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Editorial

In the past decade, an accelerating number of outraging reports on looted museums and archaeological sites, churches and mosques, cemeteries and dig houses, and other monuments have come from Middle Eastern countries. And now Egypt. Of course, lamenting about this appears callous in the face of the tens of thousands of plundered private homes, rape, and murder. Often our indignation forgets that systematic (and even institutionalized) looting has been reported in many ancient Near Eastern texts, including the Old Testament, or that the western countries' history is full of such periods, such as the sack of Constantinople by the Fourth Crusade, the looting of the Aztec gold, Napoleon's or the Nazi / Allied Forces "removal" of cultural objects from conquered territories. Or see the Lieber Code of 1863! The topic is highly complex and old: Many of us have found evidence of systematic contemporaneous looting in Neolithic and Chalcolithic contexts. Be it the villager making pits in Tell Jokha (Umma), or the armed fighters coming with bulldozers to Apamea, their disposition to benefit from the chaos is encouraged by the greed of the wealthy "co-looters" from all around the world, be they institutions or private collectors secretly enjoying the plunder. Neolithic collections may not yet be largely in the focus of looters and co-looters, but does this protect their integrity during a looting raid?

Hans Georg K. Gebel and Gary O. Rollefson

Abiotic Resources and Early Neolithic Raw Material Procurement in the Greater Petra Area (ARGPA) - Research Aims and First Results (Ba'ja Neolithic Project 2012, 10th Season)

Christoph Purschwitz

Introduction

The Ba'ja Neolithic Project's 10th field season was carried out between September 3rd and October 5th, 2012, under the joint directorship of Hans Georg K. Gebel and Christoph Purschwitz, in cooperation with the Jordanian Department of Antiquities, and under the auspices of ex oriente e.V. at Free University of Berlin. The season's main works included:

- a flint raw material survey of the local and regional vicinities/ catchment areas of major PPNB sites (Ail 4, Basta, Beidha, Ba'ja, and Shkarat Msaied; directed by C. Purschwitz) and

- an analysis of raw materials and manufacturing traces of the LPPNB Ba'ja sandstone rings (see Michiels *et al.* 2013; supervised by H.G.K. Gebel)

Archaeological and environmental investigations in the Greater Petra Region have been carried out continuously since 1981. The initial phase (Phase 1) of investigations started with a palaeo-ecological research project (1981-1985, the *Palaeoenvironmental Investigations of the Greater Petra Area* - PIGPA, *e.g.* Gebel 1988, 1990; Gebel and Starck 1985) and later led to the excavations of LPPNB Basta (1986-1992, the *Basta Joint Archaeological Project*; *e.g.* Nissen *et al.* 2004, Gebel *et al.* 2006) and LPPNB Ba'ja (1997-present, the *Ba'ja Neolithic Project*; *e.g.* Gebel *et al.* 1997, Gebel and Hermansen 2004, Gebel *et al.* 2006, Gebel and Kinzel 2007, Purschwitz and Kinzel 2007, Gebel 2010a, and other). These excavations represented Phase 2 of the Neolithic investigations in the Greater Petra Area, mainly aimed to broaden the empirical basis for the Neolithic material cultures. Phase 3, to which already the 2012 investigations belong, are aiming to "translate" empirical data according to their social, economic and ideological relevance (*i.e.* commodification research *sensu* Gebel 2010b).

These excavations - as well as the investigation of the MPPNB sites of Beidha (Byrd 2005) and Shkarat Msaied (Hermansen *et al.* 2006; Hoffmann Jensen 2004; Kinzel *et al.* 2011) - yielded comprehensive artifact collections of a rich material diversity that now allow us to start the sub-project *Abiotic Resources in the Greater Petra Area* – ARGPA, directed by the author. The project aims at mapping the local and regional availability of abiotic (mineral) resources in the Greater Petra Region as well as investigating possible strategies by which these raw materials may have been procured and capitalized during in the Neolithic Period; it also considers, of course, traded mineral raw materials (*i.e.* the supra-regional contexts). Combined with information gathered in previous project phases on the flora and fauna (Phase I, *cf.* PIGPA), on subsistence strategies and the economic and social structures (Phase II, the Ba'ja and Basta Projects), the ARGPA project seeks to reconstruct the abiotic catchment areas of the Early Neolithic sites in the Greater Petra Region (Ba'ja, Basta, Beidha and Shkarat Msaied, among others) in order to understand the territorial interaction behind the procurement strategies and their socioeconomic importance for the individual sites (see also Gebel 2010b, forthcoming).

Flint Raw Material Sources of the Near Eastern Neolithic: A Neglected Area of Research

Although chipped lithics are the most abundant artifacts found at Near Eastern Early Neolithic sites, raw material provenance is a generally neglected research topic (Delage 2007; Gebel 2007), with the exception of some obsidian studies. One of the reasons for this undervaluation or oversight may in fact be the superabundance of suitable raw materials – such as cherts or flints – in most of Levant´s regions, which makes the identification of those specific outcrops which were exploited in prehistoric periods like looking for a needle in a haystack. Thus only a few primary source areas have been identified to date in Southern Levant: those at Wadi Huweijir (Quintero 2011), Ramat Tamar (Schyle 2007), Nahal Dishon (Barkai and Gopher 2001) and Jabal Jiththa (Muheisen *et al.* 2004).

Discussion of flint sources in the literature on the Greater Petra Region are likewise scarce. Mortensen (1970: 14-15) mentions outcroppings in the Sharah Mountains to the East of Neolithic Beidha as a source of the tabular flint used at Beidha. An abundance of secondary flint sources in the site's immediate vicinity, at Wadi al-Garab and Wadi Beidha, have also been noted (Kirkbride 1966; Mortensen 1970; Gebel 1990, pers. comm.). A small flint raw material survey was carried out in the course of the Basta excavation (Muheisen *et al.* 2004). Primary flint sources have been identified at 'Ain Abu Id al-Idham (Flint Raw Material Group 1), 5-7 km south of Basta, and at Jabal Jiththa, some 6-7 km to the east. At both of these sites scattered knapping debris was found, including a prevalence of products of bidirectional core preparation (Muheisen *et al.* 2004: 135).

According to geological maps of the Greater Petra Region, flint concretions can be embedded in several Cretaceous to Tertiary geological formations (Baaske 2005; Barjous 1988, 1995; Bender 1968; Kherfan 1998; Tarawneh 2002; see also the Wadi al-Hasa Chert

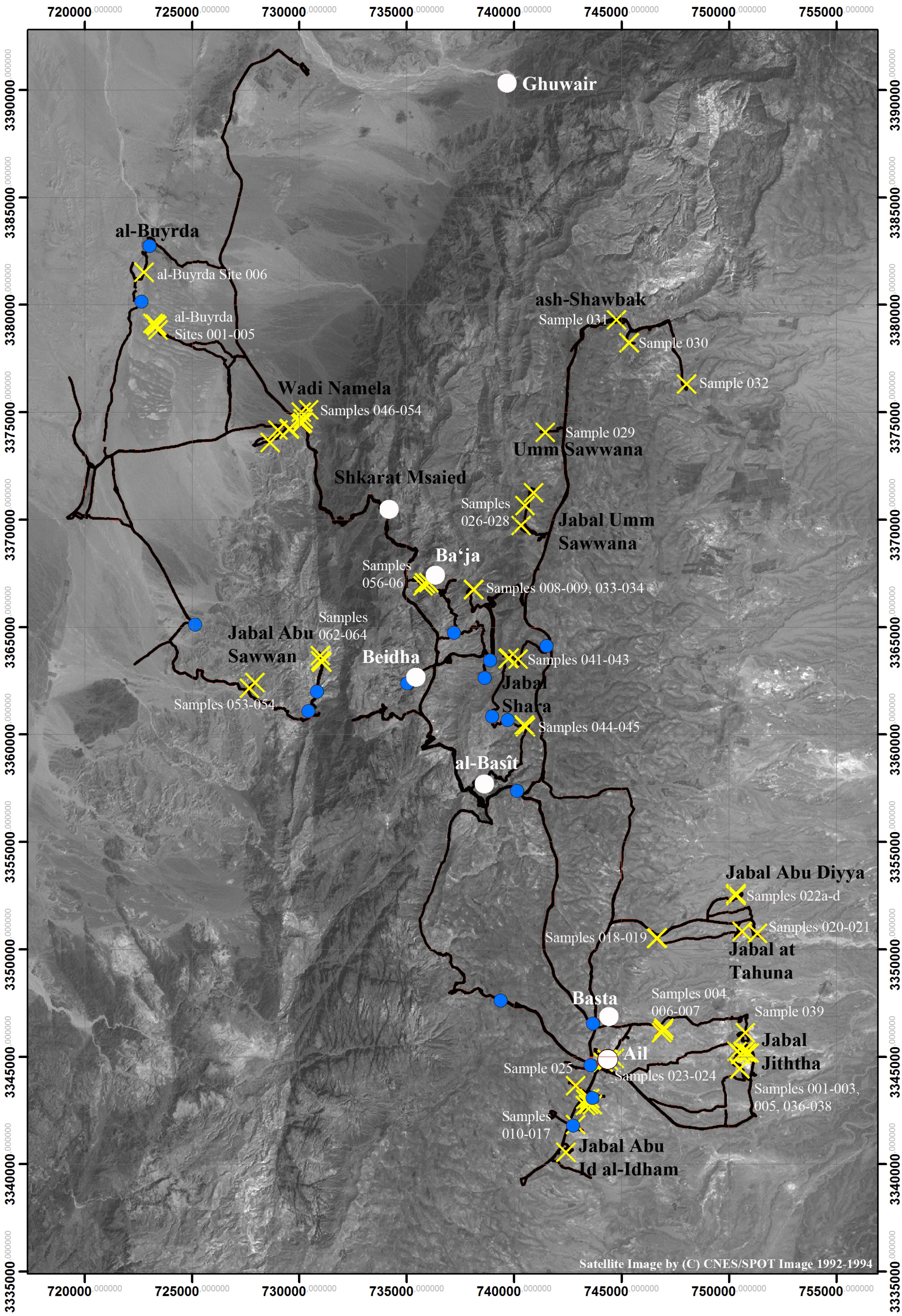

Fig. 1 General map of the survey area with major PPNB sites and the position of sample points (crosses) and the survey tracks (black lines). (map: N. Rhensius; field record: C. Purschwitz, N. Rhensius, A. al-Suleiman).

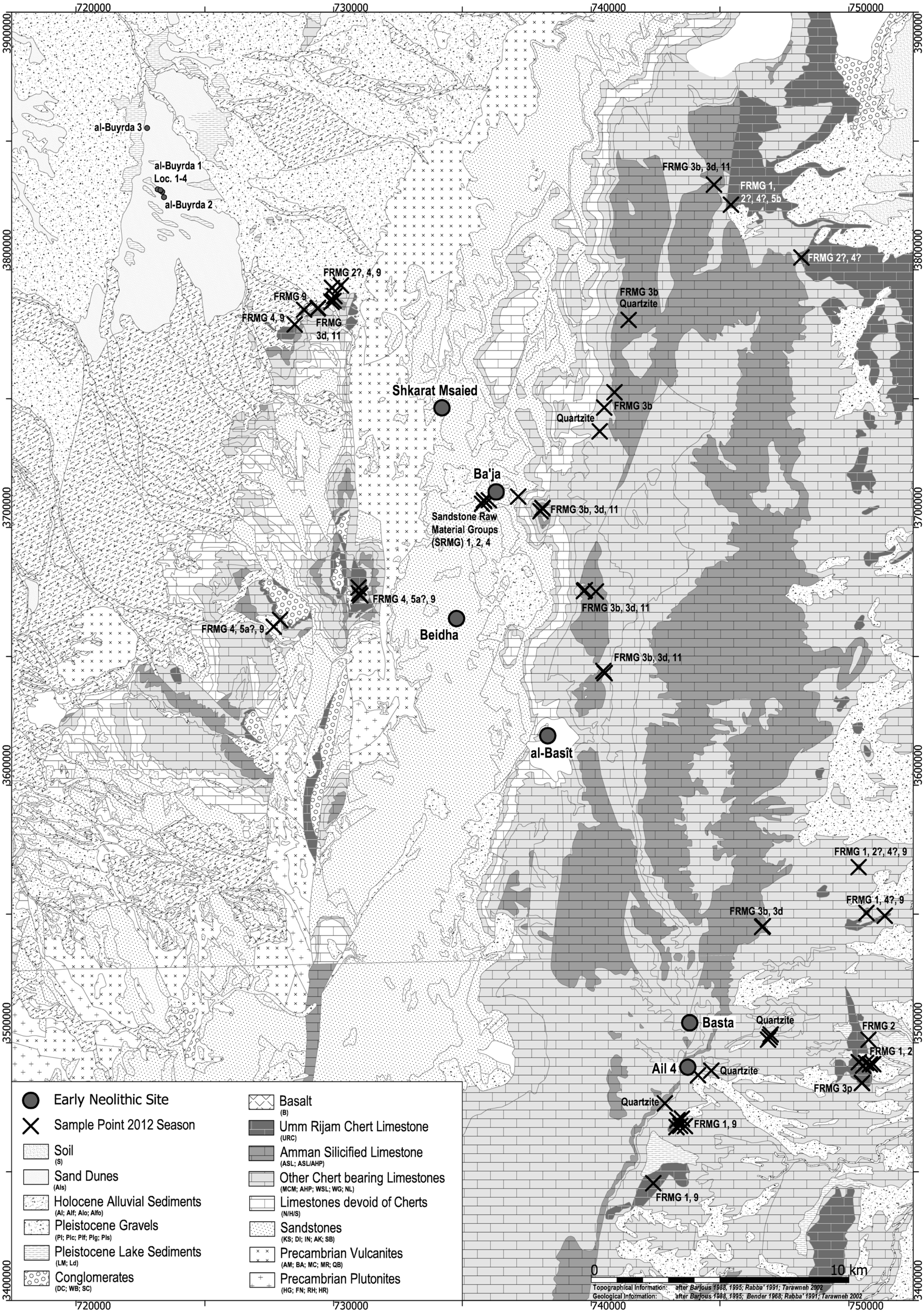

Fig. 2 Simplified geological map of the survey area.

Survey: Olszewski and Schurmans 2007). The Eocene Umm Rijam Chert formation (URC) and the Santonian to Campanian Amman Silicified Limestone formation (ASL) are described as abundant in flint layers, while others such as the Na'ur Limestone (NL, Cenomanian), Wadi as-Sir Limestone (WSL, Turonian), Wadi Umm Ghudran (WG, Coniacian-Santonian), Al-Hisa Phosphorite (AHP, Campanian-Maastrichtian) and the Muwaqqar Chalk Marl formations (MCM, Maastrichtian-Paleocene) can also bear flint concretions, although only in minor quantities.

Research Objectives and Methodology

The survey for flint sources that could have been used by Early Neolithic settlers focused on key areas in the local and regional vicinity of the major PPNB sites of Ail 4, Basta, Beidha, Ba'ja, and Shkarat Msaied. The survey areas were chosen according to their geological settings and their distance and accessibility from these settlement sites. The survey was carried out by walking transects through potentially flint-bearing geological formations (see above). Sources and outcrops of flint and other knappable rocks (such as quartzites) were recorded as sample points. Each sample point was recorded by GPS, photographs and a site description. The descriptions included a classification of the site (primary source, secondary source, extraction site, knapping ground, *etc*.), a source description, a classification of the associated artifacts found there and an estimation of their number, and a description of the raw materials (Raw Material Group, color pattern, shape, dimensions, texture, cortex features, and, for primary sources, geological contexts). When possible, raw material samples were taken for petrographical analysis.

The raw material classification system used in this analysis follows the system established at Neolithic Basta (Muheisen *et al.* 2004; see Gebel 1994). This system classifies the raw materials according to their mineral or rock qualities into chert / flint[1], obsidian, quartzite, orthoquartzite, limestone, or other such classifications. Flint is additionally classified according to macroscopic qualities such as color pattern, translucency, texture, qualities of natural surfaces, nodule shapes, etc. into the various Flint Raw Material Groups (FRMG). At Basta, nine different groups (FRMG 1 to FRMG 9) have been distinguished; two additional groups were established for flints that occur in minor quantities and do not match the nine groups (FRMG 45) or are determined to be thermally altered flints (FRMG 48) (for the detailed description of each FRMG, see Muheisen *et al.* 2004). These classifications have been modified and new FRMGs have been added since the first analyses of chipped lithic collections from Ba'ja, Beidha, Ail 4, and Shkarat Msaied. For instance, FRMG 5 at Basta and Ba'ja differs in the color pattern and has been split into two subgroups, FRMG 5a[2] ('B'ja-type') and FRMG 5b ('Basta-type'). Similarly, FRMG 3 hast been divided at Ba'ja into the subgroups FRMG 3b ('brecciated'), FRMG 3d ('dull'), FRMG 3g ('glossy/waxy'), and FRMG 3p ('phosphatic (?) inclusions'). Two new FRMGs have been added to classify flints found in abundance at Shkarat Msaied (FRMG 10)[3] and Ail 4 (FRMG 11)[4].

Specifically, the abiotic resources survey had the following objective: Mapping of regional geological formations determined to be potential Early Neolithic abiotic (especially flint) raw material sources. The mapping aims to:

a) record the location, extent and quality of flint raw materials available at each site (according to the flint raw material classification established for Basta, *cf.* Muheisen *et al.* 2004)
b) identify evidence of Neolithic exploitation, procurement, or mining, including the modes and extent of extraction, the presence of workshops and evidence of initial stages of production and processing at the raw material source.

Preliminary Results of the 2012 Flint Raw Material Survey

64 sample points have been recorded and about 230 flint samples were taken (Fig. 1-2). Several FRMGs could be identified within their primary geological cortex; these include: FRMG 1, FRMG 2, FRMG 3b, FRMG 3d, FRMG 3p, FRMG 4, FRMG 5a, FRMG 5b, FRMG 8, FRMG 9, and FRMG 11.

According to the survey, the most abundant primary sources for high-quality flint are located within the URC formations. In the Greater Petra Area these can be found as relicts on the eastern slopes of Wadi Araba (*e.g.* Wadi Namela; Jabal Abu Sawwan) and in the eastern part of the survey region (*e.g.* Jabal Jiththa, Jabal Abu Id al-Idham, Jabal at-Tahuna, Jabal Abu Diyya). Generally, the surface coverage of URC formations increases to the east in the Jordanian Highlands and predominates in the lithological landscape around Ma'an and east of Shawbak.

