ARCHAEOLOGICAL EXCAVATIONS AT THE LATE NEOLITHIC SITE OF ASH-SHALAF: A PRELIMINARY REPORT ON THE 1998 SEASON

by

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with contributions by Katrin Bastert, Lothar Herling and John Meadows

Introduction

The Pottery Neolithic period in Jordan (5,500-4,500 BC) is still not very well-known and often lacked attention by archaeologists whose focus was on the large and well-preserved settlements of the previous period, the Pre-Pottery Neolithic B (PPNB, 7,600-6,000 BC). Research on those sites produced in the past decade a new and fascinating insight into the beginning of human settlement.

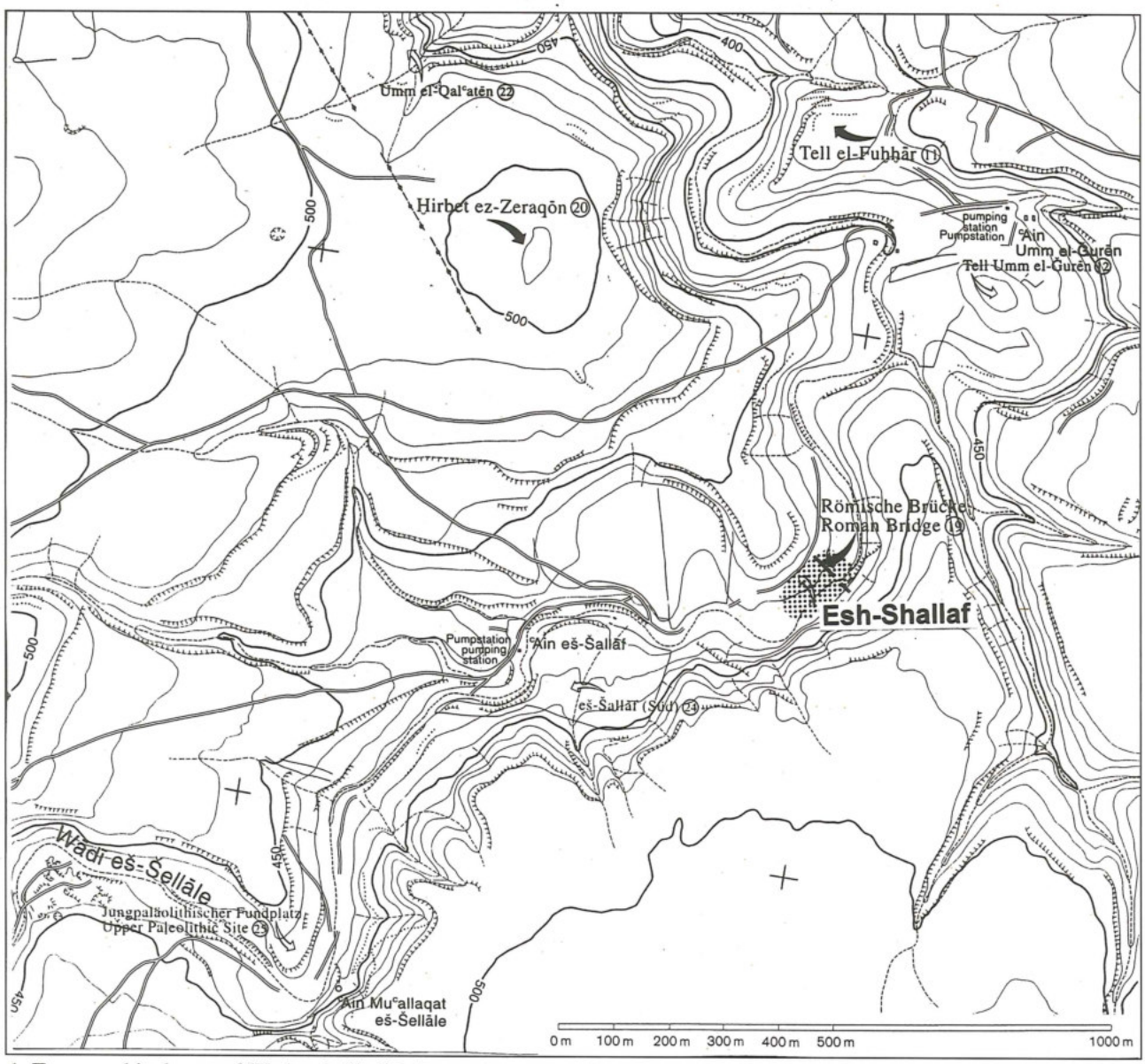
The Pottery Neolithic period, in contrast to the PPNB, did not leave - as it seems - many remains. At least, the number of sites in Jordan dating to that period is small. Rollefson described the Pottery Neolithic period as "in a sense the 'Dark Age'" of the region's prehistory (Rollefson 1993: 103). Therefore, it is hoped that present and future archaeological research will be able to uncover more information about that period.

Site Location and History of ash-Shalaf

While the settlements of the preceding Pre-Pottery Neolithic B/C period (PPNB/C, 7,600-5,500 b.c.) covered areas of up to 15 ha (Rollefson 1997: 241), the sites of the following Pottery Neolithic were much smaller and far less developed. None of the outstanding architectural features of the PPNB are repeated in the Pottery Neolithic period. On the contrary, it seems that at some sites only semi-permanent dwellings existed. Roughly made circular or oval-shaped foundations have been excavated and support such considerations (Garfinkel 1993; Kafafi 1993).

The site of ash-Shalaf is located 10 km northeast of Irbid. It is situated on a terrace approximately 90 m wide on the lower western slopes of Wādī ash-Shallālah at an altitude of about 420 m asl. (Figs. 1 and 2). The terrace follows the contour of the wadi for ca. 350 m from northeast to southwest (Fig. 3). At the eastern end, a cliff approximately 5 m high separates the terrace and the wadi bed. Towards the north, the terrace gradually becomes part of the hillside, while towards the west, the terrace is bordered by a steep hillside which leads to a higher plateau. At the southern end the terrace descends gently towards the wadi bed. The terrace is currently used for agriculture. The closest natural water source is 'Ayn ash-Shalaf, about 350 m west-southwest of the site (see Fig. 1). A second spring, 'Ayn Umm al-Qurayn, is situated 500 m towards the northeast. Both springs are used today by local farmers for irrigation purposes.

