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NEO-LITHICS

c/o Gary O. Rollefson
Department of Anthropology

Whitman College
Walla Walla, WA 99362, USA
Email: rolleffgo@whitman.edu

after 15th of May, 2000: gorikr@t-online.de

Orders

ex oriente e. V.

attn. Klaus Traulsen
c/o Free University of Berlin
Hüttenweg 7, 14195 Berlin, Germany
Fax 0049 30 8382106 or 7959937
Email: ktraulsen@compuserve.com

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NEO-LITHICS 3/99

A Newsletter of Southwest Asian Lithics Research

Editorial

The 3/99 issue of *Neo-Lithics* appears at the beginning of the last year of the century – of the millennium, for that matter, – a mile post that is often taken to represent the end of one era and the beginning of another. The end of the 20th century witnessed a major surge in Neolithic research in especially the Greater Levant, and *Neo-Lithics* emerged as a way to enhance communication among the rapidly growing community of scholars working in the area. Specifically, the newsletter was founded to facilitate the exchange of views concerning the analysis, description, and interpretation of chipped stone and ground stone lithics.

While we have been able to provide an outlet for such research, *Neo-Lithics* has expanded to include other kinds of information, particularly about field reports of recently concluded excavation campaigns. Sporadic (but unsystematic) sampling of opinion about the value of *Neo-Lithics* appears to indicate that this mixture of lithics analysis and more general developments in Neolithic investigations has been well received by the readership. Clear communication of all kinds is certainly welcome in an expanding research arena.

But as we near the end of this "calendric era" in a year that has not just two but three 0's, we would like to recall that our original purpose, as agreed in Berlin in 1993 (*Neo-Lithics* 1/94) and reiterated in Venice in 1998 (*Neo-Lithics* 3/98), is to focus on issues of lithics analysis. The subgroups that were arranged in Venice might consider concerted efforts to undertake their tasks and report back, via *Neo-Lithics*, what progress has occurred among the problems that they have confronted. Let us strive to increase our use of *Neo-Lithics* to express our ideas on the whats, hows, and whys of lithics research from the Neolithic Levant.

Gary O. Rollefson and Hans Georg K. Gebel

Deadline for the coming issue of *Neo-Lithics* is May 15th, 2000 (next deadline: Sept. 15th, 2000)

Please, note that the text of contributions should be send directly to Dr. Gary Rollefson (Email: rolleffgo@whitman.edu or Department of Anthropology, Whitman College, Walla Walla, WA, 99362 USA; from 15th of May 2000: gorikr@t-online.de).

Illustrations should be sent separately to H.G.K. Gebel at the Berlin address (Free University of Berlin, Hüttenweg 7, D-14195 Berlin, Email: hggebel@zedat.fu-berlin.de).

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A Brief Note on the Projectile Points from Ghwair I, Jordan

Doss F. Powell & Jay Gervasoni
University of Nevada – Las Vegas

A joint investigation between the Jordanian Department of Antiquities and the University of Nevada-Las Vegas (UNLV) has been ongoing since 1996 at the small Neolithic community of Ghwair I in the Wadi Feinan of southern Jordan (Simmons and Najjar 1996, 1998a, b; 1999). The settlement is situated on a hillside at an elevation of 290-320m with a spectacular view of Wadi Feinan. Today the area is a degraded steppe-desert with unstable soils and little vegetation. Ghwair I covers approximately 2-3 acres and is a Pre-Pottery Neolithic B (PPNB) occupation, based on our analysis of the lithic assemblage and on eighteen radiocarbon dates. Other Neolithic sites have been identified

in the general vicinity, including site WF16, located a short distance from Ghwair I. Radiocarbon dates and artifactual evidence suggest that WF16 was occupied during the PPNA (Finlayson and Mithen n.d.). This brief report presents preliminary data on the projectile points recovered from Ghwair I.

Summary of the Excavation Areas

Ghwair I was first excavated by M. Najjar in 1993 (Najjar 1994) and subsequent to that study, UNLV and the Department of Antiquities have reinitiated investigations since 1996. The excavations have focused on six areas of the site.

Area I was originally investigated in 1993, revealing a deep sequence of well preserved architecture. Renewed study in Area I has exposed a series of detailed architectural structures. Typically, the rooms are small, sectional, and appear to have adjacent passageways. These rooms are atypical in that they are not arranged symmetrically. In total, eight "bins" were excavated, in various multiple arrangements, with red plaster on the floors that extends up the walls in some of the structures. Both chipped and ground stone were abundant and the latter category included small cups, a possible phallic representation, "game" boards, tokens, stone palettes with pigment remaining, and possibly stone weights used in grinding activities (Simmons and Najjar 1999).

Ongoing excavations of Area II have revealed highly complex architecture exhibiting more than 30 separate walls and building episodes. At a depth of 3.6 meters, a floor was exposed with an intact work area. We have recorded a hearth, flat stones, *in-situ* ground stone, and mat impressions that will aid in assessing the floor type (Simmons and Najjar 1999).

Cleaning an exposed section of the site in Area III revealed an ash pit with no associated architecture. Tantalized by the prospect of locating a refuse area, a 2x2m area was excavated. Under this level a series of pits were revealed. Although the ash pit was too small (1.5 meters thick) to be the refuse area for the entire PPNB settlement, a PPNA style point (el Khiam) and a large number of bladelets were recovered from the area. Continued investigations found a stratified series of at least three plastered floors in very bad condition. The function of these floors remains to be determined.

Area IV was first excavated in 1993, uncovering a large architectural complex (Najjar 1994). During our recent study in Area IV, four 5x5m units were opened to the south of the previously exposed complex. The context in one room in this area included a cache of goat and cattle skulls, a cache of chipped stone blades, points, polishing stones, and malachite pendant blanks. Additionally, the floor was covered with plaster, which constitutes an important feature of the PPNB. Upon penetration of the floor, the first intact burial for Ghwair I was encountered. The individual was resting in a flexed position, which is typical for Neolithic burials, yet the most fascinating aspect of the burial is the atypical presence of the skull. The burial was secured for further excavation and removal during the upcoming 1999/2000 season (Simmons and Najjar 1999).

Surfaces for two 5x5m units were cleared in Area V in anticipation of additional investigation. The limited exposures have revealed what appears to be an abundant amount of architecture beneath the surface. Additional work will be conducted in this area.

Based on previous investigations, with the aid of ground penetrating radar, a 5x5m unit was plotted and opened in Area VI this past field season. This new unit exposed a large wall that will be investigated further in the 1999/2000 season.

Radiocarbon Dates

With the completion of the 1999 field season, 18 radiocarbon dates have been obtained from the site. These range from 8510 ± 70 bp to 9710 ± 150 bp. They are used to assign phase placement of the village in the early Middle PPNB, according to phase boundaries previously established for other sites in the Southern Levant.

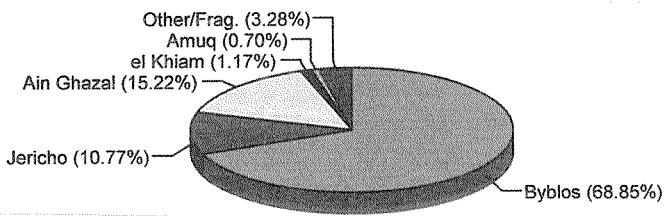
Projectile Points

The chipped stone artifacts of Ghwair reflect a typical PPNB assemblage. More than 48,000 artifacts have been recovered, with tools representing approximately 5% of all chipped stone.

As previously noted by Mortensen (1970), PPNB assemblages tend to be dominated by blades frequently struck from naviform, bipolar cores. This form of blade technology contributes to a highly standardized character in the assemblages from the PPNB (Quintero and Wilke 1995). Within the tool class, projectile points comprise an unusually large number. The projectiles from Ghwair I constitute some 16% of the tool assemblage, numbering 427 in all. Among the points, 131 are complete and 296 are broken. A preliminary examination of the points was conducted using formal attributes to classify them according to detailed morphological typologies from earlier studies, such as Mortensen (1970), and more recently by Gopher (1994) and Eighmey (1992). The results are summarized in Tables 1-3 and in Figs. 1-2.

Table 1 / Fig. 1. Summary of projectile point types from the Ghwair I.

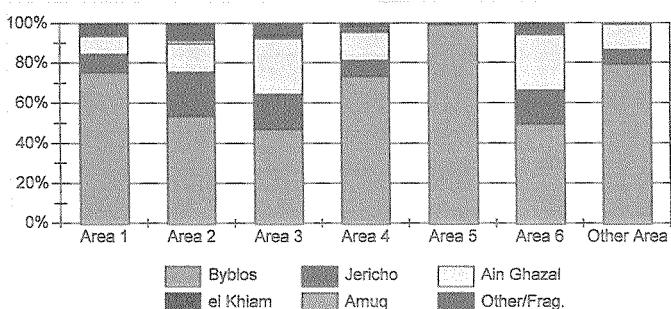
Type	n	%
Byblos	294	69
Jericho	46	11
'Ain Ghazal	65	15
El Khiam	5	1
Amuq	3	1
Other/Frag.	14	3
Total	427	100



The projectile points are consistent with previously recorded types for PPNB assemblages. A summary of projectile points by area is presented in Table 2 and a summary by percentage for each area is presented in Figure 1. Thus far, the majority of projectile points from Ghwair I are Byblos, dominating the entire point assemblage at 69%. This trend is consistently reflected in each excavated area of the site. Typically, Byblos points have been defined as being made on a blade with a tang that is set off from the body by an angle greater than 90 degrees. Usually the shoulders connecting the body to the tang are asymmetrical. Byblos points come in a variety of sizes and standards of workmanship (Gopher 1994:36-38), and this is reflected in the Ghwair I assemblage as well.

Table 2 / Fig. 2. Summary of projectile point types by Area from Ghwair I.

Type	A1	A2	A3	A4	A5	A6	Other
Byblos	50	27	19	174	3	9	12
Jericho	6	11	7	18	-	3	1
'Ain Ghazal	6	7	11	34	-	5	2
El Khiam	1	-	1	3	-	-	-
Amuq	-	1	-	2	-	-	-
Other/Frag.	3	4	2	4	-	1	-
Total	66	50	40	235	3	18	15



During this initial phase of analysis, moderate variation was noted among the Byblos points. Several of the Byblos points have shoulders that are semi-winged resembling a variant between Byblos and Jericho points, and in some cases exhibiting winged shoulders angled at 90°, a diagnostic feature of 'Ain Ghazal points (Eighmey 1992). Other variations include tangs with very

minimal retouch on the tang area, and some possess an offset tang that is at an angle to the body of the point (Gopher 1994).

One interesting facet of the assemblage is the presence of what we have provisionally termed "miniature" projectile points (Table 3) created on bladelets; similar artifacts were noted by Gopher (1994) and others, but usually in reference to Pottery Neolithic contexts. At Ghwair I there are 47 "miniature Byblos points", representing 16% of all the Byblos points we found. Quintero and Wilke (1995) have demonstrated that bladelets are by-products of the specialized naviform technology in use during the PPNB. The significance, if any, of these diminutive tools is currently under investigation. Are they merely within a wide size range of points, or were bladelets intentionally produced for manufacturing these tools?

Projectile points identified as 'Ain Ghazal points were fashioned on small converging bidirectional blades exhibiting fine retouch along their bifacial tangs. The shoulders are flat and form right angles perpendicular to the tang (Eighmey 1992: 97). It should be noted that 'Ain Ghazal points are similar to Jericho and Byblos points but are distinguished by their shoulders. This type of point is the second largest type at Ghwair I, c. 15% of all projectile points. As with the Byblos points, we have encountered "miniature" 'Ain Ghazal points manufactured on bladelets in about 12% of the examples.

Jericho points rank third in our assemblage at approximately 11%. As a rule, Jericho points have been defined as projectiles created on straight, noncurved or twisted blades. Additionally, the tang is set off from the body by an angle less than 90 degrees. Their shoulders are marked by pointed or down-turned barbs. As noted by Gopher (1994), the tang can be triangular, trapezoidal, elliptical, or oval in shape. As experienced with the other dominant types, we have identified miniature Jericho points manufactured on bladelets, comprising 28% of the Jericho projectiles.

El-Khiam projectile points have been defined as points fashioned on a bladelet and with a concave or flat base. Most points have a pair of bilateral notches near the base of the tool and sometimes two or more sets of notches. At times, a knob, or mini-tang, divides the base into two concave parts (Gopher 1994: 32). At Ghwair I we have provisionally defined a subset of el-Khiam points that is retouched but lacks bilateral notches. The el-Khiam point has been labeled the most common point type for PPNA sites (Nadel 1997:82). The presence of el-Khiam points may be associated with the nearby PPNA Site WF16. Based on currently available radiocarbon dates, there is no evidence for a PPNA occupation at Ghwair I.

Table 3. Summary of miniature point types by Area (A) from Ghwair I.

Type	A1	A2	A3	A4	A5	A6	Other	% of Type
Byblos-mini	9	6	5	20	2	3	2	16%
Jericho-mini	-	7	1	2	-	2	1	28%
'Ain Ghazal-mini	1	2	2	3	-	-	-	12%

One final type identified during the preliminary analysis of the points is the Amuq point. These points have been defined as leaf shaped points created on long blades. The contact angle between the body and the tang is greater than 160 degrees. Amuq tangs may be shaped like rectangles, trapezoids, or even pointed. Usually the base of the tang is either straight or convex (Gopher 1994:39).

It is important to point out that some of the specimens could not be assigned to any of the above type definitions since they were missing distinguishable typological features; they were classified as "Other" or "Fragmented / Unidentifiable". We will examine these points further to see if any additional conclusions can be made as to their classification.

Future Research

Our study of the projectile points will continue and lead to a thorough analysis of the attributes of the Ghwair I assemblage. Our analysis will continue to delineate the tangs, notches, and type of base modifications in an effort to differentiate the point types. Since strict typological approaches tend to obscure variation and gradation, we will also explore the variation in form from multiple aspects, such as use and manufacture, to explain the variation within this artifact class. It is hoped that our morphological analysis will enable us to interpret the significance of the

exhibited patterning in terms of context and function. The end results will seek to identify any correlations between economy and environment exhibited at Ghwair I that may enhance our understanding of the PPNB.

Acknowledgments: We are indebted to our co-directors Dr. Mohammad Najjar and Dr. Alan Simmons. The excavations at Ghwair were conducted under the auspices of the University of Nevada-Las Vegas and the Department of Antiquities of Jordan. Primary funding was provided by the National Science Foundation and the National Geographic Society. Additional financial support was provided by the UNLV Graduate Students Association and the International Studies Abroad Program.

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Investigation of the Early Neolithic Site of Ain Abu Nekheileh (J701), 1999 Season

Donald O. Henry¹, Carlos Cordova², Joseph E. Beaver¹,
J. Joel White¹, and Heather Ann Brauer¹
¹ University of Tulsa, ² University of Oklahoma

The program of research designed for the investigation of Ain Abu Nekheileh seeks to answer some basic questions regarding the prehistoric human ecology and paleoenvironment associated with Early Neolithic peoples inhabiting the now hyper-arid zone of southern Jordan (Fig. 1). At a more specific level, the research seeks to evaluate a model of the origin of caprine herding in the mountains of southern Jordan. Here, it is thought that the incipient herding of sheep and goats occurred indigenously, growing directly out of a foraging subsistence pattern. This model differs from the traditional notion that sheep-goat herding was introduced from the northern reaches of the Fertile Crescent only after horticultural villages had become established.

In general, the objectives of this short, first season of research involved:

- (1) Generating a detailed topographic map of the site and immediate area.

- (2) Producing a high-resolution architectural plan of the stone walls and structures exposed on the surface of the site.
- (3) Defining the basic depositional succession for the site and immediate area.
- (4) Completing a coring program in an effort to identify geochemical (e.g., phosphate, organic content, pH, carbonate, etc.) and geophysical (e.g., magnetic susceptibility) signatures of sediments.
- (5) Cleaning Kirkbride's (1978) original trench in an effort to define better the site's stratigraphy, depth of deposit, organic preservation, and so on.



Fig. 1. Map showing the location of the Early Neolithic site of Ain Abu Nekheileh.

Topographic Map and Architectural Plan

A Sokkia Set-6 Total Station was used to collect data-points (N=750) for an area of c. 16 hectares stretching c. 400m north, east, and south of the site. Surfer software was employed to generate a topographic map to serve as a base map upon which the architectural plan, coring data, and other information from the site (e.g., lithic artifact distribution, groundstone distribution, etc.) can be overlain (Fig. 2).