FRMGs which have been identified at URC include: FRMG 1, FRMG 2, FRMG 3p, FRMG 4, FRMG 5a, FRMG 5b, and FRMG 9. URC flint types are often lenticular-nodular in shape, and measure up to one meter in length (*e.g.* Jabal Jiththa). Tabular flint layers are also very common, ranging between a few centimeters and 30 centimeters in thickness, though these are often of poorer quality than the nodular flints. Their color ranges from brown to pale brown and can also appear brownish-grey, dark brown or blackish-brown. The texture is variable, ranging from extra-fine-grained to coarse-grained. Often there are inclusions of small gastropods or lime pieces, both of which are macroscopically visible as white spots and are characteristic of FRMGs 1, 5a, and 9. Some flint types, such as FRMG 3p, have dark inclusions of yet unknown mineral composition, while others are often devoid of inclusions, particularly FRMGs 2 and FRMG 4. The cortex of the

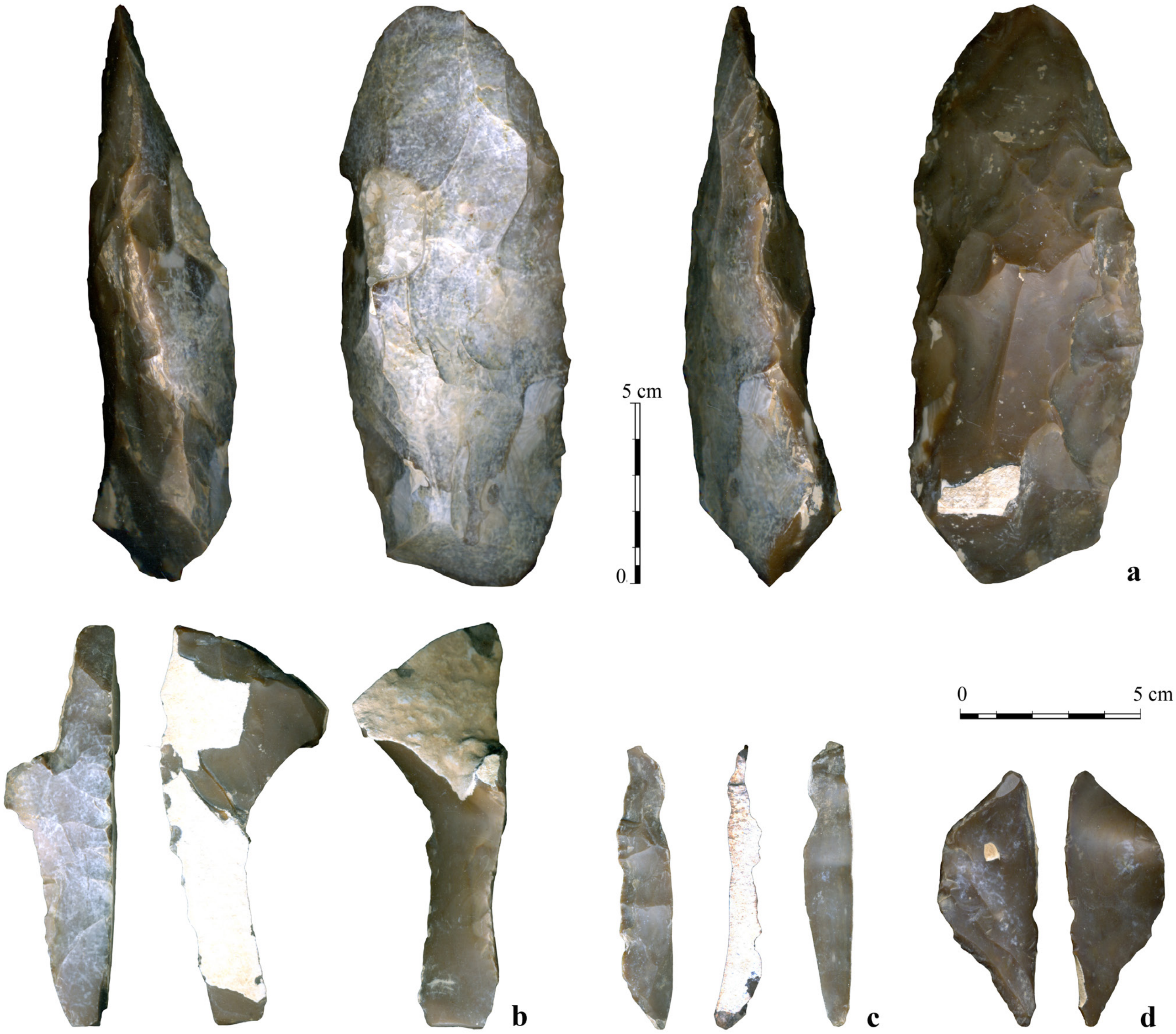

Fig. 3 Initial platform spalls (b, c), platform trimming flake (d) and unfinished celt/adze (a) from Braq al-Jiththa.

primary sources is predominantly composed of coarse, scratchable lime or, rarely, of soft chalk and ranges in thickness between very thin layers of 0.1milimeters to thicker layers of 2 to 3 millimeters.

Although the region under investigation is relatively small, local differences among the URC flints are nonetheless apparent. Tabular chocolate-brown flints (FRMG 2) have been found only in a very limited area at Jabal Jiththa. These are not in primary positions but rather embedded in Pleistocene Lake sediments, which are assumed to have been deposited between 110.000 and 40.000 BP (Moumani *et al.* 2003; Moumani pers. comm.). Given that these flints still have primary cortex without batterings or abrasions, which indicates a wadi transport, it seems likely that they were previously embedded in younger, nowadays completely eroded strata of the URC. Flints of FRMG 5 were also found only in specific locations. Small amounts of flint of FRMG 5b were found at ash-Shawbak (Sample Point 030) and flint of FRMG 5b was found only at Wadi Meshabel, near Jabal Abu Sawwan (Sample Points 062-064), and not in any of the other URC outcrops surveyed. Similarly, flint of FRMG 1 abounds in the Jabal Abu Id al-Idham region, where other URC flints are very rare.

Other primary sources of good quality flints can be found at the Amman Silicified Limestone formation (ASL), although in lesser amounts than at the URC. The flint types of the ASL and the URC can be distinguished according to their color and inclusions. Good quality flints in the ASL correspond to FRMG 3d and FRMG 11and have been found at Jabal Shara, Shawbak and Wadi Namela. These flints are nodular in shape and show hues ranging from dull grey (FRMG 3) to very pale yellowish-brown (FRMG 11) and often present concentric bands with darker hues in the nodule center and lighter hues towards the cortex. Flints of FRMGs 3 and 11 are medium- to extra-fine-grained and are almost completely devoid of inclusions and impurities. Where primary cortex is present, it is predominantly smooth and very thin (0.1mm). However, most of the

ASL flints surveyed are poor in quality, with many cracks and natural clefts; auto-brecciated tabular flints of FRMG 3b and FRMG 8 predominate. This applies in particular to the ASL layers in the Rift Valley zone, which have undergone heavy tectonic faulting.

In other geological formations, flints have either not been found at all (NL, WSL), or have been found only in small numbers (WG, AHP, MCM). In these cases, the flints often did not correspond to any existing FRMG.

Another type knappable rock which is found in most PPNB sites of the Greater Petra Area is quartzite. In this survey, quartzite was frequently found in the Al Hisa Phosphorite Formation, often cropping out in banked layers of 20-30 cm in thickness. Additionally, boulders of similar size are found on the surface of AHP slopes or in the fills of nearby wadis. The color of these quartzites ranges from grey to pale brown and reddish, with brown hues predominating.

Although orthoquartzite is found at the sites of Basta, Ba'ja, Ail 4, Beidha and Shkarat Msaied, no primary or secondary sources of orthoquartzite could be identified in this survey. According to Wilke *et al.* (2007:194), orthoquartzite used at 'Ain Jammam may have been derived from the massive Disi sandstone formations, and small relicts of orthoquartzite sandstone can be found in the vicinity of Basta and Ail.

One focus of the raw material survey was to search the vicinity of these potential primary sources for scatterings of artifacts which could be evidence of Early Neolithic flint procurement. Although flint artifacts of other periods – ranging from the Lower to the Upper Paleolithic Period to the Chalcolithic/EBA – were commonly found at the source sites, there was little evidence of Early Neolithic presence.

The only evidence of Early Neolithic use of raw materials at these primary source sites was found at Jabal Jiththa, at a large testing site identified in 2003 by H.G.K. Gebel after a notice received by Khairiyah Amr (*cf.* Muheisen *et al.* 2004). Although this site has been heavily damaged and a portion of it – of yet unknown extent – has been destroyed by a modern limestone quarry, there is still a large amount of knapping waste scattered on the surface north of a small natural pool (Braq al-Jiththa). These knapping products consist of tested raw material chunks, initial platform spalls and platform trimming flakes, and one unfinished celt/adze (Fig. 3). The raw material used in these products is overwhelmingly flint of FRMG 2, with smaller amounts of flint belonging to FRMG 1, both which can be found abundantly in chunks in the Pleistocene lake sediments (*cf.* above). The choice of raw material and the techno-typological features of these knapping products highly matches the initial stages of bidirectional blade core preparation at nearby LPPNB Basta (*e.g.* Gebel 1996); it is very likely that Jiththa was one of the procurement areas for this raw material (*cf.* Muheisen *et al.* 2004).

An intensified survey around Jabal Jiththa revealed a second surface scatter of bidirectional blade production. Some 800m to the north of Braq al-Jiththa, at Wadi al-Hassiya, by-products of bidirectional blade core preparation (platform trimming flakes, initial platform spalls) associated with products of core reduction (exhausted cores, core tablets) have been found. These findings include evidence of the early and later stages of the *chaîne opératoire* of bidirectional blade production. However, smaller byproducts of core reduction – *e.g.* small flakes and small blades – have not been found.

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Endnotes

[1] The term "flint" is used from here in its vernacular meaning; the proper petrographical or geological term is "chert".

[2] Following the description scheme of Muheisen *et al.* 2004 (see also Gebel 1994) FRMG 5a is: A) lenticular/semi-tabular bodies of unknown dimensions; B) cortex preserved from geological source: chemically weathered (bedrock - fresh) with thicknesses of 1-3 mm; sharp separation between cortex and flint body; C) slightly fine-grained homogeneous matrix; D) irregularly distributed whitish (lime?) inclusions of varying intensity, occasional blackish inclusions; flaking ability: very good; E) completely opaque - occasionally with slight translucency at very thin edges; F) black to very dark grey, but also greyish green (then predominantly with blackish inclusions); G) mottled; H) without lustre / dull, occasionally faintly lustrous.

[3] A) probably nodular flint bodies of unknown size; B) completely abraded / weathered cortex; often diffuse separation between cortex and flint bodies; C) medium-fine- to coarse-grained homogeneous matrix; D) occasional dark and white spots; E) completely opaque - occasionally with slight translucency at very thin edges; F) very pale brown to very light yellowish gray; G) irregularly distributed clouds and occasional concentric bands of slightly lighter or darker hues; H) without lustre / dull.

[4] A) nodular bodies of maximum sizes of 20-30 cm with nodular to lenticular shapes; B) very thin natural surfaces (0.1 mm), when cortex preserved, often of light-yellowish limestone; C) fine-grained to extra-fine-grained homogeneous matrix; D) no inclusions, clefts or hollows; flaking ability: very good; E) opaque; F) white to very pale brown - very light-yellowish brown, concentric color pattern with more yellowish-brownish hues towards the nodule center; G) irregular clouds of often concentric pattern, yellowish hues; H) slightly high lustre - faintly lustre.

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Neolithic Settlement at Wisad Pools, Black Desert

Gary O. Rollefson, Yorke Rowan and Alexander Wasse

Introduction

A small crew of archaeologists spent the month of June excavating and surveying at Wisad Pools at the edge of the basalt desert in Jordan's eastern badia (Fig. 1). The original goal was to investigate a tailed tower tomb (W-85): a *ca*. 4-5 m diameter mortuary structure in the middle of a circular courtyard set off by a thick wall of basalt boulders, from which a chain of 13 stone piles extended towards the west. Unfortunately, over the two years since our last work at Wisad, looters had been very active, trashing W-85 in addition to at least four other buildings in the immediate area as well as large towers and mounds farther away. Nevertheless, we had planned a secondary target at W-80, a medium sized tomb with a basalt-fenced feature to the west of the monument.

Mound W-80 and the Tomb on Top of It

Due to the limited number of personnel, only the southern half of mound W-80 (preserved to a height of 2 m, and measuring *ca*. 8-9 m in diameter) would be excavated during the 2013 season (Fig. 2). Basalt slabs of considerable size (up to 400 kg and more) and smaller boulders were removed from inside and outside the tomb, leaving a clear indication of the size and construction of the funerary installation (Fig. 3). The wall was poorly constructed in the sense that stability was not evidently a principal concern. In the lower half of Fig. 3 one can see that the slabs had been raised in columns as opposed to the stronger overlapping brickwork fashion, and openings large enough to put one's arm through remained at the junction of wall stones. There did not appear to be any interior chamber construction, suggesting that the burial was not protected by a roof, and that after erecting the wall the body was placed near the center and simply covered with boulders (Fig. 3a).

The burial itself was badly disturbed in antiquity, although whether this may have been the result of robbing or of some bioturbation is not clear; none of the bones appeared to remain in articulation, and most of the lower density bones were crushed. When the burial occurred has not been easy to determine since diagnostic artifacts were not present. In the general vicinity of the burial there were two cowrie shell beads and a tiny tubular bead of carnelian; there were also scatters of flint artifacts, but these were not definitive of any particular period. Put another way, the stone tools, debitage, and other finds were similar in general to the more densely distributed artifacts located in the structure below it; that is, the burial could well have dated to the Late Neolithic period.

The "Platform" Mound Beneath the Tomb

The placement of the tomb took advantage of the elevation of a collapsed structure that at the time of the burial would have stood about 1.40 m high. The underlying mound consisted of a long sequence of palimpsests of aeolian sediments and basalt boulders and flat slabs. Many of the basalt pieces were probably originally part of a Late Neolithic corbeled dwelling that had collapsed sometime during the 7th millennium calBC, used by subsequent squatters to level the interior and to subdivide it as sections of a large windbreak to protect the visitors as they undertook tasks associated with tool manufacture, butchering, and other activities during their stay at Wisad (see details below).

No discernible natural stratigraphy could be seen in the aeolian buildup until near the bottom of the sedimentary fill, although there were evident changes in the use of stone constructions (pavements, slabs set on edge, other forms of delineation of space) that could be used to provide a general differentiated accumulation of soil and artifacts. Locus 006 was an area that covered the entire mound below the tomb and was made up of a rough leveling of the surface using basalt slabs (Fig. 4a). Just under the pavement of Loc 006 the tops of several huge basalt slabs set on edge subdivided the general area into three more or less distinct areas, and these

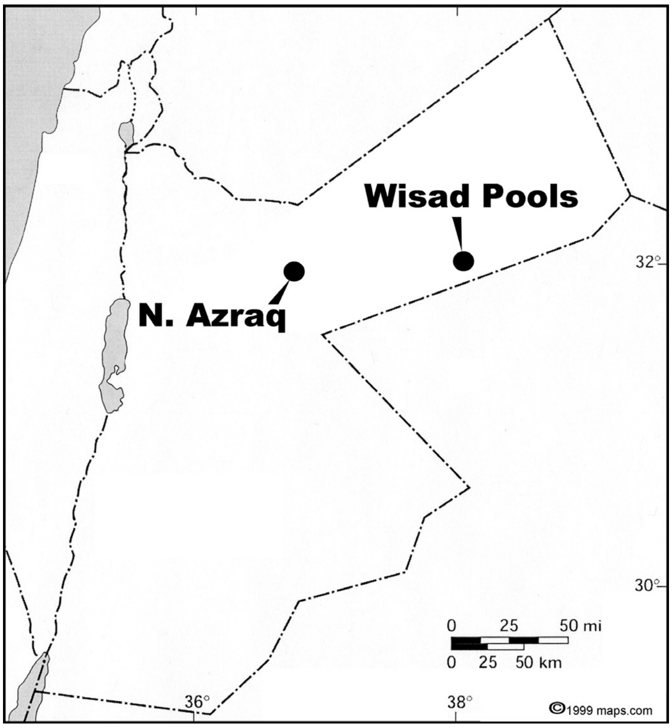

Fig. 1 Location of Wisad Pools in Jordan's panhandle.

Fig. 2 View towards WNW of mound W-80. The wall of the circular tomb can be detected in the upper part of the basalt blocks (Photo: A.C. Hill and Y.M. Rowan).

were designated as Loci 007, 008, and 009 from east to west (Fig. 4b). Lithics, faunal remains, and small finds were very numerous in comparison with Locus 006, although the density of archaeological material became remarkably denser in the underlying layer of Locus 015 (Fig. 5) and the even deeper Locus 022, both of which almost spanned the entire interior of the building.

The final architectural plan is illustrated in Fig. 6. In the southwestern part of the interior was an area that was set off by a short wall, creating a subcircular alcove about 1.5 m in diameter (Fig. 7a). The alcove was paved at least three times with basalt slabs through the sequence of its use and once with what appears to have been a layer of poorly preserved gypsum plaster.

To the east of the alcove was a larger curvilinear room (3.95 m E-W, 2.90 m from south wall to the section) along the southern wall of which was a *ca*. 40 cm-wide bench or platform paved with cobbles (Fig. 7b). The paving was in use during the Locus 015 period of the structure and for part of the time Locus 022 was in use, although 022 also continues under this feature. Animal bones and flint artifacts were particularly abundant in these two loci, although quantities of both categories seemed to decrease with depth in Locus 022[1].

Outside of the structure was a forecourt (WF in Fig. 6) set off from the rest of the site by a "fence" of upright basalt slabs that formed a semicircle from the southern part of the mound to the northern edge; midway along this arc was a small exterior arrangement of stones that appear to represent a small shrine with one of the fence stones as the back of the feature and a low (32 cm) standing stone in the center of a U-shaped configuration (Fig. 8). The orientation of this feature is 117º ESE/ 297º WNW. Elsewhere in the western forecourt are some arrangements of upright slabs that created U-shaped partial enclosures with sides c. 1.5 m long, one oriented to the west and the other to the northwest; these features were not investigated in 2013 and their uses remain undetermined.

Between the western forecourt and the structure is a relatively small (radius of *ca*. 2.5 m) semicircular area divided from the western forecourt by a screen fence of upright basalt slabs buffered on the outside of the arc by a double-leaf pavement of small basalt pavers. This "porch" ("P" in Fig. 6, measuring 2.2 m E-W by 2.7 m N-S) appears to have been an exterior work area in view of the absence for any indication of a roof, and the presence of a large grinding slab in the center of the area (Fig. 9b) as well as several handstones and a pestle nestled along the fence stones. The porch appears to have been paved, at least during some part of its use life.

The arc of the porch fence is centered on a doorway ("D" in Fig. 6) whose jambs remain standing to a height of just over 40 cm. The stone across the top of the doorway in Fig. 9a is probably a fallen or dislodged slab from the original structure and is not the lintel of the

Fig. 3 a: View towards the NW of the isolated tower tomb after removal of exterior basalt tumble. (Photo: A.C. Hill and Y.M. Rowan); b: Detail of the western part of the tomb wall, preserved here to a height of 80 cm. Notice the construction technique (Photo: G. Rollefson).

Fig. 4 a: The bottom of the tomb wall rests on top of Locus 006, a roughly leveled surface of the mound; b: Vertical slabs set on edge divide the interior of the mound into three distinct areas (Photos: G. Rollefson).

passageway. The forecourt, porch, and doorway were probably all associated with the original use of the building, although these architectural elements may have been used for some time after the initial collapse of the corbeled roof.

The last architectural aspect of the building is the "vestibule" ("V" in Fig. 6), a smallish chamber leading from the doorway into the main parts of the house. The vestibule remains unexcavated at the present time, and its precise relationship with the alcove, the main room, and what is still uninvestigated in the northern part of the house remains unknown.

W-66 Revisited, Twice

The looting that occurred between the end of the 2011 season and the onset of the 2013 campaign also involved the Late Neolithic house of W-66. At the end of the 2011 season the western alcove, which had been plastered with gypsum at least four times, was left intact (Rollefson *et al.* 2011: Fig. 7). This was the principal target of looters, and while we lost the primary context of the artifacts removed from the alcove, the looters conveniently placed their backdirt on top of our 2011 backdirt, leaving the archaeological material essentially uncontaminated with material from outside the alcove. Several days were spent sifting through the looters' backdirt to retrieve a considerable amount of chipped stone tools and debitage, faunal remains, and small finds, which are described below.

Cores and Debitage

More than 32 kg of flint debitage and tools were recovered from the interior of mound W-80. Artifacts of any kind were relatively sparse inside the tomb, but the quantities escalated with increasing depth beneath it, reaching stunning amounts in the two lowest loci

Fig. 5 The upright slabs that divided Loci 007 and 008 rest on top of Locus 015, which in turn rests on top of Locus 022 (Photo: G. Rollefson).

