

# Natufian Foragers in the Levant

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*Terminal Pleistocene Social Changes in Western Asia*

edited by  
**Ofer Bar-Yosef**  
&  
**François R. Valla**



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# The Natufian of the Azraq Basin: An Appraisal

Tobias Richter and Lisa A. Maher

## Introduction

In this paper we offer an assessment of the Late Epipaleolithic in the Azraq Basin and address how it fits into the wider context of the Natufian in Southwest Asia. We draw on existing data, as well as field research carried out by the authors on a number of sites in the Azraq Basin since 2005<sup>1</sup>. In doing so, we outline the present evidence for Natufian occupations of the Azraq Basin, the chronological, typological and other interpretative challenges this data poses, and how we can proceed to better understand the Azraq evidence within a wider picture of Late Epipaleolithic populations in the Levant. In particular, we emphasize the importance of the pre-Natufian Epipaleolithic in the region for our understanding of the development and emergence of the Natufian in relation to sedentism and inter- and intra-regional interaction. Inevitably, this leaves us with more questions than answers, but we hope these questions provide directions for more in-depth research. Here, we build on comments made by other contributors to this volume regarding variability in the Epipaleolithic and the contributions of sites outside the 'core' (Goring-Morris and Belfer-Cohen herein; Henry herein). We conclude with suggestions on how to address the current imbalances in our understanding of the Azraq Basin Late Epipaleolithic.

In particular, we focus on four key areas:

- 1) How and when did the Natufian articulate itself as a cultural phenomenon locally?
- 2) What is the evidence for a Late Natufian expansion into the Azraq Basin?
- 3) Is there an Azraq Natufian facies comparable to, for example, the arid-adapted Harifian or Ramonian? Or, is there no specific arid-zone adaptation evident in the Azraq Basin, and, if so, why is this?
- 4) What are the causes of a shift in settlement type and location in the Azraq Basin at the beginning of the Early Natufian? Why do large sites disappear exactly when we expect to see large

permanent settlements? Why do sites appear to shift in location from the southern to the northern portions of the Azraq Basin?

## Research in the Azraq Basin

The Azraq Basin, a large, shallow depression east of the Transjordanian highlands, and its dense concentration of Epipaleolithic and Neolithic sites needs little detailed introduction (Betts 1991, 1998; Byrd 1988; Byrd and Garrard 1989; Garrard 1991, 1998b; Garrard and Byrd 1992; Garrard *et al.* 1988, 1994a; Muheisen 1983, 1988a, 1988b; Richter *et al.* 2010a; Rollefson *et al.* 1997; Fig. 1). It stretches from the Jebel Druze in the north to the Wadi Sirhan in the south, with its eastern limit defined by the Hamad basalt desert. This large system of wadis and aquifers drains surface runoff and groundwater toward the central Azraq Oasis where, until recently, a series of springs fed a lush marshland and rich local wetland environment. This oasis setting forms a rich localised micro-environment, which served as a key settlement focus beginning in the Lower Palaeolithic (Copeland and Hours 1989; Garrard *et al.* 1977).

At least 18 sites with definitive or suspected Natufian occupations have been documented in the Azraq Basin and its immediate surroundings. The majority of these were discovered as part of Alison Betts' Black Desert survey project (Betts 1988, 1991, 1998), including one of the few Natufian sites that has been excavated, Khallat Anaza. Another locality is Azraq 18, excavated by Andrew Garrard and colleagues during the 1980s (Garrard 1991; Garrard *et al.* 1994a) following intensive surveys in the southern, southwestern and central basin. Some sites in the Wadi el-Jilat (Jilat 22 upper, Jilat 8) have radiocarbon dates that place their occupation into the Early Natufian (for C14 dates from Azraq/ Jilat see Garrard *et al.* 1994a:189-193; see Maher *et al.* 2011, and Stutz 2004 for recalibrated Natufian C14 sequence). However, the assemblages from these sites are difficult to place into known

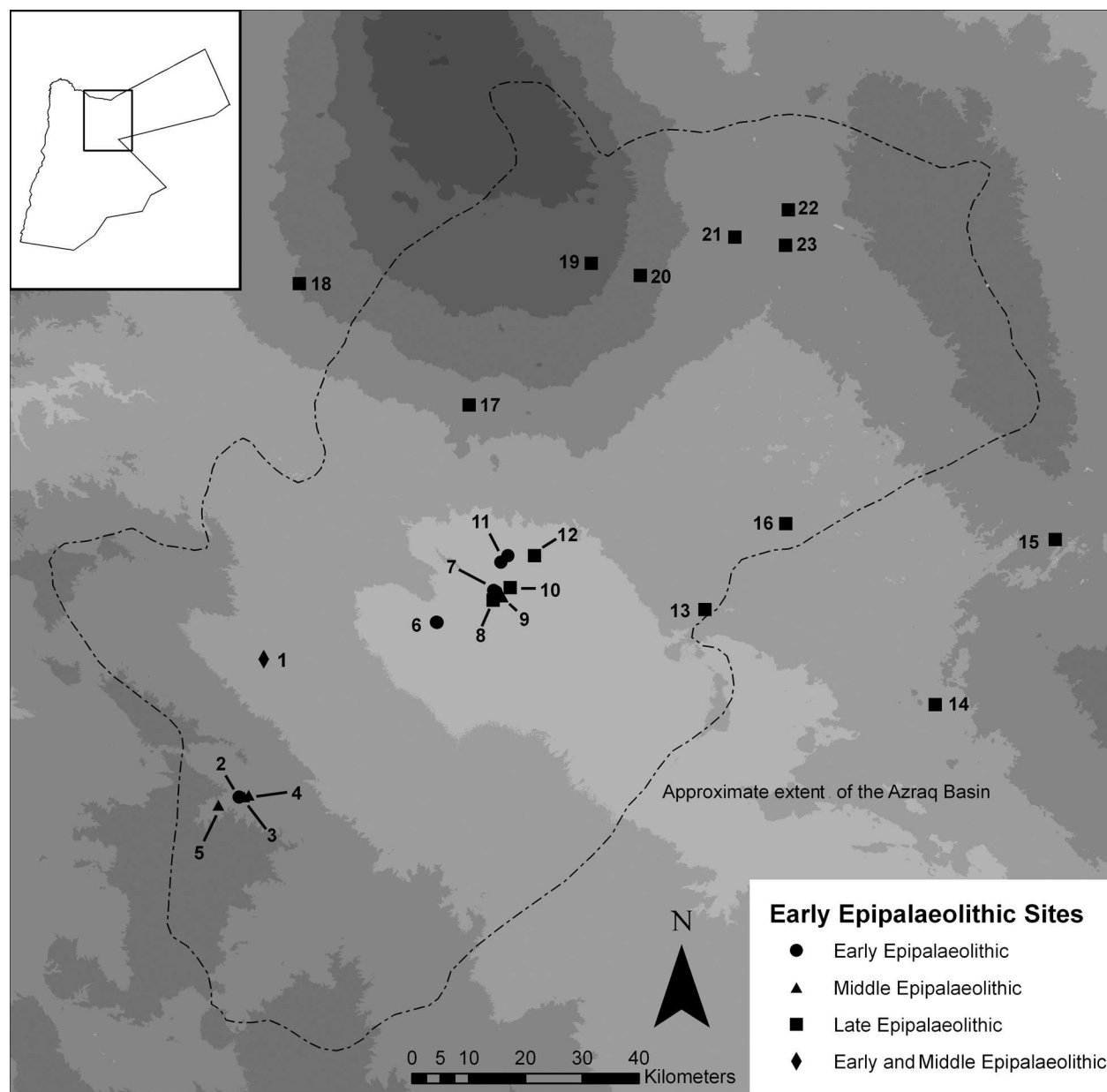


Fig. 1. The Azraq Basin showing the distribution of principal Epipaleolithic sites (1: Kharaneh IV, 2: Wadi el-Jilat 6, 3: Jilat 8, 4: Jilat 22, 5: Jilat 10, 6: Uwaynid 14 & 18, 7: 'Ayn Qasiyya & Azraq 17, 8: Azraq 18, 9: AWS48, 10: Bawabah, 11: Azraq ed-Druze sites, 12: 'Ayn al-Beidha, 13: Jebel Qurma, 14: Jebel Tharwa 15: Jebel Subhi, 16: Qa' Mejalla 17: Huwaynit, 18: Wadi 'Ajib, 19: Mughr al-Jawa, 20: Khallat Anaza, 21: Shubayqa I, 22: Shubayqa II, 23: Shubayqa III).

