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## Chronology of the Jafr Prehistory and Protohistory: a Key to the Process of Pastoral Nomadization in the Southern Levant

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**CHRONOLOGY OF THE JAFR PREHISTORY AND PROTOHISTORY:  
A KEY TO THE PROCESS OF PASTORAL NOMADIZATION  
IN THE SOUTHERN LEVANT <sup>1</sup>**

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**Résumé** – La question de l'établissement d'une séquence chronologique est primordiale dans le cadre de l'archéologie de la Badia du Levant Sud, afin de permettre de définir une typo-chronologie des différentes structures rencontrées dans les périphéries désertiques. Les sites du Bassin d'al-Jafr, dans le sud de la Jordanie, permettent d'apporter des éléments de réponse significatifs sur cette question. Les recherches effectuées dans cette région ont montré que l'occupation post-pléistocène a commencé au cours du PPNB par le développement d'établissements agro-pastoraux dans le Wadi Abu Tulayha et à Wadi Ghuweir 17, suivi par la première phase d'occupation pastorale nomade dans ce secteur, représentée par les nécropoles ou les sanctuaires ouverts du PPNC/ Néolithique récent à Harra al-Juhayra et Qa' Abu Tulayha West. Ce processus a abouti à la mise en place de sociétés véritablement nomades de l'âge du Bronze ancien, attestées par les champs de cairns funéraires du Wadi Burma et Tal'at 'Ubayda. À travers une synthèse de ces données issues des recherches entreprises dans le Bassin d'al-Jafr, une séquence chronologique de l'occupation pastorale préhistorique et protohistorique de ce secteur est proposée à titre provisoire dans cet article, permettant d'aborder la question du processus de développement du phénomène pastoral nomade à une échelle géographique plus large.

**Mots-clés** – Jordanie, Bassin d'al-Jafr, pastoralisme et nomadisation, Wadi Abu Tulayha, Qa' Abu Tulayha.

**Abstract** – The top-priority issue of the Badia archaeology in the southern Levant is to establish a chronological framework for seriating various features dotted in arid peripheries. The Jafr Basin sites in southern Jordan provide insights into the issue. A series of investigations has shown that the post-Pleistocene land use history of the arid basin began with the short-range pastoral transhumance evidenced at the PPNB agro-pastoral outposts of Wadi Abu Tulayha and Wadi Ghuwayr 17, through the initial pastoral nomadism suggested at the PPNC/LN isolated cemeteries or open sanctuaries of Harrat al-Juhayra and Qa' Abu Tulayha West, and then came to the establishment of full-fledged nomadic society represented by the EBA large-scale cairn fields of Wadi Burma and Tal'at 'Ubayda. Reviewing the previous investigation results, this paper presents a tentative chronology of the Jafr pastoral prehistory and protohistory and, on this base, briefly discusses the process of pastoral nomadization in the basin and its surrounding areas.

**Key-Words** – Jordan, Jafr Basin, pastoral nomadization, Wadi Abu Tulayha, Qa' Abu Tulayha.

1. This paper is a revised version of our oral presentation at the *Wadi Musa workshop* held on June 12-13, 2011. We would like to express our gratitude to the two organizers of the meeting, W. Abu-Azizeh and M. Tarawneh. It was our great pleasure that we had a very close and meaningful exchange of views with many colleagues who share the same interest. Our thanks also go to T. Adachi who helped us to produce some of the illustrations and G. O. Rollefson who suggested some of the references.

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**ملخص** – يعتبر إنشاء إطار زمني للعديد من المعالم الموجودة في الأطراف الجنوبية الجافة لبادية الشام من أهم القضايا لعلم الآثار. وتقدم مواقع حوض الجفر في جنوب الأردن نظرة متعمقة في هذا الشأن. وقد أظهرت سلسلة من التحقيقات في تاريخ استخدام الأرض الجافة في فترة ما بعد البلايستوسين أن هذا الاستخدام بدأ من خلال البداوة القصيرة المدى كما تشير الأدلة من مواقع وادي أبو طليحة ووادي الغوير ١٧ والتي ترجع إلى البؤرة الإستيطانية الزراعية-البديوية من فترة العصر الحجري الحديث ما قبل الفخاري الفترة ب. وكذلك خلال الفترة المتأخرة من العصر الحجري الحديث ما قبل الفخاري والعصر الحجري الحديث الفخاري كما هو الحال في المقابر المنعزلة في حرة الجهيرة وقاع أبو طليحة الغربي. وحتى ظهور مجتمع البداوة الكاملة في العصر البرونزي المبكر كما هو الحال في الرجوم الكثيرة في موقع وادي البرما وتلعة عبدة. واستناداً إلى نتائج التحقيقات السابقة تقدم هذه الورقة محاولة لوضع تسلسل زمني للبداوة في منطقة الجفر خلال عصور ما قبل التاريخ وبداية العصور البرونزية وكذلك تناقش عملية البداوة في منطقة الجفر والمناطق المحيطة.

**كلمات محورية** – الأردن، حوض الجفر، الرعي والبداوة، وادي أبو طليحة، قاع أبو طليحة.

## INTRODUCTION

A high priority issue of the Badia archaeology in the southern Levant is to establish a chronological framework for seriating various features dotted in the steppe and desert. This is especially the case when one tries to trace the process of pastoral nomadization. Any discussion does not make sense or at least lacks persuasiveness, unless it is based on a chronological perspective on the five millennia spanning from the Pre-Pottery Neolithic B (hereafter PPNB) when sheep and goats were first domesticated, through the Pre-Pottery Neolithic C and the Late Neolithic (hereafter PPNC and LN, respectively) when pastoral infiltration into arid peripheries was supposedly accelerated, to the Early Bronze Age (hereafter EBA or EB) when full-fledged nomadic society is thought to have been established. Even when one takes an anthropological approach to the issue, it is difficult for him or her to develop a convincing argument without an adequate understanding of the cultural sequence during the key five millennia.

For this reason, much effort has been devoted to the establishment of a local chronology over the last few decades, and various perspectives have been presented in southern Jordan <sup>3</sup>, eastern Jordan <sup>4</sup>, and northern Arabia <sup>5</sup>, to say nothing of the Negev and Sinai <sup>6</sup>. Similar attempts have been made in the eastern and southern parts of the Arabian Peninsula as well <sup>7</sup>. These chronological perspectives have enabled us to get a glimpse into the process of the far-reaching socio-cultural reorganization that involved the whole range of the southern Levant in the early Holocene. We would have to say, however, that they are still too patchy to formulate an overall picture of the significant episode. The chronology of eastern Jordan, for example, puts emphasis on the origin of Neolithic pastoral adaptation but still lacks specifics in terms of the post-Neolithic development. The opposite is the case with northern Arabia, where archaeological research focuses on Chalcolithic/EBA features, leaving the process of Neolithization scarcely dealt with. The chronology of the Negev and Sinai is relatively well balanced, but there still remains some ambiguity in terms of the transition especially from the PPNB to the Chal/EBA. Viewed in this light, we can restate the first sentence as follows: the top-priority issue of the south Levantine Badia archaeology is to construct a comprehensive local chronology covering the whole time range of the key millennia.

Our long-term research project in the Jafr Basin, southern Jordan, has challenged this issue. Since the first field season in 1997, we have conducted several general surveys and excavated more than a dozen archaeological sites varying in both date and nature from PPNB agro-pastoral outposts to EBA

3. HENRY 1995, 1997; MACDONALD 1988, 1992.

4. BETTS 1993, 1998a, 1998b, 2012; GARRARD *et al.* 1994, 1996; HELMS & BETTS 1987.

5. HASHIM 1996; ZARINS 1990, 1992a, 1992b, 1998a, 1998b.

6. AVNER 1998, 2006; AVNER *et al.* 1994; BAR-YOSEF & KHAZANOV 1992; BEIT-ARIEH 2003; COHEN, 1999; EDDY & WENDORF 1999; FINKELSTEIN 2001; GORING-MORRIS 1993; LEVY 1992; ROSEN 2002, 2009, 2011; ROTHENBERG & GLASS 1992.

7. ABDUL-NAYEEM 1990; DOE 1971, 1983; MAIGRET 2002; MASRY 1997; POTTS 1990; STEIMER-HERBET 2004; WEEKS 2010.

cairn fields. After some fifteen years, the efforts have barely started to be united as one body. Although there still remain a few minor gaps and ambiguities, the series of investigations has enabled us to draw a rough flowchart of the pastoral nomadization in the Jafr Basin.

This paper presents a tentative chronology of the Jafr pastoral prehistory and protohistory and, on this base, discusses the process of the pastoral nomadization in the basin and its surrounding areas. The following descriptions will start with the natural environments and the research history of the Jafr Basin, followed by the outline of our research project and a comprehensive review of the investigation results. Subsequently, we will offer the Jafr chronology and discuss the process of pastoral nomadization in the basin. An intensive crosscheck in a broader context is beyond the scope of this paper, but we will attempt brief comparisons with the cultural sequence in adjacent areas with a view to briefly testing the versatility of the Jafr chronology.

### THE JAFR BASIN

The Jafr Basin is a large-scale, high-altitude depression occupying the southern edge of the Transjordanian Plateau, having a total area of *ca.* 15,000 km<sup>2</sup> and an elevation of *ca.* 900-1200 m<sup>8</sup>. It is separated from surrounding water systems and forms an inland, closed drainage system with *Qa' al-Jafr*, a large-scale dry lake in the center of the basin, being the major converging point (**fig. 1**). For this reason, the central part of the basin is very flat, being marked by gently rolling flint pavement desert (or *hamada* in Arabic), winding dry rivers (or *awdiya*: plural of *wadi*), and dotted playas (or *qi'an*: plural of *qa'*) (**fig. 2**). On the other hand, the peripheral parts consist of limestone hilly terrain, which forms a watershed against Wadi al-Hasa to the north, Wadi al-Hisma to the south, Wadi as-Sirhan to the east, and Wadi al-'Araba to the west, respectively.

The environmental condition of the basin is (and probably was) very harsh, falling into Thornthwaite's *BWK zone*, Koeppen's *EB3 'da' zone*, or Emberger's "*Very Arid-Mild*" zone, respectively<sup>9</sup>. The average annual rainfall is less than 50 mm in the central part and not more than *ca.* 100-150 mm even in the western hilly zone<sup>10</sup>. Thus no perennial natural water sources are available in the basin. The local vegetation is also very poor, belonging to the northeastern edge of the *Saharo-Arabian phytogeographical region*<sup>11</sup>. Understandably, no traditional settlements are existent with the exceptions of only two oasis towns (i.e. Ma'an and al-Jafr), and local land use has been limited to sporadic pasturing. Although a few villages are dotted along the Desert Highway, all of them represent emerging settlements that were founded in the recent past as a part of policies to promote the sedentarization of local pastoral nomads.

Such seemingly poor archaeological potential and logistic difficulties have long impeded full-fledged archaeological investigations in the basin. There were several pioneering explorations, but most of them were conducted more than a few decades ago and primarily from a geological point of view<sup>12</sup>. It is for this reason that the Jafr Basin has been represented as a large blank in archaeological site maps until just a decade ago<sup>13</sup>. Although the situation has been improved to some extent by recent reconnaissance surveys<sup>14</sup>, the basin still forms a large lacuna that divides the Azraq Basin to the north and the Hisma/Negev/Sinai to the south or southwest. It is needless to say that the blank at the crossroad makes it

8. BENDER 1968, p. 9; 1974, p. 8; CORDOVA 2007; MACUMBER 2001, p. 10.

9. *Jordan National Geographic Center* 1986, p. 23-25.

10. *Jordan National Geographic Center* 1984, 1986.

11. ZOHARY 1973, map 6.

12. BENDER 1968, 1974; FIELD 1960; GLUECK 1934, 1935, 1939, 1951; HUCKRIEDE & WIESEMAN 1968; MOUMANI 1997; REES 1929; RHOTERT 1938; ZEUNER *et al.* 1957.

13. *Department of Antiquities of Jordan* 1973; MACDONALD *et al.* 2001; PALUMBO 1994; Doctor Sabage's Old World Archaeology Page, <http://gaialab.asu.edu/Jordan/#>; MegaJordan (The National Heritage Documentation and Management System), <http://megajordan.org/Map>.

14. QUINTERO & WILKE 1998a, 1998b; QUINTERO *et al.* 2002.

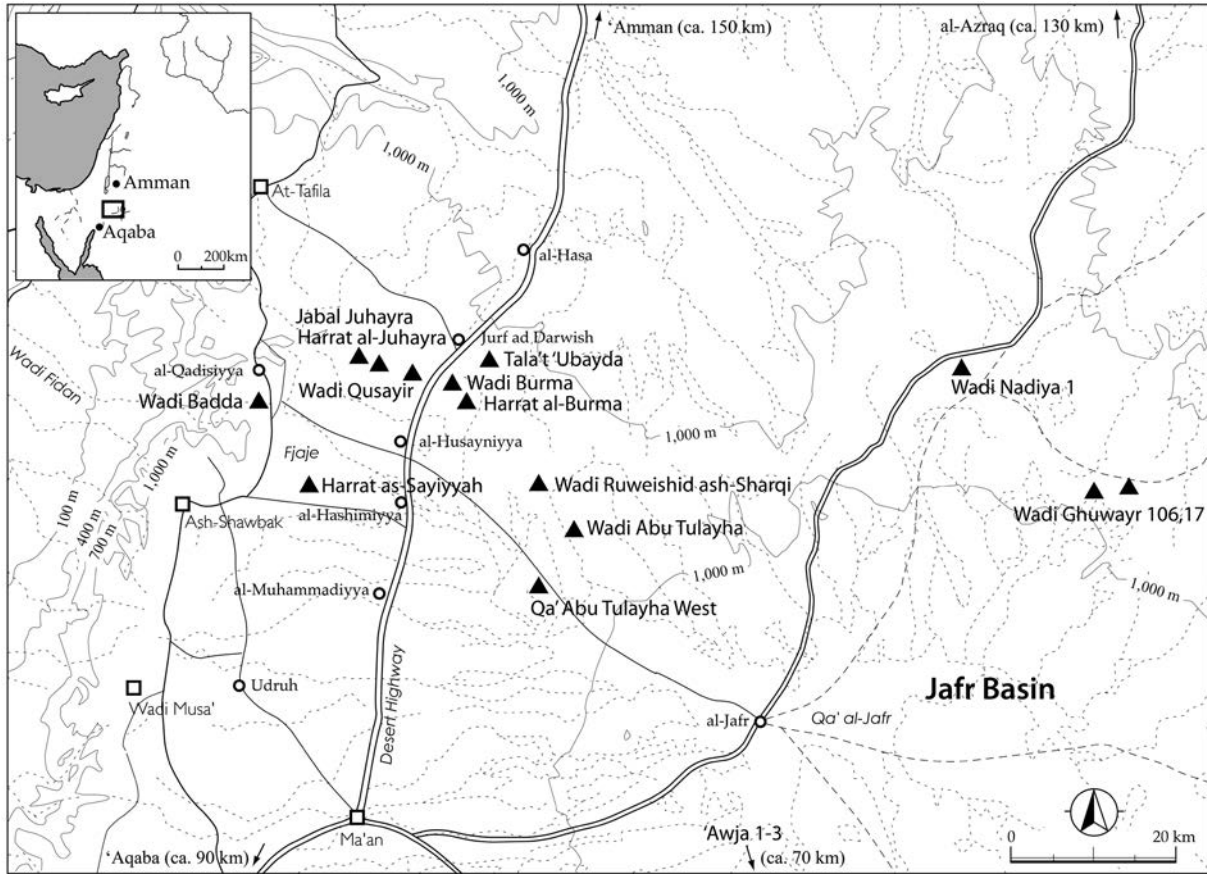


Figure 1. Archaeological sites excavated by the Jafr Basin Prehistoric Project, 1997-2011 (© S. Fujii).



1. Hamada (flint pavement desert).



2. Qa' (dry lake).



3. Escarpment at the northwestern edge.



4. Escarpment at the northeastern edge.

Figure 2. Typical landscapes of the Jafr Basin (© S. Fujii).

difficult to develop a comprehensive argument on the south Levantine Badia archaeology. This is the reason why the establishment of the Jafr chronology is an urgent issue.

### THE JAFR BASIN PREHISTORIC PROJECT

Our research project, *the Jafr Basin Prehistoric Project (JBPP)*, was designed to trace the process of pastoral nomadization in southern Jordan and its surrounding areas on the basis of archaeological evidence (**fig. 3**). For this objective, we chose the northwestern part of the basin as our main research field, which was defined as an upside-down trapezoidal territory encompassed by the hilly countries in the north, the Husayniyya-Jafr road in the south, the line connecting Qa' Abu Tulayha and Jabal Gurta Siyata in the east, and the Desert Highway in the west, respectively. The research field covers an area of *ca.* 300 km<sup>2</sup>, and its elevation ranges from *ca.* 1000 to 1200 m. Although our main operations have focused on this area, we occasionally crossed over to adjacent areas for collecting comparative data. It is for this reason that the map includes several sites lying outside our original research field.

The reason why we chose the Jafr Basin for our research project is that as noted above, this large blank still occupies the crossroad of the Badia archaeology and poses obstacles to a comprehensive study of the pastoral nomadization. The reason why then we focused on its northwestern part is that it has the potential to have provided an eastward outlet, or a major setting of pastoral nomadization, of the PPNB cultural entity in southern Jordan. As a matter of fact, the discovery of Qa' Abu Tulayha West in the course of our preliminary inspection in 1995 assured us of the archaeological potential of the area. In addition, the area is nearer to farming communities to the west and, therefore, has the advantage of being able to make full use of comparative data.

Since the first field season in 1997, we have conducted a total of twenty-one field campaigns and excavated more than a dozen sites (**fig. 1**; **table 1**). They include two PPNB small settlements (i.e. Wadi Abu Tulayha and Wadi Ghuwayr 17), four PPNB barrage systems (Wadi Abu Tulayha, Wadi Ruweishid

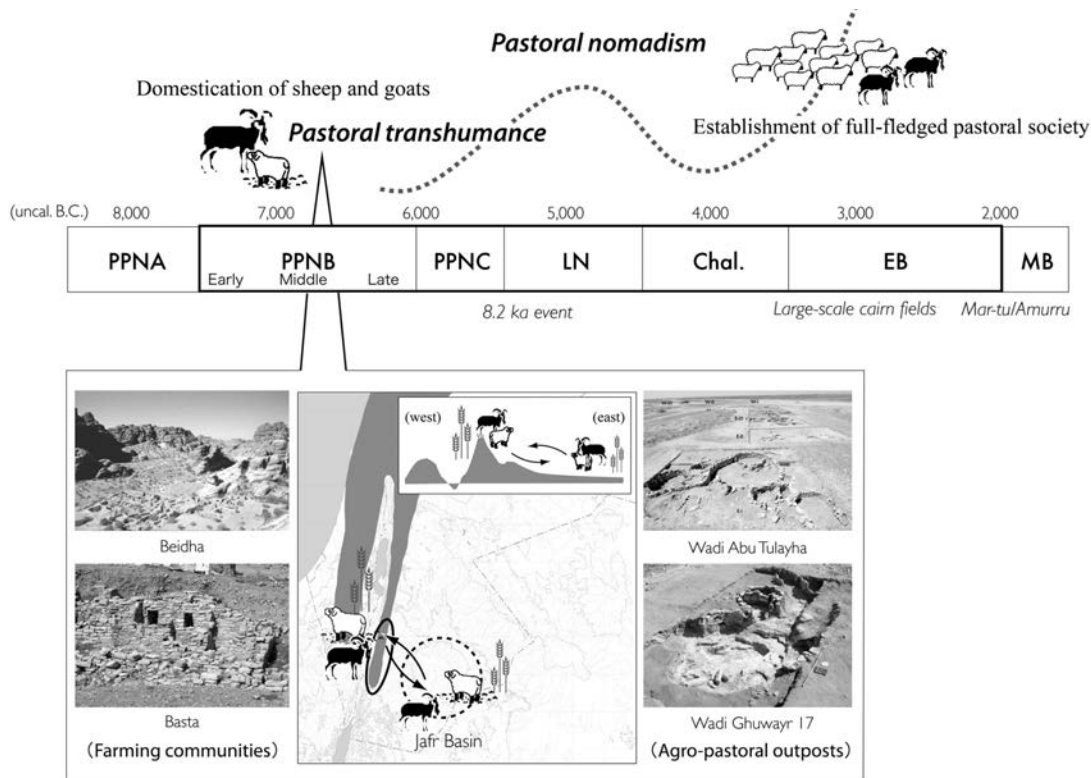


Figure 3. Research scheme of the Jafr Basin Prehistoric Project (© S. Fujii).

Campaign	Year	Season	Site(s)	Period	Major Operations	Relevant report(s)	
	0	1995	summer	Jafr Basin	-	preliminary inspection	Fujii 1996
Phase I	1	1997	summer	Qa' Abu Tulayha West	EB	Str: 01	Fujii 1998
	2	1998	summer	Qa' Abu Tulayha West	EB	Str: 03	Fujii 1999a, 1999b
	3	1999	summer	Qa' Abu Tulayha West	EB, LN	Str: 07; Layer 4 continnua	Fujii 2000a
	4	2000	summer	Qa' Abu Tulayha West	LN	Layer 4 continnua	Fujii 2001
	5	2001	summer	Qa' Abu Tulayha West	LN/Chal.	BC-200s ~ 400s	Fujii 2002a, 2002c
	6	2002	winter	Jafr Basin	-	general survey	Fujii 2002b
	7	2002	summer	Qa' Abu Tulayha	LN/Chal.	BC-500s~600s	Fujii 2003
Phase II	8	2003	winter	Harrat al-Burma etc.	-	land survey	-
	9	2003	spring	Harrat al-Burma	EB	K-lile 1, 2	Fujii 2004a
				Wadi Burma	Ummayad	hunting enclosure	Fujii 2004a
	10	2003	summer	Harrat al-Burma	Chal.	BC-700s	Fujii 2004b
				Wadi Burma South	EB	CE-1 etc.	Fujii 2004b
				Harrat al-Sayiyya	EB	K-line	Fujii 2004b
	11	2004	winter	W. Burma North etc.	EB	land survey	-
	12	2004	summer	W. Burma North	EB	CE-101, -109 etc.	Fujii 2005a
				Tal'at 'Ubayda	EB	CE-102, -106 etc.	Fujii 2005a
				W. Qusayir	EB	FC-137 etc.	Fujii 2005a
				Harrat al-Juhayra	PPNC/LN	NC-02; SC-58 etc.	Fujii 2005b
	13	2005	spring	Wadi Abu Tulayha	PPNB	Str: K; CE-2	Fujii 2006a
	14	2005	summer	Wadi Abu Tulayha	PPNB	Str: A ~ J; CE-1	Fujii 2006a, 2006b
	15	2006	spring	Wadi Abu Tulayha	PPNB	Barrage 1-3	Fujii 2007b, 2007c
				Wadi Ruweishid	PPNB	Barrage 1, 2	Fujii 2007b, 2007c
	16	2006	summer	Wadi Abu Tulayha	PPNB	Area E-1, II, III	Fujii 2007a
	17	2007	summer	Wadi Abu Tulayha	PPNB	Area E-III, W-III	Fujii 2008a, 2008b
	18	2008	summer	Wadi Abu Tulayha	PPNB	Area E-III, W-III, S	Fujii 2009a
Phase III	19	2009	summer	Jafr Basin	-	Neolithic barrage survey	Fujii 2010a, 2010b
	20	2010	summer	Wadi Ghuweir 17	PPNB	Str: 1 ~ 4	Fujii et al. 2011b
				Wadi Ghuweir 106	PPNB	Barrage 1, 2	Fujii et al. 2011a
	21	2011	summer	Awja 1-3	PPNC/LN/Chal.	Pseudo-settlement	Fujii et al. 2012a
				Wadi Nadiya 1	PPNB	Barrage 1, 2	Fujii et al. 2012b

Table 1. Trajectory of the Jafr Basin Prehistoric Project, 1997-2011 (© S. Fujii).

ash-Sharqi, Wadi Ghuwayr 106, and Wadi al-Nadiya 1), four PPNC/LN cemeteries or open sanctuaries (Harrat al-Juhayra, the Layer 4 Northeastern Complex of Qa' Abu Tulayha West, and 'Awja 1-2), four Chalcolithic cemeteries or open sanctuaries (the Layer 4 Southwestern Complex of Qa' Abu Tulayha West, Harrat al-Burma, Harrat as-Sayiyah, and 'Awja 3), and several Early Bronze Age cairn fields (Wadi Burma South, Wadi Burma North, Tal'at 'Ubayda, the Layer 3 complex of Qa' Abu Tulayha West, and Layer 2 complex of Wadi Abu Tulayha). In addition, several PPNB flint workshops and a few EBA flint quarries were also briefly examined to explore another aspect in the general land use history of the basin.

Although specific research methods varied from site to site, every excavation took place on a basis of the grid and locus system. The 5 m grid system was the standard, but the 2 m system was occasionally applied to small, isolated features such as burial cairns. In addition, the trench excavation method was also used in combination with the grid system for obtaining complementary data such as site size and site stratigraphy. Most benchmarks were set up arbitrarily at the northwestern corner of an excavation sector due to the absence of reliable triangular points around the sites. Every site elevation was measured at the benchmark by means of a portable GPS instrument and subsequently crosschecked against available

maps. In order to secure mobility in desert, we avoided the use of bulky electronic equipment such as a total station and, instead, adopted a traditional land surveying method using a plane table and/or a batter board. Although excavated soil of fill layers were not sieved due to time constraints, floor deposits and hearth contents were put into 3-5 mm mesh dry sieving and/or water flotation.

The investigations in the desert confronted many difficulties, the first of which was the archaeological invisibility of the prehistoric and protohistoric mobile population<sup>15</sup>. In comparison with the sedentary population, pastoral nomads are, in general, poorer in material culture, smaller in group size, and higher in mobility. These remarkable traits make their archaeological footprints invisible or at least less traceable. The Jafr sites were no exception to this, and the identification of their vestiges required great effort. What offered a breakthrough in this situation was the existence of various burial features. They existed even in the remote wilderness and, at the same time, had a certain degree of archaeological visibility. It is for this reason that our investigations focused largely on cemetery or sanctuary sites.

Another thorny matter we faced was the difficulty in dating desert sites. The only exceptions were the PPNB settlements, which produced a number of <sup>14</sup>C data as well as a variety of diagnostic finds including flint artifacts. In contrast, the post-PPNB cemeteries or open sanctuaries, which accounted for the vast majority of the Jafr early Holocene sites, were characterized by symbolic secondary burial and, therefore, rarely yielded charcoal remains, to say nothing of human skeletal remains and burial gifts. For this reason, we had no alternative but to depend on the typological seriation of burial features in several cases. Thus the chronology suggested below is still tentative and requires further verification.

### PHASE 1 (THE JAFR PPNB)

To date, we have excavated two small PPNB settlements: Wadi Abu Tulayha and Wadi Ghuwayr 17. Evidence suggests that both sites were sustained by a mixed economy consisting of pastoral transhumance, hunting, and basin-irrigated agriculture. Thus the settlements can probably be defined as agro-pastoral outposts derived from farming communities to the contemporary west. In addition, a few small settlements, four barrage systems, two cisterns, and several flint workshops have also been investigated. The series of research outcome shows that the Jafr Pastoral PPNB was much more substantial than previously thought.

#### *Wadi Abu Tulayha*

The site of Wadi Abu Tulayha is located in the middle of a flint-strewn desert that extends in the northwestern part of the basin. In terms of topography, it occupies the lower edge of a semi-open playa system that flows eastward into Wadi Abu Tulayha, one of the major drainage systems in the area. The site was found for the first time in the course of our 2001-2002 winter season survey<sup>16</sup> and continuously excavated over six field seasons from the spring of 2005 until the summer of 2008<sup>17</sup>. More than a dozen <sup>14</sup>C dates<sup>18</sup> and a series of diagnostic finds described below are suggestive of a Middle to Late PPNB (hereafter M-LPPNB) date for the site. In view of the small settlement size estimated at *ca.* 0.1-0.2 ha and the harsh environmental conditions around the site, it is conceivable that the settlement was used on a seasonal basis. The custom of entrance blockade attested to throughout the settlement also argues against its all-year-round use<sup>19</sup>. The frequency of neonatal gazelle bones<sup>20</sup> and the predominance of

15. FINKELSTEIN 1992; FINKELSTEIN & PEREVOLOTSKY 1990; FUJII 2000b; ROSEN 1987, 1992.

16. FUJII 2002b; FUJII & ABE 2008.

17. FUJII 2006a, 2006b, 2007a, 2008a, 2009a, 2010b.

18. FUJII 2009a, table 1.

19. FUJII 2006a, p. 28; 2007a, fig. 9.

20. HONGO *et al.* 2013.



spring crops<sup>21</sup> suggest that it accommodated a small group probably for a few months from spring to early summer.

The site comprises two structural entities: an elongated settlement and a series of water catchment facilities (**fig. 4, 5**). The settlement, measuring *ca.* 100 m in total length and *ca.* 10-15 m in width, occupies a flat terrain at the northwestern corner of the site and draws a gentle arc opening to the south or the southeast. The water catchment facilities, on the other hand, are constructed along a small playa and wadi system *ca.* 60-80 m south of the settlement, consisting of a large cistern (Structure M)<sup>22</sup>, a basin-irrigation barrage (Barrage 1)<sup>23</sup>, and two small wadi barriers (Barrages 2 and 3). (As for the details of the water-use facilities, see below). The site includes two EBA burial cairns as well, which will be described in a later chapter.

The settlement contains several dozen semi-subterranean masonry structures of various dimensions and plans, which agglomerate together to form a total of eleven complexes with a large structure being the core. Available evidence including the <sup>14</sup>C dates and the wall sharing and/or concavo-convex relationship between any two abutting complexes suggests that the linear settlement started with Complex 00 characterized by a beehive-like composition similar to Shakarat al-Musayid<sup>24</sup> and the Beidha layer 6 (of Kirkbride) or sub-phase A1-B (of Byrd) complex<sup>25</sup>, once moved eastward to Complexes 0 and I, and then gradually developed westward skipping the existing complexes<sup>26</sup> to end eventually with Complex IX at the southwestern edge (**fig. 8**). In view of marked differences in technology among complexes, it is likely that the elongated settlement gradually developed through the process of successively renewing a complex at an abutting lot. Thus it is conceivable that only a single (or at most a few) complex(es) was/were in practical use at any given stage. It would follow that the real population of the settlement was not more than a few dozens — an assumption compatible with the functional identification as a remote outpost for the initial pastoral transhumants. It is our present interpretation that the settlement was used on a seasonal basis for a few centuries spanning from the end of the MPPNB to the beginning of the LPPNB, although available evidence suggests that there were a few interruptions in the occupational history of the outpost.

The small settlement was sustained by a mixed, risk-diversifying economy, which consisted of short-range pastoral transhumance (suggested by the occurrence of domestic sheep and goat bones at the remote outpost), hunting largely of gazelles and hare (evidenced by the predominance of their bones among faunal remains and the frequency of hunting/butchering tools in the excavated flint assemblage), and small-scale agriculture (suggested by the occurrence of carbonized seeds of domesticated plants and the existence of reaping/grinding implements). The occurrence of pistachio shells indicates that collecting of wild nuts was among additional options. It follows that the early Holocene substantial penetration into the Jafr Basin was accomplished by multi-faceted pastoral transhumants who were engaged in opportunistic agriculture as well. Thus the settlement can be defined as a remote, agro-pastoral outpost used on a seasonal basis.