Ash-Shalaf was discovered by Siegfried Mittmann (Tübingen University, Germany) while excavating at nearby Khirbat az-Zayrāqūn (1984-1994) and surveying the region adjacent to the Early Bronze Age city. From the pottery he collected from the surface of the wadi terrace in Wādī ash-Shallālah, it seemed that the site was a small village or hamlet dating to the Late Neolithic period - the so-called Yarmoukian (5,500-?4,500 BC). The material collected by the excavation team directed by Mittmann has been studied by Jens Kamlah (Kiel University, Germany) and will be published as part of the regional survey conducted by Kamlah. Of 118 pottery sherds, Kamlah identified 96 as belonging to the Pottery Neolithic period. A few others date to the Early Bronze Age and the Roman-Byzantine period. The Roman-Byzantine sherds may be related to the nearby so-called "Roman bridge" (see Figs. 2 and 3), which is situated

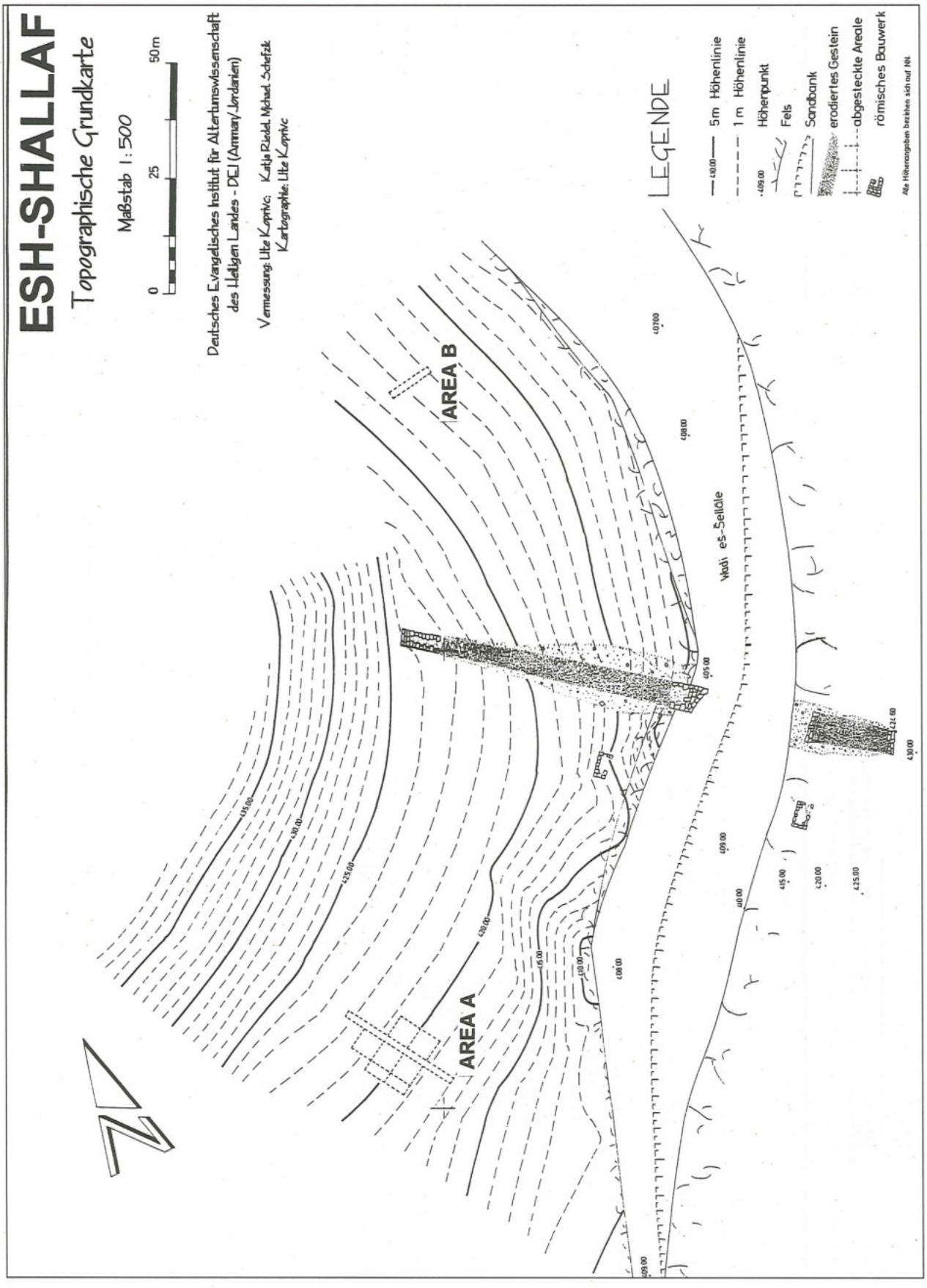


1. Topographical map of Wādī ash-Shallālah area (courtesy of S. Mittmann, Tübingen University).

in the northern part of the terrace and cuts it in a northwest-southeast direction. The Roman bridge cuts the site according to Kamlah's investigation into two parts. He suggests an extension for the Neolithic occupation of 35 x 80 m (Kamlah, pers. comm.).

The research by Mittmann and Kamlah initiated the idea and interest for further investigations of the place.[1] In October 1998 a three-week season of exacations was conducted by the German Protestant Institute of Archaeology in Amman (DEI). The excavations were jointly directed by Hans-Dieter Bienert and Dieter Vieweger. The excavation consisted of volunteers from Germany and local workmen. Team members included Ute Koprivc (Remscheid, Germany), Michael Schefzik (München, Germany), Jörg Hentzschel (Radevormwald, Germany),

1. We appreciate the help and advice of both colleagues, Prof. Dr Siegfried Mittmann (Tübingen University, Germany) and Dr Jens Kamlah (Kiel University, Germany). We are also very grateful to Dr Kamlah for allowing us to study parts of his unpublished Ph.D. dissertation dealing with ash-Shalaf. Dr Kamlah will participate in the final publication of the site.



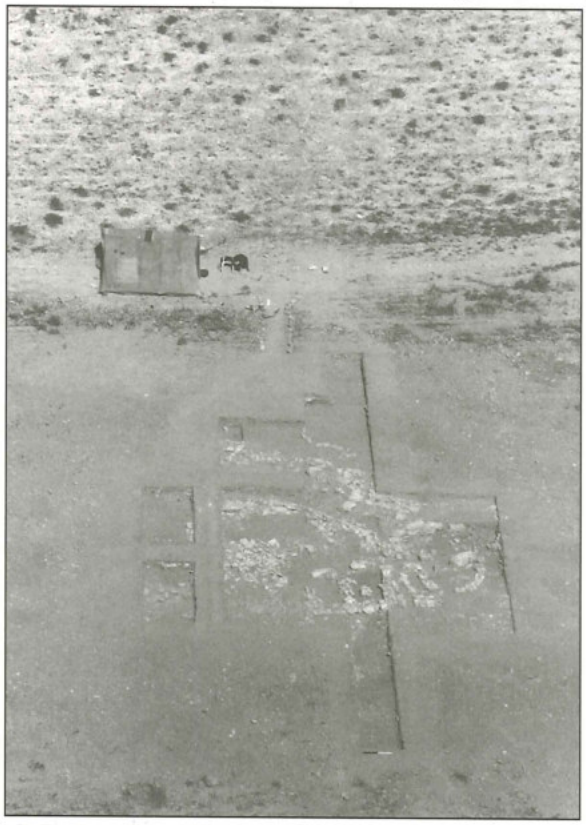
2. Contour map of ash-Shalaf with excavation areas A and B.