techno-typological complexes, although all contain geometric microliths. Based on the composition of the lithic assemblages few can be considered 'classic' Natufian sites. Since the early 1990's only a small number of new sites have been identified. Rollefson, Quintero and Wilke (Rollefson *et al.* 1999) described a Natufian component at the predominantly Middle PPNB site Bawwab al-Ghazal in the southern Azraq marshes. Excavations at 'Ayn Qasiyya Area C also

noted a Natufian component near the spring in the southern Azraq Oasis, although the lithics were from reworked contexts and mixed with disturbed PPNB artefacts (Richter 2009; Richter *et al.* 2007, 2010a). Further to the east, Rollefson and Wasse (Wasse and Rollefson 2005) have recently described a Natufian site at Jebel Tharwa.

Despite this 30 year history of research there remain several impediments to our understanding



of Natufian activities here in comparison with contemporary sites elsewhere. While sites have been identified in various locations across the basin, survey coverage is generally uneven and patchy. Some areas fall within the boundaries of localised research projects and were intensively surveyed (e.g. Wadi Jilat), while other areas have not been surveyed that intensively, or at all. This skews our understanding of regional site densities and distributions, as well as any subsequent interpretations of site function and mobility patterns. These issues are further compounded as different survey methods were employed by various projects depending on their respective research goals. In this paper we discuss some of these issues and outline the local Late Epipaleolithic sequence and sites. Before moving on to the Late Epipaleolithic, however, it is important to briefly discuss the pre-Natufian occupation of the Azraq region in some detail, not only to establish the context within which the Natufian in Azraq arose, but also to pose some fundamental questions about our understanding of the Late Epipaleolithic in the region.

### **Pre-Natufian Occupations in Azraq**

Several Early and Middle Epipaleolithic sites have been located and excavated in the Azraq Basin in the past thirty years. We argue that in order to appreciate the genesis and evolution of the Natufian in Azraq we have to understand these earlier occupations. One dominant model of socio-cultural change in the Late Epipaleolithic suggests that the Natufian emanated from a central 'core' region into more peripheral areas (e.g. Bar-Yosef 1998, 2004; Bar-Yosef and Belfer-Cohen 1989, 1991, 1992; Bar-Yosef and Meadow 1995; Henry 1989, 1995; Valla 1995). Although this position was modified subsequently (Byrd 1989, 1994; Byrd and Colledge 1991; Cauvin 1991; Henry 1995), due to the discovery of Early Natufian sites outside the originally proposed 'core', it is commonly assumed that there was a significant movement of people during the Late Natufian resulting in the establishment of more sites in the semi-arid to arid periphery of the Levant. The situation in the Azraq Basin may, however, be more ambiguous than previously assumed. For example, what were the impetuses and mechanisms of this Natufian expansion? Did it involve the migration of gatherer-hunters, bringing with them new technologies, burial practices and material culture? Or did the spread of the Natufian result from the adoption of new ideas by existing, local populations in the semi-arid to arid periph-

ery (as suggested by Valla 1999)? Or, was it some mixture of both? Only through the examination of pre-Natufian and Natufian sites congruently can we hope to tackle these crucial questions.

Sites dating to the Early and Middle Epipaleolithic have been investigated in the Oasis, the Wadi el-Jilat and in the Wadi el-Kharaneh (Table 1, Fig. 1). Some of these sites are very extensive, dense in material culture, and exhibit a staggeringly wide diversity of artefact types and site features (Garrard and Byrd 1992; Garrard *et al.* 1988, 1994a; Maher *et al.* in press; Muheisen 1983, 1988a) – in some cases much more so than any contemporary sites elsewhere. Radiocarbon dates from these sites fall within the Early and Middle Epipaleolithic phases (e.g. Jilat 22 middle phase). Following recent recalibrations of Natufian C14 dates suggesting that the Early Natufian may have begun as early as 15.5/15.3 kya cal B.P. (Stutz 2004) or at least earlier than previous models allowed (Maher *et al.* 2011) some Middle Epipaleolithic dates from sites in the Jilat can now potentially be seen as contemporary with the Early Natufian, if C14 date ranges are pushed to the extreme (e.g. Jilat 22 middle: OxA-1772; Jilat 22 upper: OxA-1770; Jilat 10: OxA-918, OxA-1000; Jilat 8 OxA-636; see Garrard *et al.* 1994). Others can be relatively dated on the basis of stratigraphic succession and chipped stone technology and typology. The surface scatter of AWS 48 in the Azraq Oasis, for example, is dominated by standardised trapeze/rectangles and endscrapers diagnostic of a Geometric Kebaran assemblage (Richter 2009).

Early Epipaleolithic sites are known from the Oasis, the Wadi Uwaynid, Wadi el-Jilat and Wadi el-Kharaneh. In the oasis, three Early Epipaleolithic sites have been investigated to date: Azraq 17 (Byrd 1988; Byrd and Garrard 1989; Garrard 1998b; Garrard *et al.* 1988, 1994b), 'Ayn Soda (Rollefson *et al.* 1997; Rollefson pers. comm.), and 'Ayn Qasiyya (Richter 2009; Richter *et al.* 2007, 2010a). Of these sites, only 'Ayn Qasiyya is radiometrically dated. While the lithic industry from Azraq 17 Trench 2 resembles a Terminal Ahmari assemblage (Byrd 1988; Garrard pers. comm.; Goring-Morris 1995), both a Nebekian as well as a Kebaran lithic industry appear to be present at 'Ayn Qasiyya. The sites have produced little in terms of distinct occupation surfaces, although excavations at 'Ayn Qasiyya resulted in the discovery of a human burial (Richter *et al.* 2010a, 2010b).

