

**PPNB FRONTIER IN SOUTHERN JORDAN:
A PRELIMINARY REPORT ON THE ARCHAEOLOGICAL SURVEYS
AND SOUNDINGS IN THE JAFR BASIN, 1995-2005**

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1. Introduction

The Jafr Basin is a large depression in southern Jordan, covering an area of ca. 15,000 km² of the Ma'an plateau (Bender 1968: 9, 1974: 8; Macumber 2001: 10). It forms an internal closed drainage system separated from the surrounding major water systems: Wadi al-Hasa to the north, Wadi as-Sirhan to the east, Wadi al-Hisma to the south, and Wadi ar-Araba to the west. The elevation of the basin is relatively high, ranging from ca. 900 m in its centre to ca. 1,200 m at the peripheral hilly countries. Topographically, it is characterized by gently undulating flint pavement deserts (or *Hamada* in Arabic) and dotted playas (or *Qa'* in Arabic).

The environmental condition of the basin is (and probably was) very harsh. Since the average annual rainfall in the central area is less than ca. 50 mm (Jordan National Geographic Center 1984: Fig. 114), no perennial natural water sources are available. The local vegetation is consequently very poor, being limited to thorny shrubs dotted on wadi beds. Furthermore, it is extremely hot in summer and very cold and stormy in winter. Thus the land, especially the core area east of the Desert Highway, has been sparsely used for seasonal pasturing only. Except for two oasis towns (i.e. Ma'an and al-Jafr), no traditional settlements exist. Although a few villages are dotted along the Desert Highway, they were founded in the recent past as a part of policies to promote the sedentarization of local pastoral nomads.

Such an unfavorable situation has affected archaeological research of the basin. Unlike the other areas in southern Jordan - Kerak (Worschech 1985; Miller 1991; Chesson et al. 2005), Wadi al-Hasa (MacDonald 1988; Coinman 1998, 2000; Neeley 2000; MacDonald et al. 2004), Wadi al-Faynan (Finlayson and Mithen 1998, 2007; Finlayson et al. 2000; Barker 2000), Petra (Gebel 1988; Schyle and Uerpmann 1988), Ghor and Wadi ar-Araba (Raikes 1980; MacDonald 1992; Henry et al. 2001, Bienkowski and Galor 2006), Wadi al-Hisma (Henry 1995), and the Aqaba area (Brückner et al. 2002), to list some - the Jafr Basin has been rarely investigated due to its seemingly poor archaeological potential as well as logistic difficulties. There were some pioneering explorations, but most of these were conducted before the 1970s (Glueck 1934, 1935, 1939, 1951; Rhotert 1938; Zeuner et al. 1957; Field 1960; Huckriede and Wieseman 1968; Bender 1968, 1974; Moumani 1997).

For this reason, the basin had been left as a large blank even in comprehensive archaeological site maps (Department of Antiquities of Jordan 1973; Palumbo 1994; MacDonald et al. 2001), when we started our project (JBPP: the Jafr Basin Prehistoric Project) in 1997 with a view to exploring the origins and development of pastoral nomadism in the southern Levant. No comparative material was available, to say nothing of a standard chronological framework to be referred to. Although this state has been remedied to some extent by reconnaissance surveys focusing on the northeastern part of the basin (Quintero and Wilke 1998; Quintero et al. 2001, 2003) and our continuous research in the northwestern part (Fujii 1998, 1999a, 1999b, 2000a, 2000c, 2001, 2002a, 2003, 2004a, 2004b,

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2005a, 2005b, 2006a, 2006b), much still remains obscure about the general occupational history of the basin.

In order to supplement the deficiency in basic information on the issue, we conducted general surveys and soundings intermittently from 1997 to 2005, in parallel with the major operations of JBPP. As a result, some seventy archaeological sites were located, several of which were briefly referred to elsewhere (Fujii 2002b). This report will focus on PPNB (i.e. Pre-Pottery Neolithic B) sites. A total of nine possible PPNB sites thus far identified in the basin will be described in some detail. It is beyond the scope of this brief report to enter an in-depth discussion, but a brief overview of their archaeological implications will be appended.

2. The Surveys and Soundings

Since the Jafr Basin was very large, our surveys were focused on its northwestern part. They covered an upside-down trapezoidal area encompassed by the following four sides: the hilly countries forming the northern watershed of the basin (to the north), the Husayniyya-Jafr road (to the south), the line connecting Jabal Gurta Siyata and Qa' Abu Tulayha (to the east), and the Desert Highway (to the west) (Fig. 1). It should be added, however, that a few sites beyond the Desert Highway were also registered on the occasion of a round of inspection in the neighboring areas. The surveys, as a whole, covered an area of ca. 300 km² – yet, merely a few percent of the total area of the basin.

The surveys were conducted nine times in total (Table 1). The first survey took place in 1995 as a preparatory inspection of the Jafr Basin, when the site of Qa' Abu Tulayha West, our main concern of the 1st phase of JBPP, was located. The subsequent three surveys from 1997 to 2000 (yet skipping 1999) were carried out in the intervals of the excavations at this site. The site registered during these four brief surveys totaled only a dozen. The main information source of our registered site list is the 2001/2002 winter season survey, which was conducted for about two weeks separately from the main operation of JBPP. The survey registered some thirty sites, which include the vast majority of PPNB sites referred to below. A few of these were sounded in order to collect stratified material. What followed it was the 2002 summer season survey, which located some twenty sites. The subsequent three surveys were of supplementary nature and registered only eight sites.

The surveys were not systematic in nature, because most of them were conducted intermittently in the intervals of the main operations of JBPP. In addition, they were purposive rather than comprehensive in that they gave the highest priority to Neolithic to EBA (i.e. Early Bronze Age) sites. This is because the primary goal of our project was to trace the process of pastoral nomadization in the basin. It should be emphasized, however, that any site ranging from Palaeolithic flint scatters to early Islamic hunting facilities, when encountered, were carefully examined and registered. (It is for this reason why a dozen Palaeolithic and post-EBA sites are included in the site list.) It should also be added that the priority of Neolithic to EBA sites was a natural consequence of the settlement pattern of the basin where, aside from post-Islamic non-descript mound tombs and enclosures, EBA sites are the commonest and followed by Neolithic sites. In this sense, we are convinced that our surveys kept a certain level of precision.

3. PPNB Sites in the Jafr Basin

As mentioned above, a total of nine possible PPNB sites have been located in our survey area and a few of these were sounded. Overall, they are small in site size, consisting of three outposts, a small flint workshop, and five flint scatters. The total absence of full-scale settlement sites is characteristic of the PPNB of the Jafr Basin. This is no wonder, however, seeing that the basin

constitutes the southeastern frontier of the PPNB cultural sphere. The following description begins with the outposts, followed by the less substantial sites.

JF-0116 (Jabal Juhayra)

This is among a few dozen sites that were first found during the 2001-2002 winter season survey and has briefly been reported elsewhere (Fujii 2002b). The site was situated at the southeastern flank of Jabal Juhayra, an isolated volcanic hill ca. 8 km northwest of al-Husayniyya (Fig. 2). It occupied a relatively steep slope facing the north, below which an erosional gully flows down southeastward (Fig. 3). The site size was estimated ca. 0.5 ha on the basis of the distribution of surface finds, flint artifacts in particular. Though much smaller in size than coeval sedentary settlements to the west, it is among the largest PPNB sites thus far located in the Jafr Basin. A test sounding conducted in the 2005 spring field season showed that cultural deposits were ca. 0.5 m thick, again a value much smaller than that of coeval sedentary settlements. Nevertheless, some wall alignments faintly visible on the present ground surface suggest that the site served as a small settlement containing at least several structures.

The question is concerned with the site function. Does the site represent a small yet year-round sedentary settlement or a seasonal outpost derived from a parent settlement probably to the west? Nothing specific can be said before excavations, but the second interpretation seems more likely in view of the small site size and the limited cultural deposits. The harsh environmental conditions around the site, the absence of a perennial water source in particular, also support the view that the site served as a seasonal outpost.

The surface collection contained several dozens flint artifacts and a few grinding implements made of limestone. With the exception of a handful of Roman-Byzantine pottery sherds, no ceramic finds were included. The flint collection was characterized by naviform core-and-blade components (Fig. 4: 1-10), an indicator of the PPNB flint assemblage. The collection also included a variety of implements (Fig. 4: 11-16). Since they were referred to elsewhere (Fujii 2002b: 41 and Fig. 3), we will only give a few noticeable points here. To begin with, the occurrence of bifacially pressure-flaked Amuq points (Fig. 4: 11) is suggestive of a Late PPNB (LPPNB) date for the assemblage. Second, the frequency of axes/adzes suggests that wood-processing and/or land cultivation was incorporated into major activities at the outpost (Fig. 4: 15, 16). Third, the occurrence of a few large querns hints at the exploitation of plant resources, although the absence of sickle elements with distinctive use gloss may be incompatible with the assumption.

Thus it seems likely that the site served as a PPNB agro-pastoral outpost. It is intriguing to hypothesize that as is the case with JF-0155 (Wadi Abu Tulayha) described below, it was used as a frontline base of short-distance transhumance between the Wadi Fidan drainage system to the west and the Jafr Basin to the east.

JF-0155 (Wadi Abu Tulayha)

This site, also first found during the 2001-2002 winter season survey, was located in the middle of flint strewn deserts ca. 25 km southeast of Jabal Juhayra described above. The investigation in the 2005 spring field season showed that the site, covering an area of ca. 1 ha, consisted of the following three distinct components; 1) a sizable PPNB outpost occupying the northwestern corner of the site; 2) a pair of EBA burial cairns (or cist enclosures in our terminology) overlying the outpost; 3) a stone-built barrage lying in the southeast of the outpost (Fig. 5-7).

A limited sounding at the PPNB outpost, our main concern, revealed a small composite structure at its southern end (Fig. 8). It was a semi-subterranean stone-built structure with a floor depth of ca. 0.4-0.5 m, consisting of a trapezoidal main room ca. 2-2.5 m each side and a semi-circular forecourt-like compartment ca. 2 m wide. While masonry walls of the main room were constructed

with four to six courses of horizontally put limestone and flint cobbles, those of the forecourt-like space were composed with a single course of upright slabs. In both cases, clay mortar and small rubble were used as adjustment material. Nothing specific can be said about the upper structure, but the volume of fallen stones around the structure suggested that the walls were originally at least some courses higher. The floor of the main room contained a clay-lined hearth ca. 50 cm in diameter, beside which a game board described below was found *in situ*. The floor also contained a few postholes, which were concentrated on its southern half. Likewise, the forecourt-like space produced a small hearth and a few postholes, but no clear evidence of an entrance was confirmed. In light of the distribution of several wall alignments faintly visible on the present ground surface, it appears that the site contained several similar structures and formed, as a whole, a small curvilinear settlement encompassing the communal forecourt to the east.

The excavated flint assemblage was characterized by the prevalence of naviform cores (Fig. 9: 1-5) and blades (Fig. 9: 6-12). The tool kit, on the other hand, was marked by the frequency of points (Fig. 9: 13-33). The predominance of Byblos and Amuq type points, coupled with the scarcity of Jericho type points, is suggestive of a LPPNB date for the assemblage. Burins, largely of a dihedral or angle type, also occurred to some extent (Fig. 10: 7-10). The tool kit also included finely serrated blades probably used for sickle elements (Fig. 10: 1), denticulates (Fig. 10: 2-4), borers/perforators (Fig. 10: 5), bifacially-retouched knives (Fig. 10: 6), end- and side-scrapers (Fig. 10: 11-13), and axes/adzes (Fig. 10: 14-15). In addition, flint hammers with a shattered end also occurred in small quantities (Fig. 10: 16-17). The occurrence of cores, debitage, and hammer stones as well as various retouched tools clearly indicates that the flint production tool place on the site.

The finds other than flint artifacts included a few flat querns and grinding slabs both made of flint or limestone (Fig. 11: 2). Of interest is the occurrence of a miniature vessel made of cortical flint (Fig. 10: 18), which are comparable with flint bowlets found at Basta (Nissen et al. 1991: Pl. III-1), Ba'ja (Gebel 1999), el-Hammeh (Makarewicz and Goodale 2004: Fig. 6), and 'Ayn el-Jammam (Rollefson 2005: Fig. 5). In addition, adornments made of cowry shell (Fig. 11: 3), bone (Fig. 11: 5), sandstone, and semi-precious stone were found in small quantities. Noteworthy is a small cylindrical clay object (Fig. 11: 4), which appears to bear affinities with geometric objects recovered from es-Sifiya, for example (Mahasneh and Gebel 1999). Also of interest is a limestone slab with eight small depressions arranged in two rows of four along its long sides (Fig. 11: 1). This unique find is comparable with 'gaming boards' found from Layer II and VI at Beidha (Kirkbride 1966: Fig. 8) and the PPNC context at 'Ain Ghazal (Rollefson 1992). In addition, faunal and floral remains also occurred in a fair amount.

