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The archaeology of the first farmer-herders in Egypt : new insights into the Fayum Epipalaeolithic and Neolithic

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Citation
Shirai, N. (2010, April 29). *The archaeology of the first farmer-herders in Egypt : new insights into the Fayum Epipalaeolithic and Neolithic*. *Archaeological Studies Leiden University*. Retrieved from https://hdl.handle.net/1887/15339

Version:	Corrected Publisher's Version
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Note: To cite this publication please use the final published version (if applicable).

6. Lithic technological organisation and mobility in the Fayum Epipalaeolithic

6.1. Introduction

The Fayum Epipalaeolithic culture is the predecessor of the Fayum Neolithic culture that adopted wheat/barley farming and sheep/goat herding for the first time in the history of Egypt. Previous studies by different research teams have provided information about the site location, material culture, subsistence activities, and burial custom of the Fayum Epipalaeolithic. However, its lithic assemblage has been poorly published. In addition, although great attention has been paid to the description of tools, such a description has not very much served to explain the actual tool making/using activities of Fayum Epipalaeolithic people. Such a descriptive approach has merely regarded lithic technological changes at the transition from the Fayum Epipalaeolithic to Neolithic as the evidence of population replacement (Wendorf and Schild 1976: 317*ff*; Wenke *et al*. 1988: 38), rather than as an indication of adaptation or optimisation in technology in response to changing environments and subsistence needs.

Reconstructing the whole sequence of lithic reduction in terms of purely technical aspects and understanding how this reduction sequence is closely associated with the general subsistence and mobility strategies of prehistoric and ethnographic foragers have been popular as the studies of lithic technological organisation since the late 1970s (Binford 1979; Odell 2001: 62-69). This kind of approach is relevant to know to what extent the tool making/using activities of Fayum Epipalaeolithic people were affected by the mobility or sedentariness of the people and how people adapted their lithic technological organisation to their needs in subsistence activities.

This study aims to reconsider the Fayum Epipalaeolithic culture in terms of its mobility and subsistence strategies through focusing on lithic artefacts collected at several localities/sites, which were visited and studied during the survey. Therefore, a particular consideration is given to the possible sources of lithic raw materials used. The lithic sourcing study may reveal where in the Fayum the lithic raw materials derived from, and this could be direct evidence for the mobility range of the Epipalaeolithic people. If the people had usually exploited non-local lithic raw materials, it would be possible to assume that they left the Fayum and migrated seasonally to other places or often took hunting trips to distant places, and that their lithic raw material procurement was embedded in seasonal migrations or hunting trips. It has been asserted that the preferred lithic raw materials utilised at Fayum Epipalaeolithic sites were small, rounded pebbles from the Oligocene conglomerate of the Gebel Qatrani Formation, which is extensively exposed on the plateau above Qasr el-Sagha (Wendorf and Schild 1976: 311), but it has not been explained how this source was identified and specified so surely. It would be worth considering other possible sources, and such possibilities would give further clues to the mobility and subsistence of Fayum Epipalaeolithic people. Another consideration is given to the sequence from the raw material procurement and the manufacture and use of tools to the discard of debitage products and worn/broken tools. The study of debitage products may reveal where in the Fayum core reduction started and continued, and this is an important clue to speculate on the function and occupation duration of the localities/sites in the Fayum Epipalaeolithic.

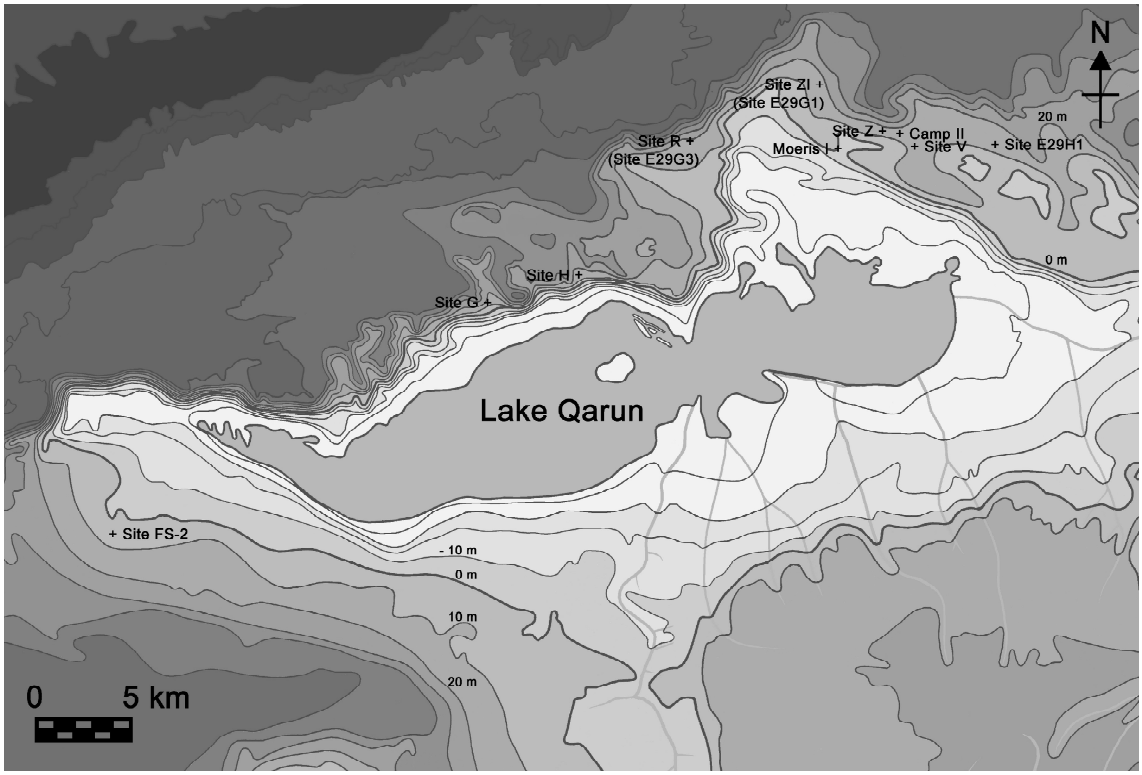


Fig.6.1. Map of Epipalaeolithic sites

6.2. The locations and features of Fayum Epipalaeolithic localities/sites

In the Fayum, whereas only one Epipalaeolithic site named Site FS-2 is known on the southwest side of the lake, a considerable number of Epipalaeolithic lithic artefacts have been found on the north side of the lake at the following localities/sites (**Fig.6.1**).

1) Combined Prehistoric Expedition's Site E29H1 (Caton-Thompson's unnamed site) in the northeast of the X Basin (Wendorf and Schild 1976: 182-199)
2) Caton-Thompson's Camp II in the east of the Z Basin (Caton-Thompson and Gardner 1934: 76-77)
3) Caton-Thompson's Site V (identical to Seton-Karr's unnamed site and Brewer's Site 2) in the east of the Z Basin (Brewer 1989a; 1989b; Caton-Thompson and Gardner 1934: 75-76; Seton-Karr 1904: fig.1; 1905: plate I)
4) Caton-Thompson's Site Z (identical to Seton-Karr's unnamed site and Puglisi's Site S4) in the northeast of the Z Basin (Caton-Thompson and Gardner 1934: 77-78; Mussi *et al*. 1984; Puglisi 1967; Seton-Karr 1904: fig.1; 1905: plate I)
5) Caton-Thompson's Moeris I (identical to Puglisi's Site MOE) in the southwest of the Z Basin (Caton-Thompson and Gardner 1934: 67-68; Mussi *et al*. 1984; Puglisi 1967)
6) Caton-Thompson's Site ZI (identical to Seton-Karr's unnamed site, Puglisi's Site MB, and Combined Prehistoric Expedition's Site E29G1) in Moeris Bay (Caton-Thompson and Gardner 1934: 79-80; Mussi *et al*. 1984; Puglisi 1967; Seton-Karr 1904: fig.1; 1905: plate I; Wendorf and Schild 1976: 162-182)
7) Caton-Thompson's Site R (identical to Combined Prehistoric Expedition's Site E29G3) in the north of the N Basin (Caton-Thompson and Gardner 1934: 81-82; Wendorf and Schild 1976: 199-211)
8) Caton-Thompson's Site G and Site H to the west of Dimai (Caton-Thompson and Gardner

1934: 61*ff*).

In addition, there are some unnamed Epipalaeolithic sites around the L Basin and X Basin, but they were merely indicated on a map, and few descriptions of the sites and finds were published (Caton-Thompson and Gardner 1934: pl.CXIII).

In this study, Site Z, Camp II, and Site E29H1 were selected among the major eight Epipalaeolithic localities/sites on the north side of the lake as listed above, and the lithic artefacts on their surface were collected for a new study on how the procurement of lithic raw materials and the manufacture of tools were organised in relation to the mobility strategies of the people who resided there. Possible sources of raw materials were considered on the basis of the survey results. Furthermore, a previously-unknown locality in Wadi B gave a clue to know the mobility range of the people (**Fig.6.2**).

6.3. Previous studies of Fayum Epipalaeolithic lithic assemblages

The beginning of serious studies on the Fayum Epipalaeolithic lithic artefacts is dated back to the time of Caton-Thompson. Besides a variety of bifacially-retouched, formal Neolithic tools which were frequently found at higher elevations, she found concentrations of various backed bladelets at several surface sites at lower elevations. She recognised that those backed bladelets, which she named 'the Neolithic B group', were technologically and chronologically apart from the assemblages of various bifacially-retouched Neolithic tools which she named 'the Neolithic A group', but she could not say which tools other than various backed bladelets certainly belonged to the B group. Even though she assumed that these two groups were distinguished according to their vertical distribution pattern, she could not exclude the possibilities that stray tools of the A group had accidentally been included in the supposedly B group artefact scatters at lower elevations or that the distribution of the A group tools and B group tools had overlapped at some middle elevations. She should have checked her assumption about the grouping of tools according to elevation by finding more tools from *in situ* contexts elsewhere, but she had no other choice but to depend mostly on surface artefact scatters. Furthermore, she did not realise that the B group as represented by various backed bladelets was later in date than the A group, due to her incorrect correlation of the lake transgression and regression against the vertical distribution of artefacts (Caton-Thompson and Gardner 1934: 55-69).

Some more systematic collections and typological analyses of Epipalaeolithic lithic artefacts have been undertaken in the 1970s and 1980s by three different research teams at the sites where Caton-Thompson has visited and studied. The Combined Prehistoric Expedition led by Wendorf and Schild studied artefacts which were surface collected and excavated at Site E29H1, Site E29G1 and Site E29G3 (Wendorf and Schild 1976). The Sapienza University of Rome team led by Puglisi has studied artefacts which were surface collected at Site S4, Site MB, and Site MOE (Mussi *et al*. 1984). The University of Washington team led by Wenke has studied artefacts which were surface collected and excavated at Site FS-2 (Wenke *et al*. 1983; 1988). All of them have studied their collections in the same manner, which was actually the standard approach at that time, and as a consequence, they have the same problems in publishing their data.

The main objectives of their lithic studies were to understand the tool typology and frequency in the assemblages of individual sites in the Fayum, and to present to what extent the Fayum Epipalaeolithic tool assemblages were similar or dissimilar to each other and were different from contemporaneous tool assemblages in other parts of North Africa. For these objectives, they referred to the Tixier typology of Epipalaeolithic tools in the Maghreb (Tixier 1963), and presented the main typological indices in percentages with the actual number of tools and the cumulative graphs of tool type frequencies (Mussi *et al*. 1984: Fig.3 and Table 3; Wendorf and Schild 1976: Fig.210 and Table 17; Wenke *et al*. 1988: Fig.6). By using

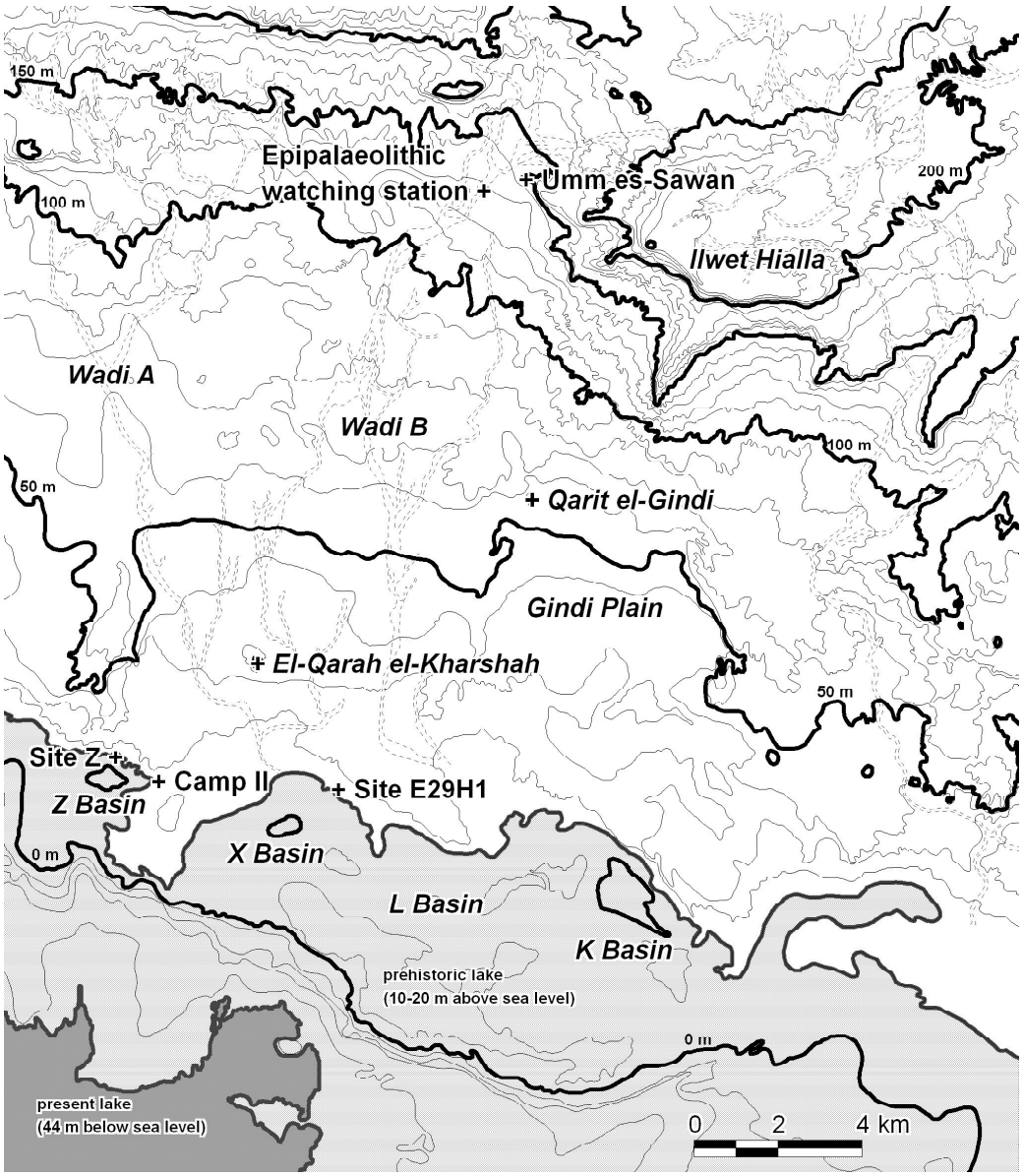


Fig.6.2. Map of Epipalaeolithic sites studied in this chapter

the cumulative graphs, they presented not only the comparison of the tool assemblages from different Fayum sites, but also the comparison of the Fayum tool assemblages with the Shamarkian tool assemblage in the Nile Valley of Lower Nubia (Schild *et al.* 1968) and the El-Ghorab Playa tool assemblage in the Western Desert of Egypt (Kobusiewicz 1984), and graphically showed the overall similarity between these assemblages. Although the cumulative graphs were not presented, the Fayum tool assemblages from Site S4, Site MB, and Site MOE were also compared with the Elkabian assemblage in the Nile Valley of Upper Egypt (Vermeersch 1978: 125-134), and the noticeable features like the rarity of microburins and the high frequency of backed bladelets in the Fayum were highlighted (Mussi *et al.* 1984: 190).

On the basis of these comparisons, it has been

argued that, in spite of the overall similarity, functional and stylistic differences in tools did exist between the Fayum sites. Although insufficiently published by the Combined Prehistoric Expedition, the lithic artefacts collected at Site E29G1, Site E29G3 and Site E29H1 are characterised by extremely high percentages of various backed bladelets, which account for more than 50 % of all tools (Wendorf and Schild 1976: 311). In contrast, the lithic artefacts collected at Site S4, Site MOE and Site MB are different from those found at Site E29G1, Site E29G3 and Site E29H1 in terms of the tool type frequency. It has been argued that the observed differences like the slightly lower frequency of backed bladelets and the relative abundance of scrapers, perforators, notches and denticulates at Site S4, Site MOE and Site MB might reflect a different chronological position or a different range of tool-using activities (Mussi *et al.* 1984: 189).

