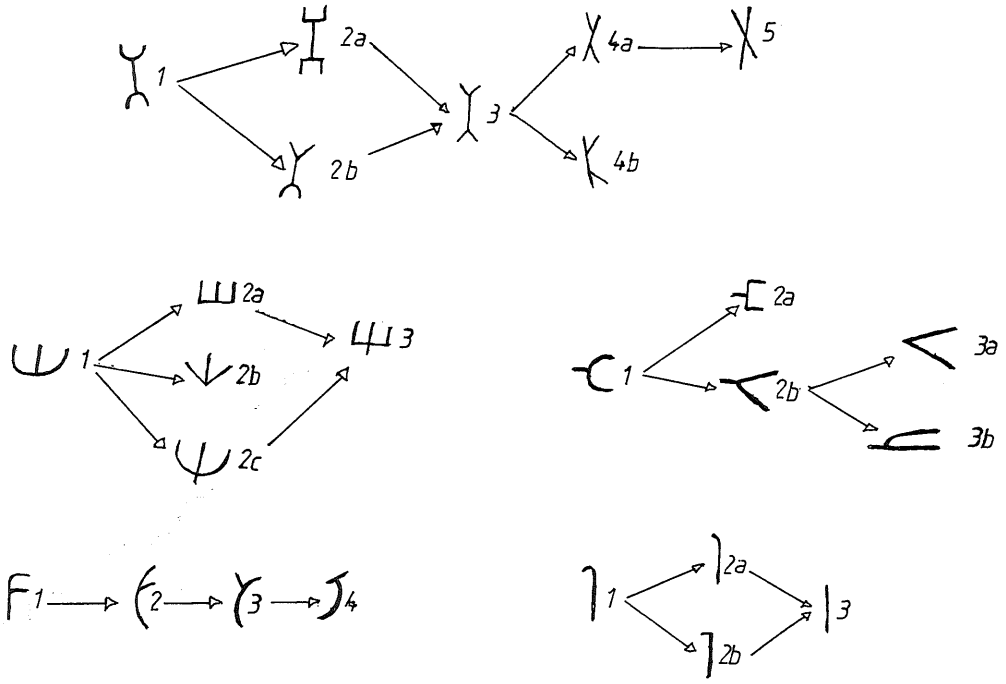

Fig. 1: 1 (cf. 2.3)

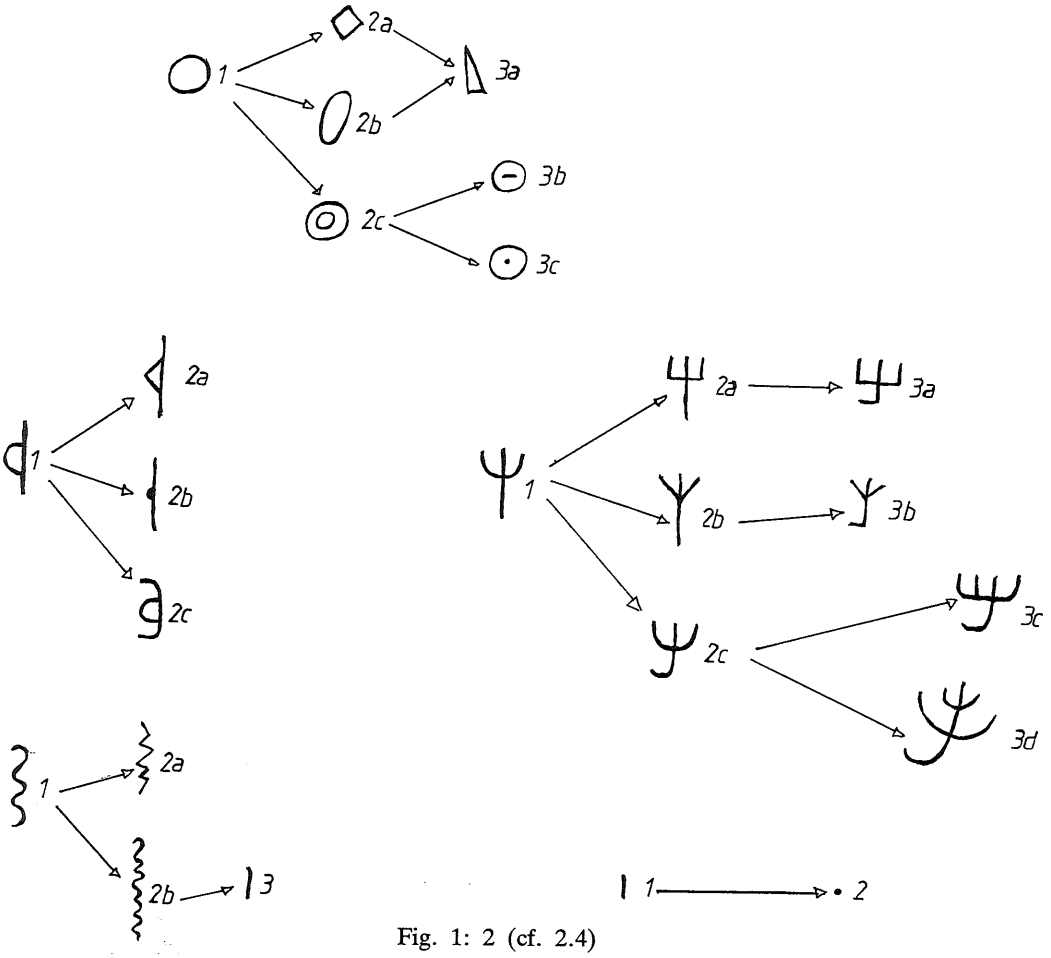

Fig. 1: 2 (cf. 2.4)

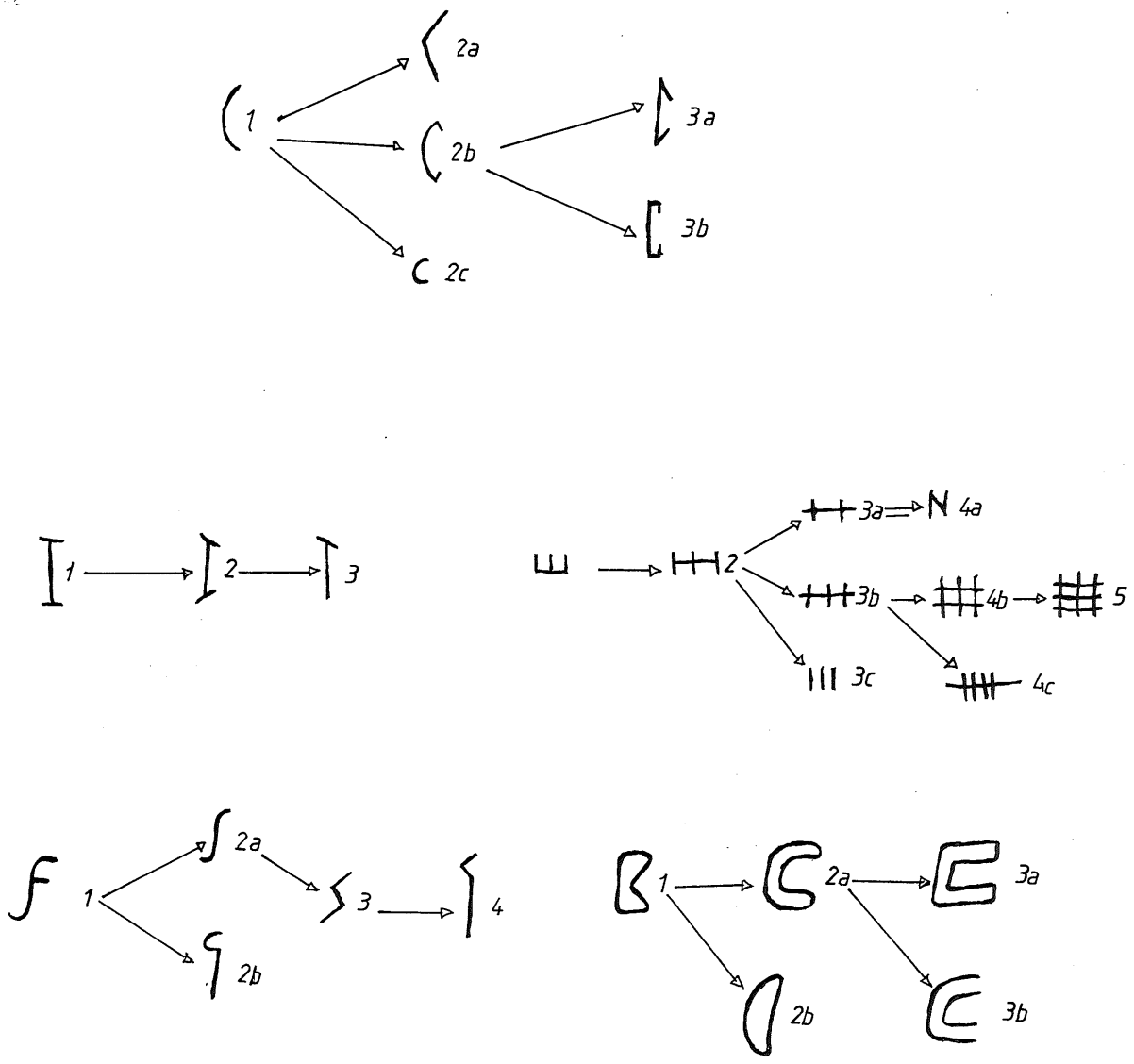

Fig. 2. (cf. 2.5)

Harding. *WH*:30f und Herodot III.8!). Aber wann begannen sie zu Schreiben?

1.1. Einige Inschriften führen mit einiger Sicherheit ins 1. Jh. v. Chr., e.g., Sumer 18: 168 (cf. Winnett-Harding, *WH:* 8). Weiter zurück führt *C* 4677, datiert ins "Jahr, als die Ituräer (أل يظر) wanderten"; in persischer Zeit im nördlichen Ostjordanland anzutreffen (cf. 1. Chr. 5: 19), müssen sie im 3., spätestens im 2. Jh. v. Chr. in den Libanon abgewandert sein.

1.2. Nach A. Jamme (1971: 54) begann die safaitische Schrift Ende des 4., Anfang des 3. Jh. v. Chr. Aber vielleicht stammen *WH* 3792a; c schon aus der Mitte des 5. Jh. v. Chr., wenn nämlich der جشم , der dort Krieg mit den Thamûd führt, mit dem aus dem Alten Testament, aramäischen und lihyanischen Inschriften bekannten Gegner Nehemias identisch ist. Sonst beziehen sich die beiden Inschriften auf den südsafaitischen Stamm ثشمو (cf. 1.1.17).

2. So oder so geht aus diesen beiden Inschriften hervor, dass die Kontakte der Safaiten der südsyrischen Ḥarra mit dem nördlichen Ḥiǧâz so intensiv waren, dass ein Ereignis dort einem Jahr hier den Namen geben konnte. Zu den Safaiten gehörten Kleinviehhirten, die mit ihren Schafen und Ziegen wohl nur zwischen der Ḥarra, der Ruḥbe und dem Ḥaurân wanderten, in der Ruḥbe gelegentlich Getreide aussäten (*C* 4985) und keine Zelte besassen, sondern sich verschiedene Arten von Unterständen bauten (cf. Winnett-Harding, *WH:* 27). Unter ihnen befanden sich aber auch Kamelnomaden, die mit der Stosslanze bewaffnet auf die Jagd oder in den Kampf zogen - zumindest stellten sie sich gerne so dar - und die über hunderte von Kilometern streiften.

2.1. Im Norden fanden sich safaitische Inschriften zwischen Hamâ und Maʿarrat en-Nuʿmân (Lassus, 108: Fig. 115; ibid. 216: Fig. 210 ist keine Inschrift!), in der Gegend von Palmyra (e.g., *AAAS* 25, 144: 3) und in Dura Europos (*C* 5175-5180). Inschriften der Ḥarra sprechen davon, dass sich ihr Verfasser auf dem Weg nach Palmyra (تدمر) befand (e.g., *C* 1665).

2.2. Im Osten reichte das safaitische Streifgebiet bis zum Wadi ʿArʿar (cf. Jamme, 1971: 43); *JaS* 142 und *C* 310, gefunden im Abstand von 450 km., stammen vom gleichen Verfasser (ibid: 56). Angehörigen des Stammes Taim begegnen wir im Wadi ʿArʿar (e.g., *JaS* 56b), in der Ḥarra (e.g., *C* 2555) und bei Khân ez-Zebîb südl. von ʿAmman (e.g., *TIJ* 522). Damit stimmt überein, dass verschiedene Verfasser von Ḥarra-Inschriften sich auf der Wanderung nach Osten befanden (cf. Winnett-Harding, *WH:* 28).

2.3. Im Süden umfasste das safaitische Streifgebiet das ganze Wadi Sirhân. Den Stamm قمر finden wir im Bereich des Ǧebel ed-Drûz (cf. Harding 1969 sv) und bei Ithrâ in der nabatäischen Inschrift *ARNA* 130 als قميرو , den Stamm بدن in der Ḥarra und bei Sakâka (cf. Harding, 1969 sv). Von der wanderung nach süden spricht e.g., *C* 325. Der Stamm أصر hat Inschriften hinterlassen in der Ḥarra (*C* 1664), im Wâdi ʿArʿar (e.g., *JaS* 54a) und am Ǧ. Abû Mughêr: Doughty XXV: fol. 47, 4 (die Inschrift ist am Anfang unvollständig)! Der Stamm زد ist ebenso in der Ḥarra (cf. Harding, 1969 sv) wie im Ǧebel Mismâ anzutreffen (*Hu* 268, 66: زيدو mit nabatäischer Orthographie; ز hat die nordsafaitische Form, ذ die Übergangsform zwischen dem Nord- und Südsafaitischen, cf. Fig. 1:2!).

2.4. Die Safaiten waren in Kriegerische Auseinandersetzungen mit dem Stamm حولت im nördlichen Ḥiǧâz verwickelt (cf. Winnett-Harding, *WH:* 28) und unternahmen Streifzüge bis nach Ḥâil, mit dem safaitisch رهى zu identifizieren ist (cf. Caskel, 1958: 98). Vom Gebel Yâṯib bei Ḥâil stammen die beiden safaitischen Inschriften Berytus 22: 21

(nordsafaitisch, cf. die Formen des ز und des ش) und 22 (südsafaitisch).

3. Auch unter dem kulturellen und territorialgeschichtlichen Gesichtspunkt spricht also nichts dagegen, sondern alles dafür, Südsafaitisch und Nordsafaitisch (bzw. Safaitisch im engeren Sinn) als Safaitisch (im weiteren Sinn) Zusammenzufassen.

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Abkürzungen

AAAS 25	A. Abū ʿAssāf, Kitābāt ṣafawīya ǧadīda fī maṯḥafay dimašq wa-tudmur, AAAS, 25 (1975), 141-145.
ADAJ 1	G. L. Harding, New Safaitic Texts, ADAJ, 1 (1951), 25-29.
ADAJ 20	G. L. Harding, Further Safaitic Texts From Lebanon, ADAJ, 20 (1975), 99-102.
ADAJ 24	s. Clark 1980.
ARNA	J.T. Milik- J. Satrcky, Inscriptions nabatéennes, in: F. V. Winnett- W. L. Reed, Ancient Records from North Arabia, (NMES 6; Toronto 1970), 141-160.
Berytus 22	F. V. Winnett - W. L. Reed, An Archaeological - Epigraphical Survey of the Ḥā'il Area of Northern Saʿudi Arabia, Berytus, 22 (1973), 53-100.
C	Corpus Inscriptionum Semiticarum V, 1: Inscriptiones Safaiticae.
Caskel 1958	W. Caskel, Die alten Semitischen Gottheiten in Arabien, in: S. Moscati ed., Le antiche divinità semitiche, (Studi Semitici 1; Rom. 1958), 95-117.
Clark 1986	V. A. Clark, Three Safaitic Stones from Jordan, ADAJ, 24 (1980), 124-128.
Doughty Ch.	Doughty, Documents épigraphiques recueillis dans le Nord de l'Arabie (Paris 1884).
Harding 1969	G. L. Harding, The Safaitic Tribes, Al-Abhath, 22 (1969), 3-25.
Harding, Index	G. L. Harding, An Index and Concordance of Pre-Islamic Arabian Names and Inscriptions, (NMES 8; Toronto 1971).
Jamme 1971	A. Jamme, Safaitic Inscriptions from the Country of ʿArʿar and Ra's al-ʿAnānīyah, in: F. Altheim - R. Stiehl, Christentum am Roten Meer, I (Berlin- New York 1971), 41-109.
JaS	s. Jamme 1971
JS	Altnordarabische Inschriften nach A.M. Jaussen- R. Savignac, Mission archéologique en Arabie, I (Paris 1909), Pl. XXXI - XXXIV; II (1914), Pl. CXL - CLII.
Hu	Altnordarabische Inschriften nach Ch. Huber, Journal d'un voyage en Arabie (Paris 1891).
Lassus	J. Lassus, Inventaire archéologique de la région au Nord-Est de Hama, I (Damaskus O.J. [1935])
LP	E. Littmann, Safaitic Inscriptions (Princeton Syria IVC; Leiden 1943).
Macdonald 1980	M.C. A. Macdonald, Safaitic Inscriptions in the Amman Museum and Other Collections, II, ADAJ, 24 (1980), 185-208.
Milik 1980	J. T. Milik, La tribue des Bani ʿAmrat en Jordanie de l'époque grecque et romaine, ADAJ, 24 (1980), 41-54.
Ph	Altnordarabische Inschriften nach A. van den Branden, Les textes thamoudéens de Philby II (BMus 41; Louvain 1956), Pl. I - XXIII.
RSO 45	A. Jamme, Liḥyanite, Sabaean and Thamudic Inscriptions from Western Saudi Arabia, RSO, 45 (1970), 91-113.
SIAM	I: M. C. A. Macdonald, ADAJ, 23 (1979), 101-119; II: MacDonald 1980.
Sumer 18	A. Nāǧī, Kitāba Safawīya min ṣaḥrā' ar-ruṭba, Sumer, 18 (1962), 165-170.
Sumer 20	F. Safar, Inscriptions from Wadi Hauran, Sumer 20 (1964), 9-27.
TIJ	G. L. Harding (E. Littmann), Some Thamudic Inscriptions from the Hashemite Kingdom of the Jordan, (Leiden, 1952).
Voigt 1980	R. M. Voigt, On the Structure of the Safaitic Inscriptions, ADAJ, 24 (1980), 79-93.
Voigt 1981	R. M. Voigt, Einige altnordarabische Inschriften, ZDPV, 97 (1981), 178-187.
WA	F. V. Winnett, Thamudic Inscriptions from the Negev, ʿAtiqot,

ES 2 (1959), 146-149.

WAM.T Thamudische Inschriften bei F. V. Winnett, An Arabian Miscellany, AION, 31 (1971), 443-454.

WH Safaitische Inschriften bei Winnett-Harding, WH (s. dort).

Winnett 1937 F. V. Winnett, A Study of the Lihyanite and Thamudic Inscriptions, (Toronto, 1937).

Winnett-Harding F. V. Winnett - G. L. Harding, Inscriptions from Fifty Safaitic Cairns, (NMES 9; Toronto 1978).

WiTh Thamudische Inschriften bei F. V. Winnett - W. L. Reed, Ancient Records (s. ARNA).

ZDPV 96 Vf., Eine Gruppe safaitscher Inschriften aus der Ḥesmā ZDPV, 96 (1980), 169-173.

Register

a) Südsafaitische Texte im engeren Sinn

ADAJ 1,25: 1 1.1.28
ADAJ 24, 125: 1a 1.1.15
C 1782 1.1.7
5335 1.1.21
JS 55 1.1.22
252 1.1.12
695 + 1.1.17; 3.1.2
705 1.1.17
710 1.1.17
732 1.1.12
Ph 367 p 1.1.12
TIJ 21 1.1.5
26 1.1.24
32A 1.1.25
33 1.1.19
36 1.1.23
44 1.1.12
57 1.1.11
58 1.1.18; 1.1.20; 1.1.23
58A 1.1.12
69 1.1.25; 1.2.3.2.
75 1.1.14
90 1.1.24
113 1.1.12
128 1.1.7
141 1.1.10
187 1.1.24
195 1.1.2
198 1.1.12
200 1.1.17
210 1.1.16
212 1.1.2
214 1.1.22
TIJ 259 1.1.12
287 1.1.3
315 1.1.2
323 1.1.26
333 1.1.12
343 1.1.2
346 1.1.24
349 1.1.13
354 1.1.2
360 1.1.27
384 1.1.27
385 1.1.12
415 1.1.17
426 1.1.21
483 1.1.15; 1.1.26
484 1.1.25
494 1.1.28
WA 10387 1.1.25
11472 1.1.24
WAM.T 11 1.1.25
15 1.1.25
17 1.1.22
52 1.1.27
56 1.1.3
WH 44 1.1.12
800 1.1.12
809 1.1.12
2322 1.1.8
3105 1.1.6
3531 + 1.1.7
3927 1.1.7
ZDPV 96: 1 1.1.4
5 1.1.7
1-5 1.1.28

219	1.1.12
221	1.1.21
225	1.1.20
257	1.1.1

b) Weitere (in Auswahl)

ADAJ 24, 126: 3	1.2.3.2
Berytus 22:21	3.2.4
22	3.2.4
C 4677	3.1.1.
Doughty XXV: 47, 4	3.2.3
Hu 268,66	3.2.3
Lassus Fig. 210	3.2.1
LP 82	2.1
87	2.1
SIAM 44	2.6
Sumer 18	3.1.1
Sumer 20: 3; 6	3.1
TIJ 17	1.2
29	1.2.3.1
96	1.2
105	1.2.3.1
108	1.2.3.1
156	1.2.3.1
160	1.2.1
223	1.2
255	1.2.3.2
280	1.2.3.1
490	1.2.3.2
WH 1776	1.2.3.1
1896b	1.2.3.1
3792a;c	3.1.2

THE NATURAL ENVIRONMENT OF CENTRAL MOAB

by
Gerald L. Mattingly

Introduction

In conjunction with the publication of the preliminary reports of Emory University's "Archaeological Survey of Central Moab,"[1] the writer feels that it would be very useful to describe this same region's natural setting. In spite of evidence to the contrary, widespread misunderstanding exists with regard to the environment of Transjordan's plateau, many people still thinking of this area as desolate and climatically inhospitable. Hopefully, this essay can contribute toward a better understanding of the actual, present-day conditions that surround Moab's ancient settlements. Once this preparatory task has been accomplished, it is the responsibility of the archaeologists to discover the ecological contexts of individual sites within specific periods of time.

Such an emphasis on environmental setting is necessary for a more thorough understanding of a given region's economic and social developments. Indeed, interest in the environmental contexts of ancient cultures is one of the most pervasive features of contemporary archaeological research.[2] Clarke suggests that the current archaeological scene may be described by reference to its morphological, anthropological, ecological, and geographical paradigms. Of these four models, the ecological approach has become closely associated with the present emphasis on the use of systems thinking in the formulation of archaeological theory.[3] Of course, a discussion of the systems approach is beyond the scope of this article. An acknowledgement of the significance of environmental data in today's archaeology does point to the value of the following description of Central Moab's geographical setting, geology and topography, soils, climate, water resources, and flora.

Geographical Setting

When examining the geographical situation of even a small section of the Levant, such as Central Moab, it is necessary to identify the geopolitical relationships that prevailed in ancient times. If, however, the region under investigation is virtually unmentioned in ancient literature, as is the case with Central Moab, and if one desires to give more attention to the internal economic and social developments of this area, it becomes even more crucial to focus attention upon the various aspects of the natural environment. Since geography determines environmental conditions, as well as influencing cultural relationships, the geographical situation of the central Moabite plateau is understood as the fundamental dimension of its ecological setting.

The Position of Central Moab in the Levant

For the purpose of geographical study, the Levant is customarily divided into four north-south zones: (1) the coastal plain, (2) the western highlands, (3) the Jordan rift, and (4) the eastern plateau. The latter zone is often called "Transjordan." These four north-south Levantine

[1] J. Maxwell Miller, Archaeological Survey of Central Moab: 1978, *BASOR*, 234 (1979), p. 43-52; *idem.*, Archaeological Survey South of Wadi Mujib: Sites Revisited, *ADAJ*, 23 (1979), p. 79-92; *idem.*, Renewed Interest in Ancient Moab, *Perspectives in Religious Studies*, 8 (1981), p. 219-229; James R. Kautz, Tracking the Ancient Moabites, *BA*, 44 (1981), p. 27-35.

[2] Gordon R. Willey and Jeremy A. Sabloff, *A History of American Archaeology*, London, p. 151-156, 189-191.

[3] David L. Clarke, Models and Paradigms in Contemporary Archaeology, p. 1-60 in David L. Clarke (ed.), *Models in Archaeology*, London, 1972; *idem.*, *Analytical Archaeology*, London, 1968.

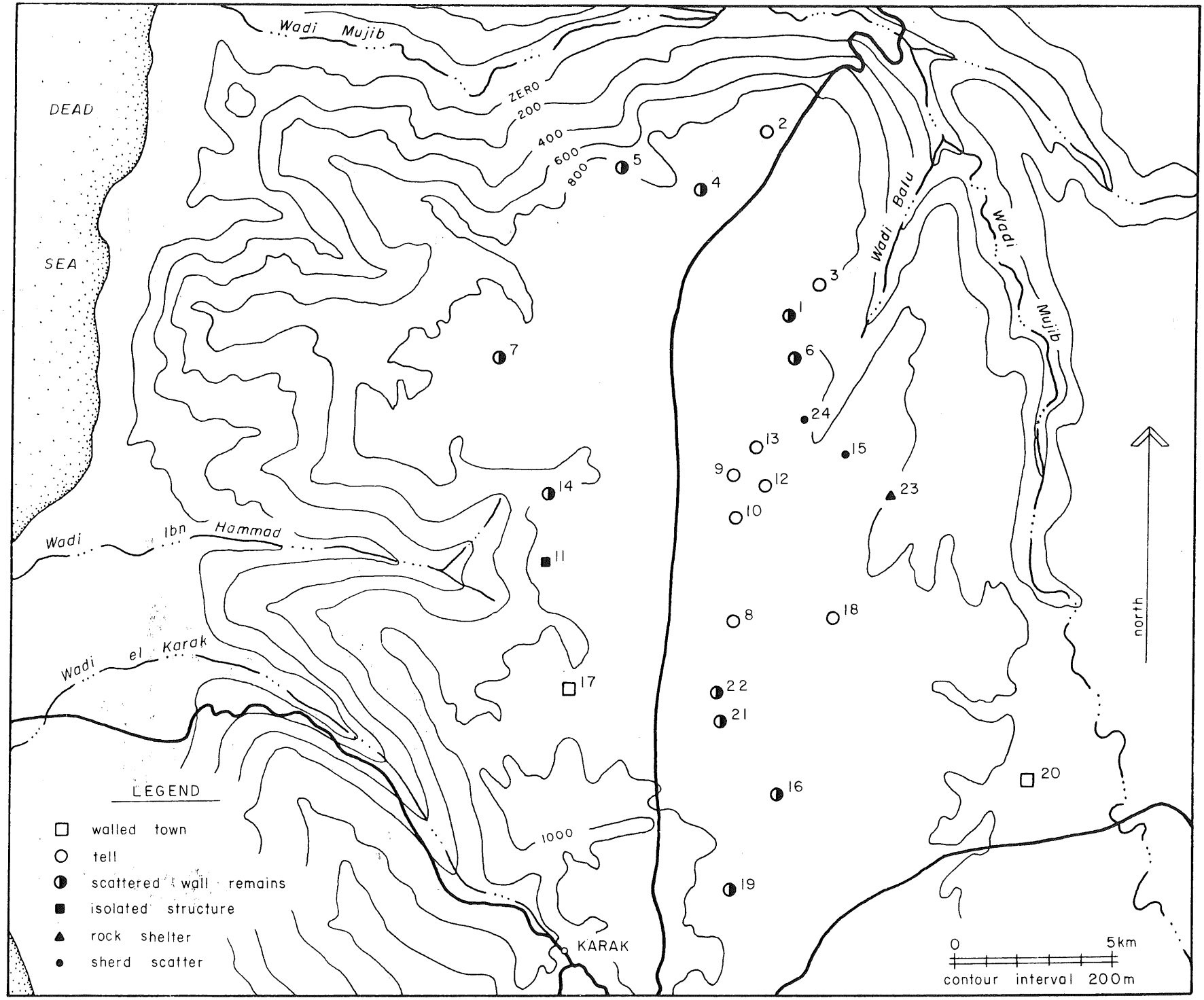

Fig. 1: EBA Sites in Central Moab

zones are interrupted by four west-east depressions or "zones of structural weakness": (1) the Aleppo-Euphrates depression, (2) the Homs-Palmyra corridor, (3) the Galilee-Bashan depression, and (4) the Beersheba-Zered depression.[4] The Moabite plateau is situated immediately to the north of the latter depression.