The outpost yielded a large number of diagnostic artifacts. Flint artifacts were produced by means of the naviform core-and-blade technique, a landmark of the Levantine PPNB flint industry (**fig. 6: 1**). Hunting and butchering tools were predominant among retouched flints, highlighting the importance of hunting activities at the remote outpost. The frequency of Amuq and Byblos types of points accords with the <sup>14</sup>C data noted above (**fig. 6: 2-6**). No typical sickle blades with silica sheen were found, but the assemblage included a small number of finely serrated blades possibly used for the same purpose (**fig. 6: 9**). The tool kit also included drills (**fig. 6: 7-8**), notches/denticulates (**fig. 6: 10**), burins (**fig. 6: 11**), scrapers (**fig. 6: 12**), and bifacial knives (**fig. 6: 13**). There is no doubt that high quality Eocene flint

21. NASU *et al.* 2009, n.d.

22. FUJII 2010c, n.d.

23. FUJII 2007b, 2007d, 2010c; KATSURADA 2010a, 2010b.

24. JENSEN *et al.* 2004; HERMANSEN *et al.* 2006.

25. BYRD 2005, fig. 42-50; KIRKBRIDE 1967, fig. 1.

26. FUJII 2006a, p. 30; 2006b, p. 13; 2007a, p. 400-401; 2008a, p. 475-477; 2009a, p. 206.

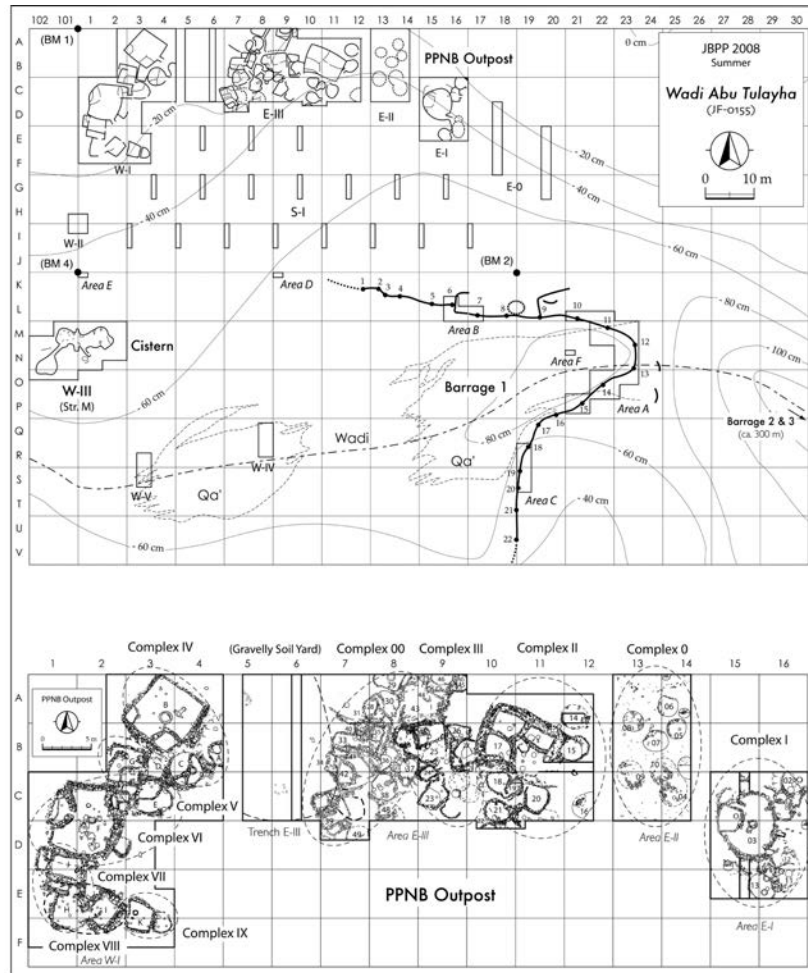


Figure 4. Wadi Abu Tulayha: site plan (© S. Fujii).

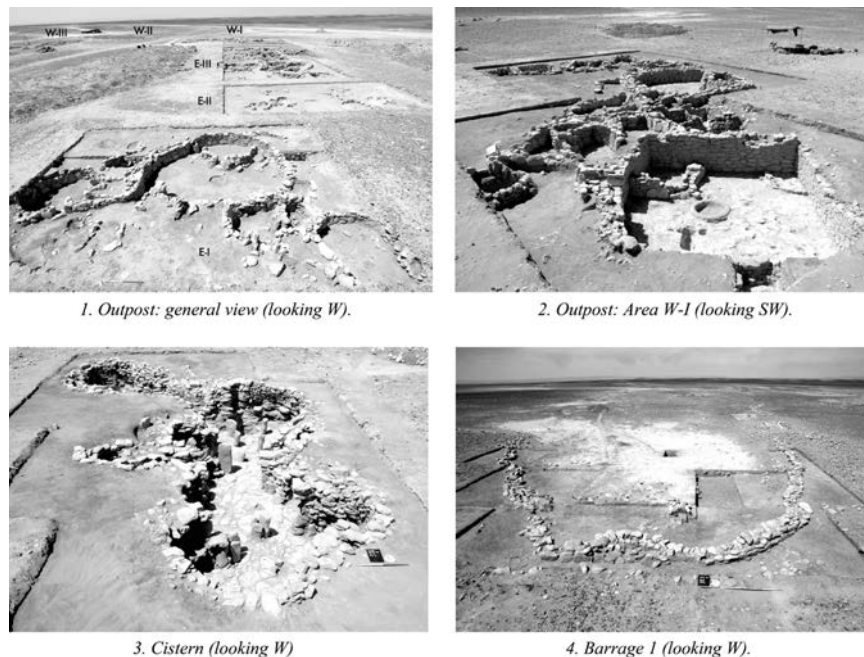


Figure 5. Wadi Abu Tulayha: outpost and water catchment facilities (© S. Fujii).

layers exposed throughout the northern edge of the basin supplied suitable raw material for the intra-site flint tool production. Incidentally, similar flint was used for the production of basin querns (**fig. 6: 14**) and bowlets (**fig. 6: 20**) as well. Limestone was also processed into various products including querns, grinding slabs (**fig. 6: 15**), pillar bases (**fig. 6: 17**), stone vessels (**fig. 6: 16**), diagonally truncated stone bars (**fig. 6: 18**), game boards (**fig. 6: 19**), and an anthropomorphic figurine (**fig. 6: 28**). In addition, various adornments (**fig. 6: 21-22**), bone tools (**fig. 6: 23-25**), a shaft-straightener (**fig. 6: 27**), and small clay objects (**fig. 6: 26**) also occurred in small numbers. Overall, the small finds were rich in variety considering the limited site size and seasonality, corroborating the interpretation that the outpost was closely tied with parent communities to the contemporary west. The occurrence of exotic material such as malachite, sandstone, and basalt fragments, all alien to the Jafr Basin, can also be understood within the same context.

Unfortunately, little is known about the burial practice at the outpost. This makes sense, however, when we consider that it was used only on a seasonal basis and largely by young adults who are supposed to have engaged in pastoral transhumance and hunting. The only exception is a small cairn *ca.* 1 m wide and *ca.* 0.5 m height, which was found at the northeastern corner of Structure G, the core feature of

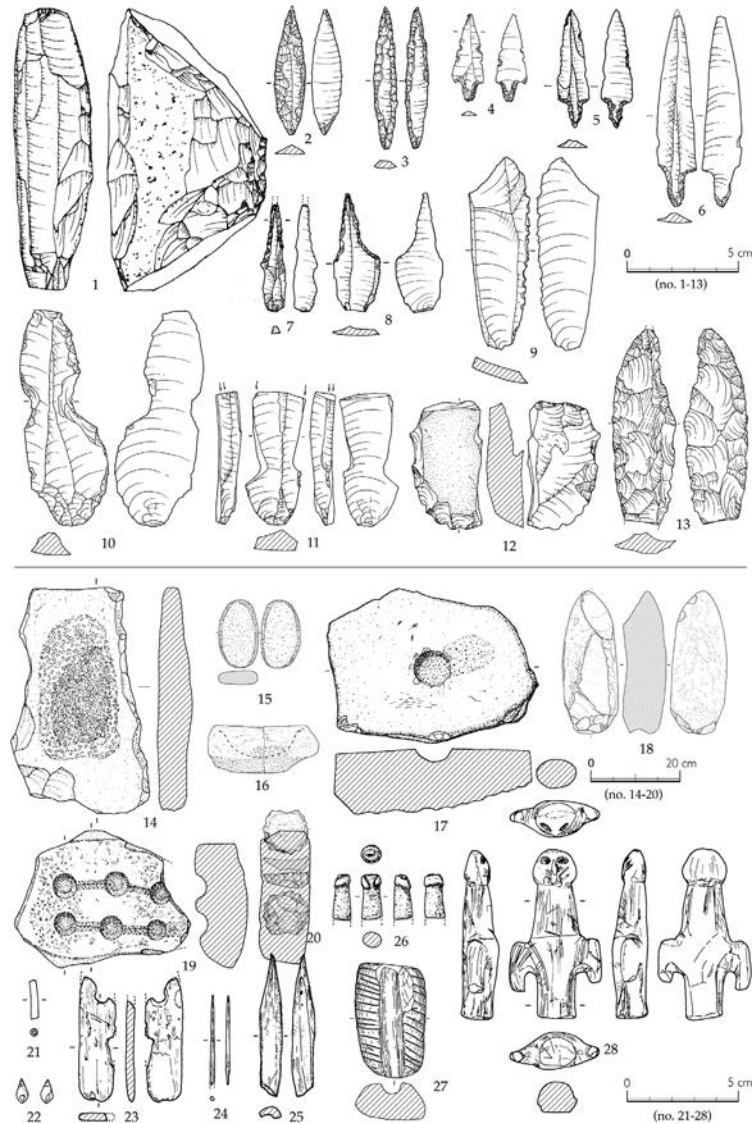


Figure 6. Wadi Abu Tulayha: small finds from the outpost (© S. Fujii).

Complex V (**fig. 7**). A narrow space covered with a large capstone contained a primary interment of an infant assuming a crouching position, but no burial gift accompanied it. Stratigraphical evidence suggests that the burial cairn was newly added at the northern edge of the front wall in the final construction phase of the structure. Of interest is the fact that the episode coincided with the abandonment of the northern half of the structure, on the one hand, and the functional conversion of its southern half into a semi-open kitchen fringed with a low partition wall, on the other hand<sup>27</sup>. This means that the burial cairn was incorporated to the front wall when the structure came into disuse for its original function. In this sense, we may argue that it was related to a renewal ritual of a house. This unique burial practice, or the *façade-side cairn burial* of our terminology, was to be inherited, though losing its substance, to open sanctuaries in the subsequent periods. Thus it provides a starting point for tracing the diachronic change of the mortuary practice in the prehistoric and protohistoric Jafr Basin. We would like to underline again that the burial cairn was constructed along a front wall of an abandoned house. This unique trait holds a key to understanding subsequent burial features.

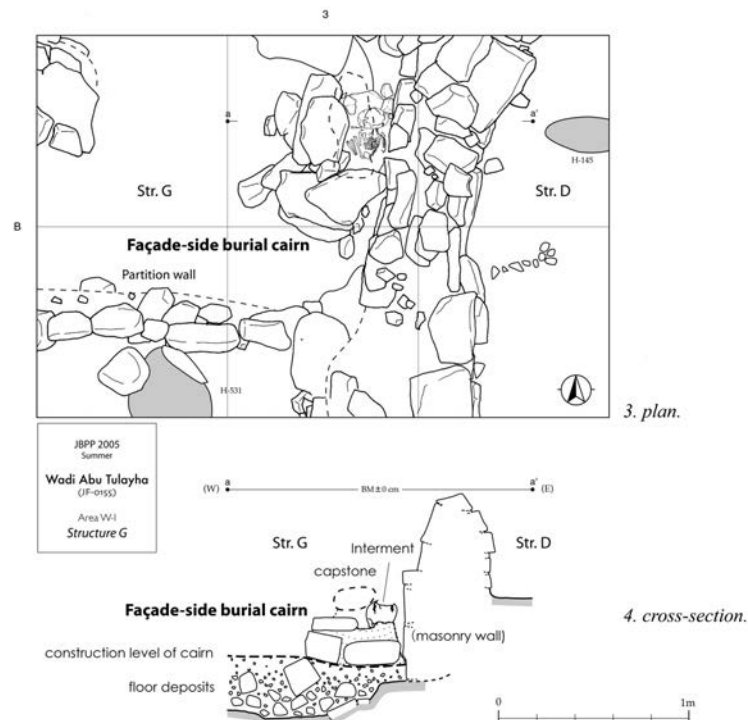
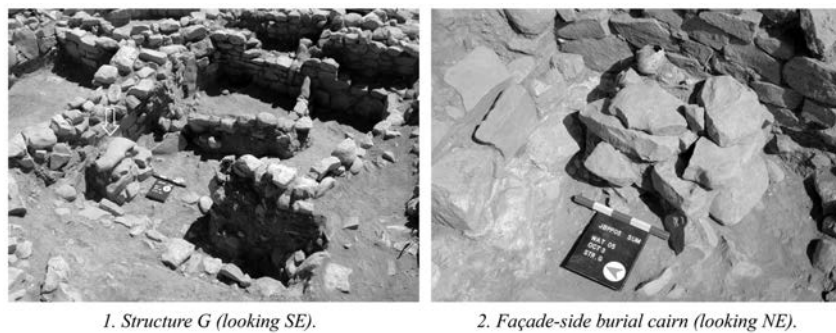


Figure 7. Wadi Abu Tulayha: Structure G and the façade-side burial cairn (© S. Fujii).

### *Wadi Ghuwayr 17*

Wadi Ghuwayr 17 is a small site at the head of the wadi of the same name that drains the northeastern part of the Jafr Basin. It was found for the first time in 1997 by Dr. Leslie A. Quintero and Dr. Philip J. Wilke<sup>28</sup> and rescue-excavated in 2010 by the author in combination with the nearby barrage site of Wadi Ghuwayr 106<sup>29</sup>. Although no <sup>14</sup>C dates are available yet, a series of evidence described below enables us to regard the site as the second example of the PPNB agro-pastoral outpost following Wadi Abu Tulayha.

The site is much smaller in scale than Wadi Abu Tulayha, consisting only of several semi-subterranean masonry structures (**fig. 8, 9**). The settlement size is estimated at *ca.* 0.015-0.02 ha, which is equivalent to approximately one tenth of the type-site *ca.* 60 km to the west. Smaller features cluster around the entrance space of a large oval structure (i.e. Structure 1) to form a complex analogous to Complex I of Wadi Abu Tulayha. Thus the site can probably be defined as a single-phase outpost used for only a short term at the end of the MPPNB or the very beginning of the LPPNB. Though heavily disturbed by illicit diggings, the site produced a series of diagnostic artifacts comparable with the finds from the type-site (**fig. 10**). The occurrence of a limestone game board (**fig. 10: 7**) and two flint bowlets (**fig. 10: 10**), among others, demonstrates a close contact with the type-site and beyond. There is no doubt that both sites shared the same cultural background.

A preliminary examination of small finds suggests that the outpost was based again on a mixed economy consisting of pastoral transhumance, hunting, and basin-irrigated agriculture (probably at the nearby barrage system of Wadi Ghuwayr 106). Here again, hunting weapons are predominant among retouched flint tools (**fig. 10: 2-5**). The frequency of large basin querns made of cortical flint is also significant in considering the multiple subsistence strategy at the remote outpost (**fig. 10: 9**). Of interest is the occurrence of a few petroglyphs that probably depict a scene of seasonal pasturing around the remote outpost (**fig. 10: 12, 13**). A crosscheck against faunal evidence is expected to validate the iconographic interpretation. In addition, a large stone weight made of limestone was found *in situ* on the floor of Structure 1 (**fig. 9: 2; fig. 10: 8**). As discussed below, similar artifacts occurred at Wadi Abu Tulayha and the neighboring barrage site of Wadi Ghuwayr 106 as well, corroborating the chronological synchronism among them. Unfortunately, no clear evidence for burial practice was confirmed, but it is possible that the short-lived outpost used only on a seasonal basis involved no interment from the beginning.

The discovery of the contemporary outpost in the northeastern part of the Jafr Basin has substantiated that Wadi Abu Tulayha was by no means an exceptional case, and that PPNB multifaceted pastoral transhumants penetrated deep into the arid margin beyond our initial expectation. Another focal point is the fact that as with the type-site, Wadi Ghuwayr 17 was also equipped with a cistern and a barrage system. This means that such careful water exploitation technology was essential to the full-fledged penetration into the early Holocene Jafr Basin. There is little doubt that the triple set consisting of an outpost, a cistern, and a barrage system was the standard equipment of the Jafr Pastoral PPNB.

### *Other PPNB settlements*

In addition to the two outposts, a few small PPNB settlements have been located at the northwestern edge of the basin (**fig. 1**). They are slightly larger in scale, being estimated at *ca.* 1-3 ha in total area. These hamlet-class settlements bridge the gap between full-fledged farming communities to the west and the remote outposts to the east in terms of both site location and site size. In this sense, they have the potential to shed new light on the PPNB multi-layered settlement hierarchy in southern Jordan<sup>30</sup>.

27. FUJII 2006a, p. 14-15; 2006b, p. 7-8.

28. QUINTERO & WILKE 1998a, p. 3; 1998b, p. 120; WILKE & QUINTERO 1998, p. 3; QUINTERO *et al.* 2004, p. 205-206.

29. FUJII, QUINTERO & WILKE 2011.

30. GEBEL 2004, 2010b.

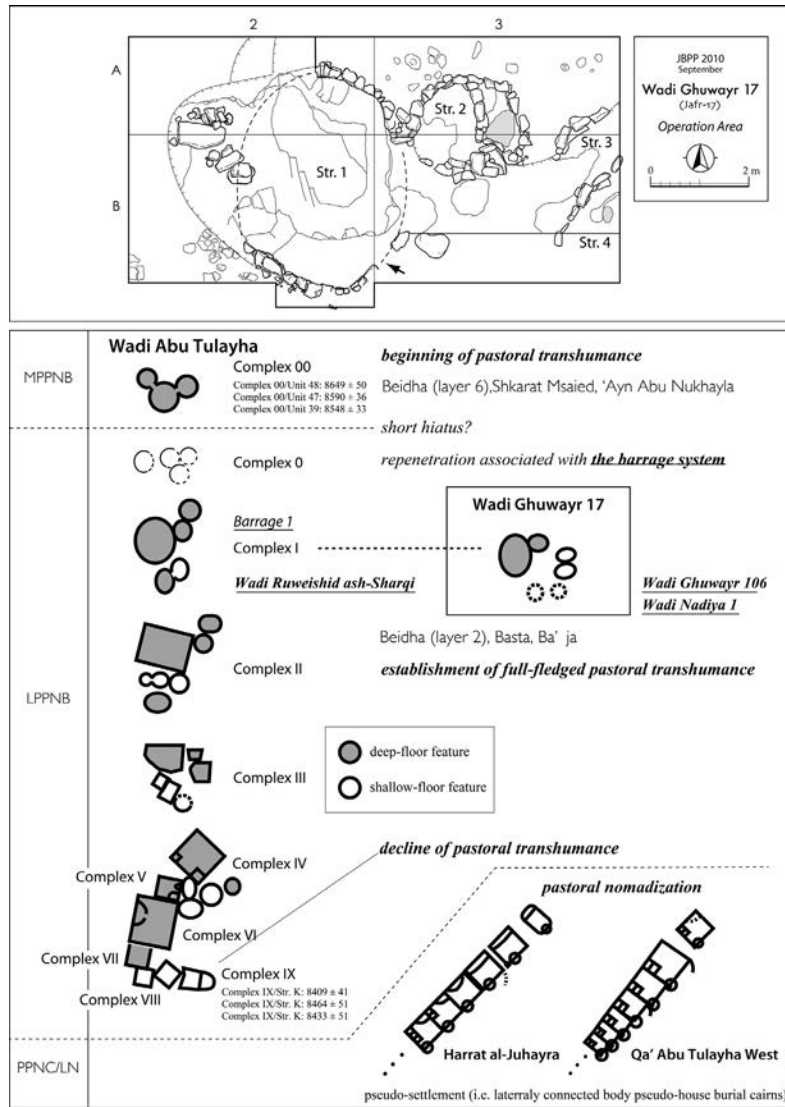


Figure 8. Wadi Ghuwayr 17: site plan and typological comparisons with the complexes at Wadi Abu Tulayha (© S. Fujii).



1. Outpost (looking NE).

2. Grooved stone weight from Structure 1 (looking NE).

Figure 9. Wadi Ghuwayr 17: general view of the outpost and a close-up view of Structure 1 (© S. Fujii).

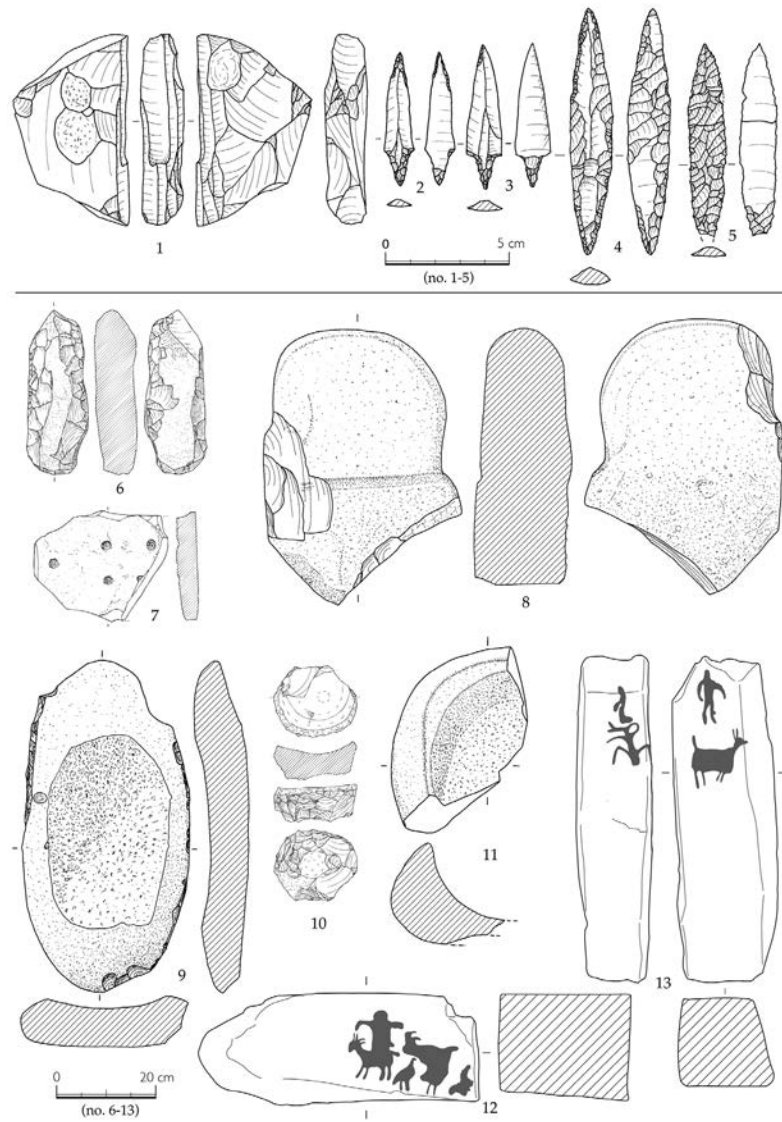


Figure 10. Wadi Ghuwayr 17: small finds (© S. Fujii).



1. Wadi Badda (looking N).



2. Jabal Juhayra (looking NE).

Figure 11. Other PPNB settlements in and around the Jafr Basin (© S. Fujii).

Among those is the site of Wadi Badda, which clings to a steep slope below the Fjayj escarpment, the western watershed of the Jafr Basin (**fig. 11: 1**). The site was found by chance during our one-day excursion in the summer of 2007<sup>31</sup> and has been revisited several times since then<sup>32</sup>. A few masonry walls still stand for a height of more than 1 m, indicating that the site contains ground-type structures of a rectangular plan. Naviform core-and-blade components constitute the major part of the surface finds. The frequency of hunting weapons including Amuq type of points is suggestive of the importance of hunting activities at the site. The groundstone implements included two shaft-straighteners, a semi-prismatic pestle, and two polished axes. In addition, limestone vessels, stone bracelets, and shell beads were also found in small numbers. Of interest are the remnants of a washed-out barrage, which were confirmed at both banks of a small stream flowing westwards below the settlement. This stone-built barrage or wadi barrier is estimated at *ca.* 1.5 m high, *ca.* 1 m thick, and *ca.* 10-20 m in total length. Nothing conclusive can be said about its date, but a few meters gap in elevation between the barrage base and the present wadi bed seems to indicate that it dates back to a remote past. In view of the frequency of similar facilities in the contemporary Jafr Basin, it is possible the wadi barrier formed a small pond for supplying drinking water to the neighboring PPNB hamlet.

Another hamlet-sized PPNB settlement known to date in the Jafr Basin is Jabal Juhayra (**fig. 11: 2**). It was found in our 2001-2002 winter season survey<sup>33</sup> and has been surveyed several times until now<sup>34</sup>. Being located *ca.* 7 km west of Jurf ad-Darwish, the site occupies a steep slope along a small gully that runs down the southeastern flank of the isolated volcanic hill of the same name. No clear evidence for wall alignments has been confirmed with the exceptions of a few possible candidates, but the surface collection includes limestone querns as well as M-LPPNB flint artifacts including Byblos type of points. The site size is estimated at *ca.* 0.5-1 ha, which falls within an intermediate size between the contemporary hamlet of Wadi Badda (*ca.* 2-3 ha) and the nearest outpost of Wadi Abu Tulayha (*ca.* 0.1-0.2 ha).

Another possible candidate for the PPNB settlement is a two-rowed upright slab wall structure (TU-102) included in the EB I cairn field of Wadi Burma described below<sup>35</sup>. Strangely enough, the floor deposits of the structure produced a certain volume of PPNB flint artifacts and EB I artifacts without any clear stratigraphic distinction. A likely explanation for this phenomenon is that the structure was constructed as a small entrepot by a PPNB group and then, after several millennia hiatus, reused as a temporary encampment for the EB I cairn constructors. An alternative interpretation is that an EB I group chanced to construct the structure just on a PPNB flint scatter without cleaning the ground surface. Our previous report included both arguments<sup>36</sup>, but recent investigations in the Thulaythuwa area in southernmost Jordan suggest the possibility that the structure represents an internal structure of a Chal/EBA burial cairn<sup>37</sup>. Thus the latter interpretation would be more likely, but further scrutiny is needed to elicit the truth.

### *Barrage systems*

The existence of stone-built barrages is another hallmark of the Jafr Pastoral PPNB (**fig. 12**). To date, we have excavated a total of seven examples: one at Wadi Abu Tulayha<sup>38</sup> (**fig. 12: 1**), two at Wadi Ruweishid ash-Sharqi<sup>39</sup> (**fig. 12: 3, 4**), two at Wadi Ghuwayr 106<sup>40</sup> (**fig. 12: 5, 6**), and two at Wadi

31. FUJII 2007c.

32. FUJII 2010a, p. 375-379.

33. FUJII 2002b; FUJII & ABE 2008.

34. FUJII 2010a, p. 379-381.

35. FUJII 2005a, p. 26-30; FUJII & ABE 2008, p. 5.

36. FUJII 2005a.

37. ABU-AZIZEH *et al.* n.d., fig. 6.

38. FUJII 2006a, 2006b, 2007b, 2007d, 2010c.

39. FUJII 2007b, 2007d, 2010c.

40. FUJII *et al.* 2011b.



Nadiya 1<sup>41</sup> (**fig. 12: 7, 8**). In addition, two small wadi barriers were also briefly examined at Wadi Abu Tulayha (**fig. 12: 2**). While the barrage and wadi barriers at Wadi Abu Tulayha abut on the PPNB outpost, the other six examples are several kilometers away from the nearest outpost to form a loose combination.

The barrages are the largest masonry structures in the PPNB Jafr Basin and, in most cases, have a total wall length of more than 100 m, a wall depth of *ca.* 0.2-1.0 m, and a preserved wall height of *ca.* 0.5 m. They usually occupy the lower edge of a semi-open playa system and have a U-shaped or semi-circular plan opening toward the upper course. Undressed or partly dressed limestone cobbles and boulders were used as major construction material, which were procured from an open-cut limestone quarry in front of the barrage wall. A dry walling technique is used for the construction of the barrage wall, and any two adjacent construction materials usually leave a small gap. For this reason, the barrage walls are inferior in waterproof property with the exception of several wall segments backed with a clay bank. As discussed below, this fact provides a key to exploring the specific use of the Jafr PPNB barrage.

There is little chance that <sup>14</sup>C data are available at the extramural water catchment facilities, and the dating of the Jafr PPNB barrages is based on the series of collateral evidence described below. (The only exception to this is Barrage 2 of Wadi Ruweishid ash-Sharqi, where two pit-type tombs dug into the central part of the barrage wall were radiometrically dated to the early Islamic Age and offered a not very useful lower limit date of the barrage<sup>42</sup>). What substitute for C<sub>14</sub> data are large limestone products such as grooved and/or notched stone weights (**fig. 13: 1-2, 5-11, 14-16**), pillar bases (**fig. 13: 3, 4, 12, 13**), and diagonally truncated stone bars (**fig. 13: 17**). Interestingly enough, the seven barrages known to date in the Jafr Basin unexceptionally incorporate at least one of them into their walls, especially the central reinforcement wall. This episode suggests that their incorporation was not a pure coincidence but an absolute requirement to the Jafr PPNB barrage. The heavy-duty products might have been incorporated into the central wall subject to the strongest water pressure, praying the safety and longevity of the barrage. Of significance is the fact that similar products have been found *in situ* at the two outposts of Wadi Abu Tulayha and Wadi Ghuwayr 17 (**fig. 9: 2**). Thus we shall be allowed to date the barrages to the same horizon as the outposts, namely, the M-LPPNB period. It is most unlikely that a post-PPNB group transported the limestone products as converted construction materials from a nearby half-buried outpost to a barrage construction site. This is first because they are very heavy (usually more than 50-60 kg in weight), second because many of the barrages are several kilometers away from the nearest outpost, and third because as noted above, they always occupy roughly the same position in the barrage. As a matter of fact, the occurrence of similar products around the Wadi Ghuwayr 106 and Wadi Nadiya 1 barrage systems attests to their on-site production<sup>43</sup>. Incidentally, other lines of collateral evidence to support the dating include the stratigraphic correlation between the Wadi Abu Tulayha Barrage 1 and its neighboring outpost, a clear stratigraphic gap between the barrage and an early Islamic tomb beside it, the overall affinities in construction method between the two (especially the existence of a protruding reinforcement wall at both sides), and the existence of Hismaic or Thamudic E inscriptions inscribed only on the exposed surface of construction materials<sup>44</sup>. It should also be emphasized that even though often separated by several kilometers, the barrages and the outposts always group into pairs in the vast *Hamada*.