Uwaynid 14 and 18 are two Early Epipaleolithic sites situated closely together, c. 10 km southwest of the Azraq Oasis. Excavations by Garrard *et al.*

Table 1. Epipaleolithic sites in the Azraq Basin (Betts 1998; Byrd 1988; Garrard *et al.* 1985, 1987, 1988; Garrard and Byrd 1994)

Site	Industry	Microliths	Burials	Symbolic Objects	Ground-stone	Marine Shell	Radiocarbon Dates	Worked Bone	Dwellings (stone architecture or hut floors)
AWS 48	Middle EP	Trapeze/rectangles	A	A	A	A	P	A	A
Ayn Qasiyah	Early and Late EP	Obliquely truncated, La Mouillah, lunates	P	A	P	P	P	A	A
Azraq 17, Trench 2	Middle EP	Thin broken backed bladelets	A	A	P	P	P (Roberts)	A	A
Azraq 18	Early Natufian	Helwan and abrupt lunates, microburins rare	P	P	P	P	A	P	A
Azraq 32	Early or Middle EP	Unspecified	A	A	P	A	A	A	A
Bawwab al-Ghazal	Early Natufian	Lunates, retouched bladelets	A	A	A	A	A	A	A
Burqu'	Late EP (Natufian)?	Abrupt lunates, retouched bladelets	A	A	A	A	A	A	A
Huwaynit	Late Natufian	Abrupt lunates	A	A	P	A	A	A	P
Jebel Tharwa	Late EP (Natufian)		A	A	P	A	A	A	A
Jebel al-Subhi	Late Natufian	Non-geometrics, rare abrupt lunates, rare microburins	A	A	A	A	A	A	P? unclear
Jilat 6	Early EP (3 Phases)	Narrow, curved and pointed and arched backed pieces, triangles, La Mouillah	A	A	P	P	P	P	P
Jilat 22	Middle EP (3 Phases) – 1 with Late EP dates	Trapeze/rectangles, La Mouillah, lunates	A	A	P	P	P	P	A
Jilat 10	Middle EP	Truncated backed bladelets	A	A	A	P	P	A	A
Jilat 8	Middle EP	Trapeze/rectangles, La Mouillah, curved pointed, arched	A	A	P	P	P	A	A
Khabrat Abu Hussein	Late Natufian	Abrupt lunates, triangles	A	A	A	A	A	A	P? (unclear)
Khallat 'Anaza	Late Natufian	Lunates	A	A	P	A	A	A	P
Kharaneh IV	Early and Middle EP	Micropoints, obliquely truncated and backed, trapeze/rectangles	P	P	P	P	P	P	P
Khirbet al-Khan (Wadi 'Ajib 11)	Late EP (Natufian)	Lunates, rare microburins	A	A	P	A	A	A	P
Mugharet al-Jawa	Late Natufian	Abrupt lunates, curved backed bladelets, finely retouched bladelets	A	A	P	A	A	A	A
Shubayqa 1	Late EP (Natufian)	Lunates	A	A	P	A	A	A	P
Shubayqa 3	Late EP (Natufian)	Lunates	A	A	P	A	A	A	P
Taibe	Late EP (Natufian)								

Table 1 (continued)

Site	Industry	Microliths	Burials	Symbolic Objects	Ground-stone	Marine Shell	Radiocarbon Dates	Worked Bone	Dwellings (stone architecture or hut floors)
Uwaynid 14	Early EP (2 Phases)	Narrow, curved and pointed and arched backed pieces	A	A	A	A	P	A	A
Uwaynid 18	Early EP (1 phase Early EP, 1 phase Late UP – based on dates)	Narrow, curved and pointed and arched backed pieces	A	A	P	P	P	A	A
Rujum Sawwan (Wadi 'Ajib 12)	Late EP (Natufian), Neolithic	Abrupt lunates, Dabba marble	A	A	A	A	A	A	A
Wadi 'Ajib 16, 18, 24	Late EP (Natufian), Neolithic	Abrupt lunates, rare microburins, Dabba marble	A	A	A	A	A	A	P

(Byrd 1988; Garrard 1998b; Garrard *et al.* 1988) showed that they contain lithic industries rich in microburins, arched-backed bladelets and double truncated, backed bladelets, as well as hearths, some ground stone and shell beads. Further to the southwest, the lower and middle levels of Jilat 6 also produced Early Epipaleolithic industries, similar to that of the Uwaynid sites and 'Ayn Qasiyya Area D (Byrd 1988; Richter *et al.* 2010a). Jilat 6 is a remarkable Early Epipaleolithic site since the upper phase produced evidence for structures and hearths. Although the size of the earlier Epipaleolithic occupations at Jilat 6 is unknown, the Upper Epipaleolithic phase at the site extends over an area of 19,000 m<sup>2</sup>. It is likely, from the limited evidence available, that preceding occupations are much smaller.

The large Epipaleolithic site of Kharaneh IV is comparable in finds density and size to Jilat 6. The Early Epipaleolithic occupation at the site can be more readily determined to be of a substantial size, since it is not entirely covered by later deposits as at Jilat 6 (Maher *et al.* 2007, in press; Muheisen 1983, 1988a). Excavations have produced evidence for hut structures, distinct occupation surfaces, hearths and human remains (Maher *et al.* 2012; Muheisen 1983, 1988a). Like Jilat 6, this site suggests the re-use of this locale by human groups over prolonged periods of time (Byrd and Garrard 1989; Garrard and Byrd 1992; Garrard *et al.* 1994a:184). This is also confirmed by a recent array of radiocarbon dates from Kharaneh IV, which suggest a somewhat shorter period of occupation than previously assumed (Richter *et al.* 2013). These sites show

that long-term occupation of sites occurred well before the rise of the Natufian in the Azraq Basin, yet the role they played in the articulation of the cultural phenomenon of the Natufian remains to be explored. In contrast to 'Ayn Qasiyya Area D, the Uwaynid and Jilat sites, Kharaneh IV's Early Epipaleolithic lithic industry appears to be more similar to that of 'Ayn Qasiyya Area A and B, and the classic Kebaran of the western Levant (Richter 2009; Richter *et al.* 2010a). Slender, finely retouched obliquely truncated and backed bladelets, in particular, are common in the assemblages.

While the Early and Middle Epipaleolithic sites in the Wadi el-Jilat have been securely dated by radiocarbon assays, few Middle Epipaleolithic sites can be straightforwardly assigned to any known lithic industries or techno-complexes (Garrard 1998b, Garrard *et al.* 1994a, Garrard and Byrd 1992). Geometric microliths considered diagnostic for many Middle Epipaleolithic industries (Bar-Yosef 1970, 1981; Goring-Morris 1995; Henry 1989) are highly variable or not as strongly represented at these sites. This makes it difficult to place them into the existing typological frameworks.

Kharaneh IV is the largest known Middle Epipaleolithic site in Azraq and highlights the great diversity of Epipaleolithic settlement patterns in the basin. Measuring at least 10,000 m<sup>2</sup> in extent, the Middle Epipaleolithic phases here represent one of the largest known occupations anywhere in the southern Levant. Excavations by Muheisen (Muheisen 1983, 1988a, 1988b) and more recently by the *Epipaleolithic Foragers in Azraq Project* (Maher *et al.* in press), documented the remains of

structures, including post-holes, occupation surfaces, and hearths (Maher *et al.* 2012). Their presence indicates that Kharaneh IV was a major site. The density of finds, the size of the site, and the relatively short period of occupation (see Richter *et al.* 2013) indicate that Kharaneh IV was either occupied for extended periods of time, used by large groups of people, or a combination of both. Clearly, local conditions were also amenable enough to permit sustained use of the site by both Early and Middle Epipaleolithic groups. While clearly geometric in nature, the lithic assemblage at Kharaneh IV Phase D is distinct from the classic definition of the Geometric Kebaran. Although trapezes are the most abundant type of geometric microlith, they are characterised by a high degree of variation in overall shape and location of retouch (Muheisen and Wada 1995; Maher and Macdonald 2012). The assemblage is notably different from nearby AWS 48 and those in the Wadi el-Jilat, and along with other aspects of material culture more similar to Natufian sites (*i.e.* worked bone, shell, architecture), raises a number of questions about the emergence of the Natufian in the Azraq Basin.