3. View from east into Wādī ash-Shallālah. Excavation area A situated on the lowermost terrace. (centre left).

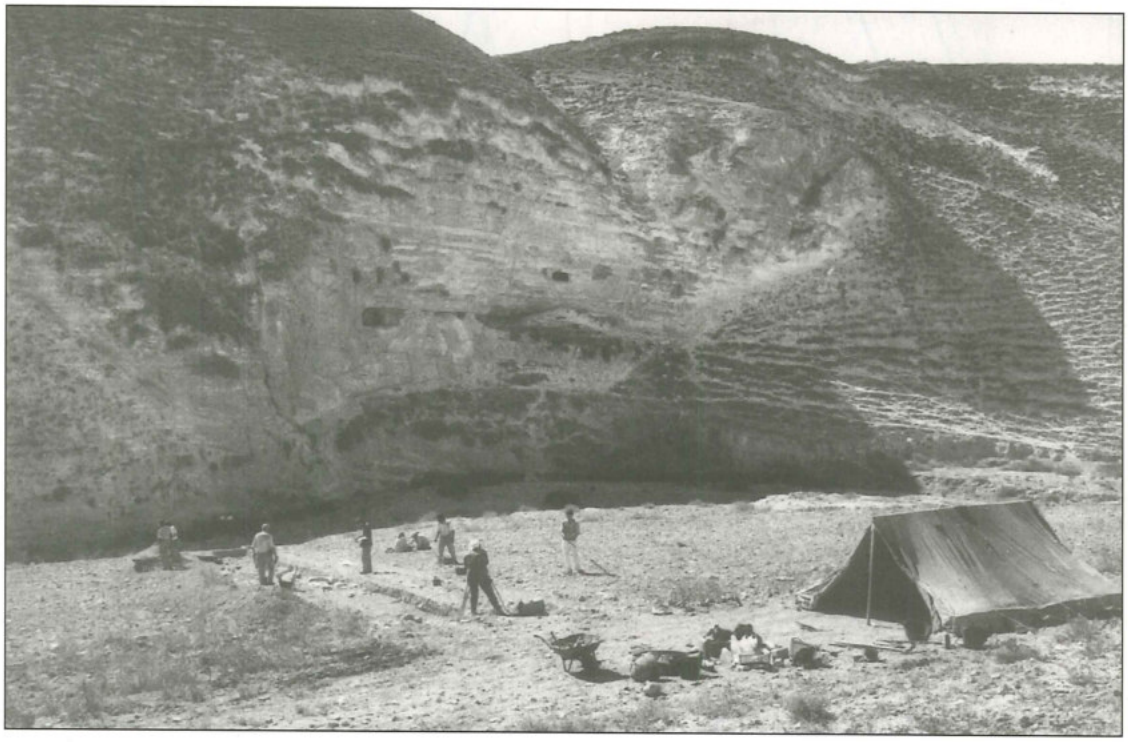
John Meadows (Northcote, Australia), Katja Riedel (Bremerhaven, Germany), Gerhard Reimann (Offenbach, Germany), and Oliver Korn (Krefeld, Germany).

Excavation Strategy and Results

After an intial inspection of the area with Siegfried Mittmann, who advised the team during the first days of the field campaign, the location for a long trench was defined. Approximately 85 m southwest of the Roman bridge a test trench (T1) of 27 m in length and 1.5 m in width was opened to investigate the nature of possible architectural remains (Figs. 2, 4 and 5). Another test trench (T2) of 10 by 1.5 m was dug ca. 60m



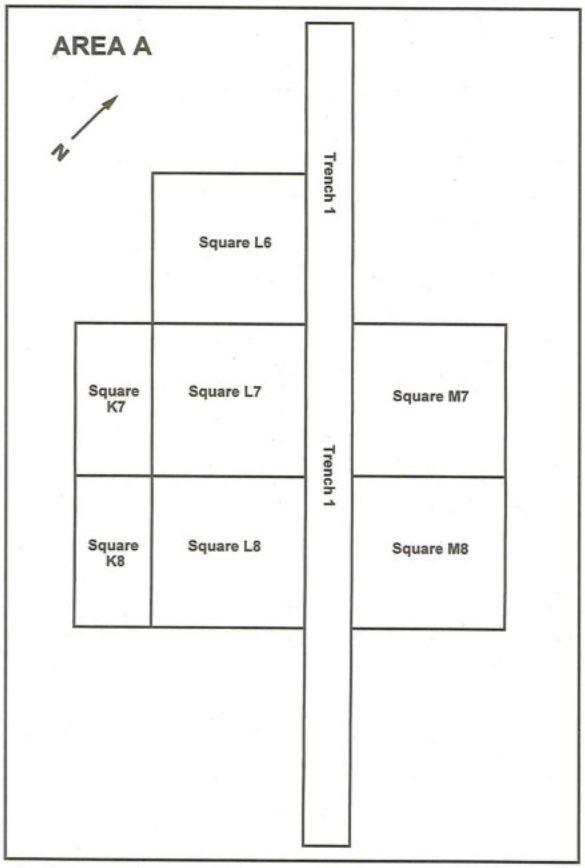
4. Excavation area A with architectural remains at the end of the 1998 season (view from east).



5. View from northwest towards trench 1 in area A.

north of the Roman Bridge (Fig. 2). While this second trench (T2) revealed only fragments of a small wall with no indication of its date, the larger one (T1) exhibited more architectural remains and Yarmoukian pottery. Consequently, it was decided to open up five squares of 5 x 5 m and two squares of 5 x 2.50 m, all adjacent to trench T1 (Figs. 2, 4 and 6).

Remains of walls were detected in trench 1 at several spots, and were mostly found immediately below the surface (Figs. 4, 7:A-C and 8-10). The excavated walls were rather fragmentary and in most cases only the lower-most course had survived. Some of the walls indicate a semicircular or oval foundation (Fig. 9), while others show rectangular foundations (Fig. 10). The same manner of wall construction was more or less found in the adjacent squares (Figs. 7:A-B, 8 and 11). However, the poor state of preservation also caused by modern agricultural activities on the site did not allow the identfication of single buildings or building units. Instead, "structures" and structural elements were only partially preserved, and they are presented in Fig. 8.



6. Schematic plan of trench and square locations in area A. Note that the deep sounding as shown in Fig. 8 B is not indicated in this sketch.

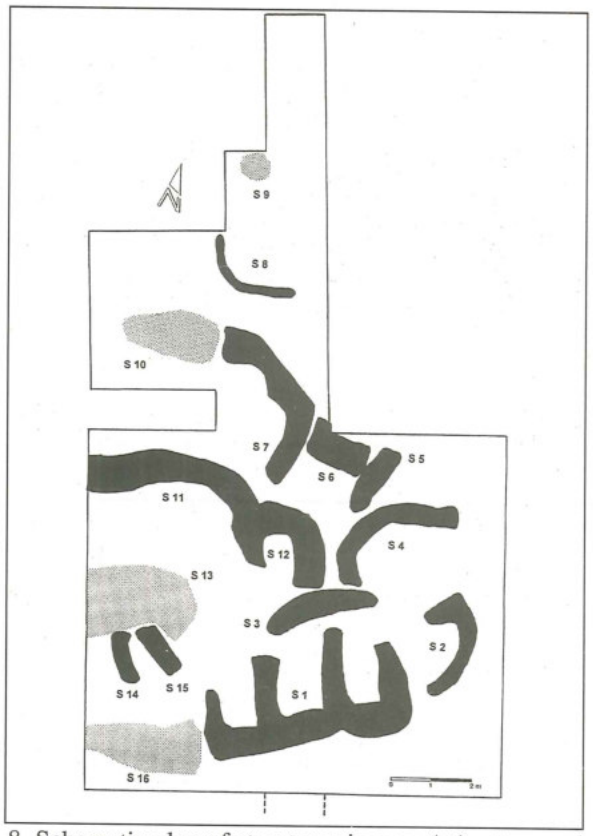
The construction technique of the walls appeared to be very simple: stones of different size were placed on the surface without any archaeological indication of a foundation ditch or any other kind of fundamental support. In some instances walls were destroyed or partly dismantled by modern ploughing. This fact also made it very difficult to develop a proper stratigraphy for the architectural remains. Therefore, until the excavation results have been fully studied and further investigations - at least in some areas - taken place, no final ground plan of buildings can be presented.