Their functional identification as a barrage is based on a series of evidence including the location at the lower edge of a semi-open playa system, the distinctive U-shaped or semi-circular plan opening toward the upper course, the wall layout following contour lines, and the attachment of a protruding reinforcement wall to the central converging point. It also deserves attention that while the foundation

41. FUJII, ADACHI & ENDO *et al.* n.d.

42. FUJII 2007b, p. 419; 2007c, p. 14, 20.

43. FUJII, ADACHI & ENDO *et al.* n.d.

44. FUJII 2007b, p. 414-415.



1. Wadi Abu Tulayha: Barrage 1 (looking NW).



2. Wadi Abu Tulayha: Barrage 3 (looking NE).



3. Wadi Ruweishid ash-Sharqi: Barrage 1 (looking SW).



4. Wadi Ruweishid ash-Sharqi: Barrage 2 (looking NW).



5. Wadi Ghuwayr 106: Barrage 1 (looking NE).



6. Wadi Ghuwayr 106: Barrage 2 (looking S).



7. Wadi Nadiya 1: Barrage 1 (looking W).



8. Wadi Nadiya 1: Barrage 2 (looking NNE).

Figure 12. PPNB barrages in the Jafra Basin (© S. Fujii).

course of a barrage wall gradually reduces its elevation as it goes downward, the top course keeps roughly the same elevation regardless of its location. There is no doubt that the seven large structures marked by these unique traits were used as water catchment facilities.

It is doubtful, however, that they were intended for long-term water impoundment. This is first because they always occupy, of all locations, permeable silty terrain at the lower edge of a semi-open playa system, second because despite such location, they are designed so as to create a shallow extensive flooded area, and third because their walls have imperfect waterproof property. The coexistence of a cistern at the two outposts also casts doubt on their functional identification as a storage dam. Thus it is evident that they were not intended for prolonged water storage from the beginning. What, then, were they used for? Suggestive in this regard is the fact that the Jafr PPNB barrages always occupy the lower edge of a semi-open playa system, not in a closed playa system seemingly convenient for water storage.

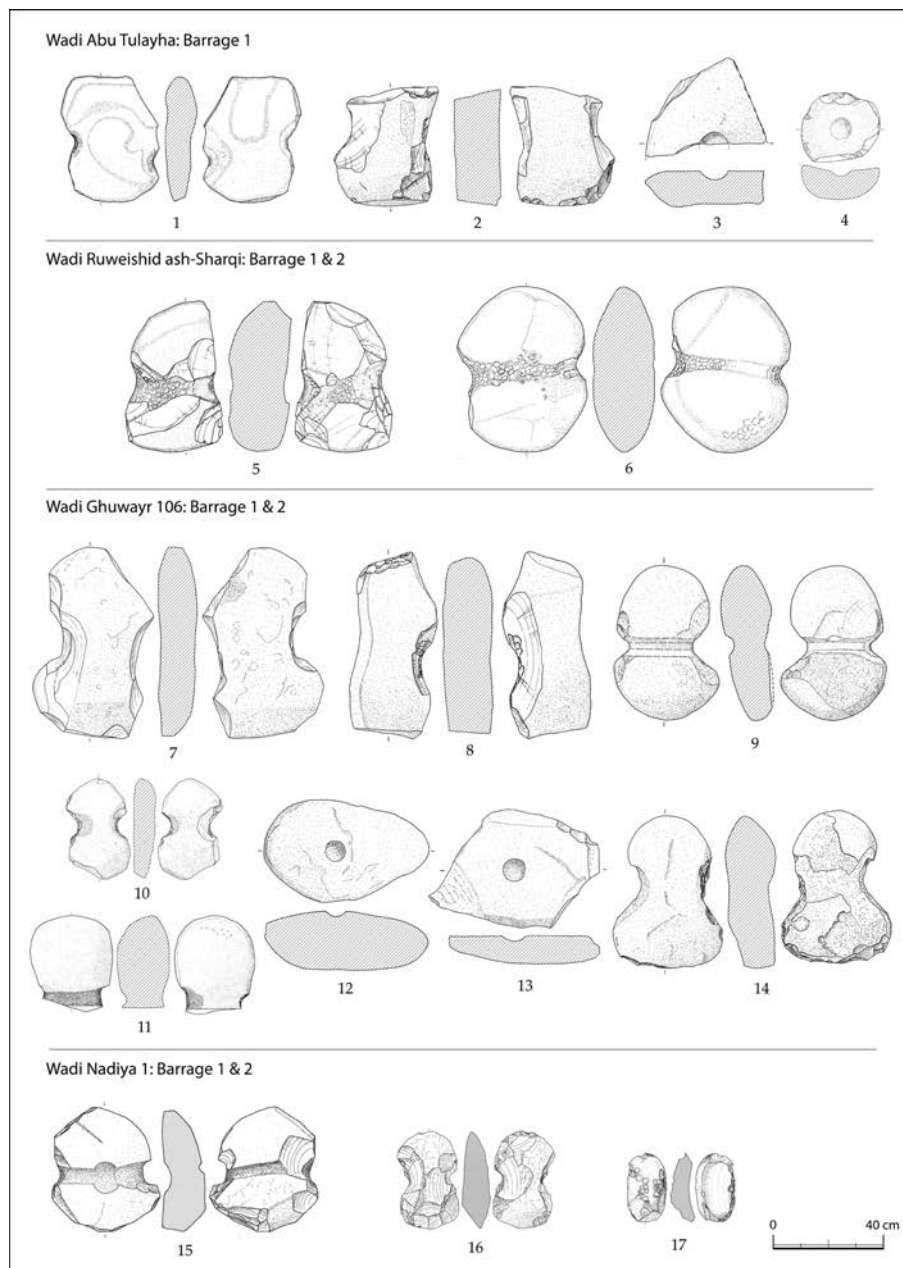


Figure 13. Small finds from the Jafr PPNB barrages (© S. Fujii).

This is probably because the location is easier to drain as well as feed and, therefore, less subject to salt damage, an unavoidable problem besetting irrigated agriculture in dry lands. As a matter of fact, the neighboring outpost of Wadi Abu Tulayha yielded carbonized cereal and pulse seeds as well as agricultural implements such as querns and serrated blades in substantial quantities. All of these facts strongly suggest that small-scale basin-irrigated agriculture was carried out within the flooded area of the barrage. (Seeing that there is no substantial settlements in the PPNB Jafr Basin, it is most unlikely that the Neolithic Jafr Basin had enough precipitation to make rain-fed cultivation possible.) Considered in this light, it seems more reasonable to assume that the barrages were used for basin-irrigated agriculture rather than simple water storage. It is for this reason that we defined the Jafr PPNB settlements as *agro-pastoral* outposts.

It is significant to note that the basin-irrigated agriculture took place within the flooded area of the barrages. As a matter of fact, no related facilities such as ditches and canals have been confirmed in their lower reaches. In this sense, it may be more correct to define the Jafr PPNB barrage as large-scale *playa/wadi* barriers for temporarily damming up seasonal runoff surface water and, in so doing, facilitating water infiltration into subsoil. The series of unique traits noted above — the location on permeable terrain, the grand design to produce shallow extensive flooded area, and the imperfect waterproof property of the barrage wall — cannot reasonably be understood before we suppose the function as a basin-irrigation barrage.

Another important point is that six of the seven barrages group in pairs to form three minor barrage systems. It is questionable, however, that they were used in combination to organize a barrage system in the proper sense of the word, because evidence from Wadi Ghuwayr 106 and Wadi Nadiya 1 suggests that the dysfunction of an upper barrage due to topsoil salinization required its renewal on a less saline terrain newly formed behind it<sup>45</sup>. Given this, it would follow that such downward renewal led to the formation of a seeming barrage *system*. However, the downward renewal would be eventually incompatible with the principle of the location at the lower edge of a semi-open *playa* system, unless the *playa* itself continues to be expanded downward due to the successive barrage construction. This means that the barrage *system* was to be abandoned on a relatively short-term basis and relocate elsewhere before long. Understandably, its operating body, namely, a nearby outpost must have also been forced to relocate periodically in conjunction with the barrage system. This assumption would explain the reason why the barrage-backed *agro-pastoral* outpost of Wadi Ghuwayr 17 was so short-lived, and why the occupational history of the other barrage-backed outpost of Wadi Abu Tulayha was occasionally interrupted<sup>46</sup>. Assuming that the Jafr PPNB barrage-backed *pastoral* transhumance must have relocated its frontline bases at regular intervals, we can argue that it involved the momentum toward *pastoral* nomadization from the very beginning, regardless of climatic deterioration such as the 8200 cal. yr BP aridity event<sup>47</sup>.

### *Cisterns*

The existence of pit type cisterns also marks the Jafr *Pastoral* PPNB. Our investigations have identified two examples: Structure M at Wadi Abu Tulayha and Structure 101 at Wadi Ghuwayr 17. Being *ca.* 50-100 m separated from the neighboring outposts, both cisterns occupy a flat bank of a shallow wadi. This probably means that the Jafr PPNB cisterns depended exclusively on seasonal runoff surface water around the outposts rather than rainwater within them. The Wadi Abu Tulayha cistern was entirely excavated spending two seasons from 2007 until 2008<sup>48</sup>, but the Wadi Ghuwayr 17 cistern has been just sounded most recently<sup>49</sup>. The following description will focus on the former.

45. FUJII 2010c, p. 29; FUJII *et al.* 2011b; FUJII, ADACHI & ENDO *et al.* n.d.

46. FUJII 2009a, p. 206-207.

47. ALLEY *et al.* 1997; ELLISON *et al.* 2006; ISSAR & ZOHAR 2007, p. 67-102; WENINGER *et al.* 2006, 2009.

48. FUJII 2008a, p. 462-475; 2009a, p. 192-203.

49. FUJII, ADACHI & ENDO *et al.* n.d.

Structure M at Wadi Abu Tulayha is a large-scale, semi-subterranean masonry structure, measuring *ca.* 15 m by *ca.* 4-5 m in floor area and *ca.* 1.8-2.0 m in floor depth (**fig. 5: 3; fig. 14**). Three rooms are connected in the east-west or northeast-southwest direction to constitute the amorphous, composite structure. While the eastern room is roughly rectangular in general plan and equipped with several robust buttress walls, the western room adopts an oval plan favorable for pressure dispersion and, probably for this reason, is devoid of substantial buttresses. The central room is eclectic in terms of both general plan and intra-structure, being connected directly to the eastern room only. These facts seem to indicate that the structure began with the eastern room and, then, was enlarged twice toward the west. Of interest is the unique construction method of the sidewalls. They stand not on the floor but on an edge of a hard limestone layer that was dug through in the course of the construction of the semi-subterranean structure. For this reason, they cover the upper, fragile, permeable silty sand layers only, leaving the lower, somewhat brittle, semi-impermeable limestone layers intact. As noted above, several robust buttresses are attached to them for the purpose of coping with the strong sideways soil pressure. It is interesting to note that unlike the sidewalls, they are based on the floor. In addition, the structure is equipped with a large pit *ca.* 1 m in both diameter and depth at the western corner of the central room, and a shallow ditch *ca.* 2 m long between the central and the western room. Traces of real life were scarce; neither hearth nor ashy deposits were found on the floor.

The dating of Structure M is based on a few <sup>14</sup>C dates (**fig. 39**) and a large number of diagnostic finds including naviform core-and-blade components and diagonally truncated stone bars. The flint artifacts were possibly drifted or thrown into the semi-subterranean structure, whereas the heavy-duty limestone products were probably used for pecking through the thick limestone layers. Both of them occurred consistently from the floor deposits to the upper fill layers, and few post-PPNB artifacts were mixed with them. This fact corroborates that the cistern was not only constructed but also buried within the period of the PPNB. It should also be noted that the southern wall of the central room incorporated a large pillar base, another chronological indicator of the Jafr Pastoral PPNB <sup>50</sup>. In addition, a petroglyph found *in situ* in the eastern room shares the same technology and iconography with those from the outpost <sup>51</sup>. It leaves little doubt that the structure share the same date with the neighboring outpost.

There is ample evidence to support the functional identification of Structure M as a cistern. To begin with, the structure is *ca.* 50 m separated from the main body of the outpost and occupies a flat bank beside the small wadi. Second, despite such a moisture-susceptible location, it takes the trouble to dig through the laminated limestone layers as well as the silty sand layers until it reaches an impermeable limestone bedrock layer. Third, the floor depth thus obtained reaches *ca.* 2 m, which is double as large as that of the largest structures in the neighboring outpost. Fourth, while the upper permeable silty sand layers are protected with masonry walls, the lower semi-impermeable limestone layers are covered with a clay coating up to *ca.* 10 cm thick. The existence of the sludge tank-like pit and the driving channel-like ditch also differentiate the structure from the others. It is also suggestive that the original floor has no clear traces of real life such as hearths and ashy deposits. There is no doubt that the structure was used as a cistern for supplying drinking water to the neighboring outpost.

It is noteworthy that the Jafr PPNB outposts were equipped with a cistern as well as a barrage system, because no clear evidence for such large-scale water catchment facilities has been reported from sedentary farming communities to the contemporary west. This contrast might possibly indicate that the full-fledged exploitation of runoff surface water developed first in arid peripheries rather than the core area favored by sufficient rainfall. This is understandable when we consider the essential role of water for survival in the arid margin. Anyhow, it is now evident that the triple set consisting of an outpost, a cistern, and a barrage system was the standard equipment of the Jafr Pastoral PPNB. Now that such large-scale, well-organized social infrastructure was indispensable for the penetration into the Neolithic Jafr Basin, we can argue that the Jafr PPNB pastoral transhumants were by no means dropouts from the flourishing sedentary communities but settlement-based pioneers of a new land.

50. FUJII 2010c, fig. 10.

51. FUJII 2008b, fig. 7.

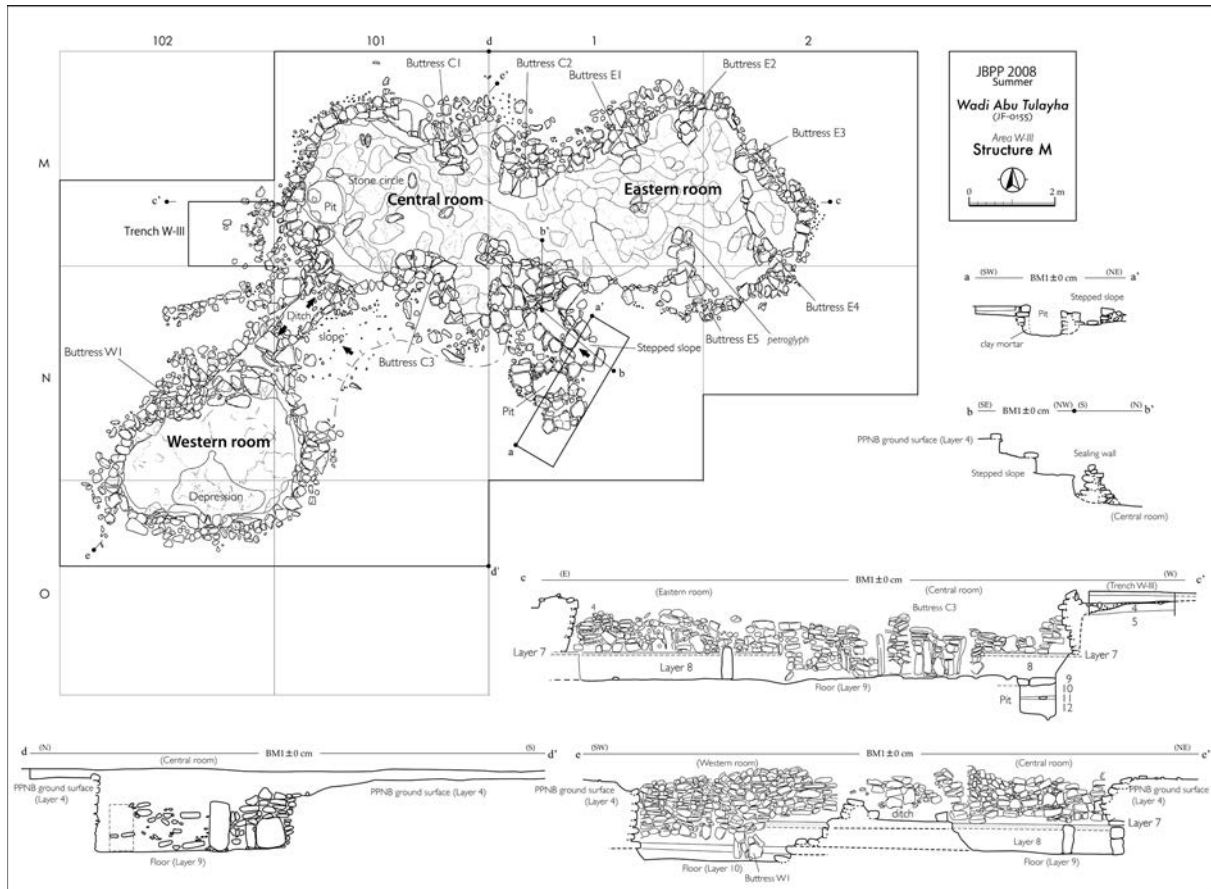


Figure 14. Wadi Abu Tulayha: plan and sections/elevations of the cistern (© S. Fujii).

### Flint workshops

In addition to the aforementioned sites and water-use facilities, several flint workshops have been located in the northwestern hilly terrain where high quality Eocene flint is abundantly available<sup>52</sup>. Overall, they are small in site size, measuring not more than *ca.* 100-200 square meters in area (**fig. 15: 1**). The volume of scattered flints is also limited, corroborating their site nature as *ad hoc* workshops. The surface finds consist largely of naviform core-and-blade components (**fig. 15: 2-8**), and few retouched tools are included. Burins are relatively frequent but not overwhelming enough to represent a burin site. The predominance of angle burins on snap (not on truncation) also differs from a typical burin site (**fig. 15: 9, 10**). Thus the sites can probably be defined as first-stage workshops for core preparations and tool blank procurement.

The question is the relationship between the workshops and the outposts. Suggestive in this regard is the fact that while the former focuses on the production of cores and tool blanks, the latter produces a large number of retouched tools as well as cores and tool blanks. This contrast seems to indicate some link between the two. A possible interpretation would be that the small-scale, *ad hoc* flint exploitation at the extramural workshops was combined with seasonal pasturing around the remote outposts — a likely assumption when we consider that hunting was among the major subsistence strategies at the outposts. The existence of many flint workshops, coupled with that of the contemporary outposts and barrage systems, highlights the lively situation of the PPNB Jafr Basin.

52. QUINTERO *et al.* 2002; WILKE *et al.* 2007; FUJII & ABE 2008; ABU-JABER *et al.* 2009.

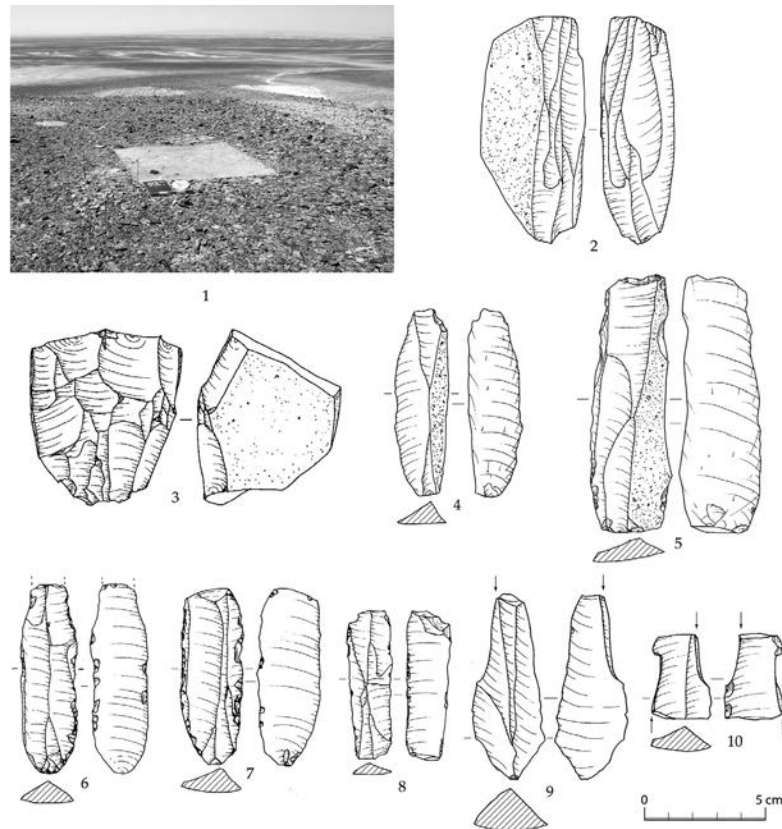


Figure 15. JF-0106: site general view and surface finds (© S. Fujii).

### PHASE 2 (THE JAFR PPNC/LN)

Phase 2 or the Jafr PPNC/LN witnessed the entire replacement of the PPNB triple set (i.e. the outpost, cistern, and barrage) by isolated cemeteries or open sanctuaries. This episode is suggestive of a drastic shift in lifestyle from the pastoral transhumance based on the series of social infrastructures to the pastoral nomadism associated only with burial features. To date, we have excavated two sites: a PPNC open sanctuary at Harrat al-Juhayra and a LN open sanctuary at Qa' Abu Tulayha West. Both sites are composed of several dozen unique burial features, which can be regarded as a subsequent form of the façade-side burial cairn attested to at the PPNB agro-pastoral outpost of Wadi Abu Tulayha. From this phase onward, already scarce settlement data entirely disappear in the Jafr Basin and, instead, burial features become almost the only clue to tracing the cultural sequence.

#### *Harrat al-Juhayra*

The site of Harrat al-Juhayra is located on the eastern foothill of Jabal Juhayra, an isolated volcanic hill occupying the northwestern corner of the basin. It was found for the first time in our 2001-2002 winter season survey<sup>53</sup> and excavated in the 2004 summer field season in combination with Wadi Qusayr sites dotted below the foothill<sup>54</sup>. The site is isolated in basalt desert (*harra* in Arabic) and not associated with any contemporary settlement. It is for this reason that we regard it as a cemetery or open sanctuary of initial pastoral nomads. Although neither <sup>14</sup>C dates nor diagnostic finds are available, typological

53. FUJII & ABE 2008.

54. FUJII 2005b.

comparisons referred to below allow us to tentatively date it to an intermediate stage between the PPNB outpost of Wadi Abu Tulayha and the Late Neolithic open sanctuary of Qa' Abu Tulayha West.

The site contains some sixty units that are aligned along the southern edge of the foothill. They are homogeneous in composition, consisting equally of a small burial cairn *ca.* 1-2 m in diameter and a square to rectangular structure *ca.* 5-7 m wide. Both components are combined to form a unique, ground-type feature, which seemingly looks like a normal house associated with a burial cairn. They fall into the following two groups: a small cluster of separated units and an elongated complex of laterally connected units. The former occupies the northeastern edge of the site, whereas the latter stretches for about 400 m with some 150 m gap being intervened in between (**fig. 16**). They differ in construction material and method as well from each other. While the former group is constructed with small basalt cobbles arranged in a single row (**fig. 17: 1**), the latter is built with flint slabs arranged in two rows and in an upright position (**fig. 17: 2-4**). Wall-sharing relationship between any two adjacent units indicates that the latter complex gradually developed southward.

It appears that the unique cemetery or open sanctuary has something to do with the PPNB agro-pastoral outpost of Wadi Abu Tulayha in view of the lateral connection of homogeneous units and its consequent formation of an elongated structural complex. The same is true with burial practice. Every cairn at Harrat al-Juhayra is constructed along or even across the front wall of an abutting rectangular structure, suggesting that it originated from the façade-side burial cairn attested to at Wadi Abu Tulayha. It is evident that there is some genealogical relationship between the two sites.

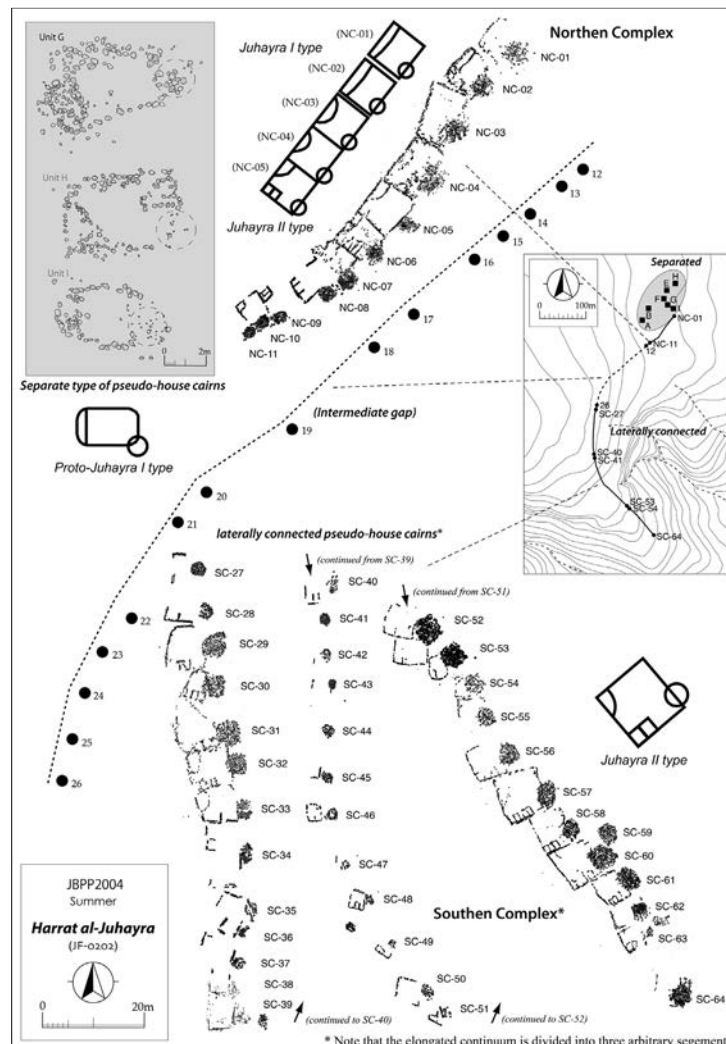


Figure 16. Harrat al-Juhayra: decomposed plan of the pseudo-settlement (© S. Fujii).



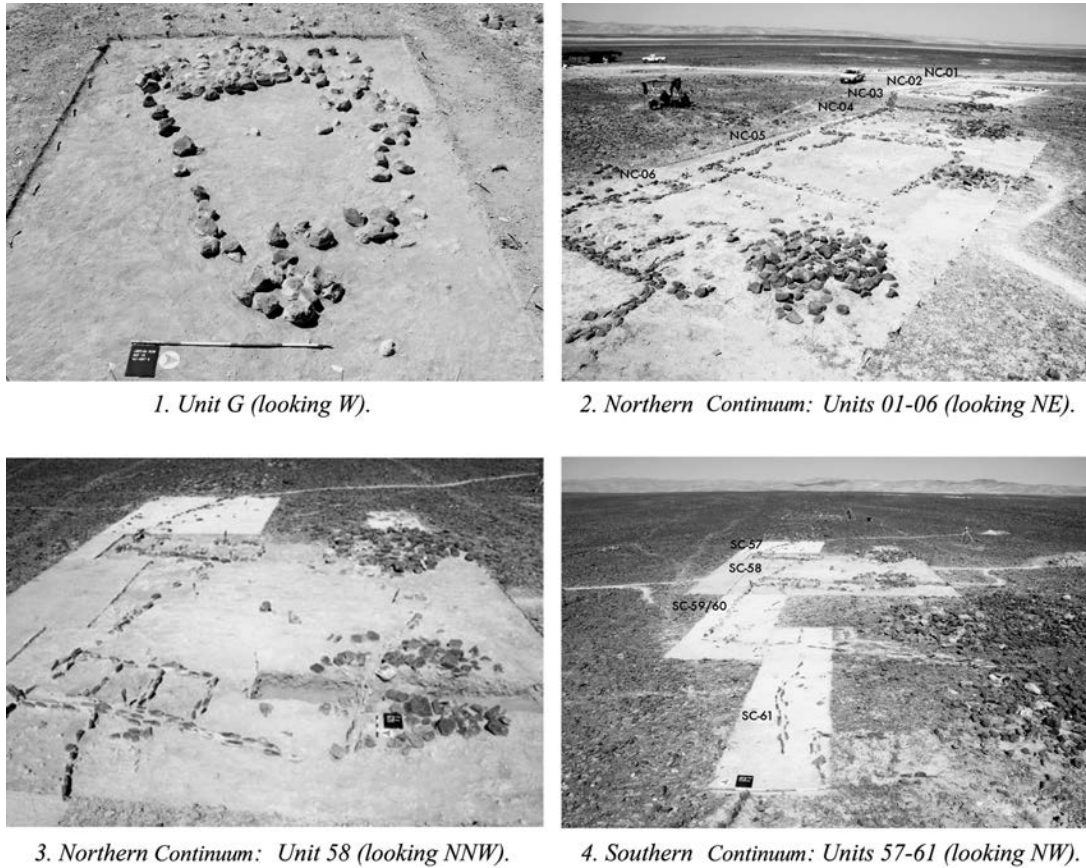


Figure 17. Harrat al-Juhayra: pseudo-house burial cairns (© S. Fujii).

However, there are a few critical differences between the two. One of them consists in the nature of attached structures. While every structure at Wadi Abu Tulayha —including Structure G where the façade-side burial cairn was added— produced various artifacts and a few hearths, none of them at Harrat al-Juhayra yielded such specific traces of real life. This means that while the Wadi Abu Tulayha structures were actually inhabited even on a seasonal basis, the Harrat al-Juhayra structures were not intended for the use as a place to live from the beginning. This contrast shall allow us to regard the empty structures as *pseudo-houses* or simple receptacles for a burial cairn. (It is probably for this reason that the burial cairn was allowed to disturb or even cut the front wall of the abutting structure.) It is our present interpretation that the initial pastoral nomads in the PPNC Jafr Basin took the trouble to construct a symbolic house for the burial practice inherited from their direct ancestors. We tentatively designate the unique burial feature as a *pseudo-house façade-side burial cairn* or, more simply, a *pseudo-house burial cairn*. Likewise, we tentatively call the laterally connected body of such homogenous units a *pseudo-settlement* in the sense that it seemingly looks like an elongated settlement but is devoid of any trace of actual life<sup>55</sup>.

The difference between the two sites is not limited to the nature of the receptacle alone. The nature of the burial cairn itself also critically differs from each other. While the façade-side burial cairn at Wadi Abu Tulayha contained an interment, none of the excavated pseudo-house burial cairns at Harrat al-Juhayra included any human skeletal remains, to say nothing of burial gifts. This contrast indicates that the latter was of a symbolic nature. Thus the pseudo-settlement can be regarded as a setting of symbolic secondary interment, a unique burial custom common to high-mobility populations such as

55. FUJII 2002c.

prehistoric pastoral nomads<sup>56</sup>. As a matter of fact, the cemetery is isolated in the middle of the basalt hill, and no contemporary settlements have been found in the Jafr Basin and its surrounding areas. The series of unique traits of the pseudo-settlement cannot reasonably be understood before we suppose the involvement of initial pastoral nomads.