Marine shell is very abundant at Middle Epipaleolithic Kharaneh ( $n > 1000$ ), but is also present at other sites in the Azraq Basin (Garrard *et al.* 1994a). While more than 20 species have been identified, deriving from both the Mediterranean and Red Seas, the shell consists primarily of *Dentalium sp.* and *Nerita sp.* (Allcock 2009; Richter *et al.* 2011). All of the marine shell is modified, usually pierced, with evidence of having been strung, and sometimes with traces of red ochre inside the pierced hole. Sites like Kharaneh IV, with such a rich shell assemblage, demonstrate that the inhabitants clearly were linked into very large networks of social interaction, with direct or indirect contact with both the Mediterranean and Red Sea shores. This shows that even prior to the Natufian Azraq was well connected with other parts of the Levant, and potentially played a role in regional networks of exchange and social interaction (Richter *et al.* 2011).

These Early and Middle Epipaleolithic sites, especially Kharaneh IV and Jilat 6, show that in Azraq pre-Natufian sites contain many non-lithic features commonly associated with Natufian sites, such as architecture, shell, bone tools, art, burials, and some ground stone. The differences between pre-Natufian and Natufian occupations can therefore be considered as more a matter of quantity than quality (Table 1). These substantial and occupationally-complex sites demonstrate the

problems in identifying seasonality and sedentism at Epipaleolithic sites in general (see also Boyd 2006).

### Late Epipaleolithic Sites in Azraq

Eighteen Late Epipaleolithic sites have been reported from the Azraq Basin, of which five have been partially or fully excavated. These are Khallat 'Anaza (Betts 1991, 1998), Azraq 18 (Garrard 1991; Garrard *et al.* 1988, 1994a), Bawwab al-Ghazal (Rollefson *et al.* 1999), 'Ayn Qasiyya (Richter *et al.* 2007, 2010a), and Shubayqa 1 (Betts 1998). In an area of approximately 12,000 km<sup>2</sup>, eighteen sites represent a rather low site density compared to nearby regions (see *e.g.* Goring-Morris 1988). The present distribution is partially an artefact of regional survey coverage. Archaeological survey coverage in the Azraq Basin has been uneven and only a small proportion of the whole area has been systematically prospected for sites (Betts 1988, 1998; Garrard 1984; Garrard *et al.* 1977). Further surveys will likely increase the number of known sites and significantly alter our understanding of the distribution of Late Epipaleolithic in the region. Excavations, likewise, have been few and far between. Only one third of the known Late Epipaleolithic sites in Azraq have been excavated and, for three of these cases, excavations were restricted to preliminary soundings. Only at Azraq 18 (Garrard 1991; Garrard *et al.* 1988) and Khallat 'Anaza (Betts 1991, 1998) have larger exposures been excavated. Radiocarbon dates are not available from any of these sites. Their dating therefore relies entirely on chipped stone artefact typologies.

### Late Epipaleolithic Lithic Industries

It goes without saying that the comparability of artefact collections depends predominantly on the use of compatible published typological systems, as well as a common collection methodology. While some sites in the Azraq Basin have been excavated and produced representative collections, the majority were identified on the basis of small surface collections with no accompanying subsurface testing. In some cases, very few diagnostic pieces were recovered and the designation of some sites as Natufian hinges on the presence of a very small number of lunates (Fig. 2, *e.g.* Betts 1998:29-32). Since lunates do occur in small numbers in assemblages from earlier and later periods, assigning sites to the Natufian on the basis of a few 'diagnostic' pieces alone is not necessarily conclusive, let alone



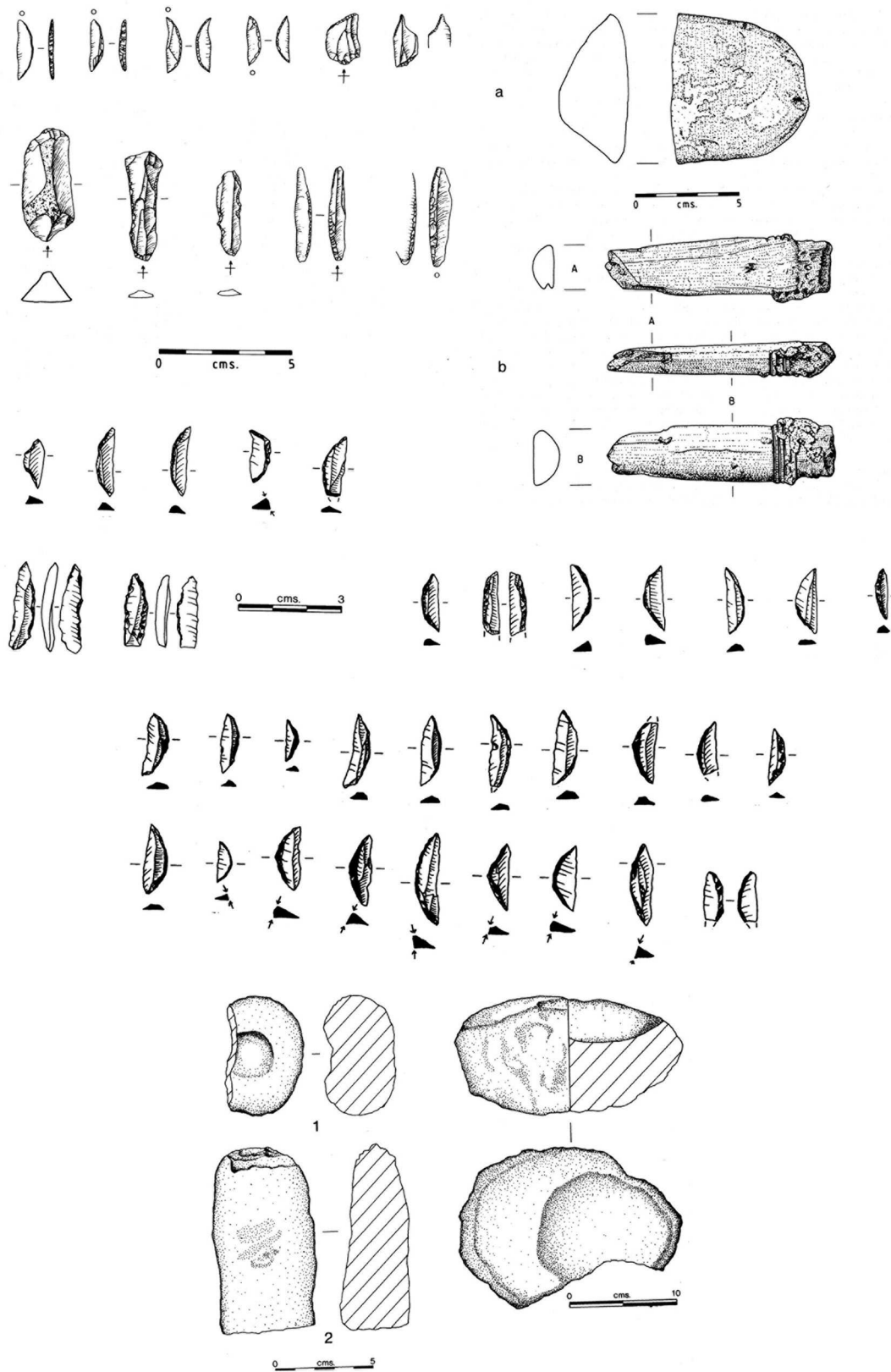


Fig. 2. The material culture of the Azraq Basin Natufian. Modified from Betts 1998 and Garrard 1991.

placing them into sub-phases of the Natufian. Lacking representative, well-dated collections from excavated contexts and a better understanding of the regional sequence as a whole this has to be considered as a significant problem in dating and interpreting these assemblages.