Some small lumps of clay with reed impressions which were found in several squares, suggest that the upper walls of the foundations were built of wood, reeds or tent-like material. In one case (S 1), remains of what would have been either a platform made for a possible wooden pillar or a table-like structure was found (Figs. 8 and 10). No proper floors were detected, and therefore it seems that either no floors were constructed or they simply consisted of stamped earth. Doorways could not be found either. However, no complete dwelling has yet been identified, and it is possible that some, if not all, of the oval structures were open on one side and that the upper part of the dwelling consisted in most cases of reed/wood or some similar material.

Beside walls, a few other architectural elements could be detected. In squares L6 (Fig. 8: S 10), L7 (Fig. 8: S 13) and L8 (Fig. 8: S 13 and S 16) remains of possible platforms consisting of clusters of small stones appeared. Their function, as well as their relationship to the near-by walls is not yet obvious. Banning drew our intention to what he thinks are similar features at Ṭabaqat al-

7A: Top plan of the eastern part of trench 1 and of squares K7, K8, L7, L8; M7 and M8 (from left to right and top to bottom).

7B: Top plan of the western part of trench 1 and of square L6 and the deep sounding.
7C: Top plan of the eastern most part of trench 1.



8. Schematic plan of structures in area A (eastern end of trench 1 is not shown).

9. Remains of a roundish structure (S 7), excavated in trench 1.

10. Remains of a rectangular structure (S 1), excavated in trench 1.

11. Part of an oval shaped structure (S 2), bearing fragments of a possible *ṭābūn* (centre).

Būma. There, a paved surface was found in phase 3 (Banning, pers. comm.; see also Blackham 1997: 357, Fig. 9).

In the northern part of the excavation area a deep sounding was conducted to investigate the stratigraphy of the settlement and to search for possible earlier occupation levels. There, still in the Late Neolithic occupation layer, a silo (S 9) was excavated. Its bottom and side walls were made of stone slabs (Fig. 12).

As mentioned earlier, the poor state of preservation as well as the simple way of construction and modern interference made it very difficult and at times impossible to develop a vertical and/or horizontal stratigraphy. Further archaeological research will be neccessary to investigate the interrelationship of the different structures. At this stage, no dwelling or building plan can be proposed.

12. Remains of a possible storage pit with a paved bottom (S 9).

For the time being, the character of the site could be described as follows: ash-Shalaf was a small settlement of herders and - maybe - farmers. Due to the architectural context it seems that it was not occupied all year round, but rather only on a seasonal basis. The dwellings were very simple with stone foundations outlining the dwelling, the upper part of which was constructed of reeds/wood. The entrances were most likely wide and covered only with cloth, so that the dwellings had the character of a tent or simple hut.

The Pottery (Katrin Bastert, Hans-Dieter Bienert and Dieter Vieweger)

Most of the excavated pottery clearly resembles that of the so-called Yarmoukian period, with sherds of both, a fine ware and coarse ware. A number of sherds bear the characteristic "herring-bone" incisions. A total of 1,612 sherds were found in excavation area A (Table 1, Figs. 13 and 14). 1,567 sherds could be identified as Neolithic, and were specifically Yarmoukian. Only 45 sherds date to the Roman-Byzantine period and are most likely related to the near-by Roman bridge. All sherds have been covered by a layer of sinter that was in some cases thick. Therefore, the sherds had to be treated with hydrochloric acid before any proper analysis of the objects was undertaken. The Neolithic pottery from ash-Shalaf ressembles assemblages from other contemporary sites such as 'Ayn Ghazāl (Rollefson and Simmons 1985; Kafafi 1990; Kafafi *et al.* 1990: 16, Fig. 2; Rollefson *et al.* 1993: 110-111, 117, Figs. 9-10; Kafafi 1995), 'Ayn Rāḥūb (Kafafi 1989), Abū Thawwāb (Kafafi 1985; Kafafi 1988; Obeidat 1995), Munhatta and Sha'ar ha-Golan (Garfinkel 1993).

A first study of the pottery assemblage from ash-Shalaf, undertaken by Katrin Bastert, distinguishes a handmade fine ware and a handmade coarse ware. Sherds of both wares can bear decoration. However, while decoration can be found on 59% of the fine ware sherds, it is found only on 7% of the coarse ware sherds (Table 2). The type of decoration varies according to the following elements: colour spots, different "herring-bone" incisions, painted stripes and red polish (Table 3).

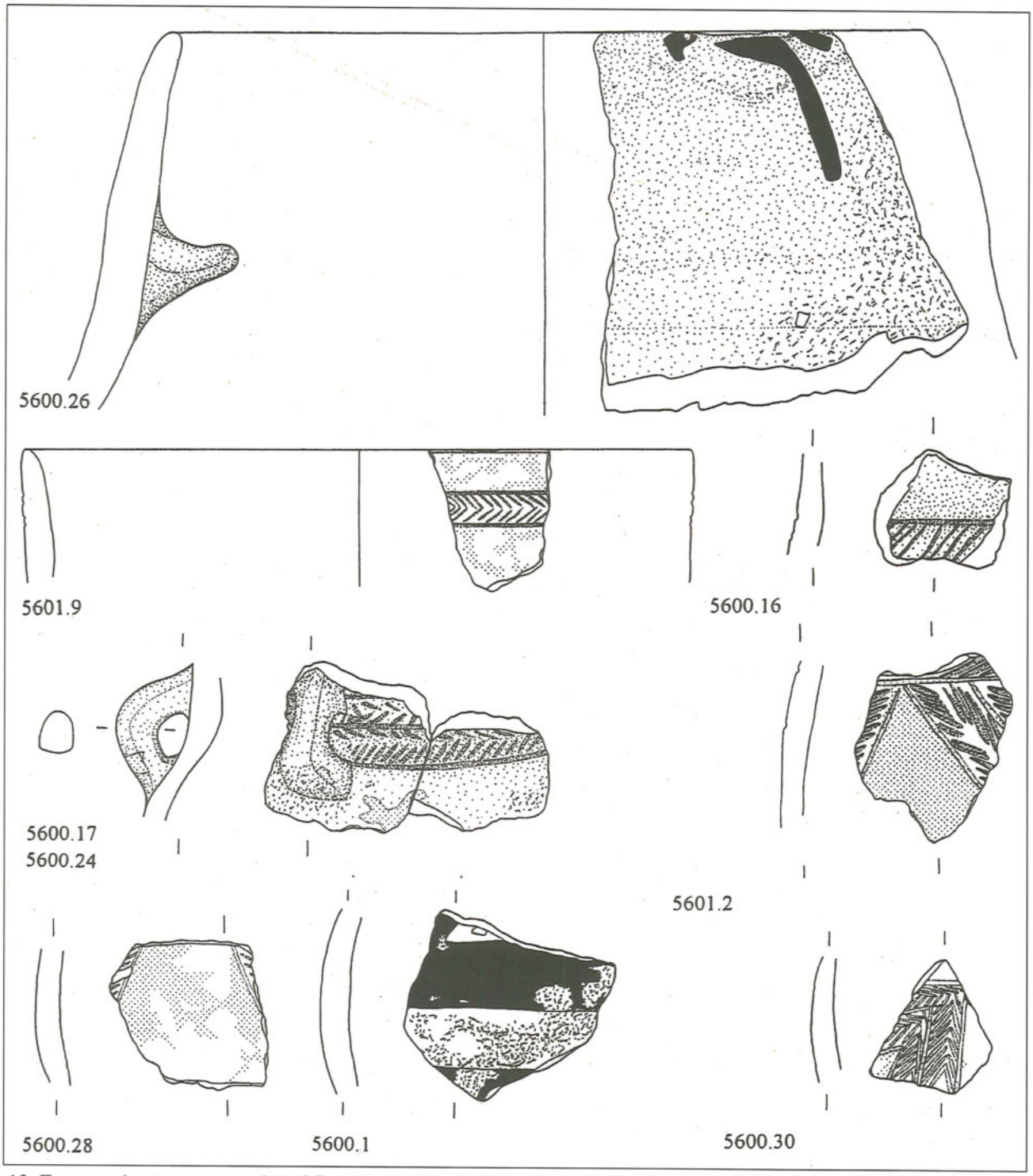
Table 2. Distribution of undecorated and decorated sherds according to coarse and fine ware.