It appears that the elongated pseudo-settlement began with the separated units equipped with a horizontally long compartment at their rear space (Units F, H, and I, for example), then, shifted into laterally connected units associated with similar space division (Units 01 and 02 of the Northern Continuum), and, through a few intermediate units (Units 03 and 04 of the same continuum), developed further into a standard form from Unit 05 onwards. The last type of pseudo-houses incorporates a degenerated form of an elongated compartment at their rear right corner and a few newly-added small compartments at their rear left corner, respectively. They were stable in terms of typology and lasted until the end of the Southern Continuum. What is important here is that while the former types (hereafter collectively called the Juhayra I type) bear some resemblance to the final complex of Wadi Abu Tulayha (**fig. 4, 8**), the last type (or the Juhayra II type) has much in common with the initial units of Qa' Abu Tulayha West described below. This implies that the Harrat al-Juhayra cemetery was later in both date and typology than the M-LPPNB outpost of Wadi Abu Tulayha and, at the same time, earlier than the LN cemetery of Qa' Abu Tulayha West. If this is the case, we shall be allowed to tentatively date it to the intermediate stage between the two. It is our present interpretation that the site of Harrat al-Juhayra represents a cemetery or an open sanctuary where initial pastoral nomads in the Jafr Basin continuously performed symbolic secondary interment of their successive group leaders (or *sheikh*) over several dozen generations.

#### *Qa' Abu Tulayha West*

Another symbolic cemetery or open sanctuary belonging to this phase is Qa' Abu Tulayha West, which was found for the first time during our preliminary inspection in 1995<sup>57</sup> and successively excavated over six field seasons from 1997 until 2002<sup>58</sup>. The site extends along the southeastern edge of a gentle hill that commands a distant view of a large dry lake of the same name (**fig. 18**). As with Harrat al-Juhayra, it is also isolated in barren land and not accompanied with any contemporary settlement.

Aside from several flint quarries dotted around the gentle hill, the site consists of two stratified structural complexes: the Layer 4 complex lying *ca.* 20 cm below the present ground surface and the Layer 3 complex overlying it. The former is further divided into the Northeastern Complex and the Southwestern Complex. A limited number of <sup>14</sup>C data suggests a Late Neolithic date for the former and a Chalcolithic date for the latter, respectively (**fig. 19, 23**). The Layer 3 complex, which is also distributed over the two operation areas, can be dated to the Early Bronze Age on the basis of several <sup>14</sup>C dates and diagnostic finds such as tabular scrapers and Jafr blades (**fig. 36**).

The Layer 4 Northeastern Complex, our main concern here, comprises a few dozen pseudo-house burial cairns. As with Harrat al-Juhayra, they are connected laterally with two minor gaps being intervened in between and form three intermittent continua *ca.* 20-50 m long, respectively. Here again, a horizontal stratigraphy from the northeast toward the southwest is suggested on the basis of wall-sharing relationship between any two adjacent units. It would follow that the elongated complex began with the Northern Continuum, then, gradually developed into the Central Continuum, and ended with the Southern Continuum.

As noted above, the Northern Continuum includes a few units that have some resemblance to the Juhayra II type of pseudo-house burial cairn (**fig. 20: 1, 2**). However, with the only exception of the first unit of the Central Continuum (**fig. 20: 3**), the subsequent units changed into a simplified form

56. HAIMAN 1992.

57. FUJII 1996.

58. FUJII 1998, 1999a, 1999b, 2000a, 2001, 2002a, 2003.

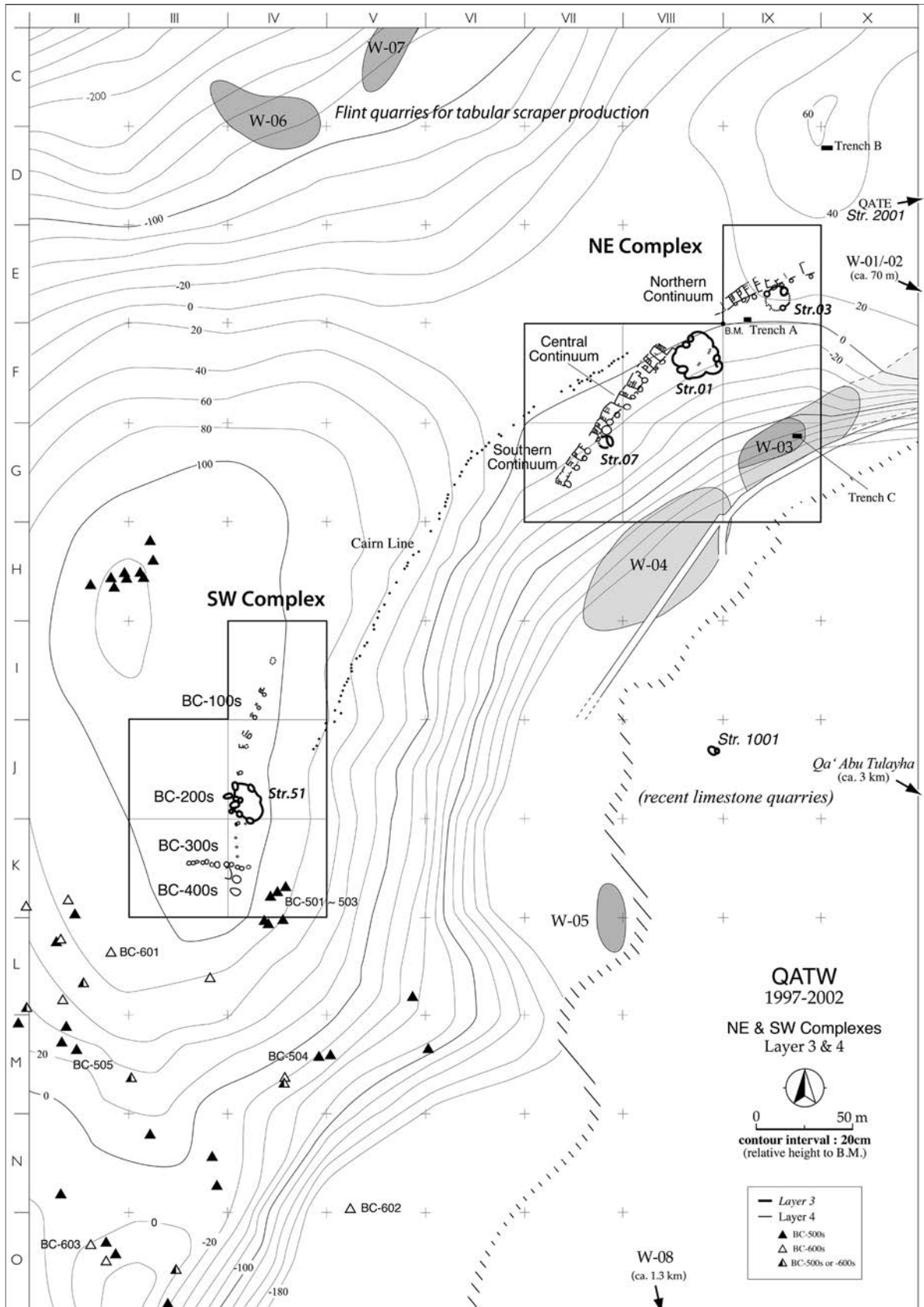


Figure 18. Qa' Abu Tulayha West: site plan (© S. Fujii).

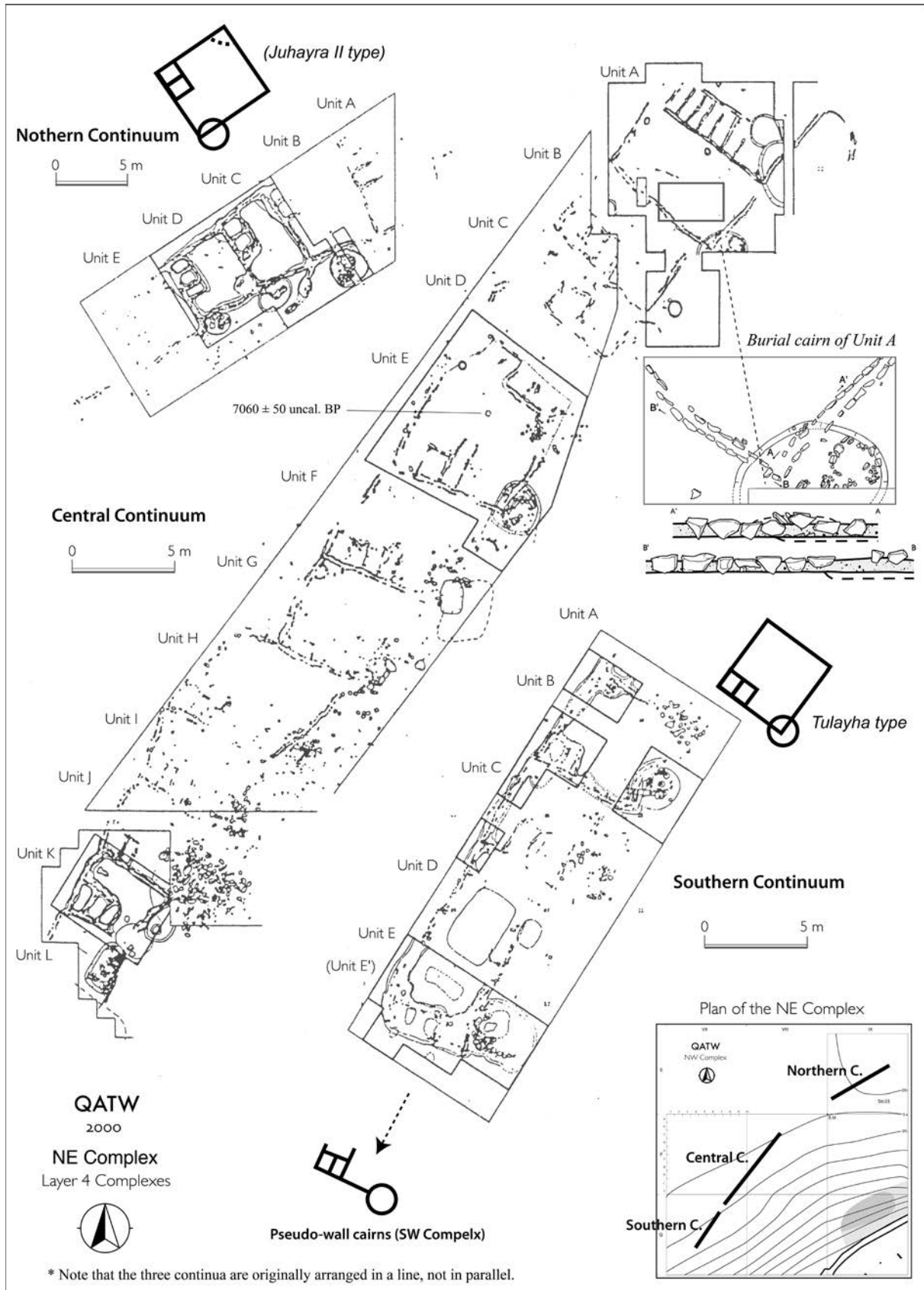


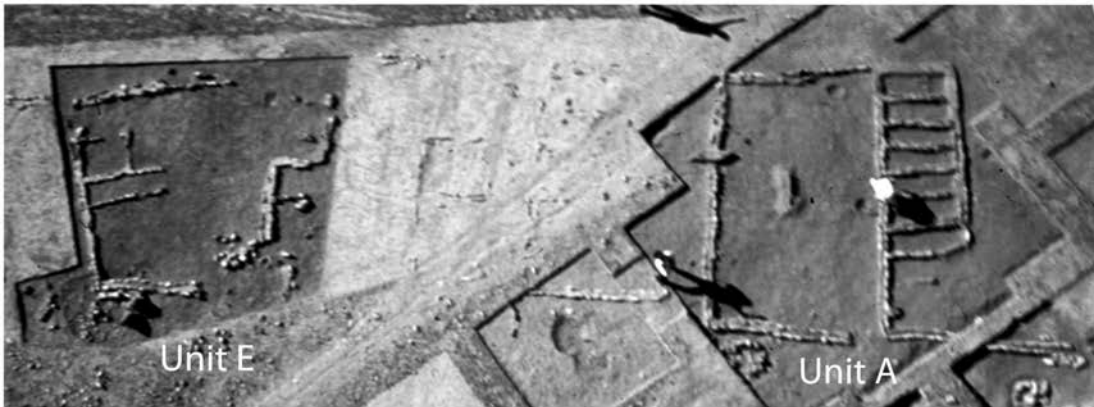
Figure 19. Qa' Abu Tulayha West: decomposed plan of the Layer 4 Northeastern Complex (© S. Fujii).



1. Northern Continuum (looking N).



2. Unit C of the Northern Continuum (looking N).



3. Central Continuum (from the air).



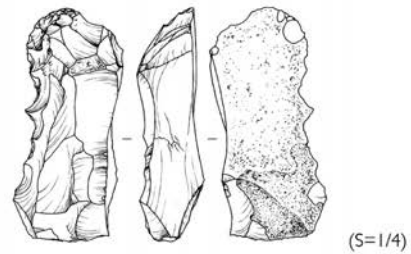
4. Central Continuum (looking SW).



5. Southern Continuum (looking NE).



6. Unit E' of the Southern Continuum (looking NE).



7. Unit C of the Northeastern Complex: digging tool.

Figure 20. Qa' Abu Tulayha West: pseudo-house burial cairns of the Layer 4 Northeastern Complex (© S. Fujii).

(hereafter called the Tulayha type) that was equipped only with a few rectangular compartments at its rear left corner (**fig. 19**). Both facts probably mean that the Qa' Abu Tulayha West Layer 4 pseudo-settlement immediately followed the Harrat al-Juyahra complex. Here again, any of the units produced neither human skeletal remains nor burial gifts. The only exception to this is a pick-like flint tool, which was found *in situ* in the burial cairn of Unit C of the Northern Continuum (**fig. 20: 7**). The heavy-duty tool was probably used for digging a shallow pit for the burial cairn and, then, left behind for some reason<sup>59</sup>.

The Central Continuum provides valuable insights into the formation process of a pseudo-settlement. Three things should be noted here. The first is the fact that the two-rowed upright slab wall at the southwestern corner of Unit A was disturbed by a cairn but soon roughly restored (**fig. 19**). This means that the pseudo-house was constructed first and followed by the addition of the burial cairn. The second focus is that with the only exception of Unit H, the rear wall of every unit is connected to each other to form a long straight line. The third is the fact that in contrast to the rear walls, the front walls are gradually set back as if they avoided disturbing an adjacent burial cairn. It is precisely for this reason that the continuum gradually tapers, as it goes southwestward. Taking these observations into consideration, the formation process of a pseudo-settlement can be reconstructed as follows (**fig. 21**): 1– while still alive, the first group leader constructed a pseudo-house as a receptacle of his own symbolic secondary interment; 2– when he died, the next group leader added a symbolic burial cairn to the existent pseudo-house, cutting (yet soon roughly restoring) its southwestern corner; 3– at the same time, he constructed his own pseudo-house at the abutting lot, setting back its front wall so as not to disturb the predecessor's cairn; 4– the third leader repeated the same procedure; 5– the repetition of the series of activities resulted in the formation of an elongated, gradually tapering pseudo-settlement<sup>60</sup>.

A question arises here: how they balanced between the following two contradictory requirements: the gradual setback of a front wall and the continuous connection of homogeneous units. Suggestive in this regard are the sudden set-forth applied to the left half of the front wall of Unit E and the exceptional setback of the rear wall of Unit H. Both devices can be understood as desperate measures to recover an original size of a pseudo-house and, in so doing, warrant further extension of a pseudo-settlement. Why, then, did the initial pastoral nomads tried to maintain the lateral connection with so many difficulties? No clear-cut answer can be given to such a difficult question including psychological aspects, but one thing we could say is that the lateral connection and its consequent formation of a pseudo-settlement might have been inseparably linked to some ritual for taking over the post of a group leader. It is for this assumption that we call the complex a symbolic cemetery or an open sanctuary.

The pseudo-settlement is among extramural features difficult to date, and no parallel examples were found outside the Jafr Basin. However, as referred to later, our recent investigations have located a few similar examples in southernmost Jordan (**fig. 45**) and central Syria (**fig. 46**). It appears that some of LN open sanctuaries in the Negev and Sinai also include similar features. The existence of these sites has raised the possibility that the unique burial practice represented by the pseudo-settlement covered the whole range of Badiat ash-Sham and its surrounding areas. We can argue that the pseudo-settlement holds a key to tracing the initial stage of the pastoral nomadization in the Levant.

### *Flint scatters*

In contrast to the preceding phase, this phase witnessed a marked decline in flint production. Our information sources are limited to a few questionable flint scatters only. Among those are a small number of surface finds collected on a gentle slope at the southeastern edge of Qa' Abu Tulayha West<sup>61</sup>. They include a few large bifacial knives, which can probably be ascribed to the Tuwailan characteristic of

59. FUJII 2001, p. 32-33, fig. 15.

60. FUJII 2001, p.33-34; 2002c.

61. FUJII & ABE 2008, p. 7, fig. 21.

the Late Neolithic Negev Highlands<sup>62</sup>. It is still uncertain, however, that the surface collection has something to do with the neighboring pseudo-settlement. Further investigation is needed to understand the ill-defined flint industry of Phase 2.

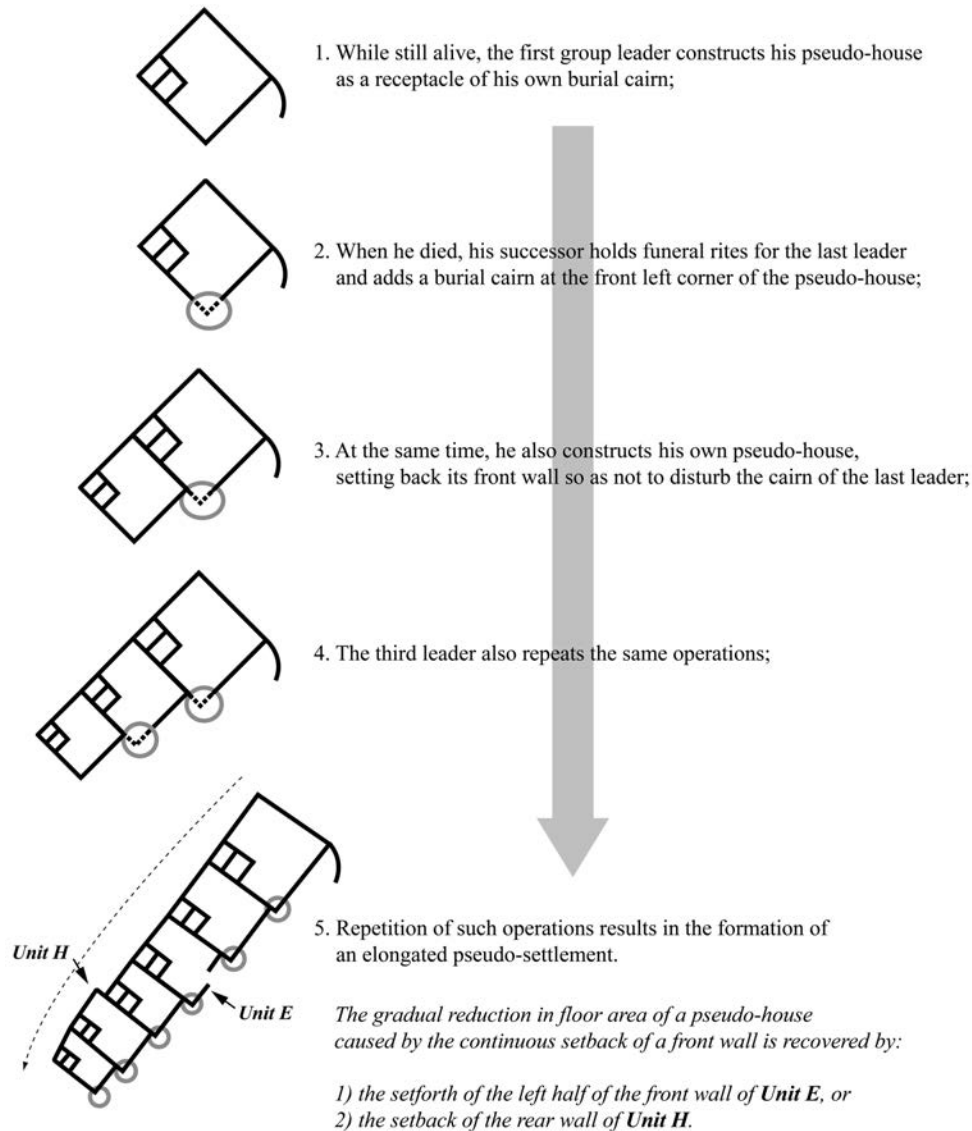


Figure 21. Qa' Abu Tulayha West: schematic Formation process of the Central Continuum (© S. Fujii).

### PHASE 3 (THE JAFR CHALCOLITHIC)

Phase 3 or the Jafr Chalcolithic can be defined as a transitional stage toward the full-fledged nomadic society. This phase saw the appearance of the *pseudo-wall burial cairn*, a simplified form of the pseudo-house burial cairn that marked the preceding phase. The typological transition between the two is sequentially traceable at Qa' Abu Tulayha West, the type-site of this phase. Unlike the pseudo-house cairn, the pseudo-wall cairn is constructed at regular intervals and, therefore, takes on the appearance

62. GORING-MORRIS 1993; GORING-MORRIS *et al.* 1994.

of a normal cairn tomb. It appears, however, that this fashion unfamiliar in the Jafr Basin did not last long. Evidence suggests that the pseudo-wall cairn came again to be connected laterally at the end of this phase.

*Qa' Abu Tulayha West*

The Layer 4 complex of Qa' Abu Tulayha West developed from the Northeastern Complex to the Southwestern Complex with some 170 m gap intervened in between (fig. 18). The new complex contains several dozen pseudo-wall cairns, which fall into six types from BC-100s to BC-600s probably in a chronological order (fig. 22, 23). Several <sup>14</sup>C dates and the intra-site horizontal stratigraphy enable us to date them to Phase 3.

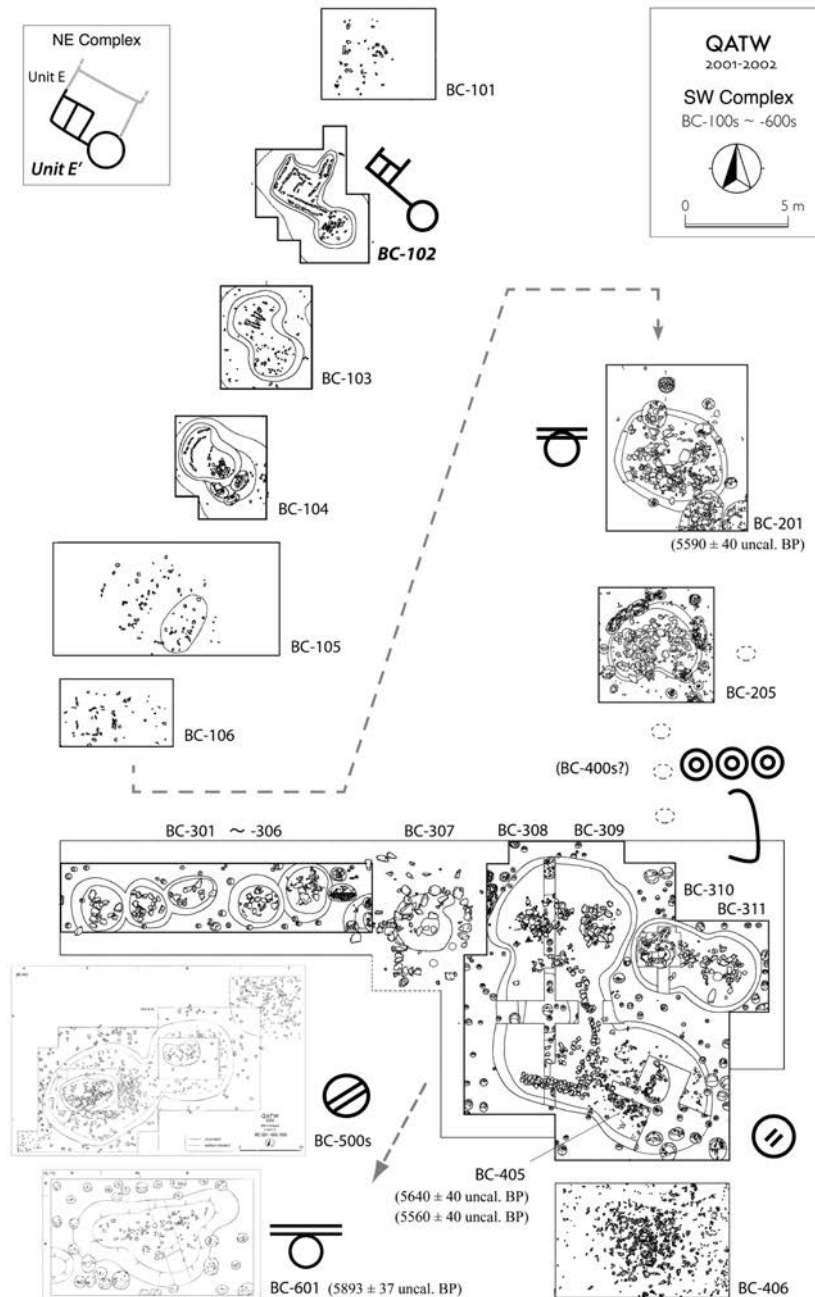


Figure 22. Qa' Abu Tulayha West: decomposed plan of the Layer 4 Southwestern Complex (© S. Fujii).



Unit E', the final component of the Northeastern Complex, holds a key to tracing the formation process of the Southwestern Complex (**fig. 19, 20: 6**). This unit is a halfway feature that reconstructed the left half of Unit E only at the same lot. For this reason, it consists only of a key-shaped wall or the remnant of the left half of the original unit. Another difference from the preceding units is its construction technique. While the two-rowed upright slab walls of a normal pseudo-house cairn are supported by narrow banks stretching along the walls, the key-shaped wall of Unit E' is founded on an amorphous, unified platform. (Note that the pseudo-wall burial cairn in the Jafr Basin differs from narrowly-defined cairns constructed only with stones.) What such techno-typological simplification took a clearer form are BC-100s (i.e. burial cairns of No. 100s) that represent the first group of the Southwestern Complex (**fig. 23: 1**). Among others, BC-102 bears a close resemblance to Unit E', corroborating the typological sequence suggested above. From BC-100s onward, the burial cairn at Qa' Abu Tulayha West was to take the form of a separated feature. It should be noted, however, that the interval between any two adjacent BC-100s cairns is roughly equivalent to the width of a standard pseudo-house. Taking this into consideration, it is also possible that the omission of the right half of a pseudo-house happened to bring about the seemingly separate appearance of BC-100s.

The subsequent pseudo-wall burial cairns gradually developed southwards. However, the collinear development long inherited from the Northeastern Complex gradually became irregular from BC-300s onward and eventually fell into bankruptcy at BC-500s (**fig. 18**). As discussed later, this phenomenon might possibly represent intra-group segmentation, a unique trait of pastoral society. Here again, none of the excavated cairns produced human bones and burial gifts. The only exception to this is a flint pick found *in situ* below the mound of BC-401 (**fig. 23: 6**). As with the similar product recovered from Unit C of the Northeastern Complex (**fig. 20: 6**), it was probably left behind in the cairn as a disused article after finishing a digging operation.

The pseudo-wall burial cairn represents a later form of the symbolic secondary interment common to the initial pastoral nomads in the Jafr Basin. From BC-100s onward, the combination of a small symbolic cairn and a pseudo-wall was maintained as a standard for a while. However, the fashion of the combination gradually changed with the times. Of significance is the importance of the front wall, which is consistent from the PPNB façade-side burial cairn, through the LN pseudo-house burial cairn, until the Chalcolithic pseudo-wall burial cairn. There is no doubt that the pseudo-wall symbolizes a disused house as a receptacle of a burial cairn. It appears that this unique ground rule, though losing its essence, was long inherited among pastoral nomads in the southern Levant. The underground tombs in front of al-Khazna in Petra <sup>63</sup>, for example, might possibly represent a long-absent revival of the burial tradition deep-rooted among the nomadic population in southern Jordan.

The pseudo-wall burial cairn provides almost the only key to approaching the social dynamics of poorly informed Chalcolithic pastoral nomads in the Jafr Basin. However, it has a critical difficulty, namely, the inferiority in archaeological visibility. In comparison with the other types of burial features in the basin, the pseudo-wall burial cairn not only is much smaller in scale but also takes the form of a separate feature. For both reasons, it is liable to be unnoticed in the course of the general survey. The several dozen examples at Qa' Abu Tulayha West were no exception to this and barely identified on the basis of intermittent wall alignments slightly protruding above the present ground surface. Numerous examples are expected to remain buried in the flint pavement desert.

63. FARAJAT & NAWAFLEH 2005.

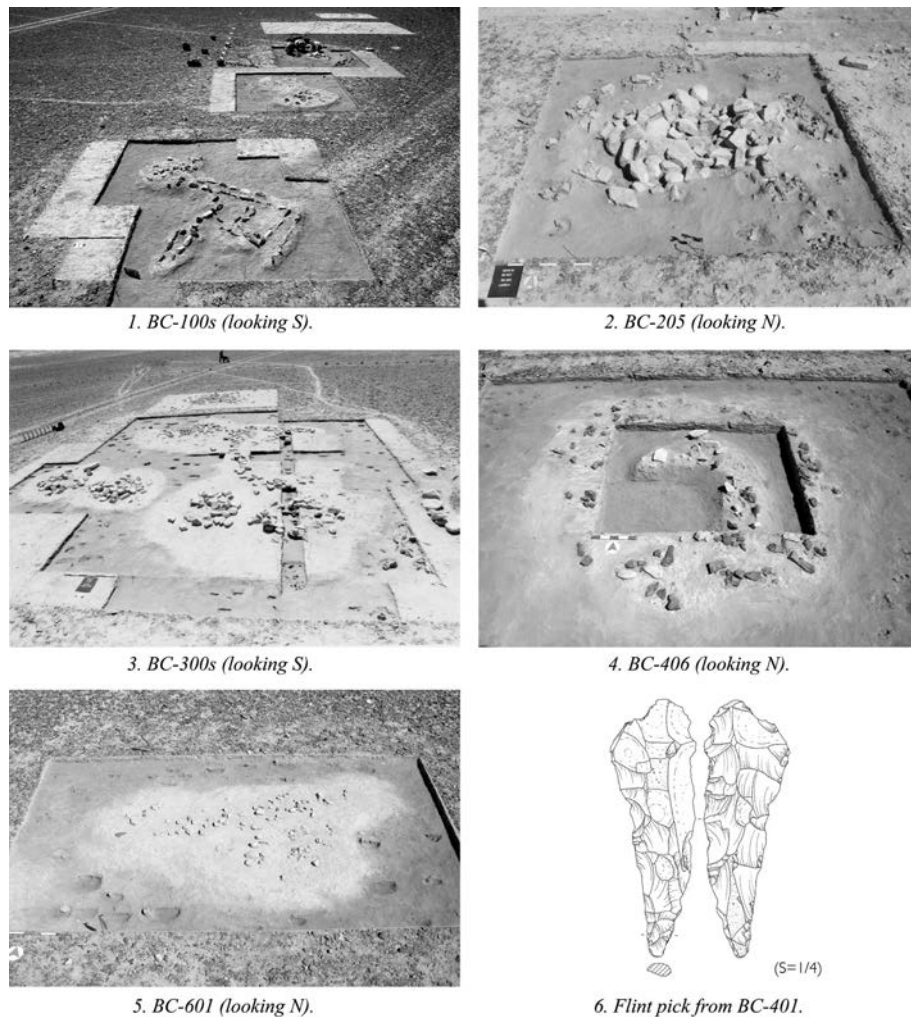


Figure 23. Qa' Abu Tulayha West: pseudo-wall burial cairns of the Layer 4 Southwestern Complex (© S. Fujii).