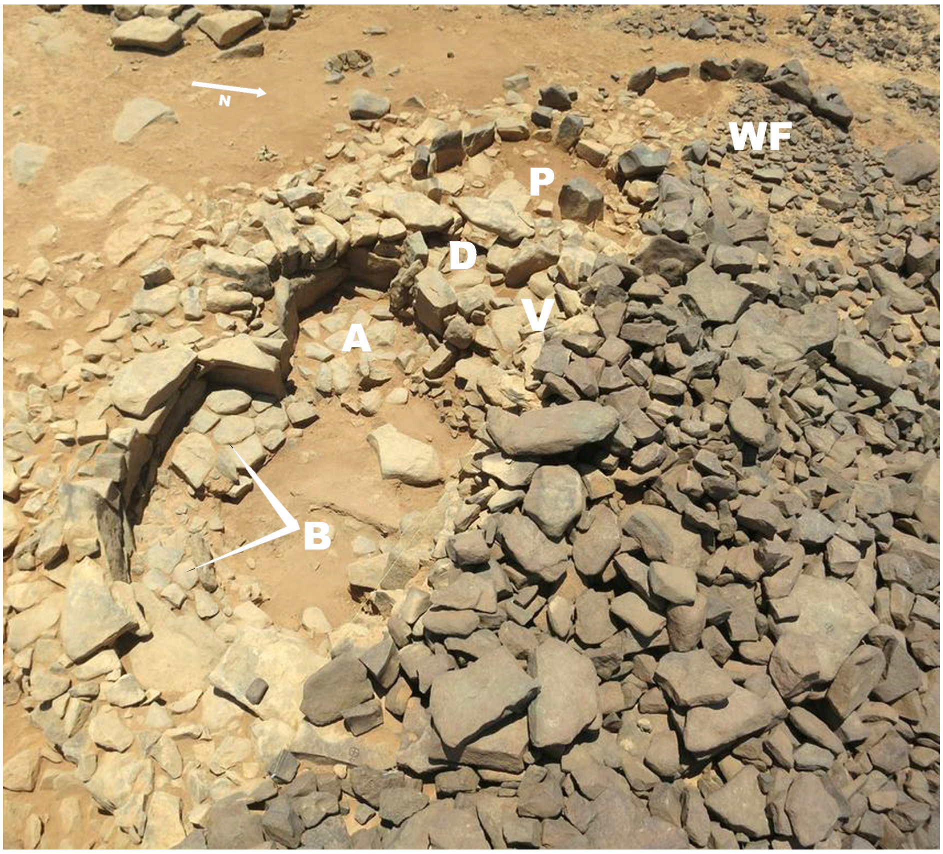

Fig. 6 Overhead view of the excavated southern half of Mound W-80. WF is the western forecourt; P is the "porch", D is the doorway; V is the unexcavated vestibule; A is the alcove, and B is the bench/platform in the eastern room (Photo: Y.M. Rowan).

(Locus 015 and Locus 022). The number of cores was particularly impressive, with 396 coming from W-80 and 62 from the W-66 backdirt. Many of the cores were minute, including some that were only slightly larger than a 1.5 cm in maximum dimension (Fig. 10a, b) and paralleling the small polyhedrons reported from the Yarmoukian site of Umm Meshrat I (Cropper 2006). The small size of the flakes removed from the closing phase of these cores are enigmatic in terms of potential use, although the tiny size of many of the transverse arrowheads (see below) might reflect one area of application.

Although firm statistics are not yet available, a sizeable proportion of the cores from W-80 and W-66 appear to be made on split cobbles, using the ventral surface of the flake as a platform in one case and the flake scar of the other part of the cobble in a similar fashion; flakes were removed from such cores either in a radial fashion or along one lateral edge of the split cobble until the

Fig. 7 a: The alcove is located in the upper central part of the image, based with the third pavement in its use; b: The "eastern room" with a paved bench or platform along the wall near the top and left edges of the photo (Photos: G. Rollefson).

Fig. 8 A rectangular arrangement of basalt stones with a standing stones in the center. This feature is located just above the "WF" in Fig. 6. View towards the east (Photo: G. Rollefson).

Fig. 9 a: View towards the east of the doorway ("D" in Fig. 6) at the eastern edge of the porch; b: Large grinding slab with a central depression and a broad grinding area adjacent to the right (Photos: G. Rollefson).

other (often cortical) edge was approached. Most of the remaining cores were multi-platform globular shapes. Although intensive analysis of the debitage remains to be undertaken, clearly there are numerous blades in the assemblage (and also noticeable among many of the arrowheads), but blade cores were very rare at W-80 and W-66.

The presence of so many cores in the accumulated sediments inside the structure at W-80 certainly indicates that a major activity in the windbreak involved the production of blades and flakes for tool manufacture. Flakes overwhelmingly dominated the debitage, although blades were still an important product of core reduction. Small flakes, retouch flakes, and little pieces of debris indicate that final tool fashioning took place in the structure as well, ranging up to 21% (by weight) of the debitage excluding cores in several of the larger sub-assemblages.

Tools

Although the formal tools spanned a wide variety of types, especially borers, drills, notches and denticulates, tabular scrapers and knives, and others, arrowheads were remarkably abundant, outnumbering other tools by a considerable margin. A total of 299 projectile points were recovered from W-80 (including 11 tangs and 4 unclassifiable types) and 15 from W-66. Transverse types dominated in both collections, accounting for 87% of the classifiable specimens. Transverse arrowheads included stemmed points (41% of the classifiable transverse arrowheads), triangular points (37%), and rectangular/trapezoidal points (22%)[2]; the last category is interesting in the sense that the hafted part of the point is an edge just as sharp as the business end of the tool, which must have damaged arrow shafts rather frequently (Fig. 11). Of the remaining arrowheads, Haparsa, Nizzanim, Herzliya, and large bifacial Byblos types were much less abundant (Fig. 12).

Among the other tool types, cortical elements were present though not with any remarkable frequencies. Tabular knives and cortical scrapers (Figs. 13-14) were made on material that comes from unknown sources,

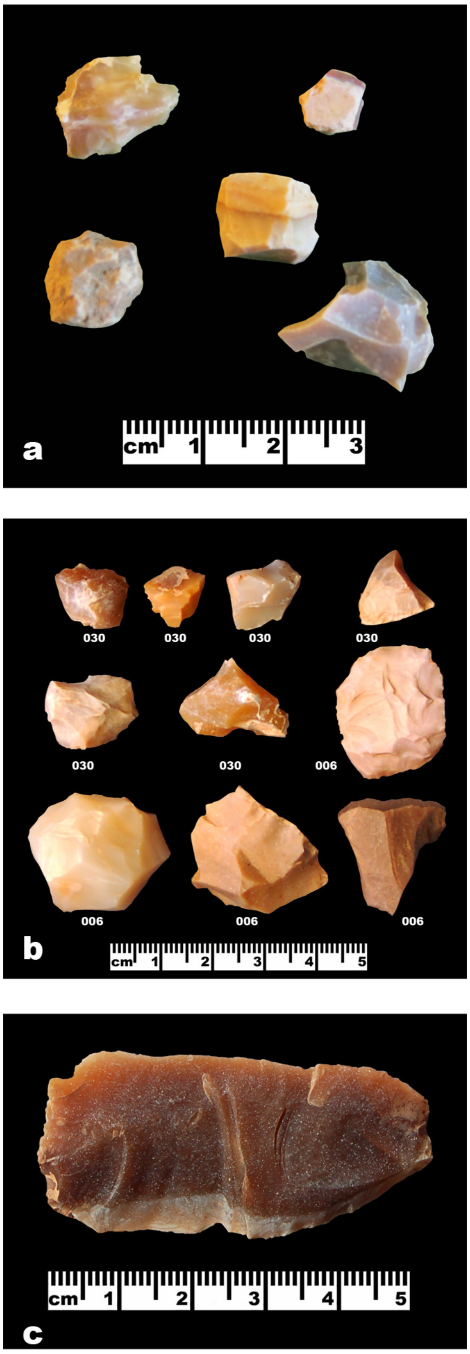

Fig. 10 a: Selection of polyhedrons from W-66. b: Small cores from W-80. The numbers refer to locus origins. c: Scars of blade-like flakes removed from both ends of the ventral surface of a naturally backed flake, Locus 007 (Photos: G. Rollefson).

Fig. 11 Transverse arrowhead types: left column = stemmed arrowheads; central column = triangular points; and right column = rectangular/trapezoidal types; all from Locus 007 (Photo: G. Rollefson).

though it is possible that the resource is the flint mining complex east of Ruwayshid, around 100 km to the NE of Wisad (Müller-Neuhof n.d.). Notably, the presence of cortical scrapers and tabular knives conflicts with Braun's view that such tools originated in the Chalcolithic period (Braun 2011: 171).

One of the intriguing aspects of the tool inventories from both W-80 and W-66 is the paucity of burins of any kind. The preliminary tool/debitage sort for the W-80 assemblage produced only three burins, and only one of these was on a concave truncation, so common to the Late Neolithic of the southern Levant (although some of the Burqu' sites were equally poor in burins; Betts *et al.* 2013).

Despite the availability of basalt (as opposed to the absence of local flint resources), the use of this material for tools not associated with grinding is very rare. Three surface artifacts near W-80 included Late Acheulian bifaces, and a Late Acheulian bifacial cleaver on a large flake was found in Locus 015, resting on the bench/platform along the southern wall of the eastern room (Fig 15). One basalt shaft straightener was found in Locus 007 and another in Locus 011 (Fig. 16). Two choppers made of basalt came from W-66 (Fig. 17).

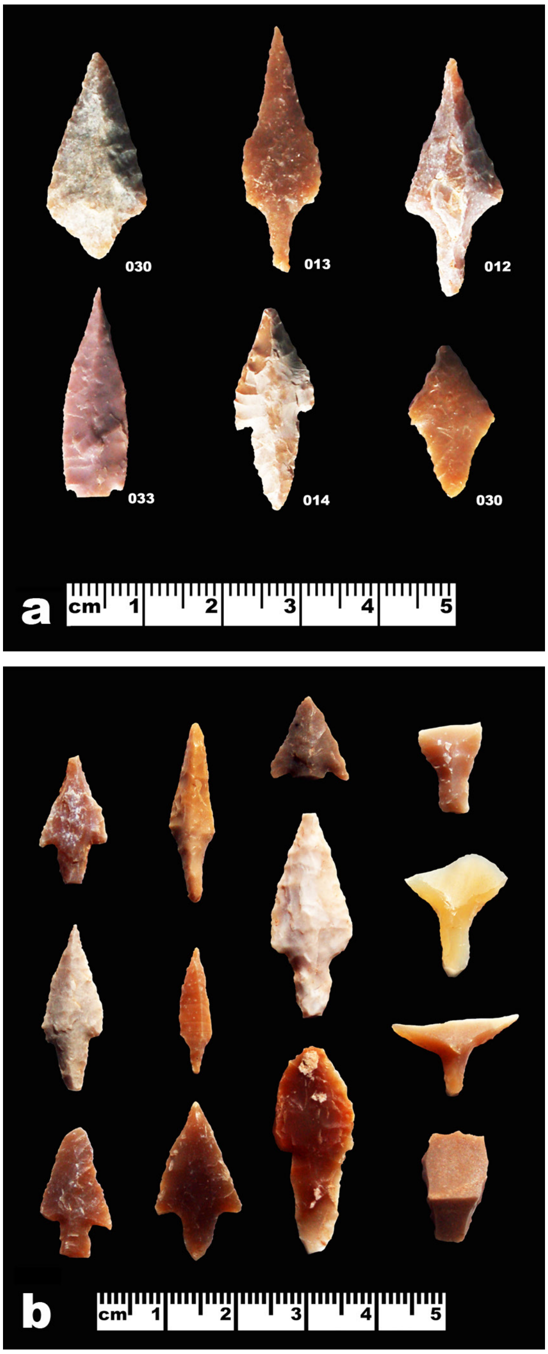

Fig. 12 Various other projectile point types. a: From W-80 (numbers refer to loci); b: From W-66 (Photos: G. Rollefson).

Fig. 13 Tabular knives from Locus 015 at W-80 (Photos: G. Rollefson).

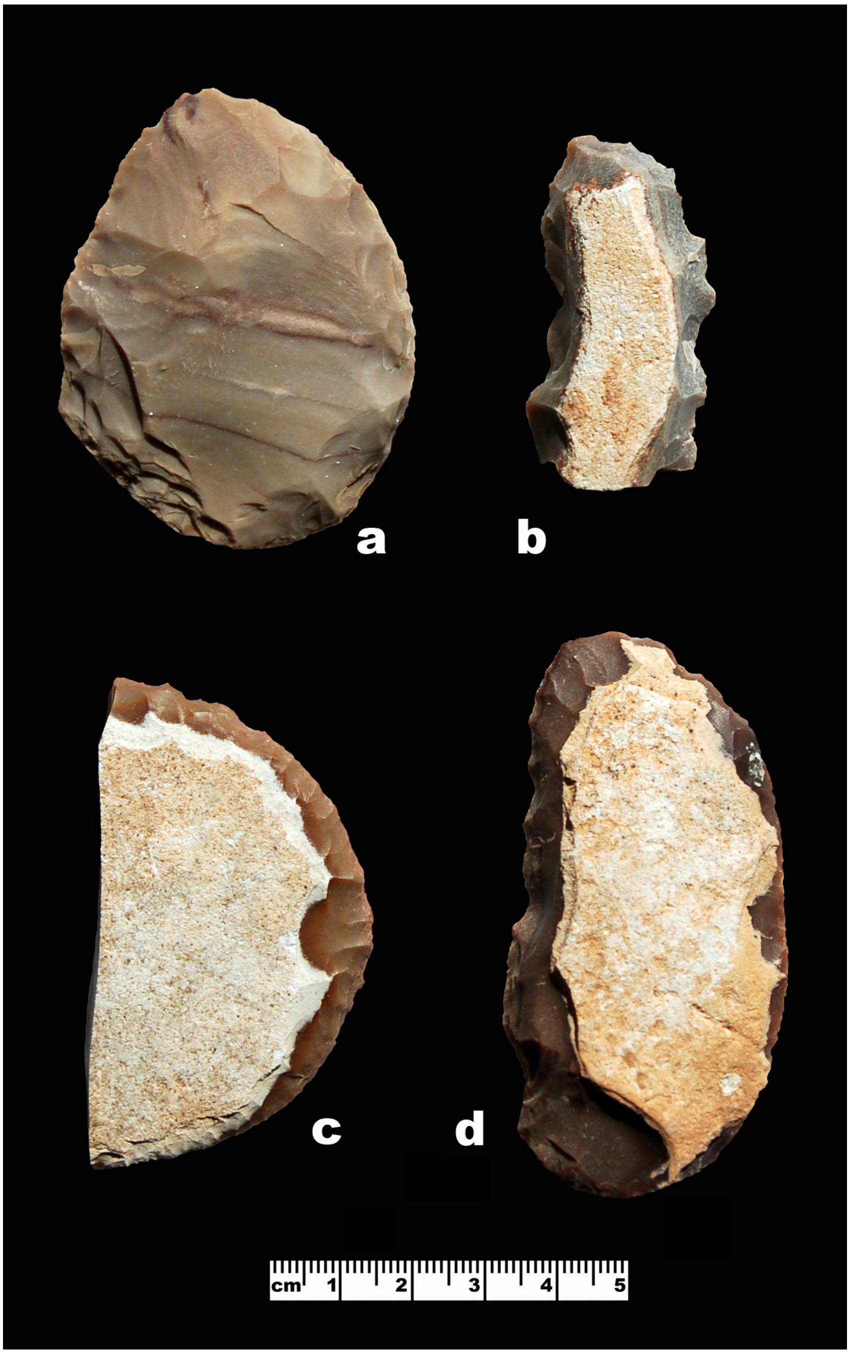

Fig. 14 Tools from Locus 007, W-80. a: Scraper edge around entire flake; b: cortical denticulate; c, d: cortical scrapers (Photo: G. Rollefson).

Groundstone

Grinding stones were relatively numerous at W-80, as was the case at W-66 (Rollefson *et al.* n.d.). A total of 30 handstones and four pestles was recovered, often resting along the interior edge of a wall. Reminiscent of the cache of 11 pestles found in W-66, three huge pestles, a small grinding slab, and a handstone were stashed in a niche under a corbel stone in Locus 007 at the eastern edge of the structure (Fig. 18). The largest pestle was 395 mm long, 110 mm in diameter, and weighed 8.2 kg; the smallest measured 313 mm in length, 76 mm in diameter, and weighed 2.7 kg. All three pestles were battered at both ends, as would be expected, but it is clear from polished areas on the sides that they were used as rollers and handstones on grinding slabs as well.

Only one mortar was recovered, but there were 13 grinding slabs in the fill of the structure. Several of the grinding slabs were inverted, perhaps to conserve the working surface during periodic absences from the site. The large grinding stone with the central depression in the center of the porch mentioned above has a close parallel at Late Neolithic Dhuweila (Betts 1998: Plate 6 and Fig. 3.19).

Faunal Remains

Over 23 kg of animal bones were recovered from the 2013 excavation season at W-80. It has not been possible to conduct any intensive analysis of the remains, but as the material was coming out of the sediment it seemed that gazelle species dominated the inventory, although larger animals (*e.g.* onager and possibly others) were also present, as well as the mandible of a domestic dog. What the relative importance of domesticated ovicaprines in the butchering areas may have been is not clear at the present time.

One of the interesting sets of evidence from the excavations came in the form of 39 gizzard stones: egg-shaped to spherical quartz pebbles that had developed a polish from their function in the digestive system of birds (Fig. 19). The size of the gizzard stones suggests they are not from ostriches (as was the case in the archaeological survey of the Azraq Wetlands Reserve; *cf.* Rollefson *et al.* 2001). It is notable that bird bones were relatively numerous among the faunal remains, which is understandable since the pools at Wisad, as well as the nearby *qa'in* would have been part of the seasonal migration route for birds flying from Eurasia to Africa and back.

Ceramics

The scarcity of pottery in sites in the badia is not surprising since the kinds of clay and fuel for pottery manufacture are generally lacking. But several decorated sherds provide some dating evidence for the deposits at W-80. A painted Yarmoukian sherd from Locus 022 is clearly Yarmoukian (Fig. 20a), as is the painted sherd from Locus 009 (Fig. 20b; the small arrows show a line

Fig. 15 Basalt bifacial cleaver on a flake from Locus 015, W-80 (Photo: G. Rollefson).

Fig. 16 Basalt shaft straighteners from W-80. a: Locus 007; b: Locus 011 (Photos: G. Rollefson).

where the ochre-red paint stops on an otherwise red-slipped fragment). The remaining sherd (Fig. 20c) is a typical Yarmoukian example, with banded herringbone incision and dark red paint[3].

Other

The sediments inside W-80 produced 43 beads (including two cowries shell beads and a tiny tubular carnelian bead from the tomb structure); in addition, there were also 17 bead blanks and a number of examples of manufacturing failures. The predominant material was Dabba marble, with a known major source in the Wadi Jilat about 150 km to the southwest of Wisad (*cf*. Garrard *et al.* 1986: 23), although stone beads of various other colors also were found. Bone and shell beads were present but not numerous. Two specimens in particular are worth describing further. One is a tiny sculpted bead made of Dabba marble from Locus 007 (Fig. 21a), which must have required a considerable degree of manual dexterity. The second bead, from Locus 008, is made of copper[4], a rare finding for a pre-Chalcolithic site. The latter bead was made of a thin and narrow copper strip of copper that had been wrapped around a cylindrical armature, which was then removed (Fig. 21b). Because of the gap, it likely was threaded onto a relatively thick cord or leather thong.

Concluding Remarks

When the research effort at Wisad Pools began in 2008, it was our understanding that the site was an enormous necropolis that also entailed other structures such as temporary huts and animal enclosures, and in fact that characterization still holds true. What we had not realized was that so many of the funerary monuments, such as the tomb at W-80, took advantage of collapsed residential buildings to elevate the burials of later visitors to Wisad. Now with the experience of investigating the patterns of corbel construction, it is clear that a significant proportion of the structures at Wisad Pools began their use-life as dwellings, not as mortuary constructions.

The lifestyle at Wisad (as well as among the mesas in the Wadi al-Qattafi; *cf*. Wasse *et al.* 2012) parallels to some degree mobile hunter-pastoralists from other parts of the southern Levant, but there are also

Fig. 17 Slender basalt chopper from W-66 (Photo: G. Rollefson).

Fig. 18 a: Cache of three pestles, a small grinding slab, and a handstone under a corbel stone at the eastern end of the main room of the structure at W-80; b: The three large pestles from the cache (Photos: G. Rollefson).