However, the argument has focused on subtle differences in the frequency of tool types, and such differences do not seem to reflect a significant difference in tool-using activities, especially if one considers the almost same environmental situation of the Fayum sites, which are very close to each other, as well as the presumably same range of available wild food resources. More importantly, Site S4, Site MOE and Site MB have been intensively surface collected by Seton-Karr and Caton-Thompson before Puglisi visited, and thus it is highly probable that Puglisi's collection is distorted. This probability has not been mentioned at all by the researchers who studied Puglisi's collection, but it is no wonder if nice-looking artefacts like backed bladelets and projectile points had already been taken away, and Puglisi collected what had been ignored and left by previous visitors. Therefore, it must be said that the argument on a different range of tool-using activities has no sound ground. It is likely that the lithic artefacts collected at Site E29G1, Site E29G3 and Site E29H1 represent intact Fayum Epipalaeolithic lithic assemblages, and it is possible that the frequency of tool types at Site S4, Site MOE and Site MB was previously the same as that at Site E29G1, Site E29G3 and Site E29H1.

On the other hand, the claimed similarity between the Fayum tool assemblage and the El-Ghorab Playa tool assemblage in the Egyptian Western Desert sounds fairly unreasonable, given the apparent difference in environmental situation, subsistence, and available lithic raw materials between these two regions. El-Ghorab Playa was a rain-fed shallow lake with no fish, and the major subsistence activity around the ephemeral lake is considered to be hunting of dorcas gazelle and hare. Lithic raw materials used there are local chert and petrified wood as well as flint brought from sources which are some 100 km away (Kobusiewicz 1984: 145 and 159). El-Ghorab Playa is not comparable to the Fayum, in which the major subsistence activity was fishing around the shores of a permanent lake fed by the Nile and the major lithic raw material was locally-available flint.

It must be noted that the account of tool type frequencies based on the Tixier typology and the resultant cumulative graphs are subject to variability in sampling and typological identification. In addition, as long as one is dependent on the Tixier typology, a number of unique local tools which do not exist in the Tixier type list tend to be underestimated, though they are classified as *varia*. As a consequence, comparisons based on the Tixier typology can only say whether tool assemblages under consideration are relatively more similar or less similar to each other, and the uniqueness beyond such similarity is hardly revealed. Furthermore, the Tixier typology conflates both functional and stylistic variability, and hence it is not easy to say on the whole whether similarity in tool assemblages reflects style or function.

Despite the similar high frequency of backed bladelets in general, a difference has been recognised in the type frequency of backed bladelets between the tool collection by Wendorf and Schild and the tool collection by Puglisi. Straight-backed and pointed bladelets (Tixier's Type 45), arch-ended bladelets (Tixier's Type 55) and arch-backed bladelets (Tixier's Type 56) predominate in both collections, but straight-

backed and pointed bladelets with truncated base (Tixier's Type 47) are numerous in Puglisi's collection but are poor in Wendorf and Schild's collection. Accordingly, it is assumed that stylistic differences in tools may have existed within the Fayum Epipalaeolithic, and that such subtle differences may possibly represent different chronological positions (Mussi *et al.* 1984: 189). However, the chronological aspect of different backed bladelet types is not clear in the Tixier typology. Therefore, this assumption has to be substantiated not only by the discoveries of well-preserved and well-dated tool assemblages at more localities/sites in the Fayum but also by further comparisons with well-dated tool assemblages found outside the Fayum. New data on almost contemporaneous Epipalaeolithic tool assemblages in other parts of Egypt like Siwa Oasis (Hassan and Gross 1987), Kharga Oasis (McDonald 2003; Simmons and Mandel 1986; Wendorf and Schild 1980), Dakhleh Oasis (McDonald 1991b; 2003) and the Nabta-Kiseiba region (Wendorf and Schild 2001; Wendorf *et al*. 1984) were published after the above-mentioned studies on the Fayum Epipalaeolithic tool assemblages, and some syntheses of these assemblages are presently available (*e.g.*, Kobusiewicz 1996; Vermeersch 1992). They provide good comparable examples with the Fayum tools.

Another problem in the studies of the Fayum Epipalaeolithic lithic assemblages in the 1970s and 1980s is that cores and debitage products were neglected. The researchers seem to have collected not only tools but also other artefacts, and briefly mentioned how the predominant cores looked like, and published some drawings of the cores (Mussi *et al*. 1984: 185; Wendorf and Schild 1976: 311 and Figs.206-208). However, no quantitative data on cores have been presented, and there has been no mention of debitage products at all. My visit to the Wendorf collection presently housed in the British Museum in London and the study of documents in the collection revealed that the cores and debitage products collected at Site E29G1, Site E29G3 and Site E29H1 by the Combined Prehistoric Expedition had actually been studied quite thoroughly in the 1970s and quantitative data exist, but these data have not been published for some unknown reason. As a result, little has been known about raw material economy, knapping techniques, and reduction sequences.

In short, the present knowledge of Fayum Epipalaeolithic lithic assemblages is more or less biased and distorted because of 1) the possible inclusion of artefacts from later periods into purely Epipalaeolithic assemblages 2) the study of already-plundered assemblages, 3) the misleading presentation of tool type frequencies in percentages and cumulative graphs, and 4) the insufficient publication of data on the entire lithic assemblages including cores and debitage products. In the following study, more emphasis is placed on the description of cores and debitage products and the reconstruction of reduction sequences. As for formal tools, the Tixier typology is always referred to, in order to describe the tools, but the tool type frequencies are not presented, due to the general paucity of tools in the studied assemblages and my insufficient ability to identify tool types. Some tools in the assemblages studied may or may not have been overlooked and included in the category of debitage products.

6.4. Epipalaeolithic lithic assemblages on the northern shore of the Z Basin

6.4.1. Introduction

Site Z is located on the northern slope of the Z Basin. The entire site was already surveyed by Caton-Thompson in the 1920s, and surface scatters of the A and B group lithic artefacts have been reported in the area between 6 m asl and 18 m asl (Caton-Thompson and Gardner 1934: 59-60, 77-78 and pl.CX). While the lower elevation of the northern slope of the Z Basin is covered by fine-grained aeolian sand, the higher ridges, which are supposed to be old beaches, are covered by pale limestone fragments and fossil shells. The width of artefact scatters reported at Site Z by Caton-Thompson was approximately 700 m. It is probable that Puglisi's

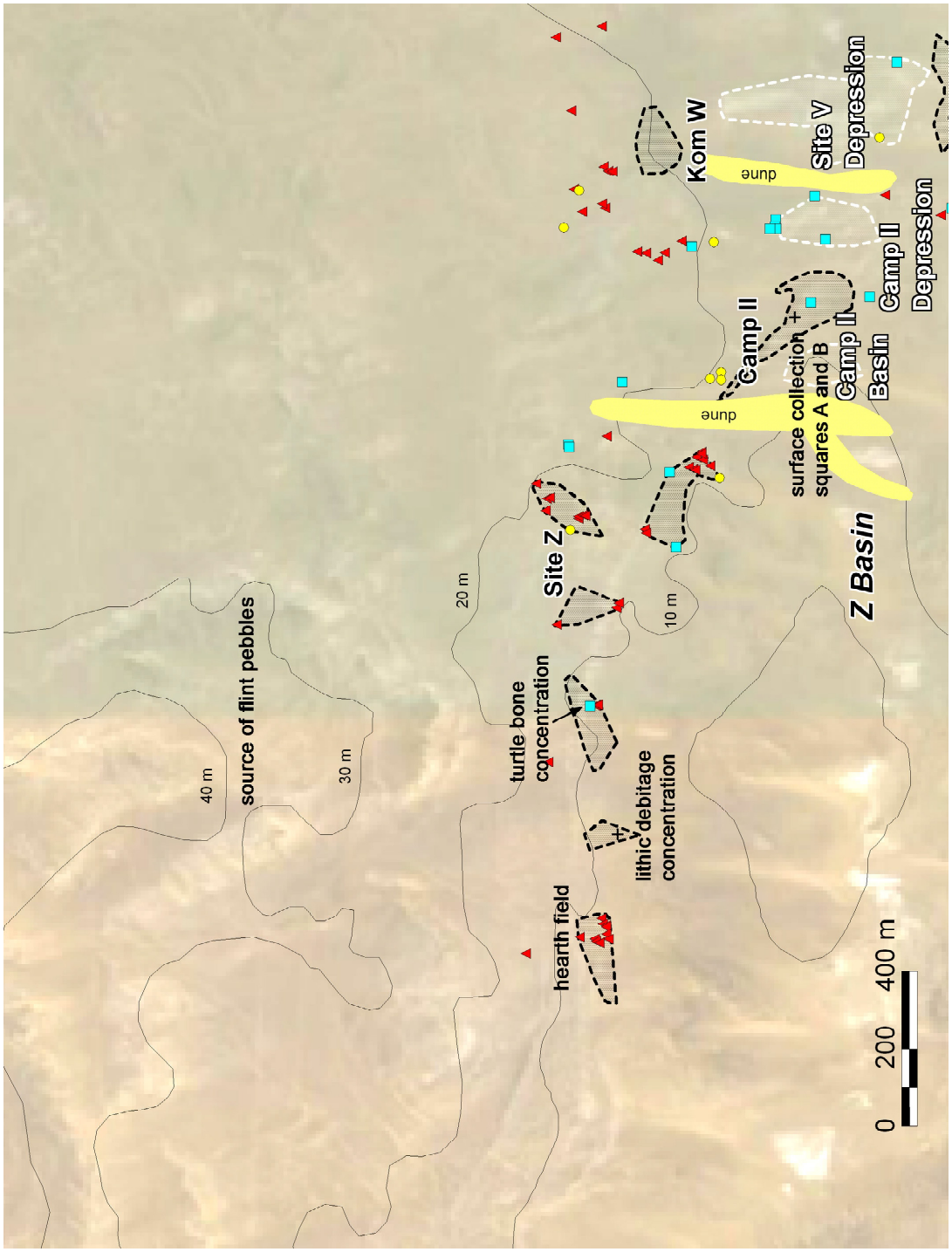


Fig.6.3. Map of Site Z and Camp II

Site S4 was located around the easternmost part of Site Z and is beyond the old beaches at higher elevations. According to my field observation, artefact scatters on the northern slope of the Z Basin at lower elevations are spread over the entire stretch of approximately 1300 m wide, but are disrupted by strips of fine-grained aeolian sand or colluvial deposits of limestone fragments and fossil shells extending north-south at several locations. Concentrations of sandstone and fossil shell-bearing limestone cobbles which seemed to be hearths, and concentrations of bone fragments, are observed on the slope surface in the areas which are not disturbed and obscured by natural features mentioned above. The majority of the finds on the deflated slope surface are Epipalaeolithic lithic artefacts. Apparently Neolithic artefacts were very rarely found. In the following, noteworthy archaeological remains found in Site Z are called localities (**Fig.6.3**).

6.4.2. A concentration of turtle bones

One locality of Site Z was chosen for surface artefact collection. This locality (N29.59044° E30.77747°) is located in the eastern half of Site Z and on the gentle slope of approximately 13-15 m asl. It is marked by a concentration of turtle bones surrounded by sandstone and fossil shell-bearing limestone cobbles in a circle (**Fig.6.4**). It is probable that these archaeological remains have been protected beneath lacustrine sediments, and were recently exposed on the surface by wind erosion. A 5 m x 5 m square was set up to contain this concentration, and 153 pieces of lithic artefacts were surface collected and studied (**Table 6.1**).

6.4.2.1. Lithic raw materials

The most popular raw material for Epipalaeolithic tools at this locality is subangular or rounded, globular or irregularly-shaped flint pebble of various colours from light to dark brown. The surface of the pebble is smooth and well polished. Another raw material is light brown flint cobble of unknown original shape. They do not naturally occur in this basin environment, and hence must have been transported from elsewhere.



Fig.6.4. A concentration of turtle bones in Site Z (looking south)

	n
single platform core	14
opposed platform core	1
multiple platform core	7
discoidal core	1
primary chunk	2
chip/chunk	13
primary flake	10
flake from single platform core	40
flake from opposed platform core	5
flakes from ninety-degree core	6
flake from multiple platform core	7
flake from discoidal core	1
unidentifiable flake	15
primary blade/bladelet	3
blade/bladelet from single platform core	5
blade/bladelet from opposed platform core	3
blade/bladelet from multiple platform core	1
blade/bladelet	11
notch	1
denticulate	2
endscraper	2
sidescraper	2
winged and tanged projectile point	1
total	153

Table.6.1. Inventory of finds at Site Z turtle bone concentration

	n	%
single platform core	14	60.87
opposed platform core	1	4.35
multiple platform core	7	30.43
discoidal core	1	4.35
total	23	100.00

Table.6.2. Cores at Site Z turtle bone concentration

	n	mean (cm)	st.dev
length	22	1.87	0.68
width	22	2.71	0.74
thickness	22	2.43	1.29

Table.6.3. Metrical data of measured cores on pebbles at Site Z turtle bone concentration

6.4.2.2. Cores

Cores are not numerous in the collection (**Table 6.2**), and they are small (**Table 6.3**). There are 14 single platform cores, followed by seven multiple platform cores. There are only one opposed platform core and one discoidal core. Only one multiple platform core is made on a fragment of large cobble, and the rest are made on pebbles of various shapes.

6.4.2.3. Debitage products

Although the sample size is small, debitage products are dominated by flakes rather than blades/bladelets (**Table 6.4**). They are small (**Table 6.5**), as already suggested by cores.

6.4.2.4. Tools

Tools are not numerous, and they are all made on flakes. One small unifacially-retouched projectile point with barbs and broken tang is noted. It resembles those which have been found numerously at other sites in the Fayum like Site N, Site V, and Camp II but have remained undated (Caton-Thompson and Gardner 1934: 75-77, 84-85, and pl.LI).

	n	%
primary chunk	2	1.80
chip/chunk	13	11.71
primary flake	10	9.01
flake from single platform core	40	36.04
flake from opposed platform core	5	4.50
flakes from ninety-degree core	6	5.41
flake from multiple platform core	7	6.31
flake from discoidal core	1	0.90
unidentifiable flake	15	13.51
primary blade/bladelet	3	2.70
blade/bladelet from single platform core	5	4.50
blade/bladelet from opposed platform core	3	2.70
blade/bladelet from multiple platform core	1	0.90
total	111	100.00

Table.6.4. Debitage products at Site Z turtle bone concentration

	n	mean (cm)	st.dev
length	68	2.02	0.92
width	68	1.80	0.81
thickness	68	0.50	0.30

Table.6.5. Metrical data of measured debitage products at Site Z turtle bone concentration

6.4.3. A gentle slope next to the turtle bone concentration

Since the size of sample from around the turtle bone concentration is small, a 5 m x 25 m square was set up longitudinally along the north-south axis 10 m to the east of the 5 m x 5 m square, in order to cover the slope of the northern shore of the Z Basin which gently rises northwards. 960 pieces of lithic artefacts were surface collected in the 5 m x 25 m square and studied (**Table 6.6**).

6.4.3.1. Lithic raw materials

The most popular raw material for Epipalaeolithic tools at this locality is subangular or rounded, globular or irregularly-shaped flint pebbles of various colours from light to dark brown. The surface of the pebbles is quite smooth and well polished. Another raw material is globular flint cobble of various colours from light to dark brown. The cortical surface of

	n
single platform core	18
opposed platform core	4
multiple platform core	11
discoidal core	2
primary chunk	15
chip/chunk	66
primary flake	73
flake from single platform core	341
flake from opposed platform core	33
flakes from ninety-degree core	33
flake from multiple platform core	29
unidentifiable flake	99
primary blade/bladelet	25
blade/bladelet from single platform core	51
blade/bladelet from opposed platform core	5
blade/bladelet from ninety-degree core	5
blade/bladelet from multiple platform core	1
blade/bladelet	116
backed bladelet	14
double-backed bladelet	1
notch	3
denticulate	3
endscraper	2
sidescraper	6
leaf-shaped projectile point	1
winged and tanged projectile point	1
Neolithic knife blade	2
total	960

Table.6.6. Inventory of finds at the Site Z slope

	n	%
single platform core	18	51.43
opposed platform core	4	11.43
multiple platform core	11	31.43
discoidal core	2	5.71
total	35	100.00

Table.6.7. Cores at the Site Z slope

	n	mean (cm)	st.dev
length	7	2.41	0.86
width	7	3.11	0.81
thickness	7	2.69	0.64

Table.6.8. Metrical data of measured cores on pebbles at the Site Z slope

	n	mean (cm)	st.dev
length	19	1.69	0.70
width	19	2.35	0.32
thickness	19	1.67	0.59

Table.6.9. Metrical data of measured cores on conical or hemispherical chunks of pebbles at the Site Z slope

	n	mean (cm)	st.dev
length	6	2.43	0.83
width	6	2.72	0.82
thickness	6	1.77	0.70

Table.6.10. Metrical data of measured cores on fragments of cobbles at the Site Z slope

cobble is commonly weathered and exhibits a dark brown colour. A further variety of raw material is translucent brown chert of uncertain original shape. All of them do not naturally occur in this basin environment, and hence must have been transported from elsewhere.