In light of the small settlement size (ca. 0.05 ha) and the isolated site location in the middle of *Hamada*, it is most unlikely that the site served as a year-round sedentary settlement; rather, the use as a seasonal outpost seems more likely. Noticeable in this respect is the frequency of hunting weapons among retouched flint tools, which is suggestive of the site function as a hunting base. The rich occurrence of wild animal bones (mainly of gazelle, according to Dr. Hitomi Hongo's preliminary examination) also argues for the view. It is questionable, however, that the outpost was sustained by such an unpredictable subsistence only. It is important to note that domesticated sheep and goats, though in a limited percentage, did occur among excavated fauna (again, according to Dr. Hitomi Hongo's personal communication). This probably means that transhumance between the outpost and a parent settlement probably to the west was also incorporated into the subsistence strategy of the outpost. In addition, the existence of the neighboring stone-built barrage, coupled with the occurrence of heavy-duty grinding tools and finely-serrated blades (probably used for sickle elements), implies that the inhabitants of the outpost were also engaged in small-scale irrigated agriculture.

Given these, it follows that the outpost was based on a mixed economy consisting of hunting,

transhumance, and irrigated agriculture. Conversely, such a risk-diversifying subsistence strategy first made it possible to infiltrate into the arid periphery. In light of the construction of durable, energy-cost structures and the occurrence of a game board, it is conceivable that the seasonal outpost was used for a relatively long term every year, at least for more than a couple of weeks. Whatever the case, the identification of a PPNB agro-pastoral outpost in the middle of *Hamada* is noteworthy in that it might have paved the way to the pastoral nomadization that was actualized in the subsequent period.

JF-0206 (Wadi Burma North)

Wadi Burma is a small drainage system that rises in Tell Burma, an isolated volcanic hill ca. 5 km northeast of al-Husayniyya. It runs northwards for ca. 25 km along the Desert Highway to merge into Wadi al-Hasa. Thus, the water catchment area of this wadi, though located in the northwestern edge of the Jafr Basin, is included in the Wadi al-Hasa drainage system.

A pair of large cairn fields, Wadi Burma North (JF-0206) and South (JF-0204), was found along the uppermost stream of the wadi during the 2002 summer season survey (Fig. 12). Both of these were extensively investigated in the 2003 and 2004 field seasons, when a relatively large stone-built structure yielding PPNB flint artifacts was found roughly in the centre of an extensive sandbank between two tributary wadis (Fig. 13). This round structure was composed of two-rowed upright slab walls, measuring ca. 5.5-6 m in diameter. It was quite different in nature from surrounding burial cairns and, therefore, registered as an independent site (WBn-TU102). The excavation showed that it was built on the upper surface of Layer 3 of the site stratigraphy and, then, probably reused on the upper surface of Layer 2b.

Since the excavation has already been described elsewhere (Fujii 2005a), no repetition is needed here. Of significance is that it yielded two distinct flint assemblages. One was a PPNB assemblage, which consisted of naviform cores (Fig. 14: 1-4), bidirectionally-detached blades often with a punctiform striking platform (Fig. 14: 5-6), and a few Byblos type points (Fig. 14: 7). The other was an EBA assemblage, which included tabular scrapers, arched backed sickle blades, and robust drills with a long tip. It also included coarse ware sherds probably datable to the EBI on the basis of typological similarities to the finds from Wadi Fidan 4 (Adams 1999: Fig. 5.10), Wadi Faynan 100 (Wright et al. 1998: Fig. 8, no. 1-3) and Hujayrat al-Ghuzlan (Khalil and Eichmann 1999: Fig. 9, no. 4; Kerner 2003: Fig. 18; Brückner et al. 2002). It appears that these ceramic finds had something to do with the EBA flint assemblage described above.

What puzzled us was the fact that both PPNB and EBA artifacts occurred alongside through layers without any clear stratigraphic shift in ratio. This admits of various interpretations. A likely interpretation is that the structure was constructed by a PPNB group as an isolated outpost and, then, after a few millennia blank, reused as a temporary shed probably for the construction of the neighboring burial cairns. This explanation is consistent with the fact that the PPNB-LN desert fringe of the southern Levant witnessed the proliferation of two-rowed upright slab wall structures (Bar-Yosef 1981, 1982, 1985; Garrard et al. 1994; Goring-Morris 1993; Fujii 2000a, 2001). If this is the case, it follows that the contamination of finds through layers was caused by the slack sedimentation in arid peripheries. An alternative explanation is that an EBA group happened to construct the structure on the PPNB flint scatter and, then, reused it after a short interval. Neither of the two have conclusive evidence, but the fact remains that a small PPNB site, whether or not associated with a structure, did exist at this location.

JF-0106 (Tal'at Abu Tulayha)

This was also among a few dozen sites first found during the 2001-2002 winter season survey and occupied the flat top of an isolated hill along the upper stream of Wadi Ruweishid ash-Sharqi

(Fig. 15). Four small cairns were found on the hilltop: two larger cairns at the southwestern edge and the other two smaller cairns at the western edge. The hilltop was covered densely with flint chunks, among which the following two distinct assemblages were found.

One is a tabular scarper assemblage, which sparsely covered the whole range of the hilltop. Cores and wastes were predominant, but finished products were also included in limited numbers. Thus the site, in one aspect, can be defined as one of tabular scraper production sites that proliferated throughout the Jafr Basin from the Chalcolithic to the EBA. Jafr blades, another indicator of the EBA flint industry of the Jafr Basin, also occurred in small quantities. It is possible that the four small cairns referred to above have something to do with these EBA flint assemblages.

The other is a PPNB flint assemblage, which was concentrated on the western edge of the hilltop. The location yielding the surface finds was ca. 10 m long in the E-W direction and ca. 5 m long in the N-S direction, covering an area of ca. 50 square meters. In order to collect stratified samples, we opened a 2 m by 2 m square (Square A) at its eastern part where flint artifacts were scattered in the highest density (Fig. 16). However, as is often the case with desert sites, the sounding ended soon with reaching a sterile layer immediately below the present ground surface. Thus the vast majority of lithic finds occurred from the surface layer (ca. 1-2 cm thick) and the second layer (ca. 5-10 cm thick) followed it. No artifacts occurred from the third layer. Therefore, it seems that the second layer was their original contextual source.

Square A yielded several dozen flint artifacts. Considering its small area and thin deposits, this is a large volume, differentiating the site from other flint scatters. They consisted largely of naviform core-and-blade components (Fig. 17: 1-9). Of interest is the frequency of cortical cores (or the scarcity of bifacially-prepared cores), which is characteristic of the PPNB flint assemblages in the Jafr Basin endowed with tabular flint chunks (Quintero and Wilke 1995: 20). Retouched tools were much less frequent, consisting merely of a few angle burins on break (Fig. 17: 10, 11). The same applied to the surface collection around the square.

Both the predominance of cores and tool blanks and the scarcity of retouched tools indicate that the site, in the other aspect, can be defined as a primary flint knapping station left by a small PPNB group. A series of circumstantial evidence – the isolated site location in the middle of *Hamada*, the harsh environmental conditions around the site, the total absence of structural remains, and the abundance of flint raw material – also supports the functional identification suggested above. It is noteworthy, however, that angle burins (though not of on-truncation types but of on-break types) accounted for the vast majority of tools. This fact, along with the unique site location at the hilltop overlooking a major wadi system, is reminiscent of ‘burin sites’, a unique site-form that characterizes the Levantine arid peripheries in the PPNB and the subsequent period (Rollefson and Fröhlich 1982; Rollefson et al. 1982; Cauvin 1983; Betts 1982, 1985; Fujii et al. 1987).

JF-0501 (Wadi Abyda)

This small site was found by chance in the course of the investigation at Tal’at Abyda Cairn Field 1 (or JF-0208) that was conducted in the 2004 summer field season (Fujii 2005a). It occupied a gentle slope around a confluence of two tributary wadis below an escarpment, on which the cairn field was extended (Fig. 18). The escarpment exposed several layers of high quality Eocene flint, which probably provided raw material for the two distinct flint assemblages described below.

The site itself consisted of two areas and covered, as a whole, an area of ca. 0.2 ha. Area A was extended on the north bank of the southern wadi, containing a few small enclosures ca. 10-12 m in diameter. Area B, on the other hand, covered a triangular terrace between the two tributary wadis and contained a few large enclosures ca. 20-35 m in diameter. The enclosures were divided into some small sectors, but, in light of a clear stratigraphic gap between partition walls and the main body of the enclosure, the space division seems to be an episode in the recent past.

Aside from a few Levallois points and Jafr blades, the site produced two distinct flint assemblages. One was a tabular scraper assemblage, which occurred especially in and around the enclosures and contained a number of cores and cortical tool blanks. The other assemblage contained a dozen PPNB flint artifacts, which were concentrated on both banks of the northern wadi. They contained naviform cores and blades (Fig. 19: 1-6), which included a upsilon blade (Fig. 19: 5). Retouched tools were not included with the only exception of an adze-like heavy-duty tool (Fig. 19: 7).

The site can be defined as a small flint scatter. It is conceivable that a small PPNB foraging group took a rest on the wadi banks and spent a short time for *ad hoc* flint knapping, taking advantage of the abundance of raw material.

JF-9503 (Qa' Abu Tulayha West)

This unique funerary site was first found during the preliminary inspection tour in 1995. Lying halfway between al-Husayniyya and al-Jafr, it occupied a flat hilltop overlooking a small playa, Qa' Abu Tulayha, to the east. The site contained various forms of burial cairns, covering, as a whole, an area of ca. 30 ha. Six successive excavation seasons from 1997 to 2002 showed that the site consisted of the following two distinct funerary complexes: the Layer 4 (Late Neolithic) complex represented by a long chain of pseudo-house cairns and their subsequent forms, and the Layer 3 (EBA) complex comprised of four large enclosures incorporating several pseudo-wall cairns. This site stratigraphy contributed to the establishment of a chronological framework of the later prehistory of the Jafr Basin. The excavations also clarified the formation process of a pseudo-settlement as a unique funerary practice endemic to the post-PPNB Jafr Basin (Fujii 2000b, 2001, 2002c). In addition, they shed new light on flint mining strategies for the tabular scraper production (Fujii 2003: 210-220) and the chronology of Jafr blades thus far often referred to in a Palaeolithic context (Fujii 2002a: 34-36).

The final excavation season showed that a small number of PPNB flint artifacts were sparsely scattered at Square N-VI, the southeastern edge of the site (Fig. 20). They contained some naviform cores (Fig. 21: 1-2) and a few bifacial knives (Fig. 21:3-4), the latter of which were comparable with 'foliate bifaces' found at Dhuweila, a LPPNB-LN site in the Black Desert (Betts 1998: Fig. 4.26), and 'bifacial pieces' from Tuwailan sites tentatively dated to the PPNC horizon (Goring-Morris 1993: Fig. 7, no. 3-4; Goring-Morris et al. 1994: Fig. 4, no. 6-7 etc.). The low density of surface finds highlights an *ad hoc* nature of this small flint scatter site.

JF-9705 (Wadi Abu Safat)

This site, found by chance during the first excavation season at Qa' Abu Tulayha West, was situated near a confluence of Wadi Abu Safat and Wadi Ruweishid, two major drainage systems in the northwestern part of the Jafr Basin. This location falls on a point a few kilometers downstream of a Roman ephemeral camp tentatively defined by an aerial photographic interpretation (Kennedy 2004: 174). The site was extended over either banks of Wadi Abu Safat, covering an area of ca. 1-2 ha (Fig. 22). The east bank contained three large enclosures ca. 10-20 m in diameter and a few small round features, whereas the west bank was not associated with any conspicuous structural remains¹⁾.

Interestingly, the opposite was the case with the distribution of surface finds; while the east bank yielded only a small number of undiagnostic flakes and blades, the west bank produced some dozens of heterogeneous flint artifacts. They included a final Acheulian handaxe, microliths, PPNB

1) Our previous report suggested that the western bank contained an example of the QATW Layer 4 type pseudo-settlement (Fujii 2002b: 42-43), but the subsequent reexaminations showed that this was not the case.

components, tabular scrapers, and Jafr blades. The PPNB components, our main concern, consisted largely of naviform cores and blades (Fig. 23: 1-2). A robust tool, probably used for an adze, may also fall within the same assemblage (Fig. 23: 3). In light of the low density of lithic finds, the site can also be defined as a small flint scatter. It is interesting to note that there is a small natural dam (or *sedde* in Arabic) near the confluence, and that this area still remains a preferred hunting ground for local hare hunters.

JF-0104 (Wadi Ruweishid ash-Sharqi)

This site was first found during the 2001-2002 winter season survey. It was situated a few kilometers west of JF-0106 (Tal'at Abu Tulayha) described above, with the upper stream of Wadi Ruweishid ash-Sharqi in between. The site, covering an area of ca. 0.1 ha, contained a U-shaped freestanding stone-built wall ca. 50 m in total length that was constructed across a tributary wadi (Fig. 24). As with a similar feature at JF-0155 (Wadi Abu Tulayha), it may have been used as a barrage to collect seasonal runoff water of the wadi²⁾.