Detailed reports of chipped stone assemblages are rare (although see Garrard *et al.* forthcoming), and since many derive from surface collections, their analytical potential is limited. Typically Natufian small blade/bladelet cores are common, but opposed platform blade or flake cores also occur. The use of chalcedony and fine-grained, high-quality flints was very common, similar to many other Natufian sites (Betts 1998; Garrard 1991). Small flakes outnumber blades and bladelets in the two assemblages published in detail (Jebel Subhi and Khallat 'Anaza) (Betts 1998:15-22 and Tables 2.1, 2.3, 2.13) and in most cases it seems that initial core reduction did not take place on-site. While present on some sites, the microburin technique appears to have been used only sporadically, if at all, by Natufian groups in the Azraq Basin (Richter 2011). This is particularly interesting because Byrd (Byrd 1988, 1994, 1998) and Garrard (Garrard 1991; Garrard *et al.* 1994a, see also Richter *et al.* 2010a for data from 'Ayn Qasiyya) report use of the microburin technique already in the Early Epipaleolithic of the Azraq Basin.

Both Helwan as well as abrupt and bipolar backed lunates are present at every Late Epipaleolithic site in the Azraq Basin. The presence of both types of lunates, along with small sample sizes, makes assignment of individual sites to the Early or Late Natufian difficult. Exceptions include the two comprehensively excavated sites. Khallat 'Anaza was assigned to the Late Natufian by Betts on the basis of a lack of Helwan lunates (Betts 1991, 1998). Azraq 18 has a higher proportion of Helwan lunates and this, along with other non-lithic parallels, suggests that the site dates to the Early Natufian (Garrard 1991). However, neither stratigraphic successions nor radiocarbon dates exist for these sites, which would allow us to anchor the assemblages into an absolute chronological framework. We know that Late Epipaleolithic lithic typologies are not necessarily pan-regional, and local variation in lithic typology is the norm, rather than the exception (Cauvin 1991; Olszewski 1988, 1991). So, while we continue to lack independent chronological data we are, perhaps, too reliant on the equivocation of Helwan lunates for the Early Natufian and their absence in favour of abrupt lunates for the Late Natufian as developed elsewhere.

This is not to say that this sub-division does not apply in other parts of the Levant or indeed in the Azraq Basin, but further independent verification in Azraq is required to confirm that it is applicable. Recent experimental work by Marder *et al.* (2006) involving a detailed technological examination of lunate production and its debitage shows clear differences between Early and Final Natufian phases. Although obtaining reliable radiocarbon dates is a priority, a similar re-analysis of the Azraq lunates, and associated debitage, might help resolve some of this chronological ambiguity.

Overall, we remain unclear as to the comparability of the analysed Natufian lithic assemblages from the Azraq Basin due to differences in collection strategies, the absence of absolute dates, the lack of stratigraphic resolution for surface sites, and large areas of the basin that remain unsurveyed. The issue of chronology is crucial here. While the chronological sub-division into Early, Late and Final Natufian phases on the basis of lithic typology has proven robust in other areas of the southern Levant, we cannot be certain that typologies developed elsewhere are equally applicable in Azraq. Ultimately, this problem has wider ramifications, since it casts doubt over the dating of many Late Epipaleolithic sites in the Azraq Basin, and complicates our identification of the emergence of the Natufian in this 'marginal' zone.

### **Late Epipaleolithic Economies in the Azraq Basin**

Four datasets provide proxies on Late Epipaleolithic economic practices in the Azraq Basin: chipped stone industries, ground stone, plant remains and faunal remains. Faunal remains were recovered from two sites. The assemblage from Azraq 18 (Garrard 1991; Garrard *et al.* 1988; Martin 1995) indicates the presence of wild cattle, a variety of wild ass, and gazelle, fox, hare, wolf and two species of migratory bird, which were each represented by a single bone. Despite their frequency at Azraq 18, wild cattle are rare at other, earlier Epipaleolithic sites in the region, and their presence here suggests that this species was most numerous in the oasis. The assemblage from Khallat 'Anaza examined by Garrard (Garrard 1998a) included gazelle, caprids, and equids as the principal species, with caprids dominating. The dominance of particular species at sites in different ecological niches, such as cattle at Azraq 18, caprids at Khallat 'Anaza, and gazelle at the Middle Epipaleolithic site of Kharaneh IV, suggests that Late Epipaleolithic hunter-gath-

ers may have continued a tradition of stalking animals typical of a particular local environment. This would suggest that earlier Epipaleolithic subsistence practices were carried over into the Late Epipaleolithic and may, in turn, suggest a continuity of populations. However, this requires more serious testing on well-sourced samples. A change in settlement location and type (discussed below) might reflect shifts over time in the differential preference of particular species, a shift in local environmental conditions, or differential reliance on other resources such as plants.

Several recent studies of Natufian faunal and chipped stone assemblages from adjacent areas (*e.g.* Bar-Oz and Munro 2007; Stiner *et al.* 2000; Stutz *et al.* 2009; Yaroshevich 2006; Yaroshevich *et al.* 2009) provide a wealth of data on hunting techniques and animal-product processing. However, Natufian faunal data from Azraq requires further study to elucidate these types of behaviours. Samples are generally too small and derive from excavations of limited spatial extent, hindering any precise statements regarding hunting, seasonality, butchery, food preparation or disposal patterns. The persistence of gazelle exploitation from the earlier Epipaleolithic is notable and further studies of gazelle behavioural ecology (*e.g.* Martin 2000) may prove useful for interpreting human use of gazelle in these archaeological assemblages. Yet, the overall wider diversity of species represented at Natufian sites, in comparison to earlier Epipaleolithic ones, suggests there may be some significant differences in economic strategies that we do not yet fully understand.

There is virtually no direct evidence that would provide us with insights into the plant economies of the Late Epipaleolithic in the Azraq Basin, since none of the excavated sites have produced identifiable carbonized plant remains, despite the best efforts of their excavators (Betts 1998; Colledge 2001; Garrard 1991; Garrard *et al.* 1994). We can infer the possibility of plant processing and likely consumption only on the basis of chipped and ground stone material suggestive of harvesting, pounding or grinding plants, although their use for other purposes such as grinding and pounding minerals (Dubreuil 2004). A number of chipped stone tools from Khallat 'Anaza show silica gloss, a feature often assumed to be associated with plant harvesting (Anderson-Gerfaud 1983). An examination of the chipped stone assemblages on the basis of major tool groups is also hindered by the lack of compre-

hensive data. If the overall proportions of the tool groups are compared, Khallat 'Anaza emerges as an assemblage with a somewhat less 'residential' profile, *i.e.* lacking scrapers, notches/denticulates (thought to relate more to on-site processing of animal carcasses) and with a higher percentage of microliths (possibly indicating the preparation and maintenance of hunting gear). This picture is somewhat contradictory since Khallat 'Anaza also has evidence for longer term residential use in the form of architecture and bedrock mortars.

Ground stone tools – both portable and non-portable – are common at Natufian sites in the Azraq Basin (Table 1). Aside from pestles, pounders and other small implements, bedrock cupmarks and mortars exist at several sites, including Khallat 'Anaza (Fig. 3), Shubayqa 1 and 3, and Wadi 'Ajib 11 and 18. In a recent visit to the Shubayqa sites, in particular, the authors noted numerous ground stone implements within the remaining traces of structures and re-used in later buildings at the site. Their abundance would suggest that grinding and pounding were important activities. It is remarkable to have such a seemingly high density of ground stone at sites located in a today semi-arid to arid environment. It would seem to us that past environmental conditions may have allowed for the collection and processing of a variety of locally available plants. By the same logic, the abundance of ground stone (albeit of a wider range of raw materials, including sandstone, limestone and basalt) at the earlier sites of Kharaneh IV and Jilat 6 may also suggest plant processing.