6.4.3.2. Cores

Cores are not numerous in the collection (**Table 6.7**). Cores can be divided into three different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.8**). The second is made on conical or hemispherical chunks with almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.9**). The third is made on fragments of cobbles (**Table 6.10**). There are 18 single platform cores, which make up more than a half of all. Except for one single platform core made on an angular fragment of a weathered cobble, the rest are made on pebbles of various shapes (**Fig.6.5**-1) and conical or hemispherical chunks which derived from pebbles. All of these single platform cores are for flake or microbladelet production. There are four opposed cores made on pebbles and chunks. There are 11 multiple platform cores, five of which are made on fragments of cobbles and the rest are made on chunks and pebbles.

	n	%
primary chunk	15	1.93
chip/chunk	66	8.51
primary flake	73	9.41
flake from single platform core	341	43.94
flake from opposed platform core	33	4.25
flakes from ninety-degree core	33	4.25
flake from multiple platform core	29	3.74
unidentifiable flake	99	12.76
primary blade/bladelet	25	3.22
blade/bladelet from single platform core	51	6.57
blade/bladelet from opposed platform core	5	0.64
blade/bladelet from ninety-degree core	5	0.64
blade/bladelet from multiple platform core	1	0.13
total	776	100.00

Table.6.11. Debitage products at the Site Z slope

	n	mean (cm)	st.dev
length	466	1.74	0.67
width	466	1.51	0.61
thickness	466	0.41	0.24

Table.6.12. Metrical data of measured debitage products at the Site Z slope

6.4.3.3. Debitage products

As already suggested by the presence of flake cores, debitage products are dominated by flakes rather than blades/bladelets (**Table 6.11**), and they are quite small (**Table 6.12**). The most numerous kind of flakes are from single platform cores, and they amount to 341. There are 73 primary flakes, 33 flakes from opposed platform cores, another 33 flakes from ninety-degree cores, and 29 flakes from multiple platform cores. There are 99 unidentifiable flakes.

Blades/bladelets are not numerous. The most numerous kind of blades/bladelets are from single platform cores, and they amount to 51. Primary blades/bladelets are 25. There are only five blades/bladelets from opposed platform cores, another five blades/bladelets from ninety-degree cores, and only one blade/bladelet from multiple platform core.

Other notable debitage products are primary chunks, and they amount to 15. Apparently such a chunk was obtained by striking one end of an elongated pebble.

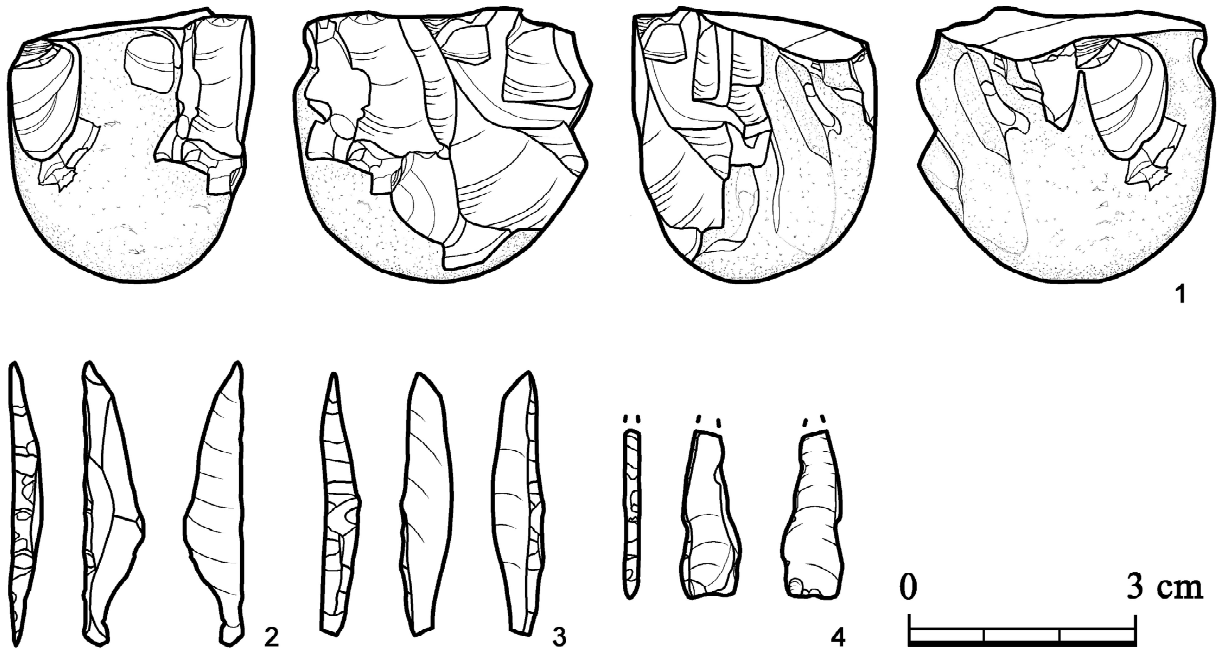


Fig.6.5. A core and tools collected at the Site Z slope

6.4.3.4. Lithic manufacture

There is no refitted specimen for discussing the tool manufacturing process, but the cores and debitage products suggest that toolmakers knapped flint pebbles in a slightly irregular manner according to the different shapes of pebbles. It appears that they tended to use fragments of pebbles or cobbles rather than whole pebbles, and that their major objective was to obtain non-cortical microbladelets and short flakes. Some bladelets from unknown cores were retouched and formed into backed bladelets.



Fig.6.6. Small bifacially-retouched projectile points collected at the Site Z slope

6.4.3.5. Tools

Blades/bladelets amount to 116, including many microbladelets of less than 2 cm long without additional retouch. Other notable tools are backed bladelets (**Fig.6.5**-2, 3 and 4), but their number is only 14. There is one broken double backed bladelet (Tixier's Type 16). It has been known that Epipalaeolithic tool assemblages of the Fayum were dominated by backed bladelets (Mussi *et al*. 1984: 189; Wendorf and Schild 1976: 311), and this seems to be the case with this locality. However, backed bladelets at this locality of Site Z are different from those at Site S4 and Site E29H1. The majority of backed bladelets at this locality are straight-backed ones with slightly convex cutting edge, which are identical to Tixier's Types 45-47. In general, they are approximately 3 cm long.

Other tool classes include three notches made on flakes, three denticulates made on flakes, one endscraper made on a half-split elongated pebble and another endscraper on a flake, and six sidescrapers made on flakes. They have parallels with those in other Epipalaeolithic assemblages of the Fayum and outside the Fayum published so far. However, notched or denticulated blades, perforators, and trapezes which have been abundantly reported in contemporaneous sites in Dakhleh Oasis, the Nabta-Kiseiba region and Elkab as well as Site S4 in the Fayum were not found at this locality of Site Z.

More formal tools include two small bifacially-retouched projectile points. One is leaf-shaped and thoroughly retouched on one face and laterally retouched on another face, and another is a tanged and barbed variety of projectile point (**Fig.6.6**). They are not rare in the Fayum though not securely dated. They are similar to not only those of the (bi)facial techno-complex of the Western Desert in the late 7th-early 6th millennia cal.BC but also those of the Levantine Pottery Neolithic. It is not surprising if such projectile points existed in the later half of the Fayum Epipalaeolithic.

6.4.3.6. Miscellaneous

Apart from the systematic surface collection, some remarkable tools were collected in close proximity to the surface collection square at the same elevation of the slope. One Ounan-Harif point (Close 1984: 276; Wendorf and Schild 1980: 110 and 259; Wendorf and Schild 1984: 304) and two Ounan points (Tixier's Type 107) were found on the surface (**Fig.6.7**). The Ounan-Harif point appears to be associated with a deflated circle of sandstone and limestone cobbles. These typical Epipalaeolithic projectile points of North Africa have been found at sites in Dakhleh Oasis (McDonald 1991b: Fig.6-nos.5 and 23), Kharga Oasis (Caton-Thompson 1952: pl.97-nos.9 and 16, pl.98-no.3, pl.99-no.1; McDonald 2003: Fig.8-a-h), the Nabta-Kiseiba region (Wendorf and Schild 1980: Fig.3.39-x, Fig.3.45-m-p, Fig.3.78-m and Fig.3.102-a) and Elkab (Vermeersch 1978: Fig.33-no.25), but the presence of these types of projectile points in

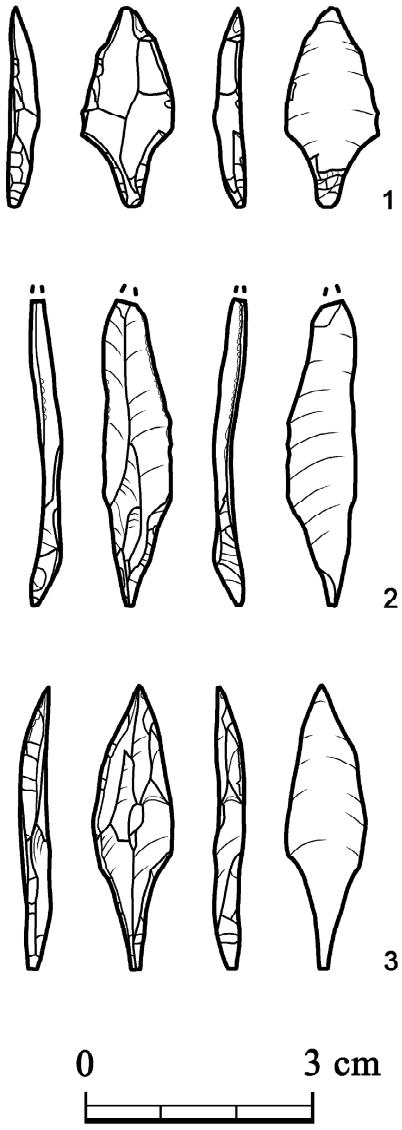


Fig.6.7. An Ounan-Harif point (1) and Ounan points (2 and 3) collected at the Site Z slope

the Fayum has not widely been recognised. The Ounan points have appeared in the collection made by Seton-Karr somewhere probably around Site V or Site Z in the Fayum in the 1900s without being designated these (Currelly 1913: pl.XXXVII), but later visitors to the Fayum have never reported such projectile points at the sites they studied, in spite of similar environmental settings. The online catalogue of Caton-Thompson's Fayum lithic collection which is presently housed in the Petrie Museum of Egyptian Archaeology in London exhibits at least two Ounan Points (UC3435 and UC3436) from Camp II Basin and one Ounan-Harif point (UC3788) from Site N, although she did not publish them. Therefore, new discoveries of these types of projectile points at this locality of Site Z reconfirm that the Fayum Epipalaeolithic has something in common with other Epipalaeolithic industries in Egypt, and that the Fayum Epipalaeolithic is not an isolated culture but is situated in a wider North African Epipalaeolithic context.

Moreover, the presence of the Ounan points in the localities/sites of the Fayum can be used as a chronological marker, because these peculiar projectile points have been dated to around 7500-6500 cal.BC, though some have persisted later than 6500 cal.BC (McDonald 2003; Riemer *et al*. 2004). This time span corresponds to that of the Fayum Epipalaeolithic, and hence this locality of Site Z, which yielded these projectile points, is also securely put within this time span. However, the later date of human occupation at this locality of Site Z suggested by the presence of the projectile points which are reminiscent of those of the Western Desert (bi)facial techno-complex and the Levantine Pottery Neolithic in the late 7th-early 6th millennia cal.BC may contradict the possible occupation span suggested by the presence of the Ounan points. Therefore, it may be assumed that the lithic assemblage obtained on the surface of this locality is the mixture of those from earlier date and later date. It follows that this locality has been visited repeatedly throughout the long span of the Epipalaeolithic period. Alternatively, it can also be assumed that this locality is dated to a transitional period when the Ounan points gradually disappeared and unifacially/bifacially-retouched, tanged or leaf-shaped projectile points appeared in the middle of the 7th millennium cal.BC. As far as the presently-available lithic collections are concerned, it seems that the Ounan points in the Fayum tend to co-occur with unifacially/bifacially-retouched, tanged or leaf-shaped projectile points and do not occur alone. Both Site N and Camp II in

particular are known for the concentration of many unifacially/bifacially-retouched, tanged or leaf-shaped projectile points (Caton-Thompson and Gardner 1934: 76-77 and 84-85). This situation suggests that the co-occurrences are not necessarily accidental, and supports the latter assumption that the locality under consideration may perhaps be dated to the middle of the 7th millennium cal.BC.

6.4.4. A lithic debitage concentration

Another particular spot of Site Z was chosen for surface collection. This locality (N29.59021° E30.77433°) is an extremely high density concentration of lithic debitage products (**Fig.6.8**). It is located on the gentle slope at lower elevations of the basin shore near the westernmost part of Site Z. This lithic concentration is approximately 3 m in diameter, and it exhibits a strong contrast to the surrounding area, which is marked by very sparse scatters of lithic artefacts and several strips of colluvial deposits stretching north-south. In this concentration, debitage pieces sit loosely on coarse-grained sand and slightly consolidated silty sediments of the slope.

All debitage products and five unworked natural pebbles in this concentration, which amount to 762 in total, were collected (**Table 6.13**). A number of pieces could be refitted to an extent that the original shape of raw materials was understood. Therefore, it is assumed that this was a lithic manufacturing spot, or a debitage dumping spot. However, it is not certain if the debitage products were dumped in a shallow pit dug in sand by toolmakers but the sand was later blown away and heavier debitage products in the deeper parts remained undisturbed and became exposed on the surface, because the spatial extent of the concentration seems to be too wide to be considered as a remnant of a pit for such a purpose.



Fig.6.8. A lithic debitage concentration in Site Z (looking south)

	n
whole pebble	5
single platform core	71
opposed platform core	22
ninety-degree core	5
multiple platform core	6
discoidal core	3
core tablet	2
primary chunk	69
chip/chunk	15
primary flake	51
flake from single platform core	194
flake from opposed platform core	16
flake from ninety-degree core	23
flake from multiple platform core	3
unidentifiable flake	16
primary blade/bladelet	28
blade/bladelet from single platform core	128
blade/bladelet from opposed platform core	8
blade/bladelet from ninety-degree core	3
blade/bladelet	83
backed bladelet	11
total	762

Table.6.13. Inventory of finds at Site Z lithic debitage concentration

6.4.4.1. Lithic raw materials

The majority of the raw materials at this locality are subangular or rounded, elongated or tabular, or irregularly-shaped flint pebbles of various colours from light to dark brown. The surface of the pebbles is generally smooth and well polished. These peculiar kinds of flint pebbles do not naturally occur on the surface of this basin environment, but a survey in the vicinity revealed

that such flint pebbles were abundantly scattered on escarpments at elevations of more than 30 m asl, which were approximately 1 km to the north of this locality (**Fig.6.9**). These escarpments have been visited by Caton-Thompson, and she found nothing other than thin gravel carpet with some Levallois flakes and a large bifacial arrowhead possibly not of the Neolithic (Caton-Thompson and Gardner 1934: 78). But these gravelly escarpments seem to have been the nearest source of the raw material. Therefore, it can be assumed that the Epipalaeolithic toolmakers of the Z Basin procured lithic raw materials within easy walking distance.

There are only a small number of pieces which may derive from weathered or abraded flint cobbles, some of which have a white calcareous cortex. A further variety of raw material is chert of uncertain original shape and of translucent brown, but there are only two pieces of this raw material. The sources of these materials could not be located in the vicinities of the Z Basin.



Fig.6.9. Scatter of flint pebbles on escarpments to the north of Site Z (looking east)

6.4.4.2. Cores

Cores are numerous in the collection (**Table 6.14**). They can be divided into four different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.15**). The second is made on conical or hemispherical chunks with almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.16**). The third is made on other fragments of pebbles (**Table 6.17**). The fourth is made on fragments of cobbles (**Table 6.18**). Cores are dominated by single platform cores, which amount to 71. Except for one single platform core made on an angular fragment of a weathered cobble, the rest are made on locally-available pebbles of various shapes (**Fig.6.10**). Most of the single platform cores made on elongated pebbles are for bladelet production. Conical or hemispherical chunks with almost 100 % cortex were also used as cores, and their ventral face was struck for flake and microbladelet production. Most of the 22

	n	%
single platform core	71	66.36
opposed platform core	22	20.56
ninety-degree core	5	4.67
multiple platform core	6	5.61
discoidal core	3	2.80
total	107	100.00

Table.6.14. Cores at Site Z lithic debitage concentration

	n	mean (cm)	st.dev
length	80	3.53	0.86
width	80	2.08	0.62
thickness	80	1.72	0.66

Table.6.15. Metrical data of measured cores on pebbles at Site Z lithic debitage concentration

	n	mean (cm)	st.dev
length	8	2.24	0.42
width	8	2.50	0.30
thickness	8	1.61	0.68

Table.6.16. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Site Z lithic debitage concentration

	n	mean (cm)	st.dev
length	17	2.55	0.65
width	17	1.85	0.59
thickness	17	1.26	0.59

Table.6.17. Metrical data of measured cores on fragments of pebbles at Site Z lithic debitage concentration

	n	mean (cm)	st.dev
length	2	3.60	0.70
width	2	3.80	0.50
thickness	2	1.35	0.25

Table.6.18. Metrical data of measured cores on fragments of cobbles at Site Z lithic debitage concentration



Fig.6.10. Single platform cores made on pebbles of various shapes at Site Z lithic debitage concentration

opposed platform cores, five ninety-degree cores and six multiple platform cores are also made on elongated pebbles or their fragments.