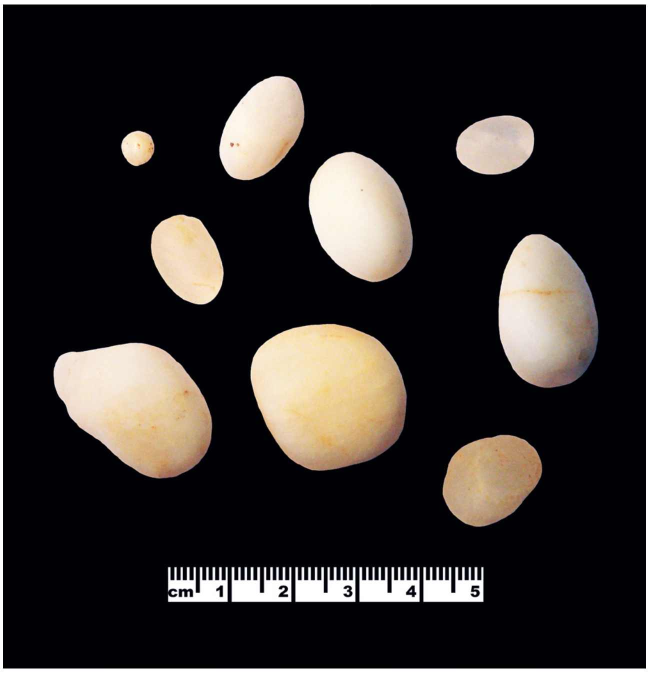

Fig. 20 Selection of gizzard stones from W-80 (Photo: G. Rollefson).

substantial differences – even in the Black Desert – particularly in terms of architecture. Compare, for example, the structures at Late Neolithic Nahal Issaron (Goring-Morris and Gopher 1983; Goring-Morris 1993), the sites of Jebel Naja, al-Ghirqa, and the Burqu' sites in Jordan's panhandle (*e.g*., Betts 1985; Betts *et al.* 2013). To some degree the differences in architecture probably reflect the kinds of material available as building stone, but the differences in roofing are obvious. The corbeled buildings in the Black Desert represent a major investment of labor (as we discovered in moving the large basalt slabs), but once constructed the housing would have served for an extended period of returning to the same locale as seasonal precipitation permitted[5].

One other difference that makes the situations at Wisad Pools and in the Wadi al-Qattafi stand apart from other sites that have been reported from the southern Levant is the possibility of large settlements that verge on true villages, albeit occupied only on a seasonal basis, and perhaps only during some seasons when unpredictable rainfall permitted a return to the permanent houses. A brief visit to southern slope of M-7 in the Wadi al-Qattafi in March 2013 revealed that most of the dozens of structures there were corbeled in a similar fashion to those at M-4 (*cf.* Wasse *et al.* 2012: Figs. 13-14), and none of the surface artifacts in the vicinity reflected a time period other than Late Neolithic; the same situation of numerous small corbeled buildings is beginning to emerge at Wisad Pools. How many of the structures were in use at the same time remains impossible to demonstrate, but simply the large number of similar buildings suggests more than one or two extended families, as the case may have been for such sites as Nahal Issaron and al-Ghirqa.

Fig. 19 Ceramics from the 2013 excavation season. a: Yarmoukian sherd from Locus 022; b: Painted Yarmoukian sherd from Locus 009; c: Yarmoukian jar sherd decorated with herringbone incision and red paint, from W-66 (Photos: G. Rollefson).

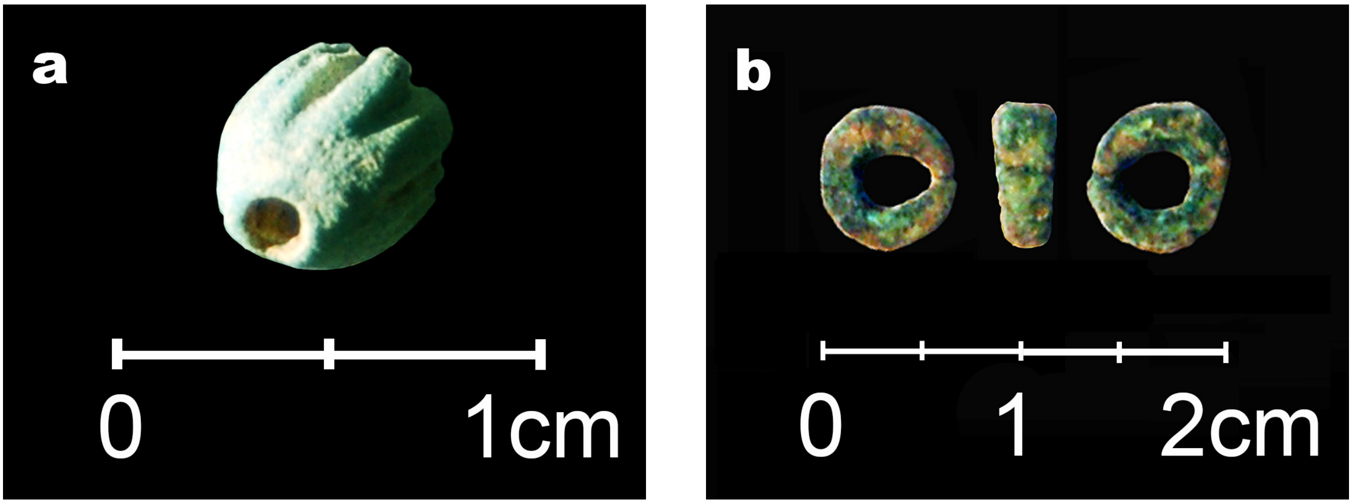

Fig. 21 Beads from W-80. a: miniature sculpted Dabba marble bead from Locus 007; b: copper bead from Locus 008 (Photos: G. Rollefson).

The domination of butchered animal remains reveals the priority these herders had in mind: with all that "free food" on the hoof, dipping into their capital, represented by herds of sheep and goats, was not an economically detrimental necessity; to the contrary, their success at hunting permitted them to increase the herd sizes in order to enjoy the benefits of trade with other groups – particularly farming communities in the west – in terms of lambs and kids, meat of adult ovicaprines, and hair and possibly wool.

The Late Prehistoric period of the eastern badia has begun to show much greater complexity than previously realized, not just in terms of a growing exploitation of the landscapes, but of the social dimensions as well as the environmental aspects of that exploitation. Certainly the contributions by Late Neolithic groups to the developing pastoral scene in the Black Desert have been under-appreciated until now, although their energetic and innovative activities are coming into clearer focus.[6]

Acknowledgements: We wish to acknowledge the cooperation of the Department of Antiquities with our research in the eastern badia, as well as the kind and generous assistance provided to us by the Badia Police at Wisad and at the Badia Police headquarters in Ruwayshid. The American Center of Oriental Research and its director Dr. Barbara Porter continued to be invaluable facilitators of our efforts, for which we are grateful. Students Moira Charrington and Nathaniel Richman of the University of East Anglia and Jordan Brown and Rosemary Hanson of Whitman College gave unstintingly of their energy and dedication, and we admire their contributions under such difficult field conditions. Dr. A.C. Hill provided invaluable wizardry in terms of aerial surveying, and Dr. M. Kersel pitched in during the last week to provide precious expertise in drawing the final plans. Generous contributions to the field budget came from Marolyn and John Hatch, Joy Mundy, Jorge Navarrete, Lynda Wolter, Barbara and Heather James, and Sandra K. Senti, for which we are profoundly thankful. Principal funding came from the Louis B. Perry Summer Research scholarship of Whitman College, Aid for Scholarship and Instructional Development (Whitman College), The Oriental Institute of the University of Chicago, and the deep pockets of the co-directors of the project.

End Notes

[1.] The original floor of the structure was not reached in the time we had at the site, so we will return to Wisad next season to complete the task.

[2] Rectangular/trapezoidal transverse arrowheads are essentially double truncations on blade segments. Rarely is there a blunted edge for hafting.

[3] We would like to thank Prof. Zeidan Kafafi for his insights concerning the potsherds from Wisad.

[4] We are grateful to Dr. Fatma Marii of the Jordan national Museum for her assistance in confirming the material as copper, as well as determining that two of the beads from W-80 were carnelian.

[5] All of the corbeled buildings at the mesas in Wadi al-Qattafi and at Wisad share similar patterns of collapse, and all of the recognizable corbeled buildings have, in fact, collapsed. One wonders if there might have been a strong earthquake at some time during the Late Neolithic that resulted in widespread destruction of these otherwise relatively stable buildings.

[6] As this issue goes to press, we have just located another major outcrop of Dabba marble about 7.5 km from Mesa 4 in the Wadi al-Qattafi (Wasse *et al.* 2012) and about 45 km WSW from Wisad.

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A Halafian Ritual Deposit from Tell Tawila[1]

Jörg Becker and Tobias Helms[2]

Introduction

The site of Tell Tawila is located about twelve kilometres south of Tell Chuera and was excavated during two field seasons in autumn 2005 and spring 2006. The excavations were carried out as a joint German-Syrian mission within the framework of the Tell Chuera regional project. This project is directed by J.-W. Meyer (Univ. of Frankfurt) and aims towards a reconstruction of the settlement history of the Wadi al-Hamar region from the Neolithic to the early Islamic times. The archaeological exploration of Tell Tawila focussed on the Halaf and Ubaid periods (6th to 5th millennium B.C.), and were supported by the Gerda Henkel-Stiftung (Düsseldorf).

The region of the Wadi al-Hamar is part of the northern steppe between Balikh and Khabur and rises about 350-430 metres above sea level. Annual rainfall reaches about 250 mm and allows dry-farming, yet fluctuations in precipitation challenge opportunities to sustain sedentary ways of life. Of the approximately 100 sites, which represent the settlement development in the Wadi al-Hamar region through the ages, about twenty sites belong to the Halaf and eight to the Ubaid cultures. Typically they are mostly small sites (< 1 ha) settled for a short time or just seasonal. However Tell Tawila, together with Agila-South and Tell Chuera, seems to be a larger village of the Halaf period (Fig. 1).

The site of Tell Tawila measures about 400 x 300 metres and rises *ca.* 9 metres above the surrounding

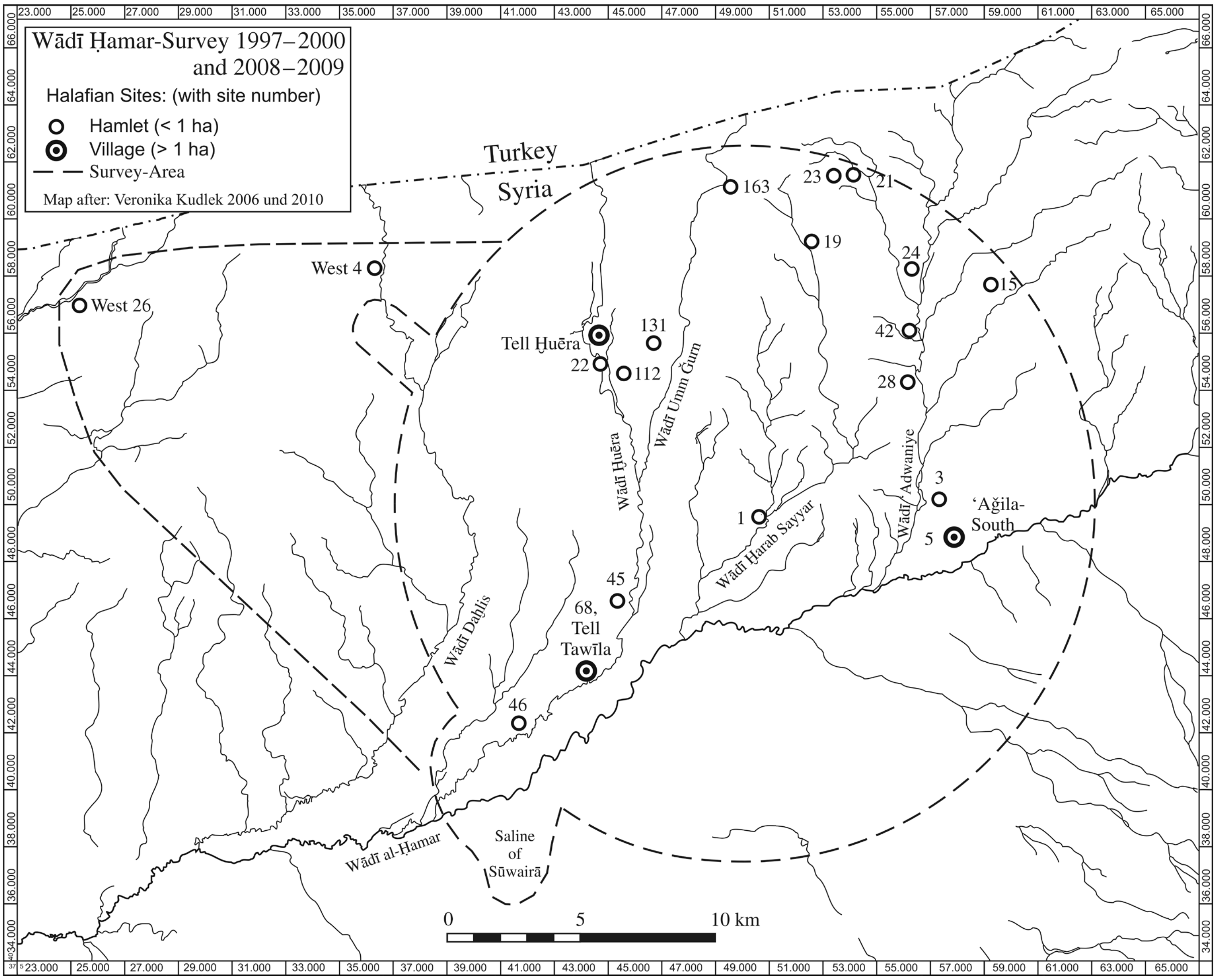

Fig. 1 Map of the Wadi al-Hamar / Tell Chuera region with Halafian settlements.

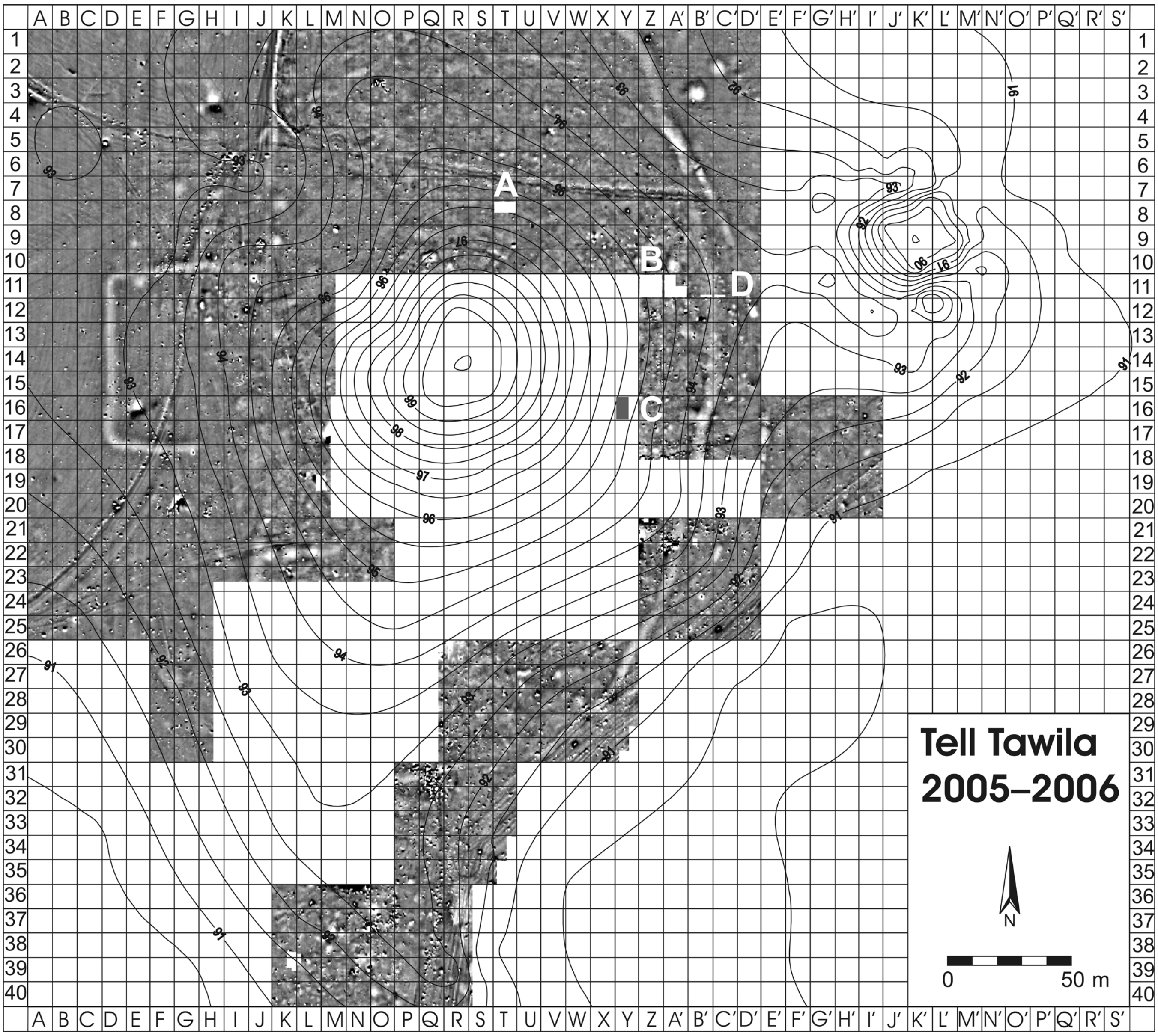

Fig. 2 Topographic plan of Tell Tawila with the geomagnetic prospection.

fields. During the Wadi al-Hamar survey from 1997 to 2000 more than a thousand Halaf sherds were recovered which show a wide distribution; in contrast just *ca.* 50 Ubaid sherds were collected, mostly from the eastern part of the tell. Later periods can be dated in the local Late Chalcolithic period, the EBA I, early Iron Age and early Islamic times (Fig. 2).

During the first campaign, in 2005, a trench on the northern (Area A) and on the eastern slope (Area B) respectively were opened. In spring 2006 a new area on the eastern slope (Area C) was excavated and a sounding east of Area B was opened (Area D), while the work in Areas A and B could be finished.

The earliest occupation levels in Area A were observed in a very small sounding resting on virgin soil (Levels A 6 and A 5). The ceramics from that operation can be paralled with the early Halaf levels at Tell Sabi Abyad, *i.e.* starting *ca.* 5900 B.C. On a larger scale some round buildings (*tholoi*) were excavated in the following Level A 4, with an inner diameter of about 5 to 6 metres. Only 15 cm of the 30 cm wide walls were preserved. According to the ceramic material theses structures can be dated to the beginning of Halaf IIa period. After the next Level A 3, also Halaf IIa in date, which included some badly preserved, presumably rectangular structures this area seems to have become an open space.

Contemporary settlement structures could be found in Area C but were mostly destroyed by later activities. Early to middle Halaf pottery in Area C was mixed with a great amount of local Late Chalcolithic pottery and material of later periods. Also, installations of these later periods were set in older Halaf structures, which makes a clear seperation of building levels difficult, but in Level C 4 a *tholos* with *dromos* could be partly uncovered.

The best preserved Halaf architecture comes from Area B on the eastern slope. Here, about 40 cm below the surface, five building levels of the early to middle Halaf (Halaf Ia-IIa) phases could be excavated. In com-

Fig. 3 Tell Tawila - Area B (Level B 5 - B 3).