Between these four west-east depressions are found four "realms," geographical subdivisions that have produced a variety of lifestyles. Each of these realms is found on both sides of the Jordan; this "dual quality" results in eight different regions. The four major realms are: (1) the Northern realm, (2) the Syro-Phoenician realm, (3) the Palestinian realm, and (4) the realm of the Southland. The third region, the Palestinian, is subdivided into the Cisjordan hills and valleys and the tableland of Transjordan.[5] The latter of these two realms encompasses the plateau of Moab. Thus, the territory of Central Moab is located on the eastern plateau of the Levant, north of the Beersheba-Zered depression, on the Transjordanian tableland of the Palestinian realm.

The Boundaries of Central Moab

The region of Moab itself has been subdivided in at least two ways. Aharoni recognizes only two divisions: "Like the two halves of Gilead divided by the Jabbok, there are also two parts of Moab, divided by the deep river bed of the Arnon, which becomes near the Dead Sea one of the largest and most impressive ravines of Palestine."[6] While agreeing with Aharoni on the role of the Arnon, or Wadi el-Mujib, as an effective boundary, Miller and Pinkerton, directors of the Archaeological Survey of Central Moab, recognize the existence of three regions within ancient Moab: (1) Northern Moab is the territory north of Wadi el-Mujib; (2) Central Moab is the area on the plateau between Wadi el-Mujib and the Kerak-Qatrana road; and (3) Southern Moab is the section of the plateau that is located between the Kerak-Qatrana road and Wadi el-Hasa. These last two divisions, the central and southern zones of the Moabite plateau are not identified in an arbitrary manner, i.e., such divisions have not been made for the convenience of dividing the plateau into manageable units for different seasons of the survey. While the road that connects Kerak and Qatrana does not represent an obvious natural boundary, Wadi el-Kerak cuts deeply into the western half of the plateau near this line. Moreover, Southern Moab, the territory south of the highway, exhibits a sharp rise in elevation until it reaches Wadi el-Hesa, a phenomenon which demarcates the central portion of the plateau from its southern counterpart.[7] A more precise delineation of the boundaries of Central Moab, as defined by Miller and Pinkerton, will further clarify the environmental conditions of this section of the Transjordanian tableland.

Central Moab's northern boundary is Wadi el-Mujib, the most important river flowing into the Dead Sea from the east.[8] The significance of this perennial stream was recognized by Musil, who describes Moab as "das zum Wassergebiet des Arnon-el-Mogib gehorige Hochland am Ostufer des Toten Meeres."[9] While Van Zyl questions this statement in terms of the Mujib's role in the whole region of Moab,[10] it is certainly true that a large part of Central Moab is drained *and* watered by this wadi and its many tributaries.

Although his estimates of the Mujib's width and depth were low, Smith was quite correct in his description of Wadi el-Mujib as an enormous trench that cuts across the

[4] Denis Baly, *The Geography of the Bible,* New and Revised Edition, New York, 1974, p. 8-9.

[5] *Ibid.,* p. 9-14.

[6] Yohanan Aharoni, *The Land of the Bible: A Historical Geography,* Translated by A. F. Rainey, Philadelphia, 1967, p. 36. Becaue of its important role in the history of Israel, Aharoni gives more attention to the *Mishor,* the plain of Moab that is located on the northern side of the Mujib. Aharoni properly observed that little is known about the cities and villages of the southern part of Moab, but he referred to this region as the "nucleus of Moab."

[7] Baly, *Geography,* p. 32, 230; Friedrich Bender, *Geology of Jordan,* Berlin, 1974, p. 9.

[8] A. H. Van Zyl, *The Moabites,* Leiden, 1960, p. 56.

[9] Alois Musil, *Arabia Petraea,* Vol. 1, Vienna, 1907, p. 1.

[10]. Van Zyl, Moabites, p. 46.

Moabite plateau.[11] The Mujib originates in the vicinity of Lejjun; from that point the stream flows north-northwest for *ca.* 24 kms., and then it courses an equal distance to the west, finally discharging its water into the Dead Sea.[12] Wadi el-Mujib's headwaters are passable, but its west-east ravine presents a formidable barrier; the rims of the canyon are up to 4.8 kms. apart, while the wadi has cut a bed up to 750 m. deep.[13] Thus, Wadi el-Mujib was an effective border during much of Transjordan's history, but the canyon did not lead to the development of wholly distinct cultures on its two sides.

The Moabite plateau extends for *ca.* 30-50 kms. to the east of the Dead Sea,[14] but the Central Moab Survey recognized the north-south canyon of the Mujib and its headwaters as the eastern boundary of reconnaissance. Historically, Moab did not exceed this eastern end of the fertile plateau,[15] although the edge of the eastern desert does not actually begin for some distance beyond the eastern limit of the current survey. The land beyond the Mujib soon becomes too dry for sedentary occupation, but the merging of the desert with the diminished plateau occurs in a gradual zone of transition.[16] Members of the Central *Limes Arabicus* Project are currently surveying the plateau beyond the north-south branch of the Mujib, and the publication of this survey will produce a clearer picture of settlement in this area.

As was mentioned above, the southern boundary of Central Moab, the Kerak-Qatrana road, is not as obvious as other boundaries in this region. Nevertheless, the highway does separate two somewhat different geographical zones. The Miller-Pinkerton team worked in Central Moab during the summers of 1978 and 1979, and the survey will continue to the south of the Kerak-Qatrana road during the 1982 season. Following this third and final season of fieldwork, the heart of the Moabite plateau, stretching from Wadi el-Mujib to Wadi el-Hesa, will have been covered. The latter wadi, while not as spectacular in appearance as the Mujib, also served as an imposing geopolitical boundary in antiquity, the dividing line between Moab and Edom.

The Jordan rift forms the western limit of the central Moabite plateau; the escarpment has produced cultural, historical, and environmental consequences for the ancient and modern inhabitants of this region. The plateau stands over 1,300 m. above the Dead Sea, and Wadi el-Mujib and Wadi el-Kerak have cut deep chasms out of the high, western face of the escarpment. Although this western boundary is sharply delineated, even these steep cliffs have not precluded the possibility of contact with peoples to the west of the plateau.

Geology and Topography

The plateau of Moab rises abruptly from the coast of the Dead Sea. This highland is the southern continuation of the Anti-Lebanon range, and the plateau represents a genuine mountain tableland.[17] The western escarpment of Transjordan rises between 610 m. and 1,067 m. above sea level, or 1,067 m. to 1,524 m. above the floor of the Jordan Valley.[18]

An interesting geomorphology is displayed by the highlands on the eastern rim of the Wadi Arabah-Jordan Graben. While the plateau slopes gently downward towards Jordan's eastern desert, the western ascents to the top of the plateau are quite steep. For example, in the area to the south of Kerak, the elevation of the plateau descends from 1,305 m. above sea level (Jebel Dabab) to 392 m. below sea

[11] George Adam Smith, *The Historical Geography of the Holy Land,* 25th ed., London, 1966, p. 377.

[12] E. D. Grohman, "Arnon," *IDB,* Vol. 1, New York, 1962, p. 230.

[13]. 1[3] Baly, *Geography,* p. 231; F.-M. Abel, *Geographie de la Palestine,* Vol. 1, Paris, 1933, p. 156, 177, 487-489.

[14] Efraim Orni and Elisha Efrat, *Geography of Israel, .3rd revised edition, Jerusalem, 1971, p. 110.*

[15] *Van Zyl, Moabites,* p. 48.

[16] Aharoni, *Land of the Bible,* p. 33; E. D. Grohman, Moab, *IDB,* Vol. 3, New York, 1962, p. 410-411; Orni and Efrat, *Geography, of Israel, p. 106, 110; Smith Historical Geography,* p. 338.

[17] Van Zyl, *Moabites,* p. 51; Aharoni, *Land of the Bible,* p. 33.

[18] Paul G. Philips, *The Hashemite Kingdom of Jordan: Prolegomena to a Technical Assistance Program;* Chicago, 1954, p. 36.

level (the level of the Dead Sea). This frightening descent occurs within a distance of only 13 kms.[19]

The Moabite plateau gradually rises in elevation as it stretches southward from Wadi el-Mujib. Even the uplifted, western rim of the plateau reaches its highest point in the southern part of Jordan, west of Ma'an.[20] Otherwise, the surface of the tableland in Central Moab presents a gently rolling, unbroken skyline; only Jebel Shihan, an extinct volcano, stands out from the level plain.[21]

Transjordan was uplifted after the Mesozoic; this movement came at the same time that the Jordan rift was formed. This geological uplift was strongest on the western rim of the plateau.[22] The entire "Transjordanian block" is tilted upward from the limestone plateau in the east towards the west, and the block culminates along the intensively disturbed "arched rim of the Graben."[23]

The tableland of Moab is built of layers of Cenomanian and Senonian limestone, with hard Nubian sandstone below. Such non-porous layers of hard sandstone explain the presence of the numerous perennial rivers in Transjordan. These ancient rocks, particularly the Nubian sandstones, are broadly exposed on the western escarpment of Moab and on the sides of the deep gorges. The extinct crater of Shihan and the warm springs in the Dead Sea Valley bear testimony to ancient volcanic activity in this region.[24]

Soils

The soils of the Middle East have suffered severely at the hand of man since pre-Neolithic times.[25] Nevertheless, the exploitation and erosion have left the soils of Moab in relatively fertile condition. Since Transjordan borders the desert, it is natural to find loess soil in Moab, but there have been additional soil-producing agents at work in this region.[26]

During the geological history of the Levant, Cisjordan was frequently covered by the waters of Tethys, the great ancestor of the Mediterranean Sea. Thus, the rocks of Palestine were formed by marine deposition; this produced the limestone and chalk covering of Palestine. Transjordan was less frequently submerged in this primeval sea, and the marine deposits to the east of the Jordan rift are much thinner. The desert sandstones, which were formed on dry land, are more common in Transjordan, especially in the highlands of the south.[27]

Although the Transjordanian limestones rest upon thick deposits of Nubian sandstone, the geological processes have still produced a type of Mediterranean soil in Moab. The rich, deep red soils, the typical Mediterranean *terra rossa,* are produced by the weathering of hard limestones.[28] The soils of the Transjordanian plateau have been given the hybrid designation "sub-Mediterranean-chestnut-brown terra rosa."[29] Transjordan's Senonian chalk is usually soft, less fertile, and useless for building, but some of these Senonian deposits have formed into harder chert.[30]

Since the Mediterranean soil is porous, it absorbs the winter rains, and the grain is able to extract moisture in the summer months.[31] The red soils, when located in relatively flat areas, are suitable

[19] Baly, *Geography,* p. 29, 233-234; Bender, *Geology,* p. 9; Orni and Efrat, *Geography of Israel,* p. 106.

[20] Bender, *Geology,* pp. 9, 23.

[21] Baly, *Geography,* p. 31.

[22] *Ibid.*, pp. 17- 22-26; Orni and Efrat, *Geography of Israel,* p. 106.

[23] Bender, *Geology,* p. 23.

[24] Aharoni, *Land of the Bible,* pp. 11-13, 33, 36; Baly, *Geography,* pp. 16, 19-20; Orni and Efrat, *Geography of Israel,* pp. 110-111; Smith, *Historical Geography,* p. 371.

[25] Karl W. Butzer, Physical Conditions in Eastern Europe, Western Asia and Egypt Before the period of Agricultural and Urban Settlement, p. 35 in I. E. S. Edwards, C. J. Gadd and N. G. L. Hammond (eds.), *CAH,* 3rd ed., Vol. 1, Part 1, Cambridge, 1970.

[26] Baly, *Geography,* pp. 77-79; Smith, *Historical Geography,* p. 336; M. Zohary, Ecological Studies in the Vegetation of the Near Eastern Deserts, I: Environments and Vegetation Classes, *IEJ,* 2 (1952), p. 205; Van Zyl, *Moabites,* p. 53.

[27] Baly, *Geography,* p. 16.

[28] Aharoni, *Land of the Bible,* p. 11; Baly, *Geography,* p. 79; Bender, *Geology,* pp. 187-189.

[29] Phillips, *Hashemite Kingdom of Jordan,* p. 47.

[30] Aharoni, *Land of the Bible,* p. 11; Baly, *Geography,* pp. 22, 255.

[31] Baly, *Geography,* p. 21-22.

for the cultivation of cereals, tomatoes, melons, tobacco, and many other crops. The less fertile yellow soils are found in narrow regions on both sides of the rift, and this soil is suited for cereal production with dry-farming methods. If irrigation were developed, more intensive cultivation could be undertaken in these less fertile areas.[32]

Climate

The vast majority of the Middle East displays a typical Mediterranean climate with an annual rhythm of summer drought and winter rain.[33] A Mediterranean climate dominates the highlands on both sides of the Jordan, including the plateau of Moab.[34] This type of climate may be described as having a relatively uniform annual temperature sequence, mild and wet winters, hot and dry summers, and a reversed annual temperature and rainfall curve.[35] The Palestinian region has only two major seasons; a dry summer lasts from mid-June until mid-September, and a rainy season prevails in the cooler half of the year.[36]

Baly offers six rules that explain the differences in the climatic zones of Palestine: (1) rainfall tends to *decrease* as one moves from north to south; (2) rainfall tends to *decrease* as one moves from west to east, i.e., away from the sea; (3) rainfall *increases* on the seaward slopes of hills and mountains; (4) rainfall *decreases* sharply on the eastern slopes; (5) temperature tends to *decrease* with an increased elevation; and (6) *range* in temperature tends to *increase* with distance from the sea and decrease in rainfall.[37] These factors facilitate a better understanding of Moab's wind, rainfall, and temperature patterns.

The Role of Wind in Central Moab's Climate

The Transjordanian plateau is characterized by a relatively high movement of winds. Dry, westerly winds prevail from April through October, the summer months. The sea breeze overflows the plateau edge about 3:00 p.m. in the summer, but this is too late in the day to moderate the daily temperature.[38]

Winds are predominantly from the southwest from November until March; this southwesterly wind brings the winter rains to the plateau. Easterly winds are common in the winter months; these icy desert winds bring cold temperatures as they sweep undisturbed across the high tableland.[39]

The hot, dust-laden winds *(sirocco* or *Khamsin)* arrive in the spring to burn up the green landscape; these scorching winds often reappear in the fall. The active winds, high temperature, and relatively low level of humidity combine to produce a high rate of evaporation in Jordan.[40]

Rainfall in Central Moab

Rainfall in the Middle East is largely determined by physiography and the disposition of land and sea in relation to the winter, rain-bearing wind. The topographic incline of Moab's western escarpment arrests and cools the atmosphere on the edge of the plateau, and this produces an abundant rainfall on the plateau.[41] While the western slope of

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[32] Bender, *Geology,* p. 187-189.

[33] W. B. Fisher, *The Middle East: A Physical, Social and Regional Geography,* 6th ed., London, 1971, p. 65. Baly, *Geography,* p. 43-55, includes a full discussion of the major factors that determine the climatological patterns in the eastern Mediterranean.

[34] Orni amd Efrat, *Geography of Israel,* p. 106, suggest that Transjordan is a geological and climatological continuation of its counterpart on the western side of the Jordan rift.

[35] Phillips, *Hashemite Kingdom of Jordan,* p. 37-38.

[36] Baly, *Geography,* p. 43. Phillips, *Hashemite Kingdom of Jordan,* p. 45-46, simply suggests that Transjordan has a humid winter and an arid summer.

[37] Baly, *Geography,* p. 54.

[38] *Ibid.,* p. 46, 60; Bender, *Geology,* p. 15; Phillips, *Hashemite Kingdom of Jordan,* p. 39, 45-46.

[39] Aharoni, *Land of the Bible,* p. 33; Baly, *Geography,* pp. 47-49; Bender, *Geology,* p. 15; Phillips, *Hashemite Kingdom of Jordan,* p. 39.

[40] Aharoni, *Land of the Bible,* p. 33; Baly, *Geography,* p. 52-53; Bender, *Geology,* p. 15; Phillips, *Hashemite Kingdom of Jordan,* p. 39, 42-46.

[41] Aharoni, *Land of the Bible,* p. 33; Fisher, *Middle East,* p. 66; Phillips, Hashemite Kingdom of Jordan, p. 40.

the highlands and the tableland itself do not experience a scarcity of rain in the winter months, the eastern depression and desert fringe do not receive enough precipitation to allow cultivation. Of course, this transitional zone fluctuates with the climate and the technological capability of man.[42]

An extreme concentration of rainfall within a few months of the year is charactristic of most of the Middle East.[43] The country of Jordan is dominated by a winter rainfall regime.[44] The rainy season begins in the latter half of October and lasts until early May; January, February, and March are Transjordan's wettest months. Indeed, Orni and Efrat point out that this area often receives 50 percent of its annual rainfall in the month of February. The months of June, July, August, and September are completely dry, and the first part of October and the latter part of May are normally dry.[45]

The inhabitants of the central Moabite plateau can usually expect to receive between 200 mm. to 400 mm. of rainfall per year,[46] but there is a wide range of variation from year to year. The average annual rainfall at Kerak from 1937/1938 to 1973/1974 was 360.7 mm., and the rainfall range for these thirty-seven seasons was 101.9 mm. to 661 mm.[47] Kerak has fifteen days out of the year with only a trace of precipitation (i.e., 1 mm. or more) in a dry year, but a favorable year will have fifty-four days of precipitation.[48]

Frontal rains are the principal source of moisture for agriculture on the plateau. Moab has five or six months of rainfall in the growing season, and this is sufficient to allow a fairly productive season of rainfall-dependent farming.[49]

Temperature in Central Moab

The elevation of the Moabite plateau results in a temperate climate; the tableland stands above the almost tropic heat that surrounds it to the west and south. Relatively cool to moderate temperatures prevail in the region, with the annual temperature isotherm on the plateau ranging between 11°C and 17°C. The coldest weather comes in January and February, and snow may appear in the highlands at this time of year. Moab's winter is colder than Cisjordan's because of the plateau's height, distance from the Mediterranean, and exposure to icy, desert winds. There are still generally nine or ten frost-free months in Jordan's growing season.[50]

Water Resources

The supply of water is the transcending limiting occupance element in Jordan. Life seems to exist at the upper level of the water supply. When the supply increases, as in a season of favorable rainfall, life expands and living conditions are correspondingly better; conversely, when the supply of water is reduced, and in places where sufficient water is not available, life is blighted and suppressed. Community locations are associated with water, and other considerations are subordinated...[51]

While these observations would certainly hold true for ancient setlements on the plateau, even modern pumping facilities have not eliminated the vital connections between water sources and communities. Glueck and the participants in the Central Moab Survey discovered again and again that modern villages are built on

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[42] Fisher, *Middle East,* p. 93; Phillips, *Hashemite Kingdom of Jordan,* p. 141; Kay Prag, The Intermediate Early Bronze-Middle Bronze Age: An Interpretation of the Evidence from Transjordan, Syria, and Lebanon, *Levant,* 6 (1974) p. 72; Van Zyl, *Moabites,* p. 48-49, 54.

[43] Baly, *Geography,* p. 48.

[44] Jack R. Harlan, Natural Resources of the Southern Ghor, *AASOR,* 46 (1981) p. 155.

[45] Orni and Efrat, *Geography of Israel,* p. 146; Phillips, *Hashemite Kingdom of Jordan,* p. 42.

[46] Bender, *Geology,* p. 10; Orni and Efrat, *Geography of Israel,* p. 137.

[47] Harlan, Natural Resources, p. 155-156.

[48] Phillips, *Hashemite Kingdom of Jordan,* p. 42.

[49] *Ibid.,* pp. 40, 45-46.

[50] Baly, *Geography,* p. 60; Orni and Efrat, *Geography of Israel,* p. 145; Phillips, *Hashemite Kingdom of Jordan,* p. 45-46; Smith, *Historical Geography,* p. 335-336.

[51] Phillips, *Hashemite Kingdom of Jordan,* p. 54, 56.

or near the ruins of ancient sites. Since water is still a major factor in sedentarization, this tendency to resettle in proven locations is to be expected.

Because of a generally deficient rainfall, Middle Eastern hydrography is discussed in terms of topography and geological structure in the formation of river systems.[52] Although Central Moab receives rain in relative abundance, the contours of the plateau and its karstic limestone composition determine the availability of water. Along with the Palestinian hills to the west of the Jordan River, the Transjordanian highlands are a major water-producing region.[53] The western side of Central Moab receives rainfall in large amounts, but much of the water is quickly drained off the tableland by numerous, deeply-eroded scarp streams.[54] In addition to the many *awdiyah* (wadis) flowing to the west, the upper tributaries of the Wadi el-Mujib drain the eastern side of the plateau. Harlan notes that "heavy rains in the highlands commonly cause flash floods; walls of water come crashing down through the canyons rolling boulders and cutting away the banks."[55] A large amount of Central Moab's rainfall percolates readily into the porous limestone; once this seeping water reaches deeper, watertight strata, it flows horizontally until the water appears in the springs on the western slopes of the plateau.[56] A few springs appear on the top of the plateau, and many water sources are found in the wadis that dissect Moab. Although the Mujib is a perennial stream, the distance from the top of the plateau to the floor of the wadi tends to increase the importance of the springs and water storage systems on the escarpment itself. Thus, the plateau's rapid drainage and deep water table emphasize the crucial role of the winter rains in the feeding of springs.[57]

Flora

Three major factors determine the composition and density of the plant cover in this part of the Levant: (1) the position of the country at a crossroads of the Middle East, (2) the Mediterranean climate and the "border of aridity," and (3) the activity of man.[58] While the first two factors actually determine the potential vegetation in this region, the third factor, the impact of man, has profoundly *changed* the vegetational landscape of Palestine and Transjordan.[59] Indeed, the flora of the southern Jordan highlands has been severely degraded. Harlan states that "under present population pressures, degradation is extreme."[60] Deforestation and overgrazing have produced areas that are virtually devoid of plant cover, and the natural vegetation has been largely replaced by farming crops. Erosion has played an enormous role in the transformation of the plant landscape in Central Moab.[61]

Palestine and Transjordan are situated at the junction of three of the world's major vegetation regions: (1) Mediterranean, (2) Irano-Turanian, and (3) Saharo-Sindian.[62] Moab is located in the Mediterranean and Irano-Turanian

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[52] Fisher, *Middle East,* p. 32.

[53] Phillips, *Hashemite Kingdom of Jordan,* p. 56-57.

[54] Baly, *Geography,* p. 211-212, points out that these scarp streams were assisted in their formation by lines of structural weakness on the plateau's western edge. This allowed these *awdiyah* (wadis) to cut farther back into the plateau, and even more of the ravines drained in the direction of the Dead Sea.

[55] Harlan, *Natural Resources,* p. 156.

[56] Aharoni, *Land of the Bible,* p. 11; Phillips, *Hashemite Kingdom of Jordan,* p. 57; Smith, *Historical Geography,* p. 70-72; Van Zyl, *Moabites,* p. 54.

[57] Richard T. Antoun, *Arab Village: A Social Structural Study of a Transjordanian Peasant Community,* Bloomington, 1972, p. 5.

[58] Orni and Efrat, *Geography of Israel,* p. 164.

[59] Butzer, Physical Conditions, p. 35; Orni and Efrat, *Geography of Israel,* p. 166; Phillips, *Hashemite Kingdom of Jordan,* p. 52.

[60] Harlan, Natural Resources, p. 163.

[61] Baly, *Geography,* pp. 24, 52, 77, 115-117; Orni and Efrat, *Geography of Israel,* p. 176; Phillips, *Hashemite Kingdom of Jordan,* p. 53-54, 138.

[62] Kamel S. Abu Jaber, Jordan, *Encyclopaedia Britannica* Vol. 10 (1974) p. 270.

phytogeographical zones, and the majority of Central Moab falls within the Mediterranean zone. The latter zone normally receives an annual precipitation of 350 mm. or more, and such Mediterranean regions usually contain Aleppo pine, deciduous Tabor oak, evergreen Mediterranean oak, styrax, terebinth, carob, and pistachia. A few areas within Jordan still have specimens of these trees, but the overwhelming percentage of the land is now covered by crops or grasses.[63]

The plateau's eastern limits fall within the Irano-Turanian vegetation zone. Normally, this plant zone will receive between 200 mm. and 300 mm. of rainfall per year. Irano-Turanian territory is characterised by an absence of trees, and its plant life appears stunted. Brush, small shrubs, and steppeland grasses prevail, but even this ground cover is sparse.[64]

Smith described Moab as a treeless plateau, a high, barren moor with few areas of brush. While Smith admited that this region looked rather desolate, he noted that its fertility is surprising and, even in his day, the plateau was heavily cultivated in wheat.[65] The wheat of the Kerak district is still thought of as one of the best quality grains in the Middle East.[66] In Tristram's report of 1873, *The Land of Moab,* Hayne described the region to the south of the Mujib as having no trees, shrubs, or bushes. Most of the plateau was covered by grass, a situation that caused Hayne to describe Moab as virgin grazing ground.[67] Indeed, the sheep and goats are still present in great numbers, but this area also produces such crops as wheat, barley, chickpeas, lentils, eggplant, tomatoes, and watermelons, to name just a few. Unfortunately, grapes, figs, and olives, so valuable to the economy of the Palestinian hills, are not grown in large quantities on the highlands of Transjordan.[68]

Conclusion

Basically, this essay is intended to introduce the reader to the present-day natural setting of Central Moab's numerous ruins. It is also hoped that this discussion will help to eliminate some of the misunderstanding concerning the environment of the Transjordanian plateau as a whole. To be sure, there are desert areas within Jordan's borders, but it is also true that a large portion of this country has enough favourable climatic conditions, agricultural potential, and water resources to allow its modern inhabitants to prosper. Further examination of Jordan's ancient settlements, including those in the land of Moab, will undoubtedly prove that the same held true for their occupants.