Dentalium shell beads have been found at both Khallat 'Anaza and Azraq 18 (Betts 1991, 1998; Garrard 1991; Garrard *et al.* 1994a). This suggests, tentatively, that connections existed between groups in the Azraq Basin and those further west and or south, since these shells must have derived from either the Mediterranean or Red Sea coasts. Groups in the Azraq Basin must have had some links to other communities with access to these materials and therefore likely participated in regional exchange systems of some kind. This extends previous patterns of exchange and social interaction, which are apparent in the region since at least the Early Epipaleolithic (Richter *et al.* 2011). Both Red and Mediterranean Sea shells were excavated at Kharaneh IV, Jilat 6 and other pre-Natufian sites in Azraq, showing wide ranging connections across the southern Levantine landscape, which presumably continued into the Late Epipaleolithic Natufian.





Fig. 3. Bedrock mortars at Khallat ‘Anaza.

### **Late Epipaleolithic Settlement Patterns and Site Features**

Late Epipaleolithic groups appear to have largely occupied different localities than those preferred by their predecessors (Fig. 1). The two large Epipaleolithic sites of Kharaneh IV and Jilat 6, as well as other Middle Epipaleolithic sites in the Wadi el-Jilat appear not to have been occupied during the Late Epipaleolithic (Garrard 1998b; Garrard *et al.* 1994a; Muheisen 1988a, 1988b). The only area that remained in continuous use was the Azraq Oasis. Here, AWS 48 was not reoccupied. The most substantial occupation levels at ‘Ayn Qasiyya date to the Early Epipaleolithic period, but Natufian groups used the area to the immediate north of the spring, since residual Late Epipaleolithic diagnostic artefacts were found mixed with PPNB chipped stone artefacts in Area C (Richter *et al.* 2007, 2010a). In the southern Azraq marshlands another site occupied during the Natufian was Bawwab al-Ghazal (Rollefson *et al.* 1999), which seems to represent a small-scale, temporary site. We recently identified a further suspected Late Epipaleolithic locality c. 5 km northeast of Azraq ed-Druze in the vicinity of Ain al-Beidha. Late

Epipaleolithic occupation of the oasis therefore remained intense and further survey will likely produce evidence for additional sites. An overall shift in occupation towards the more northerly part of the basin and surrounding areas can nevertheless be noted. Late Epipaleolithic sites appear in the eastern part of the Hamad and were established across the basalt desert (Betts 1988, 1991, 1998; Wasse and Rollefson 2005) where Early and Middle Epipaleolithic sites are rare. Betts (1998:12) notes only a few Geometric Kebaran scatters and two Kebaran camps at Burqu and Qa Mejalla, in the Harra. Irrespective of sample bias due to uneven survey coverage (as those areas that are intensively surveyed show a trend towards more or less sites of different time periods), this pattern suggests an expansion of settlement into what appears to have been previously unoccupied areas, as well as a subtle shift in settlement locations.

Notably, none of these Late Epipaleolithic sites are anywhere close to the size of the Early or Middle Epipaleolithic mega-sites further south and west in the basin. Indeed, the majority of sites appear to be on a much smaller scale. However, at least three Late Epipaleolithic sites have evidence for architecture. Small, and as yet unpublished,





Fig. 4. View of stone architecture and flagstone paved floor at Shubayqa 1. Courtesy of Louise Martin.

soundings at Shubayqa 1 have provided evidence for at least one semi-circular structure containing a flagstone-paved floor dated to the Natufian (Fig. 4). The structure consists of a low exterior wall made up of large, upright-standing stones with an interior made up of a stone-paved floor. Since the structure was only partially exposed it is difficult to characterize it further. The presence of a structure at Shubayqa 1, is accompanied by what appears to be dense concentrations of lithic artefacts, fauna, and basalt ground stone tools, including heavy

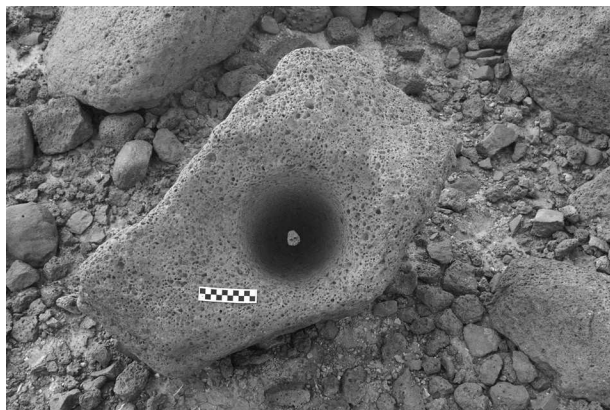


Fig. 5. Deep, non-portable mortar at Shubayqa 1.

duty, not-easily-transported, mortars (Fig. 5). Nearby, Shubayqa 3 also features at least three small, semi-circular structures at present visible only on the surface (Fig. 6). They seem to consist of low walls and are associated with chipped stone artefacts, fauna, and ground stone tools. Measuring only about 2 m in width they are likely associated with a short-term temporary camp situated along the southern edge of the Shubayqa mudflat. Limited surface collection of the lithic scatter indicates an assemblage similar to other Natufian sites in the area. Betts (1998:28) noted large numbers of ground stone at the site, which may denote intensive plant processing here. Excavations at Khallat 'Anaza, 11 km west-south-west of Shubayqa 1, indicate the presence of at least one, but potentially several more small circular structures (Betts 1991, 1998; Fig. 7).

Another Natufian site with suspected architectural remains is Jebel Tharwa 1d (Wasse and Rollefson 2005). Wasse and Rollefson's report suggests the presence of 5-6 circular or semi-circular structures, each measuring 2-8 m in diameter. Whether or not the structures are related to the Late Epipaleolithic occupation or not remains to be tested, but if it can be confirmed this would repre-





Fig. 6. Traces of circular stone architectural remains at Shubayqa 3.

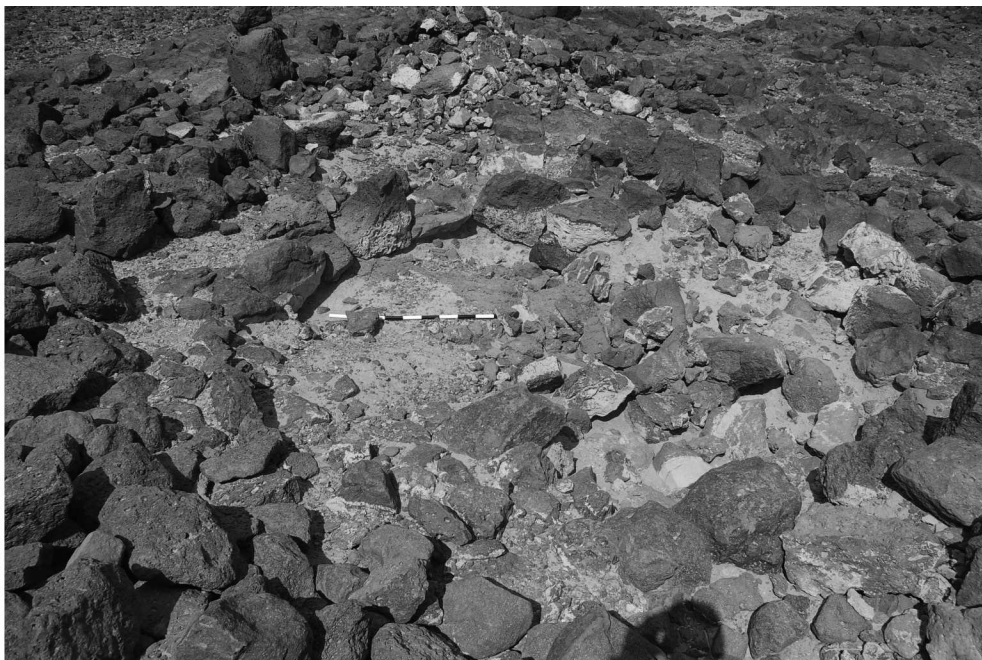


Fig. 7. Remains of circular stone architectural remains at Khallat 'Anaza.

sent a rare instance of a Natufian site far into the arid zone of the Harra. Betts (1998:11) also cites Mugharet al-Jawa as a substantial occupation site within a rock shelter, consisting of a disturbed flint scatter and ground stone, but with no evidence for structures. Betts interprets the dense lithic assemblage (exhibiting close parallels to Khallat 'Anaza), ground stone and animal bone as representing a site occupied for somewhat prolonged periods, on a seasonal basis. The remaining sites are described as knapping stations or short-term, ephemeral camp sites.