### *K-lines*

What followed the BC-600s type of pseudo-wall burial cairns was their laterally-connected form, which is called *K-line* among Western scholars<sup>64</sup> or *Hatt Shabib* in local communities in southern Jordan<sup>65</sup>. (Since the latter term carries a questionable chronological implication, we use the former here.) Several examples have been reported in the Negev Highlands beyond the Jordan Rift Valley. Our investigations have also located several examples in the hilly terrain at the northwestern edge of the Jafr Basin. We excavated three of them in the spring and summer field seasons of 2004<sup>66</sup> (**fig. 24**). They measure up to several kilometers in total length and stretch roughly in a linear fashion regardless of surrounding topography. Another trait of the Jafr *K-lines* is that they are usually attached with small stone concentrations roughly at regular intervals. These traits are common to the Negev *K-lines*, suggesting that both areas shared the same culture at this stage.

64. EVERNARI *et al.* 1958; GLUECK 1958, 1959; HAIMAN 2000.

65. KIRKBRIDE 1948; ABUJABER 1992; MACDONALD *et al.* 2000.

66. FUJII 2004a, p. 40-47; 2004b, p. 285-295.



1. Harrat al-Burma K-line (looking NW).

2. Harrat al-Sayyiyah K-line (looking SW).

Figure 24. K-lines in the Jafr Basin (© S. Fujii).

As with the Negev examples, the Jafr K-line is difficult to date, because no reliable keys are available. However, a few lines of collateral evidence are helpful for narrowing down its date to some extent. To begin with, the upper limit date is suggested by the fact that the Jafr K-line can be decomposed into BC-600s type of pseudo-wall cairns. This probably means that the K-line postdates the latter. The lower limit date, on the other hand, is defined by the fact that the Harrat al-Sayyiyah K-line is partly cut by several EBA cairns referred to below (**fig. 25**). Taken together, the date of the Jafr K-line can tentatively be dated to a relatively short time range between the end of Phase 3 and the beginning of Phase 4.

The Jafr K-lines still retain the long-inherited tradition, namely, the lateral connection of homogenous units (**fig. 26**). It is probably for this reason that they stretch in a linear fashion regardless of their surrounding topography. When we consider that the early half of this phase witnessed the florescence of the separate type of burial features, the appearance of the K-line may be regarded as a reversion to the Jafr tradition. This episode corroborates anew how deep the principle of the lateral connection was rooted in the burial practice in the Jafr Basin.

As with the previous burial features, the K-lines produced neither human skeletal remains nor burial gifts. It follows that the symbolic secondary burial unique to the Jafr Basin, though changing its phenotype in various ways, lasted as a genotype at least until the end of Phase 3 or the beginning of Phase 4. As discussed below, this possibly means that the initial stages of the pastoral nomadization in the basin proceeded in local contexts without any substantial influence from the outside.

#### PHASE 4 (THE JAFR EARLY BRONZE AGE)

Phase 4 or the Jafr Early Bronze Age saw the zenith of burial features in terms of both variety and density. To date, two distinct traditions have been confirmed. One of them is the cist cairn tradition, which is thought to represent a new wave spread from the contemporary west. This new burial tradition left behind several dozen cist cairns at Wadi Burma and Tal'at 'Ubayda, for example. The appearance of such large-scale cairn fields is suggestive of the establishment of a full-fledged nomadic society in the Jafr Basin. The other group is represented by the circularly-connected pseudo-wall cairn, which no doubt has its roots in the local tradition. Several examples have been excavated at Qa' Abu Tulayha

West. The coexistence of the two distinct burial traditions highlights the complexity of the Phase 4 society in the Jafr Basin. In addition, large-scale flint exploitation also marks this phase, and numerous flint quarries and workshops of tabular scrapers (and Jafr blades to a lesser extent) have been located along the northern fringe of the basin.

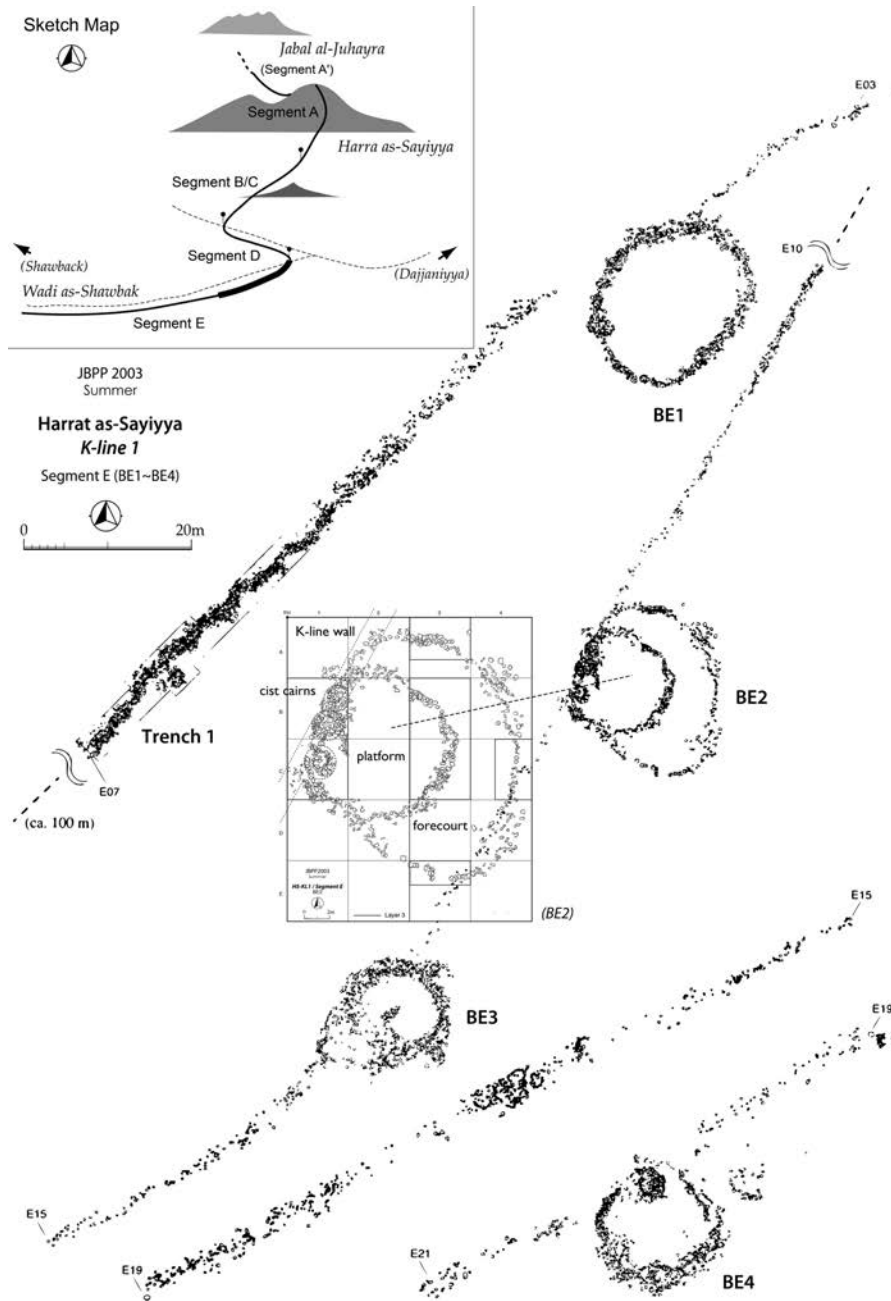


Figure 25. Harrat al-Sayiyya: decomposed plan of Segment E (© S. Fujii).

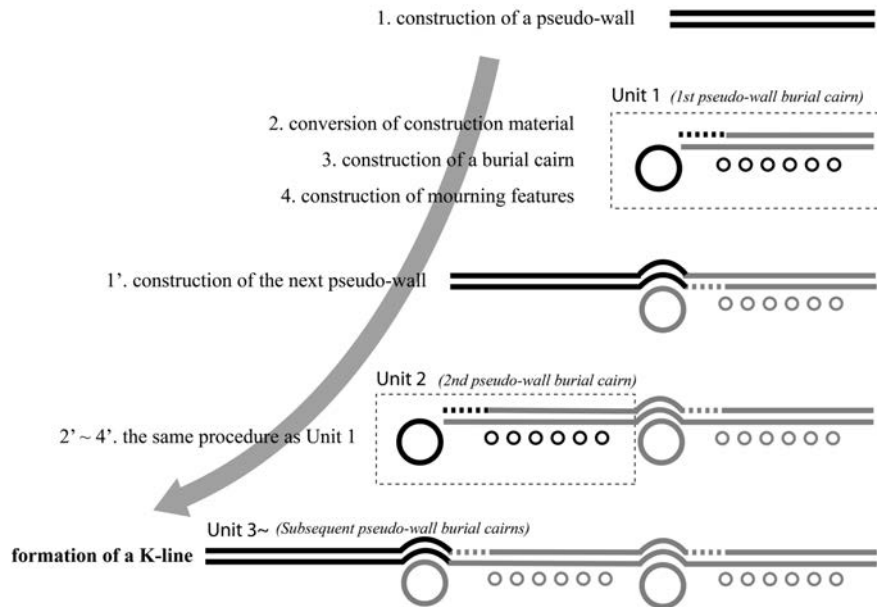


Figure 26. Schematic formation process of the Jafr K-line (© S. Fujii).

### *Wadi Burma*

This large cairn field is located on the extensive sand bank in the upper reach of Wadi Burma that drains the northwestern corner of the Jafr Basin (fig. 27). It was found in the 2001-2002 winter season survey and investigated in the subsequent two field seasons<sup>67</sup>. The site contains some forty cist type burial cairns, which form two concentrations: Wadi Burma South and Wadi Burma North. We excavated six of them and briefly examined several other examples (fig. 28).

More than a dozen <sup>14</sup>C dates are equally suggestive of an EB I date for the site (fig. 38). A series of diagnostic finds such as coarse wares associated with a punctuated rim band or diagonal impressions also demonstrates the chronological synchronism with EB I sites in southern Jordan such as Bab edh-Dhra<sup>68</sup>, Wadi Fidan 4<sup>69</sup>, and Wadi Faynan 100<sup>70</sup>, Tell Ikatanu<sup>71</sup>, and Hujayrat al-Ghuzlan<sup>72</sup> (fig. 30: 1-6, 16-19). In addition, arched backed blade sickles are also suggestive of a close tie with the EBA flint assemblage in the Negev Highlands<sup>73</sup> (fig. 30: 12-14, 24). The excavated cairn contained no human skeletal remains, but yielded a variety of burial gifts including stone vessels and maceheads as well as potteries and flint artifacts (fig. 30: 7-9, 2-21). The rich occurrence of the burial gifts, especially of the bulky containers and the reaping flint implements, differentiates them from the traditional burial cairns in the Jafr Basin, suggesting the involvement of a semi-agricultural and semi-pastoral population.

The Wadi Burma cist cairn is composed of the following four major elements: a round clearly-delineated cist ca. 3-5 m in diameter and ca. 0.5-0.7 m in wall height, a cobble mound ca. 5-15 m in diameter and ca. 0.5-1 m in preserved height, a rectangular platform up to ca. 7-8 m wide and ca. 5 m from front to back, and a 45 degrees rotated, square to lozenge-shaped forecourt up to ca. 25 m wide

67. FUJII 2004a, p. 27-40; 2004b, p. 295-299; 2005a, p. 17-30.

68. SCHAUB & RAST 1989, fig. 13: 1; 2000, fig. 4.2.

69. ADAMS & GENZ 1995, fig. 5: 1; ADAMS 1999, fig. 4. 10, no. 5, fig. 5. 11, no. 2.

70. WRIGHT *et al.* 1998, fig. 8: 4.

71. PRAG 2000, fig. 5.3.

72. KERNER 2009, fig. 9-37.

73. ROSEN 1997, p. 59-60.

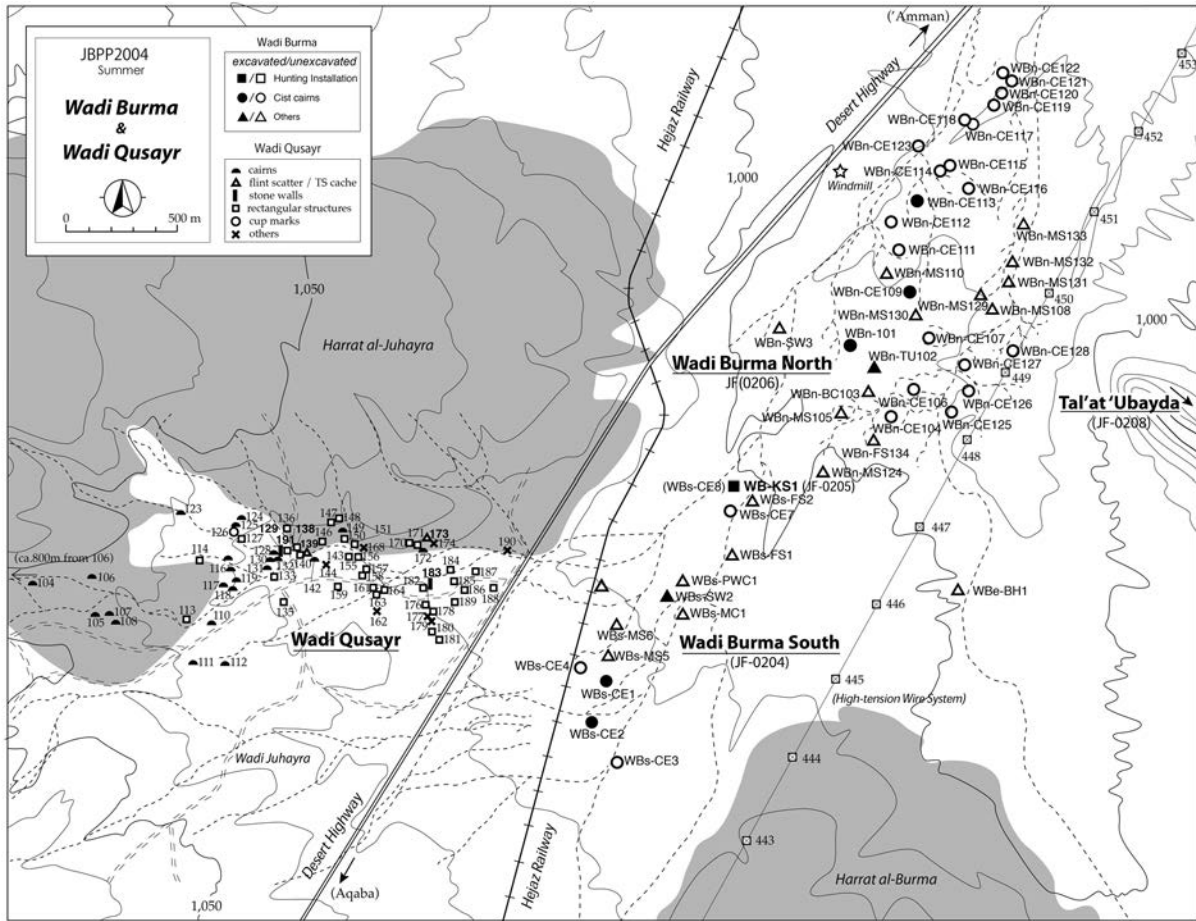


Figure 27. Wadi Burma and Wadi Qusayr: site distribution map (© S. Fujii).

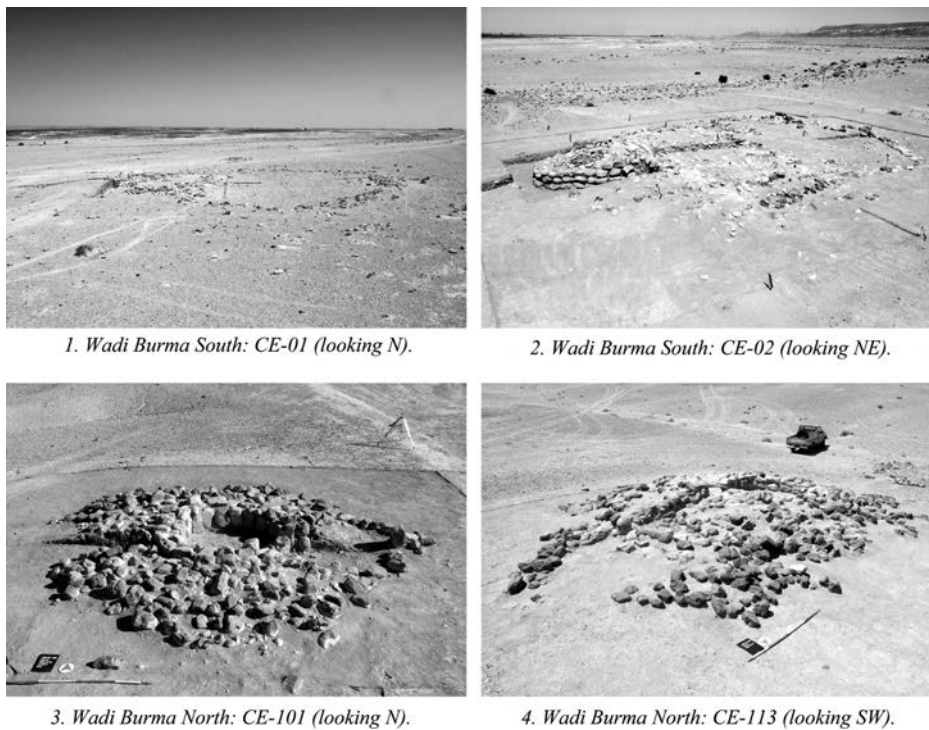


Figure 28. Wadi Burma: forecourt type cist cairns (© S. Fujii).

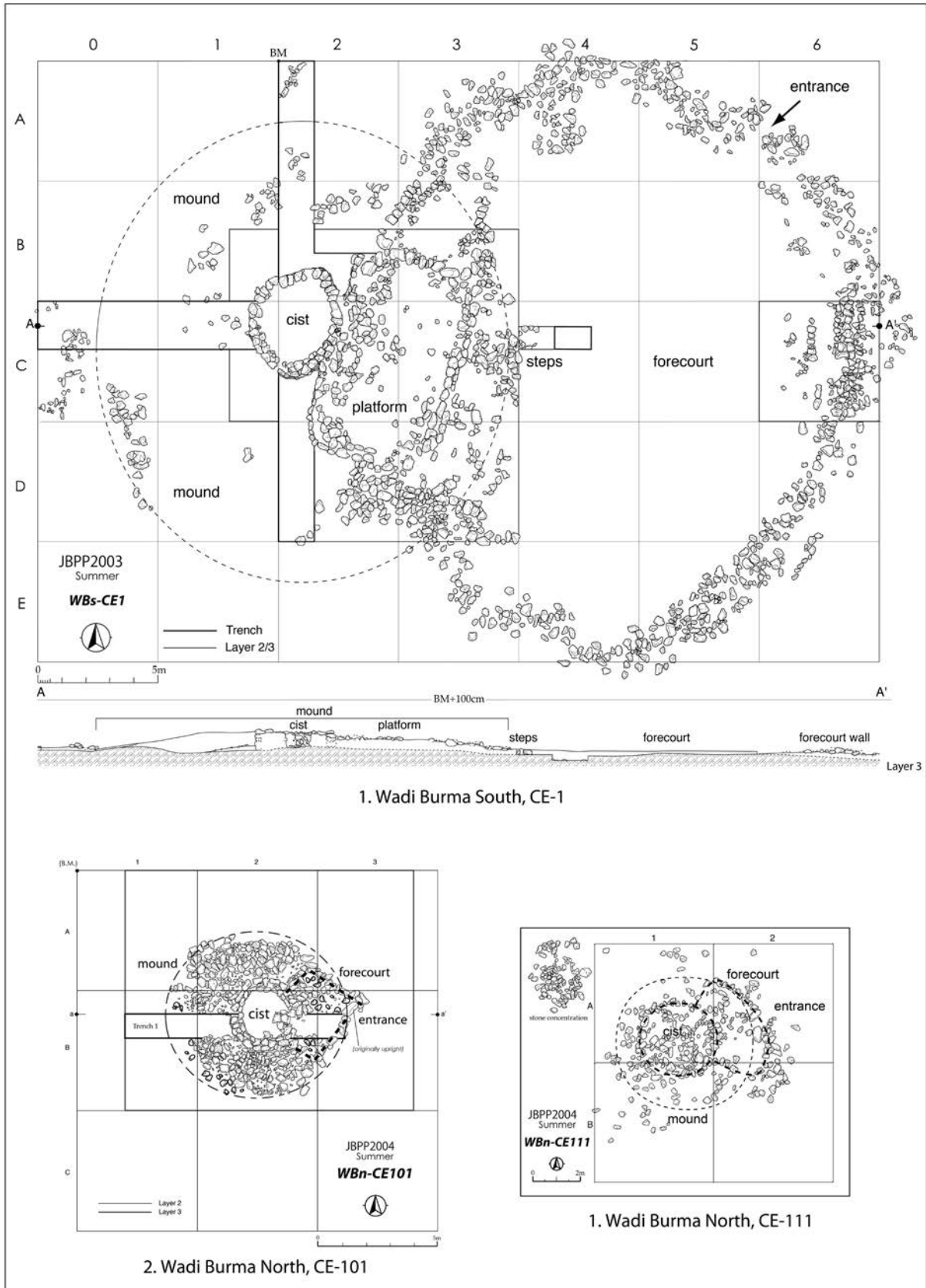


Figure 29. Wadi Burma: general plan of forecourt type cist cairns (© S. Fujii).

(fig. 29: 1). The latter two elements are unique to the Wadi Burma cairn field and probably represent a place for some funerary ritual. This kind of burial cairn, the *forecourt type cist cairn* of our terminology, can be traced back to LN open sanctuaries such as Biqat Uvda 6<sup>74</sup>. There is little doubt that it was spread from the contemporary west including the Negev Highlands and the Jordan Rift Valley. Of interest is the fact that both the platform and the forecourt gradually decrease in scale as they go northwards within the site (fig. 29: 2, 3). The same is roughly true with the cist and the cobble mound, both of which also reduce their size to some extent in conjunction with the downsizing of the other two elements. Both facts suggest the existence of a horizontal stratigraphy from the south toward the north. As discussed below, the appearance of the corridor type cist cairn at the nearby cairn field of Tal'at 'Ubayda seems to have followed as an extension of the series of typological changes.

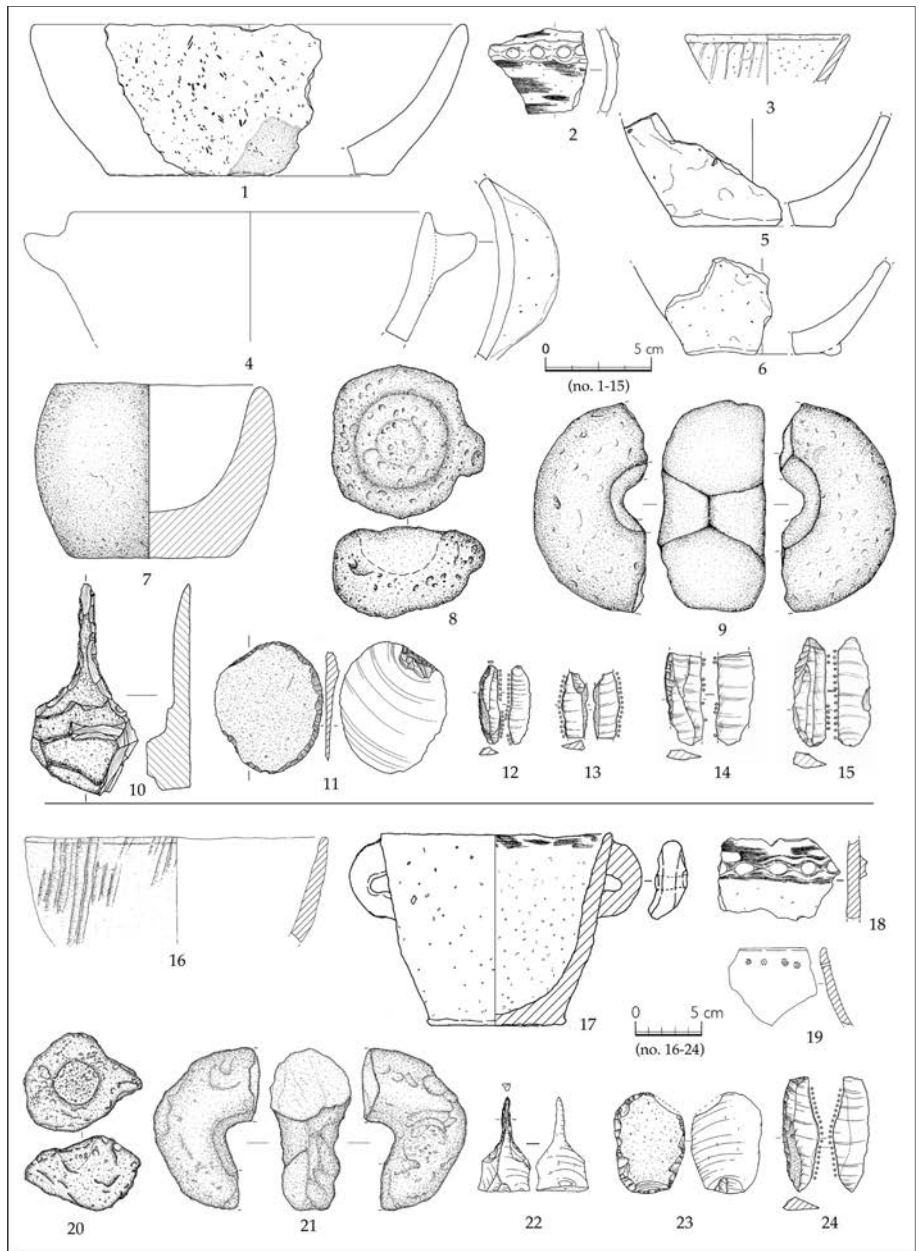


Figure 30. Wadi Burma: small finds from forecourt type cist cairns (© S. Fujii).

74. YOGEV 1983; AVNER 1984, p. 119-126; GORING-MORRIS 1993, fig. 12.



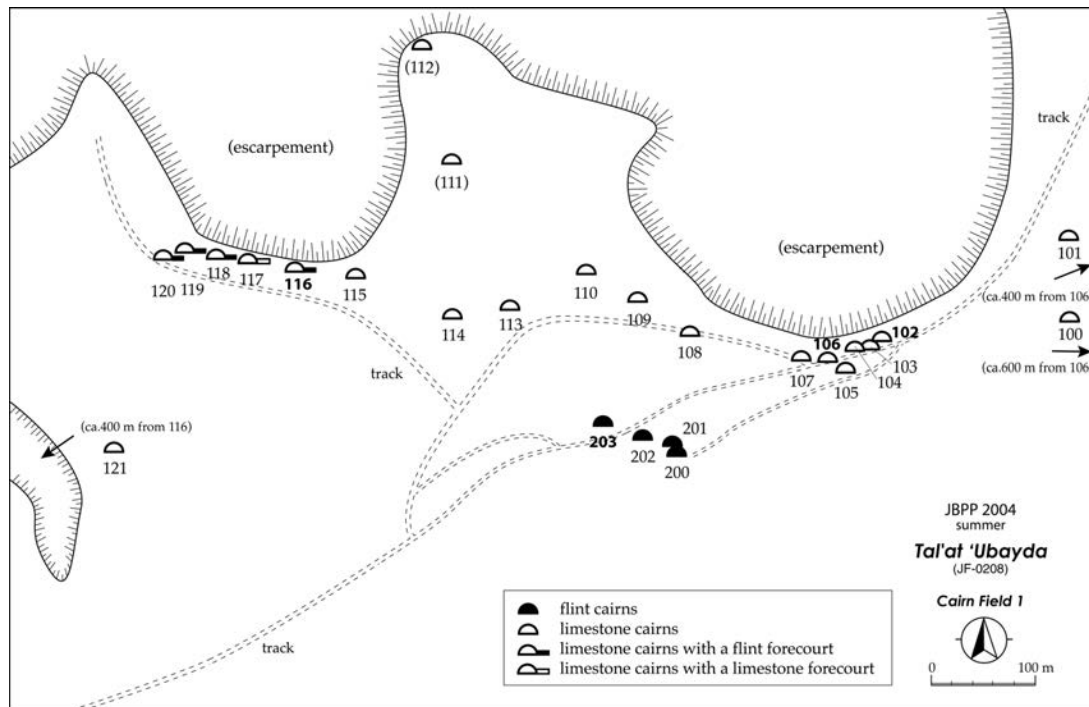


Figure 31. Tal'at 'Ubayda: site plan (© S. Fujii).

The influx of the forecourt type cist cairn not only marks the beginning of Phase 3 but also means the departure from the Jafr burial tradition that is characterized by the combination of a simple cairn without any internal structure and a pseudo-house or -wall as its indispensable attachment. Recent surveys suggest that similar features are widely distributed as far as the southern edge of the Jafr Basin <sup>75</sup>. The advent of the new burial tradition probably represents an aspect of the far-reaching socio-cultural reorganization that involved the whole range of the southern Levant. Incidentally, the forecourt type cist cairn, especially its initial forms, is liable to be mistaken as a large enclosure associated with a small feature along its wall. Thus careful observation is needed for their identification.

### Tal'at 'Ubayda

Another major cairn field, Tal'at 'Ubayda, is located at the northeastern edge of a limestone hill overlooking the upper reaches of Wadi Burma (**fig. 27, 31**). It was also found in the 2001-2002 winter season survey and investigated in the summer field season of 2004 <sup>76</sup>. The site contains some thirty *corridor type cist cairns*. We excavated five of them and briefly examined several other examples by means of cleaning or limited sounding (**fig. 32**). Available evidence suggests that the corridor type cist cairn is a subsequent form of the forecourt type cist cairn.

The site differs from the Wadi Burma cairn field in several major aspects. One of them consists in the site location. While the latter site lies on a sand bank, the former occupies an edge of the mesa-like hill that provides a distant view. Such a commanding location became the norm of subsequent cairn fields. Second, the replacement of a wide platform and a large forecourt by a compact corridor resulted in the formation of a standard burial cairn with a diameter of *ca.* 5-10 m and a height of *ca.* 0.5-1 m (**fig. 33**). Third, while the forecourt type cist cairn yields a variety of burial gifts but contains

75. ABU-AZIZEH in this volume.

76. FUJII 2005a, p. 30-41.

no human skeletal remains, the corridor type cist cairn usually contains secondary interments of plural individuals but produces only a limited variety of burial gifts (**fig. 32: 4**). Fourth, potteries and stone vessels entirely disappeared and, instead, tabular scrapers and small adornments became major grave goods in the corridor type cist cairn (**fig. 34**). The sudden shift from fragile and bulky items to durable and more compact products is suggestive of the rise in mobility of the population who was involved in the construction of the two successive cairn fields. The disappearance of sickle blades from flint offerings can also be understood in the same context. The semi-agricultural and semi-pastoral population who settled in the drainage basin of Wadi Burma might have rapidly leaned towards pastoral nomadism in accordance with local environmental conditions.