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[63] Baly, *Geography,* pp. 80, 82; Bender, *Geology,* p. 11; Orni and Efrat, *Geography of Israel,* p. 167: Van Zyl, Moabites p. 53.

[64] Baly, *Geography,* p. 80, 82; Bender, *Geology,* p. 13; Fisher, *Middle East,* p. 92-93; Orni and Efrat, *Geography of Israel,* p. 172.

[65] Smith, *Historical Geography,* p. 336-337, 343.

[66] Benjamin Shwadran, *Jordan: A State of Tension,* New York, 1959, p. 16.

[67] W. Amherst Hayne, On the Flora of Moab, p. 101-141 in H. B. Tristram *et al., The Land of Moab: Travels and Discoveries on the East Side of the Dead Sea and the Jordan, New York,* 1873.

[68] Phillips, *Hashemite Kingdom of Jordan,* p. 101-141, gives a realtively up-to-date survey of Transjordan's agricultural production. Cf. Baly, *Geography,* p. 82-86.

THE SURVEY OF THE ROMAN MONUMENTS OF AMMAN BY THE ITALIAN MISSION IN 1930

Collected and Commented
by
A. Almagro
Carlo Ceschi in memorium

Introduction

From 1927 to 1938, an Italian Archaeological Mission carried out excavations in Amman, under the direction first of Giacommo Guidi and later of Renato Bartoccini. Their works were centred basically around the excavation of various zones of the Citadel. Unfortunately, almost all their work remained unpublished, as only some advance notices were published by Bartoccini.[1]

In 1930 the architect Carlo Ceschi took part in the Mission and dedicated himself to the making of plans of the main monuments of Amman, as recounted by Bartoccini in one of his articles.[2] As most of the documentation collected and drafted by the Italian Mission, all the plans made by the architect Carlo Ceschi remained unpublished.

When the Spanish Archaeological Mission took charge of the excavation and restoration of the Umayyad Palace of the Amman Citadel, an immediate interest arose in consulting the data, photographs and plans the Italian Mission had collected when excavating a considerable part of the Palace. Bartoccini's brief publications had not enabled us to gain sufficiently detailed knowledge. Consulting this documentation was especially imperative owing to the fact that most of the structures of the Umayyad period excavated by the Italian Mission, owing to the time elapsed and various other circumstances, had been destroyed in large part. Reviewing the surveying Bartoccini might have done was necessary in order to ascertain the structure of an important area of the Umayyad Palace.

For this reason, we began a long search for the documentation, attempting to ascertain where Renato Bartoccini had left the material on the missions directed by him. After numerous enquiries,[3] we were informed by Dr. Fiorella Bartoccini, daughter of the Director of the Italian Mission, that by a decision of the family, all the documents relating to the excavations carried out by him in Amman had been deposited in the Instituto di Storia Antica de la Facolta di Lettre de l'Università di Peruggia (Institute of Ancient History of the Faculty of Arts of the University of Peruggia).

With the authorization of the family and the kind collaboration of Professor Mauro Torelli, we were able to consult all the material left by Bartoccini and especially that relating to the excavations of the Citadel. Apart from the plans and photographs of the excavation which have been of priceless assistance for our study of the Umayyad Palace, we found, among the various documents, a complete series of the plans which Carlo Ceschi had drawn of the monuments of Amman according to Bartoccini. Although most of these plans had no direct bearing on our work, our attention was immediately drawn to the extraordinary quality and detail with which they had been drawn and which makes them still unsurpassed as docu-

[1] R. Bartoccini, Ricerche scoperte della Missione Italiana in Amman, *Bolletine dell Associazione Internazionale per gli studi Mediterranei, a.I.*, 1930, num. p. 15-17.
Scavi ad Amman della Missione Archeologica Italiana, *a. III,* 1932, num. 2, p. 16-23; *a. IV,* 1933-34, nums. 4-5, p. 10-15, 19-20.

[2] Bartoccini, 1932, p. 16.

[3] This search would not have been possible without the valuable collaboration of Professor M. Almagro-Gorbea, Director of the Spanish School of History and Archaeology in Rome, who indefatigably tracked down these documents until finding their present resting place.

mentation. For this reason, and after obtaining the appropriate authorizations, we decided to prepare these plans for publication. With the enthusiastic support of Dr. Adnan Hadidi, Director of the Department of Antiquities of Jordan, we prepared small scale reproductions of all the plans we found, except those of the area of the Palace which we consider to be of lesser interest, as the plans drawn by the Spanish Archaeological Mission are more precise, having been prepared using photogrammetry.[4] Nevertheless, the documentation of the Italian Mission has helped us to complete our work relating to elements which have now disappeared.

The plans correspond to the following monuments: the temple of the South Zone of the Citadel, wholly excavated by Bartoccini;[5] the cistern situated at the North End of the Citadel, outside the walls of the Roman perimeter, also excavated by Bartoccini;[6] the Theatre; the *Odeon* and *Nyphaeum.* It must be borne in mind that some of these plans were drawn when the buildings were partly buried, so that some defects which may be observed in the drawings are attributable to this. For this reason, we shall briefly comment on each of the drawings in order to record the small divergences between the drawings and this site as it is today. In spite of these errors, the plans published here are believed to be the best documentation in existence of these monuments in Amman.

Temple of the Citadel

This temple was partly visible earlier. There is a drawing of this by Butler[7] and a small diagram published by Conder.[8] As this temple was excavated by Bartoccini, the plans drawn by Ceschi record all the things appearing and are more complete.

— Figure 1 corresponds to the plan of the temple reconstructed based on the remains found. Although the temple was reconstructed, *tetrastylum in antis,* the possibility exists that it may have been *hexastylum peripterum* and therefore have a row of columns surrounding the *cella* on the line of the perimeter *socle* which would correspond to the *podium* of the temple. This is suggested by F. Zayadine in the plan published by him.[9]

— Figure 2 records the front wall of the temple on the inside and outside as they were after the excavation.

— Figure 3 represents an internal lengthwise section of the temple and detail of the perimeter wall.

— Figure 4 corresponds to details of the base and capitals of the columns of the temple.

— Figure 5 is a study of the reconstruction and assembly of the blocks forming the *antae* of the temple.

— Figure 7 contains details of architraves and mouldings of the temple.

— Figure 6 contains details of the moulding of the *socle* and of another architectural element.

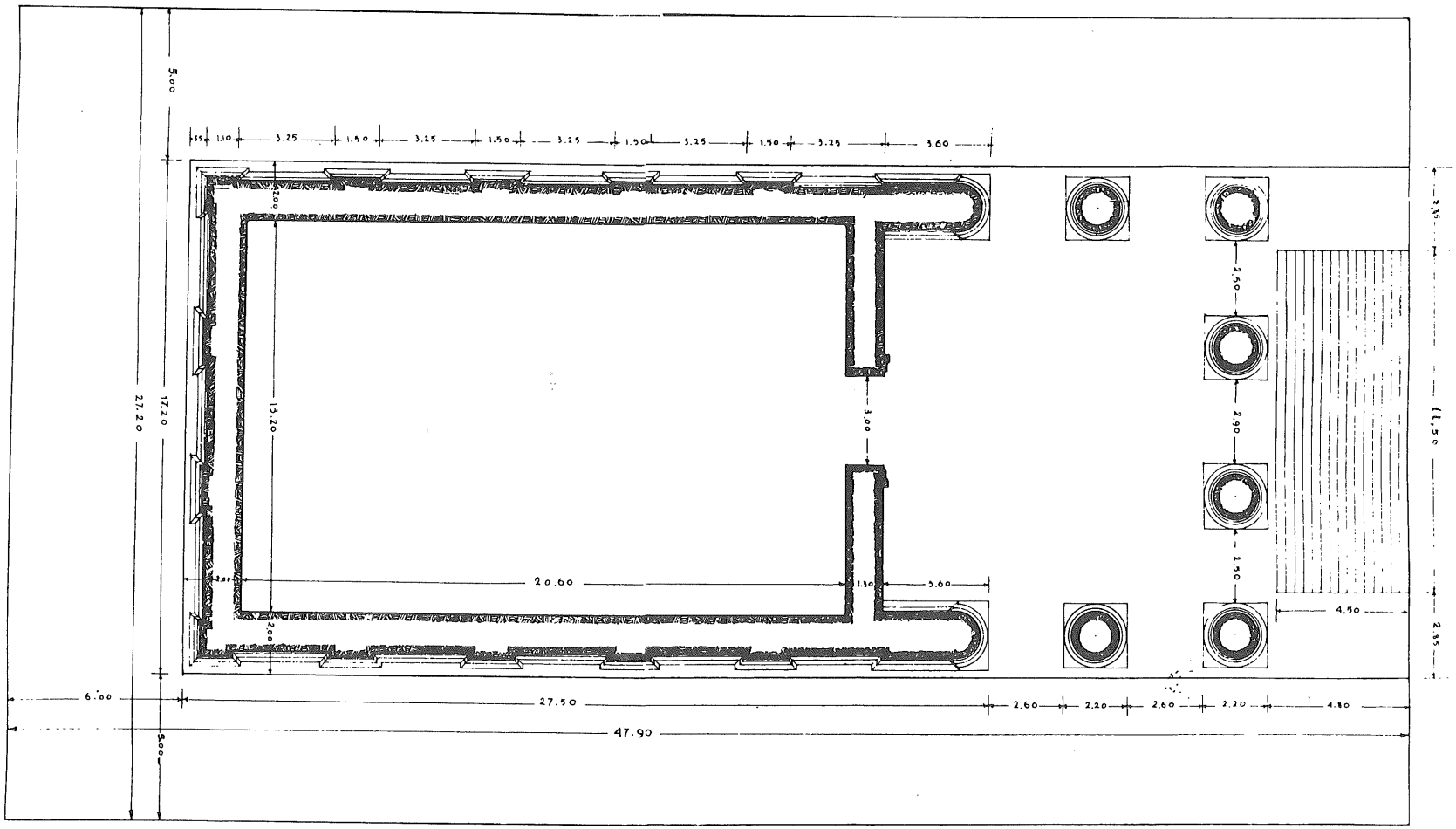
— Figure 8 shows the marks of the support planes of several shafts of columns and a drawing of a piece of the architrave of the temple with the Greek inscription of this.

— Figure 9 is a reconstruction of the front elevation of the temple. It is worth noting the resemblance of this reconstruction with that published by Butler[10] which contrasts with the great differences existing between the ground plans. A comment similar to that about Figure 1 is appropriate here, owing to the possibility that the temple may have been *hexastylum peripterum.*

The Cistern at the North end of the Citadel

This cistern was excavated by Bartoccini[11] and is described by Conder.[12] Both relate it to a passage in Polybius narrating the capture of Philadelphia by

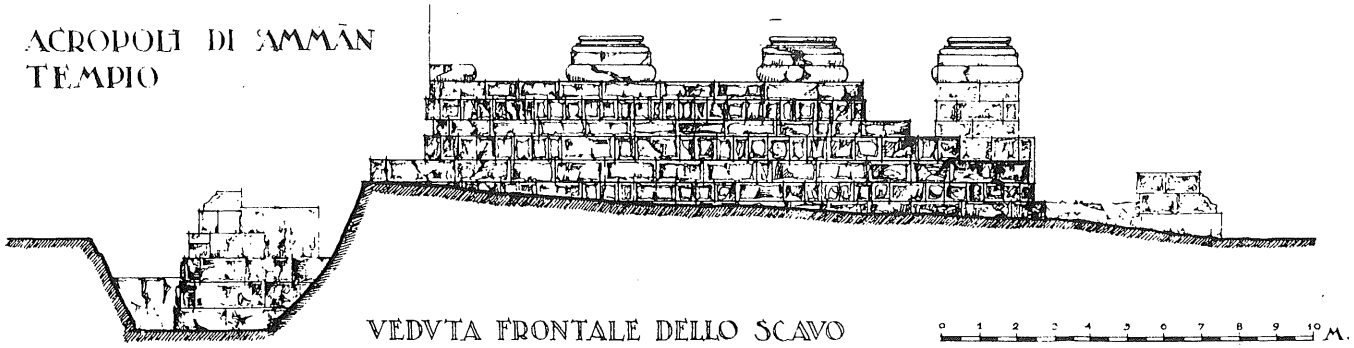
[4] A. Almagro, The Photogrametric Survey of the Citadel of Amman and Other Archaeological Sites in Jordan, *ADAJ,* XXIV (1980) p. 111-119.
[5] Bartoccini, 1930, p. 16; 1932, p. 16-21.
[6] Bartoccini, 1933, p. 10-11.
[7] H. C. Butler, *Publication of the Princeton University Archaeological Expedition to Syria,* Div. II, Sect. A, Leiden, 1907, ill. 24.
[8] R. C. Conder, *The Survey of Eastern Palestine,* London, 1889 vol. I, The Adwan Country p. 32.
[9] F. Zayadine, Amman-Philadelphia, *Le Monde de la Bible, no. 22,* 1982, Fig. 21.
[10] Butler, 1907, ill, 24.
[11] Bartoccini, 1933, p. 10-11.
[12] Conder, 1889, p. 34.



SAMMĀN ~ TEMPIO SVLL'ACROPOLI ~ RIPRISTINO IN PIANTA ~

5 4 3 2 1 0 5 SCALA METRI 10

Fig. 1


ACROPOLI DI AMMĀN
TEMPIO
VEDVTA FRONTALE DELLO SCAVO
0 1 2 3 4 5 6 7 8 9 10 M.

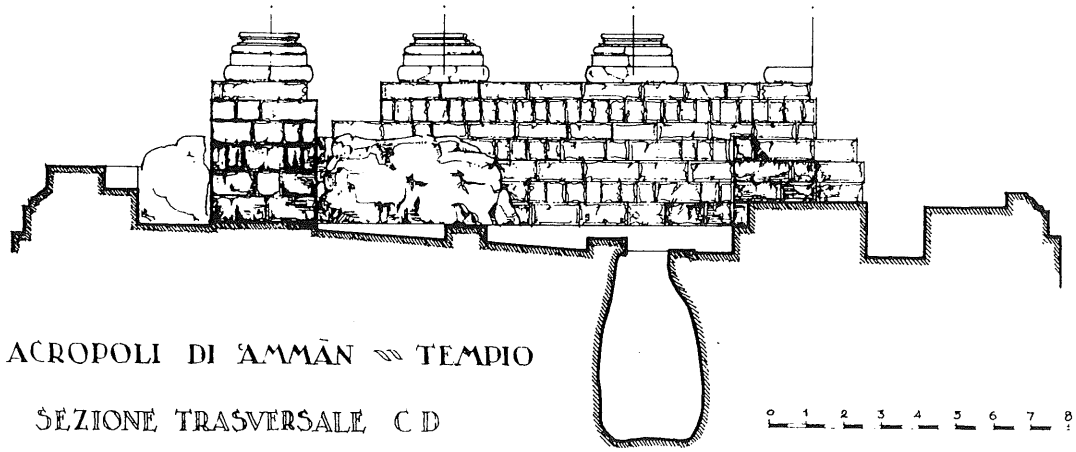
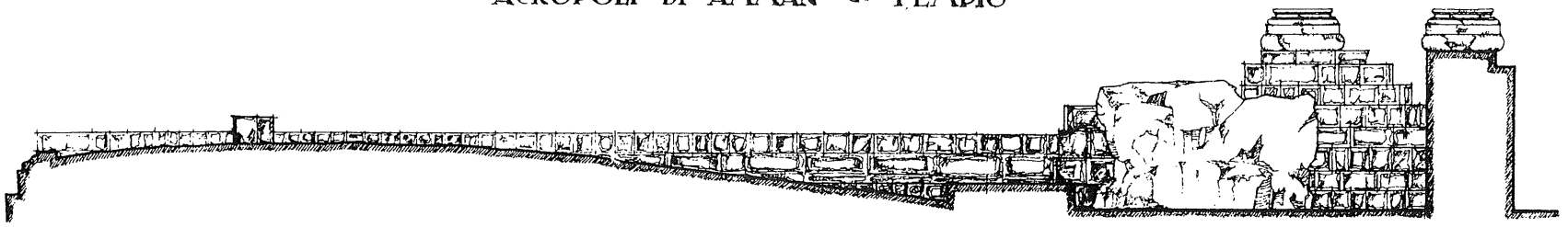

ACROPOLI DI AMMĀN TEMPIO
SEZIONE TRASVERSALE C D
0 1 2 3 4 5 6 7 8

Fig. 2

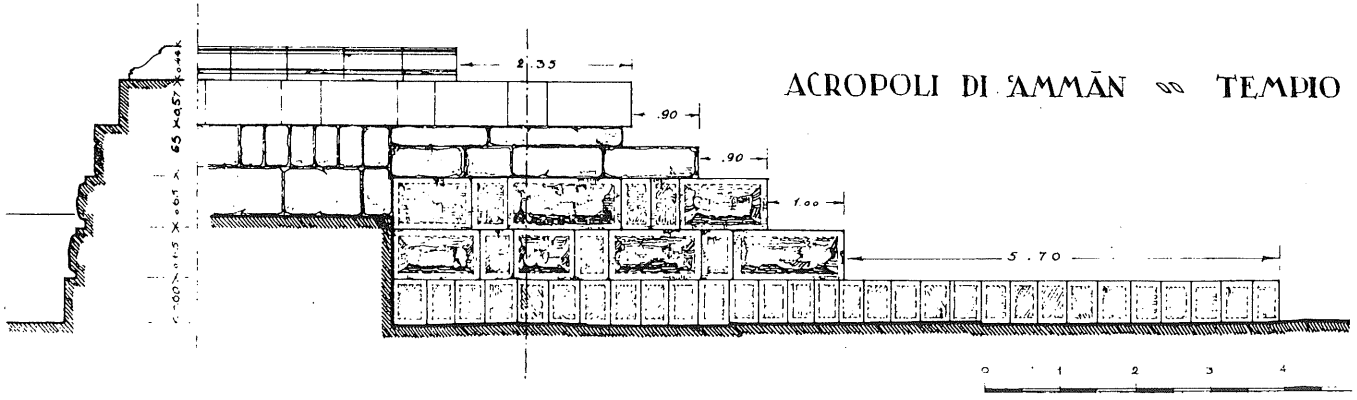
ACROPOLI DI 'AMMĀN ⇔ TEMPIO



SEZIONE LONGITVDINALE A B

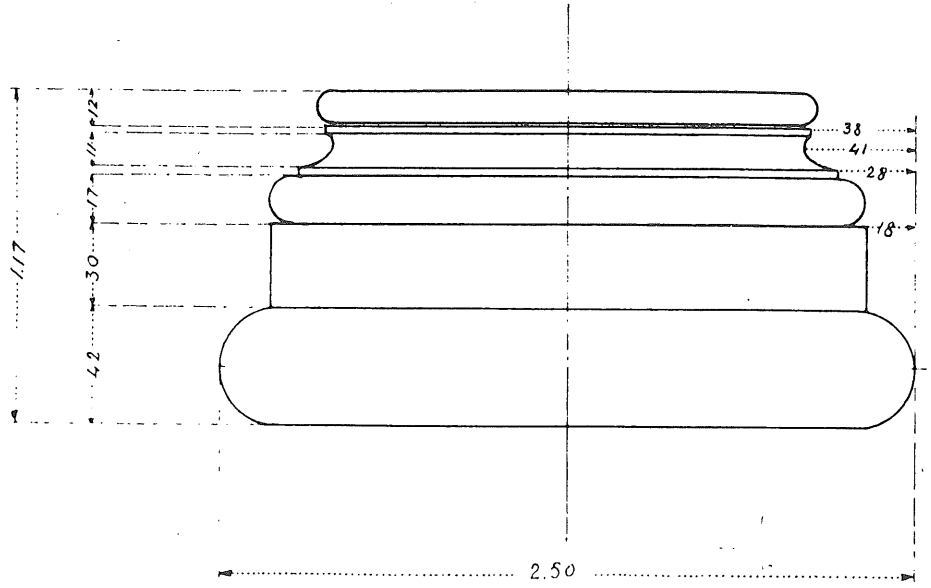
0 1 2 3 4 5 6 7 8 9 10 M.

ACROPOLI DI 'AMMĀN ⇔ TEMPIO

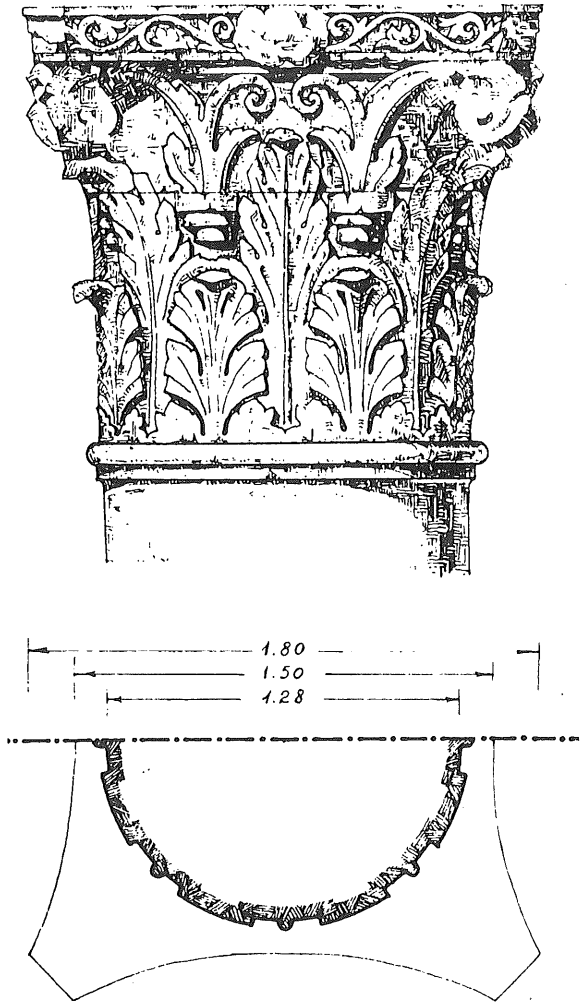


PARTICOLARE DEL MVRO PERIMETRALE NELL'ANGOLO NORD EST

Fig. 3.

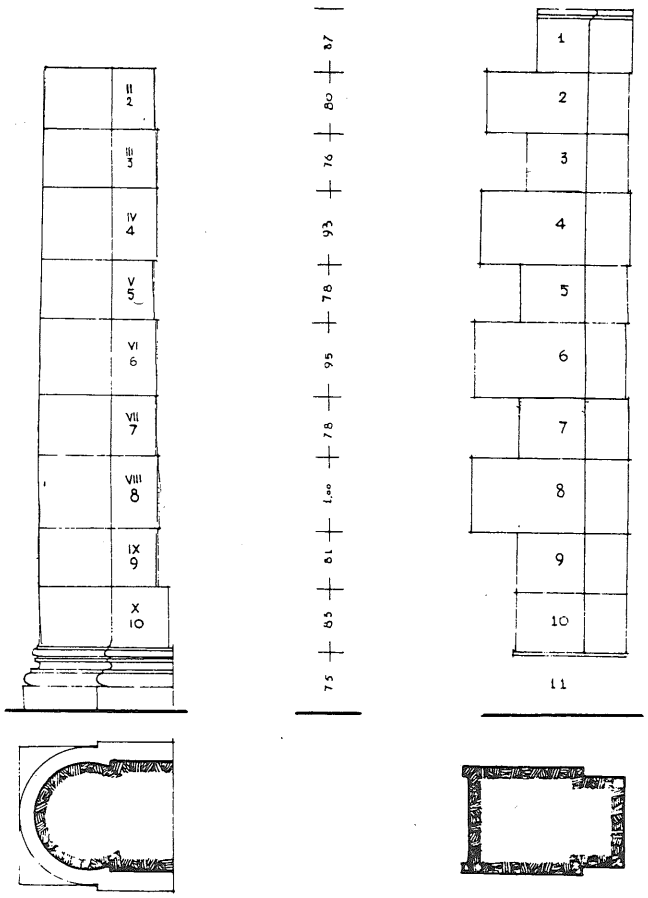


BASE DELLE COLONNE



CAPITELLO DEL TEMPIO

Fig. 4

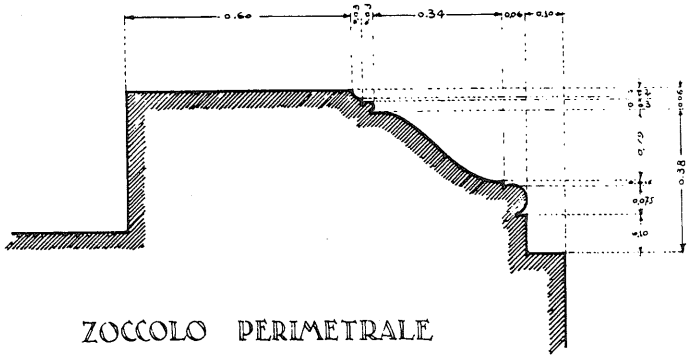


MEZZA COLONNA E CONTROPILASTRO

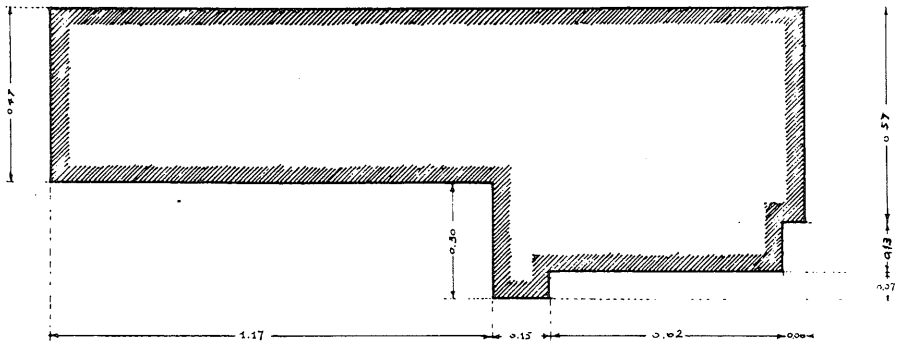
DISPOSIZIONE DEI BLOCCHI RINVENUTI NELLO SCAVO