The only Natufian site in the Azraq Basin with human remains is Azraq 18 (Garrard 1991). This site south of the Azraq marshlands has produced evidence of a collective grave pit containing several individuals within a shallow depression beneath the main occupation deposits. Within this pit three adult and six subadult individuals were associated with several wild cattle horn cores and two skulls exhibited traces of ochre staining. Some of the remains are partially articulated and suggest primary interments, but most seem to have been partly disturbed after burial by subsequent interments (see Bocquentin *et al.*, herein). Human remains are rare from the Azraq Basin throughout the Epipaleolithic period, with the only other burials known from the Early Epipaleolithic occupations at 'Ayn Qasiyya (Richter *et al.* 2010b) and Kharaneh IV (Muheisen 1988a, 1988b). No large scale cemeteries or burial grounds have been documented.

Although one has to be careful with respect to commonly used indicators for sedentism (Boyd 2006; Edwards 1989), some of the Natufian sites described above are substantial and significant sites that combine many of the features of sites in the Mediterranean zone, Hilly zone and Jordan Valley (Betts 1998; Garrard 1991). Many contain ground stone artefacts and bedrock mortars, architecture or burials, and take advantage of key micro-environments in various parts of the Azraq Basin. The most intriguing element is however the apparent abandonment of sites that were previously intensely occupied and none of the newly established Natufian sites are as large or dense as those of the Middle Epipaleolithic or even the Early Epipaleolithic. It is tempting to put forward environmental causes for this shift. Stable resources at or near sites in the Wadi Jilat and Wadi Kharaneh may have disappeared with the emergence of the Natufian in Azraq (Jones and Richter 2011; Richter *et al.* 2013). Instead, Natufian groups took advantage of more diverse environments, straddling boundary zones between different ecological zones to take

full advantage of a broader range of resources, as evidenced by the sites near the Shubayqa mudflats. Yet, we do not have the paleoenvironmental record at present to investigate this question in greater detail. The development of the Natufian in terms of semi- or full sedentism in the Azraq Basin therefore seems somewhat asymmetric. Large, dense sites on a scale not witnessed elsewhere in the southern Levant are present in Azraq prior to the Natufian, and disappear at precisely the point when they seem to become more common elsewhere. Did the experiment of long-term use of particular zones fail in Azraq? Did resources shift and people adjusted accordingly? These are crucial questions to consider for research into the origins of the Natufian and the onset of the Neolithic, since in Azraq we appear to witness a much more non-linear development than perhaps previously thought.

## Discussion

Intriguingly, and contrary to much of the rest of the Levant, we have a more advanced understanding of the Early and Middle Epipaleolithic in Azraq than the Natufian. Despite the limitations imposed by the available evidence a number of pertinent questions regarding the Late Epipaleolithic in the Azraq Basin emerge. Perhaps the most critical issue is that of chronology, with a considerable lack of clarity regarding the dating of the Natufian in the region. No radiocarbon dates from any of the excavated or identified Natufian sites exist that would allow us to tie these occupations into pan-regional sequences. We also lack sites that are stratified with earlier or later occupations to enable us to establish at least a relative chronology. For these reasons we cannot be confident about the timing of occupations in the Azraq Basin. Research elsewhere has shown that lithic sequences can be quite variable and pan-regional trends in lithic typology are not necessarily applicable (Olszewski 1991; Olszewski 1988). In other words, while certainly Late Epipaleolithic, we consider the current relative dating of Natufian sites of the Azraq Basin on the basis of lithic typology a hypothesis that has to be further tested. Throughout the Epipaleolithic period, the Azraq Basin is, in this regard, a particularly variable region since few other parts of the southern Levant show comparable lithic assemblage diversity throughout the Epipaleolithic, except the Middle, Late and Terminal Epipaleolithic of the Sinai and Negev (Goring-Morris 1987). Some of the available C14 dates from the Wadi el-Jilat for example indicate that two occupations here are at least partially



contemporary with the early Natufian, despite the fact that the lithic assemblages from these sites do not appear to be Natufian (Garrard and Byrd 1992, in press). Understanding this local variation in lithic tool kits is an important issue to account for in developing a local sequence and inter-regional comparisons.

A lack of available or comprehensive faunal and botanical assemblages makes it very difficult to identify changes in the Final Pleistocene economies of the Azraq Basin. As elsewhere we seem to be able to detect an increase in ground stone tools toward the Natufian, which is generally accepted as indicating a shift in how plants were exploited (Wright 1994). However, other complementary uses of ground stone, which could result in their increase at a site, have also been recently identified (Dubreuil 2004). It is not possible at the moment to ascertain what functions these ground stone tools fulfilled at sites in the Azraq Basin, and why they appear to have become more widespread during the Late Epipaleolithic. Their abundance hints at potential economic shifts in the way in which the landscape was used (or what resources were used more intensively) and these may be related to the abandonment of particular locations within the basin, continued use of the oasis, and the establishment of new sites concentrated along the lower reaches of Jebel Druze.

Given present datasets for Azraq, we cannot detect the large-site phenomenon characteristic of the Early Natufian in the Hilly Zone, Coastal Plain or Jordan Valley (Bar-Yosef and Belfer-Cohen 2000). Instead, very large sites that easily compare in size, intensity and thickness of occupation to major Natufian sites of the hilly zone, were already present in the Azraq Basin prior to the Natufian (Kharaneh IV and Jilat 6), and similarly were accompanied by smaller sites nearby (e.g. 'Ayn Qasiyya, Uweynid 14 and 18). Thus, the Natufian settlement pattern in the Azraq Basin, with its lack of basecamps, contrasts markedly from the Early Natufian settlement pattern in the Mediterranean zone. Azraq 18 appears to be the only Early Natufian site in the Azraq Basin, but is nowhere near the size or density of some earlier Epipaleolithic sites. Other Late Epipaleolithic sites tend to be smaller and situated in very different locations than earlier sites. The presence of very large, dense 'mega'-sites in the Wadi Kharaneh and Wadi el-Jilat suggests that local environmental conditions were suitable for longer term and repeated occupation in the Early and Middle Epipaleolithic. What changed during the Late Epipaleolithic that caused the

abandonment of these sites? Did the local environment deteriorate causing a localized depletion of resources and shift in settlement? Or did new economic practices and patterns arrive as part of a 'cultural package' that led people to exploit other, more diverse environmental settings along the northern edge of the Azraq Basin? While these have many characteristics of sites in the Mediterranean zone (stone-built architecture, non-portable ground stone tools, burials, art objects), the development of Azraq Basin settlement patterns appears asynchronous when compared to the western Levant.