	coarse ware		fine ware		Σ
undecorated	1018	93%	194	41%	1212 (77%)
decorated	79	7%	276	59%	355 (23%)
Σ	1097	100%	470	100%	1567(100%)

The coarse ware bears a high percentage of organic and inorganic temper material. The consistency of the clay is porous and coarse-grained. The thickness of the sherd walls varies between 1.2 and 2.0 cm. Despite their thickness, the sherds appear rather light and soft. The organic temper material consists of straw, the impressions of which are sometimes visible on the surface of the sherds. As inorganic temper material, fragments of limestone, quartz, basalt, cinders and sherds were used. Particles of the temper are visible on the surface of sherds.

Table 1. Distribution of pottery sherds in the excavated squares of area A.

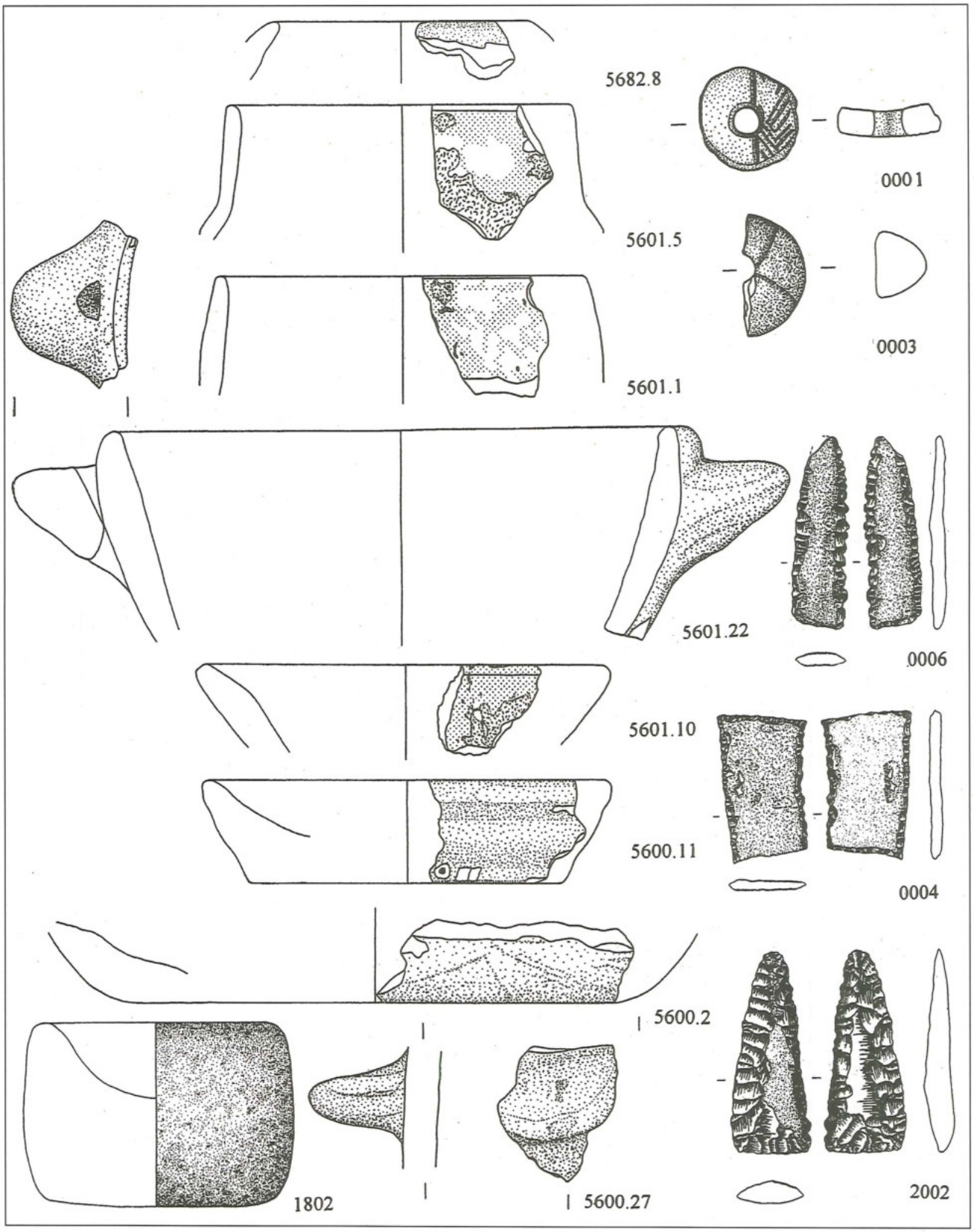
surface	TR 1 (area A)	TR 1 (area B)	K7	K8	L6	L7	L8	M7	M8	Σ	period
261	244	7	107	31	122	273	114	167	241	1567	Neolithic
3	13	22	0	0	0	1	1	1	4	45	Roman-Byzantine
264	257	29	107	31	122	274	115	168	245	1612	



13. Excavated pottery: examples of fine ware (5601.9, 5600.16, 5600.17, 5601.2, 5600.28, 5600.1, 5600.30) and coarse ware (5600.26). The fine ware shows incised herring-bone pattern and dusky red painted lines (5600.1), scale: 1:2.

Often, sherds show a carefully made slip of orange, reddish or yellow colour on the inner and outer surface.

The sherd walls of the fine ware are thinner than those of the coarse ware, varying between 0.4 and 0.8 cm. As with the coarse ware, the temper material consists of organic material as well as limestone, quartz, basalt, cinders and sherds. The sherds are carefully made from the inside as well as the outside.