Steps toward developing a detailed architectural plan were taken by clearing the rock rubble from the surface and taking digital images of c. 1,200m² of the site. This represents c. 80% of the site as evidenced by architectural exposures. The structural stones recorded as digital photos will be outlined and the frames formed into a mosaic that will provide a detailed architectural plan of the site. This technique of developing an architectural plan has several advantages over conventional approaches. Beyond offering greater speed, objectivity, and accuracy, the technique provides a digital photo archive that can be used to follow rock alignments as excavation progresses in years 2000 and 2001.

In general, it would appear that curvilinear structures 3-4m in diameter dominate the upper 1/3rd to 1/4th of the hillock as well as a portion of the southeastern slope, whereas rectangular structures (and long straight walls) are more common to the lower slopes (especially the east/ northeast). The rectangular/ straight wall constructions appear to post-date the curvilinear forms. Curvilinear structures regularly show straight walls passing through them. The curvilinear constructions seem to have been built more

often of medium sized (e.g., 35x25x15cm loaf-shaped sandstone slabs) rocks than the rectangular/ straight wall constructions. Chinking stones were commonly used to level and shore-up the curvilinear structures. Three to four stone courses can be observed in Kirkbride's old test trench where walls have been sectioned and are now eroding.

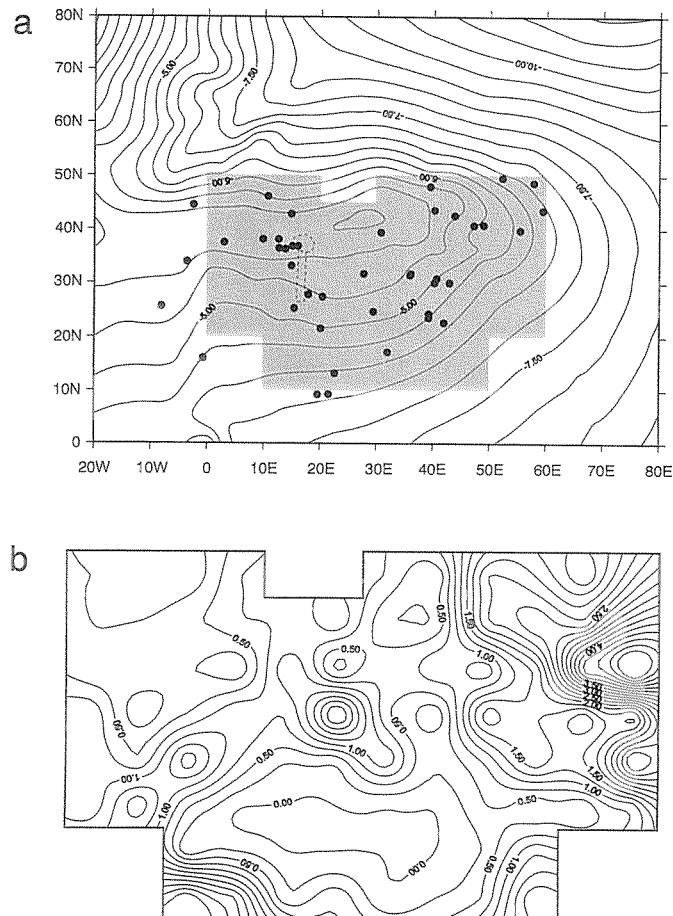


Fig. 2. The topography of Ain Abu Nekheileh, the distribution of groundstone on the surface of the site (dots), and the location of Kirkbride's excavations (dashed lines) are shown in (a). A contour map of surface lithic artifact density in the shaded regions of (a) is presented in (b). Surface artifact distributions reflect combination of occupational intensity and deflational and aggradational processes.

Coring Program

A coring program was undertaken to collect sediment samples with minimal intrusion. Cores were taken with a hand-drilled 5cm diameter bucket auger. The program was designed to collect 3 data-sets: on-site, off-site (both natural and anthropogenic). In all, 50 cores were taken from the site and adjacent off-site locations.

The sediment samples recovered from the cores will undergo paleobotanic (pollen, phytolith), geochemical (e.g., phosphate, organic content, pH, carbonate, etc.) and geophysical (e.g., magnetic susceptibility) analyses in an effort to identify specific sediment signatures. With this in mind, sediment samples were collected from specific activity areas (e.g., hearth, dung, ash disposal, fuel storage, and animal feeding) in the nearby Bedouin camp. The coring data from the site and immediate site area will be analyzed with GIS and Surfer spatial analyses in an effort to trace paleo-surfaces and construction horizons.

The program has already produced some preliminary observations. Cores taken from the architectural area show rock horizons at c. 10-15cm and 30-40cm below surface, perhaps representing two major (prolonged) abandonment episodes. The depth of anthropogenic sediments extend to 45-55cm below surface and slightly beyond the surface evidence of architecture.

Also, a 3m long core, drilled into a small pan located c. 1.3km east of the site, shows three depositional intervals: (1) an upper unit of alternating silt and sand lenses, (2) a middle unit of silt with thicker sand lenses, and (3) a lower unit (60cm thick) of fine-

medium red sand. Both the upper and lower units yielded samples for 14C AMS dates. The date for the lower unit is 7010 ± 50 BP (Beta-134455). Results for the other samples are forthcoming. The succession would suggest the on-set of moister conditions following the deposition of the lower sand unit, i.e., sometime after 7,000 BP.

Sedimentary Succession

A preliminary geomorphic study of the sedimentary lobe forming the hillock upon which the site rests and adjacent deposits fronting the western face of Jebel Ram shows the hillock to have been formed by a succession of alluvial fan, aeolian sand, and aeolian sand/anthropogenic sedimentation (Fig. 3).

An erosional section of a gully incised into northwestern shoulder of the hillock reveals a gradational contact between the underlying alluvial fan and a red aeolian sand. The alluvial fan unit, composed of medium-fine sand, exhibits carbonate filaments (root casts) and forms a coherent matrix.

Following a transitional layer with inter-fingering of the fan and overlying unit, a red aeolian sand tapers up-slope. The fine grain, non-coherent sand is, in turn, overlain by an accumulation of anthropogenic sediment accompanied by rock-walled structures. The anthropogenic sediments consist of a reddish brown, poorly sorted medium-fine sand mixed with ash and other organics. Groundstone and chert artifacts, marine shells, and bone are embedded in the deposit.

A tentative climatic - environmental interpretation of the sedimentary succession links the alluvial fan formation to a period of relatively greater precipitation than that associated with the influx and accumulation of drift sand. The Early Neolithic occupation of the hillock would have occurred after the initial accumulation of the sand, but apparently concurrent with the later phases of influx. Accumulation of the sand on the western face of the Jebel Ram points to prevailing winds coming from the east, a similar phenomenon recognized for thick Pleistocene age sand deposits (Q1 and Q3 sands) in the Jebel Qalkha area (Henry 1997; 1998). Today, prevailing winds from the west and north create sand accumulations predominantly on eastern and southern margins of jebels in the Hisma. The climatic significance of such a shift in prevailing winds is not clear, but may be associated with the hyper-arid cycle of today. Although sand accumulation, in general, signals a relatively dry interval of sufficient magnitude to allow for the mobilization of sands, the Pleistocene age sands are strongly rubified as a likely consequence of moisture and age, whereas mid-late Holocene age sands (Chalcolithic age) lack rubification.

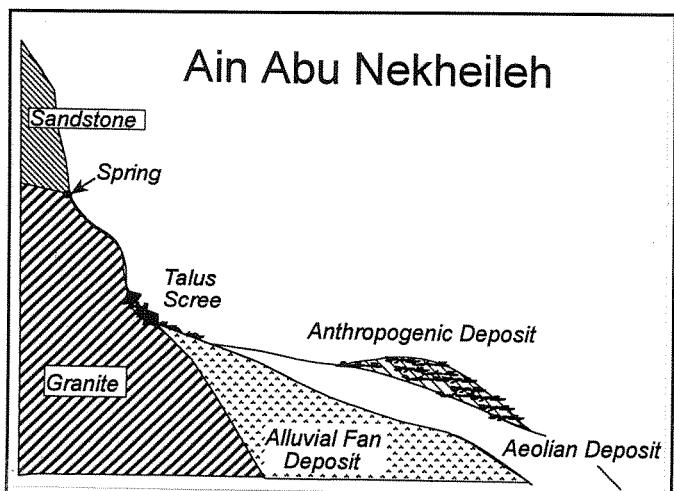


Fig. 3. Schematic cross-section (looking north) showing the surrounding landscape and depositional succession of the site of Ain Abu Nekheileh.

It is tempting to correlate the formation of the red sand unit at Ain Abu Nekheileh with the Q1 red sand of late and terminal Pleistocene age (and containing Epipaleolithic occupations) identified in the Jebel Qalkha area and Judayid Basin of the western Hisma (some 40km NW of Ain Abu Nekheileh). This interpretation would extend the age of the Q1 sand into the early Holocene. Following this tentative correlation, the underlying sedimenta-

tion of the alluvial fan at Ain Abu Nekheileh would correspond to the Q2 pink silt identified in the western Hisma and dated to the Upper Paleolithic between 50-20 Kbp. It should be stressed, however, that this correlation is simply a working model and an effort to organize the data for future evaluation.

Cleaning Kirkbride's Trench

A one meter wide section was cleaned on the west side of Kirkbride's old trench in what would have been her Segment III between walls G and H (Kirkbride 1978: Fig. 2). The section revealed a 45cm thick deposit of gray ash mixed with sand overlying a mottled red sand and ash. Samples were collected from the section for 14C dating, as well as phytolith, pollen, and geochemical analyses. The cleaning also confirmed the presence of reasonably well preserved faunal remains in good numbers.

Summary

This preliminary season laid the groundwork for two longer field seasons devoted to the excavation of large blocks at the site during the summers of 2000 and 2001. A focal point of this future research will be upon defining the season(s), lengths, and sizes of discrete occupations of Ain Abu Nekheileh.

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The Cave of Cyclope in the Northern Aegean: A Specialized Fishing Shelter of the Mesolithic and Neolithic Periods

Adamantios Sampson (Dept. of Mediterranean Studies, Rhodes) and Janusz Kozlowski (Jagiellonian University, Krakow)

Introduction

The Cave of Cyclope is a wide and impressive cave in the area of the Northern Sporades (Fig. 1), a chain of islands extending eastwards into the northern Aegean Sea. The cave is situated on Youra, a remote, wild and totally uninhabited island, one of the northernmost of the group, with steep outline and no natural harbours. In 1992 a systematic excavation started at the cave as part of a larger project that covers all the area of the deserted islands of the Northern Sporades. The excavation continued until 1996, and since then the material is being studied for the final publication. It is the first time a thorough archaeological project has been applied all over the area of the Sporades.

The Youra project was very demanding both because of the multifaceted kind of research and the need of special equipment, but also due to the practical difficulties posed by the isolation of the site. From 1992 through 1996 a survey reconnaissance of the small surrounding islands and of Youra itself also took place. Every year different parts of the island were surveyed and explored. More caves and rock shelters have been located, both in the interior and in the cliffs of the shore. Meanwhile, in the course of an underwater research for the location of possible submarine caves, geologists and cave-divers have located caves in a depth of 25 to 40m.

The Sequence at the Cave of Cyclope

In the Cave of Cyclope an aceramic stratum came to light in the very first season of digging, at the depth of 0.95m in trench B. In 1993 and 1994 the very same level appeared in trench C, at the depth of 1.25m. It was a homogeneous and undisturbed stratum,

1.85m thick, which contained no pottery, but within which existed living floors and hearths, where charcoal from different levels has been collected for radiocarbon dating. These levels produced huge faunal assemblages, including tens of thousands of fish bones, whole shells and land snails, scales and otoliths. Apart from the food remains, the non-pottery levels have yielded a small amount of obsidian, a couple of broken parts of worked shell in the shape of a bracelet, and several tiny beads. A collection of 60 bone fishing hooks of various sizes is a rare find for the Aegean. Hooks can be separated in two types. The usual type of hook (Fig. 2) and the long, thin, slightly convex bone with both ends worked to be pointed.

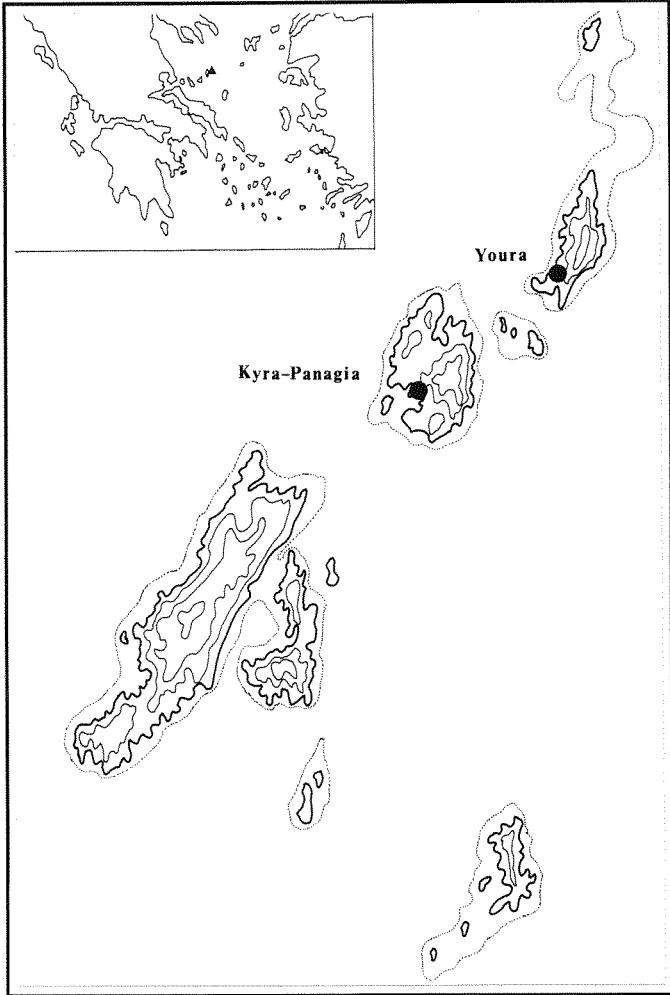


Fig. 1.

More than 30 radiocarbon dates range from 8600-8400 to 6500 BC for the aceramic layers. From the study of the lithics we can distinguish in two parts the aceramic or Mesolithic strata. In the Lower Mesolithic (8600-7500 BC) only flint or other local stones were used. The Upper Mesolithic is characterized by the presence of obsidian from Melos. The same sequence exists in Franchthi Cave in Peloponnese, where two phases of Mesolithic have been found (9000 BC and later).

The Cave of Cyclope brings back the problem of whether there existed a Preceramic Neolithic period in Greece. The well-established theories, according which there is a Neolithic period without ceramic finds antedating Early Neolithic (the "Preceramic Neolithic") and postdating Mesolithic, were strongly argued after the excavations at Achilleion (Gimbutas 1987). Our aim is to reexamine the data from the sites excavated so far, and, given the well stratified evidence from Youra along with the radiocarbon dates, contribute to the elucidation of the sequence of such early stages of prehistory in terms of both relative and absolute chronology. In the cave of Cyclope the levels dated to the first half of the 7th millennium BC could be assigned to a final Mesolithic stage or to a Preceramic Neolithic, but the animal bones of this phase are very few and non-diagnostic. The earliest domesticated species come from levels of the Early Neolithic (6300-6200 BC).

During the glacial optimum the Northern Sporades were connected to Magnesia forming a long land ridge. In Mesolithic times the channels between islands were narrower than today, but crossing them must have been easy for the local inhabitants. In 9th millennium BC the island of Youra was much bigger, perhaps joined with Psathoura, a small island and the northernmost of the group. But the area of the Northern Sporades is an unstable and seismic region, and the general eustatic trends in the Aegean area cannot be used with complete certainty for the study of the Northern Sporades.