6.4.4.3. Debitage products

Debitage products are quite numerous in the collection (**Table 6.19**), and include both small flakes and bladelets (**Table 6.20**). Bladelets are outnumbered.

6.4.4.4. Lithic manufacture

Several successfully refitted pieces show the common pebble knapping sequence (**Fig.6.11**). One end of an elongated pebble is blown off by

	n	%
core tablet	2	0.36
primary chunk	69	12.41
chip/chunk	15	2.70
primary flake	51	9.17
flake from single platform core	194	34.89
flake from opposed platform core	16	2.88
flake from ninety-degree core	23	4.14
flake from multiple platform core	3	0.54
unidentifiable flake	16	2.88
primary blade/bladelet	28	5.04
blade/bladelet from single platform core	128	23.02
blade/bladelet from opposed platform core	8	1.44
blade/bladelet from ninety-degree core	3	0.54
total	556	100.00

Table.6.19. Debitage products at Site Z lithic debitage concentration

	n	mean (cm)	st.dev
length	368	2.18	0.80
width	368	1.38	0.48
thickness	368	0.41	0.27

Table.6.20. Metrical data of measured debitage products at Site Z lithic debitage concentration

one strike, and a striking platform is created, forming an angle of approximately 90 degree or less with the longer axis of pebbles. As a consequence, an unfacetted platform is the most common form of platform preparation. Then several flakes and bladelets were struck off. Some refitted cores may be examples of failure or those handled by unskilful knappers, because the cores and debitage products exhibit irregular fractures. It is probable that the knappers gave up using the cores and discarded them even though the cores are still large enough. One example shows that an elongated pebble was snapped in the middle into two pieces, and the two elongated pieces were used as a single platform core and an opposed platform core respectively.

6.4.4.5. Tools

Bladelets of approximately 3 cm long and microbladelets of less than 2 cm long are the major tools found in this collection, and they



Fig.6.11. Refitted single platform cores made on elongated pebbles at Site Z lithic debitage concentration

amount to 83 in total. Backed bladelets are not numerous, and they are only 11, including four broken ones. Five of them are the straight-backed variety which is identical to Tixier's Type 45. Two of the unbroken backed bladelets exhibit unfinished backing retouch. No other kind of retouched tools were found.

6.4.5. Hearth field

Approximately 200 m to the west of the lithic debitage concentration described above, there are a number of concentrations of shell-bearing pale white limestone cobbles on the gentle slope (**Fig.6.12**). The limestone cobbles of some concentrations are burnt, and fragments of charcoal remain beneath the cobbles. The other concentrations of limestone cobbles are accompanied by burnt and fire-cracked flint pebbles, Epipalaeolithic lithic artefacts including backed blades and the Ounan points (**Fig.6.13**), and fish/animal bone fragments. Therefore, it is most likely that these cobble concentrations are stone-built hearths which are dated to the Epipalaeolithic period. Nine discrete concentrations of limestone cobbles were



Fig.6.12. Site Z hearth field (looking southwest)



Fig.6.13. Ounan points collected at Site Z hearth field

recorded in an area of approximately 50 m by 50 m, though they were not studied in detail due to the lack of time. Four of them are located at the higher elevation of the slope, and they consist of larger limestone cobbles and are less deflated in comparison with the others. It seems obvious that the hearth stones derived from the water/wind-eroded pale limestone bed which is exposed a few metres above this hearth field. The limestone bed stretches east-west approximately 1 km in length on the westernmost part of the northern shore of the Z Basin, and a number of limestone slabs and fragments are scattered downslope. Thus it must have been easy for Epipalaeolithic people to collect them.

6.4.6. Some consideration on life in Site Z

Given the surface structural remains and artefact scatters which do not seem to have been severely tumbled by natural forces, some considerations on how the basin shore was used or inhabited by Epipalaeolithic people may be allowed.

As for the source of the flint pebbles, it was suggested that the gravelly escarpments which are approximately 1 km to the north of the Z Basin were the most likely source. It can be argued that the inhabitants of the westernmost part of Site Z would perhaps have walked to the nearest escarpments with a fine view routinely for monitoring and have transported a whole handful of flint pebbles to the localities on the basin shore. The fact that the people brought pebbles and started to make bladelets on the basin shore rather than made bladelets elsewhere and came with the bladelets suggests that the people could afford to make tools in the proximity of wild food resources there. It follows from this fact that the people would have stayed here for some or a considerable length of time and have exploited resources which did not flee and were not easily depleted. This is certainly how aquatic resources like fish and marsh plants could be most effectively harvested.

In contrast, the situation of the easternmost part of Site Z is fairly different. The lack of clear evidence for mass transport of lithic raw materials and the presence of formal projectile points indicate that people's visit to this part of Site Z was fortuitous and short, and that the aim of the visit was bow-hunting rather than fishing and plant harvesting. Furthermore, this contrasting situation may suggest that even though these two parts of Site Z are located at the almost same elevation, they were occupied at different times of the Epipalaeolithic period. It is possible that the environmental settings such as water level and vegetation cover were different at each time, and accordingly the major focus of subsistence activity shifted from one to the other.

6.5. Epipalaeolithic lithic assemblage at the Camp II Ridge on the eastern shore of the Z Basin

6.5.1. Introduction

Camp II is the place where Caton-Thompson pitched her second camp during her field campaign. It is located at the eastern margin of the Z Basin (**Fig.6.3**). She stayed on the bottom of a narrow cove, which was divided from the main body of the Z Basin by a linear dune, and was named the Camp II Basin by her (Caton-Thompson and Gardner 1934: 76-77). Surface artefact scatters are still quite extensive from the bottom of the Camp II Basin, which is around 7-10 m asl, onto the eastern slope and ridge of the Basin, which is around 15-18 m asl. The Camp II Ridge is actually the eastern shore of the Z Basin, and its surface is marked by an approximately 100 m wide white band of beach sediments, consisting mainly of calcium carbonate pellets.

Artefact scatters are particularly dense around the eastern margin of this white band (**Fig.6.14**), and most noticeable artefacts are lithic cores and tools of the Epipalaeolithic. Scatters of numerous ostrich eggshell fragments were also seen in this area. No pottery sherds are found, and there are no structural remains like hearths. This situation suggests that these beach sediments and artefact

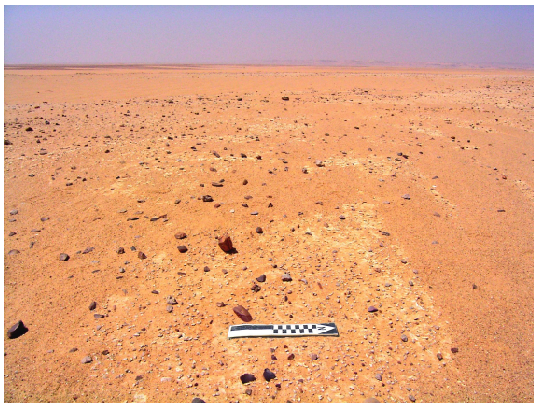


Fig.6.14. Scatter of lithic artefacts at the Camp II Ridge (looking west)

scatter patterns were made by the wave action of oscillating basin water caused by a predominant wind from the west in the Early-Middle Holocene, and hence that the original context of basin shore habitation in the Epipalaeolithic period has been considerably disturbed. Two 5 m x 5 m squares were set up for surface collection at one locality of the densest artefact scatter (surface collection square A) and another locality of relatively sparse artefact scatter (surface collection square B) on the eastern margin of the beach sediments. Surface collection square A is located approximately 90 m southeast of Surface collection square B.

6.5.2. Surface collection square A

At this locality (N29.58528° E30.78867°), 332 artefacts and four unworked flint pebbles were collected in a 5 m x 5 m square (**Table 6.21**). All artefacts were not embedded in the beach sediments but rested on calcium carbonate pellets and coarse-grained loose sand. Large cores made on cobbles as well as pebbles are quite noticeable at this locality.

6.5.2.1. Lithic raw materials

There are two distinct kinds of raw material in this assemblage. One is a subangular or rounded, elongated or irregularly-shaped flint pebble of various colours from light to dark brown. The surface of the pebbles is generally smooth and well polished. Another is a rounded and oval flint cobble of various colours from light to dark brown. The surface of the cobble is weathered or abraded. Many of them have a brown cortex, but some of them have a white calcareous cortex. Both pebbles and cobbles of these kinds do not naturally occur in the beach sediments. Thus it is certain that they have been transported from elsewhere.

6.5.2.2. Cores

49 cores are included in the collection (**Table 6.22**). Cores can be divided into two different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.23**) (**Fig.6.15**-1). The second is made on fragments of cobbles (**Table 6.24**) (**Fig.6.15**-2).

	n
whole pebble	4
single platform core	39
opposed platform core	5
ninety-degree core	3
discoidal core	2
core tablet	3
primary chunk	6
chip/chunk	1
primary flake	13
flake from single platform core	69
flake from opposed platform core	11
flake from ninety-degree core	21
unidentifiable flake	17
primary blade/bladelet	8
blade/bladelet from single platform core	18
blade/bladelet from opposed platform core	2
unidentifiable blade/bladelet	1
blade/bladelet	95
backed bladelet	11
trihedral rod	1
notch	2
denticulate	4
total	336

Table.6.21. Inventory of finds at Camp II surface collection square A

	n	%
single platform core	39	79.59
opposed platform core	5	10.20
ninety-degree core	3	6.12
discoidal core	2	4.08
total	49	100.00

Table.6.22. Cores at Camp II surface collection square A

	n	mean (cm)	st.dev
length	29	3.09	0.72
width	29	2.64	0.66
thickness	29	2.64	0.85

Table.6.23. Metrical data of measured cores on pebbles at Camp II surface collection square A

	n	mean (cm)	st.dev
length	20	3.27	0.94
width	20	3.35	0.63
thickness	20	2.28	0.78

Table.6.24. Metrical data of measured cores on fragments of cobbles at Camp II surface collection square A

	n	%
core tablet	3	1.76
primary chunk	6	3.53
chip/chunk	1	0.59
primary flake	13	7.65
flake from single platform core	69	40.59
flake from opposed platform core	11	6.47
flake from ninety-degree core	21	12.35
unidentifiable flake	17	10.00
primary blade/bladelet	8	4.71
blade/bladelet from single platform core	18	10.59
blade/bladelet from opposed platform core	2	1.18
unidentifiable blade/bladelet	1	0.59
total	170	100.00

Table.6.25. Debitage products at Camp II surface collection square A

	n	mean (cm)	st.dev
length	107	2.40	0.86
width	107	1.90	0.57
thickness	107	0.57	0.32

Table.6.26. Metrical data of measured debitage products at Camp II surface collection square A

There are 39 single platform cores, and at least 10 of them are made on cobbles. There are five opposed platform cores, four of which are made on cobbles. There are three ninety-degree cores, one of which is made on cobble. There are two discoidal cores made on pebbles. This high rate of cores made on cobbles against cores made on pebbles is quite noticeable. When cores were made on fragments of weathered or abraded flint cobbles, non-cortical parts of the fragments were usually used as striking platforms, and several bladelets of 3-4 cm long were obtained.

6.5.2.3. Debitage products

The number of flakes is much larger than that of blades/bladelets (**Table 6.25**). However, it seems that the production of blades/bladelets was more strongly aimed for, judging from the number of readily-usable blades/bladelets shown in **Table 6.21**. The debitage products at this locality are slightly larger in size than those in Site Z (**Table 6.26**).

6.5.2.4. Lithic manufacture

There is no refitted specimen for discussing the tool manufacturing process, but the cores and debitage products suggest that toolmakers knapped flint pebbles and cobbles in a regular manner. It may be said that debitage production was generally bladelet-oriented.

6.5.2.5. Tools

There are quite numerous bladelets and microbladelets, and they amount to 95. There are 11 backed bladelets including Tixier's Types 45, 52-53, and 95 (**Fig.6.16**-1, 2 and 3). There is one trihedral rod. Other informal tools include four denticulates and two notches.

6.5.3. Surface collection square B

At this locality (N29.58586° E30.78803°), 159 artefacts and five unworked flint pebbles were collected in a 5 m x 5 m square (**Table 6.27**). All artefacts rested on calcium carbonate pellets and coarse-grained loose sand.

6.5.3.1. Lithic raw materials

The raw material use at this locality is almost the same as that at surface collection square A. There are two distinct kinds of raw materials. One is a subangular or rounded, elongated or irregularly-shaped flint pebble of various colours from light to dark brown, and another is a rounded and oval flint cobble of various colours from light to dark brown.

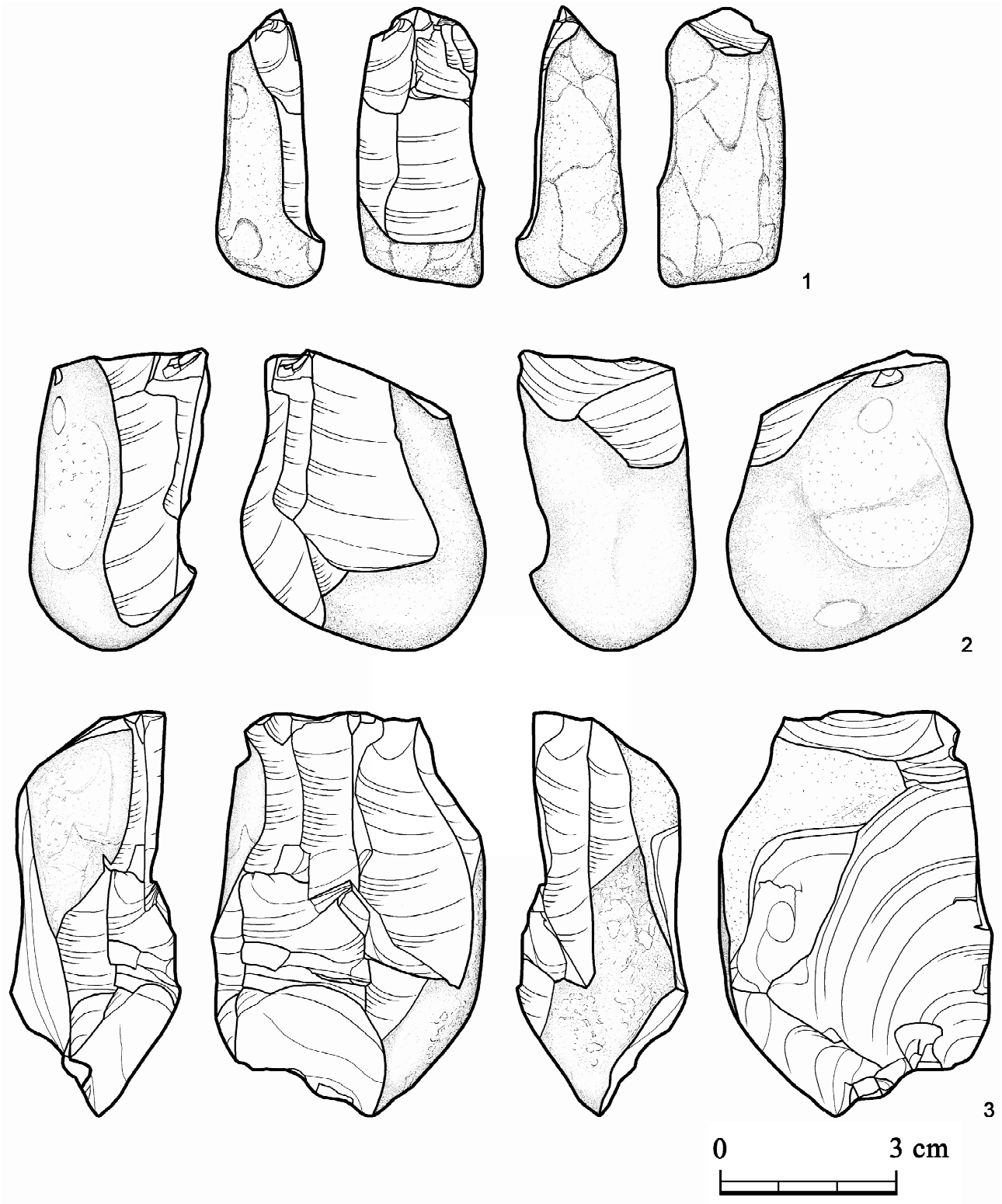


Fig.6.15. Cores collected at Camp II surface collection squares A and B

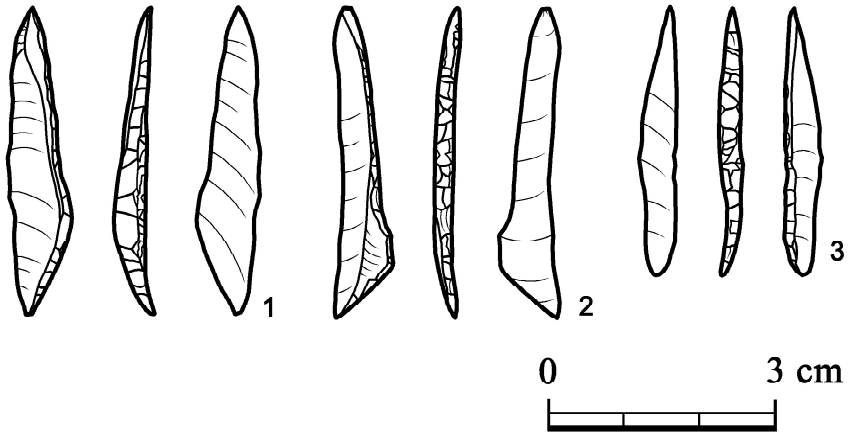


Fig.6.16. Tools collected at Camp II surface collection squares A

	n
whole pebble	5
single platform core	21
opposed platform core	3
ninety-degree core	3
multiple platform core	6
discoidal core	1
core tablet	2
primary chunk	2
primary flake	10
flake from single platform core	58
flake from opposed platform core	3
flake from ninety-degree core	5
flake from multiple platform core	6
unidentifiable flake	5
blade/bladelet from single platform core	4
blade/bladelet	22
backed bladelet	1
trihedral rod	1
notch	1
denticulate	1
scraper	2
retouched flake	2
total	164