Fig. 5

ACROPOLI DI 'AMMĀN ≈ TEMPIO



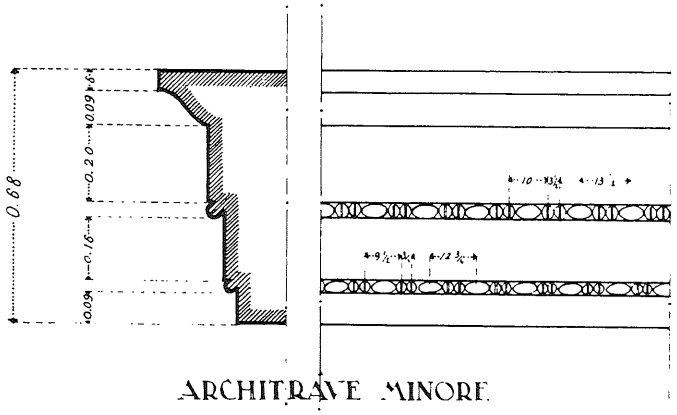
ZOCCOLO PERIMETRALE



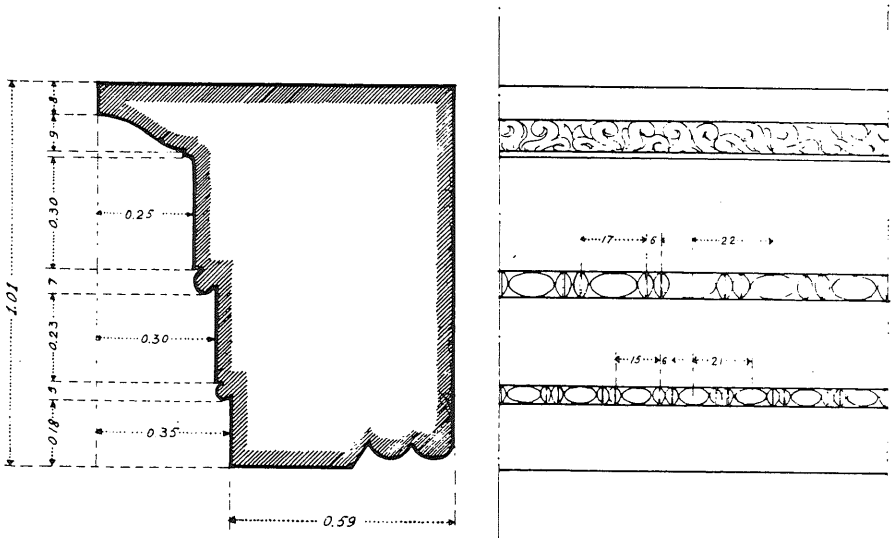
FRAMMENTO ARCHITETTONICO

Fig. 6

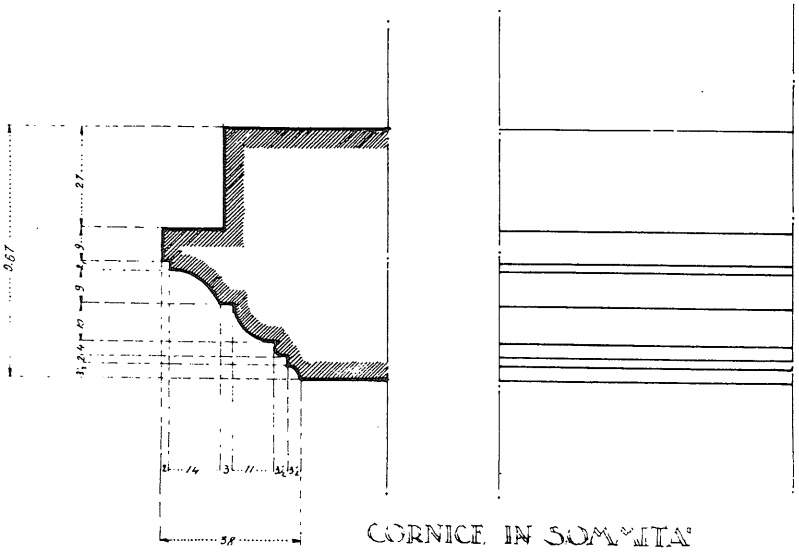
ACROPOLI DI AMMĀN ≈ TEMIO



ARCHITRAVE MINORE



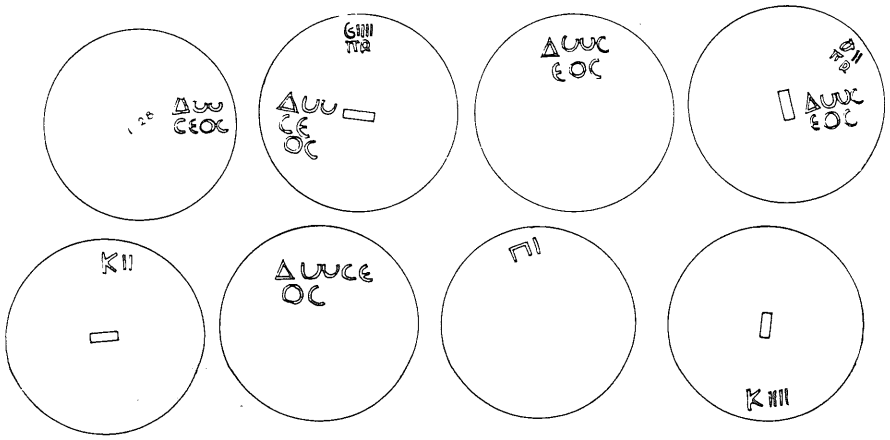
ARCHITRAVE DEL PRONAO



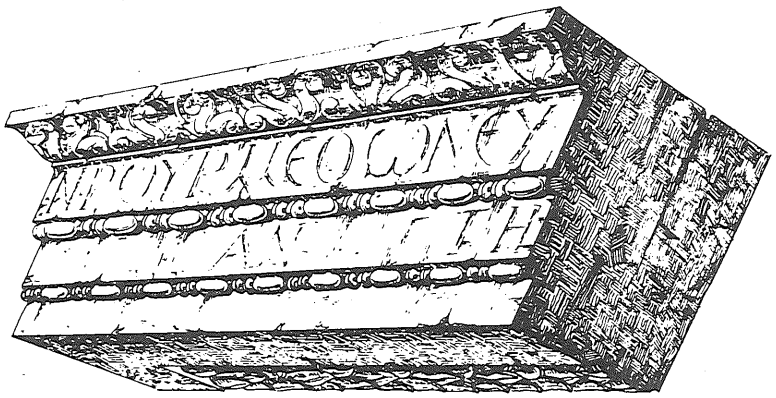
CORNICE IN SOMMITA'

Fig. 7

ACROPOLI DI AMMĀN — TEMPIO



NOMI E INDICAZIONI VARIE INCISI SVI PIANI DI POSA
DEI TAMBVRI DI COLONNA



ARCHITRAVE DEL PRONAO

Fig. 8

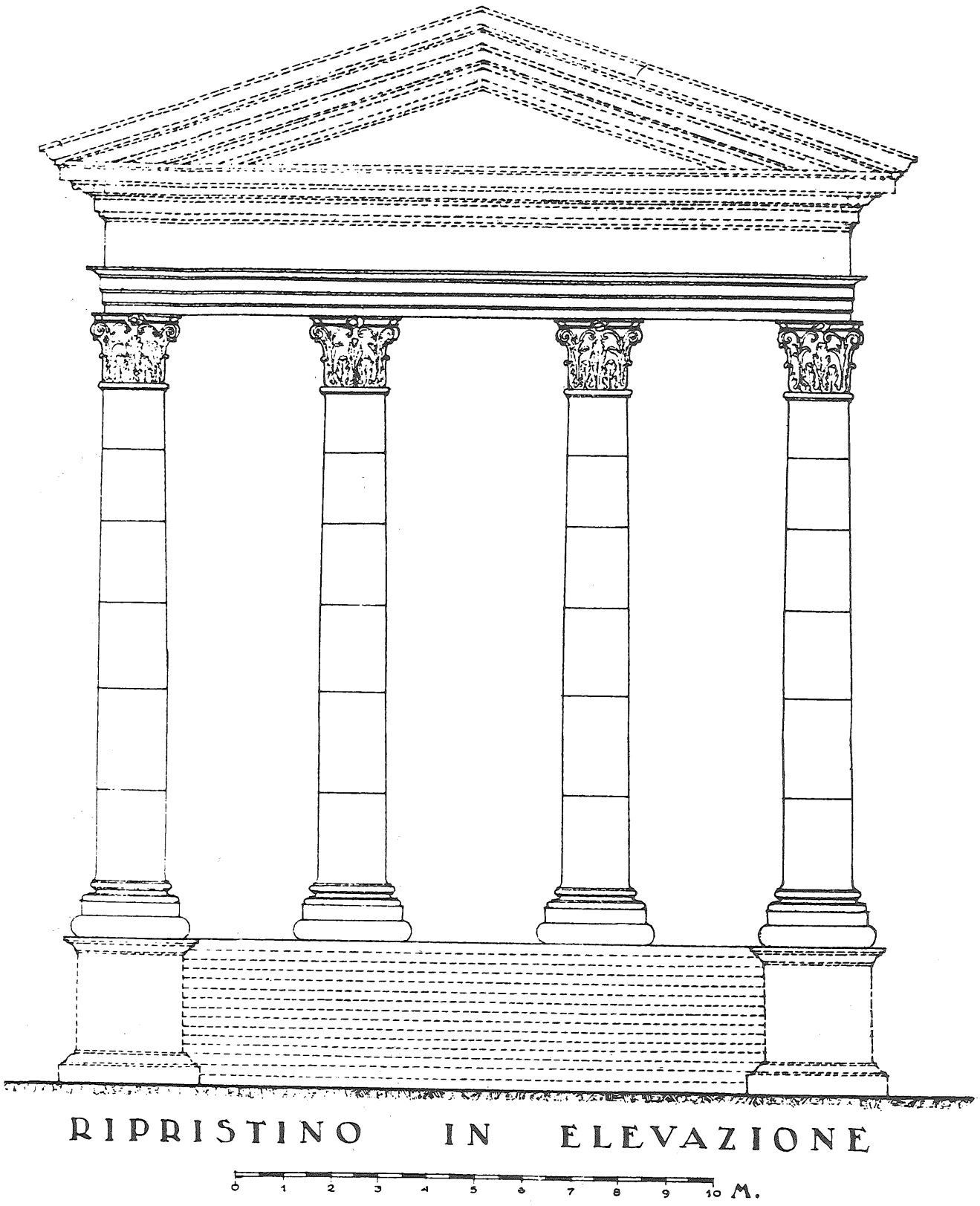


Fig. 9

Antioch the Great.

— Figure 10 contains the plan and two sections of the cistern and the passage leading to it.

The Theatre

The theatre has changed noticeably since Ceschi drew it, as it has been fully excavated and was restored in 1970. The most remarkable differences between the drawings and the reality are in the area of the stage, orchestra and ends of the *cavea.* Ceschi drew the areas, which at that time were not visible, and these do not accord with reality.

— Figure 11 corresponds to the ground plan of the theatre with the system of accesses to the *vomitoriae.* Both the stage and the area of the *parascaenia* have errors mainly because the drawing does not show the direct exit from the access galleries of the *praecintio,* separating the *media* from the *summa cavea.*

— Figure 12 is the ground plan of the theatre with the *cavea.* Besides being incomplete and with errors in the stage, the first stand of the *imma cavea* and the three stands of the *principia* of the orchestra are missing. Undoubtedly Ceschi could not see the *cavea* next to the *aditus maximus* shown, nor the double stairway leading from the orchestra to the first stand underneath the central tribune. Neither the *pulpitum* nor the *proscaenium* are shown.

The ground plan published by Butler[13] has almost the same errors to which one must add the incorrect representation of the small *nymphaeum* crowning the monument. The plan published by Hadidi[14] is doubtless taken from this and apart from the fact that it shows the *pulpitum* and some other detail, it still has similar errors. Although it does not have much detail, a more correct plan of the theatre is that given in the general plan of the Citadel and centre of Amman made by the Spanish Archaeological Mission,[15] (Figure 28).

— Figure 13 is the section of the theatre along its axis. It presents the same errors we noted in the ground plan, especially at the beginning of the *cavea* and the *pulpitum.*

— Figure 14 is a section of the threatre along the *aditi maximi* with a view of the *cavea.* The same comment may be made as the foregoing figures, and in particular it should be noted that the stair drawn between the galleries giving access to the *vomitoriae* of the first and second *praecintio* does not exist, as the upper gallery has a direct exit outside via a stairway parallel to the *aditus maximus,* and the lower gallery opens out into the latter.

— Figure 15 is a detail of the *vomitoria* of the second *praecintio* and the upper portio of the theatre. Which is apparently corrent.

— Figure 16 is an axonometric view of the front *vomitoria.* One should note the discrepancy between the present state of the theatre in the finish of the *balteus* and the stairway leading from the *praecintio* to the first stand of the *summa cavea* which Ceschi draws stepped, as Butler had done, whereas at present and after the restoration of the theatre, the *balteus* cuts straight into the *vomitoria* and coinciding with the start of the stairway.

— Figure 17 presents the details of the beginning of the *imma* and *media cavea.* The latter is completely correct, whereas in the first the lower part with the podium separating the *cavea* from the orchestra is missing.

— Figure 18 contains several details of mouldings. The fragment of architrave shown must correspond to the portico of the forum, as it is smaller than those now in the *postscaenium.*

— Figure 19 is an inside view of the *aditus maximus* showing the stepping of the vaults.

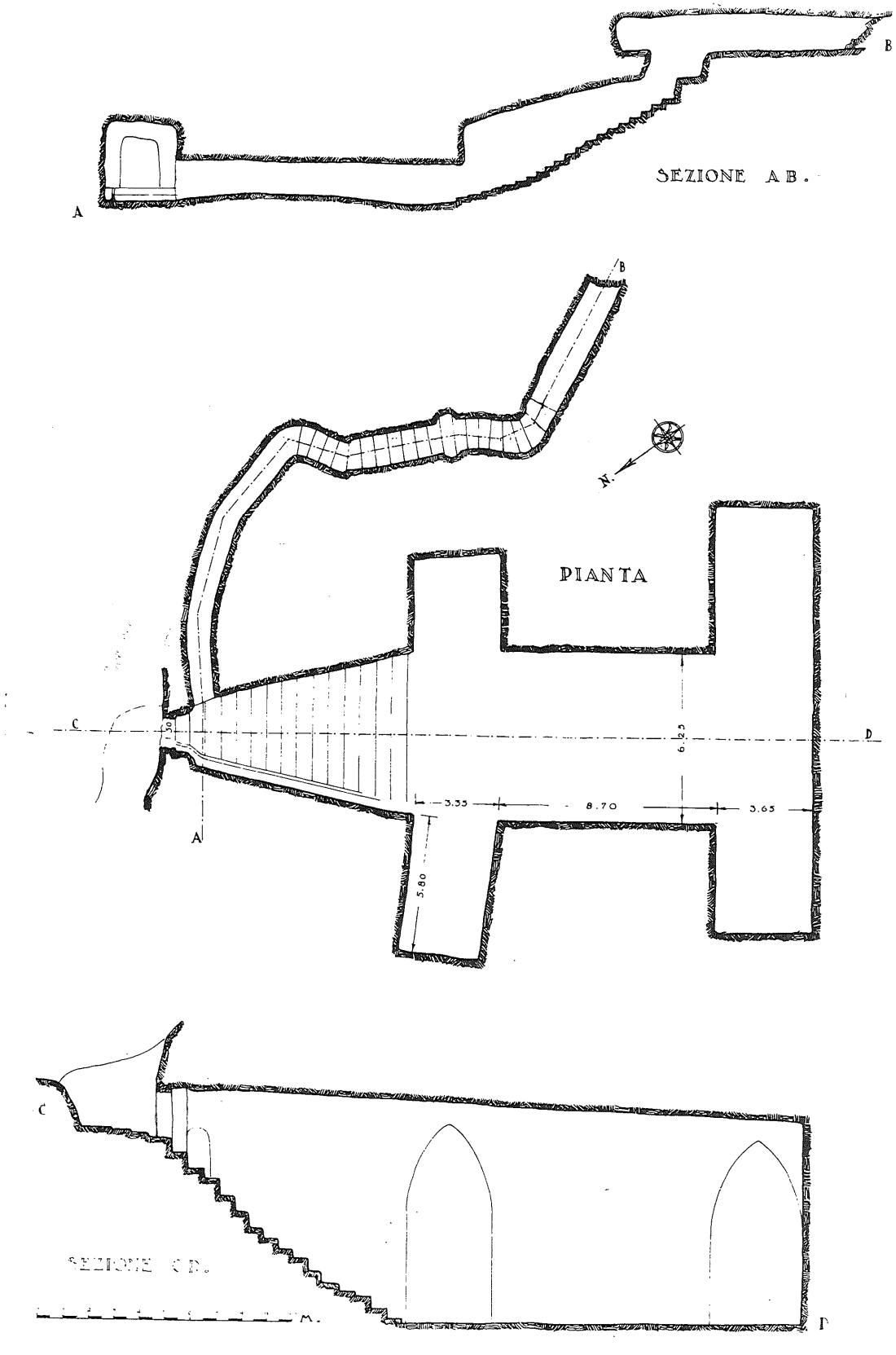
— Figure 20 is a detail of the small *nyphaeum* at the top of the theatre. The door frame is not shown on the ground plan.

— Figure 21 contains details of the niches and the pilasters of the small *nyphaeum.* They are generally correct,

[13] Butler, 1907, Plate IV.

[14] A. Hadidi, The Excavation of the Roman Forum at Amman (Philadelphia) 1964-67, *ADAJ,* XIX (1974) fig. 8.

[15] Almagro, 1980, fig. 1.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B
SEZIONE A B.
B
N.
PIANTA
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3.35
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SEZIONE C D.
M.
D

Fig. 10

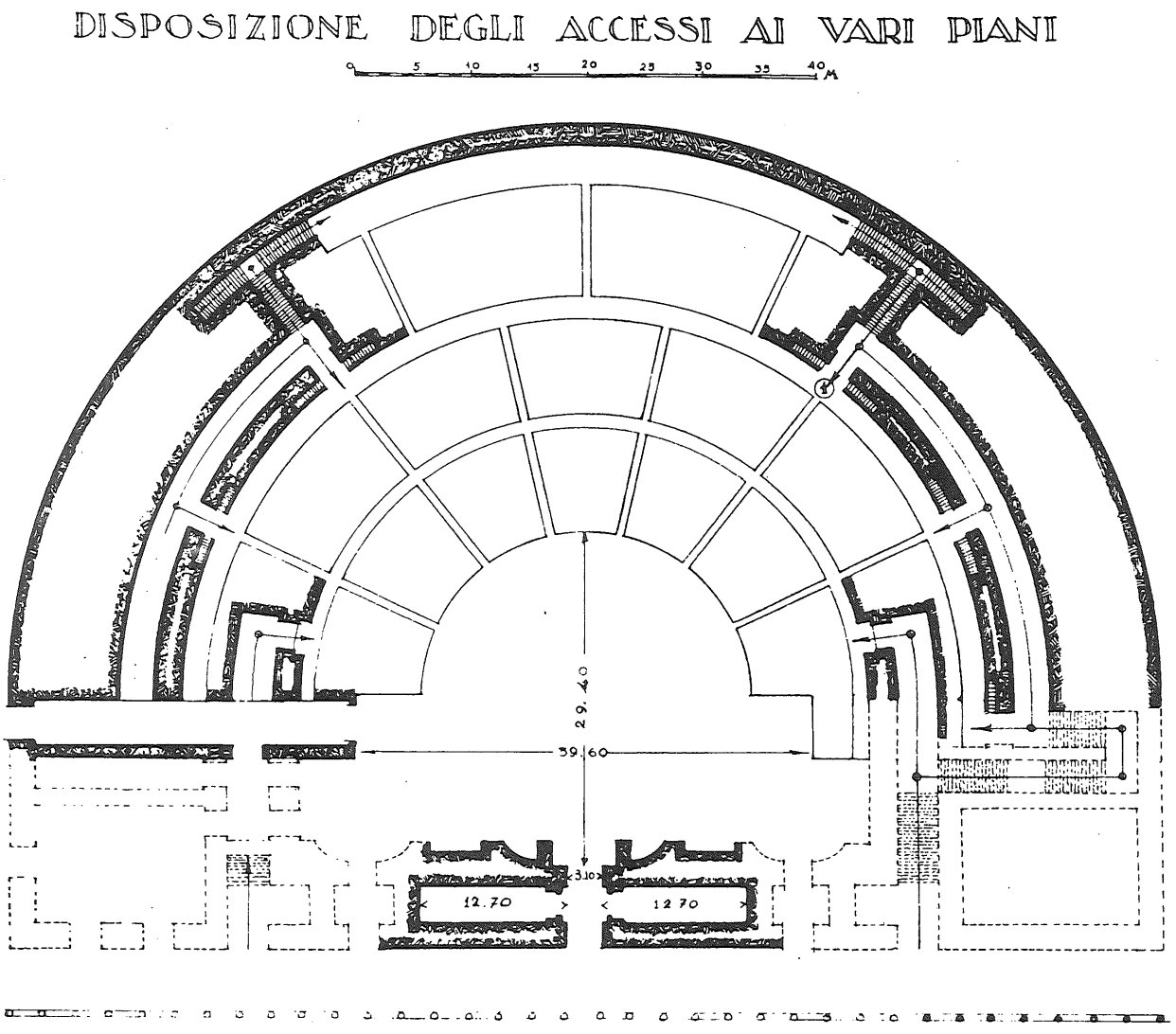
DISPOSIZIONE DEGLI ACCESSI AI VARI PIANI
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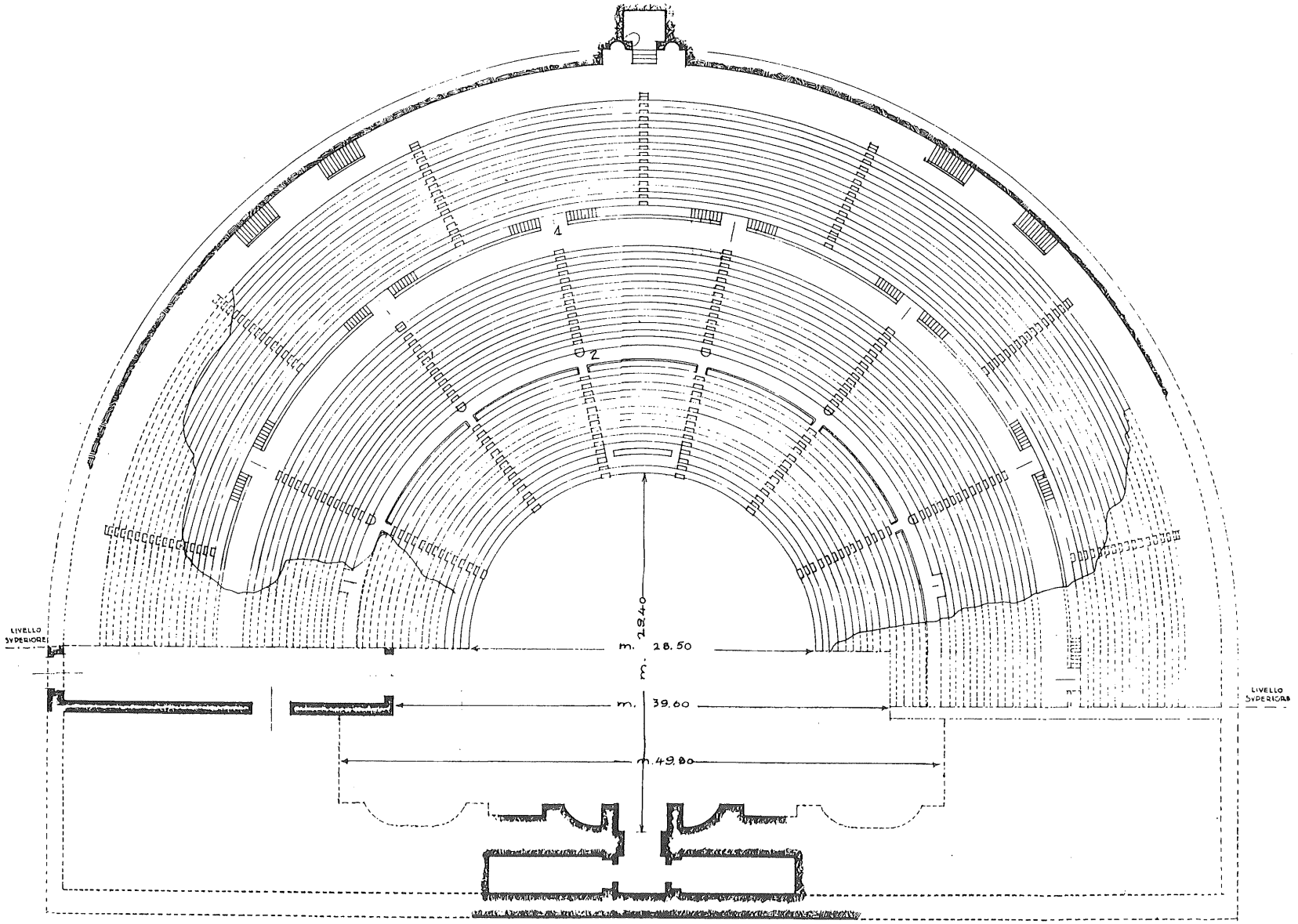
Fig. 11


LIVELLO SUPERIORE
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LIVELLO SUPERIORE