A limited number of flint artifacts were collected around the barrage. In addition to a few Levallois cores and flakes, they included a bi-directionally detached blade (Fig. 23: 4) and a bifacial knife (Fig. 23: 5), both probably of a PPNB to LN date. In view of the low density of surface finds, the site can be defined as a flint scatter left by a small foraging group. The question is concerned with the chronological correlation with the barrage, but nothing specific can be said before excavation.

JF-0109 (Wadi Abu Tulayha East)

This was also among some thirty sites first found during the 2001-2002 winter season survey and located on an isolated hill along the west bank of the upper stream of Wadi Abu Tulayha ash-Sharqi. The site, covering an area of ca. 3 ha, consisted of a small cairn field on the flat hilltop and an extensive flint scatter over the eastern gentle slope (Fig. 25). The former contained four small cairns ca. 1.5-2 m in diameter. Since no datable surface finds were collected around them, nothing specific can be said about their date, except that they probably postdate the PPNB flint assemblage described below.

The eastern slope, on the other hand, was covered densely with weathered tabular flint chunks. A limited number of naviform cores (Fig. 23: 6) and blades (Fig. 23: 7) occurred mingled with them. In addition, tabular scrapers and Jafr blades also occurred in small quantities. The scarcity of surface finds allows us to define the site as a simple flint scatter.

4. Summary and Discussion

The survey and sounding results have enabled us to incorporate the Jafr Basin into the southeastern edge of the PPNB cultural sphere. It is now evident that the basin was by no means deserted during the PPNB period. This is not to say, however, that the basin was populated throughout the period. To date, no clear evidence for MPPNB sites, to say nothing of EPPNB sites, has been confirmed in the basin. Instead, available evidence suggests that the cultural infiltration into the basin did not begin before the LPPNB. It should be added, however, that further investigation might lead to a reconsideration of this tentative perspective.

The investigation results also suggest that the infiltration was *ad hoc* rather than substantial in nature. The evidence comes from the settlement pattern. The PPNB sites thus far identified in the basin are limited to two outposts associated with several structures (JF-0116: Jabal Juhayra and JF-

2) Our previous survey tentatively defined this feature as a pseudo-wall cairn enclosure (Fujii 2002b: 43). However, the excavated evidence from JF-0155 (Wadi Abu Tulayha) suggests that it was also a water catchment facility.

0155: Wadi Abu Tulayha), a base of operations possibly with a single structure (JF-0206: Wadi Burma North TU102), a small flint workshop (JF-0106: Tal'at Abu Tulayha), and some flint scatters (JF-0501: Wadi Abyda, JF-9503: Qa' Abu Tulayha West, JF-9705: Wadi Abu Safat, JF-0104: Wadi Ruweishid ash-Sharqi, and JF0109: Wadi Abu Tulayha East). No full-fledged sedentary settlement is included. This is probably because the harsh environmental conditions, the deficiency in water supply in particular, impeded a year-round habitation in the basin.

It is noteworthy, however, that a few outposts existed. Their existence highlights that the basin, though sparsely and on a seasonal basis, was incorporated into habitation areas for the PPNB population. There is little doubt that these outposts derived from the farming society to the west. The faunal evidence from JF-0155 (Wadi Abu Tulayha) strongly suggests that they were used for a base for transhumance as well as hunting. Given this, it follows that the PPNB Jafr Basin, at least its northwestern part, served as a seasonal pastoral hinterland for the sedentary farming communities to the west. Nevertheless, such outposts were rather exceptional. The prevalence of small ephemeral sites clearly indicates that flint exploitation, probably in association with seasonal foraging, was a major aspect of the PPNB land use of the basin. This is understandable, seeing that the basin is rich in high quality Eocene flint.

Taken together, it follows that the first Neolithic infiltration into the Jafr Basin took place as late as in the LPPNB, and that it was based on transhumance and seasonal foraging in combination with flint exploitation. It appears, however, that this is the case with its northwestern part only. Things seem different in the other areas of the basin. To date, no clear evidence for PPNB sites has been attested to in the northeastern part (Quintero and Wilke 1998; Quintero et al. 2002). It makes sense that the same is true with the southern half of the basin, seeing that the area is still more deficient in both water supply and flint resource. These observations suggest that the land use of the LPPNB Jafr Basin was basically concentrated on its northwestern part nearer to the farming society to the west.

In conclusion, a few remarks should be made about archaeological implications of the Jafr PPNB. To begin with, it has pushed the PPNB frontier forward in the southeastern direction to a large extent. It will not be very long before the PPNB or PPNB-related cultures of more inland areas such as Wadi as-Sirhan come into our sight. Second, the Jafr PPNB bridges the Azraq/Jilat PPNB to the north and the Hisma/Negev/Sinai PPNB to the south, thus promoting a comparative study of the Badia PPNB in the southern Levant. Third and more importantly, the Jafr PPNB provides a key to tracing the pastoral nomadization in the area as far back as its very beginning, namely, the stage of short-distance transhumance. This is important all the more because this epoch-making episode resulted in the establishment of the social dimorphism characteristic of the subsequent Near East. Fourth, the Jafr PPNB sheds new light on the LPPNB mega-site phenomenon in southern Jordan from another angle (Gebel 2004). It is now obvious that the phenomenon should be understood in a broader context including the Jafr Basin. The archaeological implications of the Jafr PPNB are not reduced because of its peripheral nature; rather, one can argue that they increase precisely because of its marginal character.

5. Concluding Remarks

The series of archaeological surveys and soundings have enabled us to confirm the existence of the Jafr PPNB. Nevertheless, this is but the first step in an effort to understand the archaeological potential of the basin. Full-scale excavations at a few key sites, JF-0155 (or Wadi Abu Tulayha) for example, would hopefully provide further insights into the marginal PPNB.

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Bibliography

- Adams, R. B.
1999 *Development of Copper Metallurgy during the Early Bronze Age of the Southern Levant: Evidence from the Feinan Region, Southern Jordan*. Ph. D. Thesis (University of Sheffield).
- Barker, G.
2001 Farmers, Herders and Mines in the Wadi Faynan, Southern Jordan: a 10,000-year Landscape Archaeology. Pp. 63-85 in G. Barker and D. Gilbertson (eds.) *The Archaeology of Drylands*. Routledge: London.
- Bar-Yosef, O.
1981 Neolithic Sites in Sinai. Pp. 217–235 in Frey, W. and H-P. Uerpmann (eds.) *Beiträge zur Umweltgeschichte des Vorderen Orients*. Dr. Ludwig Reichert: Wiesbaden.
1982 Pre-Pottery Neolithic Sites in Southern Sinai. *Biblical Archaeologist* 45/1: 9–12.
1985 The Stone Age of the Sinai Peninsula. Pp. 107–122 in Liverani, M. et al. (eds.) *Studi di Paleontologia in Onore di Salvatore Puglisi*, Rome.
- Bender, F.
1968 *Geologie von Jordanien*. Borntraeger: Berlin.
1974 *Geology of Jordan*. Borntraeger: Berlin.
- Betts, A.
1982 Prehistoric Sites at Qa' al-Mejalla, Eastern Jordan. *Levant* 15: 1–10.
1985 “Black Desert Survey”, Jordan: Third Preliminary Report. *Levant* 17: 29–52.
- Betts, A. (ed.)
1998 *The Harra and the Hamad: Excavations and Surveys in Eastern Jordan, volume 1*. Sheffield Academic Press: Sheffield.
- Bienkowski, P. and K. Galor
2006 *Crossing the Rift: Resources, Routes, Settlement Patterns, and Interaction in the Wadi Arabah*. Oxbow Books: Oxford.
- Brückner, H., R. Eichmann, L. Herling, H. Kallweit, S. Kerner, L. Khalil, and R. Miqdadi
2002 Chalcolithic and Early Bronze Age Sites near ‘Aqaba, Jordan. Pp. 215–331 in R. Eichmann (eds.) *Ausgrabungen und Surveys im Vorderen Orient I*. Verlag Marie Leidorf GmbH: Rahden/Westf.
- Cauvin, J.
1983 Cinq Années de Recherches (1978-1983) dans l’Oasis d’El Kown (Syrie). *Annales Archéologique Arabes Syriennes* 33: 165–177.
- Chesson, M. S., C. Makarewicz, I. Kuijt, and C. Whiting
2005 Results of the 2001 Kerak Plateau Early Bronze Age Survey. *Annual of the American Schools of Oriental Research* 59: 2–62.
- Coinman, N. R.
1998 *The Archaeology of the Wadi al-Hasa, West-Central Jordan, vol.1: Surveys, Settlement Patterns, and Paleoenvironments*. Arizona State University: Arizona.
2000 *The Archaeology of the Wadi al-Hasa, West-Central Jordan, vol.2: Excavations at Middle, Upper, and Epipaleolithic Sites*. Arizona State University: Arizona.
- Department of Antiquities of Jordan
1973 *The Archaeological Heritage of Jordan, vol 1: The Archaeological Periods and Sites (East Bank)*. Department of Antiquities: Amman.

- Field, H.
1960 *The Arabian Desert Archaeological Survey, 1925-50*. The Peabody Museum: Cambridge, Massachusetts.
- Finlayson, B. and S. Mithen
1998 The Dana-Faynan (South Jordan) Epipalaeolithic Project: Report on Reconnaissance Survey, 14-22 April 1996. *Levant* 30: 27–32.
2007 *The Early Prehistory of Wadi Fidan, Southern Jordan*. Oxbow Books: Oxford.
- Finlayson, B., S. Mithen, D. Carruthers, A. Kennedy, A. Pirie, and R. Tipping
2000 The Dana-Faynan-Ghuwayr Early Prehistoric Project. *Levant* 32: 1–26.
- Fujii, S.
1998 Qa' Abu Tulayha West: An Interim Report of the 1997 Season. *Annual of the Department of Antiquities of Jordan* 42: 123–140.
1999a Qa' Abu Tulayha West: An Interim Report of the 1998 Season. *Annual of the Department of Antiquities of Jordan* 43: 69–89.
1999b Qa' Abu Tulayha West. *American Journal of Archaeology* 103/3: 496–498.
2000a Qa' Abu Tulayha West: An Interim Report of the 1999 Season. *Annual of the Department of Antiquities of Jordan* 44: 149–171.
2000b Pseudo-Settlement Hypothesis: Evidence from Qa' Abu Tulayha West. *Preprint for the 5th International Conference of ASWA*.
2000c Qa' Abu Tulayha West. *American Journal of Archaeology* 104/3: 572–574.
2001 Qa' Abu Tulayha West, 2000: An Interim Report of the Fourth Season. *Annual of the Department of Antiquities of Jordan* 45: 19–37.
2002a Qa' Abu Tulayha West, 2001: An Interim Report of the Fifth Season. *Annual of the Department of Antiquities of Jordan* 46: 15–39.
2002b A Brief Note on the 2001-2002 Winter Season Survey of the al-Jafr Basin in Southern Jordan. *Annual of the Department of Antiquities of Jordan* 46: 41–49.
2002c Pseudo-Settlement Hypothesis: Evidence from Qa' Abu Tulayha West. *Archaeozoology of the Near East V*: 181–194.
2003 Qa' Abu Tulayha West, 2002: An Interim Report of the Sixth and Final Season. *Annual of the Department of Antiquities of Jordan* 47: 195–223.
2004a Harrat al-Burma K-lines and Wadi Burma Kite-site: A Preliminary Report of the First Operation of the Jafr Basin Prehistoric Project, Phase 2 (2003, Spring). *Annual of the Department of Antiquities of Jordan* 48: 26–50.
2004b Harrat al-Burma Cairn Field, Wadi Burma Kite-site, Wadi Burma Cist Enclosures, and Harrat al-Sayyiya K-line: A Preliminary Report of the Second Operation of the Jafr Basin Prehistoric Project, Phase 2 (2003, Summer). *Annual of the Department of Antiquities of Jordan* 48: 285–304.
2005a Wadi Burma North, Tal'at Abyda, and Wadi Qusair: A Preliminary Report of the Jafr Basin Prehistoric Project, 2004. *Annual of the Department of Antiquities of Jordan* 49: 17–55.
2005b Harrat al-Juhayra Pseudo-settlement: A Preliminary Report of the Jafr Basin Prehistoric Project, 2004. *Annual of the Department of Antiquities of Jordan* 49: 57–70.
2006a Wadi Abu Tulayha: A Preliminary Report of the 2005 Spring and Summer Excavation Seasons of the al-Jafr Basin Prehistoric Project, Phase 2. *Annual of the Department of Antiquities of Jordan* 50: 9–32.
2006b A PPNB Agro-pastoral Outpost at Wadi Abu Tulayha, al-Jafr Basin. *Neo-Lithics* 2/06: 4–14.
- Fujii, S., T. Akazawa, Y. Nishiaki, and H. Wada
1986 Thaniyyet Wuker: A Pre-Pottery Neolithic B Site on the Lacustrine Terrace of Paleo-Palmyra Lake. Pp. 29–39, in T. Akazawa and Y. Sakaguchi (eds.) *Paleolithic Site of the Doura Cave and Paleogeography of Palmyra Basin in Siria, part IV: 1984 Excavations*. University of Tokyo Press: Tokyo.
- Garrard, A., D. Baird, S. Colledge, L. Martin, and K. Wright
1994 Prehistoric Environment and Settlement in the Azraq Basin: An Interim Report on the 1987 and 1988 Excavation Seasons. *Levant* 26: 73–109.
- Gebel, H.-P.
1988 Late Epipalaeolithic – Aceramic Neolithic Sites in the Petra Area. Pp. 67–100 in A.N. Garrard and H. G. Gebel (eds.) *The Prehistory of Jordan, part 1*. BAR: Oxford.