Table.6.27. Inventory of finds at Camp II surface collection square B

	n	%
single platform core	21	61.76
opposed platform core	3	8.82
ninety-degree core	3	8.82
multiple platform core	6	17.65
discoidal core	1	2.94
total	34	100.00

Table.6.28. Cores at Camp II surface collection square B

	n	mean (cm)	st.dev
length	17	2.64	1.03
width	17	2.75	0.80
thickness	17	2.33	0.85

Table.6.29. Metrical data of measured cores on pebbles at Camp II surface collection square B

	n	mean (cm)	st.dev
length	7	2.17	0.45
width	7	2.47	0.62
thickness	7	1.49	0.46

Table.6.30. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Camp II surface collection square B

6.5.3.2. Cores

34 cores are included in the collection (**Table 6.28**). Cores are certainly numerous against the total number of all debitage products collected at this locality. Cores can be divided into three different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.29**). The second is made on conical or hemispherical chunks with almost 100 % cortex,

which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.30**). The third is made on fragments of cobbles (**Table 6.31**) (**Fig.6.15**-3). All kinds of cores are included, but more than a half of all cores are single platform cores. It is noted that five out of 21 single platform cores and one out of three ninety-degree cores are made on fragments of cobbles. The other cores are made on pebbles. Most cores listed here are for blade/bladelet production. Cores made on conical or hemispherical chunks with almost 100 % cortex were used for flake production.

6.5.3.3. Debitage products

The total number of primary chunks and primary flakes is small against the number of cores (**Table 6.32**). It is likely that this assemblage is distorted to some extent. In general, the size of debitage products at this locality (**Table 6.33**) is slightly larger than those at surface collection square A.

6.5.3.4. Lithic manufacture

There is no refitted specimen for discussing the tool manufacturing process, but the cores and debitage products suggest that toolmakers knapped flint pebbles and cobbles in a regular manner. It seems that debitage production was more flake-oriented.

6.5.3.5. Tools

Tools are not numerous. But considering the small size of the collection, the small number of tools is not surprising. One backed bladelet of an arch-backed and double pointed variety, which is close to Tixier's Type 57, was noted.

6.5.4. A low mound to the east of surface collection squares A and B

Apart from the systematic surface collection at the two localities, one particular location was noticed approximately 40-50 m to the east of these. It is a long, low mound stretching north-south along the eastern shore of the Z Basin, and the surface is covered by porous calcrete duricrusts. The western face of the mound is more severely eroded, and laminated calcium carbonate and sand are exposed. It seems that this mound was made and eroded by wave action of oscillating water on the eastern shore of the Z Basin. Lithic artefacts are scattered on and around this low mound, and some artefacts are about to be eroded out of the deposits.

Lithic artefacts include a number of backed bladelets which are quite similar to those seen in Site Z, but the most remarkable artefacts are a side-notched projectile point (**Fig.8.5**-2), a tanged projectile point and a leaf-shaped projectile point (**Fig.8.7-**4 and 5), which are reminiscent of not only those of the (bi)facial techno-complex of the Western Desert in the 7th-

	n	mean (cm)	st.dev
length	10	3.25	1.46
width	10	3.81	0.73
thickness	10	2.75	0.78

Table.6.31. Metrical data of measured cores on fragments of cobbles at Camp II surface collection square B

	n	%
core tablet	2	2.11
primary chunk	2	2.11
primary flake	10	10.53
flake from single platform core	58	61.05
flake from opposed platform core	3	3.16
flake from ninety-degree core	5	5.26
flake from multiple platform core	6	6.32
unidentifiable flake	5	5.26
blade/bladelet from single platform core	4	4.21
total	95	100.00

Table.6.32. Debitage products at Camp II surface collection square B

	n	mean (cm)	st.dev
length	71	2.45	0.89
width	71	2.29	0.73
thickness	71	0.63	0.27

Table.6.33. Metrical data of measured debitage products at Camp II surface collection square B

6th millennia cal.BC but also those of the Levantine Pre-Pottery Neolithic and Pottery Neolithic. As Caton-Thompson has reported, Camp II and its vicinity has produced an extremely large number of peculiar projectile points whose dates were uncertain (Caton-Thompson and Gardner 1934: 76-77 and pl.LI), and these new discoveries also reconfirm the uniqueness of Camp II. Although the precise dates of these projectile points remain uncertain, they give some clue for reconsidering the Fayum chronology and cultural connections with neighbouring regions.

6.5.5. Some considerations on life at the Camp II Ridge

Considering the disturbed situation, it is difficult to imagine how the eastern shore of the Z Basin was used or inhabited by Epipalaeolithic people. Nevertheless, the presence of two distinct kinds of lithic raw materials which do not naturally occur on the Z Basin shore suggests that people's stay at Camp II was a regular, planned visit for a considerable length of time, and that the use of the raw materials at Camp II was made possible by either residential moves to and from source areas, or, more likely, logistical moves from Camp II to the source areas by a task group.

The reason why this part of the Z Basin was continuously or repeatedly occupied is not certain because of the paucity of faunal remains. However, the steeply-inclined shore and probably oxygen-rich water due to strong wave action caused by a westerly wind in this part of the Z Basin would have been ideal conditions for the fish and animal species that require or prefer such deep water, and it is possible that this part of the Z Basin was an invaluable resource patch which was not comparable to other places of stagnant water in the surrounding area.

6.6. Epipalaeolithic lithic assemblages on the northeastern shore of the X Basin

6.6.1. Introduction

Site E29H1 in the X Basin has been recognised and reported by Caton-Thompson in the 1920s as an unnamed extensive surface site (Caton-Thompson and Gardner 1934: 74 and pl.CX), and thereafter revisited and studied in more detail by the Combined Prehistoric Expedition in 1969 (Wendorf and Schild 1976: 181-199). The Combined Prehistoric Expedition found vast scatters of Epipalaeolithic lithic artefacts in this site, and studied the lithic assemblage from the surface collection and excavation grids named Areas A, B, and C (Wendorf and Schild 1976: Fig.121). The Combined Prehistoric Expedition published main typological indices of tools from Areas A and C on the basis of the Tixier typology, while dealing with 310 tools in total (Wendorf and Schild 1976: Table 17 and Fig.210). However, only a small number of the tools from Area A were presented (Said *et al*. 1970: Figs.6 and 7; Said *et al*. 1972: Fig.3), and it was only briefly mentioned how the cores in this lithic assemblage looked. Therefore, how the lithic technology was organised remains unknown.

At present, Site E29H1 looks different from that previously described by the Combined Prehistoric Expedition. Although the present topography and spatial extent of the site perfectly match the Combined Prehistoric Expedition's description, its elevation is 10-13 m asl, which is almost the same as described on Caton-Thompson's map but is approximately 5 m lower than that reported by the Combined Prehistoric Expedition (**Fig.6.17**). The Areas A, B and C are not visible on the surface. Not only wide and dense scatters of lithic artefacts but also many concentrations of sandstone/limestone cobbles and fragments, which are apparently hearths, are located on the surface either to the east of the supposed locations of Areas B and C, or between the supposed locations of these two Areas. However, such remains have not been mentioned by the Combined Prehistoric Expedition. In this hearth field, not only several concentrations of

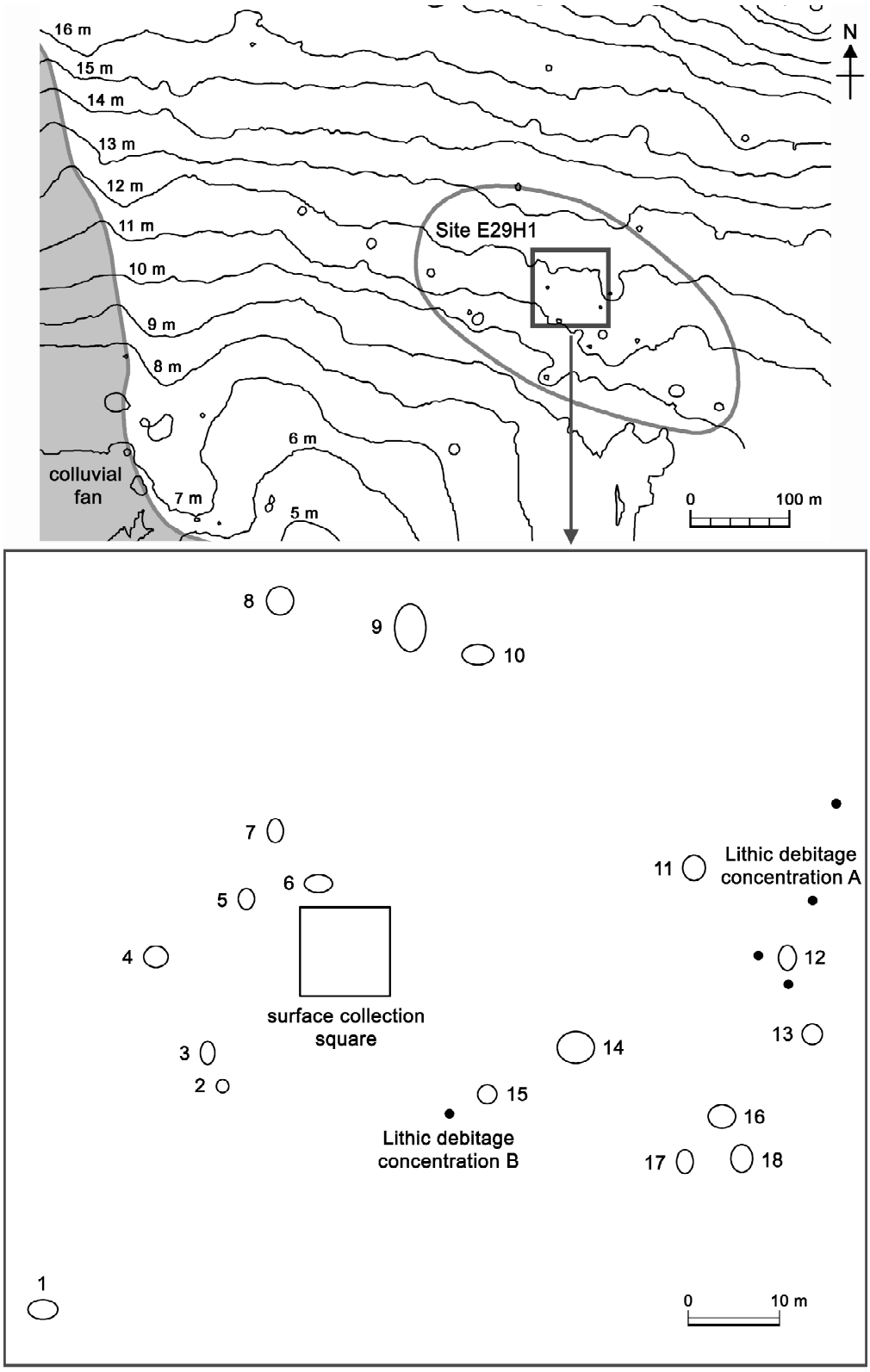


Fig.6.17. Map of Site E29H1 and Area D hearth field

animal and fish bone fragments but also several noticeable concentrations of lithic debitage products, which seem to be lithic debitage dumping spots, were found. This hearth field (N29.58393° E30.83304° in the centre) was named Area D after the Combined Prehistoric Expedition's Areas A, B, and C, and an intensive investigation including mapping and surface artefact collecting was carried out.

6.6.2. Area D

Site E29H1 is located on the gentle slope falling southwards to the bottom of the X Basin. At present, the ground surface is covered by fine-grained aeolian sand, and is devoid of vegetation. A north-south cross section of Site E29H1 has been made by the Combined Prehistoric Expedition (Wendorf and Schild 1976: Fig.140). According to the cross section, the site is located on a levee consisting of fine to medium-grained deltaic sand. This may mean that the Epipalaeolithic people chose a high elevation for their habitation in order to escape inundation. Area D is approximately 80 m (north-south) x 80 m (east-west). Following the typology of hearths by Wright (2005), 18 clearly visible hearths recorded in Area D can be described as stone-filled or stone-lined pit hearths, and four hardly recognisable, deflated ones can be described as fireplaces in a strict sense, or, they had been stone-bordered or stone-filled but the hearth stones had been removed in the past. It is not certain whether there was a pit in the middle of each hearth because no excavation was carried out, but it seems likely that the stones were put together in a shallow depression for distributing heat or supporting items to be heated. It seems that considerable time and energy were expended to construct each hearth, and it is assumed that these hearths represent more than single burning event. The surface on which these hearths were

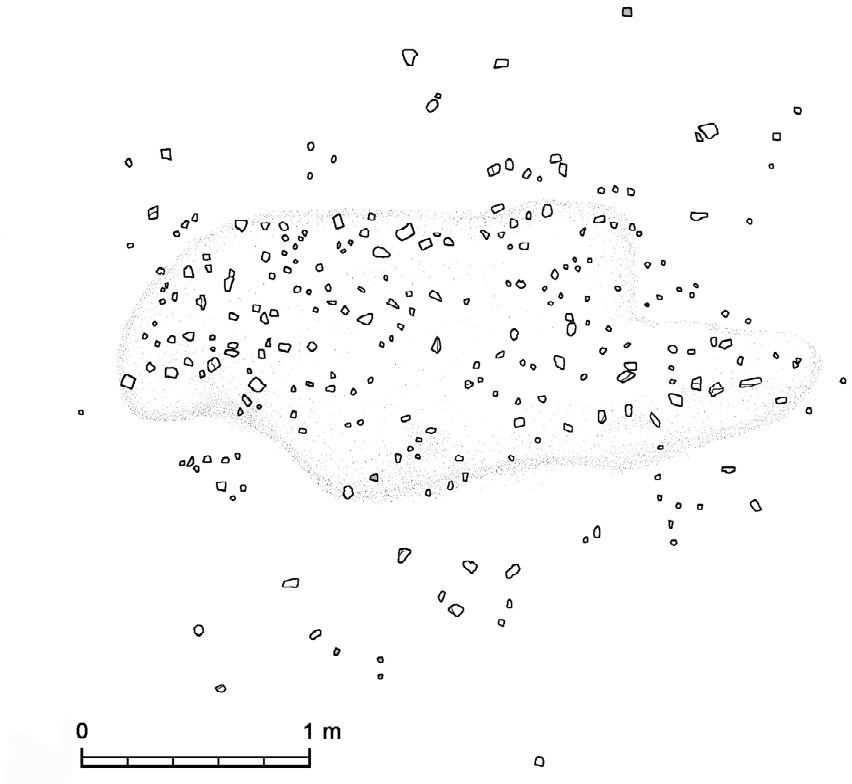


Fig.6.18. Hearth 1 in Site E29H1 Area D

located is generally flat, and the difference of elevation between the hearth on the highest ground and the hearth on the lowest ground is approximately 2 m.