Fig. 12

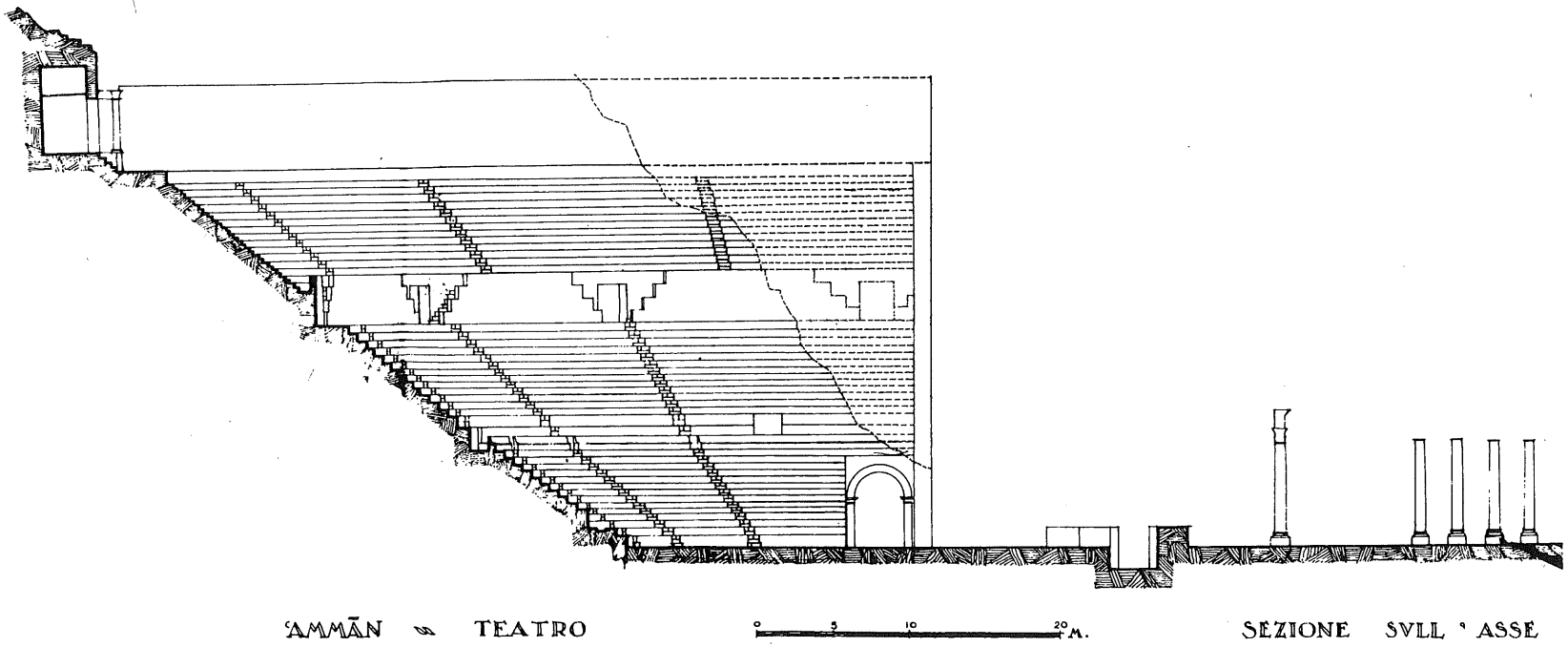


Fig. 13

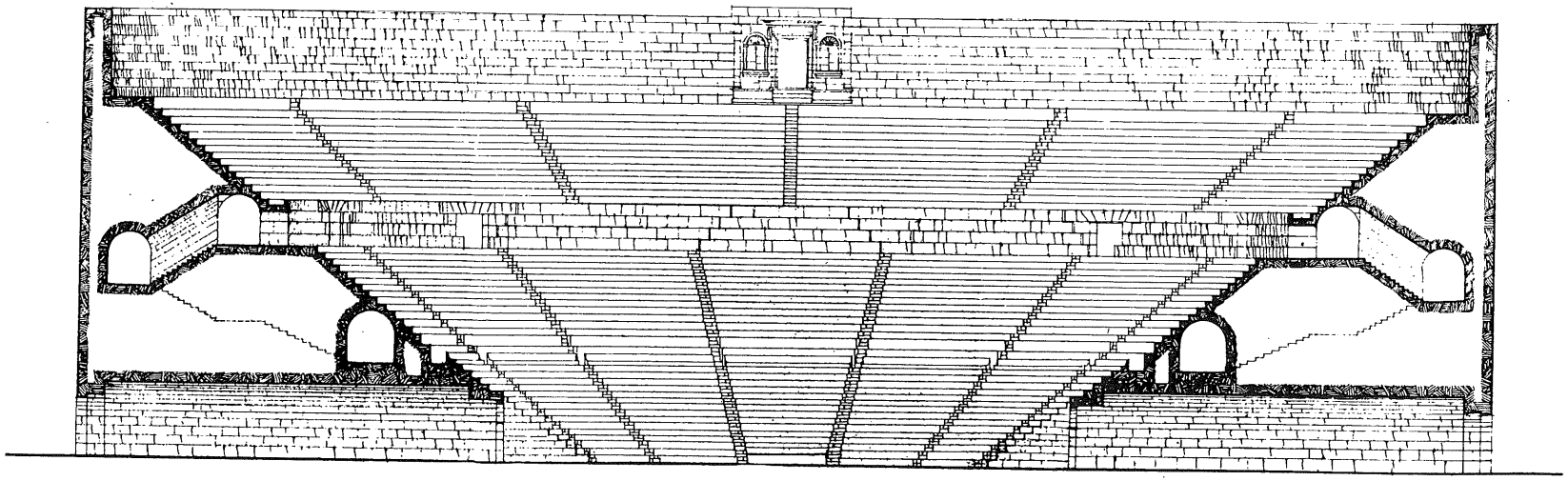
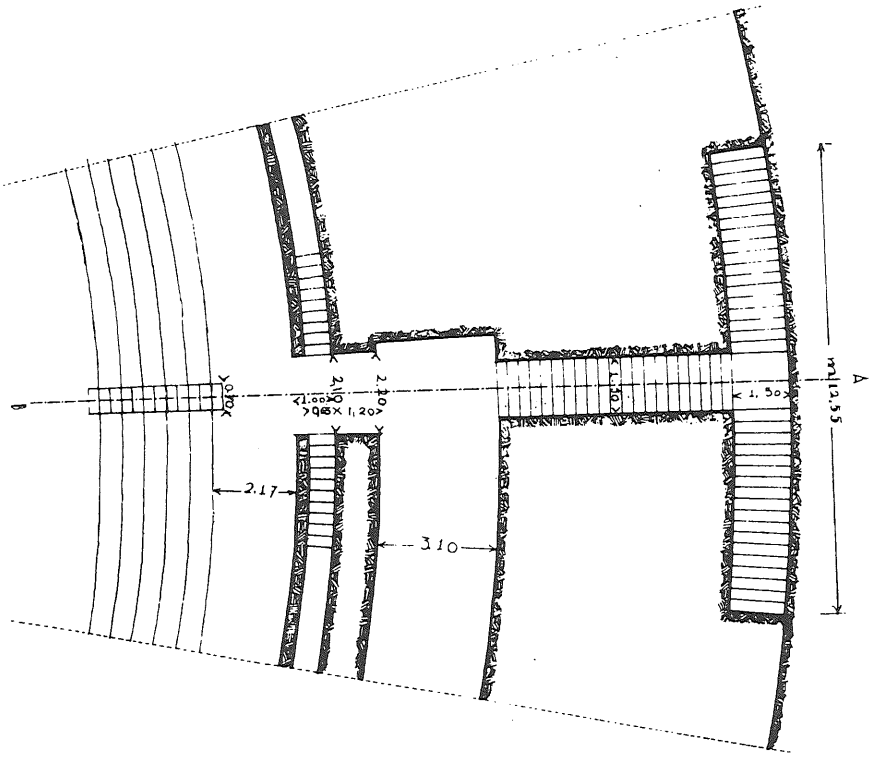
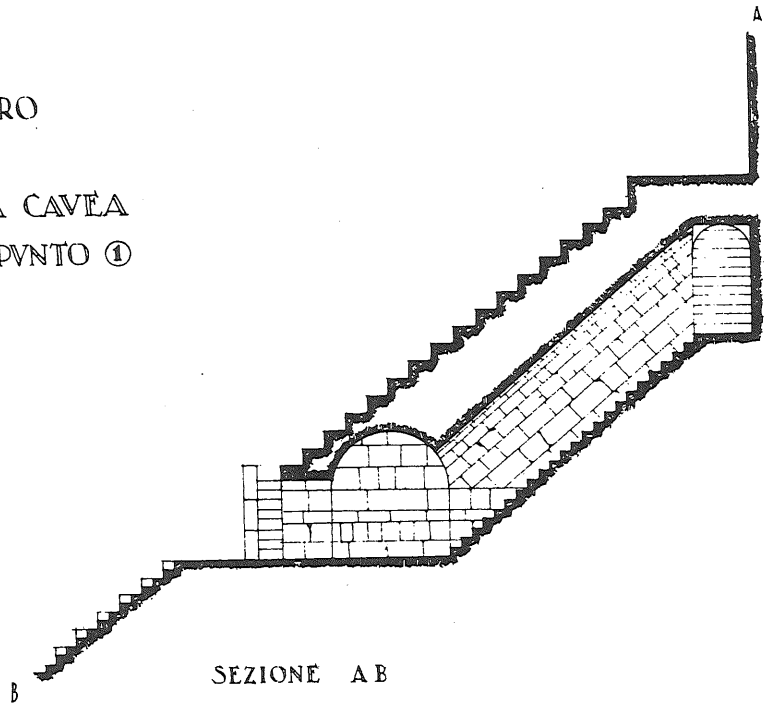


Fig. 14



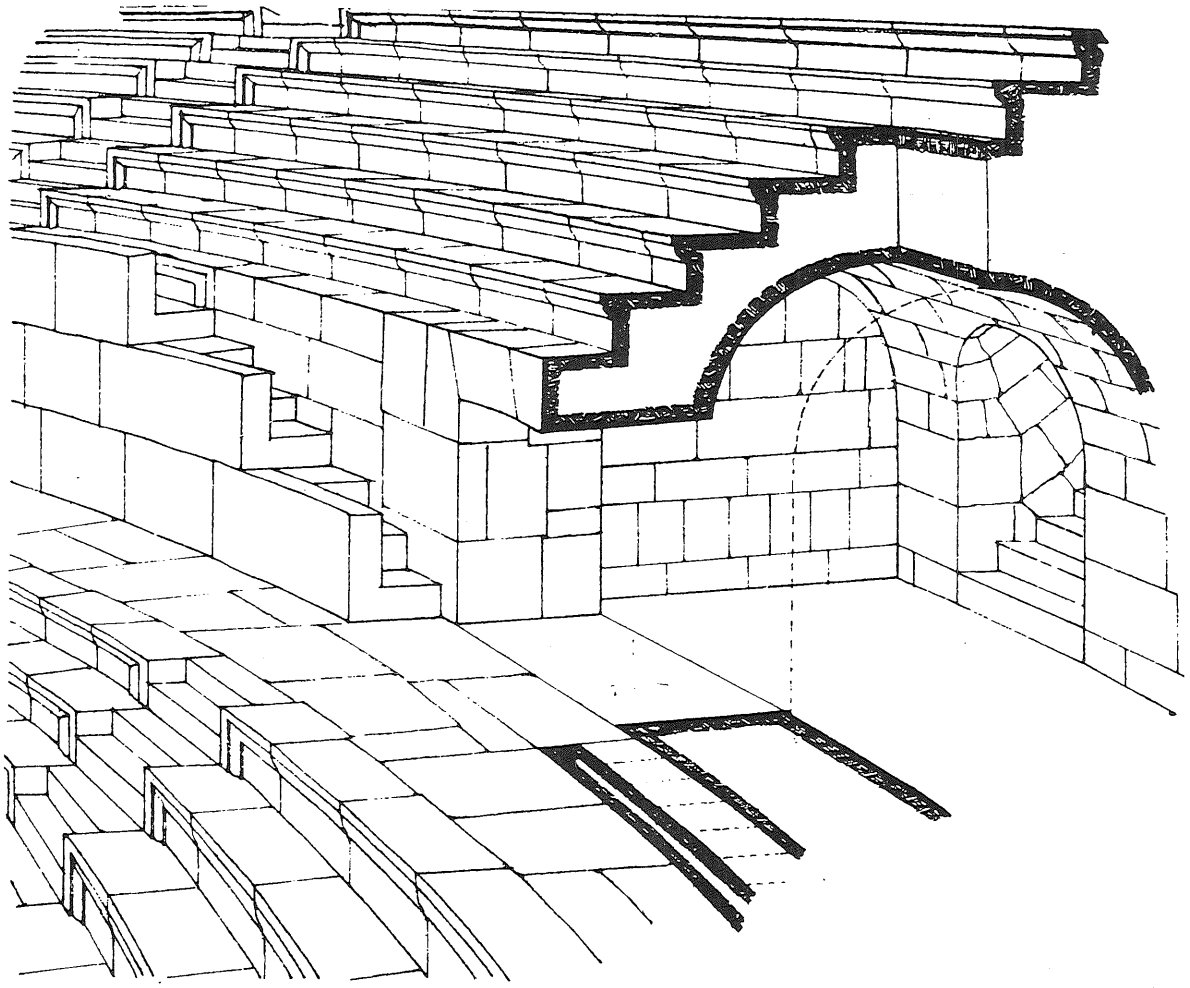
'AMMĀN — TEATRO

PARTICOLARE DELLA CAVEA
E DEGLI ACCESSI NEL PUNTO ①



SEZIONE A B

Fig. 15



VEDVTA ASSONOMETRICA DELLA GALLERIA E DELL'ACCESSO ALLA CAVEA NEL PVNTO ①

Fig. 16

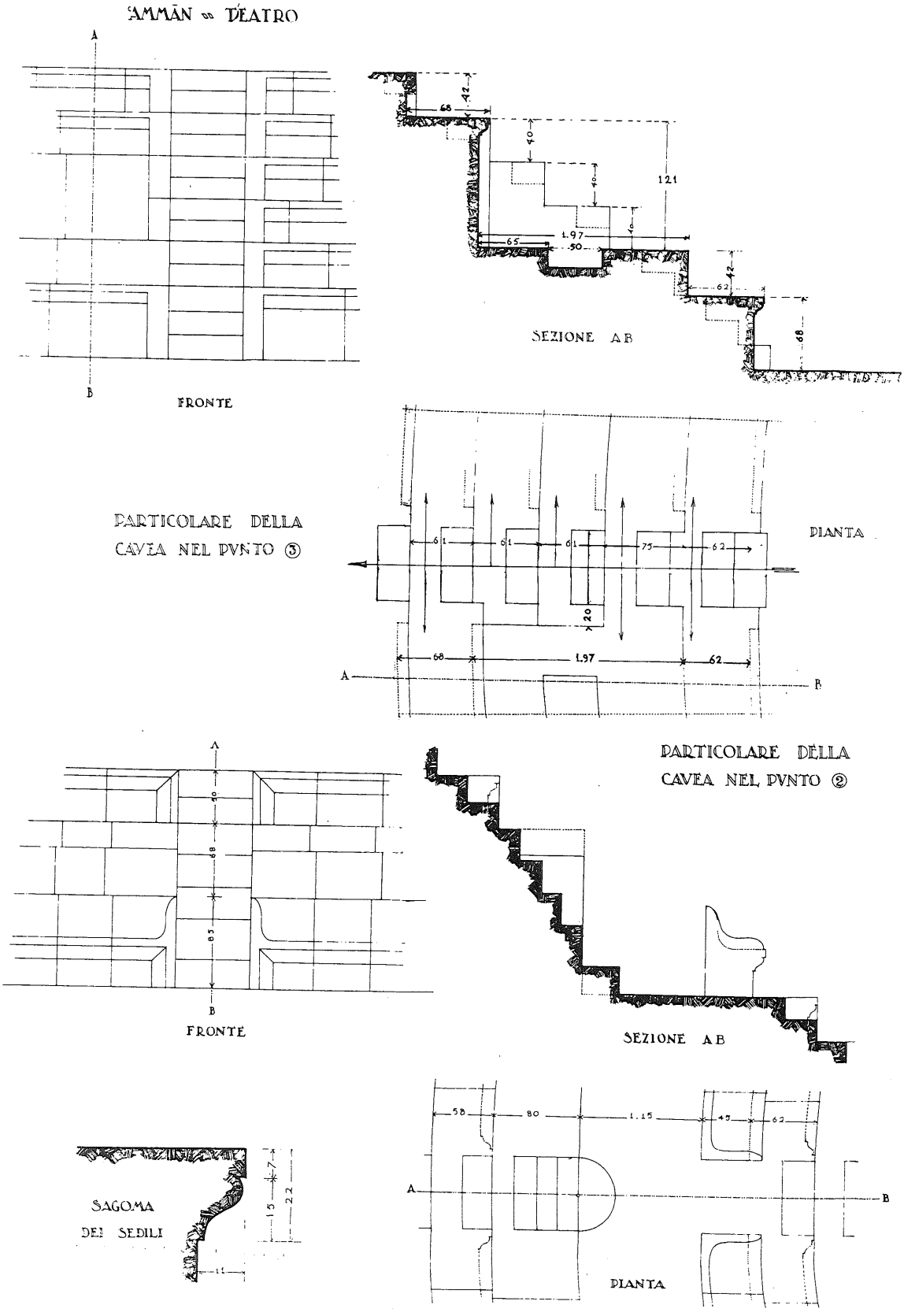

'AMMĀN — TEATRO
A
B
FRONTE
SEZIONE AB
PARTICOLARE DELLA
CAVEA NEL PUNTO ③
PIANTA
PARTICOLARE DELLA
CAVEA NEL PUNTO ②
FRONTE
SEZIONE AB
SAGOMA
DEI SEDILI
PIANTA

Fig. 17

Fig. 18

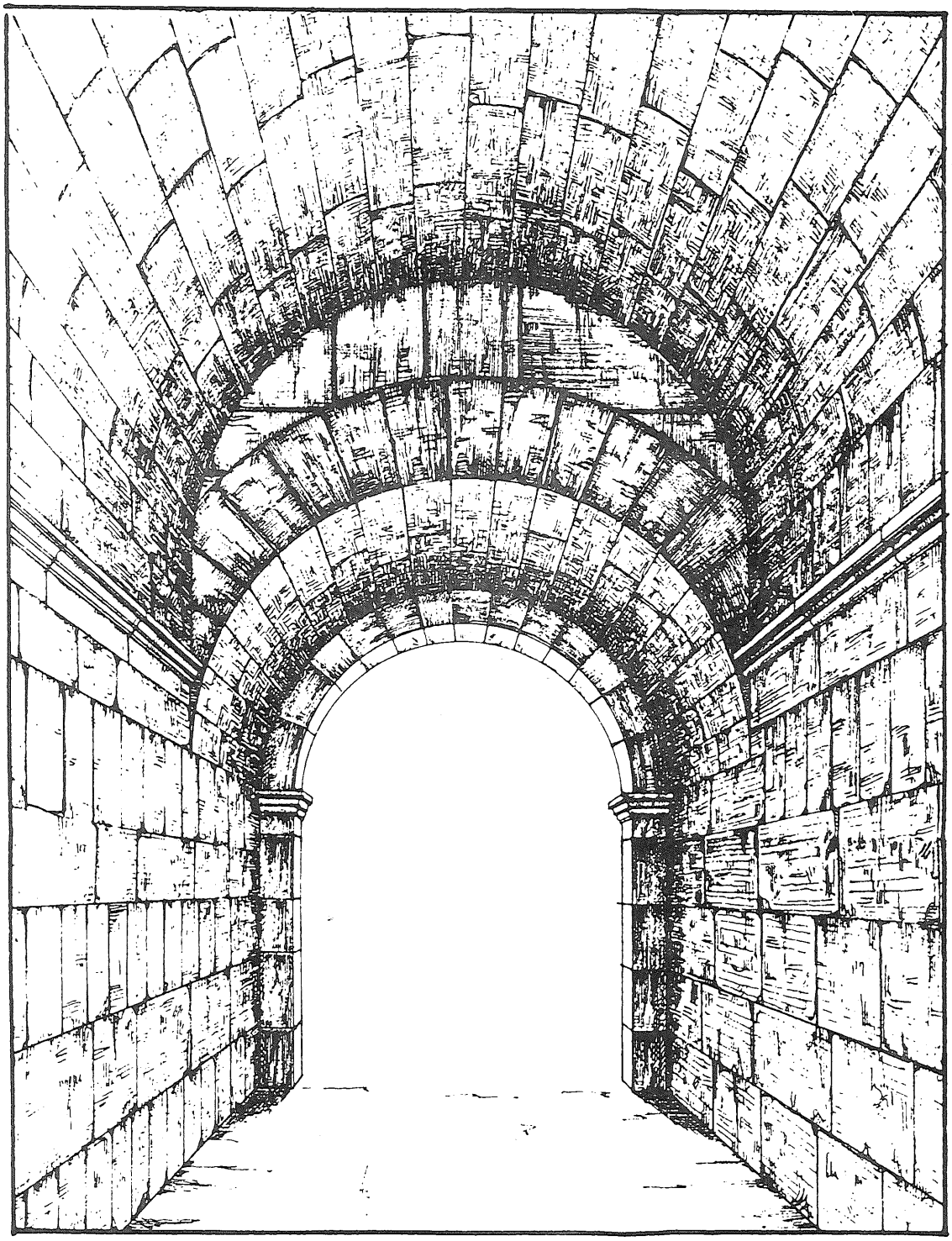
SEDILE NEL TEATRO

DETTAGLIO DELLA PORTA DEL PICCOLO NINFEO

DETTAGLIO DEL FORNICE D'ACCESSO ALL' ORCHESTRA

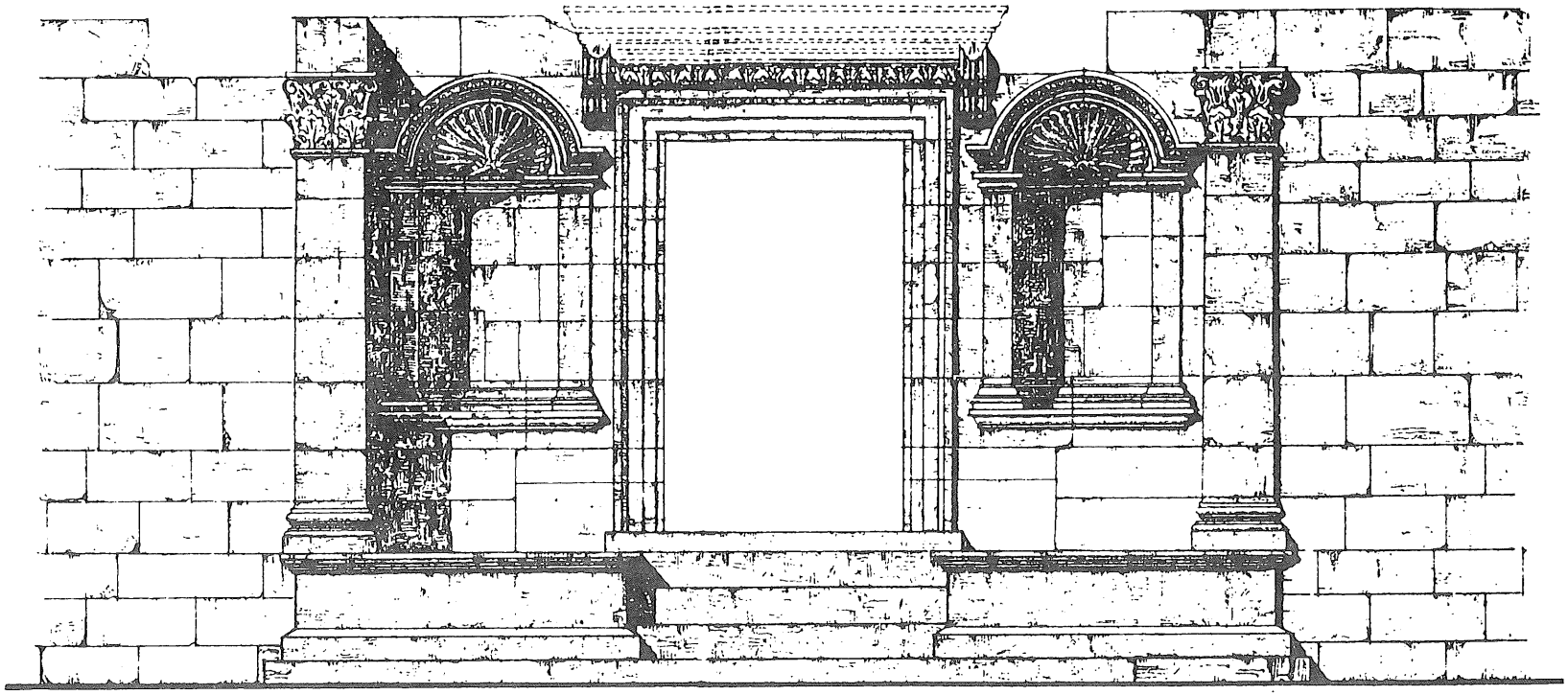
FRAMMENTO D' ARCHITRAVE

'AMMĀN ~ TEATRO



DISPOSIZIONE DEI CONCI NEL PASSAGGIO ORIENTALE ALL' ORCHESTRA

Fig. 19



PICCOLO NINFEO IN SOMMITA'

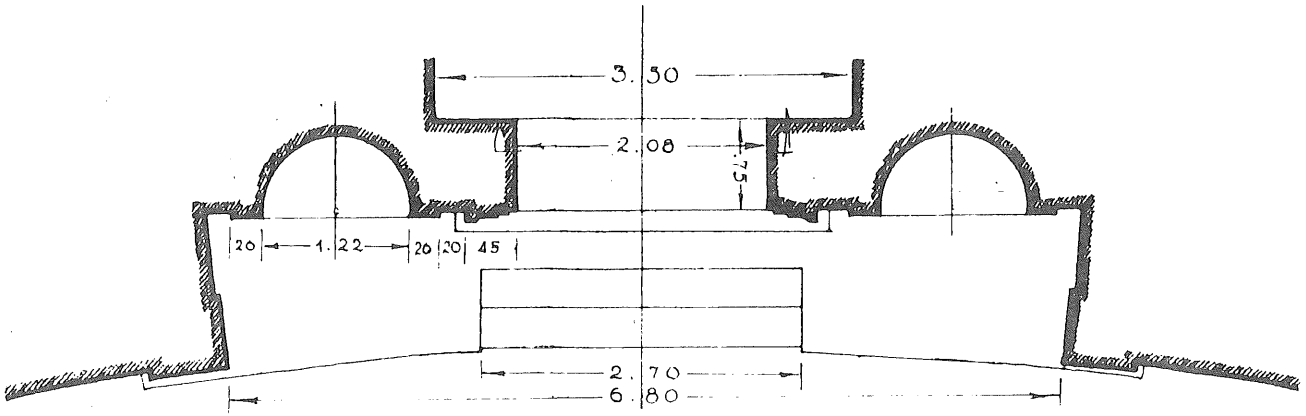
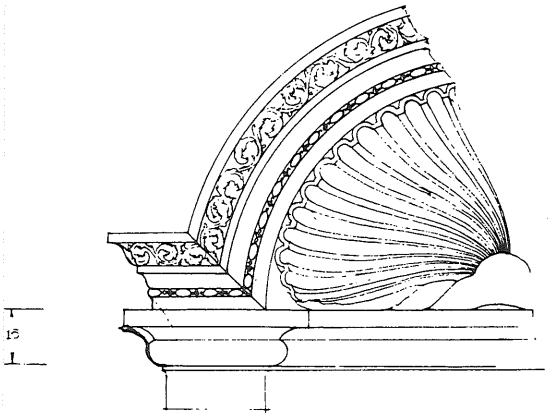
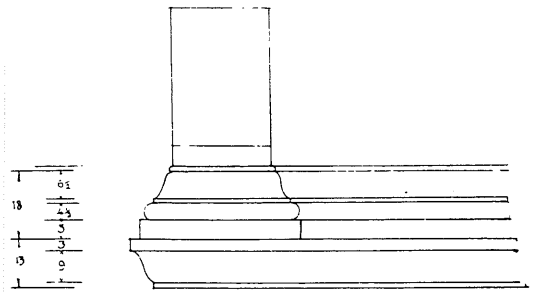


Fig. 20

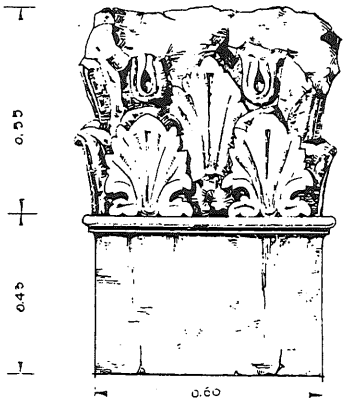


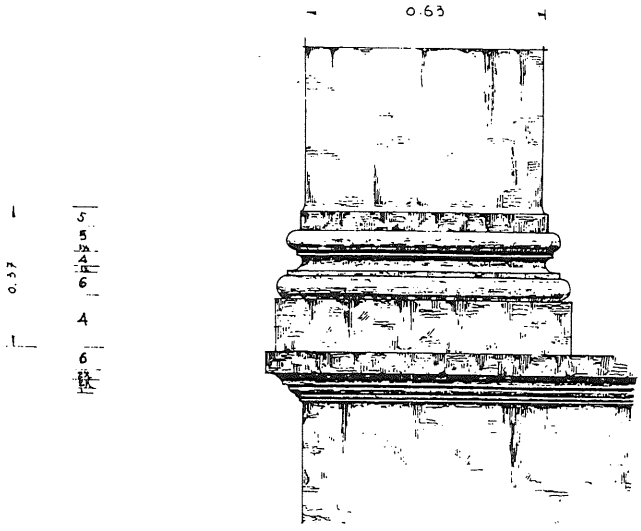
DETTAGLIO

DEL PICCOLO NINFEO



'AMMĀN – TEATRO





DETTAGLIO DEL PICCOLO NINFEO

Fig. 21

except the capital of the small pilaster of the niche which was drawn with a *torus* and a *cavetto* when actually it has a *gula.*

The *Odeon*

This monument must also have been buried deeply when Ceschi saw it, as almost all the defects in the drawings may be attributed to the bottom of the building not being visible. It is interesting to note that the part of the façade preserved has not suffered any noticeable change since 1930, whereas Ceschi drew all that had disappeared since 1900, surely based on the photograph published by Butler.[16] In this connection it should be noted that in 1868 the west wall of the south *parascaenium* was preserved to a much greater height, as can be seen in the photograph published by Conder.[17]

— Figure 22 is the plan of the *Odeon.* Here five access doors from the *postscaenium* to the *procaenium* are shown when actually there were only three. Also missing are the access doors to the rooms at the end of the *postscaenium* and the many door openings Ceschi could not see. The *pulpitum,* discovered after inner cleaning of the building,[18] is not shown. The orchestra, which has an ultrasemicircular ground plan is not shown thus; and, the central *vomitoria* shown leading to the orchestra actually led to the lower *cavea.*

— Figure 23 is the section along the axis of the *Odeon.* It presents similar errors to the plan. Neither the *pulpitum* nor the base of the *frons scaenae,* visible today, are shown, and the level of the orchestra is incorrect.