14. Pottery sherds of fine ware (5682.8, 5601.5, 5601.1, 5601.22, 5601.10, 5600.11) and coarse ware (5600.2, 5600.27), scale 1:2; spindle whorls (0001, 0003), scale 1:2; selected lithic artifacts (0006, 0004, 2002), scale 1:2; basalt mortar (1802), scale 1:3.

Table 3. Total number of Neolithic sherds, separated by ware and decoration.

	body-sherds		rims		bases		handles		Σ		%	
	coarse ware	fine ware	coarse ware	fine ware	coarse ware	fine ware	coarse ware	fine ware	coarse ware	fine ware	coarse ware	fine ware
undecorated	852	147	72	35	54	11	40	1	1018	194	65%	12%
colour spots	52	84	7	2	9	1	0	8	68	95	4%	6%
polished	0	64	4	33	2	7	0	1	6	105	0,5%	7%
incised	2	53	0	9	0	0	2	3	4	65	0,3%	4%
painted	1	7	0	3	0	0	0	1	1	11	0,2%	1%
Σ	907	355	83	82	65	19	42	14	1097	470	70%	30%

59 % of the sherds bear colour spots and incisions (Table 2). The undecorated sherds are covered by a reddish or brownish slip.

As expected, the percentage of decoration within the fine ware is much higher. Four kinds of decoration could be distinguished: colour spots, a carefully made red polished slip, incisions and painted stripes (Table 4). 10 % of the sherds bear colour spots, while 7 % show the red polished slip (Tables 2-3, 5-6; Fig. 15: lower row). Incised patterns (Figs. 13 and 15: first and second from left in the upper row; Figs. 16 and 17: upper row) can be found on only 4 % and painted stripes on 2 % of the whole pottery assemblage (Tables 3-4). The herring-bone motif is by far the most common type of incision; it varies from simple forms to more complex ones, sometimes in double rows (Figs. 13, 16 and 17). The herring-bone incisions can only be found on the outer face of sherds. One sherd bears beside a herring bone incision on the outer face, painted stripes on its outer as well as on its inner face (Fig. 15: upper left sherd).

From a total of 1,567 late Neolithic sherds, 305 pieces have been singled out as being of diagnostic character (Table 5). Among those, 165 pieces are rims. They are almost equally distributed in both wares.

Bowls, deep bowls, jars, hole-mouth-jars

15. Pottery sherds with dusky red painted lines (upper row) and sherds with a red creamy slip (lower row).

16. Pottery sherds with different herring-bone patterns.

Table 5. Distribution of both wares according to bodysherds and diagnostic sherds.

	coarse ware	fine ware	Σ
body sherds	907	355	1262
diagnostic sherds	190	115	305
Σ	1097	470	1567

Table 4. Distribution of diagnostic sherds according to their decoration.

	bodysherds	rims	bases	handles	Σ	%
undecorated	999	107	65	41	1212	77%
colour spots	136	9	10	8	163	10%
polished	64	37	9	1	111	7%
incised	55	9	0	5	69	4%
painted	8	3	0	1	12	2%
Σ	1262	165	84	56	1567	100%

17. Pottery sherds with different types of handles: loop handles (upper row), lug handles and knob handles).

and plates are the vessel forms which could be identified within the pottery assemblage. 46 % of these are bowls and deep bowls. They are mostly undecorated. 14% of the rim sherds belong to jars. Hole-mouth-jars account for 29% of the rim sherds and in most cases they do not show any decoration. Plates are rare and only a few sherds have been identified until now.

A total of 84 sherds belong to bases (Tables 3-4 and 6); they belong mostly to the coarse ware. 56 handles (big and small loop handles, lug handles and knob handles) or handle fragments were within the pottery assemblage (Table 6). As for the bases, they belong in most cases to the coarse ware. One piece, which is a hole-mouth-jar, is quite extraordinary as it has a lug handle on the inside of the vessel (Fig. 13: 5600.26).

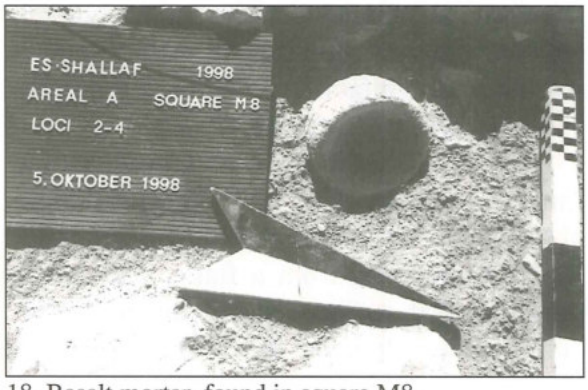
Other Finds

Two spindle whorls made of clay (Fig. 14: 0003) and of a fragment of a sherd with an incised herring bone pattern (Fig. 14: 0001) are among the very few small finds from ash-Shalaf. A fully preserved basalt mortar (Figs. 14: 1802 and 18) was also found. Only a very small quantity of animal bones was found and remains to be analysed. Fifteen soil samples were taken during the excavation, mainly from loci 17, 19, 22 and 23 in the deep sounding trench 1. They are being analysed by John Meadows (La Trobe University, Melbourne, Australia) and some results are presented below.

No human burials or bones were found in the excavated areas so far. There was also no indication at all where burials might have been situated. Due to the nature of the site - probably a semipermanent settlement - it is likely that there was no specific burial ground and that burial might have taken place at other spots.

Observations on the Lithic Industry of ash-Shalaf (Lothar Herling)

The lithic material collected during the excavation is currently under study by Lothar Herling. Therefore, only a brief comment can be made at present on the nature of the artifacts or the tool kit. However, among the abundant lithic material three are described



18. Basalt mortar, found in square M8.

Table 6. Total number and percentage of diagnostic sherds.

	bodysherds		rims		bases		handles		Σ	%
coarse ware	907	58%	83	5%	65	4%	42	3%	1097	70%
fine ware	355	23%	82	5%	19	1%	14	1%	470	30%
Σ	1262	80%	165	11%	84	5%	56	4%	1567	100%

below.

The first of the glossed pieces (Fig. 14: 0006) consists of thin tabular flint with a slight terminal break. It is quite thin and longitudinal in form and the basal end is nearly right-angled. The cortex on one surface appears both coarser and lighter in colour than on the other. The artefact shows a peripheral bifacial retouch. On the lateral left the created tool edge is nearly straight. The denticulation on the lateral right functional edge makes it difficult to identify the weak sickle gloss located primarily on the ridges.

Another glossed element (Fig. 14: 0004) was prepared from even thinner tabular flint. During the selection process of the otherwise very flat and parallel raw material, it was taken into account that the lateral left ventral surface contained a natural depression. In two places it broke through the flint. Nevertheless, it was possible to place the backed retouch adjacently without damaging the artefact. The working edge on the lateral right shows gloss from usage (cutting wood, leather, reeds, meat, or other organic material). It is very weak on one surface and can only be found on a few of the ridges. On this artefact, the cutting edge is irregularly denticulated. The edge retouch was arranged in a peripheral fashion and it was executed bifacially. The basal end carries only a ventral retouch.

In contrast to the other two artefacts, the third glossed piece (Fig. 14: 2002) is noticeably thicker. It was not made from tabular flint but prepared from a flake. The center of the dorsal surface is still covered with cortex. The element shows rather coarse marginal retouch arranged in a peripheral pattern. The retouch is very regular on the lateral left side. The gloss on the edge can be identified more clearly due to the greater thickness of this artefact. The gloss is more pronounced on this artefact than on the other two elements.