6.6.3. Area D hearths

6.6.3.1. Description of individual hearths

Hearth 1 (Fig.6.18)
It is a dense cluster of limestone cobbles which are approximately 2-6 cm in diameter on a low mound. The mound consists of compacted fine pale yellow sand. The discreteness of the cobble cluster is relatively high, but on the other hand, most cobbles are fragmentary, and the hearth mound seems to be slightly deflated. A few lithic artefacts are scattered on and around the mound. A few pieces of mammal bones are seen 2 m to the south.

Hearth 2 (Fig.6.19)
It consists of subrounded sandstone cobbles of 3-13 cm in diameter and small fragmentary limestone cobbles, but is deflated and flat. Fragments of mammal bones, lacustrine snails, and lithic artefacts are scattered around. Charcoal or swampy sediments were found beneath the surface.

Hearth 3 (Fig.6.20)
It consists of a number of subangular limestone cobbles of 3-15 cm in diameter, but is deflated and flat. Beneath the cobbles is fine compacted pale yellow sand. Fragments of mammal bones, lacustrine snails, and lithic artefacts are scattered around.

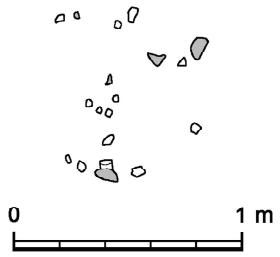


Fig.6.19. Hearth 2 in Site E29H1 Area D (sandstone in grey)

Hearth 4 (Fig.6.21)
It is a dense cluster of cobbles on a low mound of fine, compacted pale yellow sand. It consists of subangular limestone and sandstone cobbles of 3-10 cm in diameter. A number of relatively larger, subangular sandstone cobbles are notable. Lithic artefacts are not numerous.

Hearth 5 (Fig.6.22)
It is a dense cluster of cobbles on a low mound of coarse pale yellow aeolian sand. It consists of a number of subangular sandstone cobbles and a few subrounded limestone cobbles of 3-6 cm in diameter. Few lithic artefacts are around.

Hearth 6 (Fig.6.23)
It is a slightly deflated low mound consisting of coarse, aeolian sand. It consists of subangular to subrounded limestone cobbles of 3-8 cm in diameter. Lithic artefacts are scattered in the northern half of the hearth. A few lacustrine snails are notable.

Hearth 7 (Fig.6.24)
It is a sparse cluster of limestone and sandstone cobbles of 2-6 cm in diameter, accompanied by lithic artefacts and some lacustrine snails. It is

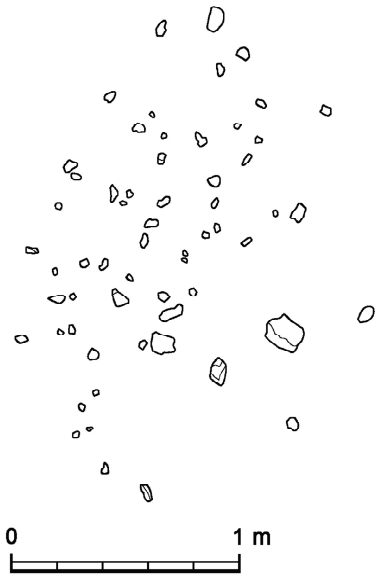


Fig.6.20. Hearth 3 in Site E29H1Area D

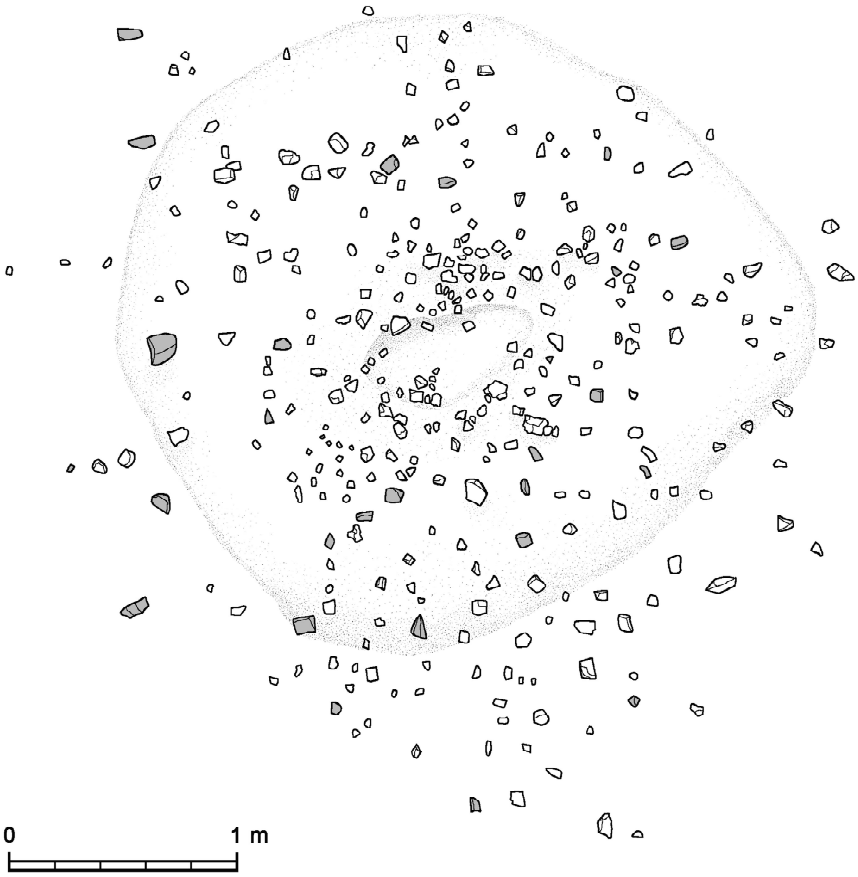


Fig.6.21. Hearth 4 in Site E29H1 Area D (sandstone in grey)



Fig.6.22. Hearth 5 in Site E29H1 Area D (sandstone in grey)

badly deflated and hence looks flat. The surface sand is fine and silty pale yellow sand. It seems to have recently been damaged through holes dug by animals.

Hearth 8 (Fig.6.25)

It is a dense cluster of cobbles on a high mound of fine silty and compacted pale yellow sand. It consists of a large number of subangular to subrounded limestone cobbles of 3-10 cm in diameter and a few subangular sandstone cobbles of similar size. Lithic artefacts are quite few on the mound, but there is a scatter of lithic artefacts to the northeast. Some lacustrine shells are noticeable.

Hearth 9 (Fig.6.26)

Probably a cluster of two or three hearths, but they are deflated and obscured. In particular, the

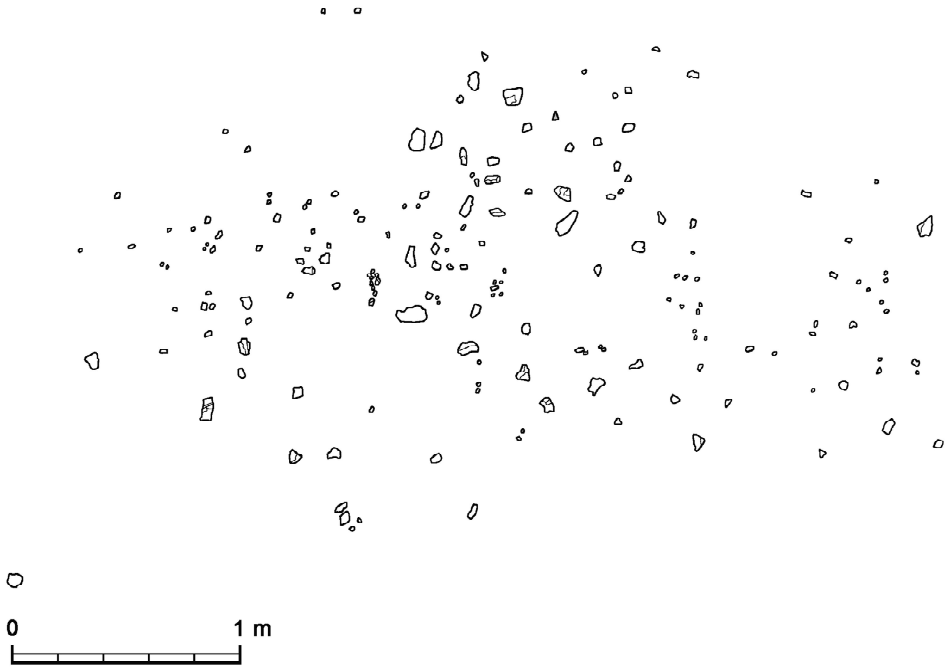


Fig.6.23. Hearth 6 in Site E29H1 Area D

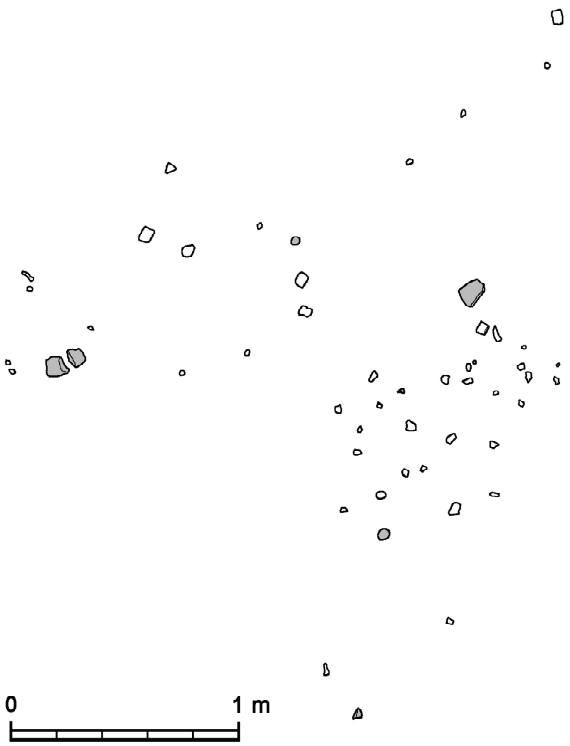


Fig.6.24. Hearth 7 in Site E29H1 Area D (sandstone in grey)

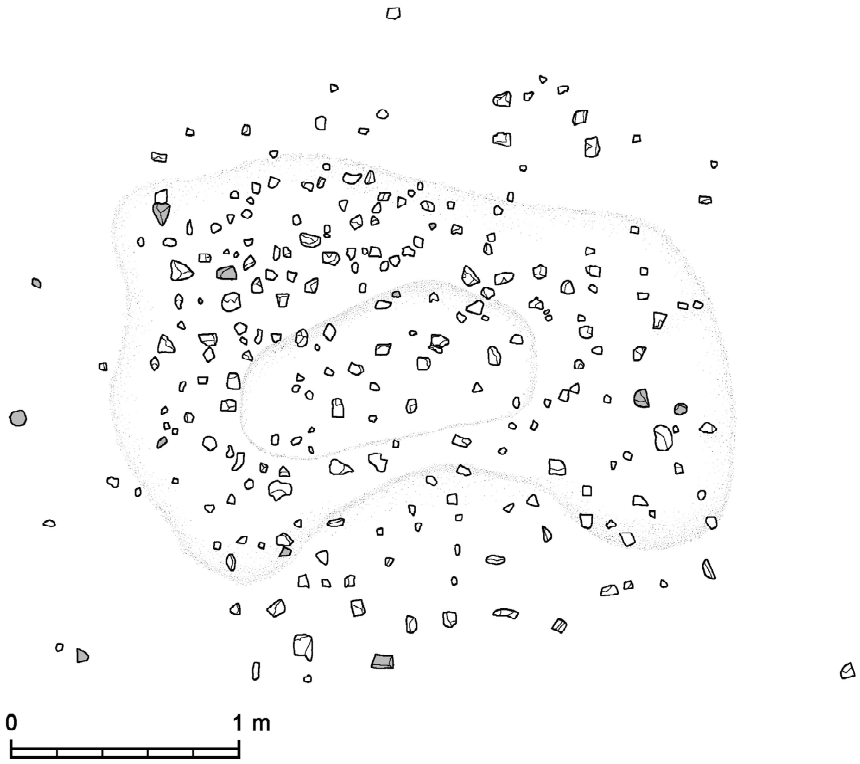


Fig.6.25. Hearth 8 in Site E29H1 Area D (sandstone in grey)

southernmost one is badly deflated. Also they are damaged by animals. Nevertheless, they still remain as low mounds. The mounds consist of fine and silty pale yellow sand. The hearths consist of subangular and subrounded limestone and sandstone cobbles of 2-10 cm in diameter. Lithic artefacts are numerous among the cobble scatters.

Hearth 10 (Fig.6.27)
It is a dense concentration of many subangular to subrounded limestone cobbles and a few angular sandstone cobbles of 2-10 cm in diameter on a mound. The mounds consist of fine and silty pale yellow sand. Lithic artefacts are numerous on and around the mound.

Hearth 11 (Fig.6.28)
Probably there are two hearths side by side, but they seem to have been deflated and hence obscured. Sparse circular clusters of subangular limestone cobbles/fragments and a few sandstone cobbles of 2-12 cm in diameter are on low mounds. Mammal bones and lithic artefacts are scattered on and around the mounds. A pit with charcoal and bones was found beneath the surface of the northwestern one.

Hearth 12 (Fig.6.29)
It is a dense cluster of many angular sandstone cobbles of 2-15 cm in diameter and a few limestone fragments on a low mound. There are many lithic artefacts, lacustrine snail fragments and mammal bones among the cobbles. There is one concentration of lithic artefacts 1.5 m to the south, and another concentration of lithic artefacts and mammal bones 2 m to the west.

Hearth 13 (Fig.6.30)
It consists of subangular limestone cobbles of 3-7 cm in diameter, but is deflated and recently almost destroyed. A very low mound consists of compacted but loose, pale yellow sand. No charcoal was found beneath the surface. A small,

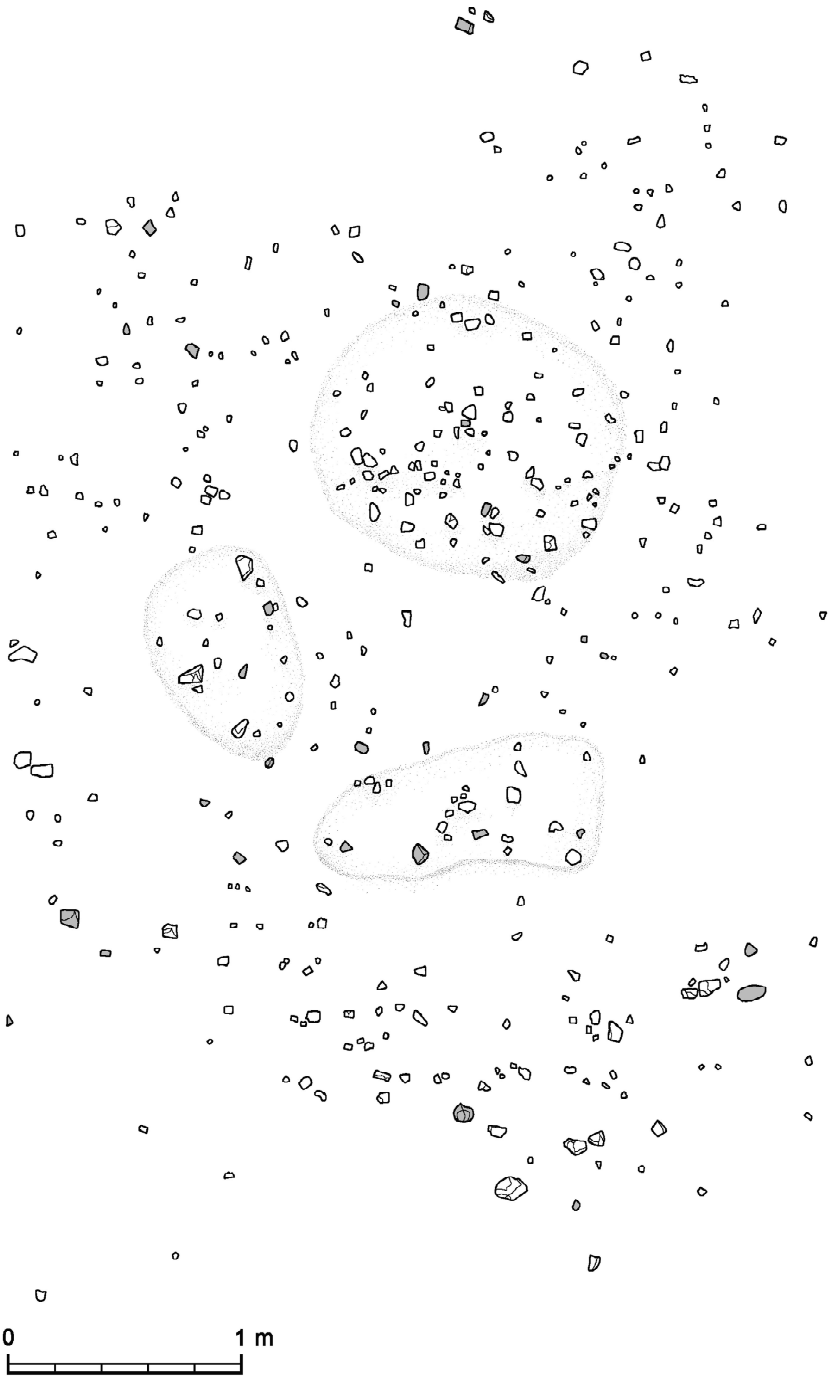


Fig.6.26. Hearth 9 in Site E29H1 Area D (sandstone in grey)

dense cluster of mammal bones are to the south of the hearth.