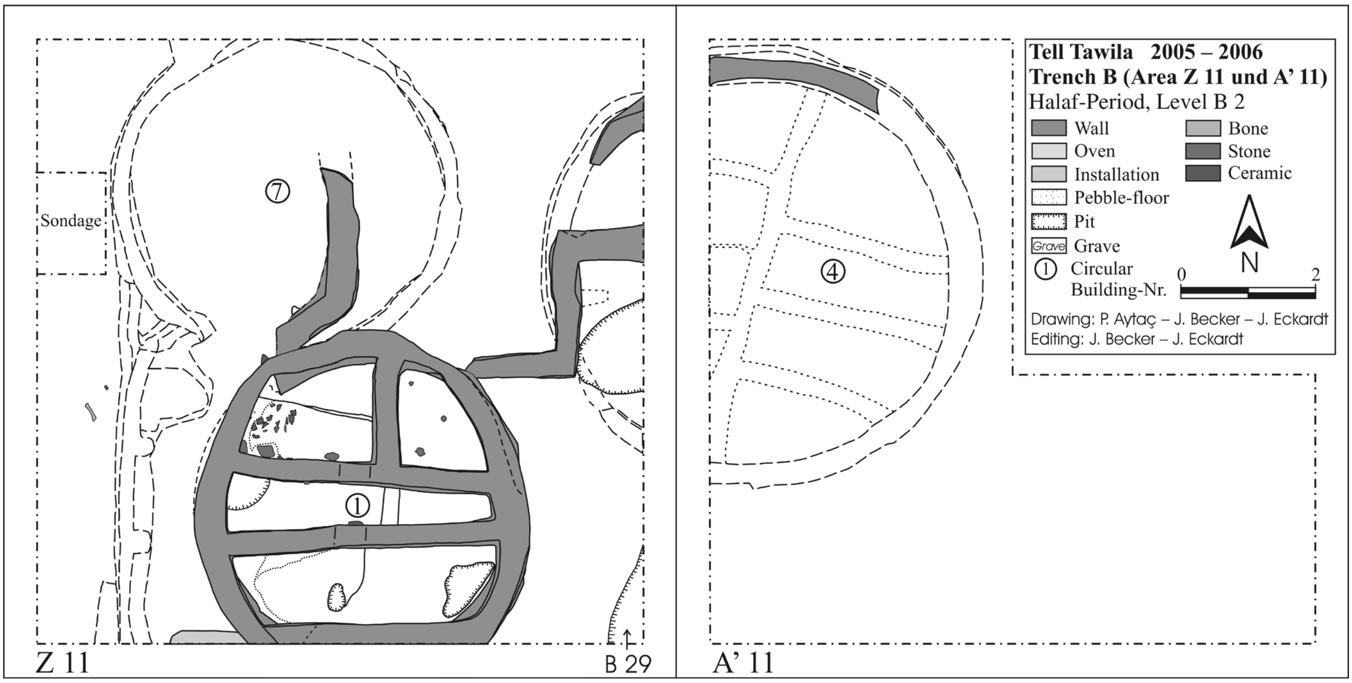

Fig. 4 Tell Tawila - Area B (Level B 2).

parison of the Areas A-D the Halaf settlement in Tell Tawila is the oldest occupation period and is resting on eithter a small natural terrace or hillside.

A good example of the Halaf houses comes from Levels B 4 to B 2 with great round buildings of the *tholos* type (Fig. 3). The 0.5 metre wide walls were made of mudbrick and stand to a height of about 0.8 to 1.3 metres; the inner diameter ranges from 4.5 to 5.7 metres. The eastern Building No. 2 is divided by smaller walls into eight rooms. The entrance into this building is unclear, but in the later levels it lay to the south. West of Building 2 lies Building 3; the northern part of this single room is occupied by a double oven, which was renewed in the next Level B 3. Characteristic of all these bigger round buildings are the very well made and levelled floors. From the older Level B 5 onward these round buildings were restricted to the east and west walls oriented north-south. A small passage way or small alley follows along these outer walls in each case. In the north a wall between Building 2 and 3 can be seen as a kind of divide. It seems that both *tholoi* can be interpreted as strongly connected areas maybe for a family with living and working areas and encircled by an enclosure. In the next Level B 3 the rooms of Building 2 were cleaned and filled up to a height of about 1 metre with ashy soil. On top of the older walls a new *tholos* of the same size was erected (Building 4), in which also the inner walls follow more or less the underlying, *i.e.* older ones. The different levels of this new building and the area directly south were levelled by a stairway with five steps. Building 3 was modified (therefore counted as Building 7) and on top of the old double oven a new oven was built on a higher platform. In both houses the entrance is to the south. Between these entrances the area was used for working activities with water and fire and for waste disposal. In the following subphases above the staircase a narrow path made of pebbles led to the entrance of Building 4; next to this path some small ovens of the *tannur* type were built over the steps of the stairway. Between Buildings 4 and 7 a small wall was now built to retain the rubbish area to the south.

In the latest Halaf Level B 2 one smaller *tholos* (Building 1) was built on these ashy layers and later partly sunk into this filling. While Building 4 was still in use, Building 7 was filled with ashy soil and this was partly overbuilt by some rectangular structures connected with *Tholos* 1. This smaller round Building 1 seems to have a storage function with some small working place, because these rooms are too small for living. East of Building 1 an ashy pit was found, in which the assemblage of a ritual deposit was found (Fig. 4).

The ceramics of Area B can be dated to the Halaf stages Ia-IIa (*ca.* 5900-5550 B.C.)[3] and finds for the younger Level B 4-2 good parallels in sites like Shams ed-Din, Tell Damishliyya, Tell Halaf, Tell ‘Aqab, Yarimtepe II/III and Arpachiyah (TT 10-7) (for the phasing of the Halaf culture see *i.e.* Campbell 1992: 61-78 or Nieuwenhuyse 2000, 155-158; see for example Fig. 5). Also the architecture has good parallels for example in Tell Sabi Abyad or Yarimtepe III (Akkermans 1993: 63 f. fig. 3.12; Merpert and Munchaev 1993: 170 fig. 9.3 and 188 fig. 9.18).

In general the oldest Halaf phases at Tawila - like some other sites in the Wadi al-Hamar region - starts in early Halaf times. No older Proto-Halaf levels or characteristic pottery could be observed. Beside some smaller hamlets or camps, Tell Tawila seems to be a larger settlement (max. size 2 ha), comparable *i.e.*

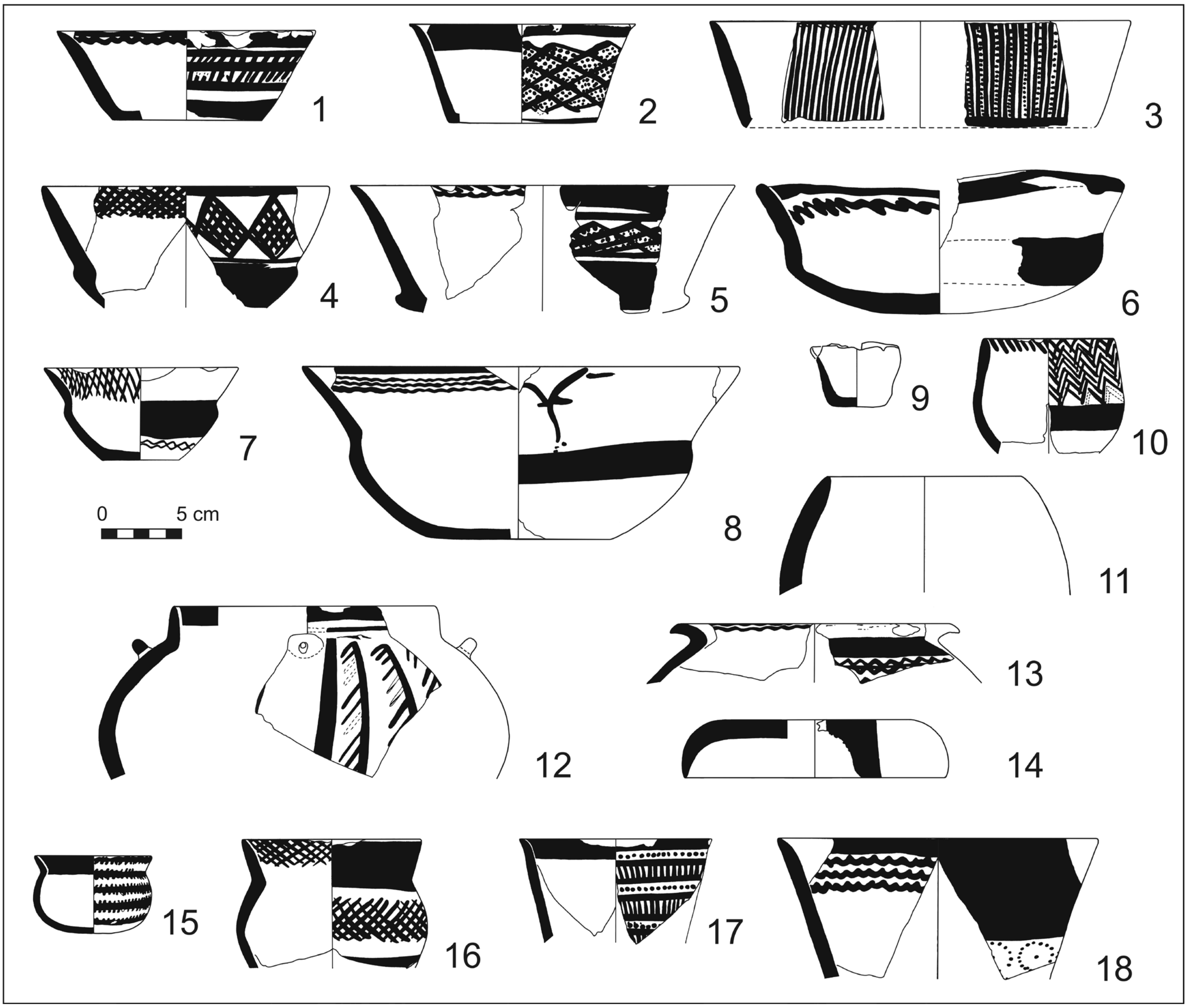

Fig. 5 Tell Tawila – Examples of Halafian pottery from Area B (No. 1-3 = Level B 5; 4-6, 15-18 = Level B 4; 7,10-14 = Level B 3 and 8-9 = Level B 2).

Fig. 6 Tell Tawila – Mace-head and lithic assemblage from the ritual deposit in area B (Level B 2).

with Tell Sabi Abyad. The animal bones and botanical remains are currently under study[4], but initial results indicate a mix of agriculture and animal husbandry with some good evidence for hunting, especially on onager and gazelle. The role of hunting (for Area B in a range from *ca.* 10-30%) is also indicated through the great amount of more than 300 ceramic scrapers, usually interpreted as tools for working on animal skins (for Umm Qseir see Tsuneki and Miyake 1998: 112-115 Fig. 49 and for Yarimtepe III see Merpert and Munchaev 1993: 152 Fig. 8.21).

During the following northern Ubaid period Tell Tawila was just a small hamlet and for the Wadi al-Hamar region in general a subtle shifting of settlements from south to north can be observed in that time. To ascribe this phenomenon exclusivly to an impact of climate change, should be looked upon very sceptically. It has to be kept in mind, that the Halaf-Ubaid transition is one of the more poorly understood phases in Syrian and north Mesopotamian archaeology. Observations from the neighbouring Balikh- and Khabur regions (Nieuwenhuyse 2000: 189-191 with Fig. 77-78 for the Khabur region and Trentin 2010 for the Balikh valley) indicate that the relocation of sites might reflect general changes of a particular "late Neolitic way of life" which was charaterized by a higher degree of mobility and the existence of small, seasonal or short-lived sites. Some of these sites – like Tell Tawila – were obviously abandoned for some hundreds of years whereas more favourable sites in the north were inhabited on a long-term basis by populations which relied on agricultural production and animal husbandry. For the Tell Chuera region, the northern part of the Wadi al-Hamar region and maybe Chuera itself it appears that the Ubaid period sites were more intensively settled for some centuries. Another good example are the massive Ubaid levels from Tell Hammam et-Turkman in the Balikh valley with about 15 metres of deposits (Akkermans and Schwartz 2003: 154-180, especially 159-168 for the settlement structure in different regions of northern Syria).

Brief Remarks on the Lithic Industry of Tell Tawila

The excavations at Tell Tawila revealed a notable number of lithic artefacts. The lithic assemblage includes chipped artefacts as well as some ground stone specimens. So far only the lithics from Area B have been examined by means of a macroscopic analysis. The vast majority of the finds dates to the late Neolithic, *i.e.* the middle and late Halaf phases. Only a small number of lithic pieces from the uppermost strata might belong to the local Late Chalcolithic or EBA I period.

The sample consists of 745 chipped (Fig. 7) and 61 groundstone specimens. The latter include for example

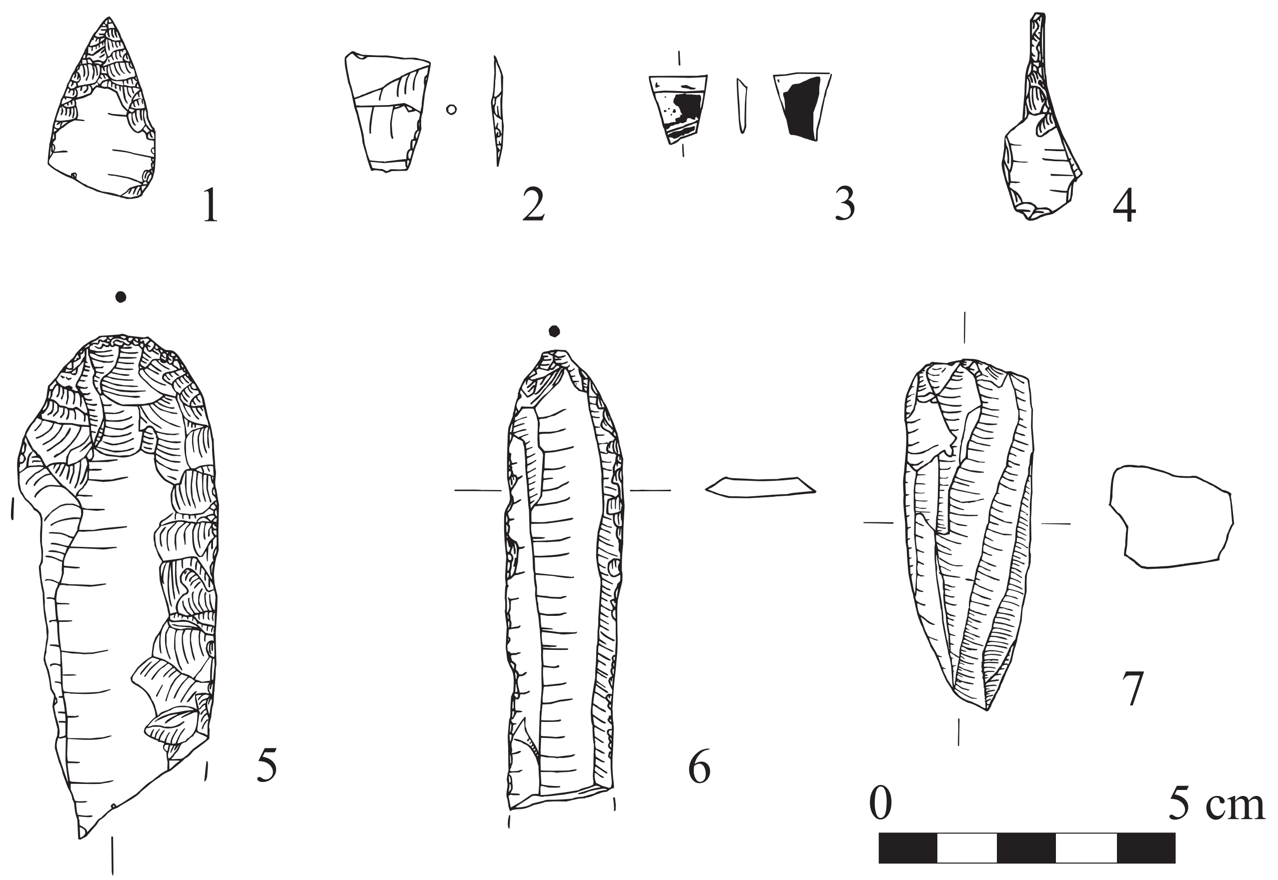

Fig. 7 Example of lithic artefacts from Tell Tawila. 1: point with unifacial retouch, 2: transverse arrowhead (Find No. 106-8), 3: trapeze (Find No. 106-3), 4: borer, 5: obsidian ‚knive', 6: blade with lateral retouch, 7: obsidian blade core.

a small polished celt, fragments of stone vessels, hammerstones, pestles, a shaft straightener, mostly fragmented grinding slabs, and some smoothed and flat pebbles, which may have functioned either as polishing tools or palettes. The most outstanding ground stone tool uncovered at Tell Tawila, an elaborately decorated macehead, which constitutes an important component of the assumed ritual deposit, will be discussed in detail below.

Among the chipped stones flint makes up 59% and obsidian 40%[5]. Most flint pieces feature a fine grained texture and are of greyish or brownish colour, although other tones occur as well. A couple of flint artefacts were for example manufactured from honey coloured tabular flint with auburn inclusions. Judging by the texture of cortex which remained on some of the artefacts, raw material procurement involved the use of river pebbles (smooth cortex) as well as of primary flint (chalky, rough cortex). Primary sources of flint have not been identified in the Chuera region so far, which implies that lithic raw material was imported.

Regarding the obsidian, five varieties could be distinguished by examining the colour of the pieces in transmitted natural light. Of the obsidian 60% is of green colour (Group 1), 26% appears grey (Group 2), and 12% opaque black (Group 3). Sporadically colourless and therefore totally translucent (Group 4) and brown obsidian (Group 5) could be recorded. Source provenance by geochemical analysis is planned. It seems most likely that Group 1 and Group 3 derived from east Anatolian obsidian sources (Bingöl, Nemrut Dağ), whilst the grey obsidian of Group 2 might have been imported from central Anatolia (Campbell 1992: 141; Schmidt 1996: 17; Özbal and Gerritsen *et al.* 2004: 56). The quantity of obsidian indicates that it played an integral role for the chipped stone industry (Campbell 1992: 143). Like other late Neolithic settlements of northern Syria the local Halaf community participated in a long-distance exchange network, which enabled a supply with this superior lithic resource. That the prehistoric inhabitants of Tell Tawila valued the volcanic glass beyond its material properties for the manufacture of efficient cutting tools is highlighted by the grave assemblage of a Halaf period inhumation, which was also uncovered in Area B. Besides a complete pottery vessel and stone bowl the shaft grave yielded a perforated obsidian flake that appears to be polished by wear and obviously represents no cutting device but some kind of personal adornment[6] (Becker *et al.* 2007: Abb. 7, 9-10).

According to the recorded debitage, primary production of flint and obsidian artefacts was carried out on site. The flint assemblage includes a wide range of (macroscopically) unmodified artefacts, *i.e.* decortification and part-cortex flakes, freshly struck flakes and blades, different kinds of flake cores, unidirectional and multidirectional blade cores, core tablets, core flanks, burin spalls and shatter. Consequently all major stages of the lithic reduction process were observable amongst the flint artefacts. As expected, the obsidian industry includes a considerably smaller proportion of unmodified debitage (*ca.* 20%). Except for one obsidian blade which shows traces of weathering on its dorsal surface, there is no further evidence for the initial and early stages of core reduction. Nevertheless four obsidian cores and core fragments as well as a core flank and a range of unmodified blades, flakes and shattered pieces are found within the assemblage. Based on this observation it seems conceivable, that the obsidian reached Tell Tawila in the form of pre-worked cores and blanks. Primary production of flint and obsidian concentrated on the manufacture of blades. 48% of the flint and 86% of the obsidian artefacts fall into the blade category.

52% of all flint artefacts and 80% of all obsidian artefacts are "tools" and were categorized with a preliminary type list (any chipped pieces with retouch or evidence of use were considered tools). The tool component is dominated by laterally retouched blade segments, but other types occur as well. The sample also includes two pressure flaked points, burins, unretouched and retouched trapezes (transverse arrowheads), notched pieces, drills/perforators, scrapers and fragments of tabular scrapers, crescent shaped elements and backed crescents, glossed elements, fragments of two large obsidian 'knives', truncated blade segments, retouched flakes and chunks, a splintered piece, combinations, and a single corner thinned obsidian blade.

A Remarkable Lithic Sub-Assemblage

This article focuses on a lithic sub-assemblage that was recovered from a small and shallow ash pit (feature B 29, *cf.* Fig. 4). The pit was located in the southeastern part of Area Z 11. Its filling consisted of ash and fine earth. Stratigraphically the feature belongs to the latest Halaf Level B 2 and can therefore be dated to the end of period Halaf IIa. Within it was found an array of lithic artefacts (Fig. 6). Besides the already mentioned macehead (Find No. 105), the pit filling yielded a transverse flint arrowhead (Find No. 106-8, Fig. 7) and seven simple trapezes made from flint and obsidian (Find No. 106-1 to 106-7). From our point of view, the latter should also be interpreted as trapezoidal projectile points, because one of the unretouched trapezes (Find No. 106-3, Fig. 7) exhibits traces of adhesive (bitumen) that clearly imply hafting onto an arrow shaft.