As for the dating, the following two keys are available. The first key comes from the horizontal stratigraphy from west toward the east. Many, if not all, of the cairns in the western half (i.e. BC-116 ~ BC-120) are equipped with a low and relatively large cist in their center (**fig. 32: 3**) and a flint or limestone slab pavement in front of their entrance (**fig. 32: 5-6**). The former bears some resemblance to a cist of the forecourt type cairn, and the latter can be regarded as the remnant of a forecourt itself. The opposite is the case with the cairns in the eastern half, which incorporate a higher yet smaller cist and are devoid of a frontal pavement (**fig. 32: 1-2; 33**). These contrasts suggest that the corridor type cist cairn at Tal'at 'Ubayda derived from the forecourt type cist cairn, and that it began with the western examples



1. BC-102 (looking NW).



2. BC-106 (looking NE).



3. BC-116 (looking N).



4. BC-116: close-up view (looking N).



5. BC-118 (looking NW).



6. BC-119 (looking E).

Figure 32. Tal'at 'Ubayda: corridor type cist cairns (© S. Fujii).

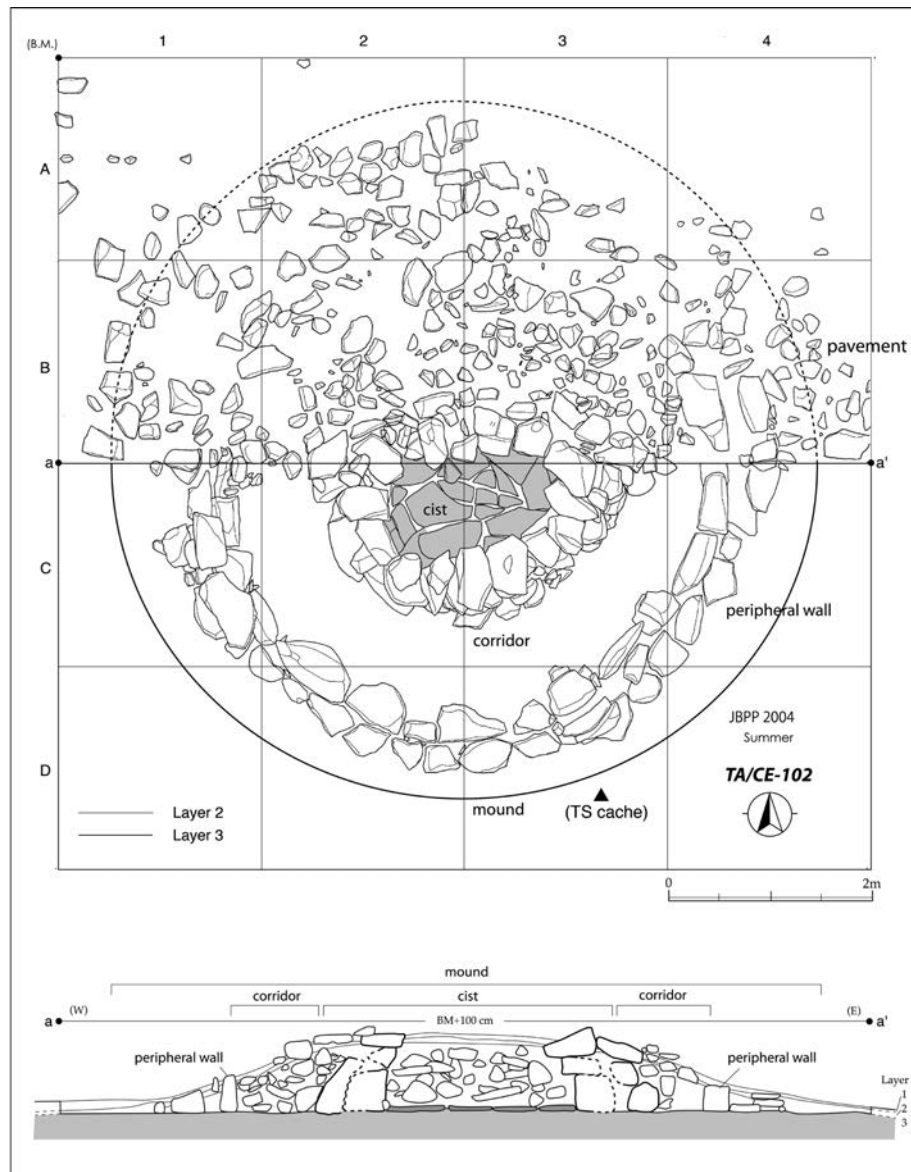


Figure 33. Tal'at 'Ubayda: general plan and section of a corridor type cist cairn (© S. Fujii).

and, then, changed into the eastern ones. This assumption, if accepted, would allow us to date the cairn field to a post-EB I horizon. The second key is the *in situ* occurrence of tabular scrapers from two of the five excavated cairns. Given the general consensus that the tabular scraper production was entirely deteriorated at the beginning of the EB IV<sup>77</sup>, their occurrence may serve as evidence to define the lower limit date of the corridor type cist cairn. Taken together, the Tal'at 'Ubayda cairn field can tentatively be dated to the EB II/III. The predominance of elongated tabular scrapers with a finely-faceted striking platform also argues for the tentative dating<sup>78</sup>.

77. ROSEN 1997, p. 73.

78. ABE 2008.

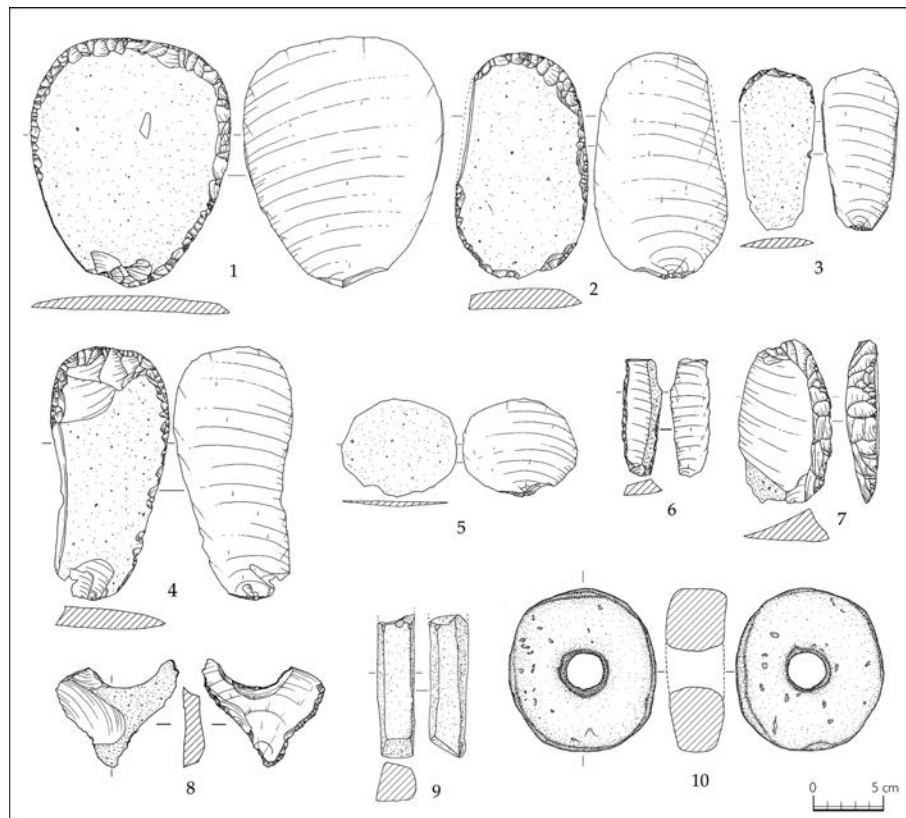


Figure 34. Tal'at 'Ubayda: small finds from corridor type cist cairns (© S. Fujii).

### *Harrat as-Sayiyya*

As noted above, the Harrat as-Sayiyya K-line was partly disturbed by several forecourt type cist cairns. Among others, BE-2 bears some resemblance to the cairns at Wadi Burma, suggesting its chronological assignment to the EB I (**fig. 25**). We should note, however, that a few small cists are incorporated into a single cairn, and that they resemble a simple stone concentration rather than a clearly delineated cist. The absence of both feature funerary goods also differentiates them from the normal forecourt type cist feature. The Harrat as-Sayiyya cairns still retain the Jafr tradition to some extent and, in this sense, may be regarded as an eclectic form between the forecourt type cist cairn and the circularly-connected pseudo-wall cairn described below. It is not impossible that the influx of the new burial tradition stimulated Jafr pastoral nomads to its halfway imitation. Considered in this light, it is also conceivable that the Harrat as-Sayiyya cairns belong to a little later phase, namely, the EB II or III. This perspective, if accepted, would lower the date of the K-line cut by these cairns as well. The dating of the atypical forecourt type cist cairns at Harrat as-Sayiyya is highly important in defining the lower limit date of the Jafr K-line and requires further verification.

### *Wadi Abu Tulayha*

The PPNB outpost of Wadi Abu Tulyha also includes two corridor type cist cairns, which are constructed diverting a part of the construction material of the underlying PPNB outpost. Both cairns were seriously looted, but BC-2 produced a certain volume of fragmented human skeletal remains on and around a small stone-flagged bed that occupies the center of the cist (**fig. 35**). The existence of the corridor type cist cairns at Wadi Abu Tulayha illustrates that the new burial tradition enlarged its

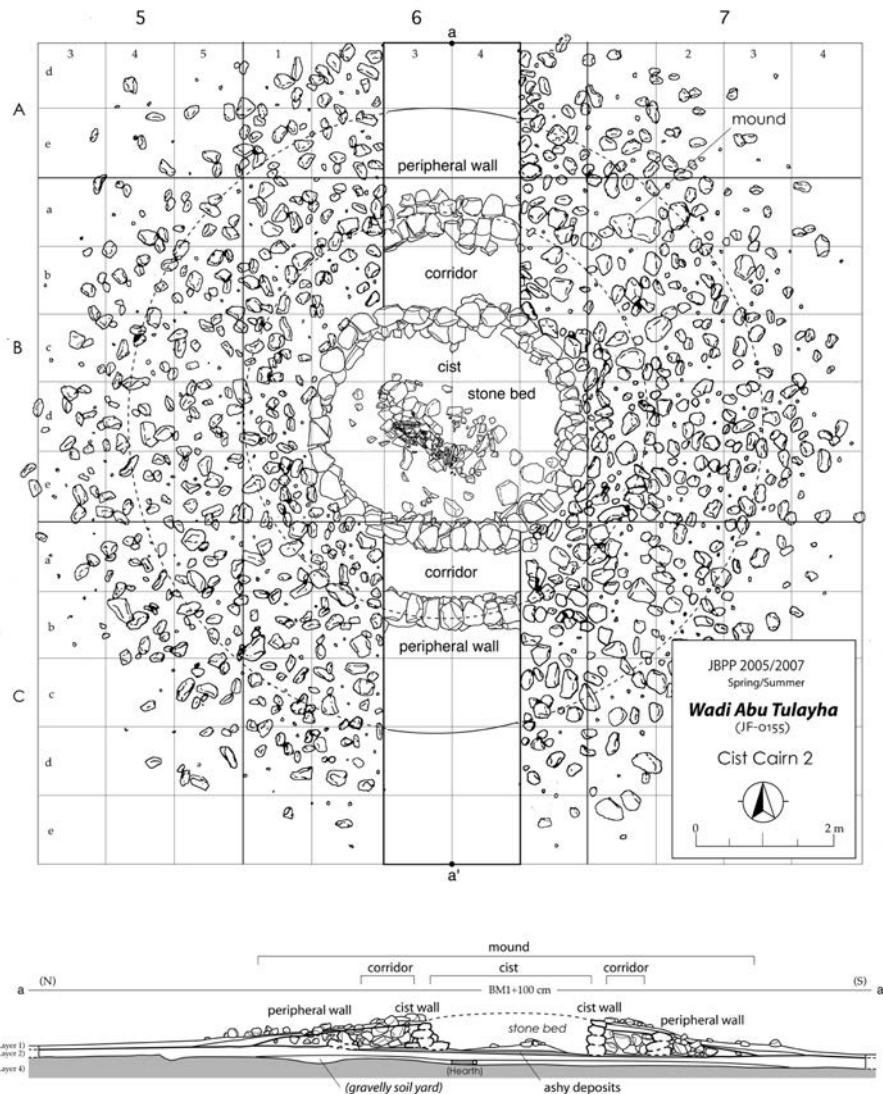


Figure 35. Wadi Abu Tulayha: plan and section of a corridor type cist cairn (Layer 2) (©) S. Fujii.

distribution range deep into the basin at the stage of the EB II/III. This episode might have something to do with the establishment of the full-fledged nomadic society in the basin, on the one hand, and the acceleration of urbanization in the contemporary west<sup>79</sup>, on the other hand.

### *Qa' Abu Tulayha West*

The large-scale open sanctuary of Qa' Abu Tulayha West was still in use in Phase 4. The Layer 3 complex contains four large stone-built structures of various plans and scales, which are dated to the EB III on the basis of several <sup>14</sup>C data. They always abut on the Layer 4 pseudo-settlement or pseudo-wall burial cairns, suggesting the continuation of the burial tradition that considers mutual connection important. We excavated all of the four structures over six field seasons from 1997 to 2001 (fig. 36, 37).

79. GOPHNA 1995; PHILIP 2001, 2008; RICHARD 2003.

The four structures incorporate several stone concentrations into the nodal points of peripheral walls and, for this reason, can be regarded as circularly-connected bodies of pseudo-wall cairns or, more simply, *circularly-connected pseudo-wall cairns*. The possibility that ordinary stone-built houses accommodate the burial cairns cannot fully be ruled out, but the scarcity of traces of actual life argues against it. Unlike the two types of cist cairns at the northwestern edge of the basin, they produce neither human skeletal remains nor burial gifts. This means that the Jafr burial tradition marked by the symbolic secondary interment still survived in the core area of the basin. A large number of tabular scrapers and

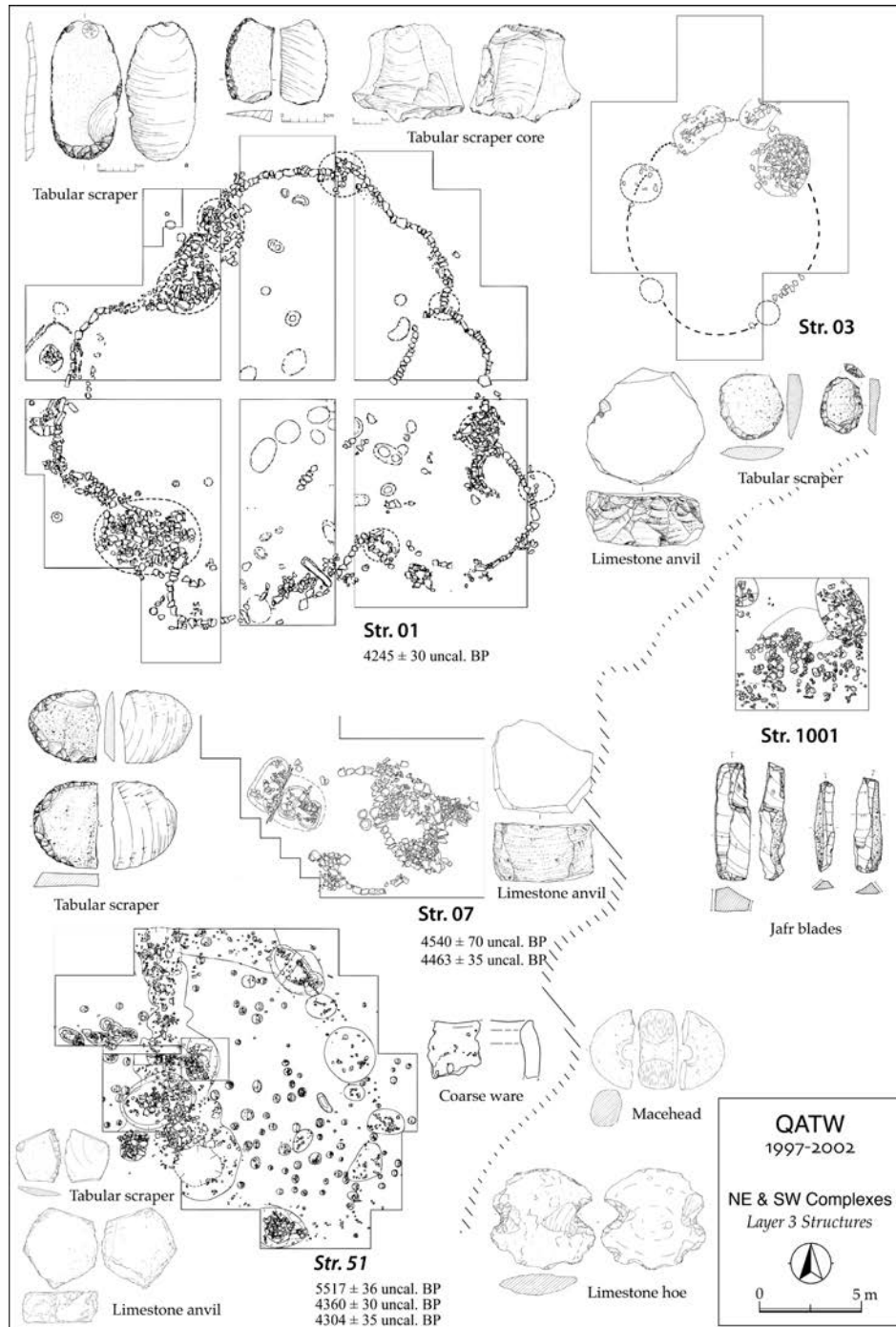


Figure 36. Qa' Abu Tulayha West: circularly connected pseudo-wall burial cairns (Layer 3) (© S. Fujii).

several anvil stones made of limestone occurred in and around the structures (**fig. 37: 4**), but they are probably related to the flint quarries dotted around the site <sup>80</sup> (**fig. 18**). The tabular scrapers often include elongated products with a small, finely faceted striking platform. This type of tabular scrapers are common to the offerings at the Tal'at 'Ubayda cairn field <sup>81</sup>, suggesting a rough synchronism between the two sites.

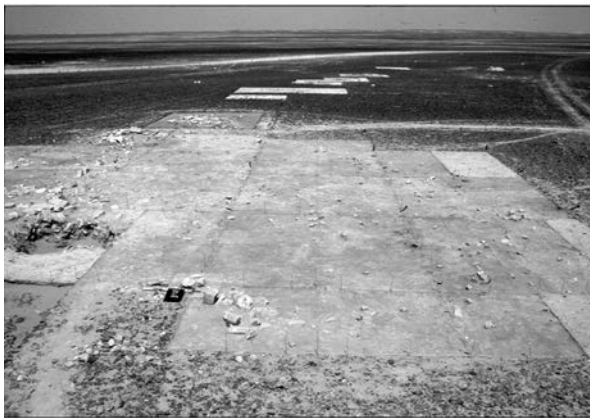
The existence of the circularly connected pseudo-wall cairns means that the Jafr burial tradition still survived even in Phase 4 and coexisted with the cist cairn tradition for a while —a phenomenon that is liable to happen in the case where an exotic culture penetrated for the first time into an area with a deep-rooted tradition. It is noteworthy in this respect that while the alien elements focused largely on the northwestern edge of the basin, the traditional elements survived only in its central part. This contrast is suggestive of the possibility of social compartmentalization in the Phase 4 Jafr Basin.



1. Structure 01(looking E).



2. Structure 07 (looking N).



3. Structure 51 (looking N).



4. Limestone anvils from Structure 07.

Figure 37. Qa' Abu Tulayha West: circularly connected pseudo-wall burial cairns and small finds (Layer 3) (© S. Fujii).

### *Flint quarries and workshops*

Phase 4 witnessed the revitalization of the flint exploitation in the Jafr Basin. To date, the following two distinct industries have been confirmed. One is the tabular scraper industry, which is represented

80. FUJII 2003, p. 210-220.

81. ABE 2008.

by an endless chain of flint quarries and workshops aligning along the northern fringe of the basin<sup>82</sup>. As referred to above, Qa' Abu Tulayha West also includes several quarries and workshops of the lithic industry (**fig. 18**). The existence of 'Lost Property' at Wadi Qusayr 173 also gives us a glimpse of an aspect of the tabular scraper production in the Jafr Basin<sup>83</sup>. There is no doubt that the large-scale flint exploitation in the Phase 4 Jafr Basin was closely linked to the urbanization in the contemporary west<sup>84</sup>.

The other is the Jafr blade industry. Workshops related to the industry have been confirmed at various loci including Structure 1001 of Qa' Abu Tulayha West<sup>85</sup>. Overall, they are much smaller in scale and lower in artifact density than the tabular scraper workshops. Unlike the tabular scraper industry, the Jafr blade industry consistently preferred small cortical flint slabs scattered on the ground surface to larger nodules procured from flint quarries or mines. These contrasts are suggestive of the *ad hoc* nature of the industry.

The relationship between the two flint industries is still unknown. However, in view of the remarkable difference in both flint procurement strategy and production technology, it is most unlikely that the same population was involved in the two distinct flint industries. Instead, it seems more reasonable to assume that two separate groups were engaged in the two distinct flint industries, respectively. The absence of workshops where both industries coexist also supports the perspective. Even when both industries seemingly coexist, they always segregate from each other within a site<sup>86</sup>.

Likewise, nothing definite can be said about the correlation between the two flint industries and the two burial traditions. All we can say is that the one-to-one correspondence between the two seems unlikely. This is first because tabular scrapers occur within the contexts of both burial traditions, and second because Jafr blades rarely accompany them. However, we should note that the flint exploitation in the Jafr Basin appears to have suddenly been revitalized in the wake of the advent of the new burial tradition from the west, and that the episode was accompanied with the technological innovation of the tabular scraper industry<sup>87</sup>. In this sense, we can argue that the expansion of the cist cairn tradition (probably bringing along the new technology of the tabular scraper production) involved the Jafr Basin in the far-reaching socio-cultural reorganization in the whole range of the Levant. Further scrutiny is needed to explore the archaeological implications of the multi-faceted flint industries in Phase 4.

### *Other features*

The post-Neolithic arid peripheries in the southern Levant are marked by the florescence of various small features. The Jafr Basin is no exception to this and includes a huge number of non-descript stone-built features such as corrals, freestanding walls, and small stone concentrations. Some of them, especially corral-like features, produce tabular scrapers and/or Jafr blades and, for this reason, can probably be dated to the Phase 3 or 4. It is understandable that the number of livestock-related facilities rapidly increased in conjunction with the establishment of full-fledged nomadic society. However, the contextual correlation between the surface finds and the structures is often difficult to confirm and requires further verification. It is not an exaggeration to say that the future of the Badia archaeology depends on how to date such ubiquitous, non-descript features related to everyday life of early pastoral nomads.

82. FUJII 2002a, p. 47-48; QUINTERO *et al.* 2002.

83. FUJII 2011a.

84. ABE 2008; FUJII 2011a.

85. FUJII 2002a, p. 34-36.

86. FUJII 2002a.

87. ABE 2008.



## THE JAFR CHRONOLOGY AND THE PROCESS OF PASTORAL NOMADIZATION

The preceding four chapters surveyed the cultural sequence of the Jafr pastoral prehistory and protohistory on the basis of our research outcome. This chapter offers the Jafr chronology as a tentative guideline and discusses the process of pastoral nomadization in the basin (**fig. 38**).

### *The Jafr chronology*

#### *Phase 1 (the Jafr PPNB)*

This phase is equivalent to the PPNB, especially M-LPPNB, in the sedentary cultural sphere to the west. This phase witnessed the beginning of small-scale pastoral transhumance. Evidence comes from the two remote agro-pastoral outposts, Wadi Abu Tulayha and Wadi Ghuwayr 17. Available datasets suggest that both sites were sustained by a mixed economy consisting of short-range pastoral transhumance, hunting of wildlife, and small-scale basin-irrigated agriculture. The two outposts were equipped with a cistern as a major supply source of drinking water and a barrage system as an artificial basin-irrigated cereal field around the remote outposts. The triple set comprising an outpost, a cistern, and a barrage system was the standard equipment of the Jafr Pastoral PPNB.

It appears, however, that the initial penetration into the Jafr Basin did not always proceed smoothly. The investigation results at Wadi Abu Tulayha suggest that the occupational history at the remote outpost was interrupted at the end of the MPPNB for a while and then resumed at the beginning of the LPPNB <sup>88</sup> (**fig. 8**). Similar perspectives have been offered from a few contemporary settlements such as 'Ayn Abu Nukheileh <sup>89</sup> and Beidha <sup>90</sup>, suggesting the possibility that such a minor gap was common to MPPNB settlements in southern Jordan. What is important is that the re-occupation at Wadi Abu Tulayha was associated with the introduction of the basin-irrigation barrage system, a new water-use technology for stabilizing the management of the remote outpost <sup>91</sup>. Viewed in this light, Phase 1 may be divided into Phase 1a (i.e. the latter half of the MPPNB) based on a combination of a beehive-like complex and a cistern, and Phase 1b (i.e. the early half of the LPPNB) sustained by the triple set including a barrage system. The combination of Wadi Ghuwayr 17 (as an outpost equipped with a cistern) and Wadi Ghuwayr 106 (as a barrage system) can probably be dated to the latter stage. There is a possibility that the re-infiltration in Phase 1b had something to do with the *mega-site phenomenon* to the contemporary West <sup>92</sup>.

Current evidence for the burial practice in this phase is limited to the façade-side burial cairn found in Structure G (belonging to Phase 1b) at Wadi Abu Tulayha. The small cairn, constructed along the front wall of the abandoned house, can be regarded as a proto-type of the subsequent burial cairns in the Jafr Basin. The unique settlement form and formation process of the PPNB outposts were also inherited down to the subsequent phase and, coupled with the subsequent forms of the façade-side burial cairn, contributed to the formation of the pseudo-settlement.

#### *Phase 2 (the Jafr PPNC and LN)*

Phase 2 or the Jafr PPNC and LN is still poorly known as with the contemporary West. There is no doubt, however, that the phase witnessed a great change in both social organization and burial practice, as suggested by the sudden replacement of the PPNB triple sets by the two isolated open sanctuaries. This episode is suggestive of the demise of the PPNB pastoral transhumance, on the one hand, and the beginning of PPNC/LN pastoral nomadism, on the other hand.

88. FUJII 2009a, p. 206; FUJII, QUINTERO & WILKE 2011.

89. HENRY *et al.* 2003, p. 26.

90. BYRD 2005, fig. 2.

91. FUJII 2008a, fig. 32; 2010c, p. 23-24.

92. GEBEL 2004; SIMONS 2007, p. 175-197.

In conjunction with the onset of pastoral nomadization, the façade-side burial cairn unique to the PPNB outposts lost its substance and changed into the pseudo-house burial cairn. The process can be traced at the two open sanctuaries, Harrat al-Juhayra and Qa' Abu Tulyha West. Aside from several separate type examples at the initial stage, pseudo-house burial cairns are laterally connected to form an elongated pseudo-settlement, a chronological indicator of this phase. Unlike the PPNB façade-side cairn, they produce no human skeletal remains. Thus the pseudo-house burial cairns and the pseudo-settlement as their laterally connected body can be regarded as a setting for symbolic secondary interment, a unique burial custom common to the high-mobility population. Seeing that no contemporary settlements have been found in the whole range of the Jafr Basin, there is little doubt that initial pastoral nomads were involved in the unique burial practice. Assuming that individual pseudo-house cairns represent a

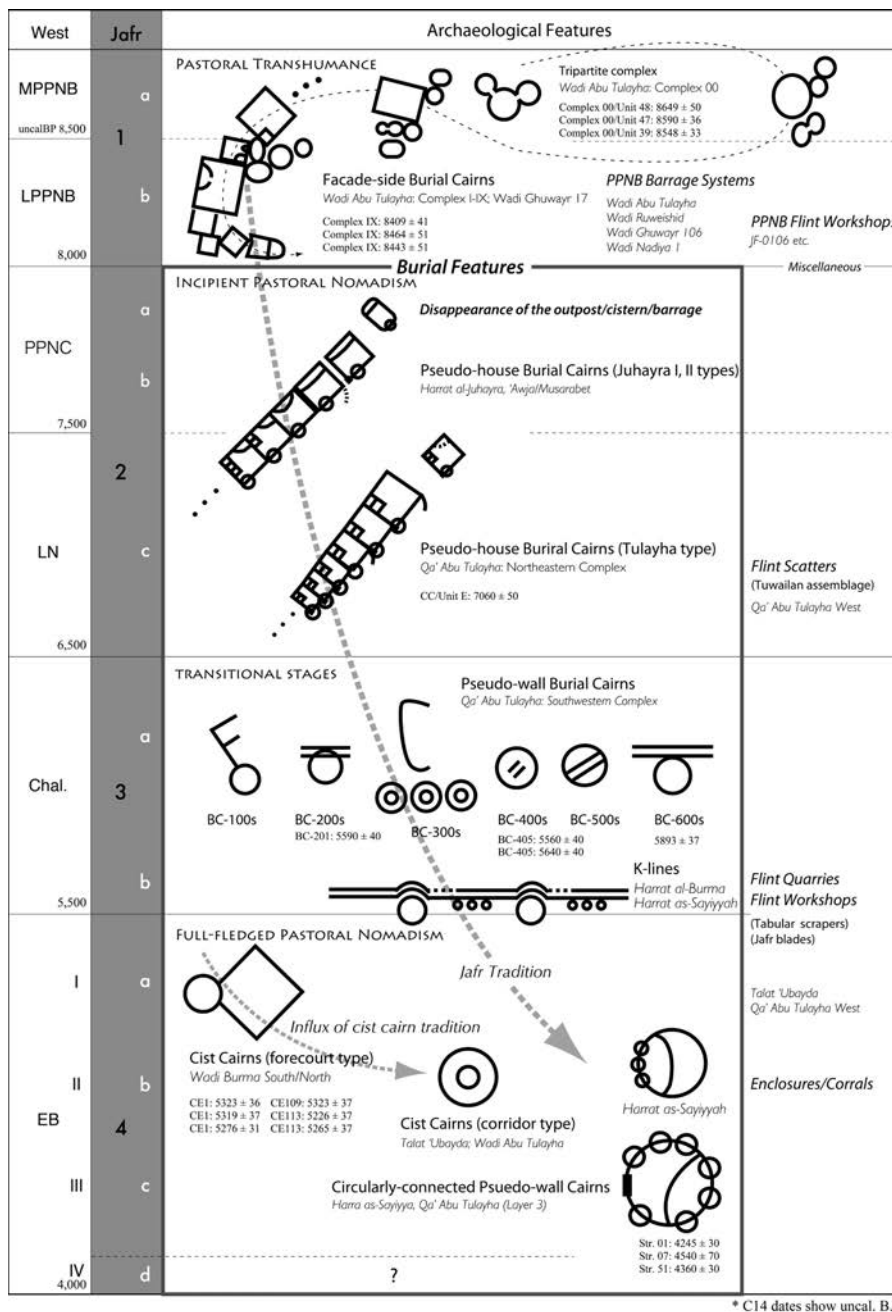


Figure 38. Tentative chronology of the Jafr pastoral prehistory and protohistory (© S. Fujii).

symbolic tomb of successive group leaders, and that every leader remained in his position for an average of a dozen years, it would follow that the two unique cemeteries, as a whole, covered a dozen hundred years - a period roughly equivalent to the time span from the beginning of the PPNC till the end of the Late Neolithic.