- 1999 Flint "Bowlets" from the LPPNB of Southern Jordan. *Neo-Lithics* 2/99: 12–13.
 - 2004 Central to What? The Centrality Issue of the LPPNB Mega-Site Phenomenon in Jordan. In H.D. Bienert, H.G.K. Gebel, and R. Neef (eds.) *Central Settlements in Neolithic Jordan. Studies in Early Near Eastern Production, Subsistence, and Environment* 5: 1–19. Ex Oriente: Berlin.
- Glueck, N.
- 1934 Explorations in Eastern Palestine, I. *Annual of the American Schools of Oriental Research* 14: 1–113.
 - 1935 Explorations in Eastern Palestine, II. *Annual of the American Schools of Oriental Research* 15.
 - 1939 Explorations in Eastern Palestine, III. *Annual of the American Schools of Oriental Research* 18/19.
 - 1951 Explorations in Eastern Palestine, IV, part I: Text. *Annual of the American Schools of Oriental Research* 25–28.
 - 1951 Explorations in Eastern Palestine, IV, part II: Pottery Notes and Plates. *Annual of the American Schools of Oriental Research* 25–28.
- Goring-Morris, N.
- 1993 From Foraging to Herding in the Negev and Sinai: The Early to Late Neolithic Transition. *Paléorient* 19/1: 65–89.
- Goring-Morris, N., A. Gopher, and S. Rosen
- 1994 The Neolithic Tuwailan Cortical Knife Industry of the Negev. Pp. 511–524 in H.G. Gebel and S. K. Kozłowski (eds.) *Neolithic Chipped Stone Industries of the Fertile Crescent*. Ex Oriente: Berlin.
- Henry, D. O.
- 1995 *Prehistoric Cultural Ecology and Evolution: Insights from Southern Jordan*. Plenum Press: New York.
- Henry, D. O., H. A. Bauer, K. W. Kerry, and J. E. Braemer
- 2001 Survey of Prehistoric Sites, Wadi Araba, Southern Jordan. *Bulletin of the American Schools of Oriental Research* 323: 1–19.
- Huckriede, R. and G. Wiesemann
- 1968 Der Jungpleistozäne Pluvial-See von El-Jafr und Weitere Daten zum Quartär Jordaniens. *Geologica et Paleontologica* 2: 73–95.
- Jordan National Geographic Center
- 1984 *National Atlas of Jordan, part 1: Climate and Agroclimatology*. Jordan National Geographic Center: Amman.
- Kennedy, D.
- 2004 *The Roman Army in Jordan*. Council for British Research in the Levant: London.
- Kerner, S.
- 2003 Appendix: The Pottery of Hujayrat al-Ghuzlan 2000 to 2003 – A Preliminary Report. *Annual of the Department of Antiquities of Jordan* 47: 175–182.
- Khalil, L. and R. Eichmann
- 2000 Archaeological Survey and Excavation at Wadi al-Yutum and Tall al-Magass Area – ‘Aqaba (ASEYM): A Preliminary Report of the First Season 1998. *Annal of the Department of Antiquities of Jordan* 43: 501–520.
- Kirkbride, D.
- 1966 Five Seasons at the Pre-Pottery Neolithic Village of Beidha in Jordan. *Palestine Exploration Quarterly* 1966: 8–72.
- MacDonald, B.
- 1987 *The Wadi el Hasa Archaeological Survey 1979-1983, West-Central Jordan*. Wilfrid Laurier University Press: Waterloo.
 - 1992 *The Southern Ghors and Northeast ‘Arabah Archaeological Survey*. Sheffield Archaeological Monographs 5. J. R. Collis Publications, University of Sheffield: Sheffield.
- MacDonald, B., R. Adams, and P. Bienkowski
- 2001 *The Archaeology of Jordan*. Sheffield Academic Press: Sheffield.
- MacDonald, B., L.G. Herr, M. P. Neerly, T. Gagos, K. Moumani, and M. Rockman
- 2004 *The Tafila-Busayra Archaeological Survey 1999-2001, West-Central Jordan*. American Schools of Oriental Research: Boston.

- Macumber, P. G.
2001 Evolving Landscape and Environment in Jordan. Pp. 1–30 in B. MacDonald, R. Adams, and P. Bienkowski (eds.) *The Archaeology of Jordan*. Sheffield Academic Press: Sheffield.
- Mahasneh, H. M. and H. G. K. Gebel
2001 Geometric Objects from LPPNB Es-Sifiya, Wadi Mujib, Jordan. *Paléorient* 24/2: 105–110.
- Makarewicz, C. A., and N. B. Goodale
2004 Results from the First Excavation Season at el-Hemmeh: A Pre-Pottery Neolithic Site in the Wadi el-Hasa, Jordan. *Neo-Lithics* 2/04: 5–11.
- Miller, J. M.
1991 *Archaeological Survey of Kerak Plateau*. Scholars Press: Atlanta.
- Moumani, K. A.
1997 *The Geology of al Husayniyya al Janubiyya (Jurf ed Darawish) Area Map Sheet No. 3151-II*. The Hashemite Kingdom of Jordan, Natural Resources Authority, Geological Bulletin No. 38.
- Neeley, M. P.
2002 A Small-scale Reconnaissance in Qa' al-Jinz. *Annual of the Department of Antiquities of Jordan* 44: 99–108.
- Nissen, H., M. Muheisen, and H.G. Gebel
1991 Report on the Excavations at Basta 1988. *Annual of the Department of Antiquities of Jordan* 35: 13–40.
- Palumbo, G.
1994 *JADIS: The Jordan Antiquities Database and Information System, A Summary of the Data*. The Department of Antiquities of Jordan and The American Center of Oriental Research: Amman.
- Quintero, L. A. and P. J. Wilke
1995 Evolution and Economic Significance of Naviform Core-and-Blade Technology in the Southern Levant. *Paléorient* 21/1: 17–33.
- Quintero, L. A. and P. J. Wilke
1998 Archaeological Reconnaissance in the Al-Jafr Basin, 1997. *Annual of the Department of Antiquities of Jordan* 42: 113–122.
- Quintero, L. A., P. J. Wilke, and G. O. Rollefson
2003 From Flint Mine to Fan Scraper: The Late Prehistoric Jafr Industrial Complex. *Bulletin of American Schools of Oriental Research* 327: 17–48.
- Raikes, T. D.
1980 Notes on Some Neolithic and Later Sites in Wadi Araba and the Dead Sea Valley. *Levant* 12: 40–60.
- Rhotert, H.
1938 *Transjordanien: Vorgeschichtliche Forschungen*. Verlag Strecher und Schröder: Stuttgart.
- Rollefson, G.O.
1992 A Neolithic Game Board from 'Ain Ghazal, Jordan. *Bulletin of American Schools of Oriental Research* 286: 1–5.
2005 Stone Tools from 'Ayn Jammam, near Ras en-Naqab, Southern Jordan. *Neo-Lithics* 1/05: 17–23.
- Rollefson, G. O. and B. Fröhlich
1982 A PPNB Burin Site on Jabal Uweinid, Eastern Jordan. *Annual of the Department of Antiquities of Jordan* 26: 189–198.
- Rollefson, G. O., Z. Kaechele, and J. Kaechele
1982 A Burin Site in the Umm Utheina District, Jabal Amman. *Annual of the Department of Antiquities of Jordan* 26: 243–247.
- Schyle, D. and H.-P. Uerpmann
1988 Palaeolithic Sites in the Petra Area. Pp. 39–65, in A.N. Garrard and H.G. Gebel (eds.) *The Prehistory of Jordan, part 1*. BAR: Oxford.

Worschech, U.

1985 Northwest Ard el-Kerak 1983 and 1984: A Preliminary Report. Manfred Görg: München.

Wright, K., M. Najjar, J. Last, N. Moloney, M. Flender, J. Gower, N. Jackson, A. Kennedy, and R. Shafiq

1998 Wadi Faynan Fourth and Third Millennium Project, 1997: Report of the First Season of Test Excavations at Wadi Faynan 100. *Levant* 30: 33–60.

Zeuner, F., D. Kirkbride, and P. C. Park

1957 Stone Age Exploration in Jordan I. *Palestine Exploration Quarterly* 1957: 17–54.

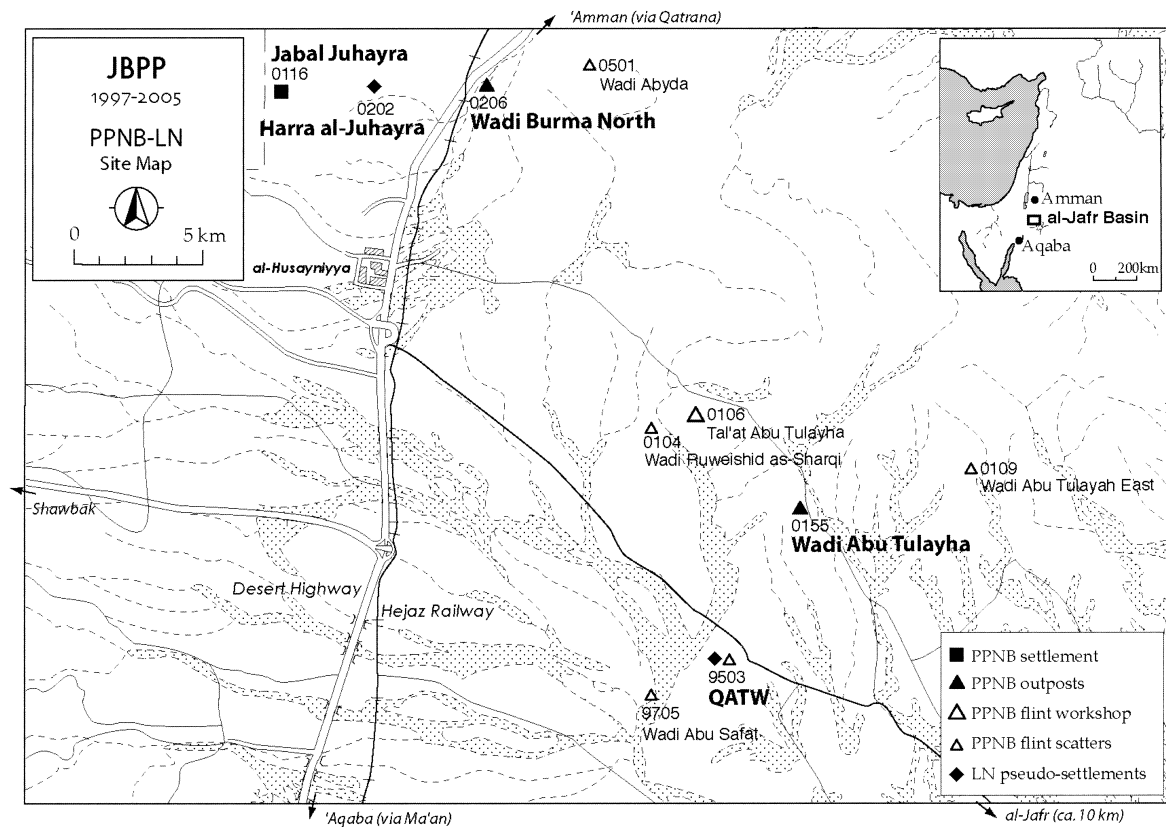


Fig. 1 PPNB sites in the northwestern part of the Jafr Basin.



Fig. 2 JF-0116 (Jabal Juhayra): distant view (looking west).



Fig. 3 JF-0116 (Jabal Juhayra): general view (looking southeast).