In addition the assemblage included a long flint blade (Find No. 106-9), which appeared to be cracked through the impact of heat, and several segments of obsidian blades (Find No. 106-12 to 106-25). Some blades exhibit lateral retouch (Find No. 106-18, 106-22, 106-25) or truncation (Find No. 106-14). The others are either basic forms or fragments of blades without edge retouch. More detailed information on the artefacts from the pit filling is given in the catalogue at the end of this article. The catalogue provides a brief morphological description of the finds as well as some basic metrical data.

Doubtlessly, the macehead constitutes the most conspicuous element of the ash pit-assemblage. It was found in a fragmented state, but could largely be reconstructed. Scorch marks reveal that the macehead had obviously been exposed to fire at some point. The item was either destroyed by the impact of fire, kinetic energy or most likely by a combination of both. The weapon had been manufactured from greyish stone. Its original weight is about 350 g, its height 7.15 cm. It features a rounded, biconical shape and a biconical drill hole. Around the shaft-hole four incised concentric lines can be seen at both ends. Just above its widest diameter are four knobs. A similar decorated macehead from Halaf related deposits has been uncovered at the site of Tell Kurdu in southeastern Turkey (Özbal and Gerritsen *et al.* 2004: 61, fig. 15:6). Another comparable piece was unearthed at Tell Halaf in northeastern Syria (von Oppenheim and Schmidt 1943: 113, pl. XXXVI: 25, CXII: 19), however this object derives from a rather vague stratigraphical context. Although it resembles the macehead from Tawila in terms of its decoration, it is much smaller, measuring only 4.5 cm in height. Basically it represents a miniature macehead. Schmidt assigned it to what he called '*Zierkeulenköpfe*' ('ornamental maceheads'). Another parallel came from the old investigations at Tilkitepe (Korfmann 1982: pl. 19:3). Although the macehead from Tell Tawila would have been an effective weapon, neolithic maceheads, especially such lavishly decorated pieces, are often considered to be primarily objects of ritual and symbolic meaning (Özbal and Gerritsen *et al.* 2004: 61).

The small collection of trapezoidal arrowheads included specimens of variable size that were made from obsidian and different kinds of flint. Taking into account that one of the trapezes still displays the impression of an arrow shaft one can conclude that the cache of arrowheads found in the ash pit actually represents the remains of a whole bundle of arrows.

In the past it has been brought forward that unmodified trapezes should not be regarded as transversal projectile points (Korfmann 1972: 188 f.). Yet it seems that at Tawila trapezes with and without truncated break planes were both used mounting arrows[7]. Obviously the sling was the preferred missile weapon of the Halaf period, as numerous finds of baked clay sling stones from various Halaf contexts indicate. Clay sling missiles usually outnumber the few lithic projectile points that are occasionally encountered at Halaf sites. Nevertheless bows were also known and used by the late Neolithic hunters (Azoury and Bergmann 1980; Miller *et al.* 1982; Collon 2005: 462)[8]. Though the occurrence of transverse arrowheads before the fourth millennium B.C. has been disputed (Korfmann 1972: 187, 190 f.) excavations of the last decades produced some evidence for their application throughout the late Neolithic/ Halaf period[9]. By now, the cache from Tell Tawila contributes another example for the use of this kind of chisel-ended arrowhead, which did not serve as 'bird arrows' as Woolley and others have supposed[10], but as long-range missiles (Korfmann 1972: 190). Except for one specimen (Find No. 106-3) all flint trapezes are blackened and thus were most likely affected by fire.

Discussion

The artefacts from the ash pit do not create the impression of a random assemblage but imply a close interrelation. As we see it, the lithic sub-assemblage constitutes an intentional deposition of a meaningful repertoire and not just a quantity of secondary refuse (Schiffer 1987: 58 f) that came to lie in a rubbish pit. In fact the assemblage reveals a pattern, in so far as it seems to represent a complete inventory, including a close combat weapon (mace), elements of archery equipment (evidence for a bundle of arrows), a long flint blade and a choice of 'valuable' obsidian blades, that may have served as implements or blanks for the fabrication of further projectile points. Furthermore the decorated macehead should be regarded as a 'special item', within the socio-technical system of the Halaf period. If certain artefacts were employed for symbolizing rank or communicating matters of prestige during the late Neolithic this object would have certainly been a strong candidate[11]. Looking at the very particular selection of artefacts one might get the impression that it refers to activities of a hunter or warrior.

If one agrees on the assumption that the finds from the ash pit are not alluding to profane waste disposal, the question arises what else led to the depositional process. Utilitarian hoarding of equipment can be ruled out since the macehead and the longer flint blade had been broken and all flint artefacts seem to be affected by fire. Since no human remains, whether bones nor evidence for a cremation, were observed within the pit, we do not have any positive indication of a funerary context either. Taking this into account we argue that the discrete ash pit assemblage possibly represents a ritual cache (Schiffer 1987: 79 f.) and that the condition of the artefacts might eventually suggest an act of deliberate destruction, *i.e.* ritual breakage (Oates 1978: 119) or 'killing' of objects[12].

This hypothesis is further strengthened by a number of comparable Halaf assemblages from Tell Sabi Abyad and Yarimtepe II that feature peculiar items which had been laid inside small pits:

At Tell Sabi Abyad the torso of a painted female clay figurine was found in an ash-filled pit that dates to the Halaf period (Akkermans 1987: 33).

At Yarimtepe II a small pit in section 19-a yielded fragments of a painted anthropomorphic clay vessel and a range of other objects, including a broken alabaster vessel, a stone seal and fragments of a simple pottery vessel (Merpert and Munchaev 1987: 27; Garfinkel 1994: 172).

Another pit in section 28-a contained fragments of a zoomorphic pottery vessel, a complete alabaster bowl and pieces of pottery (Merpert and Munchaev 1987: 27; Garfinkel 1994: 172).

In a cache under *tholos* LXVII a fragment of a clay figurine, a copper seal, fragments from a pottery vessel, three transverse arrowheads, four stone and five clay spindle whorls and two stone pendants were uncovered (Merpert and Munchaev 1987: 22 f.; Garfinkel 1994: 172 f.).

Merpert and Munchaev, the excavators of Yarimtepe regarded the caches found there as '*evidence for ritual ceremonies'* (Merpert and Munchaev 1987: 27). Garfinkel, who conducted a major survey on the earliest evidence for ritual burial of cult objects throughout the Near East, included the Halafian caches from Yarimtepe II in this category. The ritual burial of items of cult significance was frequently practiced throughout the Near East during the later prehistoric and historic periods. Damaged or broken ceremonial paraphernalia that were about to be replaced were not just tossed away, but discarded in a ritualized manner. Following Garfinkel '*the accumulation of worn-out and unwanted cultic items is a natural process which takes place in every religious community. In archaeological excavations, concentrations of such damaged items have been discovered inside pits'* (Garfinkel 1994: 180). Moreover he argued that the '*ritual institution*' can be traced back to the Pre-Pottery Neolithic (Garfinkel 1994).

Although Garfinkel has criticised explanations that ascribe damaged ceremonial gear to acts of 'ritual breaking' (Garfinkel 1994, 180) it has to be kept in mind that the deposit discovered at Tell Tawila could have served other purposes than the respectful sorting out of 'special items'. Numerous tiny fragments belonging to the burnt long flint blade (Find No. 106-9) and the macehead suggest that the process of destruction took place either inside the pit or in its immediate vicinity. This observation contrasts the image of a deposition of accidentally damaged or objects worn out overtime and instead supports the idea of deliberate breakage. Therefore the formation process of the ash pit assemblage could have been linked just as well to other ritual practices, *e.g.* a rite of passage, a dedicatory act (offering) or sympathetic magic. While it is tempting to associate the ash pit assemblage with a social persona (hunter/warrior) represented in a ritual context, the exact meaning of the ritual process remains a matter of speculation.

Summary

The lithic sub-assemblage yields persuasive evidence for a deposition that was most likely produced in a ritual context. It could be shown that the feature is not an isolated phenomenon, but resembles cache-type depositions of broken 'special items' that have been occasionally encountered at other Halafian sites. The formation process of the observed archaeological feature might indicate the ritual burial of a cult object (macehead with accompanying implements), as Garfinkel has supposed in connection with the depositions at Yarimtepe II, but from our point of view other reasons for ritual discard are also conceivable. Besides its importance for the regional chronological framework of the Halaf period, the settlement history of the Wadi al-Hamar region and the examination of the socio-economic base of the late Neolithic settlement the excavations at Tell Tawila also cast a spotlight on the ritual practices of a local Halafian community. In this respect they contribute towards a better understanding of this important aspect of everyday life.

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Endnotes

[1] For a detailed field report on the excavation at Tell Tawila see Becker *et al.* 2007. For a first assessment of the Halaf and Ubaid period sites in the Wadi al-Hamar region times see Becker 2004: 97 ff. The final report about stratigraphy, architecture, pottery and small finds from Tell Tawila will be published in Becker *in prep.*

[2] We thank David Tucker M.A. for improving the English manuscript.

[3] The sequence in Area B is confirmed through four radiocarbon dates from the Levels B 6 and B 4-2 giving a time range from *ca.* 5950-5550 cal. B.C.; *cf.* Becker (in prep.).

[4] E. Vila (Lyon – Zoology) and S. Riehl (Tübingen – Botany). A first overview for the zoology is given by E. Vila in Becker *et al.* 2007: 253-258: here an important and increasing role of hunting in the Halafian levels at Tell Tawila can be shown.

[5] One percent of the flaked stones consist of raw materials that appeared indefinable at the time of the data acquisition.

[6] Obsidian ornaments have repeatedly been found on various Halaf sites. For a brief summary on neolithic obsidian ornaments see Schoop 1995: 67.

[7] Altogether 14 trapeze-microliths were recovered around Area B. Four of them feature a perpendicular truncation. Apart from retouch the trapezes can be grouped by weight. Ten trapezes are extremely light (weight: *ca.* 1 g), four are heavier (weight: 2-3 g). Area B also yielded three conventional arrowheads that taper to a point. Two of which resemble tips of "Byblos points".

[8] The earliest pictorial evidence of a Halaf archer stems from Arpachiyah. A late Halaf painted vessel shows a hunter readying bow and arrow to shoot at an approaching wild animal (Hijara 1978: 125 f., fig. Ib).

[9] Transversal arrowheads from Halaf deposits were for example found at Shams ed-Din Tannira (Miller *et al.* 1982: fig. 1), Yarimtepe II (Merpert and Munchaev 1987: 27, fig. 11:1, 11:2) and Tell Kurdu (Özbal and Gerritsen *et al.* 2004: 59, fig. 11:14). A cache of 56 tiny trapezoidal shaped points that was recovered from Level 5 at Tell Sabi Abyad dates to the transitional Neolithic to Halaf period (Copeland 1996: 292, 306 f., fig. 14.17 nos. 1-10). Presumably transverse arrowheads may be underrepresented in Halafian lithic assemblages, because they '(…) *could easily mistaken for broken flint blades or flakes, and remain unrecorded, as they do not resemble conventional arrowheads*' (Collon 2005: 462). Chisel-ended arrowheads from post-Halafian contexts, especially from the Uruk and Early Dynastic periods, are more abundant (Conolly 2003: 462 f.). In Syria the transverse arrowhead was still in use during the Middle Bronze Age (Miller 1983).

[10] Various experiments have shown that arrows with a transverse cutting edge made of stone can inflict severe wounds. They should therefore not be seen as arrows for hunting birds but larger prey (Miller *et al.* 1982: 53; Sudhues 2004).

[11] Since about 3000 B.C. maces served as symbols of power, command and ceremonial devices throughout Mesopotamia. They were employed as votive and grave goods (Korfmann 1976 - 1980). It is often assumed that maceheads of preceding periods can also be associated with symbols of rank and prestige.

[12] Renfrew and Bahn (2006) have proposed a list of archaeological indicators, by which the occurrence of ritual may be recognized. The state of the artefacts from the ash pit matches one of their criteria: *'Other material objects may be brought and offered (votives). The act of offering may entail breakage and hiding or discard'* (Renfrew and Bahn 2006: 417).

Catalogue of finds from feature TAW 05 - B 29 - Z 11

Find No. 105-1: **Macehead**, material: greyish ground stone (marble?), burnt, object could be reconstructed (90%) from numerous fragments, rounded biconical shape, smoothed surface, features four knobs just above its widest diameter, biconically bored perforation with four incised concentric lines at both ends, height: 7.2 cm, max. diameter: 7.2 cm, perforation diameter (top): 2.0 cm, perforation diameter (bottom): 2.3 cm, weight: 333 g.

Find No. 106-1: **Trapeze microlith**, material: obsidian, colour: greenish black, translucent, basic form: medial segment of a blade, max. length: 1.2 cm, max. width: 1.6 cm, max. thickness: 0.2 cm.

Find No. 106-2: **Trapeze microlith**, material: obsidian, colour: greenish black, translucent, basic form: medial segment of a blade, max. length: 1.1 cm, max. width: 1.2 cm, max. thickness: 0.3 cm.

Find No. 106-3: **Trapeze microlith**, clearly discernable traces of adhesive (probable bitumen) imply mounting as transversal arrowhead, material: flint, colour: brown, translucent, basic form: medial segment of a blade, max. length: 1.0 cm, max. width: 1.1 cm, max. thickness: 0.2 cm.

Find No. 106-4: **Trapeze microlith**, material: obsidian, colour: greenish black, translucent, basic form: medial segment of regular blade, max. length: 1.1 cm, max. width: 1.1 cm, max. thickness: 0.3 cm.

Find No. 106-5: **Trapeze microlith**, material: obsidian, colour: greenish black, translucent, basic form: medial segment of regular blade, max. length: 0.9 cm, max. width: 1.0 cm, max. thickness: 0.2 cm.

Find No. 106-6: **Probable fragment of trapeze microlith**, material: flint (possibly burnt), colour: grey, opaque, basic form: medial segment of regular blade, max. length: 1.2 cm, max. width: 0.9 cm, max. thickness: 0.2 cm.

Find No. 106-7: **Trapeze microlith**, material: flint (possibly burnt), colour: grey, opaque, basic form: medial segment of regular blade, max. length: 1.4 cm, max. width: 1.9 cm, max. thickness: 0.9 cm.

Find No. 106-8: **Truncated trapeze microlith/transverse flint arrowhead** (proximal and distal), material: flint (possibly burnt), colour: greyish black, opaque, basic form: medial segment of a blade, max. length: 0.9 cm, max. width: 1.6 cm, max. thickness: 0.2 cm.

Find No. 106-9: **Proximal blade fragment**, material: flint (burnt, cracked through impact of heat, specimen could be refitted for the most parts), colour: greyish black, opaque, max. length: 8.2 cm, max. width: 3.0, max. thickness: 0.7 cm.

Find No. 106-10: **Angular shatter**, probably belongs to *No. 106-9*, material: flint (burnt), max. linear dimension: 2.1 cm.

Find No. 106-11: **Angular shatter**, probably belongs to *No. 106-9*, material: flint (burnt), colour: greyish black, opaque, max. linear dimension: 2.2 cm.

Find No. 106-12: **Medial blade segment**, material: obsidian, colour: greyish, translucent, max. length: 2.3 cm, max. width: 1.1 cm, max. thickness: 0.2 cm.

Find No. 106-13: **Medial blade segment**, material: obsidian, colour: greyish, translucent, max. length: 4.0 cm, max. width: 1.5 cm, max. thickness: 0.2 cm.

Find No. 106-14: **Medial blade segment**, material: obsidian, colour: greenish, translucent, max. length: 4.2 cm, max. width: 1.2 cm, max. thickness: 0.2 cm.

Find No. 106-15: **Proximal blade fragment**, material: obsidian, colour: greyish, translucent, bulbar scar, max. length: 6.9 cm, max. width: 1.2 cm, thickness at the bulb of force: 0.3 cm, max. thickness: 0.3 cm.

Find No. 106-16: **Truncated piece**, material: obsidian, colour: greyish, translucent, basic form: medial segment of a blade, max. length: 1.6 cm, max. width: 1.2 cm, max. thickness: 0.2 cm.

Find No. 106-17: **Proximal blade fragment**, material: obsidian, colour: greyish, translucent, max. length: 3.3 cm, max. width: 1.3 cm, max. thickness: 0.5 cm.

Find No. 106-18: **Lateral retouched blade**, fine clustered retouch on dorsal left margin, material: obsidian, colour: greyish, translucent, basic form: medial segment of a blade, max. length: 4.6 cm, max. width: 1.5 cm, max. thickness: 0.4 cm.

Find No. 106-19: **Medial blade segment**, material: obsidian, colour: greenish, translucent, max. length: 1.1 cm, max. width: 0.9 cm, max. thickness: 0.2 cm.

Find No. 106-20: **Proximal blade fragment**, material: obsidian, colour: greyish, opaque, max. length: 0.8 cm, max. width: 1.3 cm, max. thickness: 0.3 cm.

Find No. 106-21: **Proximal blade fragment**, material: obsidian, colour: greenish, translucent, bulbar scar, max. length: 2.2 cm, max. width: 1.4 cm, thickness at the bulb of force: 0.2 cm, max. thickness: 0.2 cm.

Find No. 106-22: **Lateral retouched blade**, subtle retouch on all dorsal and ventral margins, material: obsidian, colour: black, opaque, basic form: medial segment of a blade, max. length: 0.8 cm, max. width: 1.3 cm, max. thickness: 0.3 cm.

Find No. 106-23: **Medial blade segment**, material: flint (possibly burnt), colour: darkgrey, max. length: 0.7 cm, max. width: 1.7 cm, max. thickness: 0.3 cm.

Find No. 106-24: **Medial flake segment** (possibly fragment of regular blade), material: flint possibly burnt), colour: darkgrey, black, max. length: 1.1 cm, max. width: 1.0 cm, max. thickness: 0.2 cm.

Find No. 106-25: **Lateral retouched blade**, clustered retouch on dorsal margins, subtle retouch on ventral margins, material: obsidian, colour: black, opaque, basic form: proximal fragment of a blade, bulbar scar, max. length: 7.4 cm, max. width: 1.7 cm, thickness at the bulb of force: 0.3 cm, max. thickness: 0.4 cm.

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Establishing a Radiocarbon Sequence for Göbekli Tepe. State of Research and New Data

Oliver Dietrich, Çiğdem Köksal-Schmidt, Jens Notroff, and Klaus Schmidt

The stratigraphy of Göbekli Tepe comprises three layers, an older Layer III, assigned to the PPNA, a younger Layer II, attributed to the early and middle PPNB, and a final Layer I, featuring mixed sediments derived from agricultural activities, though containing PPN materials and sporadic finds from the Middle Ages and the modern period (but with no architectural remains). Layer III has produced the well-known monumental architecture with megalithic T-shaped pillars arranged in circle-like enclosures around two taller central pillars; Layer II consists of smaller rectangular buildings often containing just two or even one smaller pillar, and sometimes none at all. The difficulties and possibilities linked to the application of radiocarbon dating at the site have already been highlighted (Dietrich 2011); as such, in the following we provide only a brief summary of the current state of research.

Radiocarbon Dating at Göbekli: the State of Research

At least for the large enclosures from Layer III it can be stated that these were intentionally backfilled at the end of their use-lives. This backfilling poses severe problems for the dating of this layer using the radiocarbon method, as organic remains from the fill-sediments could be older or younger than the enclosures, with younger samples becoming deposited at lower depths, thus producing an inverse stratigraphy. Another issue is the lack of carbonized organic material available for dating; only in the last campaigns have larger quantities been discovered.