The pseudo-house cairn at the two cemeteries falls into the following three types: the Juhayra I, Juhayra II, and Tulayha types. In response to that, Phase 2 can also be divided into the three sub-phases from 2a to 2c in a chronological order. It is our tentative perspective that Phase 2a/2b represented by the Juhayra I and II types of pseudo-house burial cairns covered the whole time range of the PPNC, whereas Phase 2c marked by the Tulayha type of pseudo-house burial cairns corresponded roughly to the Late Neolithic. From this phase onward, burial features became almost the only clue to tracing the very few archaeological footprints of the high-mobility population in the prehistoric and protohistoric Jafr Basin.

#### *Phase 3 (the Jafr Chalcolithic)*

This phase represents a transitional stage toward the full-fledged pastoral nomadism and sees the appearance of the pseudo-wall cairn, a simplified form of the pseudo-house cairn characteristic of Phase 2. The typological transition between the two was sequentially traced at Qa' Abu Tulayha West. The pseudo-wall cairns at the type-site fall into six types from BC-100s to BC-600s, suggesting the possibility of the chronological subdivision of this phase. However, further verification is required to amplify the limited evidence to a general trend. We will restrict ourselves to saying that they collectively represent Phase 3a.

This phase inherited the symbolic secondary interment from the preceding phase. As with the pseudo-house burial cairns, none of the pseudo-wall cairns produce human bones and funerary goods. This probably means that the high-mobility population continued to be involved in the management of the unique cemetery. However, the site shows signs of a significant social reorganization. The series of suggestive phenomena recognized at the final stage of Phase 2a —the demise of the long-inherited collinear development, the sudden increase of the same type of burial cairns, and their locational diversification within the same cemetery— seems to mirror considerable population growth and its consequent intra-group segmentation.

What followed the pseudo-wall burial cairn are the K-lines found at Harrat al-Burma and Harrat as-Sayiyya, although, as noted above, their dating might be subject to minor revision depending on the dating of the eclectic burial features that partly cut the K-line at the latter site. In view of its internal structure, this enigmatic feature can probably be defined as a laterally connected body of pseudo-wall cairns, especially BC-600s attested to at Qa' Abu Tulayha West. It is highly suggestive that the Phase 3 burial cairn eventually reverted to a connected form. This episode corroborates anew the importance of the lateral connection for the Jafr burial tradition. The appearance of the K-line marks the beginning of Phase 3b.

#### *Phase 4 (the Jafr EBA)*

This phase is equivalent to the EBA of the Levantine archaeology, although no clear evidence for the EB IV (or the EB-MB or the MB I in other periodization systems<sup>93</sup>) is yet confirmed in the Jafr Basin. This phase witnessed the advent of the new burial tradition represented by the cist cairn and the appearance of a few large-scale cairn fields such as Wadi Burma and Tal'at 'Ubayda. The latter episode seems to represent the establishment of full-fledged nomadic society in the basin. The concentration of the extensive cairn fields on the northwestern corner of the basin is suggestive of a substantial population influx from the contemporary West including the Negev Highlands and the Lower Jordan Valley. In view of the series of <sup>14</sup>C dates and diagnostic finds, it is likely that the episode took place at the beginning of the EB I.

93. DEVER 1980, 1995.

The cist cairn falls into the forecourt type examples and the corridor type ones. Evidence suggests that the former appeared first and, then, gradually changed into to the latter. The former type can tentatively be assigned to the EB I, and the latter to the EB II/III, respectively. While the forecourt type cist cairn focused on the sand bank cemetery of Wadi Burma and produce fragile and bulky items as funerary goods, the corridor type cist cairn occupied the hilltop sanctuary of Tal'at 'Ubayda and yield durable and more compact products only. This contrast seems to suggest that the farming and pasturing population who introduced the new burial tradition soon leaned towards pastoral nomadism in accordance with local natural environments and possible climatic deterioration. It is suggestive in this regard that in contrast to the forecourt type cist cairn, the corridor type cist cairn expanded its distribution range into the core area of the basin. Considered in this light, we can argue that the pastoral nomadization in the Jafr Basin was accelerated by the new stimulus in the EB I and completed in the course of the far-reaching social reorganization in the EB II/III. The revival of the Jafr burial tradition (taking the form of a circularly-connected form of pseudo-wall cairn) in the EB III may also be understood as another aspect of this general trend.

The above discussion allows us to divide Phase 4 into the following four sub-phases: Phase 4a marked by the advent of the forecourt type cist cairn, Phase 4b represented by the establishment of the corridor type cist cairn, Phase 4c suggested by the revival of the Jafr burial tradition in desert, and Phase 4d yet to be clearly attested to by material evidence. It should be added, however, that the corridor type cist cairn might have still survived in Phase 4c and coexisted with the revived Jafr tradition for a while. Needless to say, the four sub-phases suggested above do not always correspond to the EB I-IV of the Levantine archaeology, respectively. The subdivision still involves many ambiguities and requires further verification.

Phase 4 witnessed the large-scale exploitation of the Jafr Eocene flint resource as well. Evidence comes from the existence of a large number of flint quarries and workshops of tabular scrapers along the northern edge of the basin and the ubiquitous occurrence of Jafr blades. The sudden revitalization of flint production in this phase is probably linked to the urbanization in the contemporary West. It might be said that the advent of the new burial tradition from the West involved the Jafr Basin in the far-reaching socio-cultural reorganization in the Early Bronze Age. Both the coexistence of the two distinct burial traditions and the drastic increase of non-descript small features highlight the social complexity in this phase.

#### *Phase 5 (the Jafr MBA)*

This phase (and the subsequent the Jafr LBA) are yet to be clearly attested to in the Jafr Basin. The same is roughly true with surrounding dry lands, suggesting that southern Jordan had a long chronological gap from Phase 3d onward till the beginning of the Iron Age II. This is strange when we consider that a large number of MBA cist cairns have been found in the central Negev Highlands<sup>94</sup> and central Syria<sup>95</sup>, for example. Further investigation is required to ascertain the authenticity of the current information gap.

#### *Process of the Jafr pastoral nomadization*

The Jafr chronology provides a tentative framework for discussing the process of pastoral nomadization in the basin. Our main concern consists in the following two aspects: the origin of pastoral nomadism and its subsequent development. As for the first issue, we can narrow down the focus of our discussion to the process of the departure from the PPNB pastoral transhumance. This new perspective based on the Jafr chronology considers a sort of pre-adaptation by initial pastoral transhumants and,

94. COHEN 1992, 1999.

95. FUJII & ADACHI 2010; AL-MAQDISSI *et al.* 2008; MESNIL DU BUISSON 1948; KEPINSKI 2010. In addition, some of supposed EBA cairns identified in Central Syria (e.g. RUSSET 2011) may also be dated to the MBA.

in this sense, differs from previous models that assume either the cultural transformation of sedentary farming communities<sup>96</sup> or the cultural reception by marginal hunter-gatherers<sup>97</sup>. The Jafr chronology provides a valuable key to the second issue as well. The typological sequence of various burial features makes it possible to get a glimpse into the dynamics of the post-Neolithic nomadic society.

#### *Origin of the Jafr pastoral nomadism*

The M-LPPNB agro-pastoral outpost of Wadi Abu Tulayha provides valuable insight into the issue. The first key is the difference in contents between the lower and the upper fill layers of the cistern, one of the triple set. While the lower fill layers contain fluvial and aeolian silty sand deposits and fallen stones only, the upper fill layers include, in addition to them, a few hearths and querns found *in situ* beside the hearths (**fig. 39**). As discussed elsewhere in some details<sup>98</sup>, this contrast means that the cistern was reused as a temporary encampment some time after it came into disuse. The question is the timing of the functional shift, which is suggested by the two <sup>14</sup>C dates (8365±35, 8355±39 uncal. BP) from the middle fill layers, the turning point between the two situations. Both dates are merely *ca.* 50-100 years later than those of Complex IX or the final component of the neighboring outpost (8409±41, 8464±51, 8443±51 uncal. BP; **fig. 8, 38**). Assuming that the short time lag between the two represents the time span required for the sedimentation of the lower fill layers in the cistern, it would follow that both the cistern and the outpost were abandoned nearly simultaneously — a likely assumption when we consider close ties between the two. What, then, brought about the functional shift of the cistern? Suggestive in this regard is the climatic deterioration eventually culminating in the 8.2 ka event. It is highly likely that the large-scale aridification, even if its initial sign, led to the gradual reduction in pondage of the cistern and the destabilization or even marked decline of agricultural production within the basin-irrigation barrage. Both of these crises probably resulted in the eventual abandonment of the neighboring outpost (**fig. 40**). The question is the origin of those who left their temporary footprints in the dysfunctional cistern. They may be defined as initial pastoral nomads in the Jafr Basin in the sense that they abandoned the maintenance of the fixed outpost and, instead, repeatedly encamped at the disused, half-buried cistern. The existence of the cistern dwellers at the abandoned outpost provides a glimpse into the departure process from the Jafr PPNB pastoral transhumance.

The second key is the dramatic replacement of the PPNB triple sets by the PPNC/LN pseudo-settlements. As repeatedly noted, the Jafr Pastoral PPNB was sustained by an outpost as living space, a cistern as a major supply source of drinking water, and a basin-irrigation barrage system as an enclave cereal field. All of these were social infrastructures essential to the maintenance of the Jafr PPNB agro-pastoral transhumance. Thus the replacement of the triple set by the isolated open sanctuaries can be taken as a reflection of the appearance of the higher-mobility population or, stated differently, the shift in lifestyle from the pastoral transhumance to the initial pastoral nomadism. If this is the case, we shall be allowed to use the aforementioned substitution process to trace the departure process from the PPNB pastoral transhumance, namely, the initial process of pastoral nomadization in the Jafr Basin. What is important here is that the three sites (i.e. the PPNB outpost of Wadi Abu Tulayha, the PPNC open sanctuary of Harrat al-Juhayra, and the LN open sanctuary of Qa' Abu Tulayha) show gradual transition in terms of site form and structure typology as well as burial practice (**fig. 41**). This genealogical relationship strongly suggests that the PPNB pastoral transhumants shifted directly into the PPNC/LN pastoral nomads probably with the cistern dwellers being intervened in between. By focusing on this gradual transition, we are able to trace the initial process of the Jafr pastoral nomadization in more detail than dichotomic comparisons between sedentary farmers and supposed marginal hunter-gatherers<sup>99</sup>.

96. BYRD 1992; KÖLLER-ROLLEFSON 1989, 1992; ROLLEFSON & KÖLLER-ROLLEFSON 1989, 1993; QUINTERO *et al.* 2004.

97. GARRARD *et al.* 1996; MARTIN 1999.

98. FUJII n.d.a.

99. FUJII 2009d.

What, then, triggered the pastoral nomadization in the Jafr Basin? We mentioned the possible impact of the climatic deterioration on the pondage of the cistern and the productivity of the basin-irrigated agricultural barrage at Wadi Abu Tulayha. Another thing we can say is that the barrage-backed Jafr PPNB pastoral transhumance was essentially non-sustainable. This is because the basin-irrigated agriculture around the remote outpost would inevitably cause salt damage and, for this reason, exhaust one after another the already limited suitable construction sites for a basin-irrigation barrage. As a matter of fact, any barrage system known to date in the Jafr Basin comprises not more than a few barrages. This fact suggests that it periodically relocated elsewhere. Understandably, the nearby outpost as an operating body of the barrage system must also have been forced to relocate in a relatively short period, as suggested by the interrupted or limited occupational history of Wadi Abu Tulayha and Wadi Ghuwayr 17. Considered in this light, we can argue that the barrage-backed Jafr Pastoral PPNB involved the potential momentum

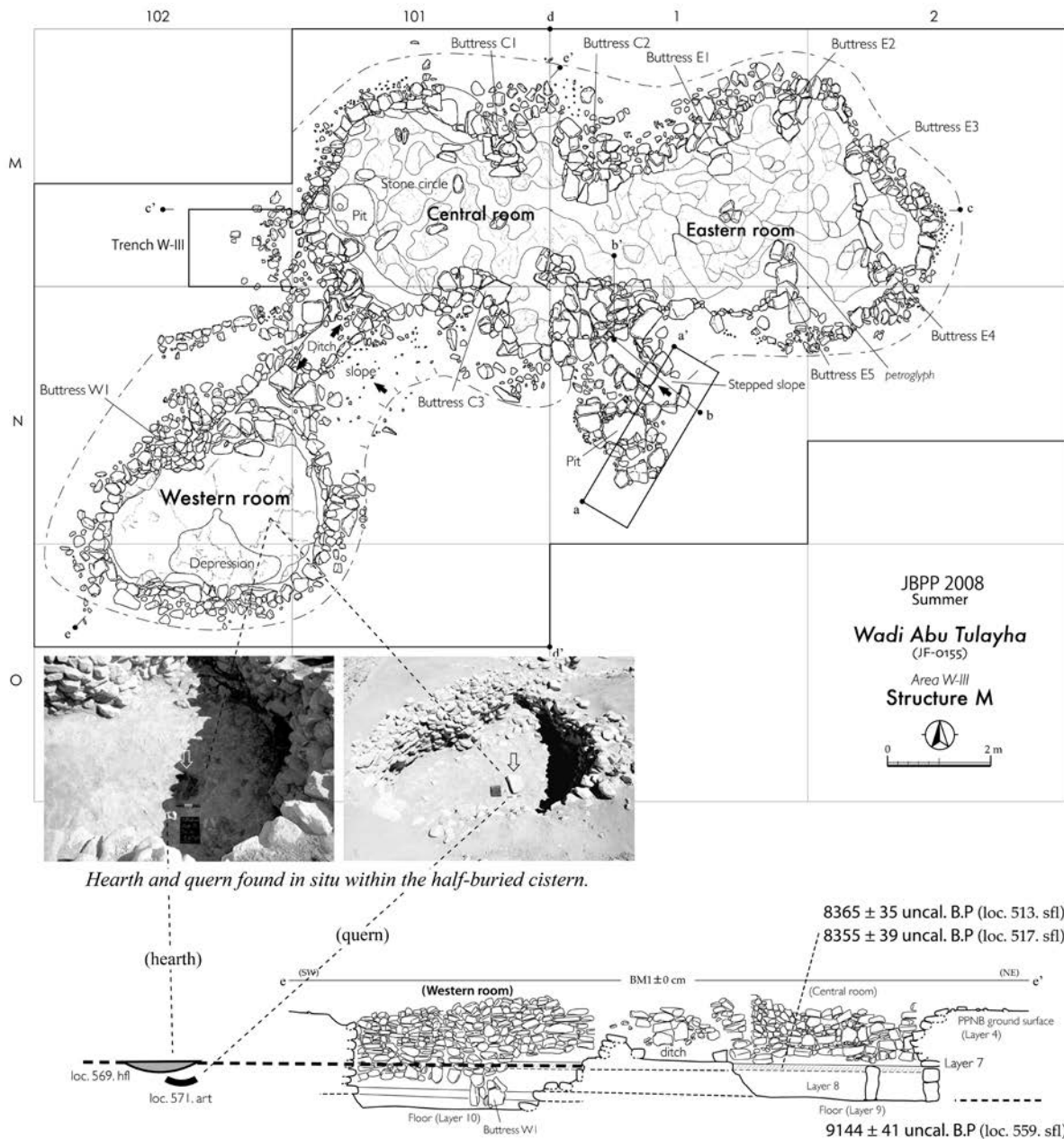


Figure 39. Reuse history of the cistern at Wadi Abu Tulayha (© S. Fujii).

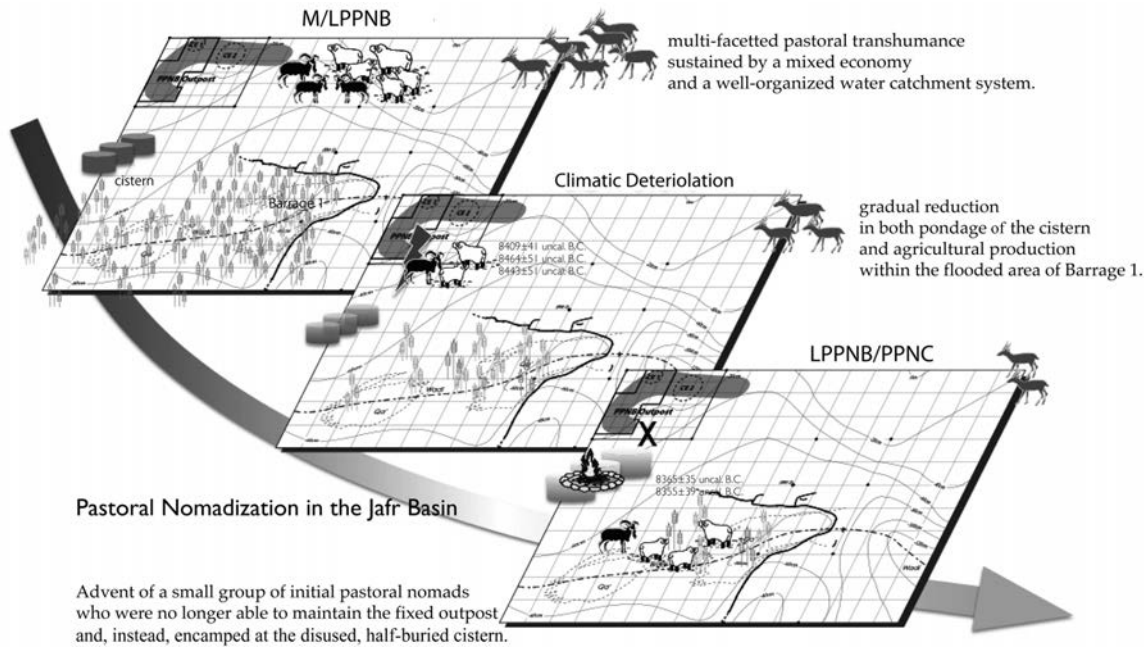


Figure 40. Schematic figure of the initial process of pastoral nomadization in the Jafr Basin (© S. Fujii).

<b>Wadi Abu Tulayha</b> <i>M/LPPNB Outpost</i>	<b>Harrat al-Juhayra</b> <i>PPNC Pseudo-settlement</i>	<b>Qa' Abu Tulayha West</b> <i>LN Pseudo-settlement</i>
<b>Settlement form</b> 		
<b>Burial practice</b> 	<b>cistern dwellers</b> 	

Figure 41. Comparisons of settlement form, structure typology, and burial practice between the outpost and the two pseudo-settlements (© S. Fujii).

toward pastoral nomadization from the very beginning. The climatic deterioration toward the end of the PPNB, if any, merely exposed this particular potential.

*Subsequent development of the Jafr pastoral nomadism*

Our second concern is the subsequent development of the pastoral nomadism thus initiated. Two indices, namely, the distribution range and density of burial features in each phase, provide some insight into the issue (fig. 42, 43). We should note that Phase 2 (i.e. the Jafr PPNC/LN) and Phase 3 (i.e. the Jafr Chalcolithic) witnessed a remarkable decline in both indices. This is partly due to the inferior archaeological visibility of the burial cairns in the two phases, but more essentially due to the limited carrying capacity at the initial stages of pastoral nomadism. The sudden rise in the indices during Phase 4 or the Jafr Early Bronze Age is all the more noticeable. This phenomenon probably mirrors the establishment of full-fledged nomadic society accelerated by the cultural influx including the new burial tradition.

Another key to tracing the pastoral nomadization in the basin is the series of suggestive phenomena recognized at the open sanctuary of Qa' Abu Tulayha West, which sheds new light on the social dynamics in the transitional phase (i.e. Phase 3 or the Jafr Chalcolithic). The above review pointed out that the long-inherited lateral connection of homogenous burial cairns terminated at BC-100s, and that the again traditional collinear development of burial features began to show strange symptoms at BC-300s and eventually collapsed at BC-500s and BC-600s (fig. 18, 22). Assuming that every burial feature represents a symbolic secondary interment of successive group leaders, we shall be allowed to understand the two

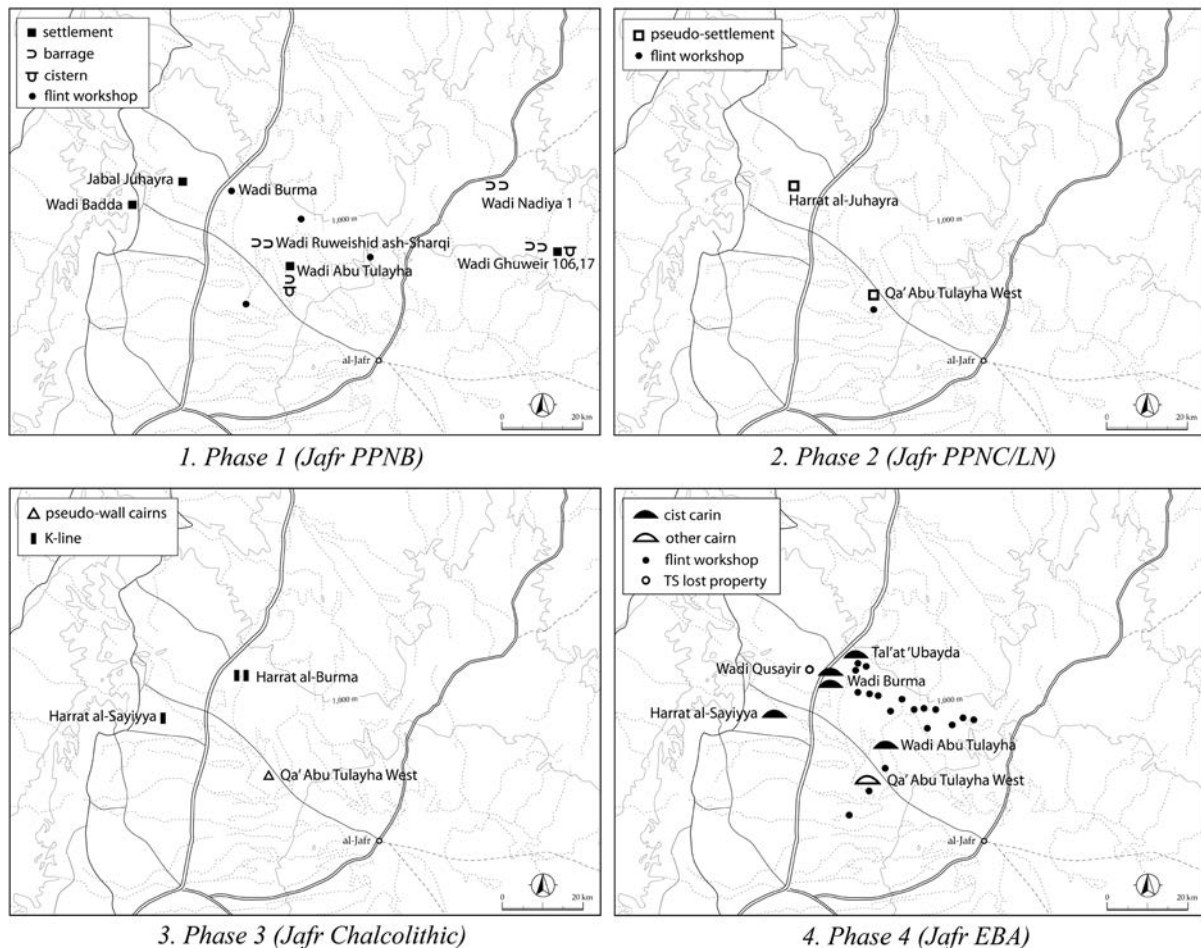


Figure 42. Site distribution maps in Phase 1-4 (© S. Fujii).



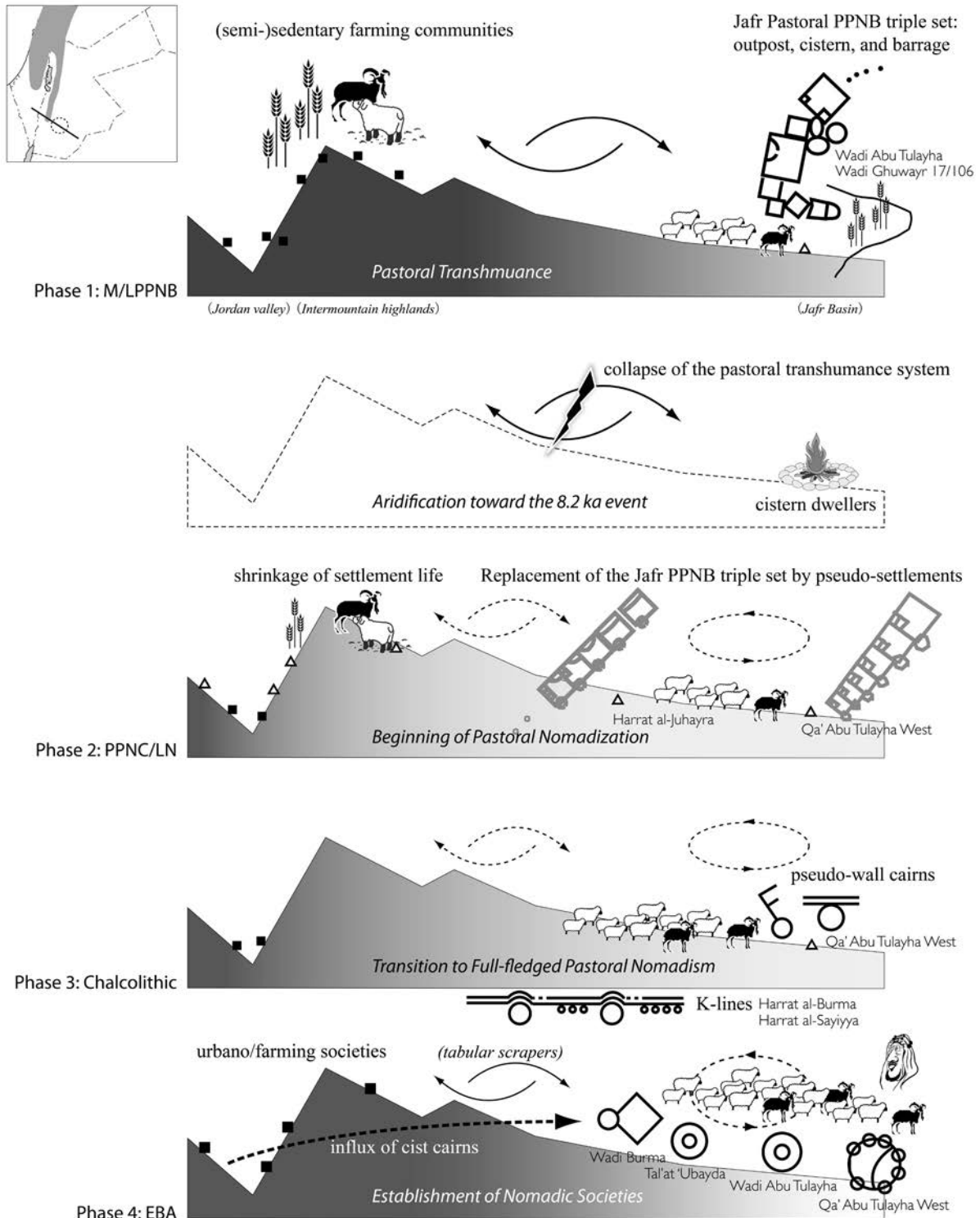


Figure 43. Schematic figure of the process of pastoral nomadization in the Jafr Basin (© S. Fujii).

phenomena as manifestations of the decline or transformation of the traditional ritual for taking over the chiefdom. Closely related to this is the sudden increase in number of the same type of burial cairns (BC-500s and -600s in this case) and the locational dispersion at the southern edge of the site. This episode is suggestive of a substantial population growth and its consequent increase in buried leaders<sup>100</sup>. It is our present interpretation that the three mutually-connected phenomena — the termination of the lateral connection and collinear development of burial cairns, the sudden increase in number of the same type of burial cairns, and the locational dispersion of burial cairns within the same symbolic cemetery or open sanctuary — resulted from the expansion of group size and its consequent intra-group segmentation in the course of pastoral nomadization. Both episodes, if really existed, must have been inseparably linked to the establishment of a tribal system.

What followed these foreshadowing phenomena were the advent of the new funerary tradition and the appearance of the large-scale cairn fields at the northwestern corner of the basin. Both of these were further followed by the shift in typology from the forecourt type cist cairns to the corridor type ones, the replacement of burial gifts from bulky and fragile products to portable and durable items, and the expansion of the corridor type cist cairns (more clearly oriented to pastoral nomadism) into the core area of the Jafr Basin. All of these seem to highlight the development of pastoral nomadism in the EBA arid margin.

Other trends of Phase 4 includes the revival of the Jafr burial tradition, the large-scale exploitation of Jafr Eocene flint, and the sudden rise in number of non-descript small features. These episodes also strongly suggest that the pastoral nomadism in the Jafr Basin was established in Phase 4, especially its later half. Considered in this light, we can argue that the far-reaching socio-cultural reorganization in the EBA southern Levant proceeded taking the form of urbanization in the west and further acceleration of pastoral nomadization in the arid peripheries, respectively. The Jafr chronology enables us to trace an aspect of the process on the basis of specific evidence.

### THE JAFR CHRONOLOGY IN A BROADER CONTEXT

This chapter briefly tests the versatility of the Jafr chronology in a broader context (**fig. 44**). Understandably, our discussion focuses on the *Badia* world. Aside from the intermountain highlands in southern Jordan, no special comment is made of sedentary cultural spheres under the Mediterranean climatic regime. Sporadic evidence referred to below suggests that the Jafr chronology, though still tentative in nature, has the potential to innovate a comprehensive framework for the integration of the Levantine *Badia* archaeology separated into several areas.

#### *Central Syria*

Contrary to what one might think, the closest correlation with the Jafr chronology can be found in the northwestern piedmont of Mt. Bishri in central Syria. In addition to a Kihiamian encampment and a few PPNB flint workshops<sup>101</sup>, our previous investigations have confirmed a pseudo-settlement (**fig. 45: 1**), a few cairn fields containing pseudo-wall burial cairns (**fig. 45: 2**), and a K-line-like feature *ca.* 450 m in total length<sup>102</sup> (**fig. 45: 3**).