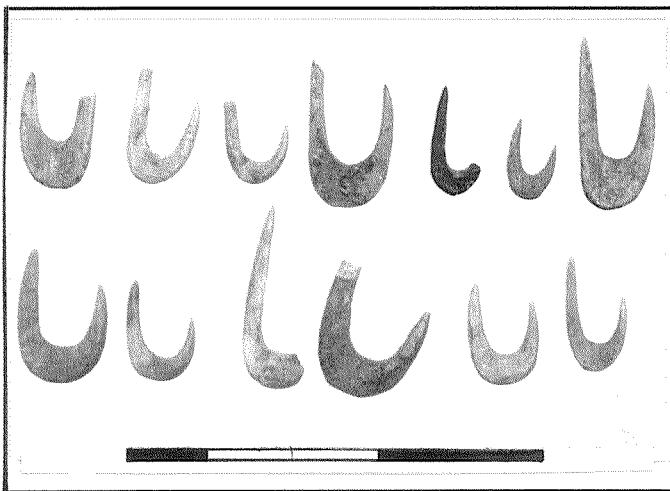


Fig. 2.

The Lithic Industries

The lithics from the Mesolithic strata of the cave are made of siliceous rocks, and a few pieces of obsidian appear in the Upper Mesolithic. The finds from the aceramic layers are to a large extent based on flake production. The complete operational chain of blank production took place locally. Flakes that must have been detached from discoidal and single-platform cores constituted intentionally obtained blanks subsequently used in the production of tools. Therefore, the high ratio of flakes in the aceramic layers is not only the evidence of the full production cycle of the site but also of the use of a specific technology.

A radical change can be seen between the aceramic and the Neolithic levels. The change consists of a sharp increase in the proportion of blades and retouched tools in the Neolithic levels.

As far as typology is concerned a normal sequence is noticeable as the occurrence of flake tools: mainly endscrapers and retouched flakes in the Mesolithic layers, macroblade tools with marginal retouch in the Early/Middle Neolithic layers, and bifacial leaf points in the Late Neolithic. A fascinating problem is that the same type of geometric microliths (crescents, trapezes) and simple backed bladelets, retouched truncations and retouched blades are represented by the same set in all the layers with the exception of Lower Mesolithic (Fig. 3). The fact that similar microliths appear in the Epipaleolithic and early ceramic layers in southwestern Anatolia, dated to the Early Holocene, might suggest that they appeared in the Youra island at the same time. An argument against intrusions is that the radiocarbon dates are consistent with the stratigraphy in all layers. There is also the fact that in the neighboring site of Ayios Petros geometric microliths (trapezes, crescents) have been found in Middle and Late Neolithic levels, which shows that the unchanged shape of microliths in the Northern Sporades would be the effect of adaptation to local ecological conditions. Maybe this foraging-fishing mode of subsistence economy encouraged the seasonal occupation of Youra by various population groups, who had their base at bigger islands such as Kyra-Panagia and Alonnesos, until the Late Neolithic.

The style of microliths from Youra is distinctly different from microliths known in the Mesolithic of continental Greece. Geometric microliths existed in Franchthi Cave at the end of the Paleolithic, and to the same period belong microlithic industries in NW Greece. It is the first presence of such a set of microliths in the Aegean Basin in the period between 8900-8200 BP (7500-7000 BC). Identical forms of microliths of the same date are

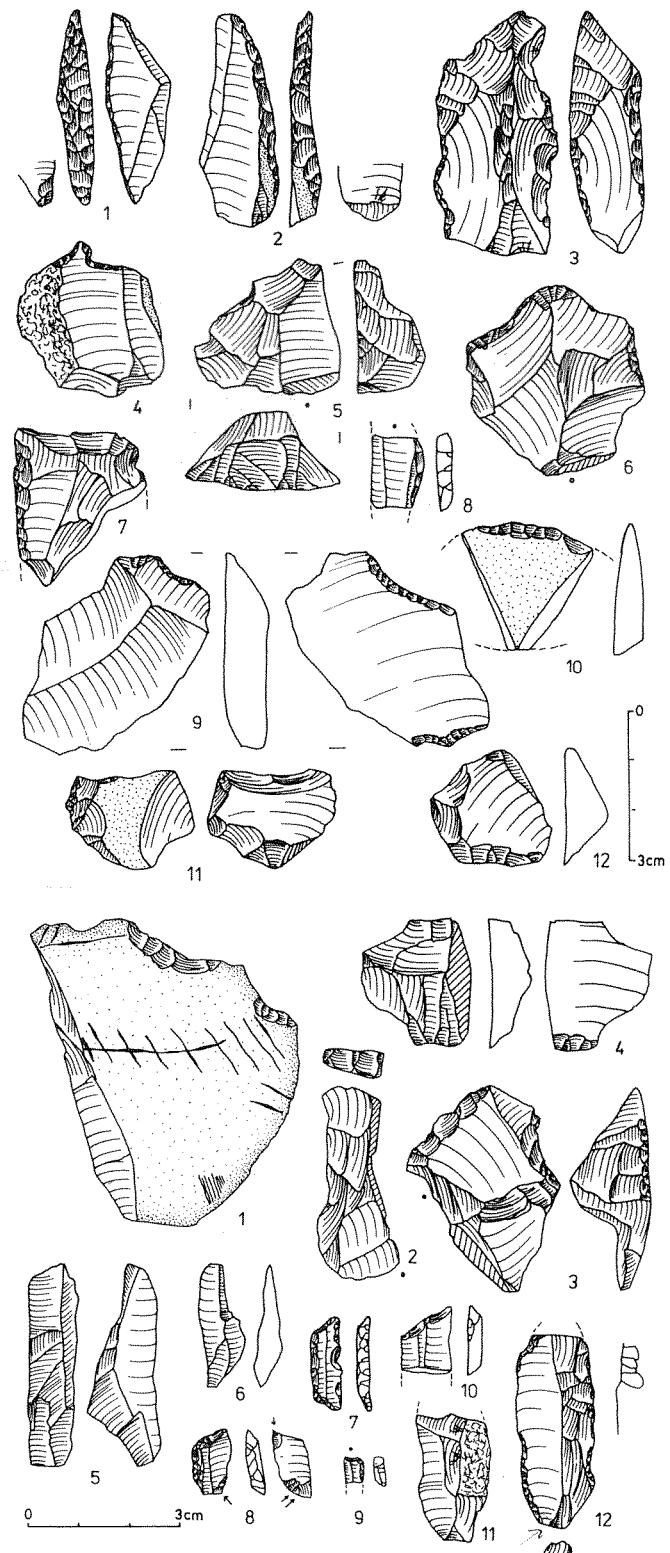


Fig. 3.

known from the Antalya region of SW Anatolia. In particular, such tools were found at Okuzini Cave, both in layer Ia2 at about 10,000 BP and in layer Ib1 dated between 8700-7800 BP (7500-6500 BC), as well as in Belbidi Cave (layers B and C). We can make the hypothesis that the Mesolithic industries of Youra used the latest Paleolithic traditions of this area, although no stratified sites of the period between the Paleolithic and the Mesolithic have been found in the Northern Sporades. It is more probable that this type of artifact came to the Aegean from the Near East by naval routes via the Antalya region.

The transportation of obsidian and the specialized fishing activities testifying to the development of sea faring are dated to the same stage with Franchthi Cave. It is very probable that these activities of the Mesolithic had deep roots in the Upper Paleoli-

thic tradition, because the sudden development and specialization of fishing in the beginning of the Mesolithic would be unusual.

Fishing

The large amount of fish bones has already been studied, and they show that a big part of subsistence was based on fishing. The fishermen of Youra were exploiting two major fish resources: large quantities of migratory fish (small Scombridae and larger Carangidae), which appeared seasonally, and the coastal fish available on a year-round basis (Sparidae, Serranidae, Scorpaenidae).

All the species identified in the archaeological assemblage are present in the water today, and the same families predominate. Marine exploitation in the Mesolithic and Neolithic periods concentrated on coastal demersal species, with only a very limited catch of large pelagic species such as bonito. From the vertebrae and cranial bones we assume a wide faunal spectrum including 19 families, within which certain species and genera can be identified. In Mesolithic levels Serranidae and Scorpionidae, Mugillidae, Scombridae were the most common species. In Early and Middle Neolithic Sparidae dominated, and Scombridae was the second most important group including medium size fish.

The fact that a large number of vertebrae without cranial bones are associated with floors and hearths supports the idea of some fish processing in the cave. The absence of cranial bones has been interpreted as the result of special processing and preservation of fish in the Cape-Andreas Kastros in Cyprus (Desse 1994). There are similarities between Youra and Cape-Andreas concerning the presence of hooks in both sites, as well as the under-representation of certain anatomical parts of Scombridae and Mugillidae.

Probably the already cured fish were stored deep in the cave where the conditions for preservation are excellent. According to D. Mylona (University of Rethymnon, Crete), who studies the vertebrae of the fish, there is no evidence for the use of any particular preservation technique, but the common practices for preservation suggest the use of drying and smoking. Preservation in salt, maybe in baskets, cannot be excluded. The preservation of fish was practiced intensively, probably only in the Lower Mesolithic.

The shallow sea may have in some places provided ample nutrients for fish. According to J. Powell (University of Queensland, Australia), who is studying the cranial bones of the fish, the decreasing emphasis on Mugillidae, usually found in conditions of low salinity, from the Mesolithic to the Neolithic, may be a reflection of the disruption of this environment due to the continuous rising of the sea level and the influx of more saline water. She believes that the reduced range of species in the later periods is the result of more specialized fishing. The wider range of species in the Mesolithic is because fishing methods that were employed did not "target" particular desirable species and as consequence there is a large incidental "by-catch". According to Powell, the Late Neolithic people seem to be more skilled in targeting desirable species and had therefore presumably developed particular strategies that suggest more refined fishing methods.

However, the cave of Youra has not so far given evidence for these skilled fishing activities of the Late Neolithic, and perhaps it was another site in the Sporades that served as the center for the specialized fishermen. In general, the fishing activities during the Early, Middle and Late Neolithic decreased gradually in the cave, while there was a strong increase of the domesticated caprines in Late Neolithic.

Later on, evidence in the cave of Cyclope for the systematic collection of shells and terrestrial mollusks seems to have contributed highly to daily nutrition. The hunting of small animals was a very secondary occupation, but the hunting of birds was very important in the Mesolithic levels. The pig occurred in the earlier Mesolithic levels, but it is doubtful whether they belonged to domesticated species or not, because the sample is very small.

The Late Neolithic

Three of the trenches so far excavated in the cave (A, B and C) yielded alternating living floors of the Early and Late Aegean Neolithic. The Early Neolithic finds in particular have yielded some exceptional pieces of red-on-white wares, with fine decorative patterns, recorded also thus far in the neighboring site of

Agios Petros. The pottery styles present, of course, affinities with the contemporaneous painted pottery of the mainland (Thessaly and Central Greece). It is important, however, to note that they present idiosyncrasies that suggest a very local culture run by a very local population, the so-named "Youra-Agios Petros culture". The motifs remind one strongly of the weaving art; in particular, the motif of canvas is a linear representation of the ways warp and west tangle to produce cloth.

During the Neolithic, Youra and the surrounding islands constituted part of a chain extending eastward in the north Aegean, a natural bridge to Lemnos and the Troad, which may have facilitated any cultural exchange through this naval route. Unlike the open sea to the east of Euboea, the Euboean Gulf, is protected and is considered an extension of this route to the south, which would have facilitated communication with the Peloponnese and the Cyclades.

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The Lithic Industry of the Final Pottery Neolithic: New Evidence from Tell Ain el-Kerkh, Northwest Syria

Makoto Arimura (University of Tsukuba)

Tell el-Kerkh is a huge tell complex consisting of three mounds located in the Rouj Basin, northwest Syria. In 1990-1992 the University of Tsukuba carried out intensive surface surveys and soundings in the basin. These investigations revealed that Tell el-Kerkh is one of the largest Neolithic settlement in West Asia, dating from the LPPNB to the Pottery Neolithic. Excavations at Tell Ain el-Kerkh, the largest mound of the complex, started in 1997 as a joint project of the Syrian Directorate-General of Antiquities and Museums and the University of Tsukuba, with the aim of conducting socio-economic studies on the establishment of the large Neolithic settlement (Tsuneki *et al.* 1998, 1999). Three seasons of fieldwork have demonstrated that Neolithic settlement of Tell Ain el-Kerkh were occupied from the El-Rouj 1 to 2d periods in the El-Rouj chronology (*i.e.*, LPPNB to final Pottery Neolithic: c. 6500-5000 bc, uncalibrated)¹.

In the 1997 and 1999 seasons final Pottery Neolithic (El-Rouj 2d: c. 5300-5000 b.c.) deposits were discovered in the central excavated area and many architectural remains, including several stone foundations and rectangular pisé houses, as well as ritual pits with restorable broken pottery, were unearthed (Tsuneki *et al.* 1998, n.d.). The aim of this note is, through the analysis of the material from these well-stratified contexts at Tell Ain el-Kerkh, to provide new information on the lithic industry in the final Pottery Neolithic period in northwest Syria, where well-documented sites are still scarce.

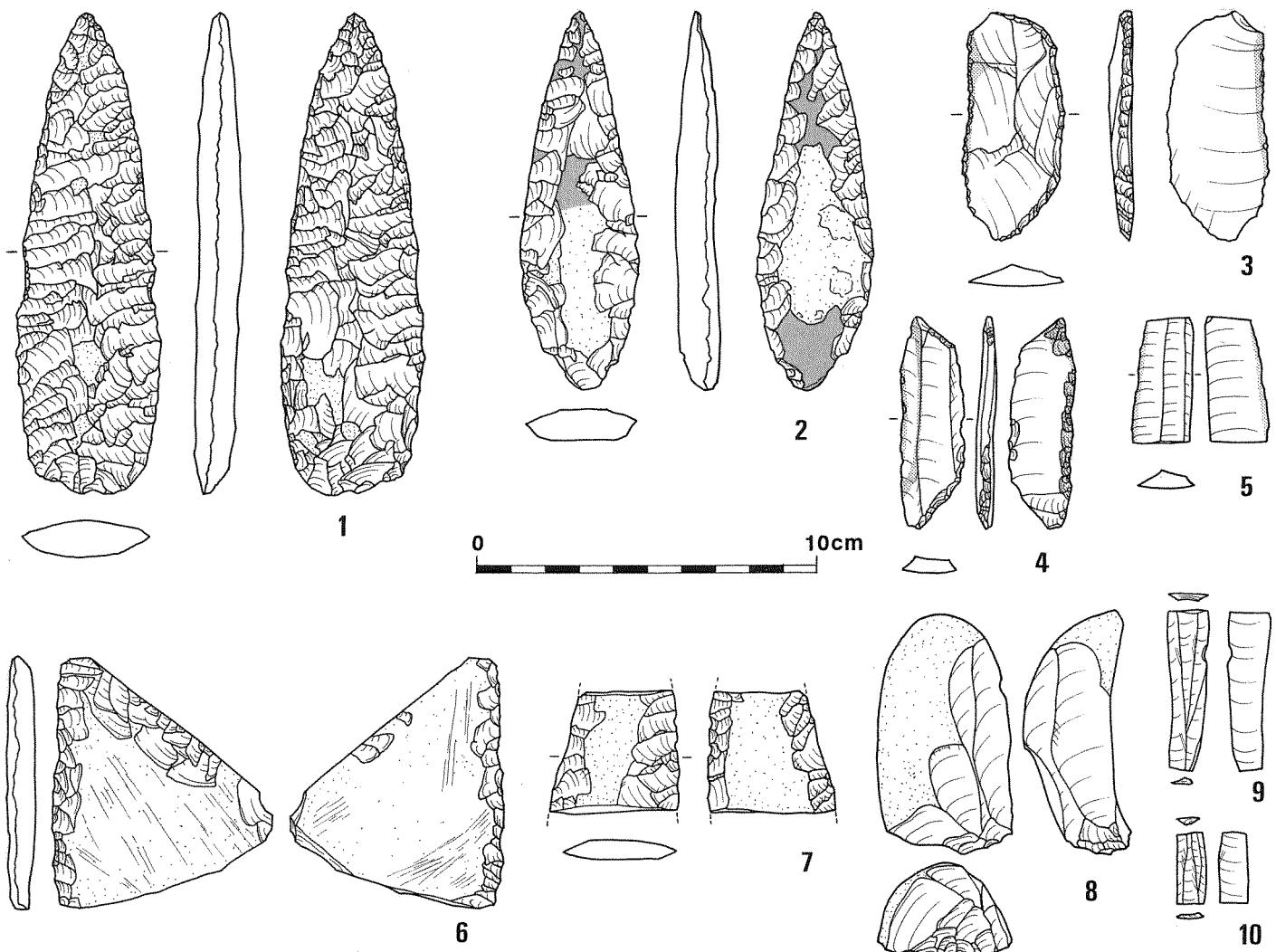


Fig. 1.