Given these inherent difficulties, in a first approach the attempt was made to date the architecture directly using pedogenic carbonates. These begin to form on limestone surfaces as soon as they are buried with sediment (Pustovoytov 2002, 2006; Pustovoytov and Taubald 2003; Pustovoytov *et al.* 2007a, 2007b). Unfortunately the pedogenic carbonate layers accumulate at a variable rate over long time periods, so a sample comprising a whole layer will yield only an average value. This problem can be avoided by sampling only the oldest calcium carbonate layer in a thin section: the result should be a date near the beginning of soil formation around the stone, *i.e.* near the time of its burial (Pustovoytov 2002). Radiocarbon data are available from both the architecture of Layers III and II (Dietrich 2011, Tab. 1). Although the observed archaeological stratigraphy is confirmed by the relative sequence of the data, absolute ages are clearly too young, with Layer III being pushed into the 9th millennium, and Layer II producing ages from the 8th or even 7th millennia calBC. Therefore, the data fail to provide absolute chronological points of reference for architecture and strata. At most they serve as a *terminus ante quem* for the backfilling of the enclosures (Layer III) and the abandonment of the site (Layer II).

A far better source of organic remains for the direct dating of architectural structures is the wall plaster used in the enclosures. This wall plaster comprises loam, which also contains small amounts of organic material (Dietrich and Schmidt 2010). A sample (KIA-44149) taken from the wall plaster of Enclosure D (Area L9-68, Loc. 782.3) gives a date of 9984 ± 42 ^{14}C-BP (9745-9314 calBC at the 95.4% confidence level), thus placing the circle in the PPNA.

Concerning the fill-material from the enclosures, two approaches have been pursued, the first dedicated to the dating of animal bones and a second to ages made on charcoal. The archaeological appraisal of a recently acquired series of 20 data made on bone samples (Fig. 3) is quite complicated, as they pose some methodological problems (Dietrich 2011: 19-20, Tab. 4). At least within the group of samples chosen, collagen conservation is poor, and the carbonate-rich sediments at Göbekli Tepe may be the cause for problems with the dating of apatite fractions (*cf*. Zazzo and Saliège 2011).

Carbonized plant remains have been very scarce at Göbekli, thus limiting the possibilities for dating charcoal. Nevertheless, three charcoal samples (Tab. 1) are available for Enclosure A. While two samples (Hd-20025 and Hd-20036) stem from back-fill (Kromer and Schmidt 1998) and have been dated to the late 10th / earliest 9th millennium calBC, a third charcoal sample (KIA-28407) was taken from beneath a fallen fragment of a pillar. This sample has provided a date for a possible final filling event around the mid-9th millennium calBC. It is confirmed by a measurement (IGAS-2658; Tab. 1) made on humic acids from a buried humus horizon that provides a *terminus ante quem* for Layer II in area L9-68, dating to the late 9th / early 8th millennium calBC.

In conclusion, up to now charcoal samples have suggested that the backfilling or *burial* of the larger enclosures occurred some time in the late 10th and early 9th millennium calBC, while KIA-44149 from the wall plaster of Enclosure D indicates building activities in the mid-10th millennium calBC, *i.e.* in the early PPNA. Notwithstanding these results, no clear image ermerged in regard to the contemporaneity of the enclosures .

A New Series of Data

Recent fieldwork in the main excavation area at Göbekli Tepe has focused on the excavation of deep soundings to reach the natural bedrock in preparation for the construction of a shelter, urgently required for the protection of the exposed Neolithic architecture. Eleven deep soundings have been excavated to the bedrock. At several locations, considerable amounts of carbonized botanical material were discovered, so far unique for excavations at Göbekli (Fig. 2). A series of more than 150 samples has been produced either on site or by flotation of the relevant soil units. To test the quality of the material for radiocarbon dating, five samples from the area of the large enclosures from Layer III were submitted for AMS-radiocarbon dating (Tab. 1, Fig. 2, 3; UGAMS-10795 to 10799). In the following, these new data, together with a further age made on collagen from an animal tooth (KIA- 44701; Tab. 1, Fig. 2, 3), are presented and discussed in context with previously available absolute chronological evidence.

Enclosure D

Two deep soundings were excavated directly adjacent to the ring wall belonging to Enclosure D, with three new ages obtained from charcoal recovered from the sounding in area L9-78 (for location of samples discussed in the text, *cf*. Fig. 1). These samples were collected close to the bedrock, which in its interior forms the floor of this enclosure. Calibrated ages cluster between 9664 to 9311 calBC at the 95.4% confidence level (UGAMS-10795, 10796, 10799; Tab. 1, Fig. 2, 3), a time-span which is in good agreement with the earlier measurement made on clay mortar from the ring wall of Enclosure D between Pillars 41 and 42 (KIA-44149, 9984 ± 42 ^{14}C-BP, 9745-9314 calBC at the 95.4% confidence level; Tab. 1, Fig. 2, 3). Based on these data, we now have a much clearer picture of the chronological frame within which construction activities took place in the area of Enclosure D. It is only regrettable that these four data all correspond to a period with a slight plateau in the calibration curve (Fig. 2b), thus resulting in larger probability ranges. Additional excavation work is needed to clarify the exact stratigraphical correlation of the three new charcoal dates with Enclosure D.

Finally, from the fill-material of Enclosure D there is one new ^{14}C-age made on collagen from an animal tooth found north of Pillar 33 (KIA-44701, 9800 ± 120 ^{14}C-BP, 9746-8818 calBC at the 95.4% confidence level; Tab. 1, Fig. 2, 3). Taken together with another new measurement made on charcoal extracted from the same fill (Layer III) in area L9-69 (UGAMS-10798, 9540 ± 30 ^{14}C-BP, 9127-8763 calBC at the 95.4% confidence level; Tab. 1, Fig. 2, 3) there can still be no consensus regarding the time of abandonment and *burial* of this enclosure. Further radiocarbon measurements will be needed to clarify this process. Indeed, the animal tooth used to produce sample KIA-44701 might even stem from the use-life of the enclosure, which as we know would have included the celebration of large feasts (Dietrich *et al.* 2012). This line of thought would then allow for a considerable (several hundred years) time of use of the enclosure prior to its burial sometime in the late 10th or early 9th millennium calBC (UGAMS-10798). But at the moment, a rather short life-span of the enclosure remains a possibility, too.

Code	Date	δ13C, ‰	Material	Context
UGAMS-10796	9990±30	-25.6	charcoal (Pistacia atlantica, Prunus amygdalus, undetermined)	**Enclosure D** L9-78, Loc. 129.11 space adjacent to ring walls
UGAMS-10795	9970±30	-24.8	charcoal (Pistacia atlantica, Prunus amygdalus, undetermined)	**Enclosure D** L9-78, Loc. 129.12 space adjacent to ring walls
UGAMS-10799	9960±30	-25.7	charcoal (Pistacia atlantica, Prunus amygdalus, Prunus, Rhamnus sp., undertermined; mainly fragments of branches)	**Enclosure D** L9-78, Loc. 129.10 space adjacent to ring walls
KIA- 44149	9984±42	-26.31 ± 0.57	wall plaster, organic remains	**Enclosure D** L9-68, Loc. 782.3 inner ring wall between pillars 41 and 42
KIA- 44701	9800±120	-20.57 ± 0,13	collagen from cattle tooth	**Enclosure D** L9-67, Loc. 65.2, north of pillar 33
UGAMS-10798	9540±30	-25.4	charcoal (Pistacia atlantica, Populus / Salix, undetermined)	**Layer III, north of Enclosure D** L9-69, Loc. 123.3
UGAMS-10797	9700±30	-26.7	charcoal (Pistacia atlantica; fragments of branches)	**Enclosure C** L9-97, Loc. 64.2 space between outer ringwalls
Hd-20036	9559±53	not provided	charcoal (Pistacia sp., Amygdalus sp.)	**Enclosure A** L9-75, Loc. 48.1
Hd-20025	9452±73	not provided	charcoal (Pistacia sp., Amygdalus sp.)	**Enclosure A** L9-75, Loc. 44.3
KIA-28407	9250±55	-24.82 ± 0.11	charcoal	**Enclosure A** under a fallen pillar fragment in L9-75, Loc. 50.
IGAS- 2658	8880±60	not provided	humic acids from soil sample	**Terminus ante quem for Layer II** over the Filling of Enclosure D in L9-68

Table 1 List of radiocarbon data made on organic samples from Göbekli Tepe.

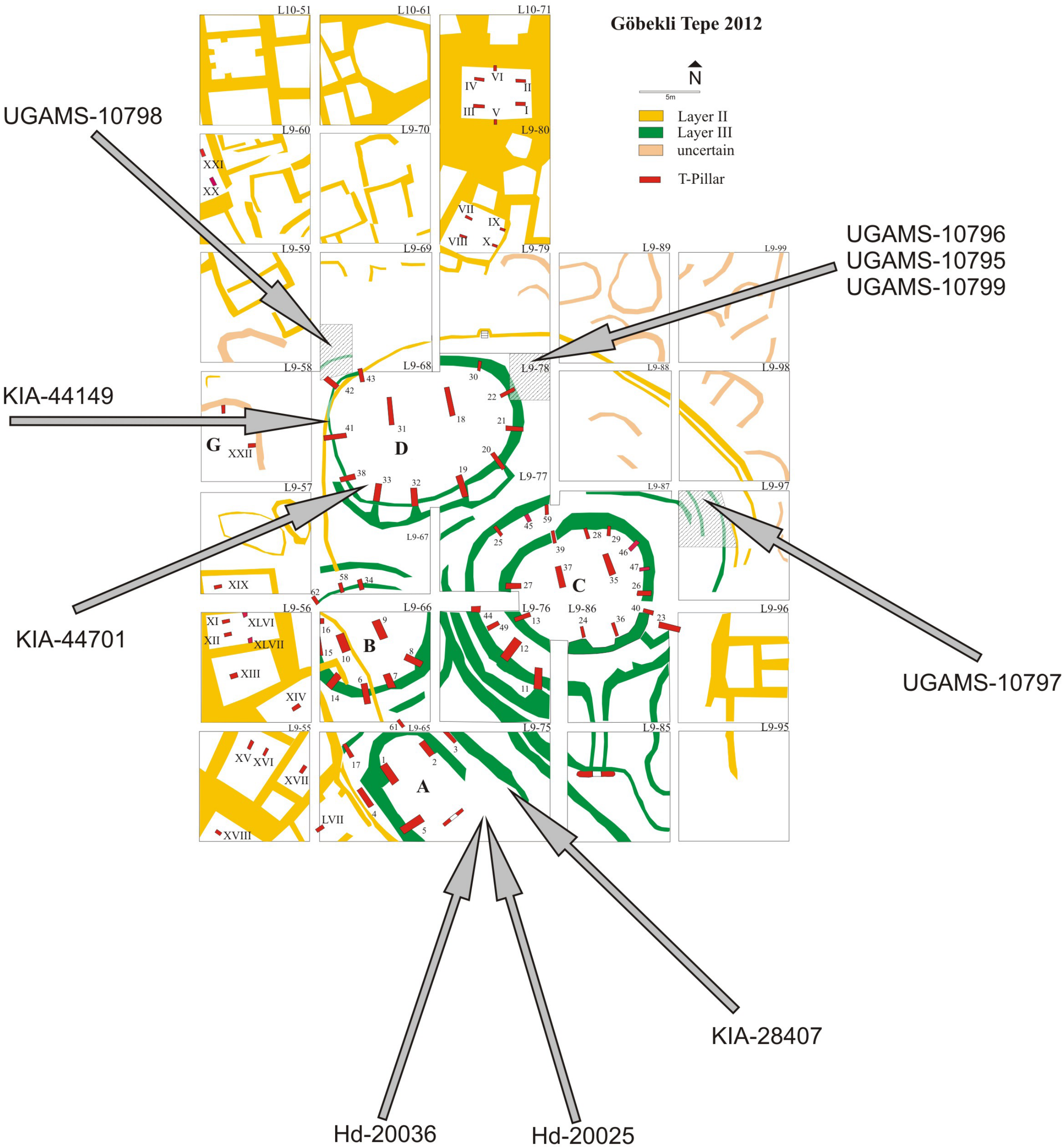

Fig. 1 The main excavation area at Göbekli Tepe with origin of 14C samples discussed in the text.

At this point reference should again be made to sample IGAS-2658 (8880 ± 60 ^{14}C-BP, 8241-7795 calBC at the 95.4% confidence level; Tab. 1, Fig. 2, 3) taken from a humus layer in area L9-68 (Pustovoytov 2006: 707-708, Fig. 2f). This date marks the last PPN activities in this area and provides a *terminus ante quem* for Layer II.

Enclosure C

To present, only one date is available for Enclosure C (UGAMS-10797, 9700 ± 30 ^{14}C-BP, 9261-9139 calBC at the 91.6% probability level; Tab. 1, Fig. 2, 3). This sample was taken from a deep sounding in area L9-97 (Loc. 64.2) between the outermost ring walls of the enclosure and close to the bedrock. This could indicate that building activities at the outer ring walls of this enclosure were underway during the backfilling of Enclosure D. However, a larger series of data and a close inspection of Enclosure C´s building history will be necessary to confirm such far-reaching conclusions.

Enclosure A

From the area of Enclosure A there are the two dates already published by Kromer and Schmidt (1998) and mentioned above (Hd-20036, 9559 ± 53 ^{14}C-BP, 9175-8759 calBC; and Hd-20025, 9452 ± 73 ^{14}C-BP, 9131-

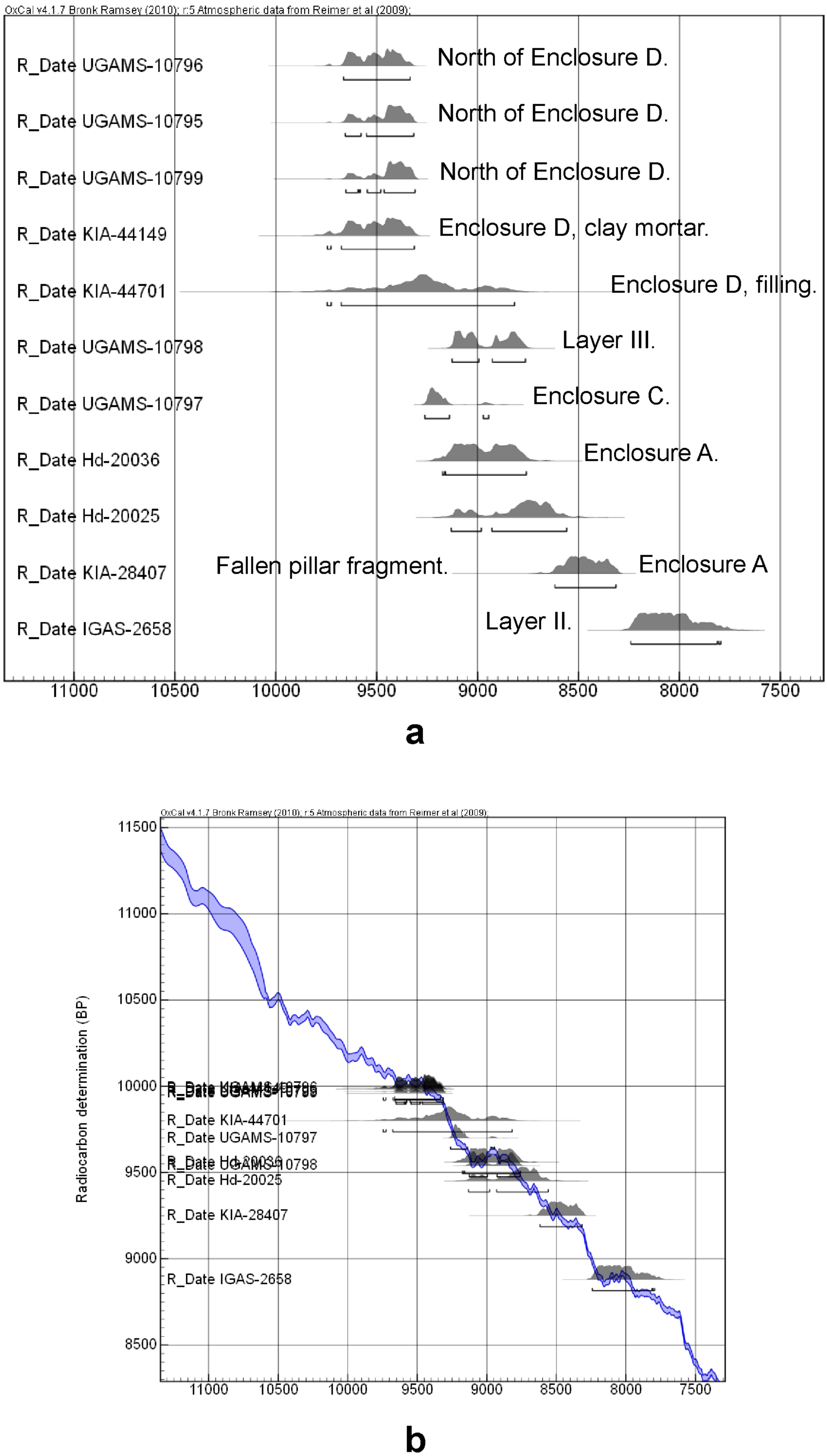

Fig. 2 Charts of radiocarbon data from Göbekli Tepe.

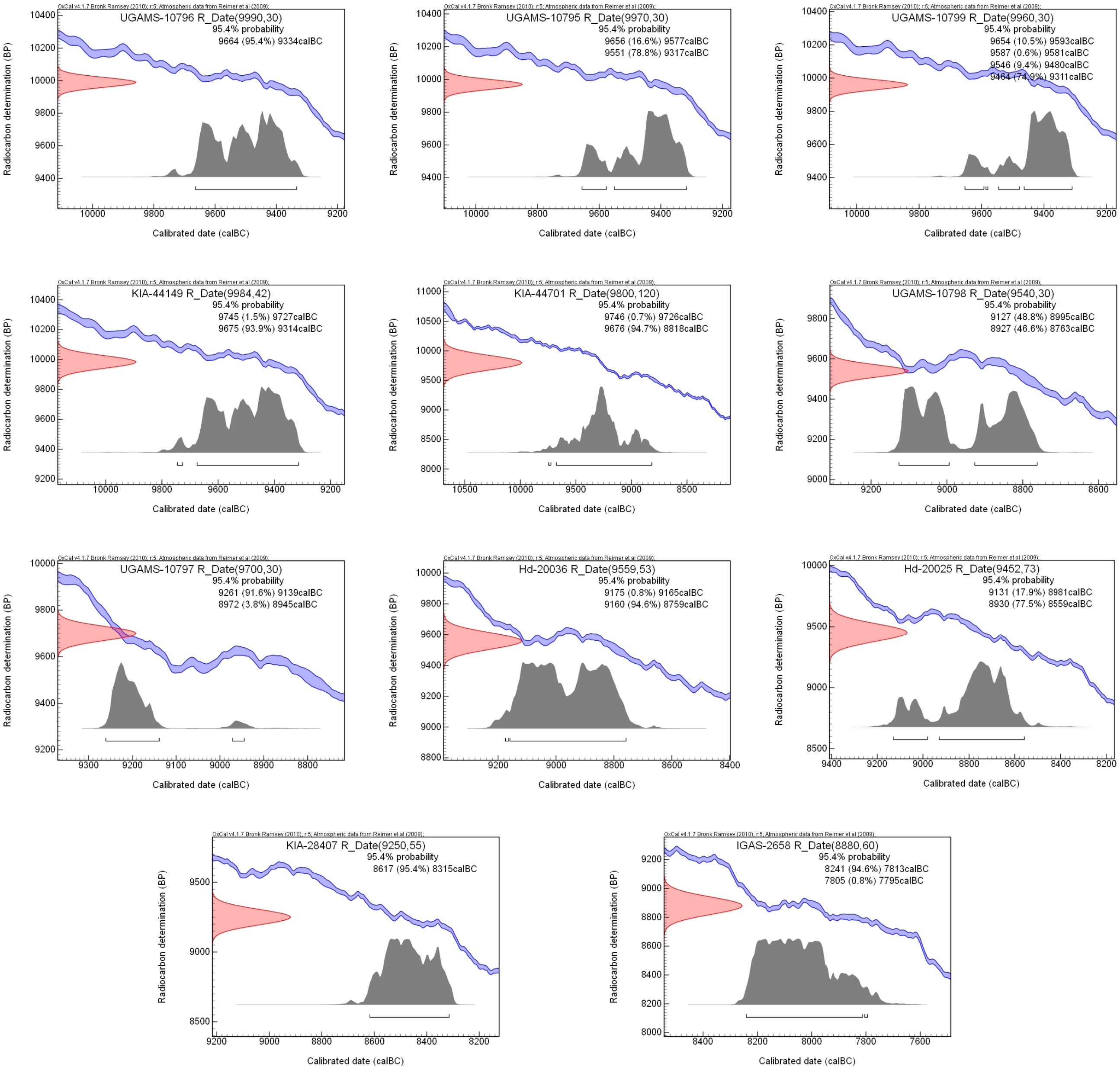

Fig. 3 The calibrated radiocarbon data from Göbekli Tepe – single plots.