The gloss, which is more or less intensely present, clearly identifies the three artefacts as sickle blades, coming from different tools. Blade no. 0004 was most likely incorporated in the center of the sickle body. The three blades already permit a first insight into the flint industry of ash-Shalaf. The lithic material will be presented in its entirety within the final publication of the excavation.

Catalogue of the above described lithic artifacts:

1) Field No. 0006, Area A, Locus L 6, under Pl. 1; Colour: 10 YR 4/1 (cortex 5 YR 7/6), Weight: 7,7 g, Length: 6,8 cm, Width: 1,9 cm, Thickness: 0,5 cm (Fig. 15: 0006)
2) Field No. 0004, Area A, Locus L 7, Colour: 10 YR 6/2 (cortex 7,5 YR 6-7/6), Weight: 9,2 g, Length: 5,3 cm, Width: 3,1 cm, Thickness: 0,4 cm (Fig. 15: 0004).
3) Field No. 2002, Area A, Locus L 1, Trench 1; Colour: 10 YR 6/3 (cortex white), Weight: 18,9 g, Length: 7,1 cm, Width: 2,8 cm, Thickness: 1,0 cm (Fig. 15:2002).

Palaeobotany (John Meadows)

Fifteen soil samples were taken by the excavators from four contexts in Area A, Trench 1 (the 'deep sounding'). The four contexts, L 17, L 19, L 22 and L 23, were sampled because they appeared to be deposits which had accumulated during the occupation of the site, and not after its abandonment. The sampling strategy was therefore to sample every securely stratified occupation deposit. The samples were processed by flotation, using the 'wash-over' method. Table 7 shows the results of the sorting of samples.

Stratigraphically, L 19 is below (earlier than) L 17, and L 22 and L 23 are contemporary with or earlier than L 19. The quantity of grass roots, which is not recorded, was much greater in L 17 than in any of the lower levels (and apparently greater in the L 19 samples than in those

from L 22 and L 23). The excavators described L 17 and L 19 as ashy occupation levels (secondary contexts), and L 22 and L23 as possible fireplaces (primary contexts).

With these results and stratigraphic relationships in mind, the following observations were made:

1. The uncarbonised seeds are probably all modern.

Note that (a) the incidence of uncarbonised seeds decreases with depth below the modern surface; (b) there are more types of uncarbonised seeds in L 17 than below L 17 (the 'cf. pea' in L 19 was introduced during the recovery process); (c) the

Table 7. The results of this stage of sorting are as follows:

Sample	Level	Volume (litres)	Carbonised plant remains	Uncarbonised	Snails
7700	17	1.7	1 barley grain 1 cf. *Astragalus* 1 ? grass seed + fragments	2 Boraginaceae	22
7701	17	5.0	5 cf. *Astragalus* + fragments	36 Boraginaceae	36
7702	17	6.5	1 grain, indet. 1 unknown seed + fragments	33 Boraginaceae 2 *Fumaria* sp.	62
7704	19	2.0	1 cf. lentil 3 cereal grains dozens of small legumes (1 or 2 cf. *Astragalus*)	1 Boraginaceae	10
7705	22	0.6	1 glume base 2 cf. grains + fragments	-	-
7706	23	0.1	3 glume bases 1 cf. lentil 1 cf. grain 2 grass seeds 8 cf. *Astragalus* + fragments	-	-
7707	17	2.5	1 cf. lentil2 cf. grains + fragments of cf. *Astragalus*	11 Boraginaceae	11
7708	17	2.8	1 ? emmer grain + fragments	9 Boraginaceae	15
7709	17	2.8	fragments of several small legumes and grass seeds	18 Boraginaceae	15
7710	19	7.0	several dozen cf. *Astragalus* fragments	11 Boraginaceae	15
7711	19	6.3	1 cf. lentil 1- 2 grass seeds several dozen cf. *Astragalus* fragments	20 Boraginaceae	16
7712	19	1.2	1 cf. *Astragalus* fragments of 5-6 others	3 Boraginaceae 1 cf. pea	3

cont. Table 7.

Sample	Level	Volume (litres)	Carbonised plant remains	Uncarbonised	Snails
7713	19	11.5	3 glumes 1 glume base 2-3 grains 1 pulse 1 speck of wood estimated 50+ cf. *Astragalus* + fragments	21 Boraginaceae	34
7714	22	3.0	1 glume base 4-5 grains + fragments	1 Boraginaceae	16
7715	17	6.5	1 cf. lentil 2-3 grains 1 cf. *Astragalus* + fragments	55 Boraginaceae 2 *Fumaria* sp.1 Caryophyllaceae	37

Summarising these results by context:

Context	Samples	Volume (litres)	Carbonised plant remains	Uncarbonised	Snails
L17	7	27.8	7 grains, 1 grass seed, 2 lentils, 7 cf. *Astragalus* + fragments	164 Boraginaceae 4 *Fumaria* sp. 1 Caryophyllaceae	198
L19	5	28.0	6 grains, 5 glumes, 1-2 grass seeds, 3 lentils, 3 cf. *Astragalus* + scores of small legumes + fragments	37 Boraginaceae 1 cf. pea	78
L22	2	3.6	6-7 grains, 4 glumes + fragments	1 Boraginaceae	16
L23	1	0.1	1 grain, 6 glumes, 2 grass seeds, 1 lentil, 8 cf. *Astragalus* + fragments	-	-

most common type of uncarbonised seed is a species of Boraginaceae, whose seeds have siliceous coats - several were broken open to confirm that only the seed coat remains, the organic part having already decayed. There is nothing to suggest that these seeds were ever carbonised.

Therefore, the seeds are part of the modern seed bank, which have not germinated and are in the process of breaking down. Modern seeds without siliceous coats clearly break down more quickly, and are not often found much below the modern surface. Charred seeds of Boraginaceae are sometimes found on Jordanian sites, but never as the most common taxon.[2]

2. *The snails are probably a mixture of modern and ancient.*

Although snail incidence decreases with depth below the modern surface, it does not decline as rapidly as the incidence of uncarbonised seeds. Only a small proportion of the snail shells were glossy, bullet-shaped shells typical of burrowing species, and these were practically all in L 17 samples. Most shells were weathered rounded types, which are still extremely common on the ground around the site. Since even these are

2. Note that the ash-Shalaf assemblage is similar in many ways to that from el-Kowm in central Syria (van Zeist 1986), which was also dominated by Boraginaceae seeds. The author, together with Gordon Hillman of the Institute of Archaeology, University College London, concluded that the Boraginaceae were mostly modern. Again, the samples came from relatively close to the modern surface of the site.

nearly three times as common in L 17 as in L 19, it may be that a proportion of them reached the archaeological strata as a result of recent bioturbation.

3. The incidence of crop remains is very low.

The number of grains, glumes and lentils per litre of sediment is about the same in L17, L 19 and L 22 (0.25, 0.5 and 2.5 items/litre, respectively), and rather higher in L 23 (50 items/litre). The density of crop remains in L 22 is comparable to that from a poor secondary context at sites in the Jordan Valley, whilst that in L 23 is comparable to a poor primary context (see Meadows 1998 for examples).