The pseudo-settlement at Fakat Bidewy 1 bears some resemblance to the Jafr examples and can probably be dated to a parallel horizon to Phase 2, especially Phase 2c, of the Jafr chronology. The occurrence of flake-oriented flint assemblage also supports the tentative dating. The Bishri pseudo-settlement is marked by the tripartite layout, which probably derived from normal structures at

100. FUJII 2009c.

101. FUJII *et al.* 2011a; FUJII n.d.b.

102. FUJII, ADACHI & YAMAFUJII 2013.

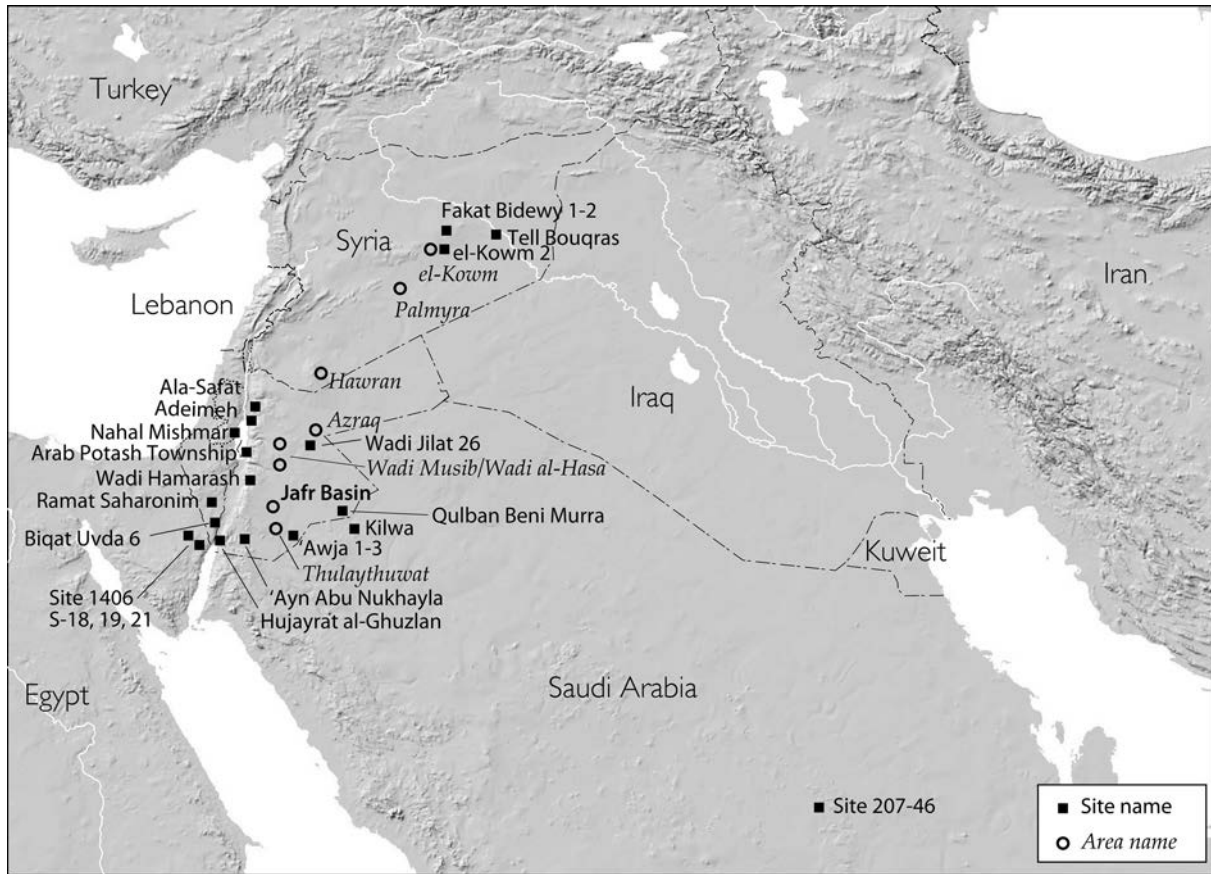


Figure 44. Sites and areas related to the Jafr chronology (© S. Fujii).

neighboring PPNB settlements such as Tell Bouqras<sup>103</sup> and el-Kowm 2<sup>104</sup>. This means that the pastoral nomadization in central Syria proceeded hand-in-hand with the Jafr Basin in a broader perspective, yet within a local context in its details. The same applies to the pseudo-wall cairn at Fakat Bidwey 2, which resembles BC-600s of the Phase 3a cemetery at Qa' Abu Tulayha West but differs in minor technology from them. Likewise, the unique feature at Jabal Gara can tentatively be dated to Phase 3b of the Jafr chronology, although the recent discovery of the “*très long mur*” in central Syria might require a reconsideration of the chrono-functional identification of the unique feature<sup>105</sup>. Anyhow, it is now evident that the general scheme of the Jafr chronology is applicable to the northern edge of Badiat ash-Sham as well.

### *Southernmost Jordan*

Another promising candidate is the al-'Awja area in southernmost Jordan, which is located below the escarpment fringing the southern edge of the Jafr Basin, abutting the Saudi border. Our recent investigation has confirmed a separate type pseudo-house cairn at 'Awja 2 (fig. 46: 2), a typical pseudo-settlement at 'Awja 1 (fig. 46: 1), and a few pseudo-wall cairns at 'Awja 3<sup>106</sup> (fig. 46: 3).

103. AKKERMANS *et al.* 1981, 1983.

104. STORDEUR 2000.

105. GEYER *et al.* 2010; LAFONT 2010.

106. FUJII, YAMAFUJI & NAGAYA n.d.

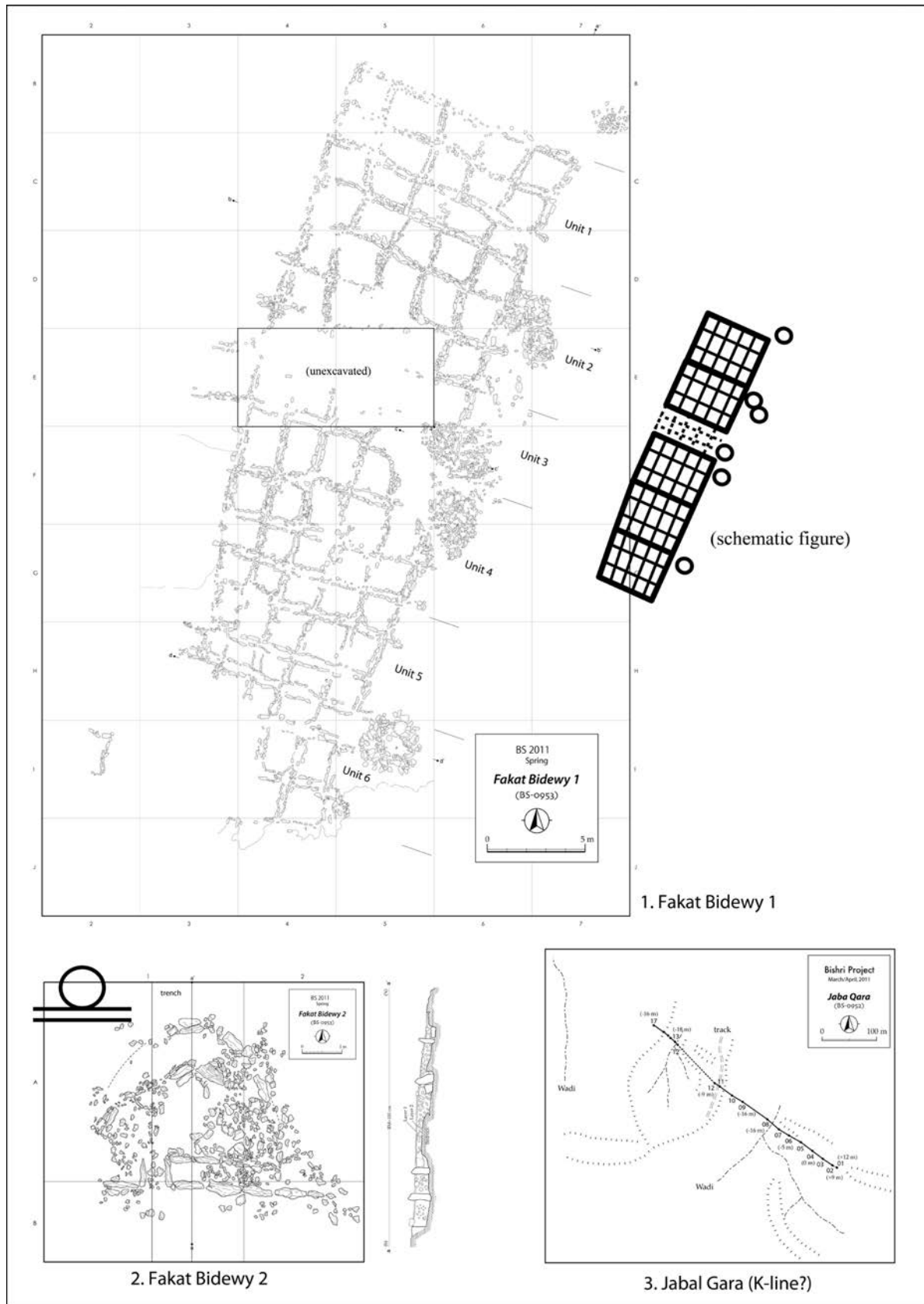


Figure 45. Pseudo-settlement, pseudo-wall burial cairn, and K-line-like feature in the northwestern piedmont of Mt. Bishri, central Syria (© S. Fujii).

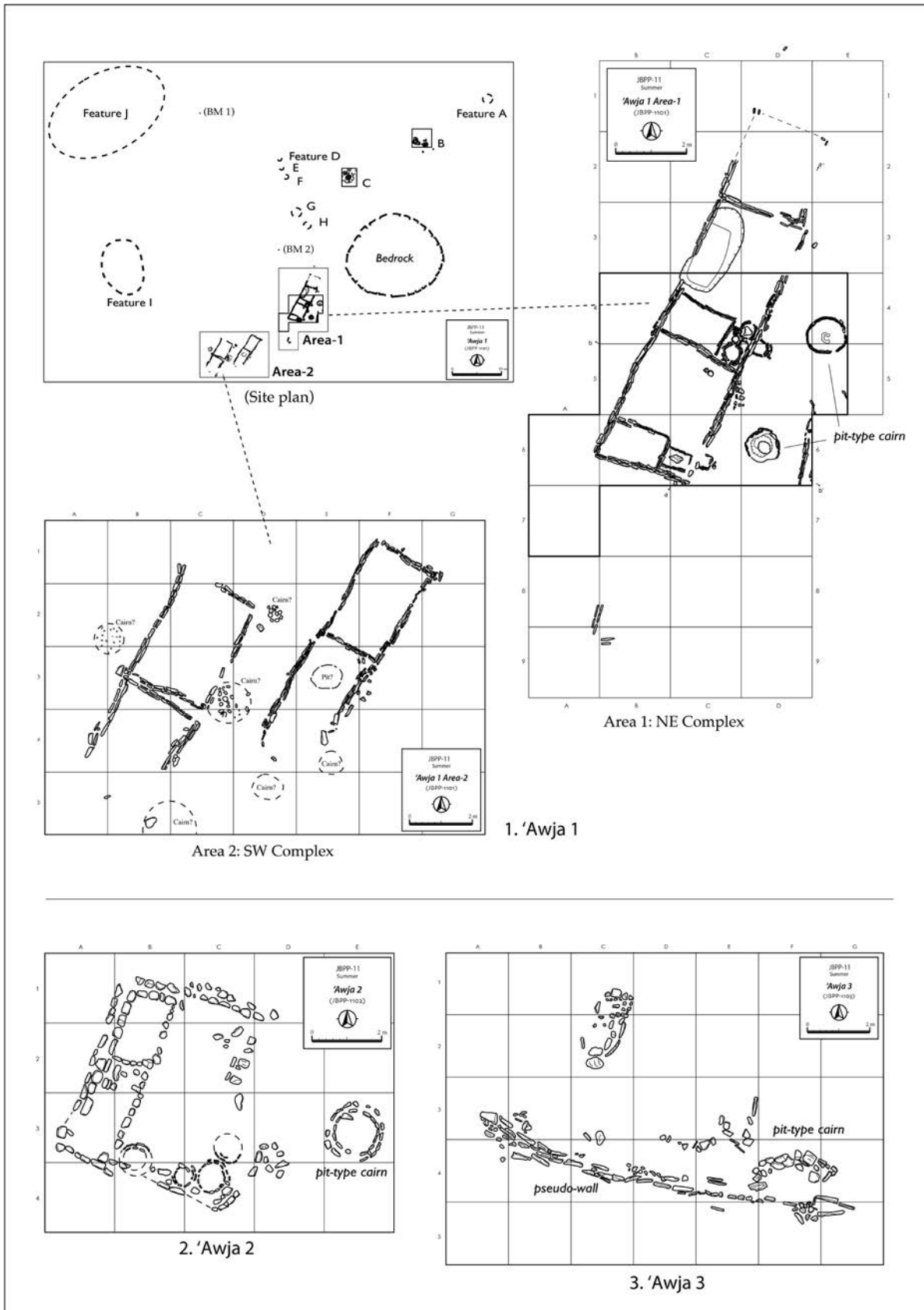


Figure 46. Pseudo-settlement and pseudo-wall burial cairns in the al-'Awja area, southernmost Jordan (© S. Fujii).

The first example resembles the proto-Juhayra I type of pseudo-house cairn (**fig. 16**) and, for this reason, can probably be dated to the Phase 2a or the Jafr PPNC. The second example, on the other hand, has much in common with the pseudo-settlement of Qa' Abu Tulayha West and can be assigned to Phase 2b or the Jafr LN. Of particular interest is the Southwestern Complex, which might possibly represent a proto-type of LN open sanctuaries in the Negev and the Sinai referred to below. Likewise, the third examples are comparable with BC-600s of Qa' Abu Tulayha West (**fig. 22**), thus being placed to Phase 3a or the early half of the Jafr Chalcolithic. These examples illustrate that the pastoral nomadization in southernmost Jordan is traceable within the framework of the Jafr chronology. It should be added, however, that here again, some local traits — the parallel (instead of linear) arrangement of the pseudo-settlements, the incorporation of a few small circular features into the indoor space of a pseudo-house, and the application of the two-rowed upright slab wall technique to a burial cairn, for example— are mixed with the Jafr original tradition.

The al-Thulaythuwat area some 30 km west of the al-'Awja is investigated by a Jordanian team. Although no clear evidence for the pseudo-settlement and the pseudo-wall burial cairns have been found, recent surveys have located various Chal/EB burial features. Some of them, especially a few large-scale features associated with a lozenge-shaped forecourt and a cairn-like stone concentration, are similar to the Jafr examples<sup>107</sup>, suggesting that the Jafr chronology is applicable to the area as well.

### *The Negev and Sinai*

The Negev Highlands also show a certain degree of correlation with the Jafr chronology. Among others, the twin structures found at the open sanctuary of Ramat Saharonim in the central Negev<sup>108</sup> resemble the Southwestern complex at 'Awja 1 in terms of both technology and typology and, therefore, may be regarded as a later form of the pseudo-settlement. They produced a few <sup>14</sup>C data to suggest a LN date, which accords well with the Jafr chronology. Although no clear evidence for pseudo-wall burial cairns has been reported, the existence of a 45 degrees rotated forecourt type feature at Biqat Uvda 6<sup>109</sup> and a K-line at Har Romem<sup>110</sup> exemplifies that the pastoral nomadization in the area proceeded synchronically with the Jafr Basin. As suggested above, the former can be taken as a prototype of the forecourt type cist cairn that marks Phase 3a of the Jafr chronology. The latter represents an aspect of the K-line culture tentatively assigned to Phase 3b or a little later.

Understandably, the Sinai Peninsula has also some correlation with the Jafr chronology. Of particular significance are the unique structural complexes found at a few open sanctuaries in the northeastern Sinai<sup>111</sup>. They resemble the later form of the pseudo-settlement at Ramat Saharonim and the Southwestern Complex of 'Awja 1, and are dated, on the basis of two <sup>14</sup>C data and comparative studies, again to the LN<sup>112</sup>. Similar structures have been found at Site 1406 in the same area as well<sup>113</sup>. It would follow that the Jafr Phase 2, especially Phase 2b, pseudo-settlement culture covered an extensive territory ranging from the Mt. Bishri to the Negev and Sinai. It appears, however, that unlike the Negev Highlands, the chronological correlation between the Sinai and the Jafr did not last long. With the exception of ubiquitous tabular scraper workshops and non-descript small features, no clear evidence to suggest it has been confirmed in the subsequent phases. Incidentally, the Sinai and the Azraq are known for kite sites<sup>114</sup>, but the Jafr lying between the two has no examples for some reason.

107. ABU-AZIZEH 2011a, 2011b, and in this volume.

108. ROSEN *et al.* 2007.

109. YOGEV 1983; AVNER 1984; GORING-MORRIS 1993.

110. EVERNARI *et al.* 1958; GLUECK 1958, 1959; HAIMAN 2000.

111. EDDY & WENDORF 1999, fig. 11-5, 3-34, 3-42.

112. EDDY & WENDORF 1999, p. 72, 192.

113. BEIT-ARIEH 2003, p. 430.

114. BAR-OZ *et al.* 2009; HOLZER *et al.* 2010; MESHEL 1974, 2000; PEREVOLOTSKY & BAHARAV 1991.

### *Lower Jordan Valley*

Though poorly investigated, the Lower Jordan Valley sandwiched between the Negev and the Jafr also offers a few lines of material evidence for the chronological correlation. The recently excavated PPNB settlement of Wadi Hamarash-Suwayf, for example, produces diagnostic artifacts such as limestone game boards, standard equipment of the Jafr agro-pastoral outposts<sup>115</sup>. However, it may be more correct to say that both areas are indirectly linked with the Petra intermountain highlands being intervened as a core in between. Of further significance are large enclosures found at several sanctuary sites such as Nahal Mishmar<sup>116</sup>, Adeimeh<sup>117</sup>, Ala-Safat<sup>118</sup>, and the Arab Potash Township site near Bab edh-Dhra<sup>119</sup>. These sites have been discussed exclusively within the context of the unique cult of the Ghassulian culture<sup>120</sup>. However, in view of the existence of small cairns along the peripheral wall and a partition-like wall across the central floor, they could be taken as a proto-type of the Phase 4 burial features at Qa' Abu Tulayha West.

The Aqaba area, the southern edge of the Lower Jordan Valley, also provides patchy evidence to suggest some contact with the Jafr sites. The small MPPNB settlement of 'Ayn Abu Nukhayla produced diagnostic basin querns<sup>121</sup>, which have many parallel examples at the Jafr outposts<sup>122</sup>. The occurrence of shell and snail beads at Wadi Abu Tulayha also hints at a close tie between the two areas<sup>123</sup>. No less important are the cist cairns excavated on the wadi bed beside the EB I village of Hujayrat al-Ghuzlan<sup>124</sup>. They resemble the Wadi Burma forecourt type cist cairns in many aspects, indicating that the eastward cultural expansion at the beginning of Phase 4 involved the area as well as the contemporary Jafr Basin.

### *Southern Syria and Northern/Central Jordan*

When turning our eyes to the north again, we notice that there is little evidence for the correlation with the Jafr chronology in the intermediate drylands between Mt. Bishri and the Jafr Basin. To date, neither pseudo-settlements nor pseudo-wall cairns have been reported from the el-Kowm Basin<sup>125</sup>, the Palmyra Basin<sup>126</sup>, the Middle Euphrates River Basin<sup>127</sup>, the Hawran area<sup>128</sup>, the Azraq Basin<sup>129</sup>, and the upper drainage basins of Wadi al-Musib and Wadi al-Hasa<sup>130</sup>. It is strange that even the southern flank of Mt. Bishri has not yet produced related evidence<sup>131</sup>. Instead, most of these areas are characterized by PPNB

115. SAMPSON 2010a, 2010b.  
 116. BAR-ADON 1980, p. 12-13.  
 117. STEKELIS 1935, fig. 15; WORSCHER 2002, abb. 16.  
 118. STEKELIS 1961, fig. 4, 8.  
 119. MCCREERY 1977/78, fig. 3; CLARK 1979, fig. 10.  
 120. ELLIOTT 1977, 1978; BOURKE 2002.  
 121. HENRY *et al.* 2003, fig. 13.  
 122. FUJII 2007a, fig. 29: 1-7; 2008a, fig. 29: 1-6; 2009a, fig. 17: 3.  
 123. FUJII 2006a, fig. 21; 2007a, fig. 34; 2008a, fig. 31; 2009a, fig. 20.  
 124. BRÜCKNER *et al.* 2002; KHALIL *et al.* 2003; KHALIL & SCHMIDT 2009.  
 125. CAUVIN 1981, 1994; DORNEMANN 1986; STORDEUR 1993, 2000.  
 126. AKAZAWA 1979; AKAZAWA & SAKAGUCHI 1987; AL-MAQDISSI *et al.* 2008; ANFINSET 2009; ANFINSET & MEYER 2010; NISHIAKI 1998.  
 127. MESNIL DU BUISSON 1948; FUJII & ADACHI 2008; KEPINSKI 2010.  
 128. BETTS 1991; BETTS & TARAWNEH 2010; BRAEMER *et al.* 2004, 2010; HELMS 1981; STORDEUR *et al.* 2010.  
 129. BETTS 1988, 1991, 1993, 1998a, 1998b; GARRARD 1998; GARRARD & STANLEY 1975; GARRARD *et al.* 1988; ROLLEFSON in this volume; ROLLEFSON *et al.* 2011.  
 130. CORDOVA *et al.* 2005; MACDONALD 1988; MACDONALD *et al.* 2000.  
 131. LÖNNQVIST 2006, 2008, 2011.

settlements and flint scatters<sup>132</sup>, PPNB/LN kite sites<sup>133</sup> and burin sites<sup>134</sup>, LN encampments<sup>135</sup>, Late Chal/EB Nawamis<sup>136</sup>, and MB cist cairn tombs<sup>137</sup>, all of which (except for the first) are alien to the Jafr chronology. This contrast means that overall, the Jafr pastoral prehistory and protohistory was oriented to the south rather than the north, although the existence of clear evidence in the northwestern piedmont of Mt. Bishri suggests the possibility that similar features still remain buried in the intermediate arid lands. Aside from ubiquitous enclosures and non-descript small features, the few exceptions to this are flint quarries and workshops for the tabular scraper production<sup>138</sup>, which are understood as a universal phenomenon that involved the whole range of the Phase 3/4 Levantine Badia. In addition, the PPNB settlement of Jilat 26<sup>139</sup> in the Azraq basin bears some resemblance to Wadi Abu Tulayha in terms of its unique settlement form.

### *Eastern Jordan and Northern Arabia*

Little is known about the situation in the eastern Jordan (beyond the Jafr Basin) and the northern Arabia due to the scarcity of full-fledged investigations. It is suggested that the south Levantine Neolithic including the Jafr Pastoral PPNB has something to do with the Neolithization in the Arabian Peninsula<sup>140</sup>, but no specific evidence has been identified yet. The few exceptions to this are Kilwa<sup>141</sup> near the Jordan border and Site 207-46 in the suburb of Riyadh<sup>142</sup>. The former site might possibly represent the southeastern frontier of the Jafr Pastoral PPNB. The latter, on the other hand, contains a unique feature similar to BC-100s of Qa' Abu Tulayha West and may be dated to Phase 3a or the early half of the Jafr Chalcolithic. In addition, tabular scraper flint quarries and workshops dotted in the area can also be understood within the framework of the Jafr chronology<sup>143</sup>. In contrast to these is Qulban Beni Murra, a Late Chal/EBA funerary site recently excavated at the head of Wadi as-Sahab al-Abyad<sup>144</sup>. The emphasis on upright boulders at the site seems to indicate that the post-Neolithic east Jordanian Badia belonged to the cultural sphere of the Arabian Peninsula rather than the southern Levant<sup>145</sup>. Further investigation is required to understand the archaeological potential of the areas.

### *Intermountain Highlands in Southwestern Jordan*

The last yet significant target for comparison is the intermountain highlands in southwestern Jordan including the Petra area. It is the only well-watered area among those abutting on the Jafr Basin and, for this reason, expected to show consistent correlation with the Jafr chronology throughout the four phases. This is not the case, however. Clear evidence to suggest mutual contact is limited to Phase 1. Limestone game boards and flint bowlets<sup>146</sup>, for instance, are shared between the two adjacent areas, corroborating

132. GARRARD *et al.* 1994; STORDEUR 1993, 2000; ZARINS 1989.

133. BETTS 1987; BETTS & YAGODIN 2000; MORANDI BONACOSI & IAMONI 2012; DUSSAUD 1929; ECHALLIER & BRAEMER 1995; HELMS & BETTS 1987; MAITLAND 1927; POIDEBARD 1928; REES 1924; VAN BERG *et al.* 2004.

134. BETTS 1982, 1983, 1984, 1985; BETTS *et al.* 1990; FINLAYSON & BETTS 1990; FUJII *et al.* 1987; GARRARD *et al.* 1987; NISHIAKI & FUJII 1986; ROLLEFSON 1982.

135. ROLLEFSON in this volume; ROLLEFSON *et al.* 2011.

136. ROWAN *et al.* 2011; ROLLEFSON in this volume.

137. MESNIL DU BUISSON 1948; FUJII & ADACHI 2010; KEPINSKI 2010.

138. MÜLLER-NEUHOF 2006.

139. GARRARD *et al.* 1994, fig. 3.

140. DRECHSLER 2009; UERPMANN *et al.* 2009.

141. ROTHERT 1938.

142. ZARINS 1998a, fig. 14. 10b; ZARINS *et al.* 1982, pl. 39A.

143. QUINTERO *et al.* 2002; TARAWNEH 2007; WASSE & ROLLEFSON 2005; WILKE *et al.* 2007.

144. GEBEL 2010a; MAHASNEH & GEBEL 2008, 2009.

145. ZARINS 1979; ZARINS *et al.* 1980, 1981.

146. FUJII 2009b.



that the Jafr pastoral transhumance derived from farming communities to the contemporary west. The influx of exotic material such as malachite and sandstone fragments into the Jafr outposts can also be understood within the same context<sup>147</sup>. The overall affinities of construction techno-typology between Beidha<sup>148</sup> and Wadi Abu Tulayha also deserve attention. However, there are a few sharp contrasts between the two areas. Petroglyphs, for example, is the norm of the Jafr Pastoral PPNB<sup>149</sup> but essentially absent at the farming communities. The opposite is the case with wall painting, which is recognized at the latter only<sup>150</sup>. Likewise, (partly-)polished axes/adzes are relatively common in the parent settlement area<sup>151</sup> but entirely absent in the outpost zone. It is needless to say that no clear evidence for the façade-side cairn burial has been confirmed in the west except for a few possible links<sup>152</sup>.

Such contrasts become even clearer in the subsequent periods. Neither pseudo-settlements nor pseudo-wall cairns have been attested to in the sedentary cultural sphere. Instead, current evidence suggests that a part of the area was included in the distribution range of dolmens<sup>153</sup>. Understandably, material evidence to suggest mutual interaction is scarce, being limited to several kinds of artifacts including maceheads and tabular scrapers<sup>154</sup>. This may be a reflection that the two adjacent areas were separated from each other in the course of pastoral nomadization. However, when we consider that the whole range of post-PPNB southern Jordan witnessed a sudden decrease in archaeological features, it is also conceivable that contrary to the situation in Phase 1, a part of the West was incorporated as summer quarters into the nomadic society to the East. Further investigation is necessitated to explore the chronological correlation between the two adjacent areas.

#### CONCLUDING REMARKS

The above discussion has proved that the Jafr chronology provides valuable insights into the process of pastoral nomadization in southern Jordan and its surrounding areas. However, there still remain a number of challenges to be addressed. To conclude, we would like to point out a few essential issues that the new perspective involves.

One of them is the innovation of the terminology for periodization. With the only exception of the Wadi Burma cairn field, the Jafr sites produced no potteries, to say nothing of copper/bronze products. Thus, properly speaking, we have to not only prefix “Pre-pottery” or “Aceramic” to every periodization term but also avoid the use of the traditional terms such as the Chalcolithic and the Bronze Age. However, it is difficult to meet such oppressive requests. An alternative idea, if any, would be to substitute “Pre-Pottery or Aceramic Neolithic D, E, F” for the Late Neolithic, the Chalcolithic, and the Early Bronze Age, respectively, but such dry substitution has little to gain and much to lose. For this reason, we used the neutral term “Phase” in combination with the traditional periodization terms of the Levantine archaeology. Such eclectic measures are nothing more than a temporary detour, however. Now that the synthesis of patchy information has come into our sight, the innovation of the terminology for periodization is an urgent issue.

Another weak point of the Jafr chronology is the absence of settlement data other than the two PPNB outposts. As repeatedly mentioned, the Jafr chronology depends much on the limited information from burial features. This is especially the case with Phases 2 and 3, where our information source is restricted

147. FUJII 2006a, p. 21, fig. 21; 2007a, p. 399; 2008a, p. 473.

148. BYRD 2005; KIRKBRIDE 1966.

149. FUJII 2008b.

150. E.g. GEBEL 2010b, fig. 16.

151. E.g. KIRKBRIDE 1966, fig. 10; BARKAI 2005.

152. KINZEL *et al.* 2011.

153. DUBIS *et al.* 2004; KAFABI & SCHELTEMA 2005; SCHELTEMA 2008; ZOHAR 1992.

154. FUJII 2011a.

to only a few cemetery sites. To make matters worse, the Jafr burial features are characterized by the symbolic secondary interment and, therefore, yield neither human skeletal remains nor burial gifts. Even if this is the norm of Badia archaeology, such a double or triple torture makes it even more difficult to approach everyday life of early pastoral nomads. Alternative information sources, if any, would be ubiquitous, non-descript features such as enclosures/corrals, stone concentrations, and freestanding walls that mark the post-PPNB arid margins. Aside from large-scale water catchment facilities, the Jafr chronology has not yet succeeded in scooping up the archaeological implications of such extramural features.

Another serious problem we confront is the deficiency in basic information on palaeo-environments. This is a critical drawback, all the more because desert sites were much more sensitive to environmental fluctuation than farming communities protected with both natural and anthropogenic buffers. We attempted to collect pollen data from Wadi Abu Tulayha, but the outcome was disappointing. The only promising approach to the issue is the diatom analysis of barrage deposits, but it has a serious difficulty in dating. For these reasons, the Jafr chronology has not yet incorporated any eco-data other than excavated faunal and floral remains. It is an urgent necessity to crosscheck the chronology against palaeo-environmental and palaeo-climatological datasets. In addition, the Jafr chronology has other problems such as the shortage of  $^{14}\text{C}$  data and stratified evidence, the lack of excavated sites in the eastern and southern parts, and the scarcity of material evidence other than burial features in Phases 2 and 3. These defects can be all the more fatal because the chronology covers the long time range over the five millennia.

However, despite all these imperfections, the Jafr chronology provides a major breakthrough in the study of the process of pastoral nomadization in the Levant. As a matter of fact, the series of sporadic evidence has corroborated that the chronology has a certain degree of versatility. We would like to continue our efforts towards a better understanding of the formation process of the Badia world, another dimension of the Levantine archaeology<sup>155</sup>.

155. After submitting the draft, we conducted the following four investigations. To begin with, the excavations at Wadi Nadiya 2 have suggested that a large-scale basin-irrigation barrage gradually changed into a small-scale reservoir type barrage in the course of the facility renewal started from the upper barrage system of Wadi Nadiya 1. Second, the survey in the eastern Jafr Basin has proved that while the former type of barrages focus on the westerly area nearer to contemporary farming communities, the latter type of barrages penetrate deep into the desert far from the sedentary cultural sphere. It was also confirmed that while the former is often associated with a neighboring agro-pastoral outpost, the latter is usually dotted as an isolated feature in the remote wilderness. Both contrasts are suggestive of a drastic shift in water-use strategy in the Jafr Basin. It is our tentative perspective that the shift mirrors a change in lifestyle from the PPNB pastoral transhumance to the subsequent pastoral nomadism. Given this, it would follow that we are now able to trace the process of pastoral nomadization from both aspects of life (water-catchment facilities) and death (burial features). In addition, the complementary excavation at Wadi Ghuwayr 17 has proved anew that the outpost was equipped with a small cistern as well as the neighbouring barrage system (Wadi Ghuwayr 106). Likewise, the additional investigation at the 'Awja sites in southernmost Jordan has shown that the open sanctuary included a Harrat al-Juhayra type of pseudo-settlement ('Awja 5), the later type of pseudo-settlement similar to the Southwestern Complex at 'Awja 1 ('Awja 4), and feline representations using a two-rowed upright slab wall technique (the Northeastern Complex at 'Awja 1). These findings have made up for a shortage in basic information on Phase 2. The series of investigation results are to be reported in *ADAJ* and other journals in the near future.

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