Lithic Industry

In 1997 and 1999, some 8000 chipped stones were unearthed from El-Rouj 2d deposits. The vast majority of the lithic assemblage is made on flint and obsidian; 7581 and 258 respectively.

Most of the used flints are brown to gray in color and of medium to low quality with rounded cortex or rolling signs. This indicates that the original raw materials were wadi pebbles, which are available near the site (Tsuneki *et al.* 1998). Dark-colored (especially chocolate-brown) high quality flint, which is common in El-Rouj 1 period (LPPNB), is virtually absent in El-Rouj 2d period. Instead, high quality tabular flint of reddish brown color which was not exploited in preceding periods, is present in this period, although it occurs in small numbers. Its source, the Wadi Qabou 5.5km to the south of Tell el-Kerkh, must be different from other flints. These tabular flints were selected especially for bifacial-flaked tools as mentioned below.

The numerous flint cores and debitage products found in the El-Rouj 2d period indicate that lithic production was carried out within the site. Almost all of the flint cores are types of small flake cores; most of them can be classified as single-platform cores. The original cortex usually remaining on the surface of the core shows that the original flint was a small wadi pebble and that the core preparation is not elaborate. Judging from the working faces of these cores, most blanks seem to have been elongated shaped flakes (Tsuneki *et al.* 1997: Fig. 21:1-2). Compared to preceding periods, it can be said that blade production did not prevail in this period. Especially, naviform cores, other opposed-platform blade cores and their debitage products are completely absent.

Standardized tools are scarce in this period. Most of the tools are made on amorphous flakes (Fig. 1:8), such as retouched or

utilized flakes. In addition to the raw material selection, which is oriented to wadi pebbles, easily accessible from the site, the dominance of non-standardized flake tools indicates that the tool production of this period was obviously expedient.

Some specific and new types of tool, such as daggers, Tile knives, crescent-shaped sickle elements and chipped disks, appeared in the El-Rouj 2d period for the first time. Projectile points such as Ugarit or Amuq points and other arrowheads, which are common in preceding periods, almost disappeared, while two elaborate worked daggers were found in the 1999 season. One specimen (Fig. 1:1) is made on high quality flint of reddish brown color and was bifacially retouched by pressure flaking.

Fine retouch, possibly for hafting, is seen on the middle of both lateral sides. It seems quite probable that this piece was manufactured within the site because the raw material, tabular flint, is available in Wadi Qabou as already mentioned above and some amount of semi-chipped tabular flints were also found in the same layer. The other dagger (Fig. 1:2) is the sole specimen made on quartz. It is also bifacially retouched, but finished by polishing the surfaces.

The appearance of other bifacial-retouched tools is also significant. Tile knives made on high quality tabular flint, also appeared in this period for the first time, although the number is very small (Fig. 1:6). They are usually made on similar raw material to the daggers. They are usually retouched bifacially on either one or two edges and retain the original cortex on both surfaces. On the cortical surfaces of some tile knives, scratched lines are present as already known from other sites (e.g. Tell Sabi Abyad). Moreover, different types of bifacial knife with two working edges made on thin tabular flint were found (Fig. 1:7).

Sickle elements are also important tools in this period. They can be divided into two types: crescent-shaped type (Fig. 1: 3-4) and blade segment type (Fig. 1:5). The blanks of the former type were selected from both flakes and blades. This type is backed unifacially by abrupt retouch and sickle gloss is visible obliquely on the working edge. The latter type is made on blades snapped on both ends without any retouch. The blanks are regular blades apparently detached from single-platform cores. Based on the technological aspects the same type of sickle elements are continuously used from the El-Rouj 1 period (LPPNB), although their length in El-Rouj 2d period is shorter than that of El-Rouj 1 period (3-4cm in El-Rouj 2d period, see Tsuneki *et al.* 1999). Parallel sickle gloss is usually visible along the lateral edges. These two distinct types of sickle elements show the presence of two different hafting methods: the crescent-shaped type is obliquely inserted into the haft, while the blade segment type is parallel.

Almost all obsidian artifacts are blades/bladelets (Fig. 1:9-10) or small flakes. Although obsidian cores, all of which are bladelet cores, are present, the number is very few. This indicates that obsidian was generally brought to the site in the form of blades/bladelets. The existence of obsidian cores, however, suggests that the production of bladelets was also carried out within the site even though they are not common. Although the analysis of obsidian sources has not yet been conducted, it should be noted that the obsidian of the El-Rouj 2d period includes many pieces of greenish gray color, signifying that they are possibly derived from eastern Anatolia. The proportion of such obsidian dramatically increased in the El-Rouj 2d period.

Besides chipped stones made on flint and obsidian, some chipped disks made on flat limestone blanks were found (Fig. 2). They are retouched bifacially and shaped into disk forms. For the time being, however, it is not possible to clarify the function of this tool².

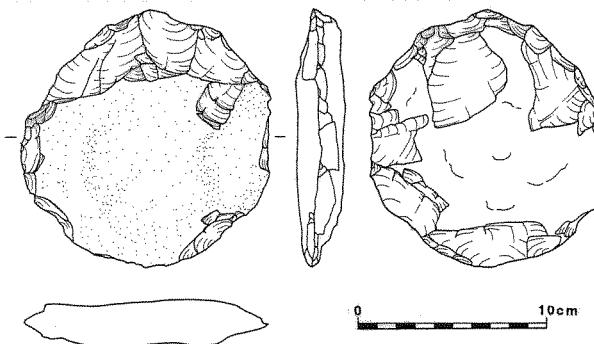


Fig. 2.

Discussion and Concluding Remarks

The lithic industry of the El-Rouj 2d period can be summarized as follows: the dominance of flake tools and the appearance of bifacial-retouched tools (dagger and tile knife), crescent-shaped sickle elements and chipped disks. Especially, the bifacial-retouched tools and the crescent-shaped sickle elements would be significant for the comparison in order to understand the inter-regional relationships of the site.

Bifacial-retouched tools including daggers and tile knives are found from several Neolithic sites in Syria. Tile knives are present in small quantities from the late 6th to the beginning of the 5th millennia b.c. (Tell Judaidah-Amuq Phase C, Ras Shamra IVC, Tell Mastuma Square 15Gc, Tabbat al-Hammam, Tell Sabi Abyad). Bifacial daggers found from Neolithic sites in Syria are also highly restricted. A similar fragment is found from Ras Shamra IVC (Contenson 1992: Pl. LXXXI-2) and Tell Sabi Abyad. Recent excavations at Tell Sabi Abyad in the Balikh provide good evidence for the appearance of bifacial-retouched tools in Syria with secure contexts. At Tell Sabi Abyad, bifacial-retouched tools, especially daggers (or javelins) and tile knives, appear in the Balikh IIIA period (c. 5200-5100 b.c.) in the Balikh phase chronology (Copeland 1995)³. Copeland asserted that the appearance of tile knives seems to be part of Samarran influence (1995:315). In fact similar pieces, for example, the dagger at Tell es-Sawwan and tile knives at Baghouz, were attested in the layers of the Samarra period.

On the other hand, in the central and southern Levant, bifacial-retouched tools are common. The earliest specimens were found in PPNB sites, such as Kfar HaHoresh in the Mediterranean zone, although the number is restricted (Goring-Morris 1994). In the following 6th millennium bc, bifacial-retouched tools increase in the arid zone such as the Negev and eastern Jordan (Goring-Morris *et al.* 1994; McCartney and Betts 1998). Goring-Morris suggested that the tabular knives of the Tuwailan industry were used in slaughter-related activities with the introduction of domesticated animals in the arid zone. However, it is important to note that the cultural and environmental settings between northwest Syria and the arid zone are quite different. In northwest Syria, the domestication of mammals, not only sheep/goat but also pig and cattle, was already established by the LPPNB period (Tsuneki *et al.* 1998). Furthermore, bifacially retouched knives usually occur in rather small quantities in the late 6th millennium bc. Assumptions based on evidence from the arid zone do not seem to be applicable to northwest Syria.

As for the crescent-shaped sickle elements, the earliest specimens of this type already appeared in the LPPNB period in middle Euphrates site, such as Tell Halula. Beyond the middle Euphrates, crescent-shaped sickle elements were commonly used during the Pottery Neolithic period in the Balikh (Nishiaki 1997). In northwest Syria this type became common in the late 6th millennium bc. The appearance of this type of sickle element is much later than the middle Euphrates. In the Amuq plain, for example, these crescent-shaped sickle elements appear in the First Mixed Range, which is partly contemporary with the El-Rouj 2d period, and then become common in the following Amuq Phase C. As already seen, at Tell Ain el-Kerkh crescent-shaped sickle elements and tile knives are usually found together in the same chronological context (e.g. Tell Judaidah and Tell Mastuma). Further south, at Byblos, these sickle elements are found together with tile knives in the *néolithique récent*. This means that their appearance is much later than the examples in north Syria. This situation indicates that the crescent-shaped sickle elements found in northwest Syria and the central Levant are probably derived from north Syria.

Based on the above comparison, the lithic assemblage of the El-Rouj 2d period fits well with the evidence from other sites in the late 6th to the beginning of the 5th millennia bc in northwest Syria. The appearance of the new types of tool, and the increase in obsidian possibly originating from eastern Anatolia, strongly suggest that cultural influences from the eastern regions grew more intensive in the late 6th to the beginning of the 5th millennia bc. The pottery also reinforces this assumption. Among the local pottery, especially with respect to vessel shapes, strong Halaf influence is detected. It should also be mentioned that there remains a possibility of influence from the southern Levant, when one takes the geographical position of the Rouj Basin, situated in the northern part of the Levantine Rift Valley, into consideration.

Over the long sequence from El-Rouj 1 to 2d period, the lithic industry at Tell Ain el-Kerkh changed dramatically in the El-Rouj 2d period. The technological tradition that had existed since El-Rouj 1 period, characterized by the blade production by naviform (and other opposed-platform) core method and bladelet production by the single-platform bladelet core method (see Tsuneki *et al.* 1999), completely disappeared in the El-Rouj 2d period. On the other hand, new types of tool, such as tile knives and crescent-shaped sickle elements, began to appear. The meaning of these technological and morphological changes of the lithic industry will be investigated in future studies.

Acknowledgments: I am indebted to Akira Tsuneki, director of the Syro-Japanese Archaeological Mission at Tell el-Kerkh, for the opportunity to study and publish this short note on the materials from Tell el-Kerkh. Dr. Mark Hudson kindly checked and improved my English. Last but not least, I would like to thank Dr. Yutaka Miyake and Osamu Maeda for their comments on an earlier draft of this paper.

Notes

1. The chronological framework of the prehistoric period in the Rouj Basin has been already established on the basis of surveys and soundings at four sites (see in details. Iwasaki *et al.* 1995).

2. Recent articles on stone ring production at Baja in Jordan reveal that chipped disks are probably the blanks of stone rings. At Tell Ain el-Kerkh, however, there are no stone rings or their debitage products.

3. The El-Rouj 2d pottery assemblage at Tell Ain el-Kerkh shows that this period would be contemporary to Balikh IIIB (Early Halaf) period. The appearance of these bifacial retouched tools at Tell Ain el-Kerkh is slightly later than at Tell Sabi Abyad where these tools were found from the Balikh IIIA period. Moreover, in layers of the El-Rouj 2d period a few Samarra or Samarra related potsherds are found with early Halaf potsherds. This situation is different from Tell Sabi Abyad. Therefore, further investigations are needed to understand the affection of the Samarra and Halaf cultures in northwest Syria.

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The Neolithic Site of es-Sayyeh:

Preliminary Report on the 1999 Season

Zeidan Kafafi¹, Isabella Caneva², and Gaetano Palumbo³

¹Yarmouk University; ²University of Rome; ³Getty Museum, Los Angeles

The archaeological survey and excavation in the Wadi Zarqa and Wadi Dhulayil is a joint project of Yarmouk University, Irbid, and the University of Rome "La Sapienza". The joint project is co-directed by Zeidan Kafafi and Gaetano Palumbo. Field directors are Fabio Parenti, Isabella Caneva, Abdul-Halim al-Shiyab and Nabil Qadi.

Fieldwork was previously conducted in the years 1993, 1996, 1997 and continued this year (1999). Preliminary results have been published already (e.g., Kafafi et al. 1997a, b). A report concerning the 1999 season to be published in the *Annual of the Department of Antiquities of Jordan* is in preparation.

The aims of the project are the following:

1. to investigate the sequence of human occupation in this sector of the Zarqa River.
2. to prepare the archaeological map of the area by means of intensive surveys and assess the conditions of the sites and the threats to their integrity.
3. to research the earlier periods of use of occupation in the area.
4. to study human adaptation and food production strategies during various time periods.
5. to understand the man-made landscape of the region.

The team is achieving these aims through a variety of sub-projects. This year the work concentrated on three separate initiatives:

1. Archaeological survey, with principal aim to reconstruct the historic and classical landscape of the region.
2. Soundings in the Lower Paleolithic sites in Sukhne (sites 330 and 414), with the aim of retrieving further information on the presence of *Homo erectus* in the region as early as 1.5 million years before present.
3. Excavations at the Neolithic site of es-Sayyeh (site 8), with the aim of retrieving information on the sequence of occupation in this PPNB to Pottery Neolithic site, and collect environmental and material culture information from the archaeological layers.

A team from the Lerici Foundation in Italy also conducted remote sensing surveys at several sites. Below we present a preliminary report about the results of the excavations at the Neolithic site of es-Sayyeh. The report on the Paleolithic excavations and the survey will be presented in detail in articles and preliminary news in other publications.

Two areas have been excavated during the 1999 season of excavations at the site of es-Sayyeh.

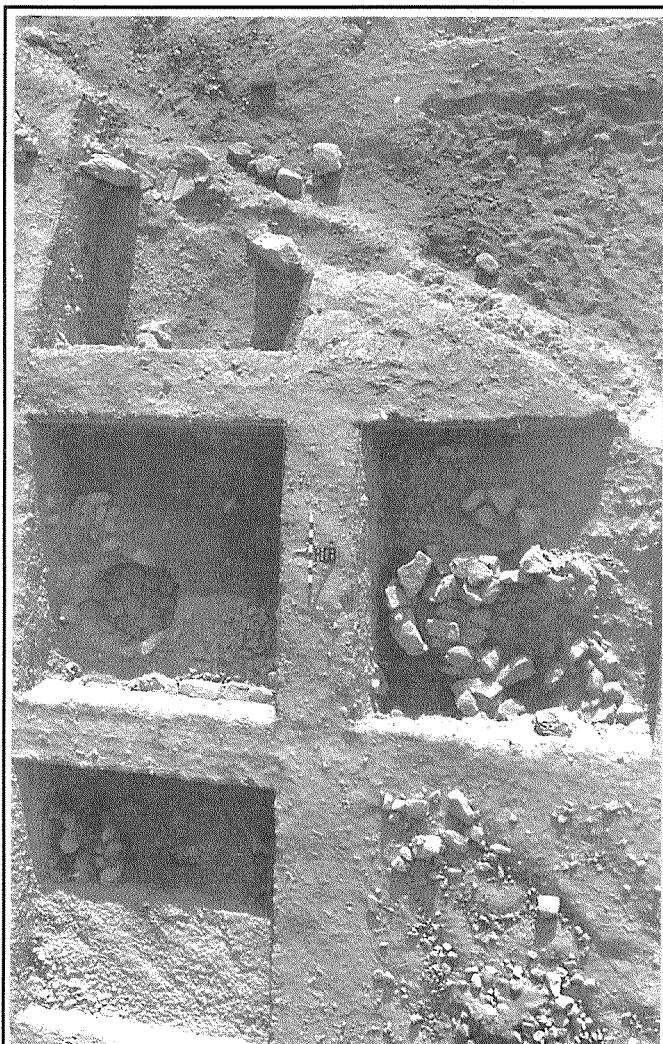


Fig. 1. General view of the Western Area (sixth and fifth millennia structures).