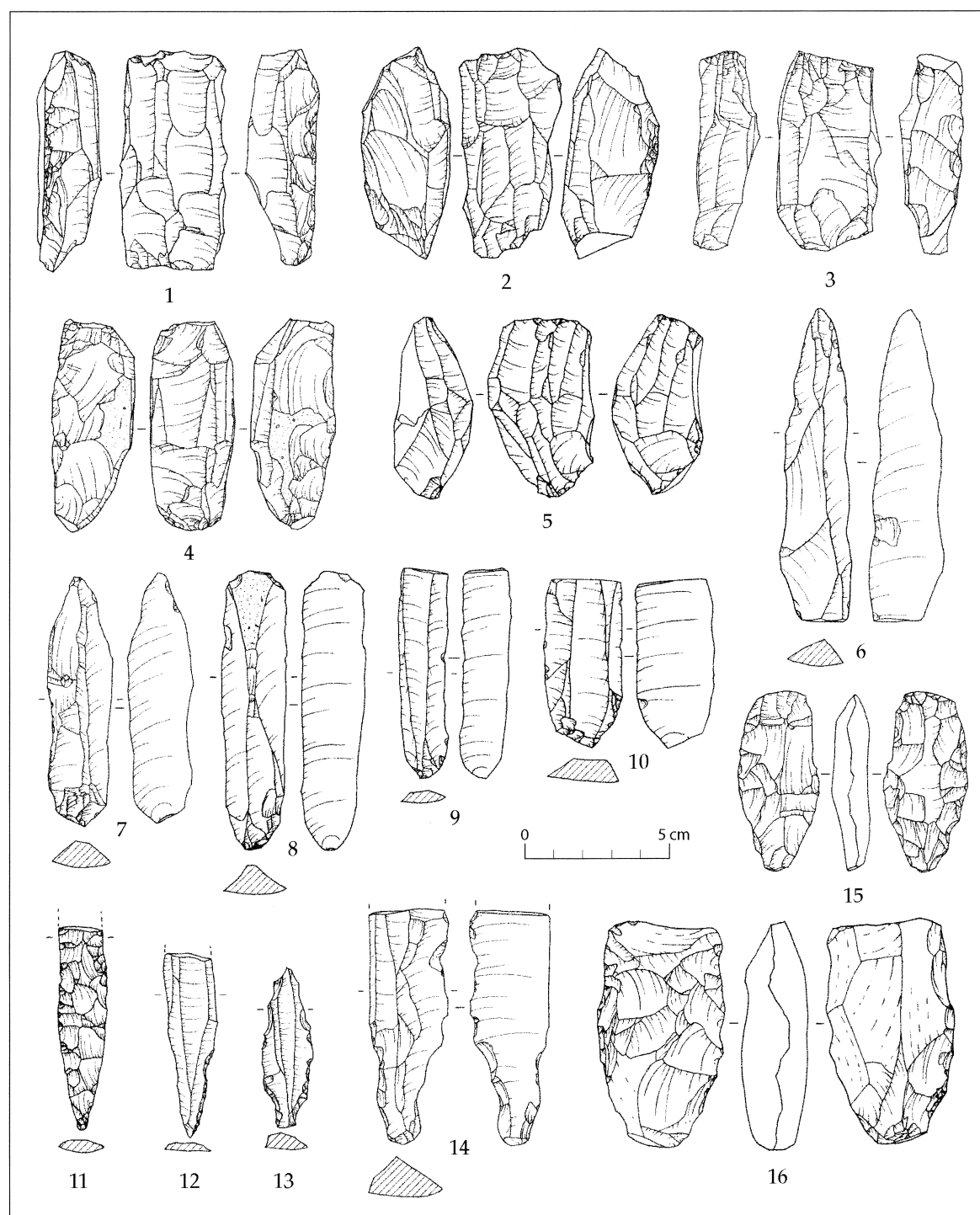


Fig. 4 JF-0116 (Jabal Juhayra): lithic finds.

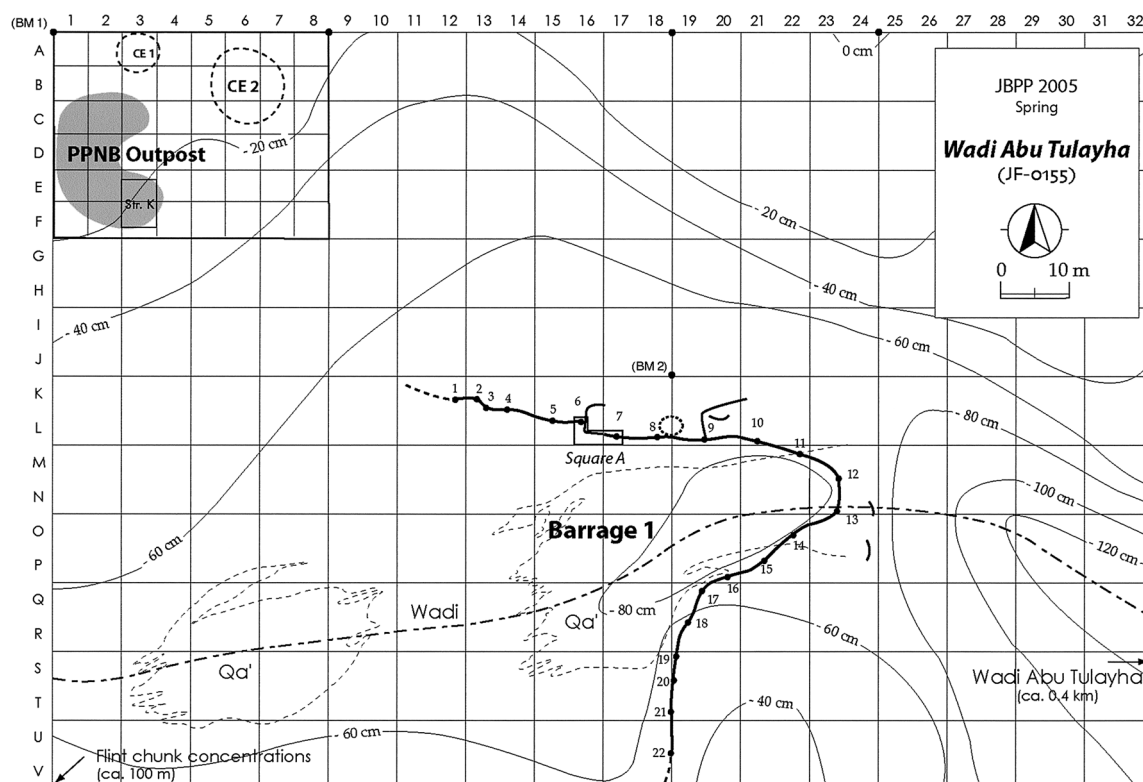


Fig. 5 JF-0155 (Wadi Abu Tulayha): site plan.



Fig. 6 JF-0155 (Wadi Abu Tulayha): general view (looking northwest).



Fig. 7 JF-0155 (Wadi Abu Tulayha): general view of Barrage 1 (looking west).



Fig. 8 JF-0155 (Wadi Abu Tulayha): Structure 1 (looking north).

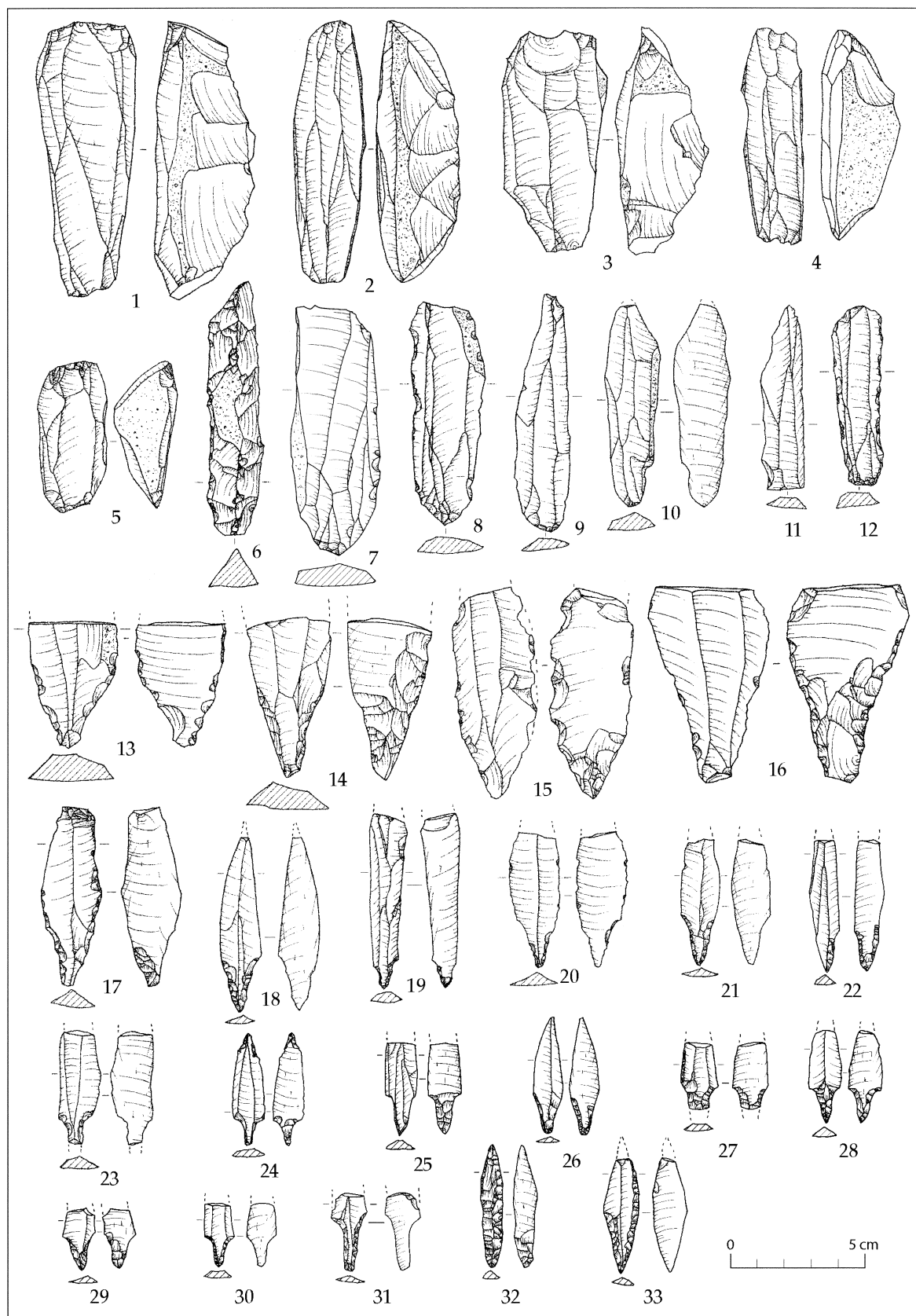


Fig. 9 JF-0155 (Wadi Abu Tulayha): lithic finds from Structure 1.

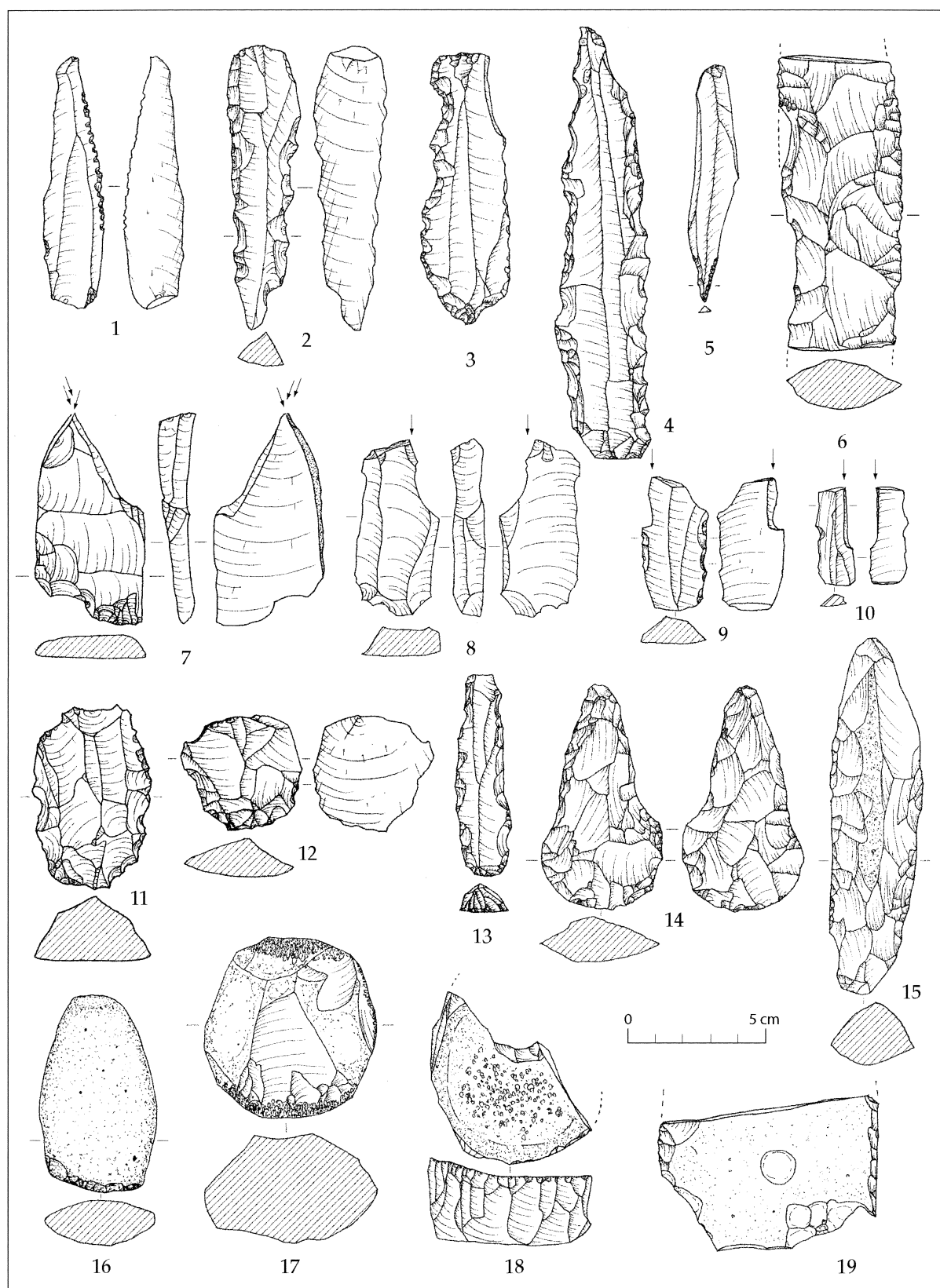


Fig. 10 JF-0155 (Wadi Abu Tulayha): lithic finds from Structure 1.