8559 cal BC at the 95.4% confidence level; Tab. 1, Fig. 2, 3). As these charcoals came from the fill of the enclosure, these measurements most likely date its abandonment, though it certainly cannot be ruled out that older organic remains became mixed in with material used for the burial of the structure (Kromer and Schmidt 1998).

In combination with the new data, these dates may indicate that Enclosure A is generally later (or was in use for a longer period) than Enclosures C and D. From the perspective of its rather square-like ground-plan, Enclosure A could be an architectural missing link between the older circular structures of Layer III and the smaller rectangular complexes of Layer II. Good comparisons for its general layout can be found in the sub-quadratic "*Terrazzo Building*" in Çayönü (cell plan layer) (Schirmer 1990: 382-384) or in the „*Cult Building*“ at Nevalı Çori (Hauptmann 1993), which also yielded T-shaped pillars of forms similar to those at Göbekli, Layer II.

KIA-28407 (9250 ± 55 ^{14}C-BP; 8617-8315 calBC at the 95.4% confidence level; Tab. 1, Fig. 2, 3) is a date made on charcoal from a soil sample extracted from beneath a rather large fragment of fallen pillar (Pustovoytov 2006: 709, Fig. 3g). Although this age could mark the time of abandonment of Enclosure A, its origin makes it difficult to determine whether it dates the *burial* of the enclosure at the end of its use-life, a later intentional destruction, or a moment when Enclosure A was already filled and Layer II activities led to the deposition of the pillar fragment.

Conclusion

As a preliminary conclusion, the still limited series of radiocarbon data seems to suggest that Layer III enclosures at Göbekli Tepe were not exactly contemporaneous. Earliest radiocarbon dates stem from Enclosure D, for which the relative sequence of construction (*ca*. mid-10th millennium calBC), usage, and burial (late 10th millennium calBC) are documented. The outer ring wall of Enclosure C could be younger than Enclosure D. However, more data are needed to confirm this interpretation. Finally, Enclosure A seems younger than Enclosures C and D. With only eleven radiocarbon dates, many questions remain. It is hoped that the recent discovery of larger amounts of carbonized material at Göbekli Tepe will soon provide us with further dates and a much firmer grasp on the absolute chronology of this unique site.

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Review of F.R. Valla, *Les Fouilles de la Terrasse d'Hayonim (Israël). 1980-1981 et 1985-1989* by Tobias Richter

Together with Andrew Garrard et al.'s forthcoming Azraq report and Philip Edwards recently published Wadi Hammeh volume (Edwards 2012), François Valla's *Les Fouilles de la Terrasse d'Hayonim (Israël)* is one of a series of new publications that reports field-work at Epipalaeolithic sites excavated in the southern Levant during the 1980s. As the final publications of these sites are now becoming available this may mark the beginning of a new phase of research into the Final Pleistocene occupation of the Levant. It certainly seems that research interest into the Natufian and the Epipalaeolithic in general in the past decade or so has somewhat declined, with many more projects focusing on the subsequent Pre-Pottery Neolithic. Perhaps this and other forthcoming volumes will enable us to consider the evidence in a different light and open up new and exciting avenues of future research. From this perspective, it is a pleasure to see this volume in the flesh, since it provides a wealth of detail and information on this important Natufian site. Given the breadth and volume of material presented in this substantial 28 chapter, 527-page book it is impossible to discuss every aspect in detail in the space provided here.

The subject of this book are the excavations of the Natufian deposits on Hayonim Terrace in 1980-1981 and 1985-1989 carried out under the direction of François Valla. The books 28 chapters are sub-divided into three parts: the first part, encompasses of Chapters 1-6 and discusses general aspects of the excavations; the second part includes Chapters 7-12 and deals with the ceramic Neolithic material; the third part focuses on the Epipalaeolithic phases and consists of Chapters 13-28. In Chapter 1 Valla describes the initial aims of the excavations, the methods used and provides a brief overview of the stratigraphic sequence. He relates that the initial reason for launching the excavations at Hayonim Terrace were to resolve some uncertainties over the Geometric Kebaran – Early Natufian – Late Natufian succession on the terrace reported by Donald Henry (Henry & Leroi-Gourhan 1976; Henry et al. 1981). Valla and his team were, however, rewarded with much more than just a sequence of different lithic industries, as the excavations quickly revealed the remains of several structures, heavy duty ground stone implements and human burials, suggesting that the terrace of Hayonim Cave was intensively settled. Table 1 on page 24 is particularly useful in giving a schematic overview of the stratigraphy of Hayonim Terrace, although adding more information would have made this overview even more useful.

This becomes obvious in the discussion of the radiocarbon dates by Valla in Chapter 3. Although the dates are presented in stratigraphic order in the table on page 45, it is difficult to relate them directly to the schematic stratigraphic sequence presented in Chapter 1, since not all the terms used to describe the provenance of the C14 samples appear in the schematic straigraphic sequence. Most of the dates are on burnt bone with only two having been obtained from seeds. As one can see from the table, and as Valla surmises in the discussion, the dates are problematic. At least three are wildly off the accepted range for the Natufian and these occur both at the top and the middle of the sequence. One of the issues he does not comment on is the problematic use of charred bone for C14 dating. Prior to the advent of more reliable ultrafiltration techniques for the pre-treatment of bone, dates from bone collagen have been known to produce at time significantly younger age estimates (Brown et al 1988). This does not help us in feeling anymore confident about the Hayonim Terrasse C14 dates. Some statistical modeling of the dates would have been useful in getting a better handle on this ambiguity and to reduce the effects of these erroneous dates. Unfortunately, charred plant remains were not recovered in any significant quantities – a common problem on some Natufian sites – which would have produced slightly more reliable dates.

Chapters 4 and 5 deal with aspects of the sediments of Hayonim Terrace. In Chapter 4 Hervé Colleuille presents her study of the sediments and micromorphologhy, and it is in this chapter that the reader first gets to see some section drawings and a detailed description of the various sedimentary units at the site. The microstratigraphy of the site reveals more intricate deposits than could be observed during excavation, as Valla also mentions in Chapter 1. Colleuille detected a significant rise in calcium carbonate concentrations in the Hayonim Terrasse sediments through time, spiking in unit Iw. This, she suggests, could be related to either a cooler and wetter climatic regime, or a particular local weathering phenomenon. Wattez's Chapter 5 deals with the geomorphology of the site. This work shows that elements of the site can be considered to be in situ, but that there was also a significant amount of digging and movement of soil, creating a challenging stratigraphic situation.

Arlene Rosen reports the analysis of six phytolith samples from Hayonim Terrasse in Chapter 6, and argues that while the number of samples was small, they seem to suggest the more common use of grasses, including cereals, in the Natufian phase, as opposed a more woodland dominated spectrum in the Geometric Kebaran. The use of wetlands plants is also attested in the Natufian samples, but not in the Geometric Kebaran material. The sample number here is surely too small to consider these results necessarily convincing, especially because four of these samples are problematic, as Rosen readily states. Lacking any additional data from charred plant remains the issue of plant exploitation at Hayonim Terrace therefore remains an open question.

Chapters 7-11 deal with the structures, ceramics, chipped stone and ground stone assemblages, and fauna of the pottery Neolithic occupation at the site. Although the ceramic Neolithic remains at Hayonim Terrace were limited to a wall segment and several pits, they indicate the continued use of the terrace in the 6th millennium. Valla *et al.* attribute the ceramic Neolithic occupation to the Wadi Raba culture on the basis of the ceramics and chipped stone artefacts. Occupational activity on the terrace during the pottery Neolithic disturbed the Natufian occupation beneath, but the stratigraphic observations and detailed spatial recovery methods have allowed for a separation of this material from the Epipalaeolithic finds as much as possible.

Chapters 13-26 discusses various aspects of the Epipalaeolithic occupation of Hayonim Terrasse, ranging from chipped and ground stone artefacts, to worked bone, fauna and other aspects. In Chapter 13 Valla describes aspects of the Geometric Kebaran chipped stone assemblage, the earliest found on the terrace. He focuses on a discussion of just the retouched component since, as Valla notes, the material from the Geometric Keberan layer is quite mixed, with the Natufian occupants of the terrace having disturbed much of the underlying deposits.

Christophe Delage's Chapter 14 focuses on the exploitation of the flint sources around Hayonim during the Natufian, noting that there is an abundance of flint nearby the site, and that the assemblage from Hayonim Terrace broadly reflects this diversity. Valla and Plisson's discussion of the lithic industry from the base of Locus 4 in Chapter 15 presents a detailed analysis of the Natufian lithic technology. The material derives from a deposit inside a semi-circular structure and represents a sample of the larger industry from the site. The material discussed was chose for its uncontaminated characteristics and stands in as an example for the entire Natufian industry from Hayonim Terrace. The chapter not only deals in detail with the technological and typological aspects of cores, debitage and tools, but also discusses a functional use-wear analysis of the tools. With over 7500 pieces analysed this is a substantial assemblage and a chapter containing a wealth of information and illustrations. Together with the following two chapters, discussing the retouched lithic artefacts from the 'occupation floor' and a dedicated chapter on scrapers by Valla, chipped stone enthusiasts will a wide range of interesting data here.

Chapter 18 deals with the reexamination of Donald Henry's original Hayonim Terrace trench. The Valla team reopened Henry's trench in 1981 to examine the stratigraphic sequence and to obtain additional samples of material. In her chapter, Nourissat argues that there is no early Natufian present in 1974-1976 excavation. Taking into account differences in the stratigraphic observations between the two excavations and the small sample of lithics reported by Henry she argues that there is a break in the sequence from the Geometric Kebaran to the Late Natufian. This conforms with the overall results of the nearby Valla excavations. It is always difficult to reexamine old excavation trenches, but Nourissat makes a convincing case and the issue of an early Natufian on Hayonim Terrace should perhaps now be laid to rest.

In Chapter 19, which includes a contribution by Marianne Chistensen, Valla describes the ground stone assemblage, which consists of large, heavy-duty mortars, vessels, pestles, stones with cupholes, grooved stones, handstones and various fragments. It is nice to see that this chapter also goes beyond a mere descriptive typological study of the material, since it also discusses raw material sources and functional microwear. Tracing of the raw materials represented in the Hayonim Terrace ground stone assemblage once again hints how widespread systems of exchange and interaction were during the Natufian. Another pertinent observation how the tools were used. Valla rightly points out the fallacies of relying too heavily on ethnographic sources for the interpretation of Natufian ground stone tools. The increased numbers of heavy-duty ground stone tools in the Natufian has long been directly associated with the idea that cultivation and incipient agriculture appeared during the Late Epipalaeolithic. However, as this and other studies show, too many *a priori* assumptions have been made about the function of these tools without examining the artefacts in greater detail. Other functions are clearly indicated when we consider the character of the ground stone artefacts and the evidence from usewear analysis (*e.g.* Dubreuil 2004). The cumulative result of these studies is that there was a wide range of functions that these tools were put to, and a large proportion of them had little to do with processing legumes or cereals. Another case in point, which Valla and Christense rightly critique, is the interpretation of grooved stones as 'shaft straighteners', which also stems from ethnographic observations. Their study of the Hayonim Terrace grooved stones suggests the working of bone, and not of wood.

In her detailed study of the Hayonim Terrace faunal remains in Chapter 20, Natalie Munro notes differences in the preservation of animal bone between the cave and the terrace and argues that the assemblage fits expectations for faunal exploitation during the Natufian. She notes in particular the abundance of small game, suggesting that this reflects increased hunting pressure on higher ranked game. This has been a recurrent argument for some time. Her proposal that the similarities in processing and cooking practices on the terrace and in the cave suggest that both were occupied by a homogenous cultural or social group is interesting. It is a shame that this particular point was not more thoroughly discussed, as the social and ritual aspect of food surely lie at the heart of how Natufian gatherer-hunters exploited animals (and plants).

Brian Boyd discusses the Hayonim Terrasse bone artefacts in the next chapter. This comprehensive analysis favours a use-wear approach over a typological classification. His analysis leads Boyd to argue that there was a perceptible change in the way in which Natufian gatherer-hunters related themselves to animals, while also connecting the worked bone artefacts to other activities at the site (production of clothes, exchange), and thereby raises other issues relating to identity and gender. While this chapter takes a refreshing perspective, it seems somewhat at odds with Munro's previous chapter that focuses heavily on a macroscale, behavioral perspective, despite also dealing with faunal material. This is somewhat of a shame, since a combined effort looking at the issue of agency, sociality and human-animal relations may have produced an even better insight into some of these crucial questions.

Chapters 22 and 23 by Valla and Judith Ben-Michael, discuss the symbolic objects from Hayonim Terrace. These include a significant number of ochre, one figurine, an incised stone plaque and a small number of stone beads, while Ben-Michael discusses the remains of a very small clay figurine from the site. The stone figurine and the example in clay are some of the very few depictions of the human form known from the Natufian, and the clay figurine is still a unique example. What seems to be lacking from the description, sadly, is some contextual information, i.e. in which location and deposit this figurine was found. Bearing in mind that the site is overlain by a Pottery Neolithic occupation and the degree of disturbance caused by both the late Natufian and PN occupants, it would have been useful to include precise information on the clay figurine's provenance.

Hayonim Terrace has long been associated with its spectacular human burials, which Valla describes in Chapter 24, while Belfer-Cohen and Arensburg provide a description of the physical characteristics in Chapter 25. Burials are one of the most enigmatic and characteristic aspect of the late Epipalaeolithic in the Levant, and Valla presents a nice series of detailed photographs and drawings. This includes the fabulous and rare human and dog burial complex. It is nice to see all of the burials described in detail and richly illustrated, and on page 425-427 Valla offers a thoughtful discussion of the Hayonim Terrace burials. Following a somewhat structuralist line of thought he argues that a number of common themes and patterns unite late Natufian burial practices. He suggests that these common themes and patterns of treating and burying the dead served to create a sense of Natufian identity and community. Animals, such as the dogs and the turtle that were included in some of the Hayonim Terrace burials and Natufian burials elsewhere, were brought into these funerary contexts to help to create links and establish distinct identities and a sense of community. Valla also suggests that although status and social hierarchies are difficult to see in late Epipalaeolithic burial customs that we should understand Natufian burials nevertheless as connected to the identities, roles and individual status of the deceased. The detailed and thorough discussion Valla offers here is highly interesting and provides many intriguing angles for further discussion and research on the topic of the treatment of the dead in the Late Epipalaeolithic, social identities and ritual practice.

Chapter 26 provides a detailed discussion of the Natufian structures on Hayonim Terrace and what they contained. The chapter brings together various spatial elements and in addition to the architecture itself, material culture and other finds are discussed in relation to the structures. This chapter is accompanied by 34 pages of photographs, drawings and other illustrations. Valla et al note that it was difficult to determine the phasing and contemporaneity of some of the structures due to the complex stratigraphic situation on the terrace. Part of the problem here is that none of the structures were exposed completely in plan, making it more difficult to understand their phasing and interpreting their functions. It is interesting in this respect that Valla et al. refer to the settlement as a village. It may seem a bit of a stretch to force this terminology on Hayonim Terrace, given that the excavations only revealed parts of a small number of structures in a 30 m^2 area. We should expect a village to consists of more than one or two families living together, and it is not quite clear from the available evidence that we can assume this to be the case on Hayonim Terrace outright.

In the following chapter, Anna Belfer-Cohen and Ofer Bar-Yosef, summarize the results of the excavations of the Natufian layers in Hayonim Cave, which provides a useful comparison with the other chapters in the book. The authors offer an interpretation of the relationship between the Natufian occupations in the cave, which was occupied during both the early and the late Natufian, and the terrace. They suggest that placement and character of both the early Natufian and the late Natufian architecture is connected to specific social and ritual factors: the early Natufian large building of Locus 3 is interpreted as the house of a shaman or Big Man, or alternatively, of a founding family, while the late Natufian 'honeycomb' structures inside the cave are interpreted as special purpose or ritual structures. The idea that there Shamans or other kind of ritual specialists can be identified archaeologically in the late Epipalaeolithic seems to have recently become a rather popular idea (see Grosman et al. 2008). This is despite the fact that there are a host of definitional and interpretative problems with this concept (e.g. Atkinson 1992; McCall 2007), which should caution archaeologists to bear in mind the limitations of such concepts in ethnography and cultural anthropology. Belfer-Cohen and Bar-Yosef also raise the possibility that the cave area could have been reserved for special, ritual activities during the late Natufian, basing their argument on the nature of the structures inside the cave, as well as the lower densities of finds from the cave when compared to the terrace. They suggest that this area may have been used for feasting rituals. Feasting appears to be another buzzword that has recently been often applied to the Natufian (e.g. Munro & Grosman 2010), yet few seem to be able to agree on a clear definition of what evidence of feasting actually looks like archaeologically (see e.g. Hamilakis & Harris 2011, pp.199–200). While the material culture, architecture and burial practices of the Natufian cry out for interpretation, it is important to be cautious when projecting ethnographically derived terms and concepts back into prehistory, as the volume's main author and editor himself so emphatically stated in Chapter 24.

In conclusion, *Les Fouilles de la Terasse d'Hayonim* makes a very important contribution to our understanding of the Natufian in the Levant. A number of questions have always concerned Natufian specialists when it comes to Hayonim: is the early Natufian confined only to the cave and if so why, and are the late Natufian occupations inside the cave and on the terrace contemporary or not? If they are contemporary, were there functional differences in the late Natufian use of these spaces? Given the reevaluation of the Henry excavations in this volume and the lack of an early Natufian component in the Valla excavations, it is now more certain that there is no evidence for an early Natufian occupation on the terrace. Since there is no stratigraphic connection between the cave and the terrace we should still be cautious concerning the contemporaneity of the cave and terrace occupations. Even if we consider the cave and the terrace as part of one large late Natufian site, the issue of contemporaneity should not be taken as a given. As many prehistoric archaeologists will acknowledge this is a precarious issue and we simply have to accept that many sites represent palimpsest into which a very large amount of time is compressed. Even if we consider sites to be technically contemporary, their occupations could in reality lie dozens or hundreds of years apart.

While this volume overall present reflects a high standard of scholarship, two critical comments must be made. There is one glaring omission from this volume, which is the archaeobotanical aspect. Although it is a well known problem that many Natufian sites in the southern Levant have poor preservation of charred plant remains, a statement on the sampling approach for archaeobotanical materials is absent. This is a critical issue, since the late Epipalaeolithic is such a pivotal period for discussions concerning the origins of plant cultivation. One would have wished for a more thorough exploration of the archaeobotanical issue, even if it turned out that there was little preservation of charred plant remains.

The second critical comment concerns the organization of the volume. It is at times very difficult to keep track of the stratigraphic relationships throughout the work. Different elements of the stratigraphic record are presented in separate chapters that are spread across the book: a basic overview of the stratigraphy is in Chapter 1, but the radiocarbon dates are in Chapter 3, while sedimentary descriptions are in Chapters 4 and 5. The burials and structures, which are also stratigraphic units of a kind, are discussed in Chapters 24 and 26, but the Neolithic architecture is in Chapter 7. Section drawings, plans and photographs are spread throughout the book, so that it is quite often necessary to jump back and forth. Perhaps one more substantial chapter simply on the stratigraphy and phasing of the site, with radiocarbon dates and sedimentary descriptions, as well as combining all key plans and schematic representations of the stratigraphy would have avoided some of this confusion.

This and other critical comments aside, this volume is a great achievement and plugs an important gap in our record and understanding of the Natufian in the Levant and is thoroughly recommended to specialists and other interested readers.

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