Western Area

This area was first visited during the first season of excavations in 1997 from which pottery sherds, flint tools, basalt grinding stones and a large number of animal bones were collected. Thus, it has been decided this season that this area should be inspected aiming at the followings:

- a. to understand the stratigraphic sequence in this part of the site.
- b. to check possible earlier occupational layers.
- c. to uncover the architectural remains which are visible in the cut made by the bulldozer.

To achieve these goals the team trimmed the cut and excavated eight squares laid out in the area very close to the main road connecting the towns of Sukhneh and Qneiyeh. Four of these squares were opened in the upper section and other four in the lower one.

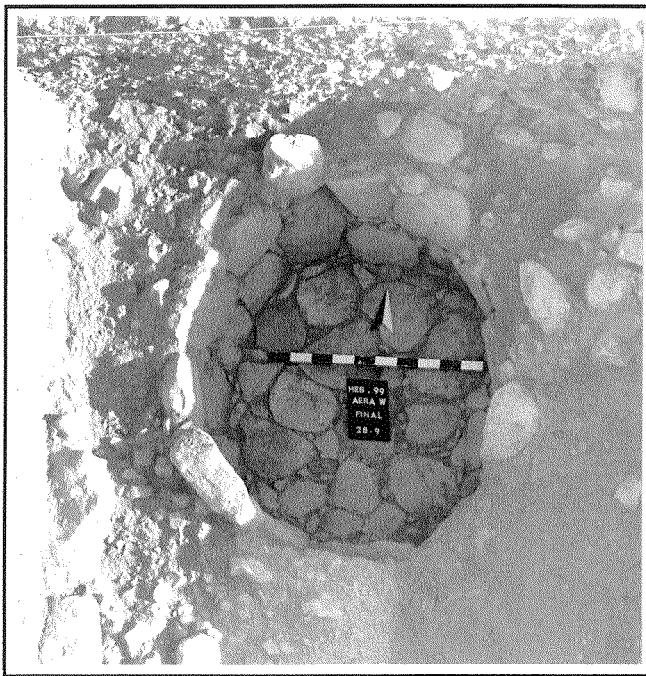


Fig. 2. Yarmoukian storage pit.

The excavations showed that nothing earlier than the PPNB is attested in this area. Virgin soil was reached in the lower slopes of the excavated area. The stratigraphic sequence is as following: Virgin soil/ PPNB (7th millennium bc) / 6th millennium strata (PPNC and Yarmoukian) / perhaps Chalcolithic remains.

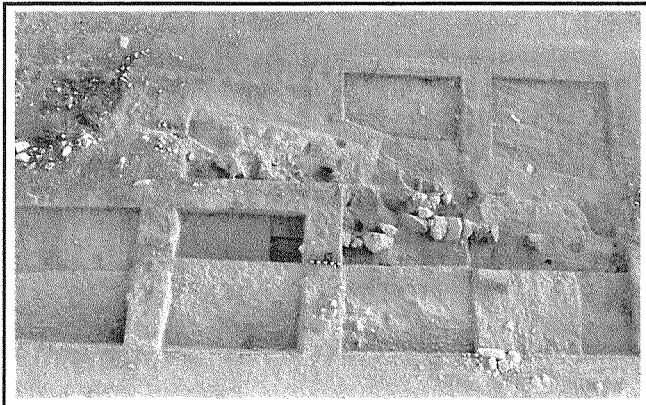


Fig. 3. Eastern Area: seventh and sixth millennia remains.

In terms of archaeological remains, PPNB Jericho points were found in the lower levels dug in squares G2, G3, F2 and F3, while deeply denticulated sickle blades dated to the Yarmoukian were uncovered in the upper levels. The pottery assemblage was little in quantity and found in the upper layers in squares E2, E3, D2 and D3. The pottery sherds are dated to both the sixth and the fifth millennia bc. No typical Yarmoukian sherds (such as incised or incised and painted ware) were found. Special small finds such as four fragmentary animal clay figurines were found in the lower layers (dated to the 7th millennium bc) in Square G2. The same layer yielded also bone tools, shells and a spindle whorl. Unfortunately, this lower part is strongly affected by bulldozer operations.

No architectural remains dated to the PPNB were excavated, but parts of storage pits of this period were found. It may be argued that the PPNB structures have been completely destroyed and taken away by the bulldozer recently or when the asphalt road was opened. Structural remains dated to the sixth and the fifth millen-

nia have been excavated in addition to storage pits dated to the Yarmoukian period, which perhaps reused during the Chalcolithic. Fragmentary walls dated to the 6th millennium have been explored. These were built of large and medium sized stones. Unfortunately, we still do not have a complete plan of a house from these levels. Two storage pits were excavated in Squares E2 and D2, one lined in the inner side with a layer of stones that also covered the floor. It measures 2.2m in diameter at the top and 1.3m at the bottom.

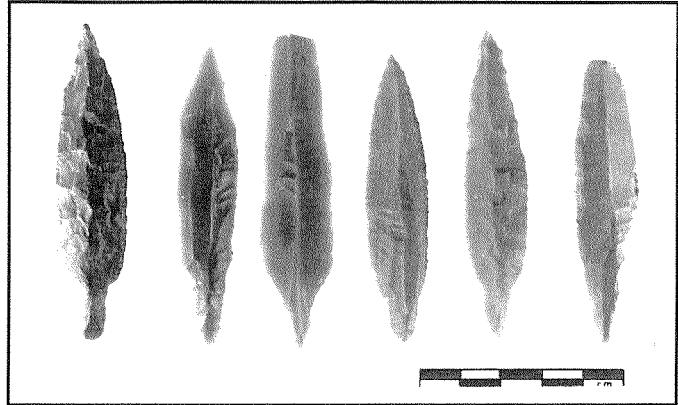


Fig. 4. Byblos and 'Amuq Points.

Eastern Area

This area was first inspected in 1997 by trimming bulldozer cuts and opening four test trenches. The excavations at that time yielded structural and archaeological remains dated to the PPNC and Yarmoukian periods. This year it was decided that more information about an installation excavated in 1997 must be sought. Thus, seven squares, each measuring 4x4m, were opened in the area adjacent to a wall uncovered in 1997 in Test Trench IV. The archaeological operation in these squares yielded three phases of occupation dated to the 6th and 7th millennia bc, with the following stratigraphy:

0. Top soil: Dark brown with many large stones disturbed by ploughing activities.

Level I: Light grayish brown soil; mixed with different stone sizes. Most of these stones are of angular form. These stones probably accumulated on this lower slope by natural effects or by leveling the slope. Flint tools and stone objects have been found with few animal bones.

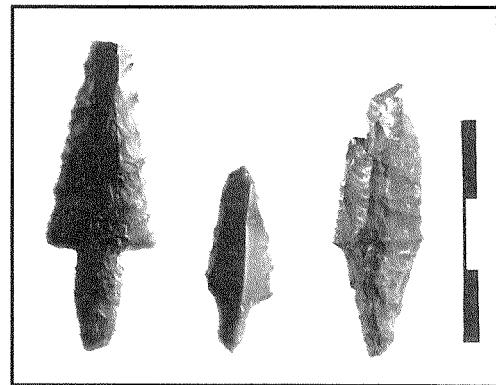


Fig. 5. Yarmoukian Points.

Level II: Gray loose soil with many stones of angular form. The continuation of the structure discovered in 1997 appeared within this level, and it was revealed to be a retaining wall for a terraced structure.

Level III: This level is a compacted floor surface settled over the virgin soil and represents the earliest occupation on the site in square OV20. The floor is composed of reddish brown compact soil with a stone structure extending EW, built directly on the surface of the floor. Parts of this wall have been removed from both ends during later occupation on the site.

A large pit was noticed in OV19 and was partially excavated during the 1997 season. It had been abandoned and refilled before

the construction of the stone structure above. The pit is large and of irregular shape, dug into the virgin soil and filled with a dark gray ashy soil mixed with different sized stones; several levels (such as surfaces made of compacted reddish soil) were noticed inside this pit. Abundant flint and bone tools in addition to ground-stone and a large quantity of charcoal chunks have been collected. It seems that these kinds of pits were used for dwelling purposes and are quite typical of the PPNB, where they take advantage of the hard and solid virgin soil composed of fluvial deposits in the area.

C14 dates from the lower levels are being processed in the laboratories of the University of Rome, and lithic and pottery materials will be analysed in the course of the year. In spite of the poor architectural remains at the site, the quantity of charred vegetable materials and animal bones are likely to provide a good picture of the economy of these groups at the key moment of their shift from a purely agricultural to a mixed farming and pastoral life organisation.

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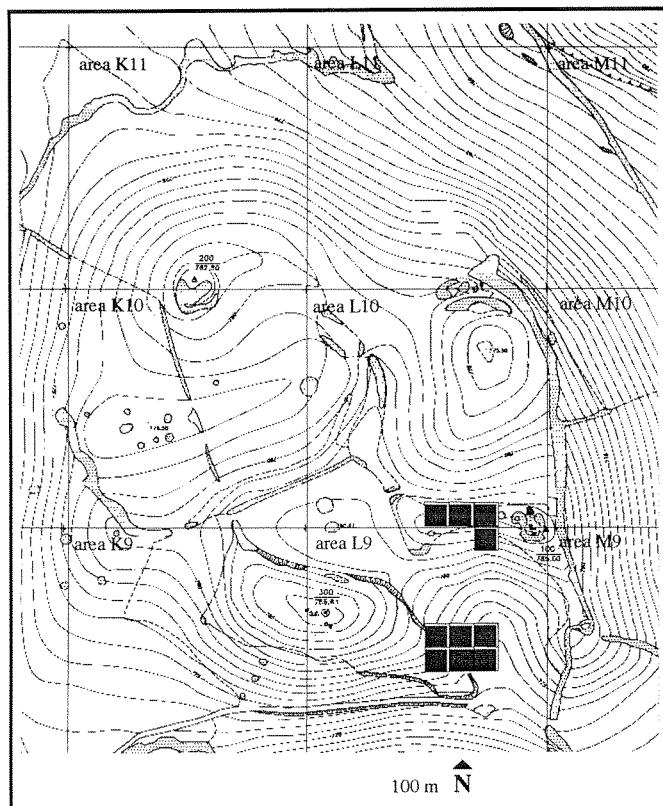


Fig. 1. The mound of Göbekli Tepe and the excavation trenches.

Boars, Ducks, and Foxes - the Urfa-Project 99

Klaus Schmidt (Bamberg University)

In 1999 a fifth campaign of excavations at Göbekli Tepe and Gürcütepe, both in the vicinity of the town of Şanlıurfa in Southeastern Turkey, was undertaken by the Museum of Şanlıurfa and the German Archaeological Institute in Istanbul (Beile-Bohn *et al.* 1988; Hauptmann 1999a-c; Hauptmann - Schmidt 2000; Schmidt 1997/98; 1998a-c; 1999). At Gürcütepe, a group of four small mounds (I to IV) in the northern Harran Plain, excavations continued at Gürcütepe III with a 4x4m deep sounding. Above virgin soil a section of an LPPNB pisé building with small rectangular rooms was reached 4m beneath surface. It recalls the architectural structures found at Gürcütepe II in earlier seasons. In the upper levels, no architecture was encountered, but numerous animal bones and LPPNB lithics were recovered.

According to a preliminary analysis, no traces of earlier or later periods have been found at Gürcütepe. It confirms the former hypothesis that the settlement was not contemporary with the nearby Göbekli Tepe on top of the limestone hills north of the Harran Plain.

At Göbekli Tepe excavations had been continued both on top of the southeastern mound (Squares L10-51/71, L9-80; Fig. 1) and at the southern slope (Squares L9-56/66/76). Since there is no connection between the two excavation areas so far, a continuous numbering of the several layers is not yet possible. In the areas on the southeastern mound, where the "Löwen-pfeilergebäude" ("Lion Pillar Building") was excavated in 1997 and 1998, a series of rectangular rooms, all with terrazzo floors, was excavated in 1999. A detailed report on this younger layers, which can be dated archaeologically to the MPPNB, will be given in a later article.

The oldest excavated building layer had been found at the southern slope. The main structure excavated in 1996 and 1997 (Squares L9-65/75; Fig. 2) was the "Schlangenpfeilergebäude" ("Snake Pillar Building") with 5 huge T-shaped pillars of more than 3m height, three of them with reliefs. In Trench L9-55 and the western section of L9-65, a younger building layer with rectangular rooms and several little T-shaped pillars was found nearby. In 1999, more rooms with little pillars of that younger building were found in the western Trench L9-56.

In the areas north of the "Schlangenpfeilergebäude" in 1998 and 1999 more huge T-shaped pillars of the earlier layers were unearthed *in situ* (Squares L9-65/76). As of the end of the 1999

season, there are in total 16 large T-shaped pillars from the earlier layers, eight with reliefs. But the most important result is that one can now understand that the pillars belong to three separate structures, which seem to form round or oval enclosures.

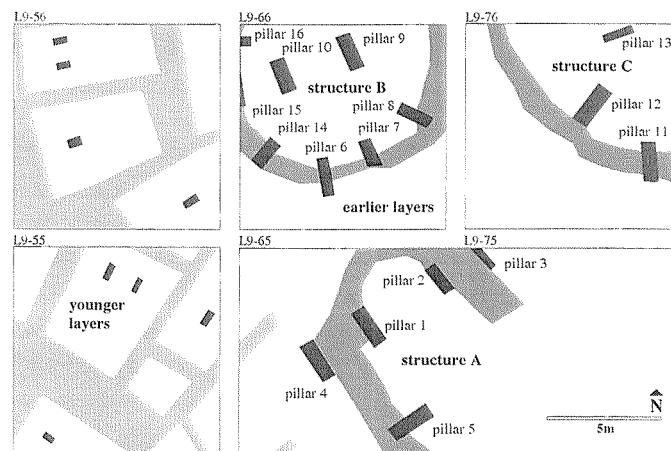


Fig. 2. The excavated areas on the southern slope.

Structure A

The "Schlangenpfeilergebäude", excavated in 1996 and 1997 in Areas L9-65/75, includes Pillar 1 with five snakes, a net of snakes (?) and ram (?), Pillar 2 with a bull, a fox, a crane and a bucranium; and Pillar 5 with a snake. Pillars 3 and 4 have no reliefs.

Several sculptures had been found in the filling debris (for references to reliefs and sculptures see catalogue in Schmidt 1998c; 1999). Two C14-dates of the fill are around 9,000 BC, cal (Kromer and Schmidt 1998). The pillars of the "Schlangenpfeilergebäude" seem to be part of oval or square enclosure, whose southeastern section is deeply disturbed. The floor is not yet excavated, but a bench has been exposed between Pillars 1 and 2.

Structure B

The excavations in 1998 and 1999 concentrated in the areas north of Structure A in L9-66/76. Pillars 6 to 9 were found in 1998, Pillars 10, 14, 15 and 16 could be added in 1999. The earlier assumption, that the new pillars belong to the same struc-

ture as the "Schlangenfeilergebäude", couldn't be confirmed (Fig. 3). Pillars 9 and 10 (Fig. 4), each with a relief of a fox, are in the center of a second enclosure consisting of stone walls and Pillars 6, 7, 8, 14, 15, and 16. A bench or a floor has not yet been reached. It is predicted that the floor level will be reached at a depth of more than 1m below the present exposures. On the southern face of Pillar 6 there are the reliefs of a reptile (Fig. 5) and a snake. Pillar 14, mostly covered by the enclosure walls, has an as yet undeterminable relief.



Fig. 3. Area L9-66. North is at top of the picture.

Pillars 6, 7, 8, 14, and 16 are clearly set radially against the two pillars in the center (Figs. 2 and 3). The orientation of Pillar 15, which is set parallel to Pillars 9 and 10, was thus surprising. It was found just at the end of the season while cleaning the western profile of the trench. Its unexpected orientation seems to be repeated by Pillars 3 and 4 of Structure A. In Structure B a pillar is missing at the wall opposite to Pillar 15. It may be hidden within the baulk or destroyed by the activities of the farmers.

Structure C

East of Structure B the western section of a third enclosure with the Pillars 11, 12 and 13 was found (Fig. 6). Pillars 11 and 13 are mostly hidden by secondary walls, and up to now there are no visible reliefs. But on the southeastern face of Pillar 12, which has been excavated to about half of its length, there are several reliefs (Fig. 7). On the T-shaped upper part there are five birds, probably ducks, trapped in a net or jumping over rocks. It is the first time that a pillar from the earlier layers had reliefs on the T-heads surface. On the pillar's shaft there is a threatening boar baring its teeth. Just in front of it a sculpture of a similar boar was found in the debris fill (Fig. 8). On the pillar below the boar, another fox is depicted, but only its head could be exposed, as a secondary terrazzo floor connected with the wall partially covering the pillar was reached at the level of the body of the fox.