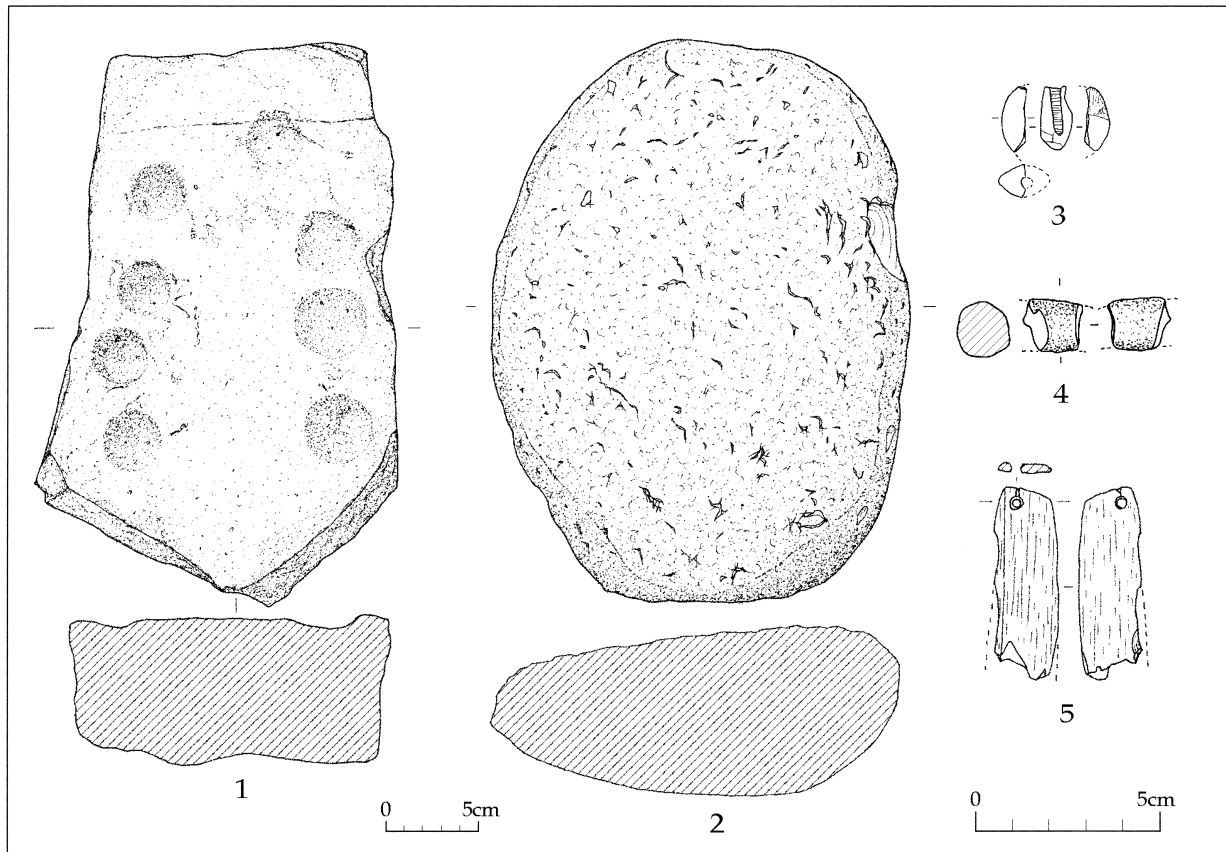


Fig. 11 JF-0155 (Wadi Abu Tulayha): miscellaneous finds from Structure 1.

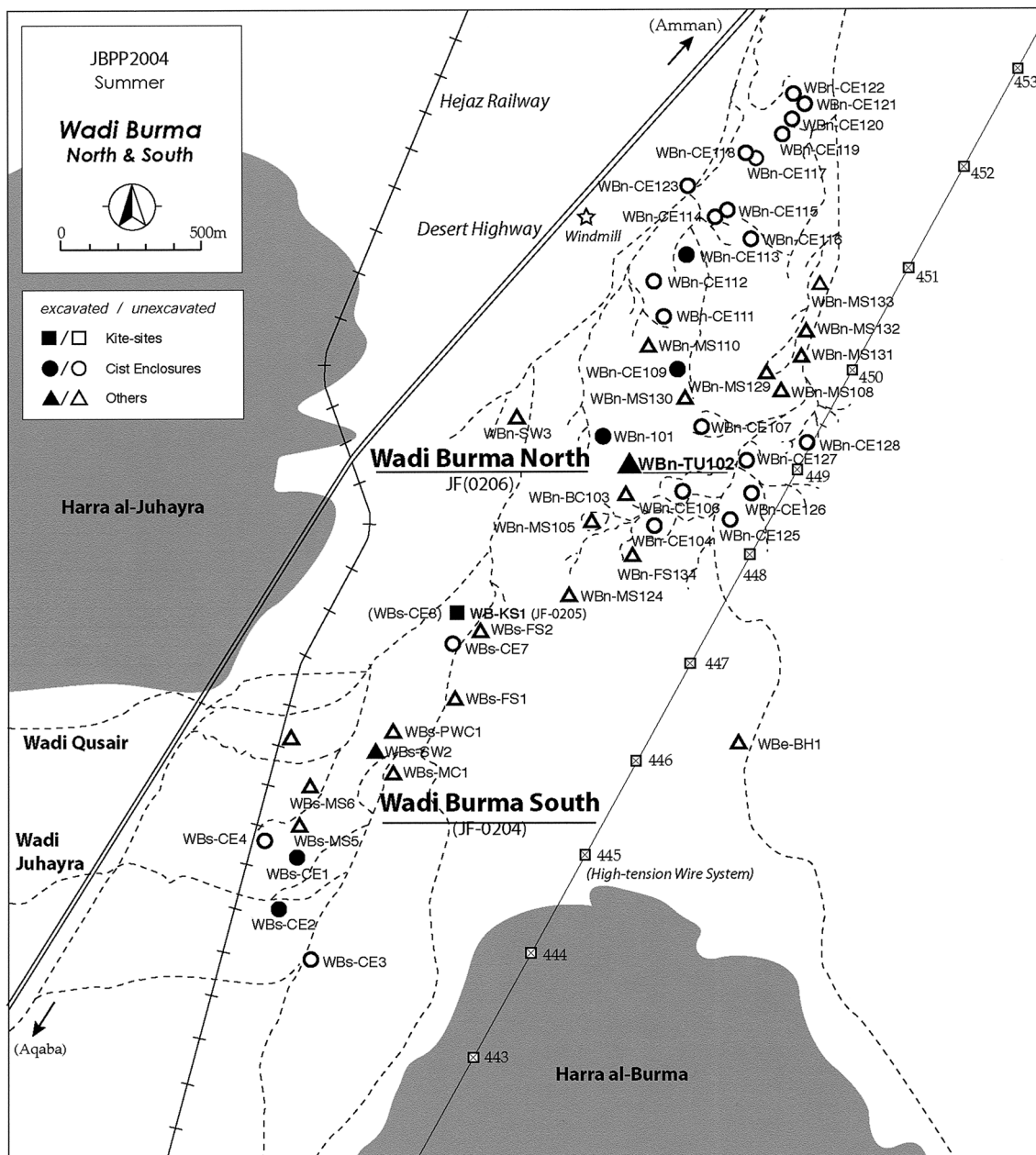


Fig. 12 Site map of the Wadi Burma area.



Fig. 13 JF-0206 (Wadi Burma North): structural remain at TU-102 (looking northwest).

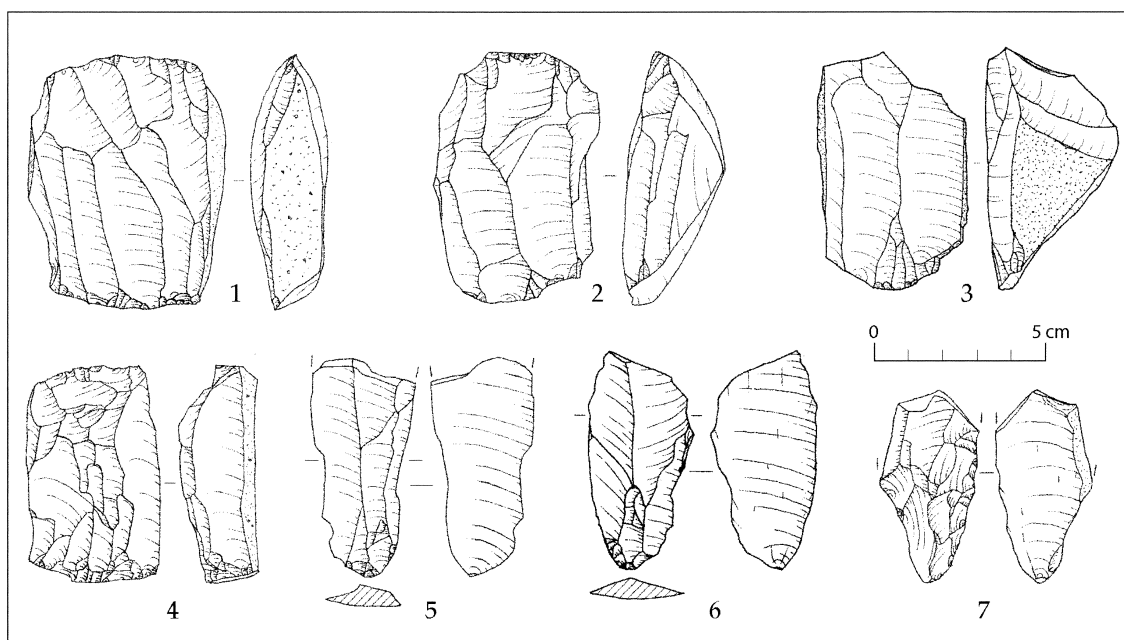


Fig. 14 JF-0206 (Wadi Burma North): lithic finds from TU-102.



Fig. 15 JF-0106 (Tal'at Abu Tulayha): distant view (looking northeast).



Fig. 16 JF-0106 (Tal'at Abu Tulayha): Square A (looking northwest).

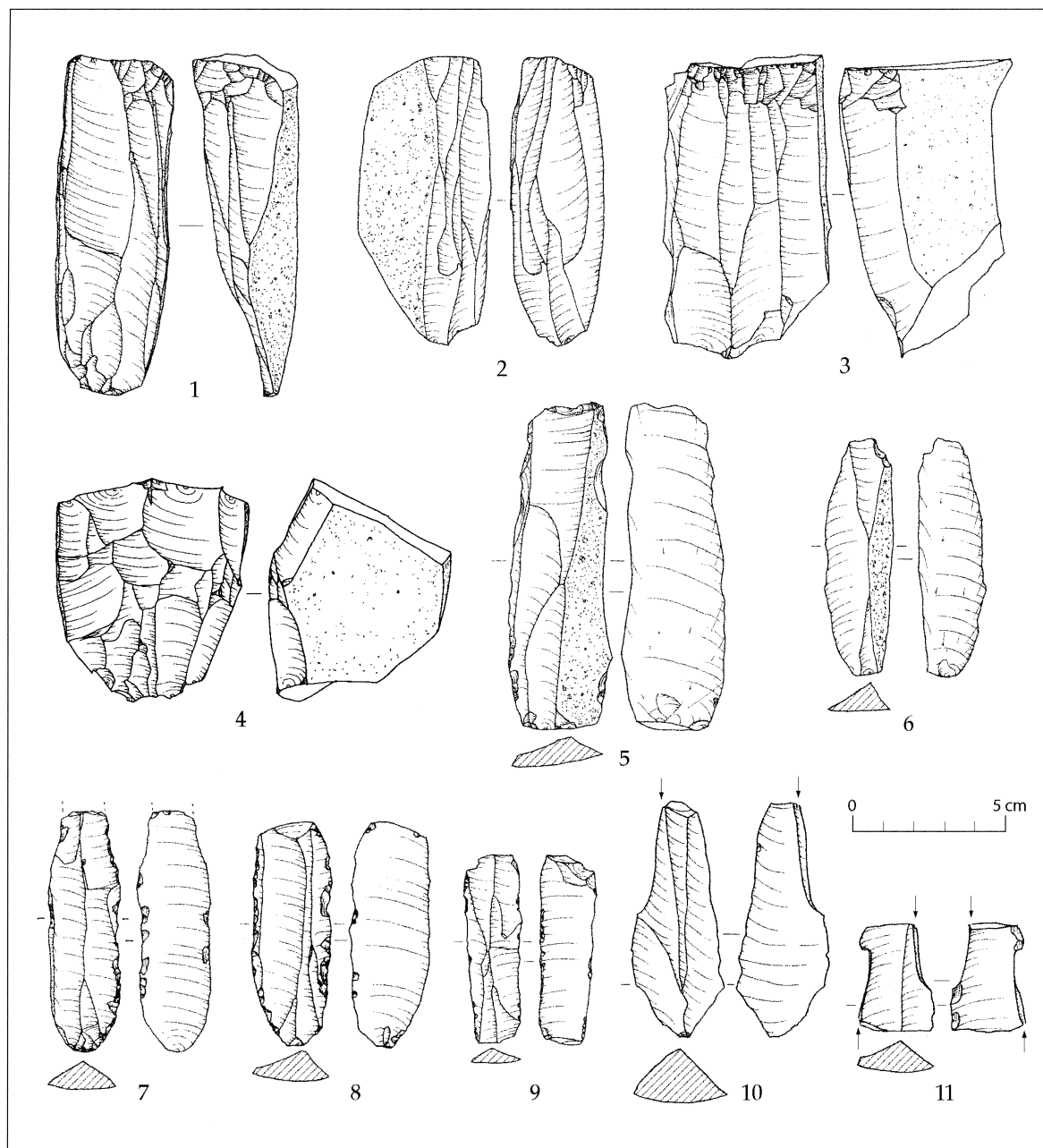


Fig. 17 JF-0106 (Tal'at Abu Tulayha): lithic finds from Square A.