Hearth 14 (Fig.6.31)

It consists of a wide but sparse scatter of many fragmentary limestone cobbles of 2-6 cm in diameter and a few subangular sandstone

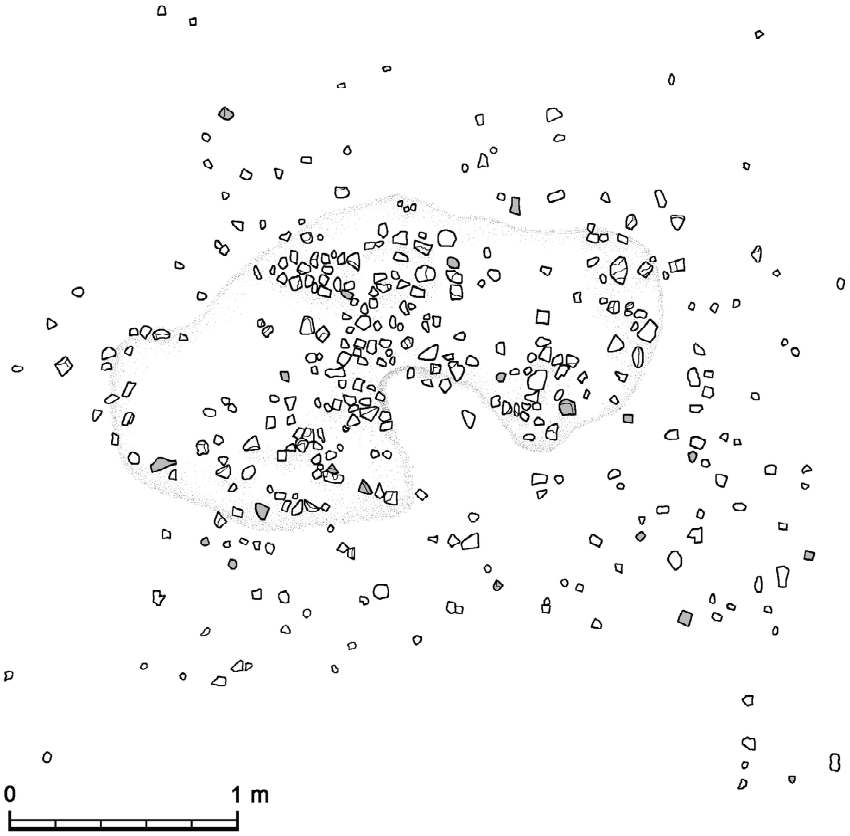


Fig.6.27. Hearth 10 in Site E29H1 Area D (sandstone in grey)

cobbles, but it is heavily deflated. The surface is covered by fine silty and compacted pale yellow sand. Lithic artefacts are numerous among the cobble scatter. There are also a few mammal bones, lacustrine snail fragments, and ostrich eggshell fragments.

Hearth 15 (Fig.6.32)
It is a dense cluster of subangular limestone and sandstone cobbles of 5-8 cm in diameter on a low mound of compacted fine silty pale yellow sand. The ratio of limestone and sandstone is almost 1:1. There are many lithic artefacts and some lacustrine snails among the cobble cluster.

Hearth 16 (Fig.6.33)
It consists of many angular sandstone cobbles and a few limestone cobbles of 3-9 cm in diameter, but it is deflated and flat. Lithic artefacts including cores and bladelets are not numerous.

Hearth 17 (Fig.6.34)
It is a scatter of subangular limestone and sandstone cobbles of 3-7 cm in diameter. It is deflated and flat, and seems to have recently been almost destroyed. Lithic artefacts are extremely numerous among the cobble scatter. The surface is covered by compacted pale yellow sand, and no charcoal was found beneath the surface.

Hearth 18 (Fig.6.35)
The surface is covered by compacted fine, silty, pale yellow sand. The hearths consist of limestone and sandstone cobbles of 3-7 cm in diameter. The surface is deflated and flat, and seems to have recently been destroyed and obscured. Lithic artefacts are not numerous. There are a few pieces of mammal bones to the east.

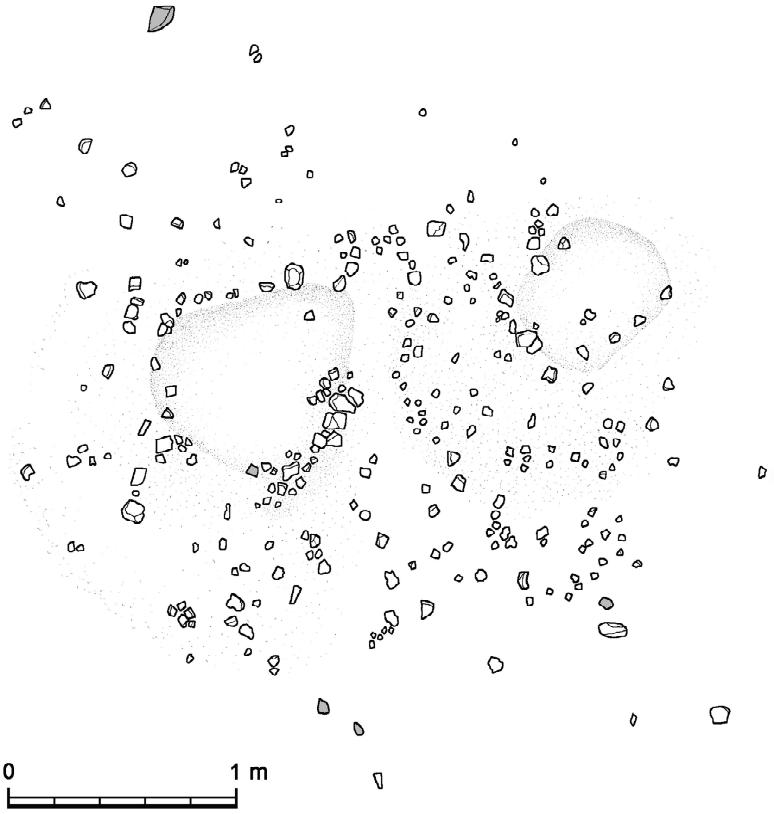


Fig.6.28. Hearth 11 in Site E29H1 Area D (sandstone in grey)

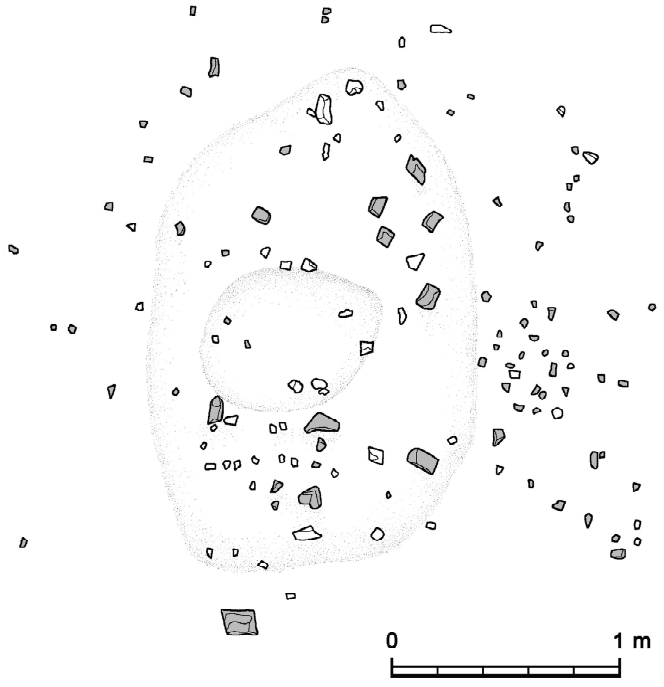


Fig.6.29. Hearth 12 in Site E29H1 Area D (sandstone in grey)



Fig.6.30. Hearth 13 in Site E29H1 Area D

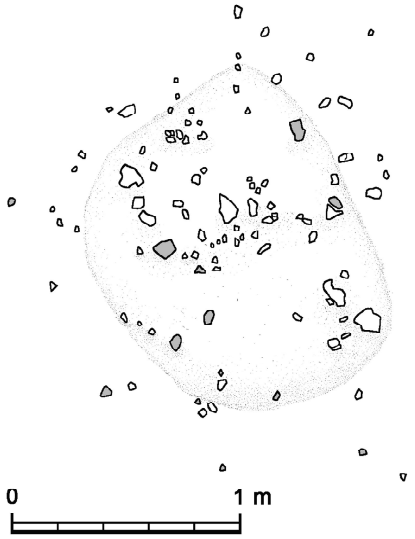


Fig.6.32. Hearth 15 in Site E29H1 Area D (sandstone in grey)

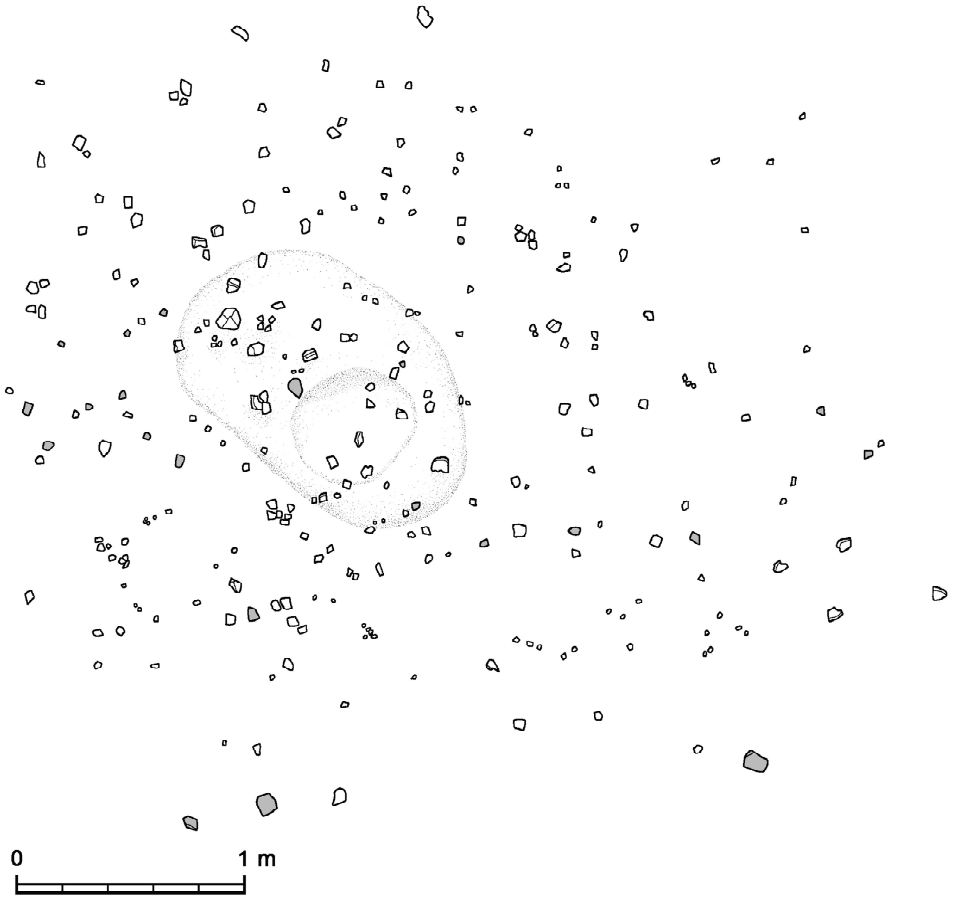


Fig.6.31. Hearth 14 in Site E29H1 Area D (sandstone in grey)

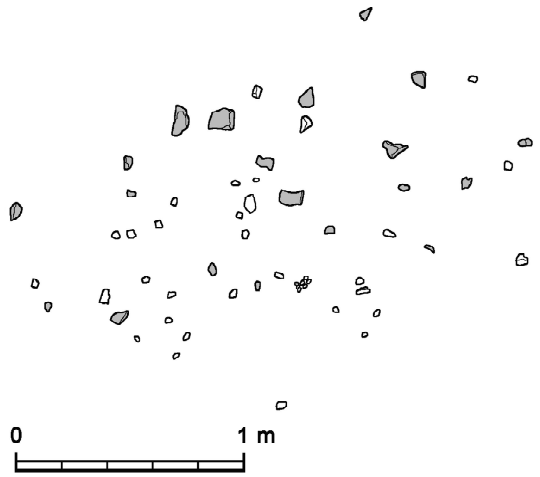


Fig.6.33. Hearth 16 in Site E29H1 Area D (sandstone in grey)



Fig.6.34. Hearth 17 in Site E29H1 Area D (sandstone in grey)

6.6.3.2. Some considerations on the life history of the hearths

Questions arise as to how long or how repeatedly individual hearths were used, and how many hearths were operational at one time. As described in detail, the variety, size, and number of rocks for making hearths are not equal, and the degree of discreteness of features like rock layout and artefact scatter are also not the same. Such various degrees of feature discreteness should be indicators of the duration and repetition of hearth use.

According to Chatters' four-level discreteness measure based on the degree of horizontal displacement among hearths and faunal remains (Chatters 1987: Fig.1), some hearths (9 and 11) should be classified as 'Level 1', which is the least discrete, and represents the result of multiple reuses. Some others (7 and 18) would be classified as 'Level 2', which is the result of a reoccupation of the same site with construction of fires in new places, while obscuring scatter of residues from the previous occupation. Most other hearths (1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 15, 16 and 17) could be classified as 'Level 3', which shows some changes in fire positions and scattering of debris clusters, resulting from a longer-term occupation but still representing a single period of residency. Based on this observation, it is tentatively concluded that this

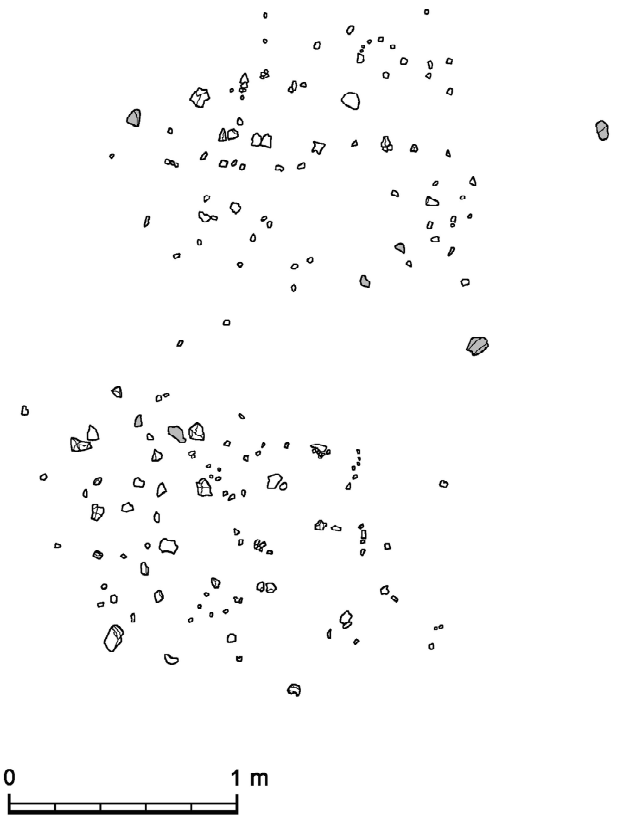


Fig.6.35. Hearth 18 in Site E29H1 Area D (sandstone in grey)

hearth field as a whole represents repeated occupations, and that each occupation was not a brief, undisturbed single event.

One process which has been observed by ethnoarchaeological studies with regard to site furniture is the size effect. Upon arrival at a known site, one generally searches for the furniture and pulls it up out of its matrix for reuse. As a consequence, large items of site furniture get continuously translated upward if a deposit is forming (Binford 1979). If this effect did take place in the hearth field in Area D, it is presumed that cobbles of older hearths would have gradually broken into smaller fragments due to fire cracking and natural erosion and decay, and would have been buried beneath sand. Nevertheless, larger cobbles and their fragments would have tended to remain unburied, and they would have been most likely pulled up and reused. Therefore, it is possible that some hearths (2, 3, 4, 10, 11 and 12) which are characterised by the presence of many larger cobbles are relatively later in date than other hearths consisting of small cobbles and fragments.