The lower reaches of the Jebel Druze appear to have been a particularly important settlement area, with several small sites located in a relatively small area in strategic situations to take advantage of views and access to highlands (Betts 1998). These are somewhat classic Natufian site locations where inhabitants could draw on the advantages of different ecotones. Some of these sites contain architectural traces and bedrock mortars and suggest that occupations were more than just short-term hunting camps. Despite being situated in an area of relatively low rainfall today (100-200 mm/yr), this area receives a large amount of seasonal runoff from Jebel Druze (Betts 1991, 1998) and green vegetation often persists throughout the driest parts of the summer, particularly after wet winters. Even environmental conditions with slightly more available moisture, as expected in the Bølling-Allerød (Allison *et al.* 2000; Jones and Richter 2011; Whitehead *et al.* 2008) and coinciding with the Early Natufian, would have provided significantly more surface run-off and may have made for example the Shubayqa mudflat a more reliable, permanent water source (Whitehead *et al.* 2008). It is not inconceivable to think that in this situation increased plant availability encouraged more intensive exploitation in the vicinity of these sites.

The presence of these intriguing Natufian occupations, the intensity of the earlier Epipaleolithic occupation of the Azraq Basin, as well as our knowledge of reconstructed ecological conditions for the region ought to make us question the perception of this region as peripheral to cultural developments throughout the Epipaleolithic. If Early and Middle Epipaleolithic sites are anything to go by, it appears that occupation of the region was more or less continuous throughout the Epipaleolithic. This begs the question whether there really was an influx of groups from the western Levant during the Late Natufian due to the environmental impact of the Younger Dryas, as is evident in the spatial

organization of groups in the Negev and Sinai (Goring-Morris 1987, 1988)? Despite being characterised by differences in occupational intensity, there seems little evidence for total abandonment or sudden influx; rather Epipaleolithic groups may have adjusted to locally-specific ecological changes, shifting to different locales or sites. The abandonment of the large mega-sites at Jilat 6 and Kharaneh IV, and an apparent shift in settlement location toward the flanks of the Jebel Druze in the north seems to hint that there was a break in settlement continuity; at least as far as the reuse of particular locales was concerned. However, the reasons for this switch remain inconclusive and may have been environmental or related to larger population movements. The water sources at these localities may have shifted or dried up with the increasing amelioration of the Bølling-Allerød (14.6 cal BP). At the same time, it may relate to the adoption of a new economic regime. Natufian sites appear to take better advantage of the local mosaic of ecotones along the Jebel Druze flanks, whereas earlier Epipaleolithic sites were perhaps more specifically orientated toward procurement of game. The preponderance of non-portable ground stone at sites along the Shubayqa mudflat suggests that plant collection and processing took place, showing that people took better advantage of the different opportunities of the local environment. At the same time, partially new technologies arrive in the Azraq Basin. Were these brought in by groups migrating to Azraq from the Natufian 'core' or were these technologies adopted locally through a diffusion of ideas? Paths of communication/interaction along which such ideas and technologies could have travelled were certainly in place prior to the Natufian, as marine shells indicate that Azraq was well-connected with regions further south along the Red Sea, as well as the Mediterranean coast (Richter *et al.* 2011).

The evidence from chipped stone artefacts shows, at least tentatively, that there was no development of a local industry during the Late Epipaleolithic. Despite atypical Middle Epipaleolithic assemblages, to date we have not come across different Late Epipaleolithic tool types or techniques that would suggest Azraq-specific adaptations or traditions in lithic technology. A comparison to the final Pleistocene in the Negev and Sinai is instructive here; where sites identified as Harifian on the basis of notable differences in site organization and the appearance of specialised tools (Goring-Morris 1987, 1991, 1995; Goring-Morris and Belfer-Cohen 1998), emerged contemporaneously to Late Natu-

fian groups elsewhere. While there are particular tool types that appear restricted to Azraq sites (the Jilat Knife and triangle variants) these pre-date the Late Epipaleolithic and are site-specific, rather than a regional phenomenon. Perhaps further work on Natufian sites in Azraq will change this picture, but at the moment, we see no evidence for an Azraq-adapted Late Epipaleolithic facies. The only pattern we do note is one common to Natufian sites throughout the Levant (Bar-Yosef and Valla 1991) – the preponderance of Helwan lunates together with abruptly backed and bipolar lunates in all Natufian assemblages in the basin – and lends further support to connections between groups in Azraq with their contemporaries.

## Conclusion

In this paper we have attempted to situate the Late Epipaleolithic of the Azraq Basin within the wider context of cultural developments during the final Pleistocene in Azraq and Southwest Asia. Although our current understanding of the Azraq Basin chronology is limited, some key questions do surface: How did the Natufian emerge as a cultural phenomenon in the Azraq Basin? Was there an *in situ* development from local populations or did people migrate here from other parts of the southern Levant? Or, were groups in Azraq part of a larger, regular movement of people across the southern Levant? What are the dates for Natufian occupations in the Azraq Basin and how do they relate to other Levantine chronological frameworks? What role did groups occupying the Azraq Basin play in our models of cultural, social and economic change during the terminal Pleistocene and early Holocene? And, given the Neolithic re-occupation of many Natufian sites (Betts 1998; Garrard *et al.* 1994a; Rollefson *et al.* 1999), what is the nature of the transition to the Neolithic in Azraq?

It has been widely argued that the Younger Dryas had a dramatic impact on Natufian groups (Bar-Yosef 1998; Bar-Yosef and Belfer-Cohen 1991, 2000, 2002; Bar-Yosef and Meadow 1995; Henry 1989, 1995; Stutz 2004), causing a dispersal of Natufian populations from the Mediterranean core into the arid periphery while Natufian groups in the core began to cultivate cereals. In the case of the Azraq Basin we simply do not have the chronological data to verify whether such a move occurred, or whether it was related to the impact of the Younger Dryas. Without more stratified Natufian sites and radiocarbon dates, the questions posed above must remain unresolved. Nevertheless, it

seems that the Late Epipaleolithic was a period of change in the Azraq Basin, as elsewhere. These changes may relate to the development of new ideas, technologies, economic models, people or a combination of all of these. What we can say is that large, long-term occupation sites such as Kharaneh IV and Jilat 6 were not re-used by Natufian groups. The only location within the basin that appears to have been continuously used is the oasis itself, with settlement shifting toward the northern part of the Azraq Basin. Why were these large Early and Middle Epipaleolithic sites abandoned and new sites established in other parts of the basin?

Notwithstanding the pioneering work of Garrard, Betts and others in the Azraq Basin over the course of almost three decades, the current situation leaves us with more questions than answers. Our review of the evidence here shows that we ought to be cautious at present to use the Azraq data as unequivocal support for models of cultural change and dynamics that suggest an expansion of Late Natufian groups into the marginal zones of the Levant because of environmental change. Our chronological control over the sites and assemblages from Azraq has, as yet, a too poor resolution to relate the occupations of these sites to any climatic episode. We also have virtually no data to reconstruct the severity or impact of the Younger Dryas on the local environments in Azraq, and are consequently unable to develop a better understanding of how groups locally may have dealt with these external influences. It may well be that Late Natufian groups who migrated out of the Mediterranean zone arrived in the Azraq Basin and established new sites. Yet, we need additional and more detail research to test this idea. Such data will also allow us to consider whether there was an input from local populations into the emerging local Neolithic, or not. Such excavations would also enable us to recover lithics, environmental samples, and other aspects of material culture, to investigate Natufian economies in the Azraq Basin, and to situate developments here against the wider pan-regional picture. Continued work at earlier Epipaleolithic sites will also shed light on local trajectories of development throughout the Epipaleolithic.

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### Notes

<sup>1</sup> Excavations and survey at 'Ayn Qasiyya, AWS48 and Kharaneh IV, now part of the Epipaleolithic Foragers in Azraq Project based at the University of Cambridge.

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