All depicted animals are male; no clearly female symbol is visible so far. All three structures are directly under the modern surface, and it can be proved that they clearly were not filled by erosion and deposition (*cf.* Özdoğan and Özdoğan 1998). The three enclosures, decorated with sculptures and reliefs, most probably should be regarded as open *temenoi* without roofs.

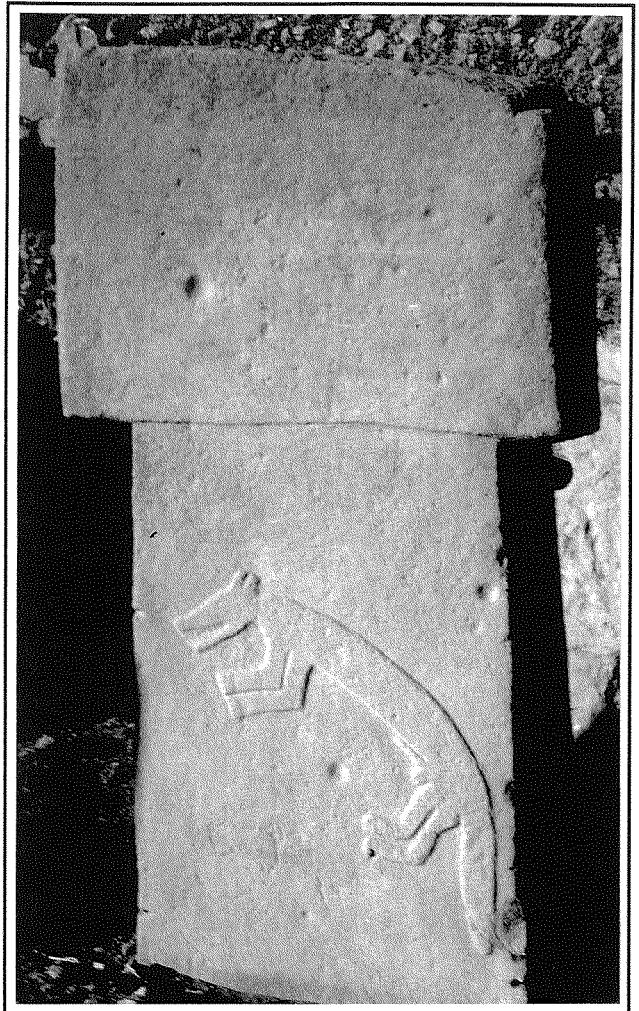


Fig. 4. Area L9-66, Pillar 10.

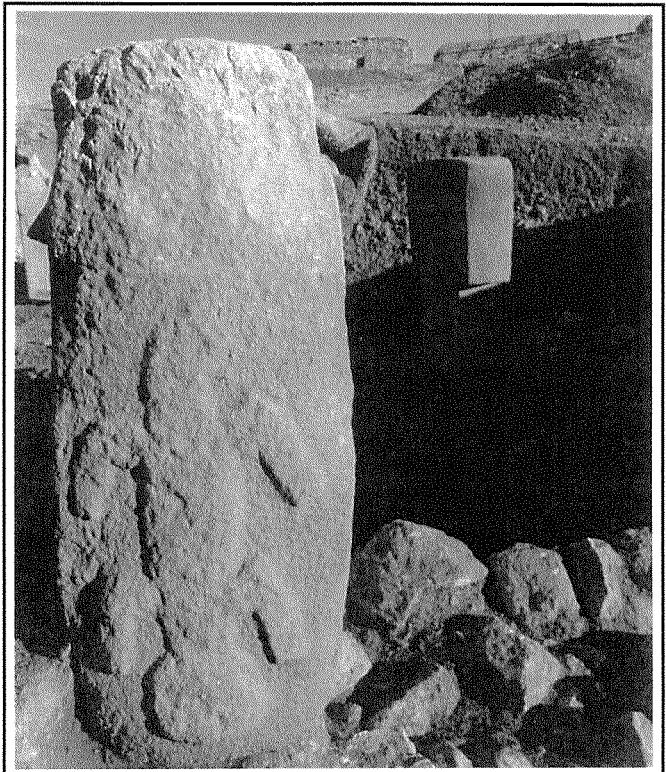


Fig. 5. Area L9-66, Pillar 6.

Later, in the younger building layers, a certain reduction of size and a transformation of the enclosures to rooms with small pillars is observable. But the pillars still have the characteristic T-shape

of the older layers. The lithic industry of the fill of the earlier enclosures seems to be not later than EPPNB. Except for some medieval sherds from the uppermost levels, finds of later periods do not exist. Since many PPNA points such as el-Khiam, Helwan and Aswad points occur in the fill, a pre-PPNB date for the *temenoi* itself can not be excluded; indeed, it even seems to be most probable.

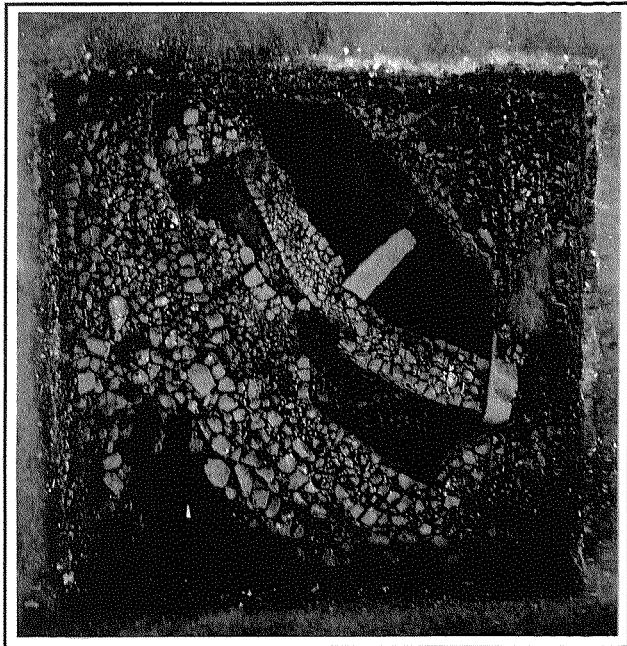


Fig. 6. Area L9-76. North is at top of the picture.

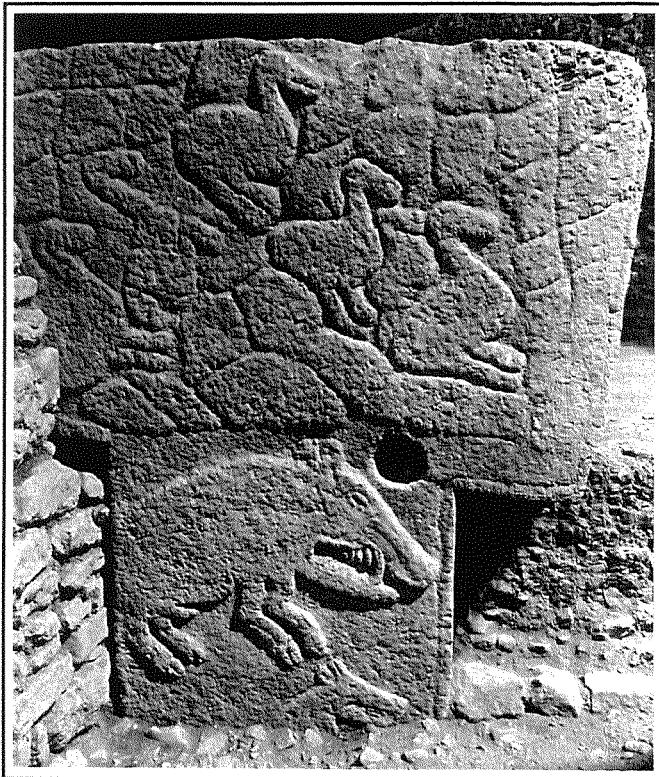


Fig. 7. Area L9-76, Pillar 12.

It is quite interesting to compare the motifs from the large scale sculptures and reliefs from both the older and the later layers (see table). In the earlier layers a wide range of animals is depicted, but humans appear only occasionally (A10; A26). In the younger layers humans are dominant. It is obvious that there is a fundamental change in motifs, a change that should be connected with the transition from the hunter-gatherer to a food producing society.

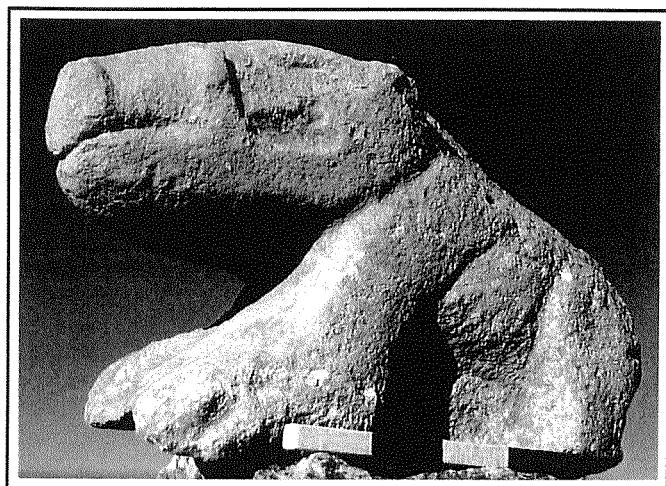


Fig. 8. Area L9-76, sculpture of a boar.

Finally it should be stressed, that the monumental buildings of the earlier layers, be they PPNA or EPPNB, are far from the existing model of "Early Village Farming Communities". They give proof to a specific cultural behavior beyond subsistence strategies or beyond the adaptation to changing natural resources. The construction of the megalithic enclosures must have been organized by powerful people using religious motives to coerce the

Table 1.

Motif	Catalogue No. (Schmidt 1999)
Early Layers	
Structure A	
Snake	P1, P5, C3, C4
Ram (?)	P1
Bull	P2
Fox	P2
Crane	P2
Boar	A15
Lion (?)	A14
Animal on human head	A10
Structure B	
Fox	P9, P10
Reptile	P6
Snake	P6 (?)
Phallus (?)	A26
Structure C	
Ducks	P12
Boar	P12, A25
Fox	P12
Later Layers	
L10-71	
Lion	P1, P2
Human arms	P6, C7
Geometric	C6
Human	C1
L10-51	
Human	A3, A24
"Figure with hat"	A23
L9-55/56	
Mask	A1
Human head	A4
Human torso	A5

community to such enormous efforts. Following this view, the transformation of the monumental structures of the earlier *temenoi* to the miniatures of the later building layers, together with the change of motifs and the entire abandonment of Göbekli Tepe during the PPNB, could be understood as some defensive reaction of the society to established classes – as a "Neolithic Revolution", a revolution not fully in the sense of Gordon Childe. With the newly developed equipment of agriculture, people did not have to follow the rules of the old shamans from the age of the hunters: they were free to enter a new way of life.

That took place in the settlements of the plains, at Gürcütepe, for example.

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The Spatial Organization of the PPNB Site Nahal Reuel, Israel

Avraham Ronen¹, Shulamit Milstein² and Modi Lamdan³

¹ Zinman Institute of Archaeology, University of Haifa
² Hirshenberg St. 21, Tel Aviv, ³ Kibbutz Yagur, Israel

Nahal Reuel is located in the southern Negev c. 35km north of Eilat (UTM grid 6902/3150), 435m asl. It was excavated as a salvage project in 1980 and 1981. The site has a single cultural layer of the PPNB period, 0.2-0.5m thick. The original area of the site is estimated at some 400m², of which 76m² were excavated.

Nahal Reuel yielded architectural remains and lithic industry. Bones were not preserved, but 19 shells or shell-fragments belonging to 7 taxa were recovered (Mienis n.d.). All originate in the near-by Red Sea except for a single specimen from the Mediterranean, c. 175km away.

Dating

Three 14C measurements (Pta-2848, Pta-3137 and Pta-3202) gave very close results with a pooled mean age of 8627 ± 45 years

BP (7736 – 7499 BC cal with 2 sigma). Nahal Reuel was a relatively short occupation in the first half of the 8th millennium BCE.

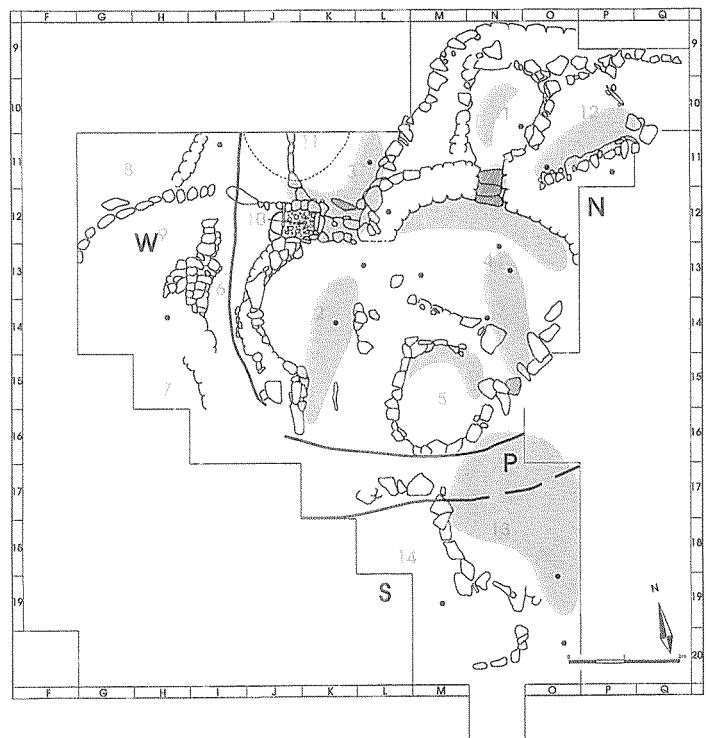


Fig. 1. Nahal Reuel architectural remains. Spatial distribution of complete arrowheads (shaded) and grinding tools (dots). N - Northern habitation zone. Numbers indicate loci. S - Southern activity zone. W - Western activity zone. P - path.

The Architecture

The excavation yielded a complex of round structures (Fig. 1) with a central court surrounded by chambers, possibly the oldest of its kind in the round-structure zone of the Negev and Sinai (Avner 1998). The walls were carefully built of undressed stones 0.8-0.6m thick and 0.5-0.9m high. Features worth noting are the paved rectangular basin (silo?) in Locus 10 and the large pit of Locus 11, 2m in diameter and 0.5m deep, filled with ash and stone debris (trash pit).

Lithic industry

The industry is essentially blade production: some 75% of the 235 cores found at the site are blade cores, mostly naviform, and some 80% of the retouched items are on blades. Among the 810 modified objects found in Nahal Reuel, arrowheads dominate at 30%. The majority of the arrowheads are Jericho points (53%), followed by Byblos (30%) and Amuq points (15%). The arrowheads of Nahal Reuel are characterized by a brief modification, generally confined only to the tip and the tang. The shape is frequently asymmetrical, with the point located off the central axis or the wings asymmetrically positioned. Both features may occur on the same piece. Asymmetrical arrowheads identical to ours were recently reported from Gürcütepe (Schmidt and Beile-Bohn 1996).

Besides arrows, the major tool categories are racloirs (ca. 27%), denticulates and notches (24%) and awls (12%). The "Upper Paleolithic" types - grattoirs, burins and truncations - are present in small numbers. Celts are entirely absent and sickle blades with sheen are very rare.

Spatial Distribution

Locus 12 in the north-eastern corner of the excavation is a large knapping workshop with abundant blanks, core trimming elements and waste. Within the residence complex, room 1 and the courtyard are outstanding. Three exceptional objects were found in room 1: a pointed slab c. 80x20x10 cm, undressed, which may have stood as a monument; the largest piece of native copper (51 grams) found at the site, with both extremities ground; and finally, the only Mediterranean shell at the site. These unique objects indicate that room 1 had a special role, perhaps the resident's high place.