Fig. 18 JF-0501 (Wadi Abyda): distant view (looking east).

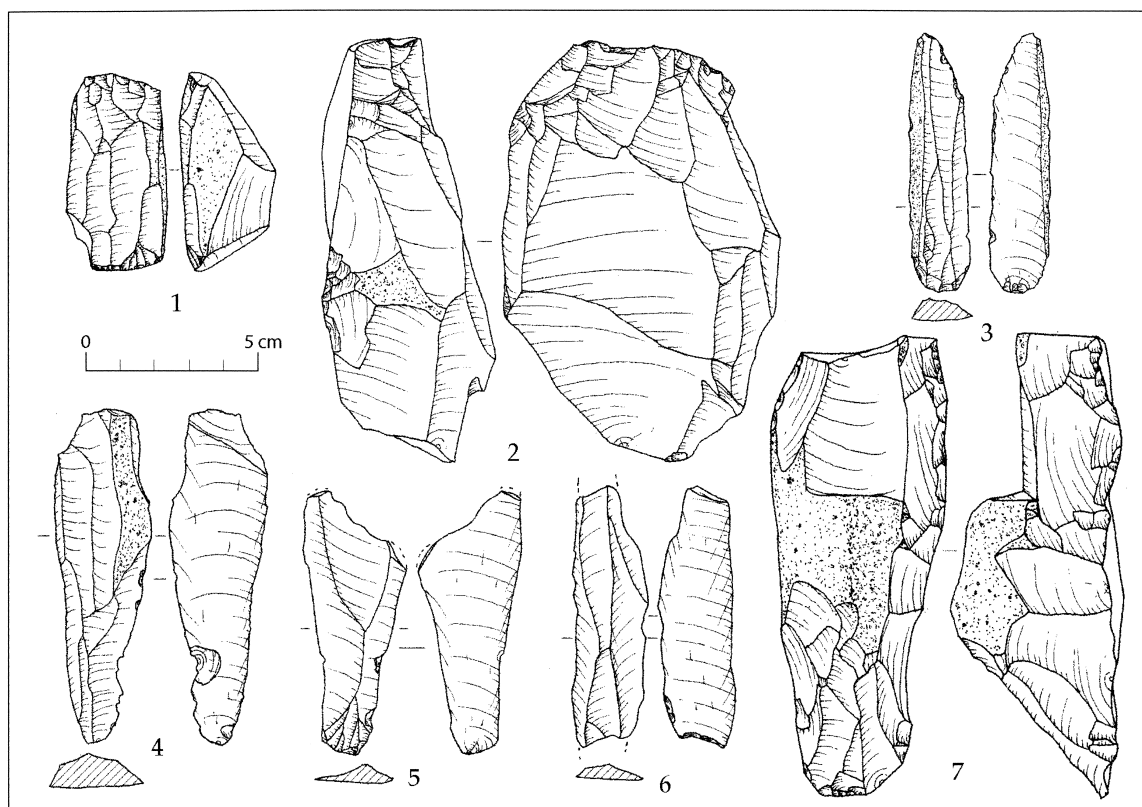


Fig. 19 JF-0501 (Wadi Abyda): lithic finds.



Fig. 20 JF-9503 (Qa' Abu Tulayha West): general view of Square N-VI (looking northeast).

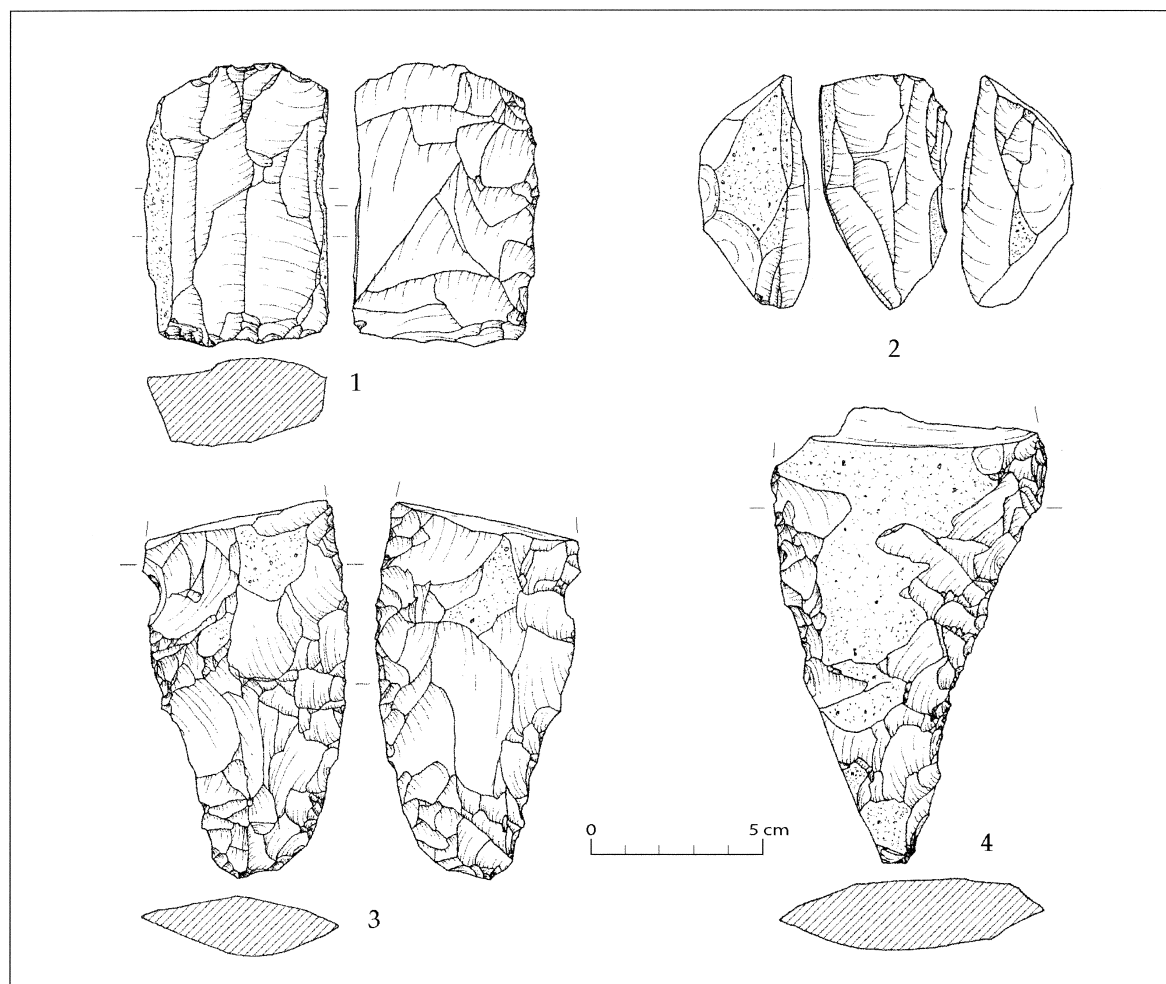


Fig. 21 JF-9503 (Qa' Abu Tulayha West): lithic finds from Square N-VI.



Fig. 22 JF-9705 (Wadi Abu Safat): general view (looking southeast).

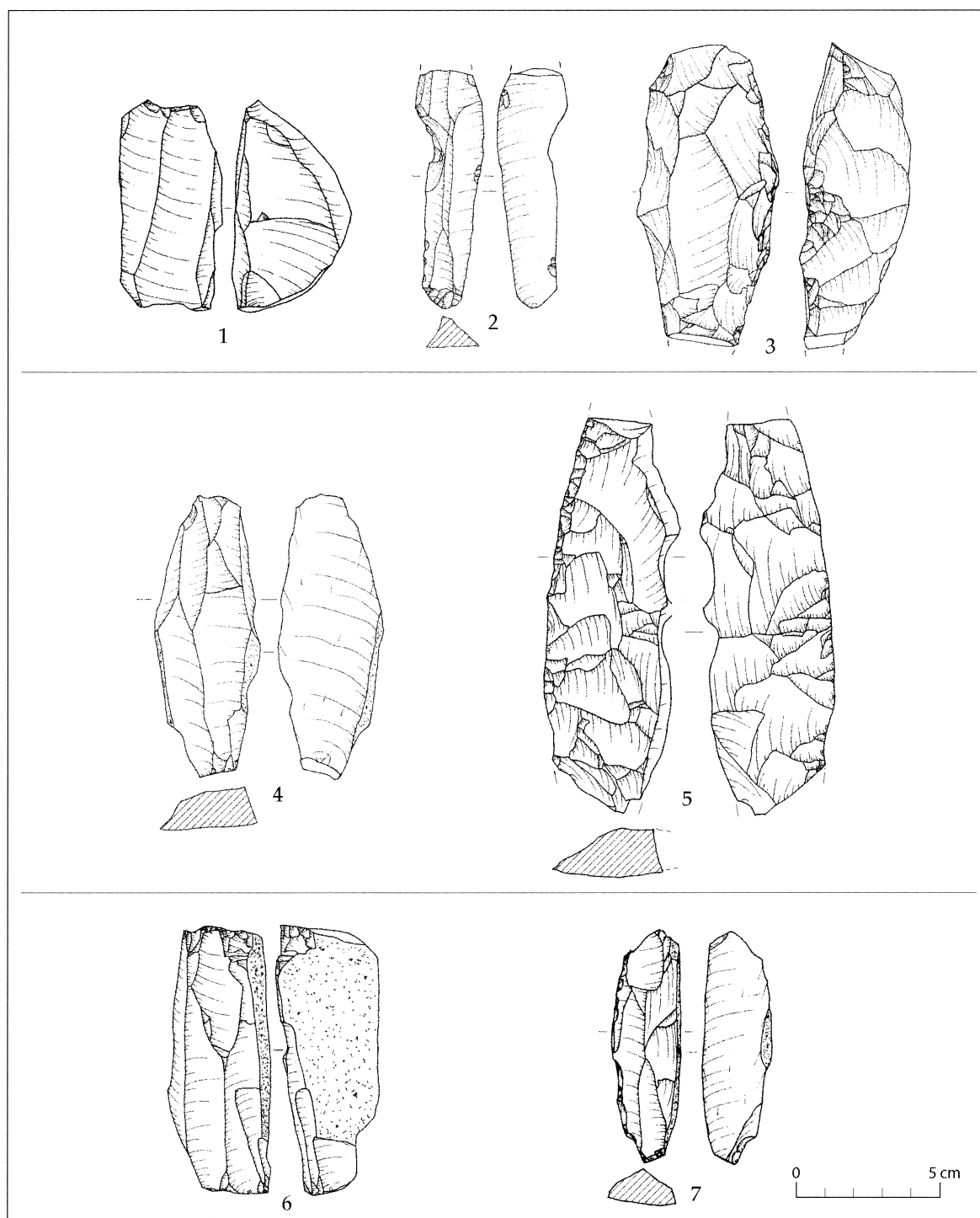


Fig. 23 Lithic finds: No. 1-3 from JF-9705 (Wadi Abu Safat), no. 4-5 from JF-0104 (Wadi Ruweishid ash-Sharqi), and no. 6-7 from JF-0109 (Wadi Abu Tulayha East).



Fig. 24 JF-0104 (Wadi Ruweishid ash-Sharqi): general view (looking south).



Fig. 25 JF-0109 (Wadi Abu Tulayha East): general view (looking south).

Table 1 Surveyed Sties of the Jafr Basin Prehistoric Project, 1995-2005.