4. The incidence of small legumes in L19 is several times that found in L 17.

Estimating the actual number of seeds recovered from the many fragments of Astragalus and perhaps other small-seeded legumes will be a laborious process. It is clear, however, that there are 5-10 times as many in the L19 samples as in the L17 samples.

5. There are no glumes in L 17.

Each of the other 3 contexts produced at least some glumes - evidence for the later stages of crop processing of emmer (or einkorn). The low incidence of all plant remains in L 17 may be due to the absence of crop processing (generally the source of most archaeobotanical material, even if indirectly). Alternatively (see below), the absence of glumes could indicate generally unfavourable preservation conditions in L17, which should also be reflected in a low count of other plant remains.

The ash-Shalaf assemblage is relatively poor. This is probably due to several factors operating at different stages in the site formation process, such as:

* the range of plant material reaching the site, the form in which it arrived, how and where it was processed, stored and consumed
* the thermal conditions under which the surviving material was carbonised (preservation in recognisable form only takes place in a relatively narrow temperature band, when the oxygen supply is limited)
* post-depositional conditions: charred plant remains are chemically inert, but physically very fragile, and therefore vulnerable to mechanical damage.

As suggested earlier, most archaeobotanical remains in open sites reflect local crop-processing; in most circumstances, the amount of wastage during storage and consumption would have been much smaller than the volume of residual material from crop processing. One possible explanation of the low incidence of plant remains at ash-Shalaf, therefore, is that it was not a permanent agricultural village. Results from other lines of evidence may support or refute this idea.

Furthermore, the use of ruminant dung as fuel is probably the major source of carbonised plant remains at arid or semi-arid sites with domestic animals. Typically, crop processing residues are fed to animals, which incompletely digest their fodder, and pass identifiable plant remains which are then preserved by charring. The availability of dung for fuel obviously depends on what animals were herded and how they were managed. The absence of wood charcoal, however, tends to imply that dung would have been used had it been available.

The most likely explanation of the low incidence of charred plant remains at ash-Shalaf is damage occuring during and after carbonisation. The remains that were recovered, however badly preserved, are those which survive the widest range of thermal conditions (Boardman and Jones 1990). Less dense plant parts, such as straw and rachis internodes (which are found in abundance at Jordan Valley sites with good preservation), did not survive at all at ash-Shalaf. The more durable parts (grains and glumes) are badly damaged. This tends to suggest that fires were fairly open and well-

ventilated. Plant remains from around *ṭābūn* ovens, where dung was used as fuel, tend to be much better preserved.

The topography of ash-Shalaf is probably also a factor. It is a relatively high-energy environment, which is reflected in the fragmentation of the bones and the poor preservation of architecture. Plant remains, which are more fragile than either bones or walls, probably suffered even more damage. A combination of slope processes, oxidising thermal conditions and perhaps seasonal occupation may therefore account for the relative poverty of the ash-Shalaf plant assemblage. Bearing in mind the small sample size, some tentative conclusions may be drawn from what was recovered.

Cereal grains (glume wheat and hulled barley) occur in every sampled context. Lentils were also found in every sampled context except L 22. No other crops were found. The combination of crop staples, emmer, hulled barley and lentil, is ubiquitous at Neolithic sites, and ash-Shalaf is no exception. Given the small sample size, no conclusion about the absence of other crop species is meaningful.

Small-seeded legumes outnumber all the other types combined. The better-preserved of these apparently belong to the genus *Astragalus*, which is usually treated as an indicator of steppe vegetation. Given the dominance of *Astragalus* at ash-Shalaf, the absence of wood, the absence of evidence for crop-processing and the absence of burnt animal dung, the most likely explanation for its presence is that it was a shrub gathered for fuel.

This does not mean that the surrounding vegetation was a continuous sward of *Astragalus*. As van Zeist (1986) points out in his report on el-Kowm, the very small and delicate seeds of *Artemisia herba-alba*, probably the dominant steppe species, are quite unlikely to be recovered in identifiable form.

Finally, the absence of wood is likely to be more significant than the absence of minor crop species. Given that seeds were preserved, it tends to suggest a real shortage of timber, which implies that the environment may have been much as it is today. Even with today's rainfall, some wood from wadi vegetation is expected to be found.

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Bibliography

Blackham, M.

1997 Changing Settlement at Tabaqat al-Būma in Wadi Ziqlab, Jordan: a Stratigraphic Analysis. Pp. 345-360 in H. G. Gebel, Z. Kafafi and G. O. Rollefson (eds), *The Prehistory of Jordan II. Perspectives from 1997.* Berlin: *ex oriente.*

Boardman, S. and Jones, G.

1990 Experiments on the Effects of Charring on Cereal Plant Components. *Journal of Archaeological Science* 17: 1-11.

Garfinkel, Y,

1993 The Yarmukian Culture in Israel. *Paléorient* 19/1: 115-134.

Kafafi, Z.

1985 First Season of Excavations at Jebel Abu Thawwab (Er-Rumman), 1984 (Preliminary Report). *ADAJ* 29: 31-41.

1988 Jebel Abu Thawwab: A Pottery Neolithic Village in North Jordan. Pp. 451-471 in A. N. Garrard and H. G. Gebel (eds), *The Prehistory of Jordan II. The State of Research in 1986.* Oxford: BAR.

1989 Late Neolithic 1 Pottery from 'Ayn er-Rahub, Jordan. *ZDPV* 105: 1-17.

1990 Early Pottery Contexts from 'Ain Ghazal, Jordan. *BASOR* 280: 15-30.

1993 The Yarmoukians in Jordan. *Paléorient* 19/1: 101-114.

1995 Decorative Elements on the Excavated Neolithic Pottery at 'Ayn Ghazal. Pp. 545-553 in *SHAJ* V. Amman: Department of Antiquities of Jordan.

Kafafi, Z., Rollefson, G. O. and Simmons, A. H.

1990 The 1989 Season at 'Ain Ghazal. Preliminary Report. *ADAJ* 34: 11-25.

Meadows, J.

1998 Teleilat Ghassul 1997 Archaeobotany, unpublished report on file, University of Sydney.

Obeidat, D.

1995 *Die neolithische Keramik aus Abu Thawwab, Jordanien.* Studies in Early Near Eastern Production, Subsistence, and Environment 2. Berlin: *ex oriente.*

Rollefson, G. O.

1993 Prehistoric Time. Pp. 72-111 in G. A. Ahlström, *The history of Ancient Palestine from the Palaeolithic Period to Alexander's Conquest.* Sheffield: Academic Press.

Rollefson, G. O.

1997 Neolithic 'Ayn Ghazāl in its Landscape Pp. 241-244 in *SHAJ* VI. Amman: Department of Antiquities of Jordan.

Rollefson, G. O. and Simmons, A. H.

1985 Excavations at 'Ain Ghazal 1984: Preliminary Report. *ADAJ* 29: 11-30.

van Zeist, W.

1986 Plant remains from Neolithic el-Kowm, central Syria, Pp. 65-68 in R. H. Dornemann, *A Neolithic Village at Tell el-Kowm in the Syrian Desert.* Studies in Ancient Oriental Civilization, No. 43, The Oriental Institute of the University of Chicago, Chicago.