Table 1. Nahal Reuel tool types

Type	N	%
Arrowheads	245	30.2
Sickle blades	3	0.4
Celts	0	0.0
Awls	98	12.1
Grattoirs	16	2.0
Racloirs	17	2.1
Burins	12	1.5
Truncations	15	1.8
Notches	104	12.8
Denticulates	89	11.0
Retouched blades	117	14.4
Ret./ used flakes	88	10.9
Miscellaneous	6	0.7
Total	810	99.9

The central court with its hearth was apparently the focus of domestic activities. While forming c. 9% of the excavated area, it contained 20 - 25% of certain tool types (most notably awls, hammerstones and grinding tools).

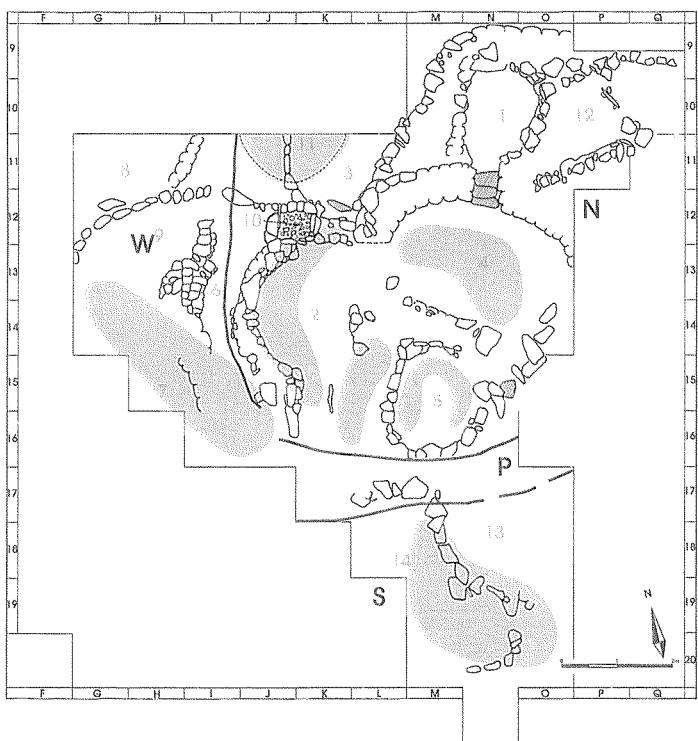


Fig. 2. Spatial distribution of arrowhead fragments. Symbols as in Fig. 1.

Arrowheads

The arrowheads are clearly divided between a southern and a northern activity zones (S and N, respectively, in Figs. 1 and 2), with a practically empty dividing strip between them (P in Figs. 1 and 2). There is, however, a distinctly different distribution pattern for broken and complete arrowheads. Generally speaking, complete points are mainly in the east and north while the broken ones are mainly in the west and southwest. Thus, mainly broken arrows are found in locus 7, locus 14 and the western half of pit 11. On the other hand, mainly complete arrowheads are found in locus 13. There is a strong tendency for complete arrowheads to be close to walls, for example W21 and W23. This fact may best be interpreted as complete arrows having been placed against, or lay along, the walls.

The spatial distribution of arrowheads seem to reflect organized working spaces, and hence argue against a significant lateral displacement at the site. We suggest that the distinct distribution patterns of complete and broken arrowheads indicate the location of living quarters as against garbage areas. Accordingly, the main garbage dumping areas would have been in the west-southwestern margins of the residential complex.

Cores

Like the arrowheads, the cores too are divided between the northern and southern activity zones with the same empty space in between. The distribution of cores fits remarkably closely that of broken arrowheads. This is clearly seen in locus 13, an area with complete arrowheads but with no cores. It is perhaps possible to further suggest that the cores associated with the garbage areas were considered exhausted, whereas those found in the living quarters, amidst the complete arrowheads were considered still workable.

Other tools

Most of the 88 awls with known provenience are associated with complete arrow points and only a minority is associated with broken points (dumped awls?). Likewise, 100% of the shells and 81% of the grinding tools are associated with complete arrowheads, i.e., with living quarters vs. out-of-use, dumped objects. Hammerstones, on the other hand, are roughly equally divided between "active" and "dumped" specimens, judging by the category of associated arrowheads

Summary

Nahal Reuel is a single-phase, PPNC site from the first half of the 8th millennium BC, with a lithic industry dominated by navi-form cores and Jericho/Byblos type arrowheads, similar to Beidha (Mortensen, 1970) and other contemporary south Levantine desert sites. Termed "Middle PPNC" in the northern Levant (Cauvin and Cauvin, 1993), this is the oldest PPNC phase present in the southern Levant. In the second half of the 8th millennium arrowheads became dominated by the Amuq point, as is the case in the neighboring site Nahal Issaron, just 3km south of Nahal Reuel (Goring-Morris and Gopher 1983).

Our excavation revealed a residential complex of the central-court type, one of the oldest currently known (Avner 1998). Food preparation and other activities were carried out mainly in the courtyard. Room 1 in the north of the residence complex probably served as a high place. The flint knapping area in locus 12 is adjacent to this room.

Two activity zones are visible, separated by a practically sterile strip about 1.5m wide along the southern end of the residential complex, possibly a walking trail. The main living areas were in the north and east parts of the excavated area, marked by the presence of complete arrowheads, grinding stones and shell ornaments, beside other tool types. Garbage was dumped in the west and southwest, indicated mainly by an accumulation of broken arrowheads.

The subsistence heavily depended on hunting. The species hunted, as well as the vegetarian foods processed, remain unknown. Raw materials were procured locally (flint), in the Red Sea (shells, sandstone and granite) and Timna (copper), all close-by. The single Mediterranean shell apparently points to weak long distance links, in contrast with some later PPNC sites which have yielded not only shells from the Mediterranean and the Red Sea, but even from the Nile River (Mienis 1978, 1987).

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The Late Neolithic Site of Esh-Shallaf, Northern Jordan

Hans-Dieter Bienert¹, Dieter Vieweger², and Katrin Bastert³

¹ Deutsches Evangelisches Institut, Amman;

² Kirchliche Hochschule, Wuppertal; ³ Dresden

The site of esh-Shallaf is 10km northeast of Irbid, situated on a natural terrace approximately 90m wide on the lower western slopes of Wadi esh-Shallale at an altitude of about 420m asl. The closest natural water source is 'Ain esh-Shallaf, about 350m WSW of the site. A second spring, 'Ain Umm el-Guren, is situated 500m towards the northeast.

Esh-Shallaf was discovered by Siegfried Mittmann (Tübingen University) when excavating at nearby Khirbet ez-Zaraqun (1984-1994). While surveying the region adjacent to the Early Bronze Age city he collected pottery of the Yarmoukian period (5,500-?4,500 bc) on the surface of the wadi terrace. According to the investigation by the team from Tübingen University it seemed that esh-Shallaf was a small village or hamlet dating to the Late Neolithic period.



Fig. 1. Overview of the excavations at esh-Shallaf (October 1998).

The research by Mittmann and Jens Kamlah (Kiel University) initiated the idea and interest for further investigations of the place. In October 1998 and in February/March 1999 excavations were conducted by the German Protestant Institute of Archaeology in Amman (DEI) (Fig. 1). Both field campaigns were jointly directed by Bienert and Vieweger (Bienert and Vieweger 1998, n.d. a, b; Bastert *et al.* 1999).

The architectural remains uncovered in a long trench (27x1.5m) and in several 5x5m squares were heavily disturbed by ploughing and therefore it was sometimes impossible to define the relationship of some wall-like remains. However, with further investigations in 1999 we were able to define the outlines of some huts. In the first season the remains of a number of structures – possible huts – were excavated. It seems to us that they had been constructed very simply. In most cases, the outlines of the huts were defined by undressed stones of very different sizes. In most cases only the lower-most course of a wall had survived. Most walls were two stones wide. Some indicate a semicircular or oval foundation, while others show rectangular foundations. Due to their arrangement it is very unlikely that high stone walls existed at all. Pieces of clay ('Hüttenlehm') point to superstructures of wood or reed plastered with mud (Fig. 2).



Fig. 2. Architectural remains, Area A, M8, Loci 11-13.

Inside the huts no specific installations were found. Fireplaces were detected adjacent to some outside walls, one of them with a floor made of gravels and broken stone slabs. A huge basalt mortar was found lying upside down in a hut. Clusters of fist-size stones in some areas might have functioned as working/food processing platforms. However, no traces of any implements suggesting a workshop were found.

A total of c. 2,600 pottery sherds were found in both seasons of excavations of which only a very few pieces dated to the Roman/Byzantine period. The vast majority could be attributed to the Yarmoukian period. Bowls, deep bowls, jars and hole-mouth-jars account for most of the vessel forms; plates are very rare. Amongst the abundant lithic material of esh-Shallaf that has been retrieved to date there are several sickle blades. More details will be published in the forthcoming preliminary reports.

No human burials or bones were found in the excavated areas. There was also no indication at all where burials might have been situated. Due to the nature of the site it is also likely that there has been no specific burial ground, and if this site was only used on a seasonal basis it is likely that the dead were interred elsewhere.

The soil samples taken during the excavations are being analysed by John Meadows (La Trobe University). Most of the plant remains in these samples were badly fragmented, but it was possible to identify lentil, hulled barley and a glume wheat (probably emmer). The most common seeds, however, were those of *Astragalus*, a typical steppe species that may have been used for fuel. The absence of any wood charcoal also suggests that the landscape in the later Neolithic may have been as barren as it is today. A more detailed report on the plant remains will be presented in the final publication of this excavation. Only a very small quantity of animal bones was found; they still await analysis.

According to the state of research after two seasons of excavations, esh-Shallaf was a cluster of simply built huts with fireplaces and stone platforms in between. It was not possible to clearly define the extension of the village, but we suspect that it did not exceed the size of a small hamlet.

Acknowledgements: We would like to specially thank all of our staff members of the 1998 and 1999 seasons. We also extend our gratitude to Dr. Wajih Karasneh, Inspector of Irbid, who help us very much in organizing the logistics of the excavation. Many thanks to Dr. Ghazi Bisheh, then the Director General of the Department of Antiquities of Jordan, for granting the permission to excavate at esh-Shallaf. Further, we also thank Mrs. Lina Khereis and Mrs. Asma Sibdeh, our local representatives of the Department of Antiquities, for their help and support. All of them made the archaeological fieldwork a success. Last but not least, we express our gratitude to Prof. Mittmann, who discovered esh-Shallaf and inspired the excavation, and to Dr. Jens Kamlah for allowing us access to his yet unpublished research on esh-Shallaf.

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Ba'ja Neolithic Project 1999 : Short Report on Architectural Findings

by Hans Georg K. Gebel¹ and Bo Dahl Hermansen²

¹Institut für Vorderasiatische Altertumskunde,

Free University of Berlin;

²Carsten Niebuhr Institute, Copenhagen University

A second season of large-scale excavations was carried out in April-May 1999 for 5 weeks at Neolithic Ba'ja, southern Jordan, in cooperation and with the support of the Department of Antiquities, Amman. Under the directorship of Hans Georg K. Gebel, assisted by Bo Dahl Hermansen as deputy director, a team from Germany, Denmark and Finland explored more 200 m² of Late PPNB architecture of this remote Neolithic village in the rugged sandstone mountains north of Petra. The project continues under the sole auspices of *ex oriente* at Free University of Berlin (for the previous season cf. Neo-Lithics 3/97), and maintains a collaboration with the Carsten Niebuhr- Institute at Copenhagen University¹.

Ba'ja increasingly provokes discussion among Neolithic prehistorians about its unique setting (Fig. 1): it is the only early village found in such a protected setting difficult to access. Ba'ja continues to fuel arguments that already by the 7th millennium B.C. territorial conflicts might have caused raids in sensitive environments like those Early Holocene Greater Petra, and such conflicts affected settlement pattern organization and the choice of site location. Competition for restricted habitats, even those degraded by human impact in this period of dense population, is our explanation for the dramatic location of the site. But we certainly do not expect that Ba'ja is "unique": we anticipate more LPPNB villages like Ba'ja in the rugged Greater Petra area, and we will start this coming April to search for them.

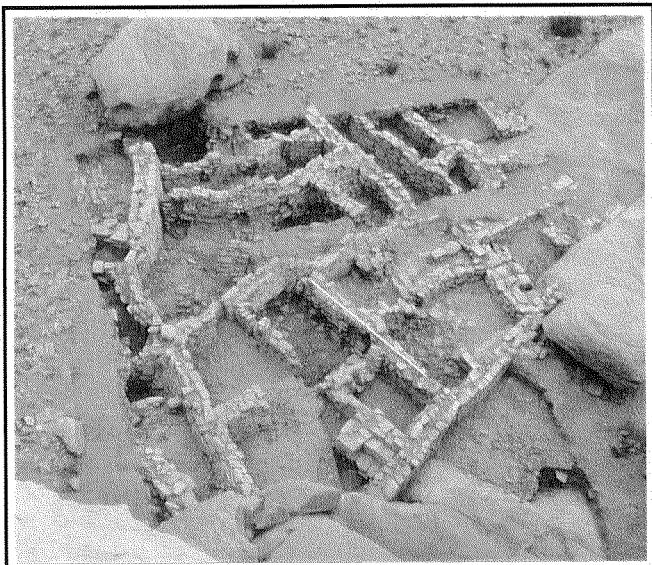


Fig. 2. Neolithic Ba'ja: bird's eye view of Area D.
<photo by B. Borowski>

Ba'ja also is a production centre for a widespread prestige good that was traded along the Rift Valley some 9000 years ago: sandstone rings are represented by broken finished products as well as by their production waste and as stored pre-forms. As in the flint industry, a division of labour can be seen in the production stages.

Angela von den Driesch (Munich) reports from the animal bone analysis that hunting for fur is in evidence (leopard, foxes, hyrax).

General Features of the Architecture

The groundplan of the settlement so far implies an "egalitarian" social structure: multi-roomed "courtyard" houses densely neighbour each other in a pueblo-type manner (Fig. 4), without evidence of special buildings within the 400m² excavated so far. Access to most rooms was probably by ladders through openings in the ceilings and roofs, for only rarely were rooms connected by doors and windows.

Outer walls were shared and appear to have had no doorways. The general house plan is organized around a large irregularly shaped central room or courtyard, which would have been the only room suitable for most household activities. (In two-storied houses this central space could have been roofed in the basement and open in the second floor). However, this space was surrounded on three or four sides by smaller rooms that could hardly have served any other function than storage (in the basements). The plans we have mostly represent the basements or cellars, whereas many social and productive/processing activities would have taken place on the second floor. There is some evidence that the plan of the second floor partly followed that of the ground floor. Some rooms within houses, both on the ground floor and the first floor, were connected by shallow doorways and other kinds of openings. In the case reported below (cf. 3), doorways at the ground floor and first floor were connected by a built staircase: otherwise houses are expected to have functioned with a system of ladders connecting storeys.