— Figure 24 is the elevation of the facade of the *Odeon* facing the *forum.* This shows, as we have said earlier, the state in which Ceschi saw it and when photographed by Butler.

In spite of these inaccuracies, the survey may be considered to be more exact than that by Butler[19] which is the same plan published by Hadidi.[20]

The *Nymphaeum*

It is difficult to judge the accuracy of these plans, as the monument is at present completely taken over by modern buildings making the checking of the drawings totally impossible. The only element of comparison is the survey published by Butler[21] with which the plan coincides in almost everything. Only a few details seem to demonstrate that the plans of Ceschi are rather more faithful than those of Butler. At any rate, a comparison of both drawings enables us to verify the destruction suffered by the monument between 1900 and 1930 affecting fundamentally the top of the apse or central *hexedra* which Ceschi draws in dotted lines.

— Figure 25 is the ground plan of the *Nymphaeum* at the level of the foundations and sewerage into the river.

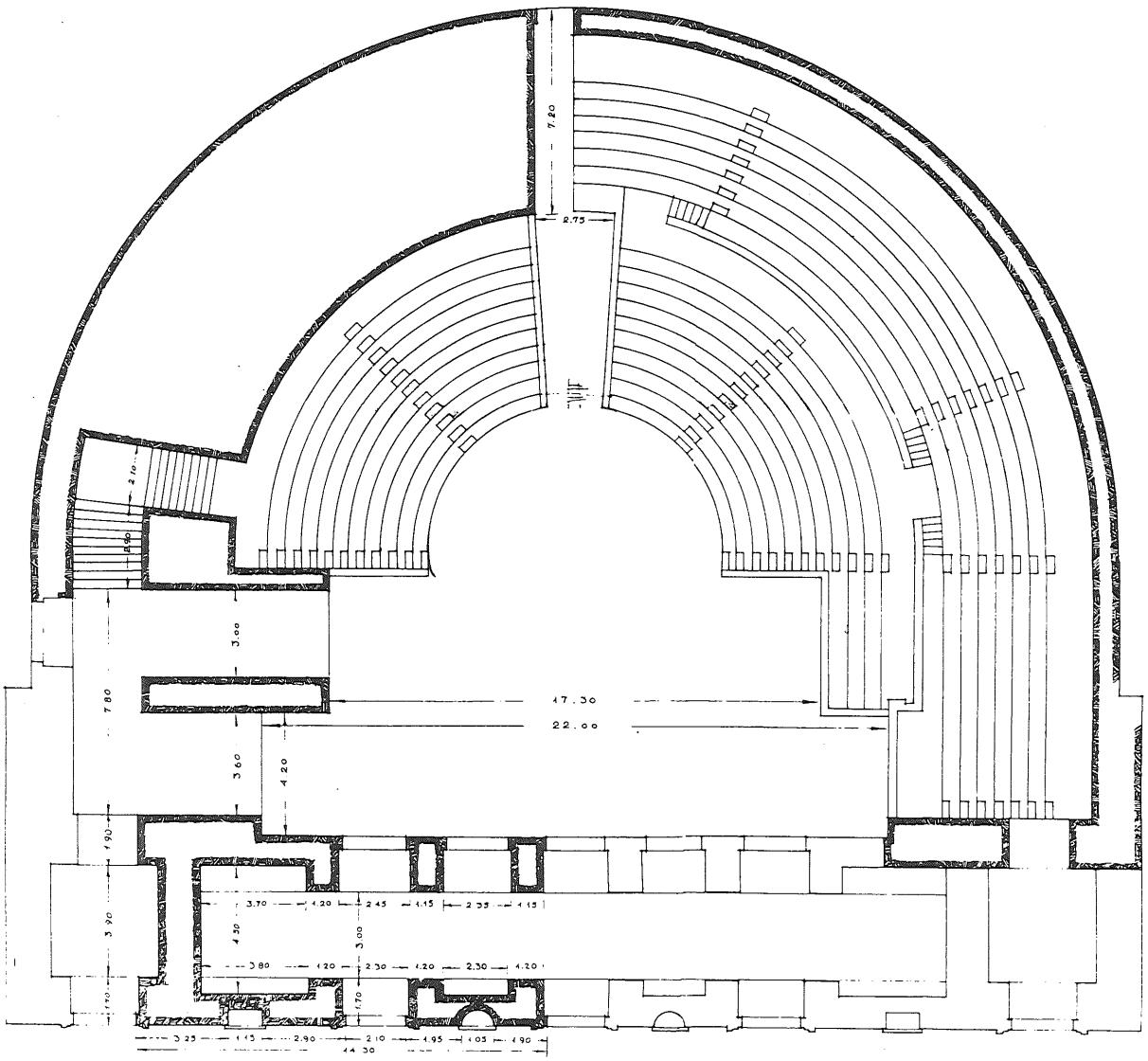
— Figure 26 is the plan of the *Nymphaeum* at the level of the *portico.*

Figure 27 presents the elevation of the *Nymphaeum* at its monumental part.

The fact that we have laid special emphasis on the errors or defects observable in all these plans should be no reason for a less than positive judgement of all the work carried out by the architect Carlo Ceschi in 1930. In general I have already said that almost all these defects are due to the fact that the monuments were at that time still unexcavated. In spite of this, I believe them to be an important contribution to the study of the Roman monuments in Amman, surpassing in quality those already published. May this critical study then serve as a warning to those who may wish to use these plans as a possible starting basis for a definitive planimetric survey of these buildings.

For my part, I only wish to contribute to public knowledge this important documentation, unfortunately unpublished until now. And, at the same time pay my

[16] Butler, 1907, ill. 35.
[17] Conder, 1889, opposite p. 40.
[18] Hadidi, 1974, p. 89.
[19] Butler, 1907, ill 34.
[20] Hadidi, 1974, Fig. 9. A new plan of the Odeon, prepared by J. Rougetet, has been recently published by F. Zayadine, *ZDPV,* 99 (1983) Fig. 1, p. 185.
[21] Butler, 1907, ill. 38.



L'ODEON

0 1 2 3 4 5 10

Fig. 22

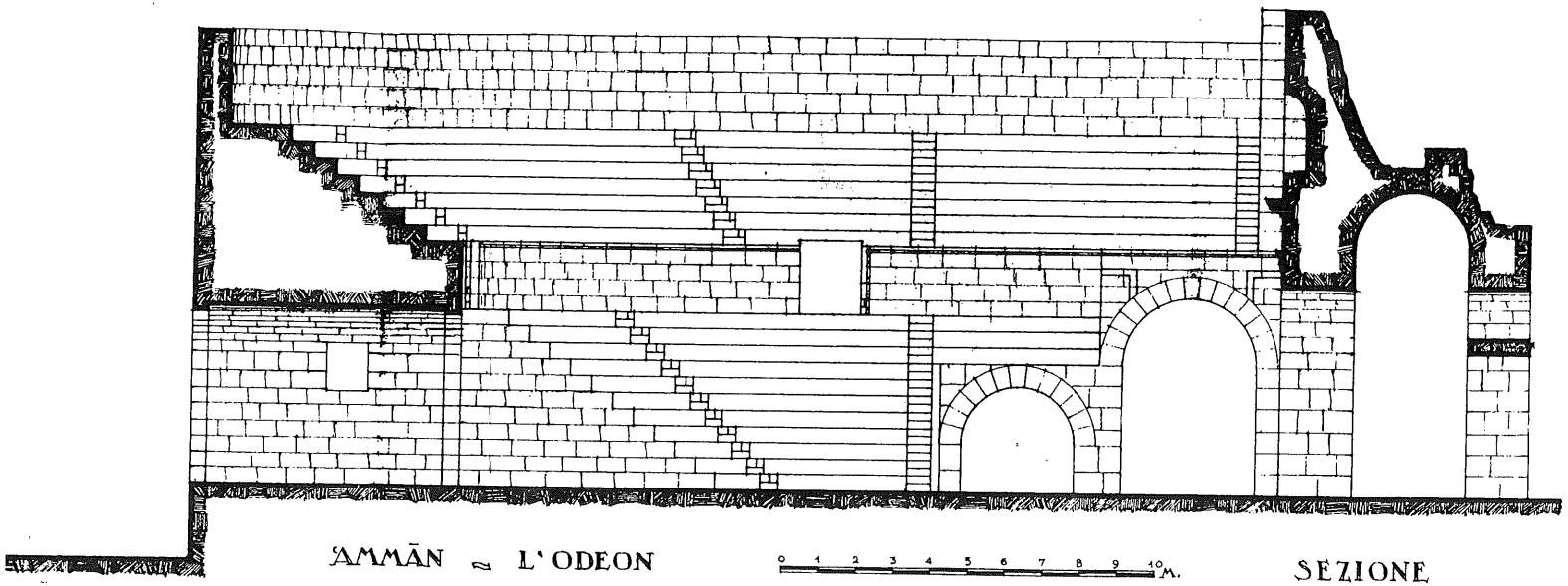
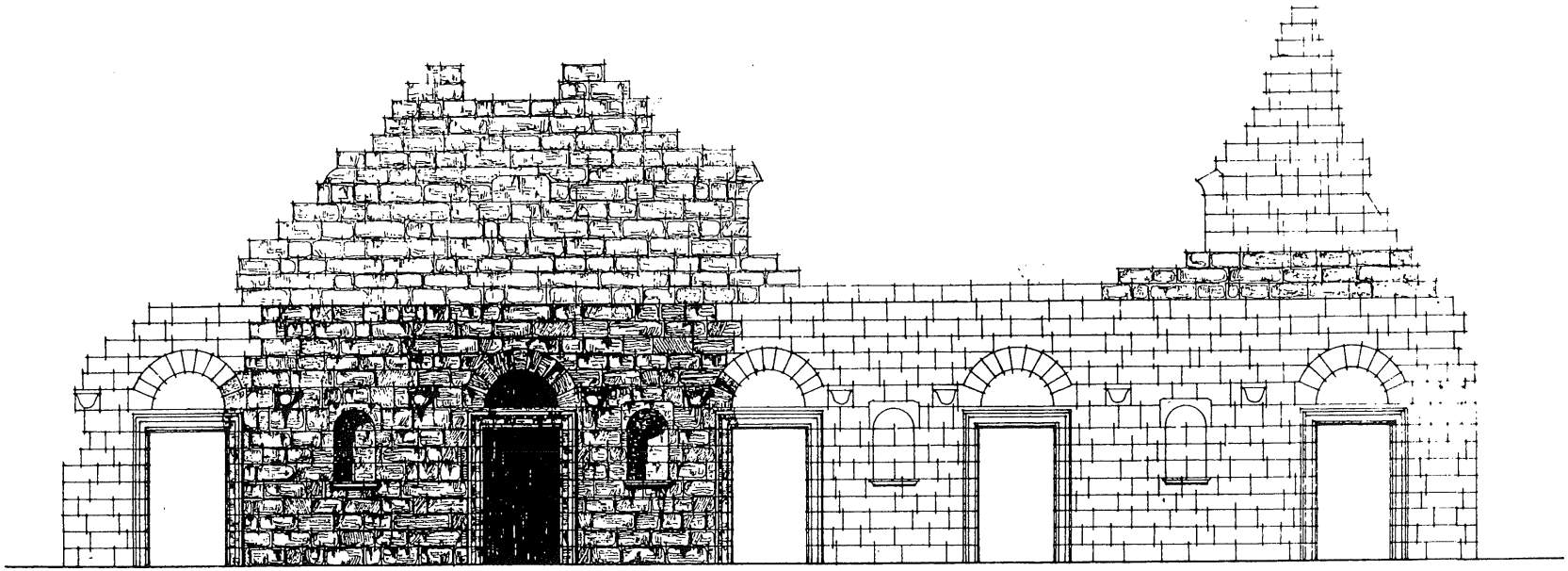


Fig. 23



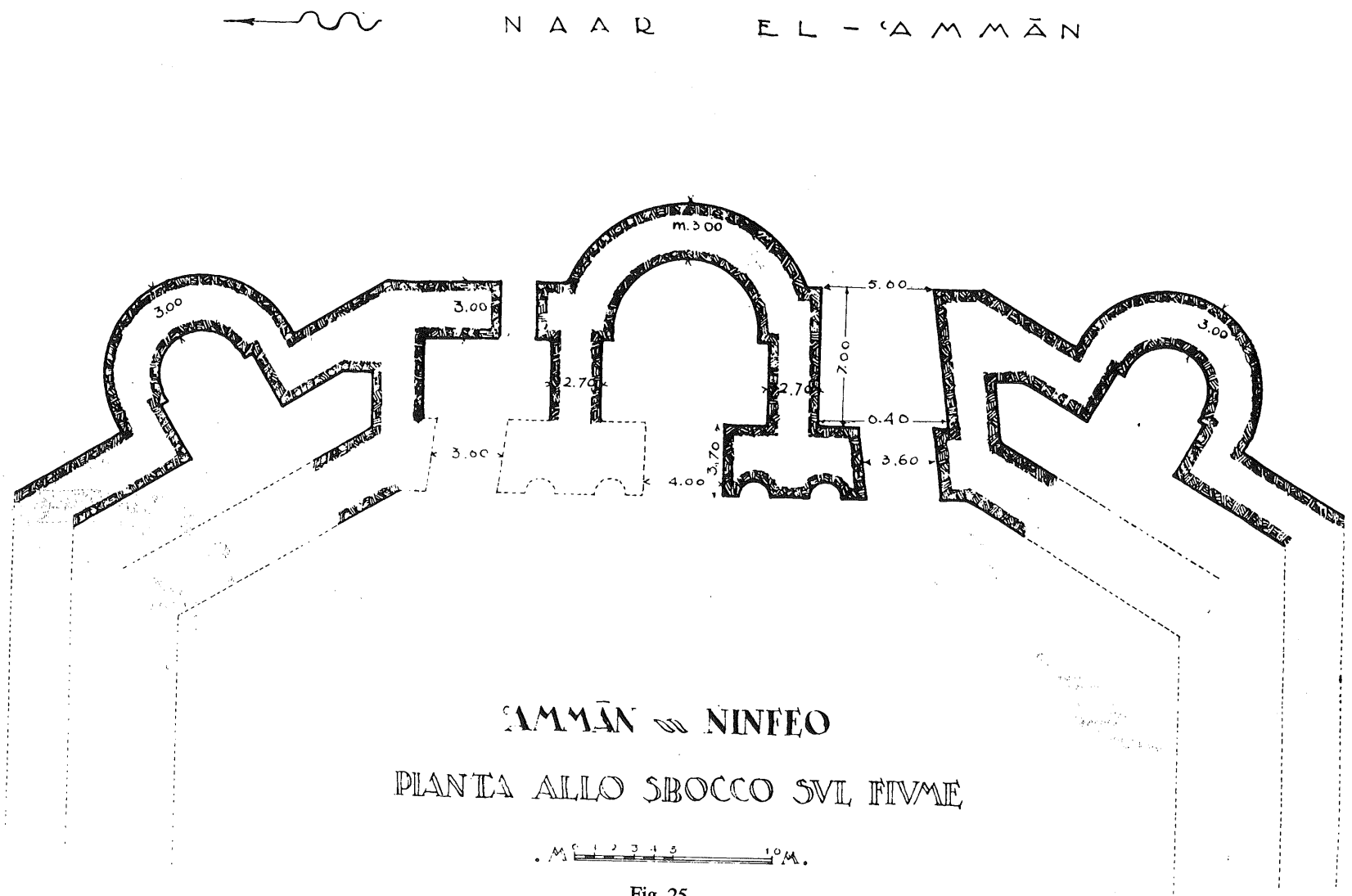
ELEVAZIONE

0 1 2 3 4 5 6 7 8 9 10M

'AMMĀN — L'ODEON

LA PARTE IN NERETTO E' QVELLA ESISTENTE

Fig. 24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3.00
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ʿAMMĀN ~ NINFEO
PIANTA ALLO SBOCCO SVL FIVME
M 0 1 2 3 4 5 10 M.

Fig. 25


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PIANTA AL PIANO DELLA CITTA'
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Fig. 26

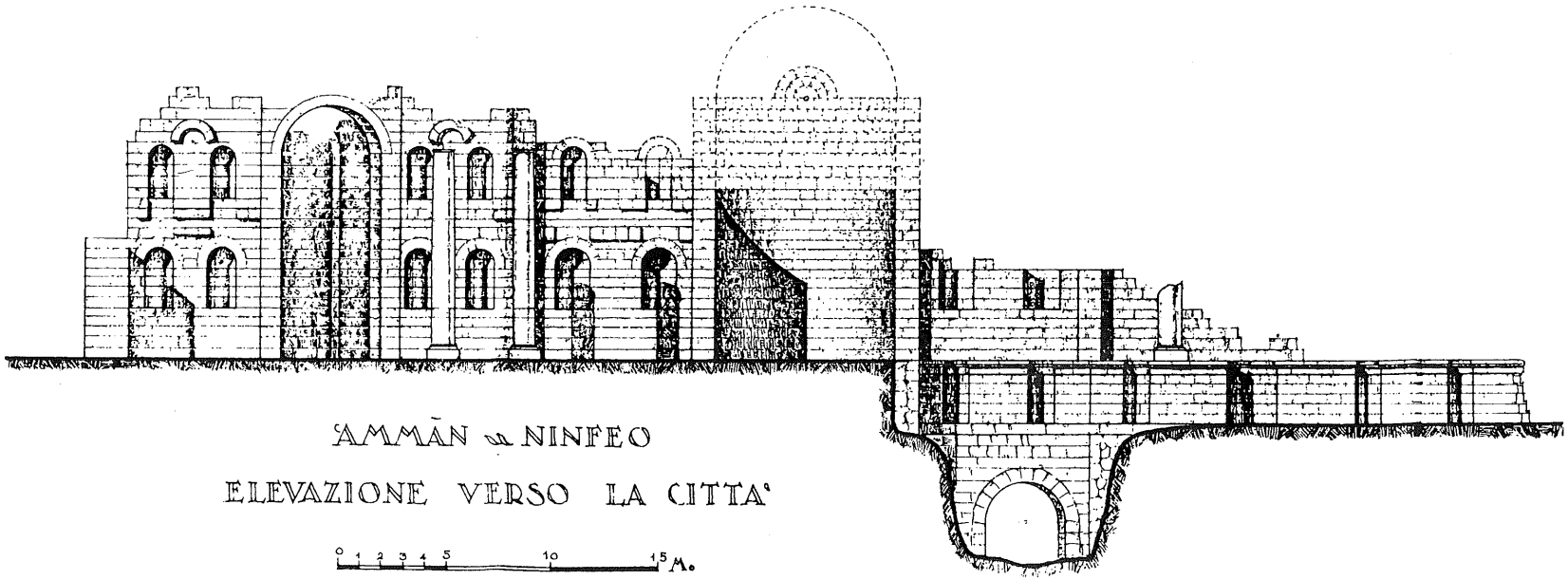

Fig. 27

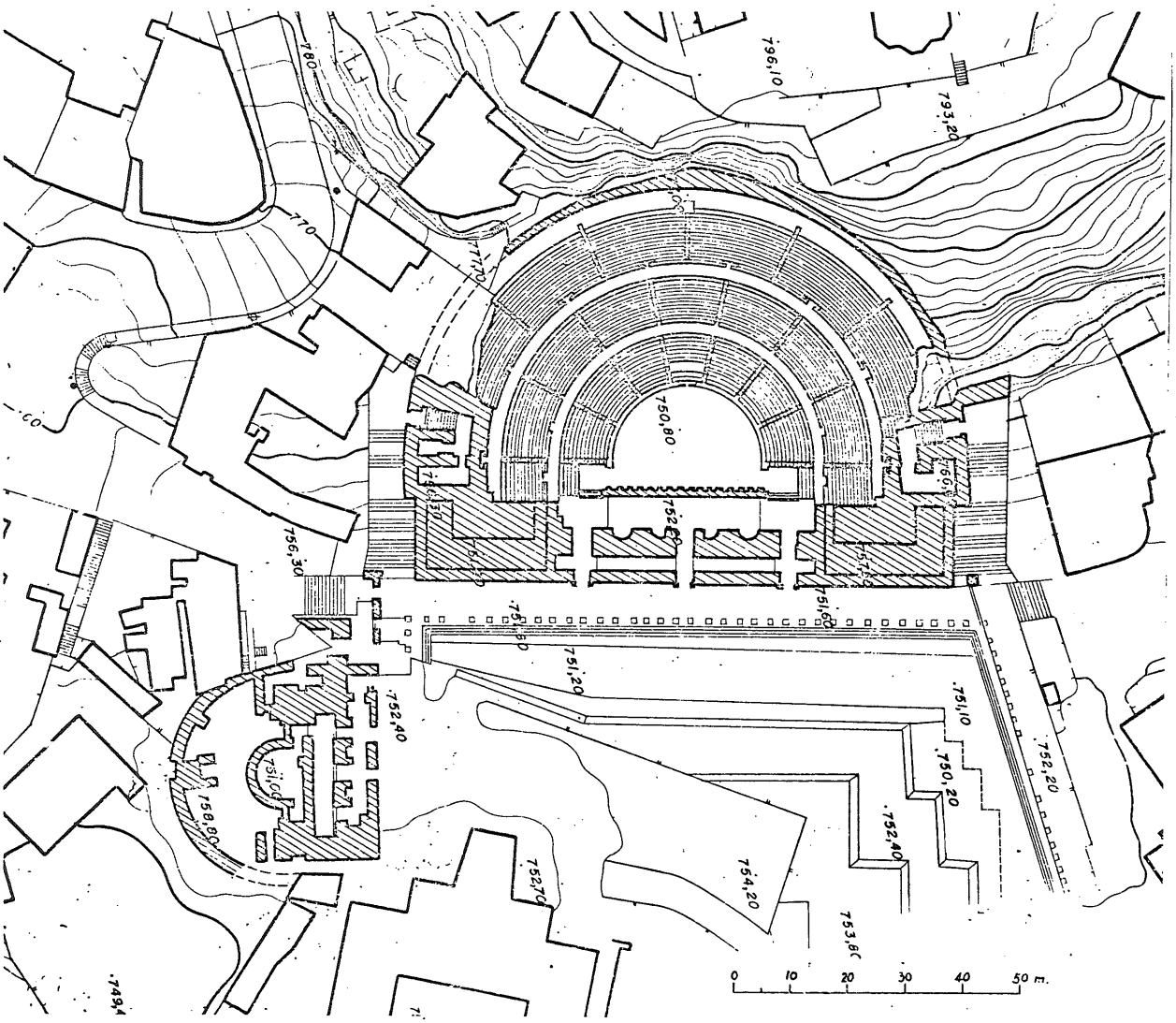

Fig. 28: The Theater and the Odeon Plan made by the Spanish Archaeological Mission (1970).

regards to the architect Carlo Ceschi, one of the great post-war Italian restorers whom I had the great fortune to become acquainted with and have as a professor during my specialised restoration studies at the University of Rome and the ICCROM. The best example of his teaching is, perhaps, his book *Teoria e Storia del Restauro,* which has contributed to the training of so many specialists in the field of restoration with its readable explanation and development of the theories applied in this field over the years.

This is not the place to speak of his activities as restorer, although the drawings published here are sufficient examples of his professional worth.

Antonio Almagro
Spanish Archaeological Mission

BAQ'AH VALLEY PROJECT SYMPOSIUM

by

Patrick McGovern

A Baqa'ah Valley Project Symposium was held the weekend of October 23-24, 1982 at the University Museum, University of Pennsylvania, Philadelphia, PA, U.S.A. The conference was sponsored by the Museum Applied Science Centre for Archaeology (MASCA) and the Near Eastern Section of the Museum through a grant from the University's Humanities Coordinating Committee.

The six public lectures on the Saturday program (The Archaeology of Jordan: An Interdisciplinary Perspective) were designed to give both the educated layman and the professional an overview of current archaeological work in Jordan, especially with regard to its increasingly scientific character. Given the necessary limitations of a one-day seminar, the sites and areas discussed, including some of the most intensively explored in Transjordan, covered a broad time span (Early Bronze Age up to the present) in considerable detail for different regions of the country (Jordan Rift Valley; central and southern plateau). Several of the following abstracts are of special interest, because they incorporate previously unpublished material. Full documentation and qualifications of the conclusions presented in a summary fashion here must of course await the final publications. As a final explanatory note, Beth Shan was included in the program because of the Museum's long-standing involvement with this site and its close ties with several of the Jordanian sites.