No.	Site/Area	Code	Excavation	N / E	Altitude (m)	Features / Site Nature	Site Size (m)	Period	Primary Finds	Reference
1995-2000 SURVEYS										
9503	Qa Abu Tulayha West	QATW	1997-2002	30°27' 983"/ 035°56' 950"	980	Pseudo-settlements, Flint mines	ca. 20ha	LN, CH-EB	TS/JB	Fujii 1996-2003
9503'	QATW (Sq.-N-VI)	-	2002	30°27' 403"/ 035°56' 464"	1,010	Flint scatter	30 x 50	PPNB-LN	NV, bifacial knives	Fujii 2002b
9701	Wadi Abu Hathaneh	-	-	30°31' 684"/ 035°51' 322"	1,037	large enclosures, Cairns	500 x 200	CH-EB	LV, microliths, TS/JB, EB sherds	-
9702	NW hammada	-	-	30°33' 816"/ 035°48' 620"	1,074	Enclosures, Cairns	200 x 100	CH-EB	LV, microliths, TS/JB, hammers	-
9703	below QATW	-	-	30°27' 496"/ 035°56' 664"	998	Cairn circle?	15 x 15	-	LV, microliths, JB	-
9704	Qa Abu Tulayha East	QATE	2002	30°27' 960"/ 035°57' 089"	1,009	Lithic production	1.5 km x 50	CH-EB	TS	Fujii 1998, 2003
9705	Wadi Abu Safat	-	-	30°26' 662"/ 035°54' 597"	988	Enclosures, Flint scatter	100 x 30	LP, EPI, PPNB, EB	HA, microliths, NV, JB, anvils	Fujii 2002b
9706	below QATE	-	-	30°27' 777"/ 035°56' 993"	1,004	QATW L.3 type cairn enclosure	100 x 20	CH-EB	TS/JB, anvilstones	-
9801	Wadi Aylayah	-	-	30°30' 969"/ 036°02' 458"	994	Round structures	35 x 25	-	TS/JB, basalt quen	-
0001	Khirbet al-Juhayra	-	-	30°35' 367"/ 035°45' 987"	1,256	Rectangular structures, Cist tombs	150 x 50	R/B	R/B sherds	-
0002	Bir Abu Danneh	-	-	30°16' 119"/ 035°33' 443"	1,456	K-line, Rectangular structures	250 x 50	EPI, CH-EB, R/B	microliths, EB and R/B sherds	Fujii 2002b
2001-2002 WINTER SEASON SURVEY										
0101	NW hills	-	-	30°40' 021"/ 035°51' 513"	1,008	Lithic production, cairns	550 x 450	MP, CH-EB	LV, TS/JB	Fujii 2002b
0102	NW hills	-	-	30°39' 264"/ 035°51' 110"	1,021	Lithic production, cairns	150 x 100	MP, EPI, CH-EB	LV, microliths, TS/JB	-
0103	NW hills	-	-	30°36' 824"/ 035°52' 168"	1,074	Lithic production, cairn line	150 x 20	MP, EPI, CH-EB	LV, microliths, TS/JB	-
0104	Wadi Ruweishid as-Sharqi	-	-	30°32' 332"/ 035°54' 558"	1,036	Barrage, Flint scatte	40 x 30	PPNB, CH-EB	LV, bifacial knife	Fujii 2002b
0105	NW hills	-	-	30°32' 418"/ 035°55' 477"	1,052	Lithic production	250 x 100	MP, EPI, CH-EB	LV, microliths, TS/JB	-
0106	Tal'at Abu Tulayha	-	-	30°32' 500"/ 035°55' 746"	1,063	Lithic production, cairns	150 x 50	PPNB-LN, CH-EB	NV, TS/JB	-
0107	NW hills	-	-	30°32' 299"/ 035°55' 608"	1,055	Lithic production	80 x 80	CH-EB	TS/JB	-
0108	Wadi Abu Tulayha	-	-	30°31' 232"/ 036°02' 426"	1,000	Cairn circle	50 x 50	-	none	Fujii 2002b
0109	Wadi Abu Tulayha East	-	-	30°31' 035"/ 036°02' 379"	1,001	Cairns, Flint scatter	250 x 200	PPNB, CH-EB	TS/JB	-
0110	Gurta Siyata	-	-	30°32' 000"/ 036°05' 708"	1,039	Lithic production	300 x 300	CH-EB	TS/JB	-
0111	Tell Burma	-	-	30°37' 433"/ 035°50' 419"	1,085	Flint scatter	150 x 20	EPI, CH-EB	microliths, TS	-
0112	Tell Burma	-	-	30°38' 385"/ 035°50' 445"	1,019	Cairn field, flint scatter	400 x 350	MP, EPI, CH-EB	LV, microliths	-
0113	Harra al-Burma	-	-	30°37' 759"/ 035°50' 397"	1,037	Cairn line, flint scatter	130 x 10	MP, EPI, CH-EB	LV, microliths, NV, TS/JB	-
0114	Jabal Juhayra	-	-	30°38' 596"/ 035°47' 572"	1,114	Cairns	15 x 15	R/B	R/B sherds	-
0115	Jabal Juhayra	-	-	30°38' 655"/ 035°46' 836"	1,156	Cairns	5 x 5	EPI, R/B	Microliths, R/B sherds	-
0116	Jabal Juhayra	JJ-OT	-	30°39' 029"/ 035°45' 683"	1,218	Small settlement	150 x 50	PPNB	NV	Fujii 2002b
0117	Harra al-Burma K-lines 2	HB-KL2	2003	30°37' 879"/ 035°49' 961"	1,046	K-line	400	CH-EB	none	Fujii 2004a
0118	Harra al-Burma K-lines 1	HB-KL1	2003	30°37' 149"/ 035°50' 176"	1,064	K-line	750	CH-EB	rare	Fujii 2002b, 2004a
0119	Jabal 'Oneize	-	-	30°29' 547"/ 035°46' 925"	1,163	Stone-built structures	200 x 100	R/B?	R/B pottery sherds	-
0120	Jabal 'Oneize	-	-	30°29' 785"/ 035°46' 820"	1,129	Cairn line	120 x 15	-	none	-
0121	Khirbet al-Qanas	-	-	30°31' 458"/ 035°40' 235"	1,208	Small Settlement	120 x 55	R/B (Nabatean)	R/B (Nabatean) sherds	-
0122	Harrat al-Sayiyeh	-	-	30°34' 276"/ 035°42' 758"	1,235	Watching tower, Cairns	120 x 20	R/B?	rare	-
0123	Harra al-Sayiyeh K-line	HS-KL	2003	30°31' 854"/ 035°41' 441"	1,194	K-line	5 km	CH-EB?	TS/JB	Fujii 2004b
0124	Wadi Dursi	-	-	30°24' 785"/ 035°54' 504"	975	Lithic production, cairns	100 x 20	CH-EB	TS/JB	-
0125	Tell Abura'	-	-	30°18' 586"/ 035°35' 295"	1,367	K-line	3 km	CH-EB?	rare	Fujii 2002b
0126	Bayir	-	-	30°46' 192"/ 036°40' 846"	906	Lithic production	200 x 50	CH-EB	TS/JB	Fujii 2002b
0151	NW hills	-	-	30°39' 573"/ 035°51' 469"	1,012	Lithic production	100 x 100	LP, CH-EB	Handaxe, TS/JB	-
0152	Wadi Abu Tulayha	-	-	30°31' 825"/ 035°57' 911"	1,026	Lithic production	100 x 80	CH-EB	TS/JB	-
0153	Wadi Abu Tulayha	-	-	30°32' 039"/ 035°58' 971"	1,055	Lithic production, cairns	300 x 200	CH-EB	TS/JB, Thamudic inscriptions	-
0154	NW hammada	-	-	30°32' 129"/ 035°50' 029"	1,079	Cairns	130 x 100	-	none	-
0155	Wadi Abu Tulayha	WAT	2005-	30°30' 540"/ 035°58' 269"	1,011	Cairns, Lithic production	250 x 250	PPNB-LN, CH-EB	NV, TS	-
0156	NW hammada	-	-	30°32' 710"/ 035°50' 261"	1,071	Cairn	10 x 10	-	none	-
2002 SUMMER SEASON SURVEY										
0201	Harrat al-Juhayra	-	-	30°38' 819"/ 035°49' 352"	1,026	Cairn field	1km x 1km	CH-EB?	microliths,	-
0202	Harrat al-Juhayra Pseudo-S.	HJ-PS	2004	30°38' 959"/ 035°48' 070"	1,073	QATW L. 4 type pseudo-settlement	300 x 50	LN?	none	Fujii 2005a
0203	Harrat al-Burma	-	2003	30°37' 444"/ 035°49' 486"	1,046	Cairn	50 x 30	CH-EB?	microliths	-
0204	Wadi Burma South Cairn Field	WBs-CF	2003	30°38' 481"/ 035°49' 787"	1,017	Cairn field	ca. 100 ha	CH-EB	rare	Fujii 2004b
0205	Wadi Burma Kite-site 1	WB-KS1	2003	30°39' 026"/ 035°50' 240"	1,008	Kite site	400 x 400	Umayyad?	red-painted pottery sherds etc.	Fujii 2004b
0206	Wadi Burma North	WBn-CF	2004	30°39' 561"/ 035°50' 684"	1,000	Cairn field, Upright slab wall structure	ca. 200 ha	PPNB, CH-EB	rare	Fujii 2005a
0207	Tal'at Abydah	-	-	30°40' 959"/ 035°52' 182"	1,057	Watching tower	30 x 25	Roman	Roman sherds	-
0208	Tal'at Abydah Cairn Field 1	TA-CF1	2004	30°39' 944"/ 035°53' 085"	1,070	Cairn field	ca. 50 ha	CH-EB	LV, NV, TS,	Fujii 2005a
0209	Tal'at Abydah	-	-	30°40' 273"/ 035°53' 142"	1,022	Lithic production	300 x 500	CH-EB	TS/JB	-
0210	Tal'at Abydah	-	-	30°38' 967"/ 035°51' 626"	1,094	Cairn line, Lithic production	750 x 20	CH-EB	TS	-
0211	Tal'at Abydah Flint Mine 1	TA-FM1	-	30°39' 168"/ 035°52' 541"	1,097	Lithic production (Flint mines)	600 x 20	CH-EB	TS	-
0212	Tal'at Abydah Flint Mine 2	TA-FM2	-	30°39' 161"/ 035°52' 203"	1,083	Lithic production (Flint mines)	30 x 750	CH-EB	TS	-
0213	Tal'at Abydah	-	-	30°38' 203"/ 035°52' 207"	1,091	Lithic production, Carin field	400 x 30	CH-EB	TS/JB	-
0214	Tal'at Abydah	-	-	30°38' 835"/ 035°53' 796"	1,055	Lithic production	500 x 150	CH-EB	TS, JB	-
0215	Tal'at Abydah Flint Mine 3	TA-FM3	-	30°37' 549"/ 035°55' 960"	1,078	Lithic production (Flint mines)	200 x 20	CH-EB	TS	-
0216	Tal'at Abydah Flint Mine 4	TA-FM4	-	30°37' 470"/ 035°55' 611"	1,078	Lithic production (Flint mines)	100 x 15	CH-EB	TS	-
0217	Tal'at Abydah Flint Mine 5	TA-FM5	-	30°36' 499"/ 035°55' 674"	1,077	Lithic production (Flint mines)	200 x 170	CH-EB	TS	-
0218	Jabal Juhayra (JJ-KL)	-	-	-	-	K-line	-	CH-EB	-	-
2003 SPRING SEASON SURVEY										
0301	Tell ar-Radiha	-	-	-	-	Lithic production, cairns	300 x 100	CH-EB	TS, JB	-
0306	Harrat al-Burma Cairn Line	HB-CL	2003	30°37' 695"/ 035°49' 872	1,017	Cairn Line	800x100	CH-EB?	rare	Fujii 2004b
2003/2004 WINTER SEASON SURVEY										
0310	Harrat al-Juhayra	-	-	30°39' 173"/ 035°48' 004"	1,083	Enclosure field	450 x 200	CH-EB?	-	-
0311	Harrat al-Juhayra	-	-	30°39' 062"/ 035°47' 700"	1,069	Enclosure field	70 x x50	CH-EB?	none	-
0312	Jabal Juhayra	-	-	30°38' 926"/ 035°45' 295"	1,335	Watching Tower	8 x 10	Roman	Roman sherds	-
0313	Wadi Qusayir	WQ	2004	30°38' 522"/ 035°48' 566"	1,047	Composite site	150 x 450	EP-ISL	-	Fujii 2005a
0314	Tal'at Abyda Cairn Field 2	TA-CF2	-	30°41' 231"/ 035°53' 153"	1,031	Cairn field	150 x 400	CH-EB	TS, JB	-
2005 SPRING SEASON SURVEY										
0501	Wadi Abyda	-	-	-	-	Flint scatter, Enclosures	-	PPNB, CH-EB	NV, TS, JB	-

* The length of the N-S, NE-SW, or NW-SE axis is described first.

* MP: Middle Palaeolithic; EPI: Epipalaeolithic; PPNB: Pre-Pottery Neolithic B; LN: Late Neolithic; CH: Chalcolithic; EB: Early Bronze Age; IA: Iron Age; R/B: Roman/Byzantine

** LV: Levallois components; NV: Naviform components; TS/JB: Tabular scraper and Jaf blade components