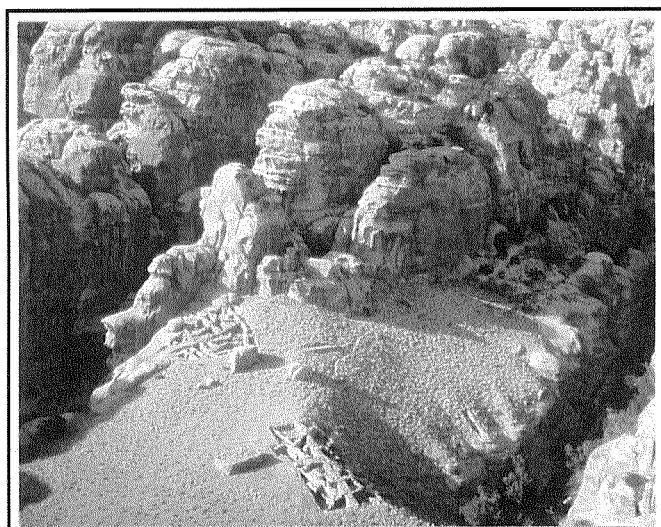


Fig. 1. Neolithic Ba'ja: bird's eye view of the central parts of the settlement, with excavation Areas C (edge) and D (summit area).
<photo by B. Borowski>

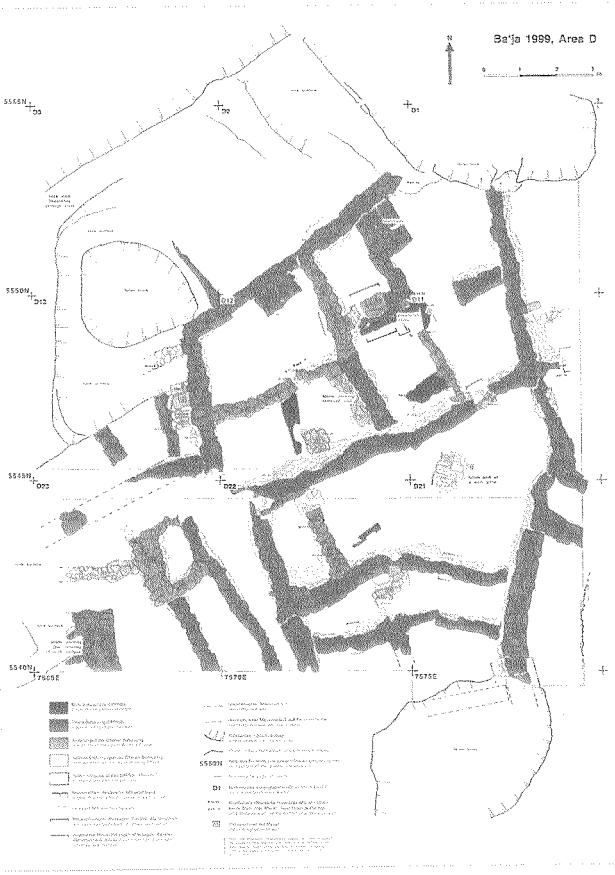


Fig. 3. Groundplans excavated in Area D in 1999. <field record by B. Borowski, archaeological interpretation: H.G.K. Gebel and B. Borowski>

All evidence so far allows us to expect extended families living in the houses. One of us (HGKG) calculates that 50-60 families lived in Ba'ja (provided that only half of the Ba'ja slopes were occupied by densely built houses, 0.6-0.7ha). Depending on child mortality, the proportion of family members herding outside, etc., this would result in some 400-500 people living in Ba'ja.



Fig. 4. Neolithic Ba'ja: terraced housing in Area D from the west. <photo by H.G.K. Gebel>

Special Results of Architecture

1) On the summit of the site, excavation (Figs. 2-4) in the newly opened Area D (220m²) exposed the basement of a building of more than 80m²; staircases in one of the northern rooms led to a second floor or onto the roof. A large room or courtyard of some 6 x 2.5-4.5m was situated in the lower part of the building that seems to have rested on two levels. Rooms surrounded this large room/courtyard on three sides. One of them contained the *in situ* remains of a workshop and/or storeroom of a sandstone ring manufacturer (mainly the raw disks). West of this building and

partly founded on bedrock, parts of a neighbouring building were exposed. The outer walls of the building run downslope and are shared by the neighbour's property. Like Area C (Gebel *et al.* 1997), we did not find evidence for open spaces or lanes, and only domestic architecture with no evidence of special buildings was encountered. All communication, traffic and domestic and manufacturing activities must have taken place via the (terraced) roofs. A huge sandstone block (25-30 tons) at the southern edge of Area D fell on and sank into the ruin.

2) The architecture of Area D (Figs. 2-4) is more spacious than the groundplans in Area C (Gebel *et al.* 1997), and it shows different principles of spatial order. The major walls, including the outer walls of the buildings(s), run downslope, thus providing better stability than walls that follow contour lines (cf. the terrace walls in Area C). Probably the inhabitants experienced during their occupation of the steep slopes of Ba'ja that walls running perpendicular to the contour lines remained stable longer, and that the (anyhow unstable) room walls set between them allowed for more flexible groundplans. Area D has a main or original building phase with two events of groundplan changes or repairs that did not occur throughout the building. Below the main phase an earlier building appears, most likely having a different groundplan and that deliberately was cut to create a new building level.

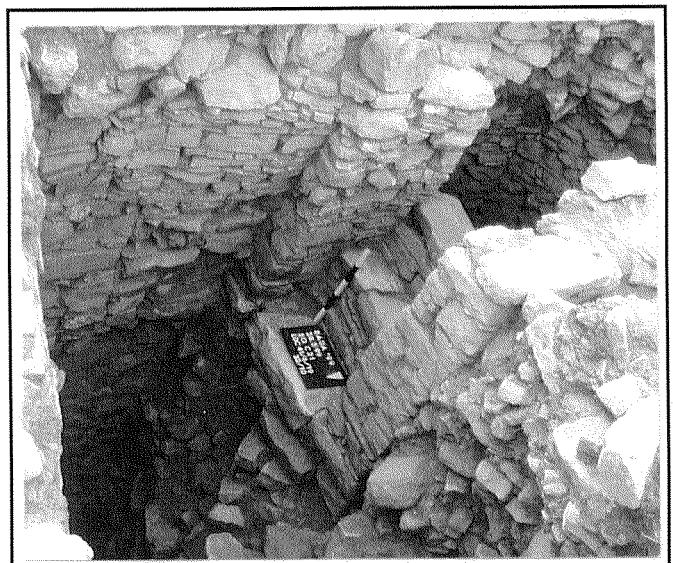


Fig. 5. Neolithic Ba'ja: stairwell in Area C with walls preserved up to 4.16m. <photo by H.G.K. Gebel>

3) Continued excavations in Square C20(-21) exposed part of a stairwell (Figs. 5-6). The walls associated with this room reach a height of 4.16m. The preserved remains include an earlier Phase I and a later Phase II. One wall (Wall 13) was founded directly on the soft virgin soil. A stone layer served as a platform for the foundation of neighbouring Wall 6; the lowest area framed by the two walls was covered by a red-stained plaster-floor (Locus 45). Only the lower courses of the walls were connected by bridging-stones, and from the 9th course Wall 13 leans on Wall 6. A considerable quantity of fragments of red painted plaster have been found in the collapse material, suggesting that the exposed face of the walls was originally coated by a ca. 2-3 cm thick layer of coarse plaster-bedding with a ca. 2-5 mm thick layer of fine red stained plaster. Thus, it may be suggested that the stairwell to which the walls belong possessed red painted walls.

After an unknown interval of abandonment of this part of the building, the walls were leveled and reused as a foundation for the later Phase II. Again, only the lower parts of the wall were connected by bridging stones. Ca 1.80 m above floor level Wall 6 becomes narrower, leaving a shelf which is interpreted as support for the beams of an upper floor. A buttress (Locus 21), leaning on Wall 6, is also understood as a support for beams. Additionally, a staircase (Locus 41) occupied the space between this buttress and Wall 19. This staircase was founded at floor level and preserved three steps high. However, spaces in Wall 6 and Wall 19 indicate that additional steps must have been included in the

original construction. The staircase originally connected the doorway on the ground floor with the one on the first floor. The three preserved steps of the staircase seem to be supported on a series of three parallel risers, each one stone wide and supporting only the front part of the step. The space south of the staircase contained what may be the collapsed remains of two additional steps. There is evidence (supports in the walls) that these two additional steps in the original scheme were supported by a wooden construction.

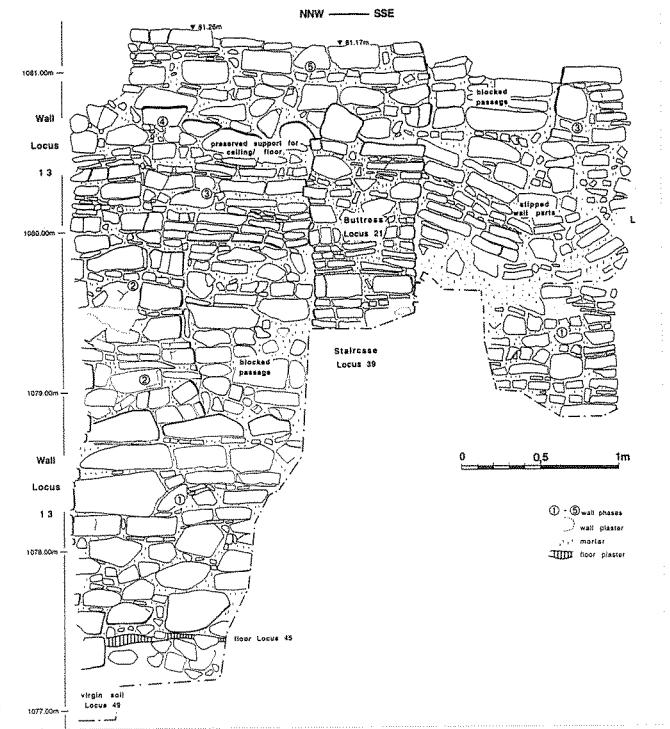


Fig. 6. Eastern wall in the stairwell of C20.
<field record by B. Dahl Hermansen and J. Baumgarten,
archaeological interpretation: B. Dahl Hermansen>

4) First results from the *Wilhelm Dyckerhoff Institut für Baustofftechnologie* (Wiesbaden) on plaster materials (floor and wall plaster) show more varied mixtures and technologies than expected. The analysis programme on plaster samples deserves intensive care, since we deal here with a high potential for insights into craft specialization and thus into social information.

Other Major Results of the Season

1) For the first time we can report a Neolithic staircase outside the housing areas: a rock cleft that leads onto the settlement from one of the rare spots from which the site is accessible from the *siq* (gorge) below was furnished with stone steps. These stairs lead to a wide, flat part of the gorge's bank that limits the site in the south. On the way up, it also led to a source of (banked) sandstone of the type that was used in the construction of the LPPNB houses.

2) The topographic situation of the above mentioned *siq*'s bank, the existence of a 90° change of direction of the *siq* that damped the energy of waters flushing down the gorge, and the subsequent narrowness (1.5m) of the gorge created an ideal situation for storing water by building a dam. (About 150-180m³ of water could have been stored if the barrage wall was only 1m high). A similar topographic situation is attested further up the gorge, and the possibility of Neolithic water storage through the use of 1-2 dams in this otherwise arid area is a distinct possibility.

3) We continued the programme of test units that followed specific questions related to the site's periphery, its internal spatial organization and its control and defensibility, and a considerable amount of data were collected. It became clear this season that Ba'ja is indeed in a protected setting, but it is also difficult to defend since any aggressor could have easily blocked the inhabitants from access to water and from escaping either up or down the gorge.

4) Large amounts of debris from a sandstone ring workshop were thrown down the above-mentioned staircase cleft in Neolithic times, after it went out of use. Together with the workshop found in D12, we now have evidence for a more complex *chaîne opératoire* in the sandstone ring production than previously discussed (Gebel *et al.* 1997: Pl. 7). The published tree analysis has been confirmed, but the working stages appear much more diversified and show almost "individualised" features, including failure management.

5) We found four finished but unused celts (and one that was unfinished) built into a house wall in Area D. Their sizes are among the largest ever found in the southern Levant. This finding leads to the question of possible magic practices using walls as depots. At Basta we found similar evidence, where unused manos (as well as a human infant!) were included in the construction of walls. Since we normally do not remove walls in archaeological excavations, such evidence appears only when preserved tops of ruined walls are exposed.

Next Season

During our next season in coming April/ May we plan to concentrate on the following questions:

- Excavation of the lower stratigraphy in Area D: Will we find evidence for the earliest settlement history in this upslope situation that differs from the latest occupation?
- Will we find in Area D the burials suggested by the human remains and ornaments found in a sediment trap in the gorge below?
- More exposure of architecture: Will the structures give evidence for buildings that served other than domestic functions?
- Soundings in Area B ("The Saddle"): Will we find here the expected communal space of the settlement?
- How were the extreme parts of the Ba'ja slopes used? Can we identify more traces of architecture that slid down the slopes?
- Investigations of the southern gorge's topography: can we find evidence to test our hypothesis on water storage by damming the gorge?
- Can we locate a "second" Ba'ja in the Petra area?

Acknowledgements: We thank Ghazi Bisheh, former Director General of the Department of Antiquities for his generous support of the excavation, as well as Muhammad Ismael al-Salameen, the government representative, for his good, efficient, and trusting collaboration during the field work. We also express our thanks for the considerable assistance we received from Zeidoun al-Muheisen (Petra Regional Council), Suleiman Farajat and Muhammad Shobaki (Dept. of Antiquities, Petra-Section), Helge Fischer (German Association for Technical Cooperation, Petra), Sheikh Ibrahim al-Amareen (Beidha), Mukhtar Eid Steijan Salim al-Amareen (Beidha), Wendy Botham and Eid Nawafleh (Petra Moon Tourism Services, Petra), Zeidan Kafafi (Yarmouk University, Irbid), and Hamzeh Mahasneh (Mu'tah University, Kerak),

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We welcomed as visitors on the dig: Karin Bartl, Charlott Hoffmann Jensen, Lea Kalszan Rehoff, Bernd Müller-Neuhoff, Ingolf Thuesen, Gary O. Rollefson, Muhammad Shobaki, and the team and directors of the Utah University project digging near al-Bedul Housing.

We acknowledge with deep appreciation and sincerity the warmth of the hospitality and friendship of our workmen from the al-Amareen, al-Bedul, and al-Seyi'idin for their great efforts in the excavation. Respectfully, we dedicate our work to the Jordanian people and their heritage.

Note 1: The Carsten Niebuhr-Institute now has established -in cooperation with the Department of Antiquities, Amman- a new excavation at Shaqarat Mazyad [directed by Ingolf Thuesen, field directors: Lea Rehoff Kaliszan & Charlott Hoffmann Jensen, Bo Dahl Hermansen (survey)], a small Middle PPNB settlement found by D. Kirkbride (Gebel 1988) endangered by road building some 4 km north of Ba'ja, where the remains of round houses and rich layers of organic material were uncovered August 1999.

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Notes and News

Note on the Department of Mediterranean Studies in Rhodes

Adamantios Sampson (Dept. of Mediterranean Studies, Rhodes)

The Department of Mediterranean Studies was founded in Rhodes in 1997 and began its function in the academic year 1999-2000, when it received its first 150 students. The principal purpose of the Department is to promote and co-ordinate comparative and national studies on the society, politics and history of the Mediterranean countries. Particular attention is given to the study of
a) the ancient civilizations through the sciences of archaeology and archaeometry; b) the structure, development and interchange of the languages, especially in the south-eastern part of the Mediterranean (Greek, Arabic, Turkish and Hebrew); and c) the modern economic, social and technological development of the Mediterranean countries, the relations among them and with Greece and the other countries of the European Community. The department develops special institutional links with universities and institutions in Greece and other Mediterranean countries.

It is to the Department of Mediterranean Studies that the recently established Archaeological Sciences Institute of the Aegean of Alexandria (A.S.I.A.A.) belongs. The official presence of ASIAA in Alexandria will be that of a scientific mission. The aims of the ASIAA will be the following: a) to undertake joint archaeological excavation and surface survey activities with appropriate authorities in Egypt and the large Arab world in the Middle East; b) to apply archaeological sciences (new methods of dating, analysis of finds, archaeoastronomy etc); c) to undertake ethnoarchaeological research in the Greek area and seek of ways and means of communication and interaction of peoples; d) the organization, coordination and realization of post-graduate studies in collaboration with universities in Middle East and Europe; e) the organization of seminars on educational and research character, as well as the occasional realization of symposia and international conferences in the above themes.

Announcements

The Cyprus American Archaeological Research Institute (CAARI) has established a new page on its web site. This page will list exhibits of Cypriot artifacts, lectures on Cypriot archaeology and conferences with sessions or papers devoted to Cypriot archaeology. Any knowledge of exhibits, lectures or conferences related to Cypriot archaeology would be welcome. Please send any information to ddetr@aol.com.

The URL of the CAARI site is: <http://www.caari.org>

The URL of the new page is

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from: David Detrich, CAARI web editor

Upcoming Conferences

Magic Practices in the Near Eastern Neolithic

a Mini-Symposium organized by Hans Georg K. Gebel
& Charlott Hoffmann Jensen

in the framework of the

2nd International Congress on the Archaeology of the Ancient Near East (Copenhagen, 23-27 May, 2000)

Addresses of the Mini-Symposium:

Charlott Hoffmann Jensen, Carsten Niebuhr- Institute, University of Copenhagen, Snorresgade 17-19, DK- 2300 Copenhagen
tel. +45 35 32 89 08, fax +45 35 32 89 26, email: charlott@hum.ku.dk

Hans Georg K. Gebel, Institut für Vorderasiatische Altertumskunde, Free University of Berlin, Hüttenweg 7, D-14197 Berlin
tel. +49 30 83856747 or 7959937, fax +49 30 7959937, email: hggebel@zedat.fu-berlin.de

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