The choice of sites for the Saturday seminar was largely dictated by ongoing MASCA/Pennsylvania analytical programs and collaborative efforts, which were the focus of a workshop on Sunday (October 24). Presentations were given on Baq'ah Valley Project research, including metals (V. Pigott, MASCA), ceramics (P. McGovern), neutron activation analysis (G. Harbottle, Brookhaven National Laboratory), proton-induced x-ray emission spectroscopy (C. Swann, Bartol Research Foundation of the Franklin Institute), scarabs (J. Weinstein, Cornell University), Mycenaean and Cypriot imports (R. Koehl), marine mollusks (D. Reese), geophysical prospecting (B. Bevan), and human skeletal remains (D. Ortner and B. Frohlich, Smithsonian Institution; M. Finnegan, Kansas State University; M. Saul). General discussion followed each talk which was aimed at resolving outstanding problems and setting future research objectives. A summation session in the afternoon then sought to articulate the results of the various archaeometric and archaeological studies into a coherent frame-work of cultural and technolgoical development in the Baq'ah Valley over a 500 year period (*ca.* 1600-1050 B.C.) For example, a marked shift in the metals and ceramics industries around 1200 B.C. with the appearance of mild steel jewelry and poorly fired, calcite-tempered wares, respectively, must be viewed in the context of the human and natural environment; the geological, human skeletal, faunal, and floral data is now being fully examined for any evidence of climatic deterioration, the incursion of a new ethnic element, etc. that might account for the technological changes. The present plan is to publish the technical reports as a *MASCA Journal* Supplement and the archaeological material as a Museum Monograph.

The Archaeology Of Jordan: An Interdisciplinary Perspective; Welcome (by Khair Yassine)

It is indeed fitting that today's symposium should be held at the University Museum of the Univesity of Pennsylvania, since this institution has long been in the forefront of archaeological research in Jordan. Over the past twenty-five years joint projects of survey and excavation were carried out through the collaborative efforts of the Department of Antiquities, the University of Jordan, and Pennsylvania, which included work at Tell es-Sa'idiyeh, in the

Jordan Valley, and in the Baq'ah. A number of native Jordanian archaeologists also received their academic training at the Museum. I sincerely hope that the proceedings of this conference will continue to encourage the scholarly dialogue and cooperation between American and Jordanian scholars, as already begun by the First Conference on the History and Archaeology of Jordan, held at Oxford in 1980, and the Third Conference on Bilad al-Sham, which took place at the University of Jordan in the same year.

The University of Jordan, young though it may be, has begun to build up research facilities for the recording, analysis, and conservation of archaeological materials. This will provide a central laboratory available to all interested researchers, and the goal is to combine it with an archaeological data bank.

Until very recently archaeologists of Palestine and Jordan were largely preoccupied with pottery and architecture, especially as it related to the biblical tradition. As a result, ecological, demographic, and social processes were ignored. However, a wider perspective is needed, particularly in Jordan where textual material is meager. This symposium should move us further in the direction of integrating the diverse archaeological data into a more coherent picture of environmental conditions, population dynamics, settlement patterns, and technology. Drs. McGovern, Sauer, and Fleming are to be especially thanked for organizing the symposium. The large attendance today is eloquent testimony to the widespread interest in the archaeology of Jordan.

Recent Scientific Approaches in Jordanian Archaeology: The Baq'ah Valley as a Case Study (by Patrick McGovern)

Four seasons of work in the Baq'ah Valley illustrate how scientific techniques need to be fully integrated into an archaeological project. In addition to being essential for the reconstruction of technological and cultural processes, scientific instrumentation is valuable in developing a directed, economical field strategy.

The main focus of the Baq'ah Project has been the elucidation of the Late Bronze (LB) and early Iron periods. Nelson Glueck in his pioneering survey of the central and southern Transjordanian plateau had noted a relative absence of LB remains, which led him to hypothesize that the region had been inhabited largely by nomads and 'semi-nomads' before the emergence of national states (Ammon, Moab, and Israel). Yet the appearance of exceptionally well-made LB I (*ca.* 1550-1400 B.C.) pottery on the Amman antiquities market in 1975-76, which was traced back to a partly robbed-out burial cave in the Baq'ah, pointed to a well-established, sedentary community. Subsequently, a trial sounding in this cave produced such impressive archaeological remains that a full-scale program of systematic survey and excavation was planned with the support of the University Museum and its Applied Science Centre (MASCA), the National Geographic Society, and the Jordanian Department of Antiquities.

During the 1978 survey, thirty-three additional partially or fully robbed-out burial caves, nineteen of which dated to various phases of the LB, were located on the lower northwestern slopes of the Baq'ah. The caves, which were formed initially by erosion of limestone and sandstone strata, run in lines at the back of terraces. In time they silted up and a thick soil accumulation sealed off the entrances to most of the tombs. The challenge was to find and employ a method of detection for locating undisturbed caves. Preliminary tests of soil and stone from the Baq'ah indicated that there was a contrast between the more magnetic soil in the caves and the surrounding bedrock. Measurements in the vicinity of the robbed-out caves with a cesium magnetometer led to the isolation of significant magnetic anomalies.

The most interesting of these anomalies, a 7.00 x 11.00 m. magnetic high, proved to be a completely intact Iron IA

(*ca.* 1200-1050 B.C.) cave with over 225 burials and a unique assemblage of 78 whole vessels, bronze and mild steel jewelry (NB: no weapons), and a wide assortment of small artefacts in glass, faience, semi-precious stones, and bone. Detailed metallographic examination showed that there must have been good control of the metals' production — the bronze has consistently high levels of tin (10-15%), and the mild steel displays a uniform carbon distribution. Glass was limited to 7 beads of very high iron (50%) content, suggesting that they were byproducts of the iron industry. The proximity of iron mines 10-80 kms. to the north, the only known source of iron ore in the Levant, suggests that fuller investigation of central Transjordan is crucial to understanding the transition from the Bronze to Iron Age.

Excavation of another magnetic high in 1981 resulted in the discovery of undisturbed LB II (*ca.* 1400-1200 B.C.) burial remains, which conveniently filled in the gap between the LB I and Iron IA groups. The LB II cave with its 20 odd burials and over 300 whole vessels provided the all-important link between the earlier and later artefactual and skeletal remains. Neutron activation, petrographic, and fabrication studies of the pottery indicate that the majority of the vessels from all three groups are made of clay from a bed in the wadi immediately below the main LB-Iron Age settlement site of the region, Khirbet Umm ad-Dananir. Although potters continued to use this clay over a 500-year period, less care was taken in tempering and firing the wares as well as in forming and decorating the vessels as one moves from LB I to Iron IA. Imported wares from Cyprus and central mainland Greece (as confirmed by neutron activation analysis) were found only in the LB tombs in which a larger number of vessels and special small finds (scarabs and cylinder seals) attested to a higher standard of living. Glass was the preferred material for jewelry in the LB I group; affinities with the Mesopotamian industry were revealed by pigment studies. Preliminary morphological and palaeopathological investigation of the human skeletal materials suggests continuity in the human population, and a relatively high incidence of arthritis and dental caries, often characteristic of an agricultural way of life, was noted for the three groups. Carbonized bread wheat from the LB II tomb was the first direct evidence for plant domestication.

The LB level at the settlement site of Khirbet Umm ad-Dananir has thus far been exposed in only a very limited area of the $2^1/_2$ hectare site. A pit, containing large pottery vessels and the burnt bones of a variety of animals (sheep/goat, donkey, cow, and a carnivore), and an associated wall and floor were found 3.00 m. from the surface beneath Early Roman and late Iron Age remains. A wider exposure of the LB and Iron I occupational levels, the latter attested to by surface sherds, is planned in future seasons.

Human Biological History at The Early Bronze Age Site of Bab Edh-Dhra (by Donald J. Ortner and Bruno Frohlich

Archaeological evidence at Bab edh-Dhrâ' suggests a gradual transition from a nomadic-pastoralist society in EB I (3150-2850 B.C.) toward a more sedentary, urban society highlighted by the construction of defensive city walls in the early stages of EB II (2850-2550 B.C.). The urban society flourished until the end of EB III (2550-2275 B.C.) and appears to be followed by a return to a nomadic-pastoralist society during EB IV (2275-2050 B.C.) at the end of which the site was abandoned. In the cemetery the transition from nomadic-pastoralist to urban society is suggested by the change in burial pattern from primarily secondary interments in underground shaft tombs during EB I to predominantely primary interments in mudbrick charnel houses toward the end of EB I and during EB II-III.

Preliminary data suggest that the EB I people were small both in stature and build with subsequent people being taller and more muscular. Whether this difference represents a change within a group or a new group of people taking over the site is not yet resolved. Evidence of probable

traditions are found at the sites of Tell el-Far'ah (N), Samaria, and Hazor, where strata generally assigned to the eighth and seventh centuries B.C. have produced striking parallels to the Tell es-Sa'idiyeh corpus of forms. Thus, the cultural alignment of Tell es-Sa'idiyeh in the late Iron II period would seem to be with the sites across the Jordan on its west bank, rather than with those on the plateau of Transjordan. Lines of contact can be drawn across the Jordan to the hill country on the west and also up the Jordan Valley as far as Hazor.

Tell Hesban: 2700 Years of Frontier History (by Lawrence T. Geraty)

Tell Hesban is a Transjordanian mound at an elevation of 2900 feet, which guards the northern edge of the rolling Moabite plain where a southern tributary to the Wadi Hesban begins to cut down sharply toward the Jordan River, about 15 miles to the west. It is about 35 miles east of Jerusalem, 12 miles southwest of Amman, 4 miles northeast of Mt. Nebo, and 600 feet higher than 'Ain Hesban, the perennial spring with which it is often associated. Because of the spring's distance and the absence of wells, springs, or streams at the tell itself, extensive facilities for storage of rain and runoff water were essential throughout all periods of occupation.

For geographical and linguistic reasons Tell Hesban is identified with Heshbon, mentioned 38 times in the Bible. The earliest literary reference to Heshbon's history is in Num. 21 where mentioned is made of the Israelites taking the city from Sihon the Amorite who had in turn taken it from the Moabites. It became a possession of the tribes of Reuben and Gad, belonged to Solomon's 12th administrative district, and ultimately reverted to Moab and perhaps Ammon. In post-biblical pre-Arab literary sources, the site is commonly called Esbus. It is also known from coins, milestones, and inscriptions.

An Andrews University expedition completed five seasons of excavation (1968, 1971, 1973, 1974, and 1976) at this once vital commercial and military centre at the intersection of two important ancient trade routes. A series of 32 squares were cut to bedrock along major north-south and east-west axes centered in the acropolis. This was supplemented by tomb research and soundings scattered around the perimeter of the site in most seasons as well as the continued excavation of one of the Byzantine churches in 1978. This work identified a series of nineteen distinguishable superimposed strata covering a period from about 1200 B.C. to A.D. 1500 (4 strata of the Iron Age, 5 strata of the Hellenistic and Roman periods, 6 strata of the Byzantine and Early Arab periods, 3 strata of the Ayyubid/Mamluk period, and a final Ottoman/Modern stratum). There seem to be two primary gaps in settled occupation (about 500-250 B.C. and A.D. 1500-1870).

Excavation on the tell yielded the following: Iron I--a reservoir, major wall, deep fills; Iron II/Persian--reservoir, soil layers, Ammonite ostraca. Throughout the Iron Age the town was relatively small and characterized by domestic facilities, possibly including a cottage textile industry. There was no apparent trade. A carburized blade-point and arrowhead of the seventh/sixth century indicate that local smiths had a working knowledge of ferrous metallurgy. A mixed economy of farming and cattle herding prevailed. Hellenistic--two defense walls, rock-cut caverns. In the small fortified settlement luxury trade items of alabaster and ivory were found for the first time. Early Roman-domestic caves, a sequence of plazas, tower; Late Roman--monumental stairway to acropolis, possible temple, domestic complex. The Roman town was relatively large with evidence for mercantile activities, trade, and elaborate public architecture. Skeletal remains suggest a stressed population. Farming, cattle herding, and viticulture were the main economic activities. Fish remains pointed to east-west movement. Early Byzantine--tower rebuild, basilica-type Christian church, lime kiln, "Prometheus Bound" carving; Late Byzantine-three churches (one an expansion), stone

stairway. The Byzantine community was well-established with elaborately decorated buildings and evidence for foreign trade. It was surrounded by numerous contemporary sites and elaborate water-management works. There was intensive food production with the consumption of poultry, pigs, and fish. Sheep/goat remains were relatively scarce, probably because pastures had been turned into croplands by employing horses and donkeys as draft animals. Umayyad-flagstone floor, ceramic oven, and imported marble; Abbasid--stone-lined pit; Ayyubid/Mamluk--vaulted rooms associated with caravan "motel," series of cisterns, domestic caves, domestic building complex, bathhouse, and possible mosque. The Arab period begins with a mixed-farming community which gradually declines until its medieval revival when a relatively large, important settlement emerges with intensive food production. The fish remains evidence of north-south movement.

Further expedition goals and results included soundings—eighteen of which added important complementary data and confirmed the accuracy and completeness of the more extensive acropolis stratigraphical operation; cemeteries—all the tombs of which were either Roman or Byzantine (192 skeletons studies) despite a thorough search for Iron Age burials; regional archaeological survey—155 sites were mapped with a 10 km. radius of the tell including two impressive tells, Tell el-Umeiri and Tell Jalul; related scientific data—such as environmental and ehtnographic fieldwork (floral changes at Hesban indicate a succession of plant communities through time but no evidence for desertification), zooarchaeological data gathering (50,000 animal bones were processed yielding some 120 species of which 42 were wild birds, 32 hunted mammals, and 14 domestic mammals), and investigations aimed at discovering the depositional, post-depositional, and excavation factors which affect our understanding of the material excavated (bones, sherds, glass, scientific samples, small finds etc.)—all now undergoing study for final publication.

Pella of the Decapolis
(by Robert Houston Smith)

Since major archaeological work began at Pella in 1967, a great deal has been learned about the history of the city and its relationship to its larger region. The reconstruction of Pella's past has involved the study of ancient texts, environmental factors (geography, weather, hydrology, etc.), excavation, and specialized geological, zoological, botanical and anthropological studies.

It is now known that occupation of the site began as early as 5000 B.C. (not to mention nearby Palaeolithic occupation) and continued with the little interruption until the city was destroyed by earthquake in A.D. 746/747. Middle Bronze II B.C., Late Hellenistic, Byzantine and Umayyad remains are especially abundant, but there is also increasing attestation for Middle-Late Chalcolithic, Late Bronze I-II, Iron I and Iron II, and Roman occupation. As excavation reaches deeper levels in the central mound, additional evidence of Pella's early periods will probably be found.

Thus far excavation has been carried out in more than a dozen areas, including the central mound, Tell el Husn (a large natural hill south of the tell with occupational remains and numerous tombs), the Wadi Jirm, and several outlying locations.

With the help of the Department of Antiquities, which has provided generous support for the Joint Expedition in a number of ways, some of the columns of Byzantine ruins at the site have been restored to their original positions. The expedition has had financial support from the National Geographic Society, the National Endowment for the Humanities, and the Australian Grants Comittee, among others, and, pending the continuation of such funding, the Expedition anticipates being in the field for a number of future seasons.

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IN MEMORIUM

Ernest Walter Krueger

Oberregierungsbaurat a.D. Ernst W. Krueger was born in Stettin in Eastern Germany (now Poland) on July 16th, 1902. He became an architect and entered government-service. At the outbreak of World War II he was in Persia to build the German embassy in Tehran. After the war he lived for some years in Australia, before he re-entered German service as "Oberregierungsbaurat" (senior government architect). In this period of his life he built, among other important buildings, the stock exchange at Berlin and the German embassy at Addis Ababa, Ethiopia.

The most important period of his life, however, began when he retired from service and came to Jerusalem, where he worked for several German protestant institutions. He restored the Lutheran Church of the Redeemer in the Old City of Jerusalem and the Lutheran compound. From 1976-1978 he built the German Protestant Institute for Archaeology in Amman, and from 1981-1982 he restored the institute's building in Jerusalem, formerly the house of Dr. Taufiq Canaan, medical director of Auguste-Victoria Hospital.

From 1974, he worked with the Umm Qeis excavations as architect and supervised the restoration work at the site. Most of his time in the last few years he spent in Amman taking care of the institute which he had built, as long as there was no staff appointed to it. In the summer of 1982 he went back to Germany because of ill health. He died at Liestal (Switzerland) March 6th, 1983.

He was conferred the "Bundesverdienstkreuz" (order of merits of the Federal Republic of Germany) and honorary membership in the "Deutscher Verein zur Erforschung Palästinas" (German Society for the Exploration of Palestine).



NOTE ON AN ARCHAEOLOGICAL OCCURRENCE ON THE CENTRAL PLATEAU OF JORDAN

by
Anna L. Garner

On the central plateau of Jordan, there is a small chain of low mountains extending from Wadi al Hammam in the north to the basin in which the Qatranah River meanders in the south. The named peak in this short mountain chain is Jabal al Khurayyim. At the very southern tip of these low mountains, where they are eroding onto a sandy desert plateau with patches of pebble desert, extensive paleolithic remains were found.

A relatively shallow *wadi* cuts its way from its head in the southern terminus of these low mountains and runs southwest toward the Wadi al Hafiyah. Densely strewn along the banks of the shallow wadi are handaxes, flakes, blades, cores and spheroids worked in various materials. Many artefacts were manufactured from a hard rose-colored stone (jasper?). A softer brown chert furnished the material for handaxes worked in a delicate technique. Gray chert was also used. Boulders and outcrops of these various materials are located in the mountains nearby. The implements all revealed a high degree of desert polish, as if they had been exposed a long time.

The lithic remains extend from a concentration of flint implements characteristic of a "blade culture" southwest along the *wadi,* where the mode of the implements changes to a preponderance of large flakes and flake cores, as well as beautifully-made handaxes and backed knives.

To find the location, take the desert highway from Amman toward Qatranah. Five kilometres before reaching Qatranah, turn left onto a paved road which leads eastward into the desert. Pass an emergency landing field fourteen kilometres from the highway. Go one kilometre past the landing field (a widened asphalt strip). Walk from the road to the foot of the mountains on your left; then follow the wadi leading from them to the southwest. The flint scatter becomes sparser at a point one mile to the southwest of the foot of the mountains.

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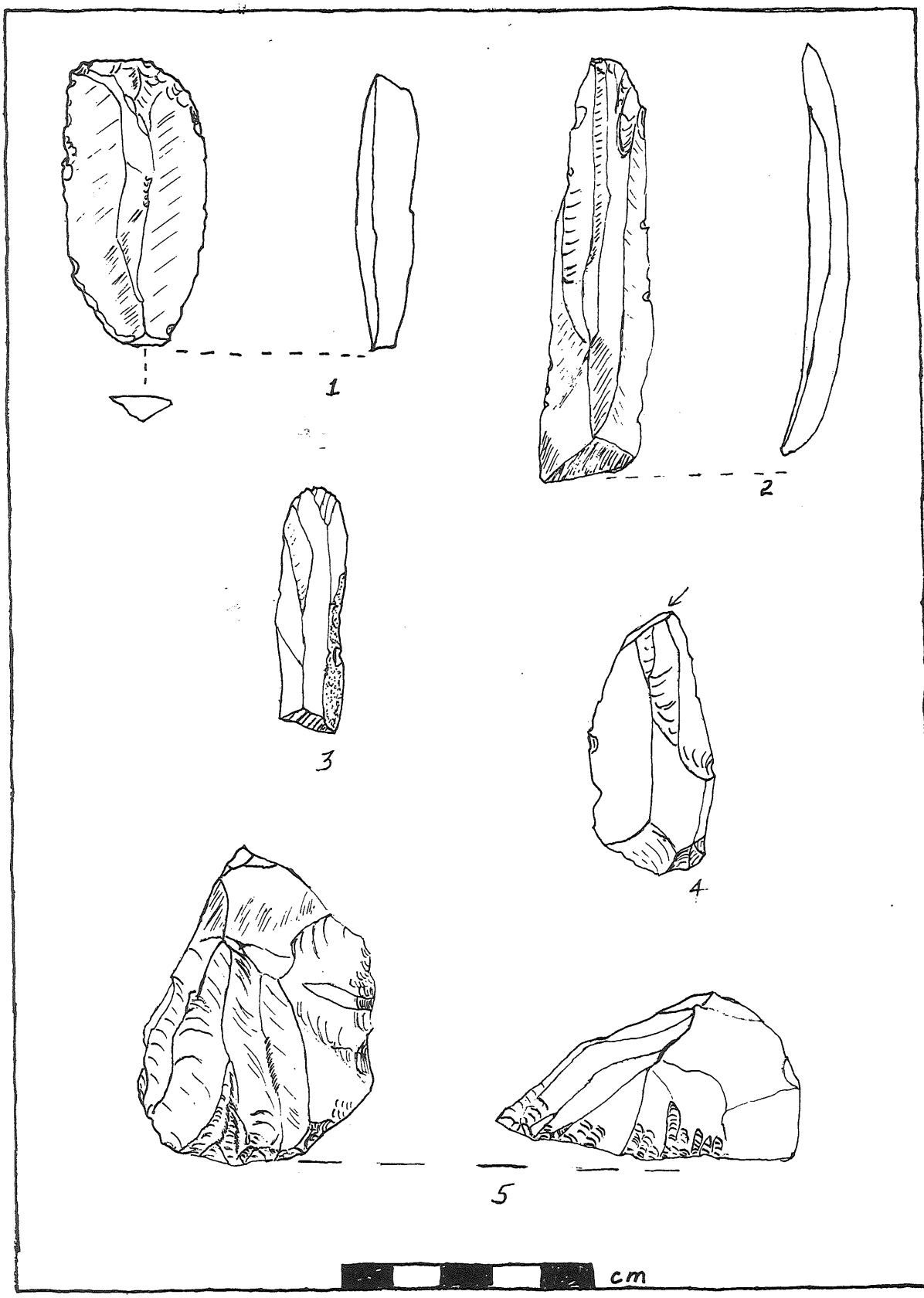

Fig. 1

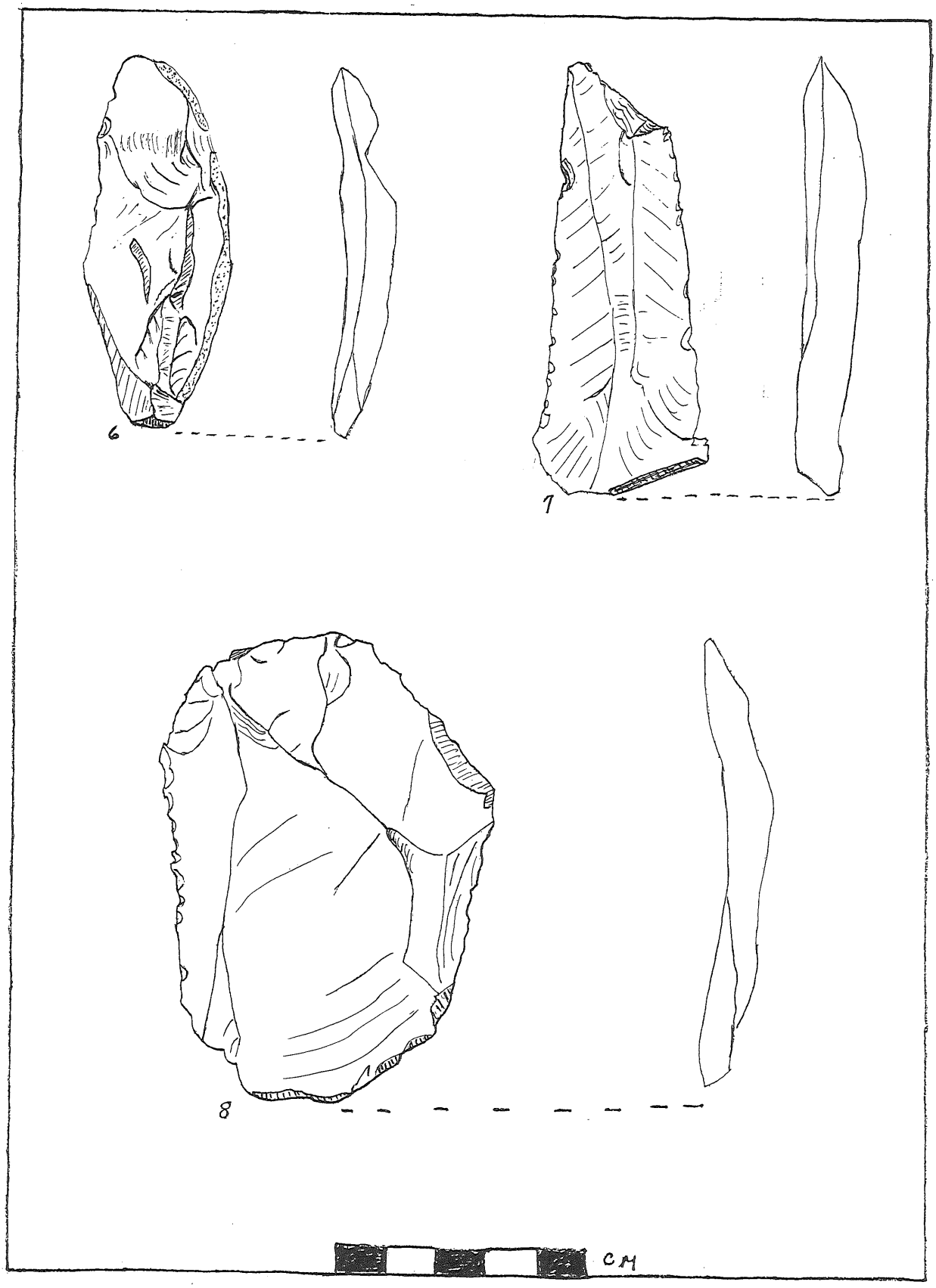

Fig. 2

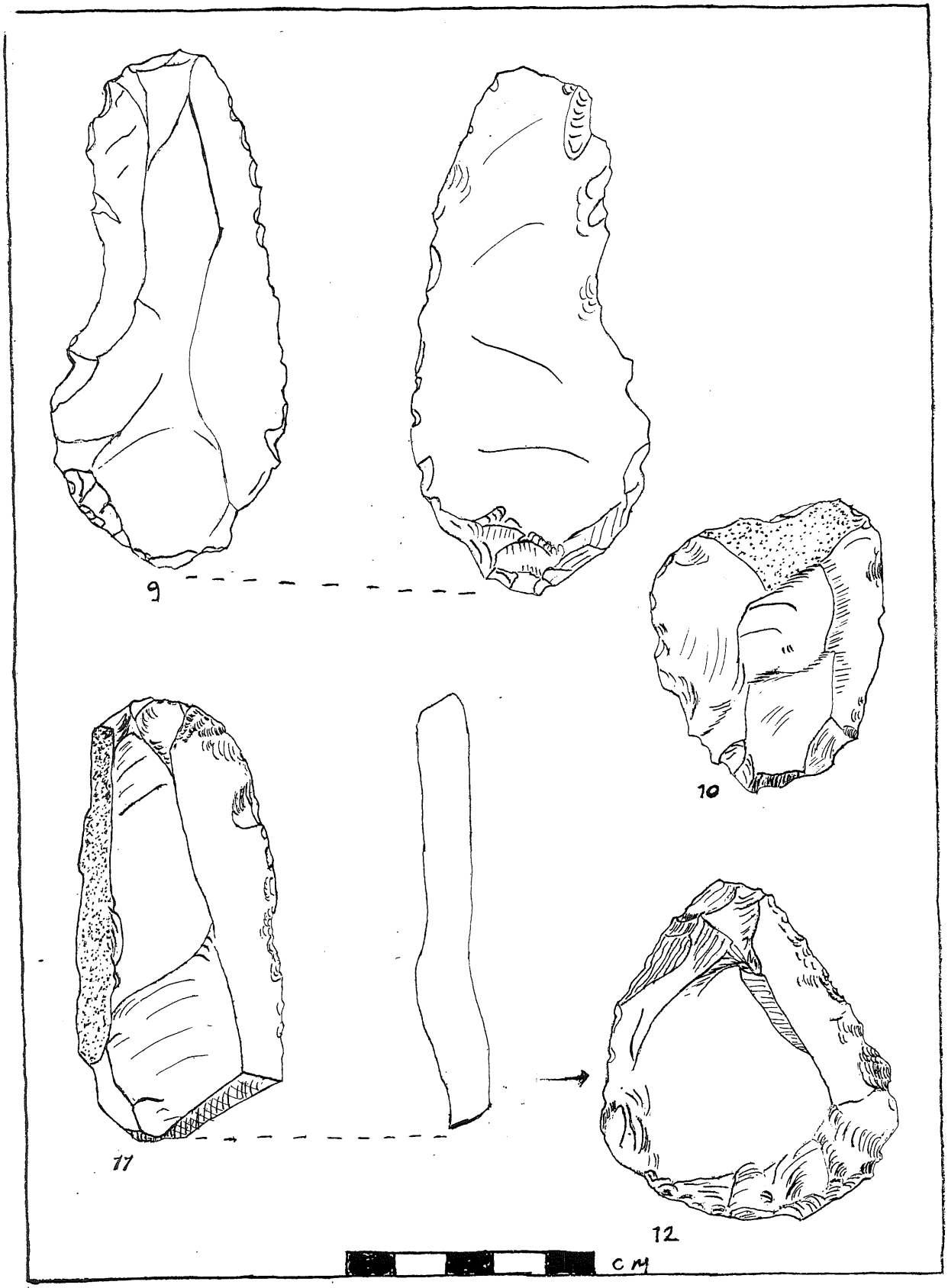

Fig. 3

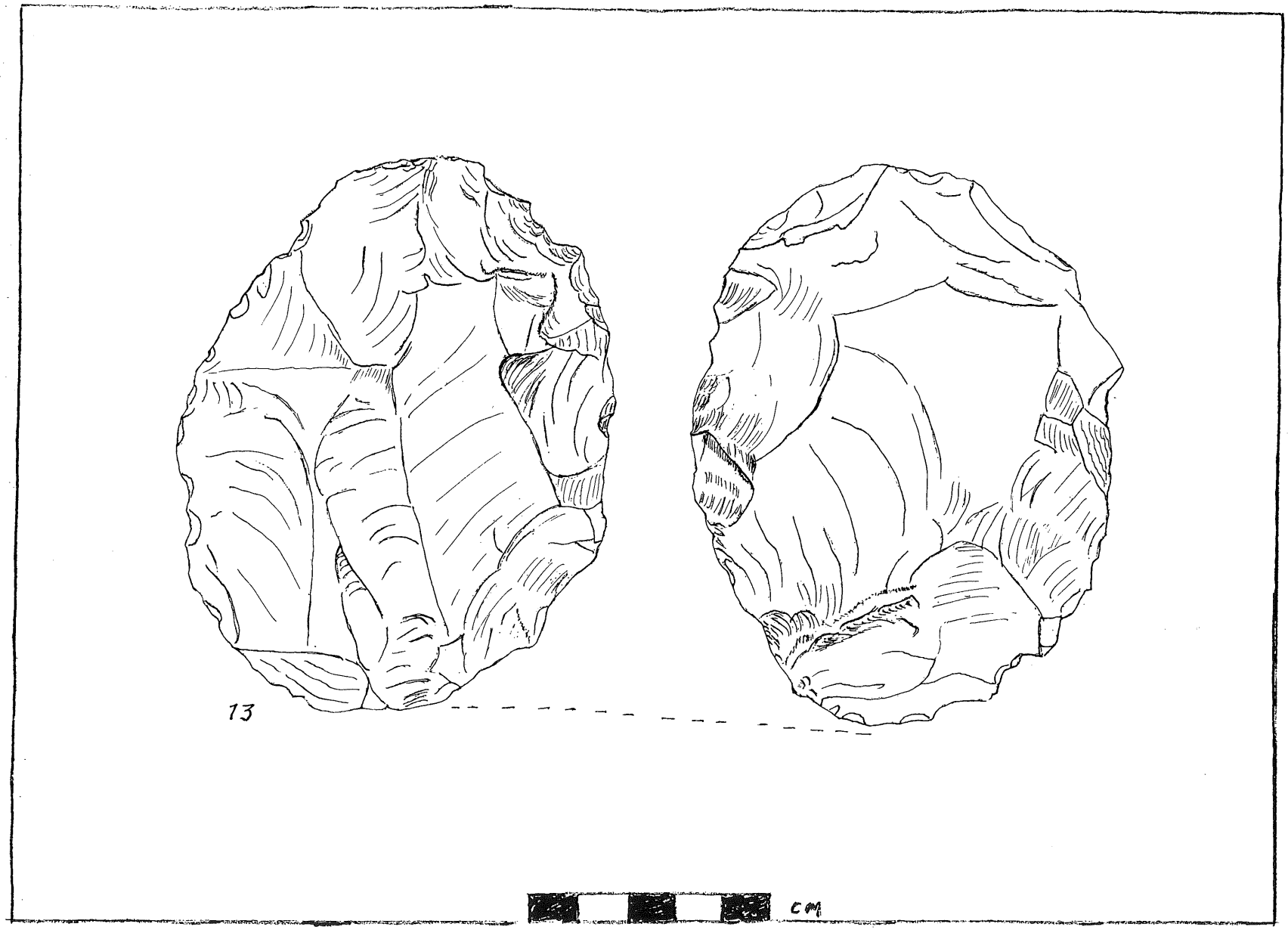

Fig. 4

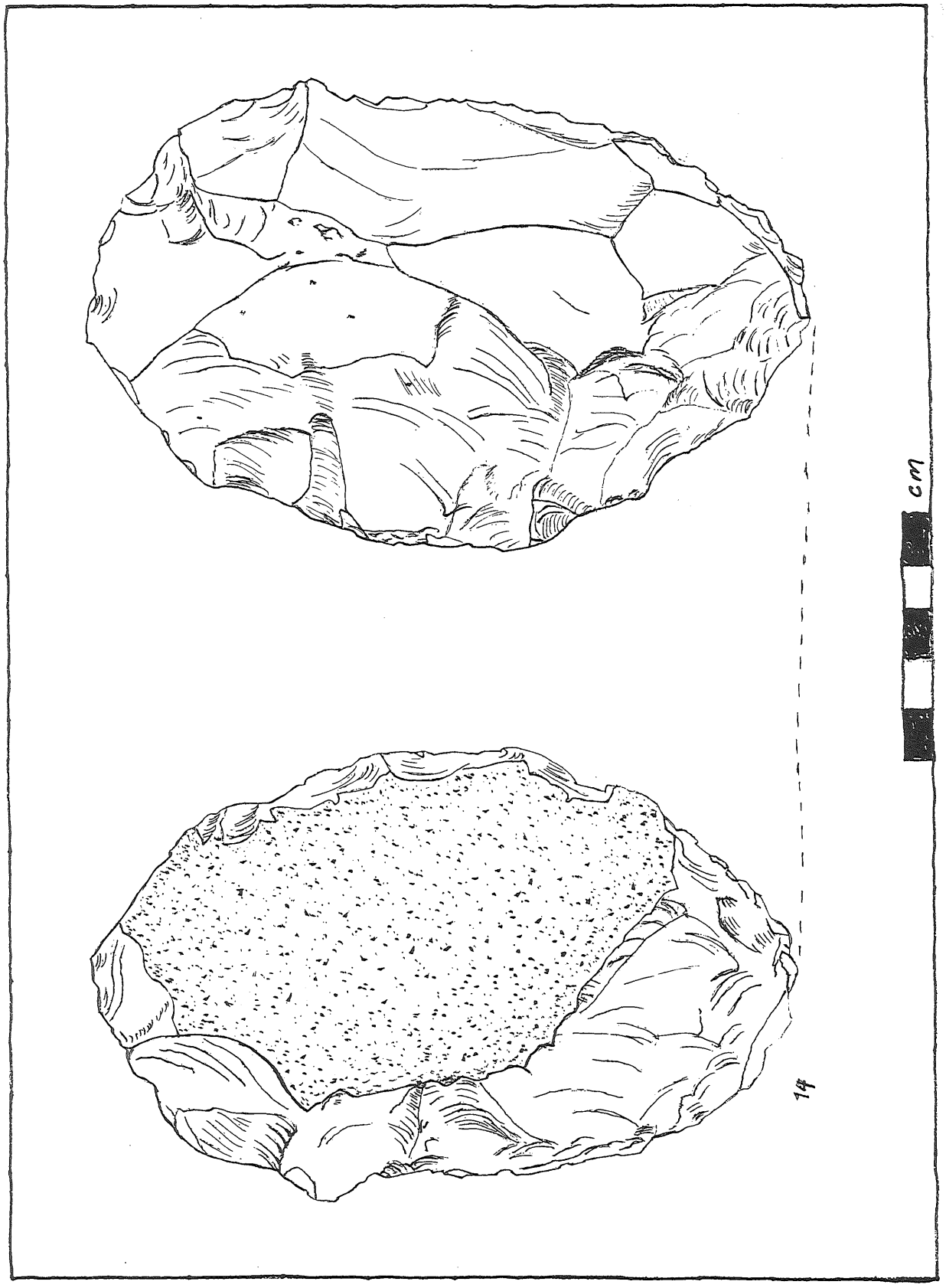

Fig. 5

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Map: *TPC-5B,* Defense Mapping Agency Aerospace Center, St. Louis, Mo., 1975, Scale: 1:500,000.

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Drawings by Anna L. Garner

A PRELIMINARY SURVEY OF THE IRBID-BEIT RAS REGION, NORTH-WESTERN JORDAN.

by
C. J. Lenzen and Alison McQuitty

A regional archaeological investi gation based in north-west Jordan and concentrating on the ancient and modern towns of Irbid (Arbela) and Beit Ras (Capitolias) is planned. The intention of this project is to view the region as an integrated whole, taking into account the influences of environment, modern development, previous fieldwork bias — not merely to write another list of human occupation. As part of this project, a week's preliminary survey was carried out in August, 1983.

This provided a means to acquaint the researchers with the area as well as to act as a valuable recording exercise in its own right. The region is subject to rapid change and the recording of historical and archaeological features before they disappear is desirable. The aim of the preliminary survey was to examine the modern settlements and terrain and to determine the existence of modern/ancient regional variations. The area under consideration is bounded by the modern villages of: Fau'ara, Kufr Jayiz, Harima, Al'Al, El Mughaiyir, Bishra, Hawwara, Es Sarih, Aidun, Ham, Beit Yafa, Kufr Yuba, Jumha, Jijjin, Hawar.

Survey took the form of exploring the modern villages, ancient sites and the intervening tracts of land, based on information obtained from previous surveys (G. Schumacher, N. Glueck, G.L. Harding, S. Mittmann), and that obtained from the villagers. Because of the limited time available, surveying was necessarily selective, although it is envisaged that eventually a stratified sampling technique will be employed.

Recording of selected features was carried out, although this project aims to record all human activity until 1948. Such features included the water system of ancient Beit Ras, domestic Ottoman buildings at Kufr Jayiz, re-used architectural fragments at Beit Ras, olive/ wine presses near Tuqbul. The recording consisted of photographs, measured drawings, sketches and detailed notes. Areas under threat from development were determined and the variation throughout the area was noted. The results are being synthesized and related to previous data retrieved from the region, e.g., the objects in the Irbid Department of Antiquities Office, previous survey material.

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AN ETHNOGRAPHIC AND ARCHAEOLOGICAL STUDY OF *TAWABEEN* IN JORDAN

by
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Tabun is the Arabic name for a circular clay bread oven which is today usually housed in a small "shed". These structures are still in use and are one of the most common installations found on archaeological sites. However, *tawabeen* (tabuns) have received relatively little study in the past. The object of this research is to increase the amount of information that they can provide to the archaeological record, particularly in terms of interpretation, and to contribute to the archive of customs and activities which are fast disappearing in contemporary Jordanian society. The aim of combining these two approaches is to address the wider question of the extent to which archaeological interpretation relies on knowledge of the contemporary use of material objects and whether this can be extended to statements about behaviour in the past.

During July and August, 1983, ethnographic fieldwork was carried out in several villages in north-west Jordan: Ashrafiah, Beit Ras, Harta, El Mughayir, Tabaqat Fahl, Taiyba. These villages were included in the survey partly because of familiarity with the inhabitants which aided ethnographic enquiry, but chiefly because they display economic variety, ranging from the Jordan Valley to the Hauran.

In the process of fieldwork it became clear that there is more than one type of oven and that they are used for more than breadmaking. The type of oven seemed to vary according to the recent history of the village, e.g., whether occupied by recently settled Bedu or well-established with a long history of settled life. The fieldwork took the form of photographs, drawings, plans, details of the construction of ovens, their siting and the associated courtyards. This data is being related to the results from archaeological excavations as a means to aiding interpretation, e.g., the Iron Age domestic complex uncovered in the 1983 Wooster College excavation at Pella. The archaeological clay ovens at Pella have also provided samples for archaeomagnetic dating which are being analyzed at Newcastle University by Dr. Don Tarling.

Work continues relating the results of the study of modern *tawabeen* to archaeological examples from sites of all periods throughout Jordan. A full report will appear in the next edition of *ADAJ*.

Acknowledgements

The fieldwork was financed by the British Academy, the British Institute at Amman for Archaeology and History, the Emslie Horniman Anthropology Scholarship and the Palestine Exploration Fund. My thanks go to the inhabitants of all the villages surveyed, to the Department of Antiquities in Amman and Irbid, to Dr. R. H. Smith for permission to use the Pella material, to Dr. Don Tarling and to Dr. C. J. Lenzen.

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سليمان بن عبدالملك الذي كان ناقما على أقرباء الحجاج[١٢]. والواقع أن القوات السورية التي كانت متمركزة في العراق منذ ولاية الحجاج بن يوسف كانت تتشكل في معظمها من قبائل يمانية من جنوب سوريا (منطقة سهل حوران والاردن) فنقلوا الى العراق لحفظ الامن وفرض ادارة الدولة حيث استقروا مع عائلاتهم وضربوا جذورا لهم هناك[١٣] فكان من الطبيعي ان تستمر الصلات بين من نزحوا الى العراق وأقربائهم في جنوب سوريا والاردن.

ان هذه العلاقات الوثيقة بين الاردن والعراق في العصر الاموي تطرح امام الباحثين والمهتمين بالفنون والعمارة الاسلامية قضية الاصول المعمارية للقصور الاموية في الاردن بشكل عام وقصر المشتى بشكل خاص ثم أولوية ظهور بعض العناصر المعمارية الفريدة. فوجود معظم هذه القصور في الاردن وندرتها في العراق حدا بالباحثين الى التركيز على الطرز المعمارية السورية المحلية ومقارنة القصور الاموية بالقلاع الرومانية والابنية البيزنطية. الا ان التنقيبات الاثرية التي قامت بها دائرة الاثار العراقية خلال العقدين الماضيين في كل من واسط والكوفة[١٤] تستوجب اعادة النظر في دور الابنية الاموية في العراق وتأثيرها على تطور القصور الاموية في الاردن وسوريا[١٥] وهو موضوع آمل أن أعود اليه مستقبلا في بحث اكثر تفصيلا.

قضية أخرى تطرحها كتابة قصر المشتى تتعلق بنسبة الابنية والقصور الاموية الى خلفاء وأمراء بني أمية لا سيما الى الوليد بن يزيد الذي عاش معظم سني شبابه منفيا في بادية الاردن متنقلا بين واحة الازرق ووادي الغدف وباير وذلك قبل تربعه سدة الخلافة. فمثلا نجد بعض الباحثين قد نسبوا بناء قصور المشتى والطوبة وخربة المفجر وحتى قصير عمرة الى الوليد الثاني وكأن نشاطه الوحيد كان مقتصرا على تشييد الابنية الباذخة وزخرفتها. ولكن أليس من المحتمل أن تكون بعض تلك القصور على الاقل قد شيدت لوال تمكن من جمع ثروة طائلة اثناء ولايته كيوسف بن عمر أو أحد أقربائه؟

سؤال لا يمكن الاجابة عنه بالقطع في ضوء الادلة المادية والتاريخية المتوفرة ولكنه احتمال يجب أخذه بعين الاعتبار الى حين اكتشاف شواهد كتابية تلقي الضوء على باني تلك القصور.

غازي بيشة
دائرة الآثار العامة
عمان ـ الاردن

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١٥ تطرق الى هذا الموضوع البروفسور جرابار الذي لفت النظر الى أوجه الشبه بين مخطط قصر المشتى من جهة وبين دار الامارة في الكوفة وقصر الخليفة ابو جعفر المنصور في بغداد من جهة اخرى. كما أشار الى الدور الذي يحتمل أن تكون مدينة واسط قد لعبته في تطور المخطط المحوري الذي نلحظه في المشتى.

O. Grabar, Al-Mushatta, Baghdad, and Wasit, in *The World of Islam: Studies in Honour of P. K. Hitti,* ed. J. Winder, London, 1959, p. 101-108.

والسؤال الذي يطرح نفسه هو: من هو سليمان بن كيسان كاتب هذا الخطاب؟ لقد كانت عشيرة كيسان التي تنتمي الى بني كلب ذات مركز مرموق في العصر الاموي ولا سيما منذ خلافة الوليد بن عبدالملك حيث احتل أفرادها مراكز ادارية وتعليمية هامه. فصالح بن كيسان عهد اليه بالاشراف على اعادة بناء المسجد النبوي الشريف في خلافة الوليد بن عبدالملك.[٦] وسليمان بن سليم بن كيسان كان مؤدّبا لابن هشام بن عبدالملك «محمد».[٧] وفي فترة لاحقة اثر مقتل الوليد بن يزيد سنة ١٢٦ هـ / ٧٤٤ م نجد سليمان بن كيسان هذا في العراق يتلقى الكتب والرسائل من منصور بن جمهور ـ أحد زعماء المحرضين على قتل الوليد والمؤيدين ليزيد بن الوليد بن عبدالملك ـ لتوزيعها على القواد ورؤساء الجيوش، ويأمره في احداها بالقاء القبض على يوسف بن عمر الثقفي والي العراق للوليد بن يزيد.[٨] الا أن سليمان بن كيسان أمسك هذه الرسائل وأفشى فحواها ليوسف بن عمر الذي لم يجد مفرا سوى الهرب الى البلقاء بمساعدة سليمان بن كيسان. هذا وقد رافق يوسف بن عمر في هروبه الى البلقاء كلا من سفيان بن سلامه بن سليم بن كيسان وغسان بن قعاس العذري، ولكن ما لبث أن عُرف أمر وجود يوسف بن عمر في البلقاء بين أهله فألقي القبض عليه وأرسل الى دمشق حيث سجن في الخضراء[٩] القصر الذي كان قد ابتناه معاوية بن ابي سفيان جنوبي المسجد الاموي وعرف بذلك الاسم نسبة الى قبته الخضراء.

أما بالنسبة الى سلمان بن كيسان الوارد اسمه في النقش من قصر المشتى فاني لم أتمكن من الحصول على أية معلومات عنه من المصادر التاريخية وقواميس الافراد، وربما يكون شقيقا لسليمان أو أحد أقربائه، وهذه العلاقة أو القرابة ترجح بناء قصر المشتى في فترة متأخرة من العصر الاموي مما يفسر عدم اكتمال بناء القصر اطلاقا.

لكن الاهم من محاولة تأريخ الشروع في بناء قصر المشتى هو العلاقات القوية التي كانت قائمة بين الاردن أو البلقاء بشكل خاص والعراق والتي انعكست ليس فقط في بناء القصر وزخارف واجهته الحجرية[١٠]، بل أيضا في لجوء والي العراق يوسف بن عمر وهربه الى البلقاء لينضم الى أهله واقربائه. وليس هرب يوسف بن عمر الى البلقاء بأمر مستغرب فقد عهد الى شقيقه محمد بن عمر الثقفي بادارة شؤون البلقاء[١١]، وقبل ذلك كانت في البلقاء خزائن الحجاج بن يوسف وعياله فنقلهم يزيد بن المهلب وما معهم اليه، وذلك في خلافة

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٧ تهذيب تاريخ ابن عساكر، حـ ٦: ٢٧٧.

٨ الطبري، تاريخ، حـ ٧: ٢٧١ ـ ٢٧٢

ومن الجدير ذكره هنا ان أم الوليد بن يزيد هي زينب بنت محمد بن يوسف الثقفي أخ الحجاج بن يوسف. راجع:
حسين عطوان، **الوليد بن يزيد: عرض ونقد**، (بيروت، ١٩٨١) ص ٦١ ـ ٦٤.

٩ الطبري، حـ ٧: ٢٧٣ ـ ٢٧٤.

١٠ فمثلا استعمال الطوب والاقبية البرميلية لتسقيف قاعات القصر بالاضافة الى بعض العناصر الزخرفية المحفورة على واجهة القصر الحجرية كالحصان المجنح والجريفون وأوراق النخيل المجنحة تعكس مؤثرات من بلاد ما بين النهرين.
لاخذ فكرة عن المؤثرات المختلفة التي يمكن ملاحظتها في هذا القصر راجع:

R. Hillenbrand, Islamic Art at the Crossroads: East Versus West at Mshatta, in *Essays in Islamic Art and Architecture in honour of Katharina Otto-Dorn,* ed. A. Daneshvazi, p. 63-86.

حتى قاعة الاستقبال ذات الحنيات الثلاث ما هي ـ في رأي هنري ستيرن ـ الا نتيجة لامتزاج المؤثرات الساسانية (غرفة مربعة تعلوها قبة مع حنيات جانبية منبسطة) والمؤثرات العمائرية المحلية.

H. Stern, Notes sur L'architecture des chateaux Omeyyades, *Ars Islamica,* XI-XII (1946) p. 89 ff.

١١ خليفة بن خياط، تاريخ، (دمشق، ١٩٦٧ ف) ص ٣٩٤.

نقش عربي من قصر المشتى وأهميته

د. غازي بيشه

بالرغم من الدراسات العديدة التي حظي بها قصر المشتى وما أسيل من حبر في مناقشة تأريخ بنائه[1] فان هناك بعض العلماء الذين ما زالوا يميلون الى الشك في نسبته الى العصر الاموي.[2] لذلك فان اي دليل مادي يمكن أن يلقي الضوء على تاريخ بناء هذا القصر وعلاقته بالابنية الاموية الاخرى يعتبر في غاية الاهمية.

والنقش ـ موضوع هذه الدراسة ـ محفور على لوح من الطوب المشوي تبلغ قياساته القصوى ٢٠ سم طولا، ٥ر١١ سم عرضا، و ٦ سم سمكا، وهو مكسور عند حافته السفلى من جهة اليسار. ويبدو جليا بأن الكتابة كانت قد حفرت على الطوب قبل الشوي. ولوح الطوب هذا (لوحة ١) كان قد عثر عليه من قبل دائرة الاثار العامة أثناء عملية التنظيفات وازالة انقاض التي جرت في شهر حزيران سنة ١٩٦٤ وهو محفوظ الان في متحف عمان الاثري تحت الرقم J9883 .[3] هذا وكان الاستاذ سليمان دعنه الموظف في دائرة الاثار سابقا قد نشر صورة لهذه الكتابة مع قراءة أولية في مجلد المؤتمر الخامس للاثار في البلاد العربية.[4]

تتألف الكتابة (لوحة ١ ـ ٢) من خمسة أسطر بالخط الكوفي. وأصبحت بعض الاحرف باهتة نتيجة تآكل سطح الطوب بحيث يصعب قراءة النص كلية لا سيما بعد كسر الحافة السفلى لذا فان محاولة القراءة التالية هي محاولة أولية وربما تحتاج الى بعض التعديلات والاضافات.

١ ـ بسم الله الرحمن [الرحيم]
٢ ـ من سلمان ابن كيسان الى [خيلا]
٣ ـ ابن ..... سلام عليك ورحمة [الله]
٤ ـ وبركاته أما بعد فاني أحمد [اليك الله]
٥ ـ ... . المسلمون؟

واضح من النص أننا بصدد خطاب أو رسالة شبيهة بتلك الكتابة التي عثر عليها في خربة المفجر ـ الذي يعرف خطأ باسم قصر هشام القريب من مدينة أريحا ـ والمكتوبة بالحبر الداكن على لوح من الرخام.[5]

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١ لاخذ فكرة عن هذه الدراسات والمناقشات التي دارت حول قصر المشتى وتأريخه راجع :

K. A. C. Creswell, *Early Muslim Architecture,* New York, 1979, Vol. I, pt. II, p. 578-606.

يجد القارىء جدولا للمصادر والمراجع رتّبت ترتيبا زمنيا حسب تاريخ ظهورها في الصفحات ٦٠٤ ـ ٦٠٦، ثم ملخصا للمناقشات التي دارت حول تاريخ القصر في الصفحات ٦٢٣ ـ ٦٤١. وكان هذا الكتاب القيم قد نشر اصلا في اكسفورد في السنوات ما بين ١٩٣٢ ـ ١٩٤٠ في جزئين.

٢ F. Altheim, *Niedergang der alten Welt,* Frankfurt, 1952, p. 143 f.

R. Dussaud, *La Penentration des Arabes en Syrie avant L'Islam,* Paris, 1955 p. 64ff.

٣ اثناء عملية التنظيفات هذه عثر على لوح آخر من الطوب المشوي حفرت عليه بدوره بعض الكتابات التي لم أتمكن من قراءتها وتحليلها (لوحة ٣).

٤ سليمان دعنه «القصور الاسلامية في الاردن»، **المؤتمر الخامس للاثار في البلاد العربية (القاهرة، ١٩ ـ ٢٤ نيسان، ١٩٦٩)**، جامعة الدول العربية، الادارة الثقافية ص ٤٧٣ ـ ٤٧٧، (لوحة ٢).

٥ D. C. Barmaki, Excavations at Khirbet al-Mafjar, III, *QDAP,* Vol. VIII, No. 1, (1938) p. 51-53; Pl. XXXIV.2.

٦ البلاذري، فتوح البلدان، (بيروت، ١٩٥٧) ص ١٣
الطبري، تاريخ الرسل والملوك، (القاهرة، ١٩٦١ ف) حـ ٦: ٤٣٥
السمهوري، وفاء الوفا بأخبار دار المصطفى، (القاهرة، ١٣١٦ هـ) ص ٣٧٠

الفهرس

صفحة

نقش عربي من قصر المشتى واهميته

د. غازي بيشة ٥

لجنة التحرير

الدكتور عدنان الحديدي . المدير العام
الدكتور فوزي زيادين
السيدة حنان كردي
الآنسة حنان عازر
الدكتورة شيري لنزن

قيمة الاشتراك السنوي :

خمسة دنانير اردنية (للأردن والشرق الأوسط)
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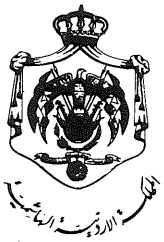

حولية دائرة الآثار العامة

المجلد السابع والعشرون

عمان

١٩٨٣

المملكة الأردنية الهاشمية