6.6.4. Wide scatters of lithic artefacts in the middle of the hearth field

There is a blank area in the middle of the hearth field, and no clear structural remains are visible on the surface, but the surface is covered by a tremendous number of lithic artefacts. Most of them are supposed to be dated to the Epipalaeolithic. It seems that those lithic artefacts are not randomly scattered, but somehow concentrated in a wide meandering band running from the northwest to the southeast. This may be caused by wave action of oscillating basin water on the beach in the past (Morton 2004: 45-54; Rapp and Hill 1998: Fig.2.4). In spite of the possible water rolling, preservation of these lithic artefacts is generally

very good, and edges and ridges of the lithic artefacts are still sharp at the macroscopic level. It has been argued that smaller, lighter, and flatter flakes are more easily transported by oscillating water flow than heavy and angular cores, but as described below, a large number of blades/ bladelets and flakes are included in these scatters, and their ratio against cores does not seem to be distorted. Hence it may be said that considerable size/weight/shape sorting of artefacts did not take place. This suggests that these lithic artefacts may have been disturbed by a single high energy wave event, and thereafter buried beneath lacustrine sediments for a long time, and have become exposed on the present surface very recently by wind erosion. Also as described below, some concentrations of Epipalaeolithic lithic artefacts in this field exhibit extremely high integrity and no trace of disturbance. Thus it is concluded that successive different wave events caused different degrees of disturbance even within the Epipalaeolithic period.

By contrast, there is a tendency that apparently Neolithic bifacially-retouched tools which are sparsely seen in this hearth field are more heavily rounded. This may support the above-mentioned suggestion that Epipalaeolithic lithic artefacts have been buried intact beneath lacustrine sediments for a long time, but overlying Neolithic lithic artefacts have been subject to water/wind erosion for a longer period.

A 10 m x 10 m square was set up in this blank area, and all lithic artefacts on the surface were collected in order to obtain a general idea about the lithic assemblage of this hearth field. The total number of collected lithic artefacts is 2541, including 31 unused or only partly used whole flint pebbles (**Table 6.34**). As mentioned above, the majority of the pieces are dated to the Epipalaeolithic, but some are dated to the Neolithic on the basis of technological features.

	n
whole pebble	31
single platform core	215
opposed platform core	36
ninety-degree core	13
multiple platform core	78
discoidal core	7
unclassifiable/fragmentary core	20
core tablet	18
primary chunk	134
chip/chunk	196
primary flake	210
flake from single platform core	569
flake from opposed platform core	35
flake from ninety-degree core	9
flake from multiple platform core	186
flake from discoidal core	1
unidentifiable flake	304
primary blade/bladelet	68
blade/bladelet from single platform core	206
blade/bladelet from opposed platform core	14
blade/bladelet from ninety-degree core	1
blade/bladelet from multiple platform core	4
unidentifiable blade/bladelet	58
blade/bladelet	72
backed bladelet	34
notch	2
denticulate	3
endscraper	2
retouched flake	10
winged and tanged projectile point	1
tanged projectile point	1
concave-based arrowhead (Neolithic)	1
unifacially-retouched knife (Neolithic)	1
knife blade (Neolithic)	1
total	2541

Table.6.34. Inventory of finds at Site E29H1 Area D surface collection square

6.6.4.1. Raw materials

The most commonly used raw materials are elongated or globular, subangular or rounded flint pebbles of less than 7 cm long and 4 cm wide. The surface of the pebbles is very smooth and not weathered. The colour of this flint is generally light brown to brown, and darker colour varieties are few. This kind of flint pebble does not naturally occur on the surface of this basin environment, but they are sparsely scattered on the gentle slope of low desert ridges, which extend from a rocky and gravelly summit named Gebel Abyad or El-Qarah el-Kharshah approximately 3 km to the north of the X Basin

shore. That area would have been the nearest source of flint pebbles. Therefore, it may be said that the Epipalaeolithic toolmakers of the X Basin procured lithic raw materials within easy walking distance, and it is difficult to believe that they procured flint pebbles at distant sources like the escarpments above Qasr el-Sagha, as has been suggested by previous researchers (Wendorf and Schild 1976: 311).

Another variety of raw material is white chalky flint, and a small number of debitage products and tools from this material was noticed in the collection. Some debitage products deriving from this white chalky flint retain a weathered calcareous cortex, but they are too fragmentary to understand the original shape of the pebble/cobble. Since no whole pebble which has this feature has been found, it is plausible that this flint derives from cobbles or nodules of unknown origin. Other chert which exhibits a translucent brown colour is quite few in this assemblage, and several debitage products from translucent brown chert are too small to understand the original shape of the pebble/cobble.

6.6.4.2. Cores

Cores are quite numerous in the collection (**Table 6.35**). Cores can be divided into four different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.36**). The second is made on conical or hemispherical chunks with almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.37**). The third is made on other fragments of pebbles (**Table 6.38**). The fourth is made on fragments of cobbles (**Table 6.39**). Cores are dominated by single platform cores (**Fig.6.36**-1, 2, 3 and 4), which amount to 215. In most cases, platforms are created on one end of an elongated or globular pebble by one strike, forming an angle of approximately 90 degrees or less with the longer axis of pebbles. As a consequence, an unfacetted platform is the most common form of platform preparation. Dihedral platforms are not numerous. Some dihedral platforms consist of a struck face and a cortical face. A facetted platform is quite rare. In other cases, angular or flat parts of the cortical surface

	n	%
single platform core	215	58.27
opposed platform core	36	9.76
ninety-degree core	13	3.52
multiple platform core	78	21.14
discoidal core	7	1.90
unclassifiable/fragmentary core	20	5.42
total	369	100.00

Table.6.35. Cores at Site E29H1 Area D surface collection square

	n	mean (cm)	st.dev
length	291	2.59	0.89
width	291	2.40	0.52
thickness	291	2.04	0.91

Table.6.36. Metrical data of measured cores on pebbles at Site E29H1 Area D surface collection square

	n	mean (cm)	st.dev
length	31	2.16	0.59
width	31	2.28	0.49
thickness	31	1.86	0.56

Table.6.37. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Site E29H1 Area D surface collection square

	n	mean (cm)	st.dev
length	10	2.97	0.98
width	10	2.60	0.48
thickness	10	1.36	0.47

Table.6.38. Metrical data of measured cores on fragments of pebbles at Site E29H1 Area D surface collection square

	n	mean (cm)	st.dev
length	17	2.65	1.15
width	17	3.35	1.02
thickness	17	2.66	0.93

Table.6.39. Metrical data of measured cores on fragments of cobbles at Site E29H1 Area D surface collection square

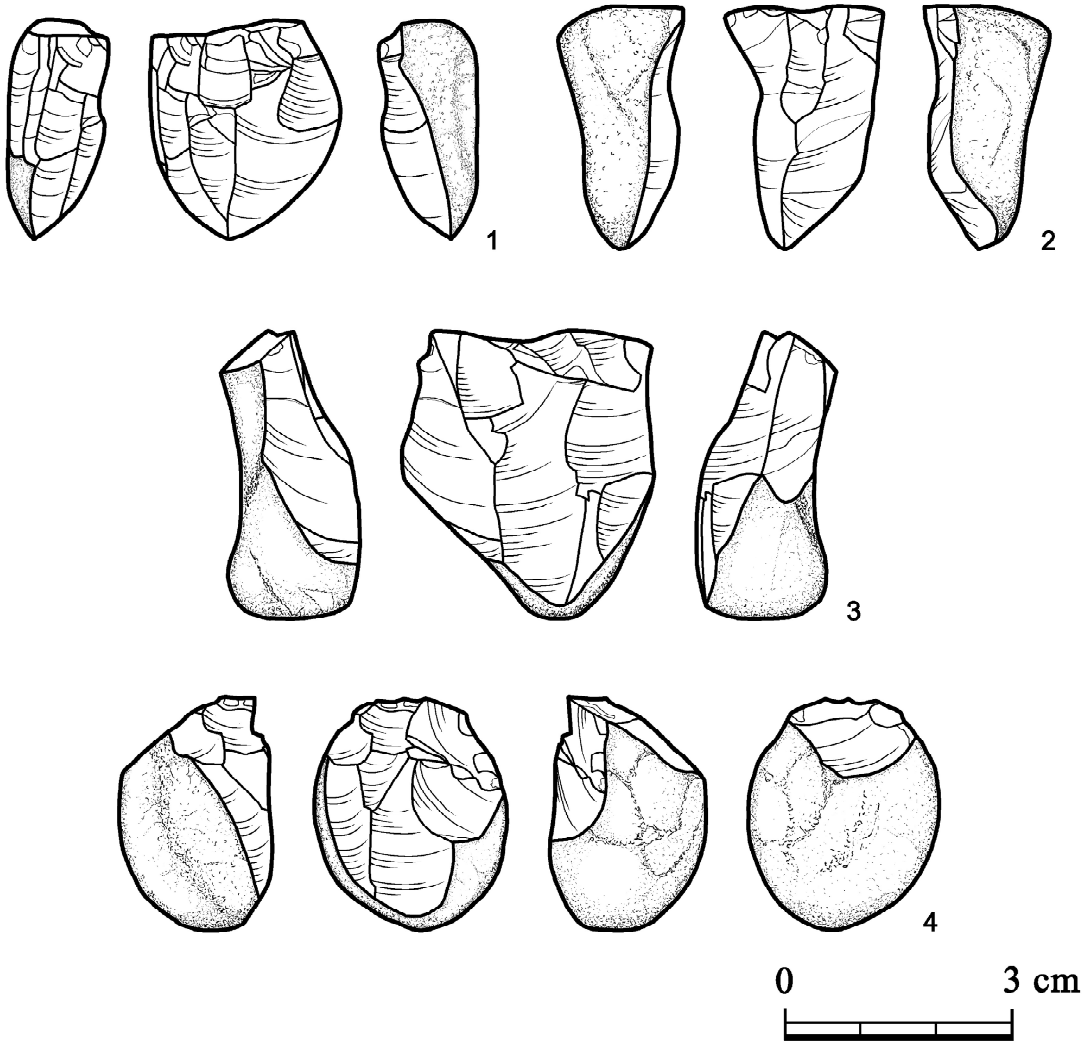


Fig.6.36. Single platform cores collected at Site E29H1 Area D surface collection square

of pebbles were used as platforms. Vertically half-split elongated pebbles were also used as cores, and a few flakes/bladelets were obtained from the ventral face. Pyramidal cores are one type of single platform core. They were made on angular or subangular fragments of weathered or abraded large flint cobbles, and the sources of such larger cobbles are not the same as those of the elongated pebbles described above. This type of core is not numerous in this assemblage.

The second most numerous cores are multiple platform cores, and they amount to 78. It was hard to find any patterned multiple platform preparation, and hence most of them were classified as unpatterned. Opposed platform cores (**Fig.6.37**-1, 2 and 3) and ninety-degree cores are not numerous, and amount to 36 and 13 respectively. There are 20 unclassifiable fragmentary cores. These were so repeatedly struck that it is hard to imagine the original shape of the pebbles, whereas many other cores were discarded after a few flakes or bladelets were obtained, and hence they still retain the original shape.

In some cases, thick primary flakes were also used as cores. Flakes and bladelets were struck off from the dorsal to ventral face, forming an angle of approximately 90 degrees with the

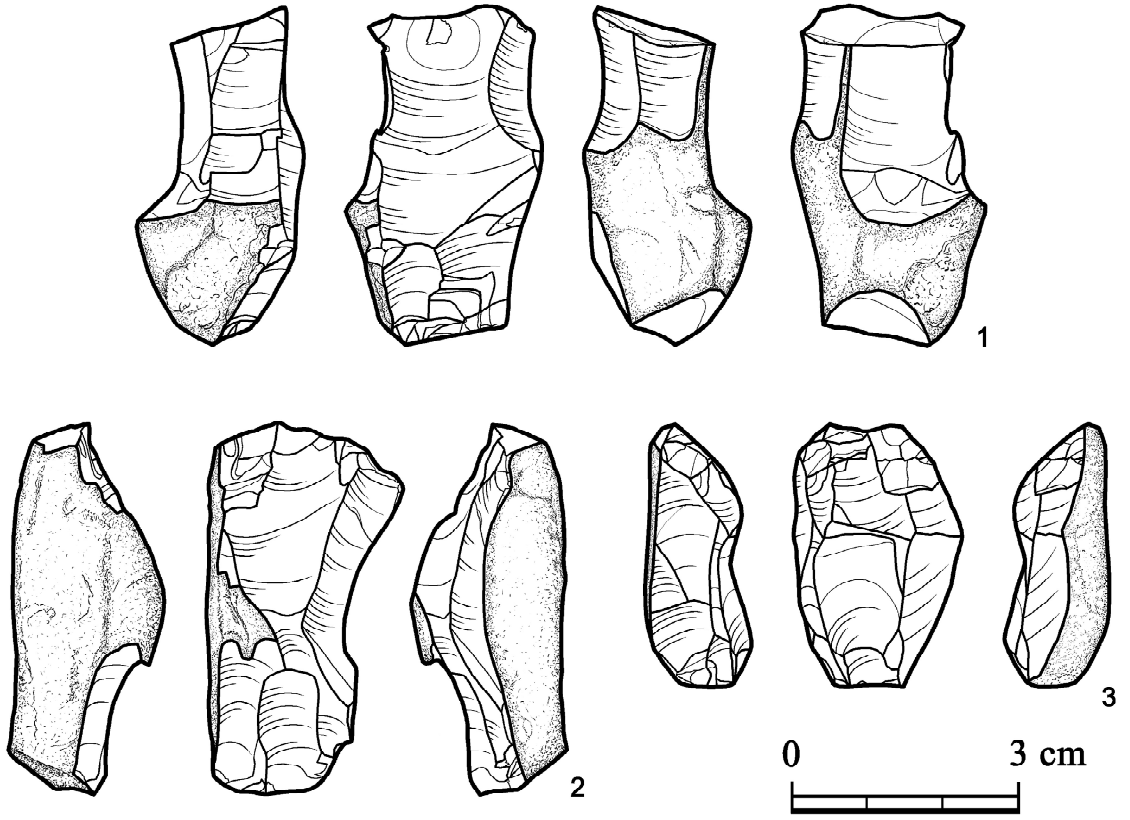


Fig.6.37. Opposed platform cores collected at Site E29H1 Area D surface collection square

	n	%
core tablet	18	0.89
primary chunk	134	6.66
chip/chunk	196	9.74
primary flake	210	10.43
flake from single platform core	569	28.27
flake from opposed platform core	35	1.74
flake from ninety-degree core	9	0.45
flake from multiple platform core	186	9.24
flake from discoidal core	1	0.05
unidentifiable flake	304	15.10
primary blade/bladelet	68	3.38
blade/bladelet from single platform core	206	10.23
blade/bladelet from opposed platform core	14	0.70
blade/bladelet from ninety-degree core	1	0.05
blade/bladelet from multiple platform core	4	0.20
unidentifiable blade/bladelet	58	2.88
total	2013	100.00

Table.6.40. Debitage products at Site E29H1 Area D surface collection square

	n	mean (cm)	st.dev
length	1195	2.40	0.88
width	1195	1.73	0.60
thickness	1195	0.58	0.31

Table.6.41. Metrical data of measured debitage products at Site E29H1 Area D surface collection square

dorsal face. There are single platform, opposed platform, and discoidal platform varieties in these flake cores.

6.6.4.3. Debitage products

The number of debitage products in the collection is 2013 (**Table 6.40**), and they are quite small in size (**Table 6.41**). The predominance of single platform core in the collection is also indicated by a large number of flakes and blades/bladelets from single platform



Fig.6.38. Backed bladelets collected at Site E29H1 Area D surface collection square

cores. One notable kind of primary piece is a conical or hemispherical chunk with a complete cortex. The chunk has an impact bulb on the naturally flat proximal end with no platform preparation, and a tiny breakage on the distal end, and the ventral face is flat with few or no surface undulations. This means that a considerable number of whole globular or elongated pebbles were brought here and the primary chunks were produced by bipolar wedging, in order to create a platform on one end of pebbles. Other debitage products are as listed in the table.

6.6.4.4. Tools

Formal retouched tools are not numerous in this assemblage, and the most predominant are bladelets without backing retouch. They are followed by various backed bladelets (**Fig.6.38**), but they amount to only 34, including 24 complete and 10 broken ones. They include a number of straight-backed and pointed examples without basal retouch (Tixier's Type 45) and a few arch-backed ones without basal retouch (Tixier's Type 56). The average length of the complete backed bladelets is 3 cm. Backed bladelets are followed by some retouched flakes. One longer side of primary flakes is retouched continuously from the ventral to the dorsal face, creating a serrated cutting edge. There are only two notches and three denticulates. In addition, there is only one small tanged projectile point whose lateral edges are retouched. On the whole, this tool type frequency is not dissimilar to those of nearby Areas A and C published by the Combined Prehistoric Expedition (Wendorf and Schild 1976: 317-318), though some minor tools like burins and Ouchtata retouched bladelets are absent or may be overlooked in Area D.

6.6.5. Lithic debitage concentrations

Five curious concentrations of lithic artefacts were located in Area D (black dots in **Fig.6.16**). As mentioned, almost the entire surface of the

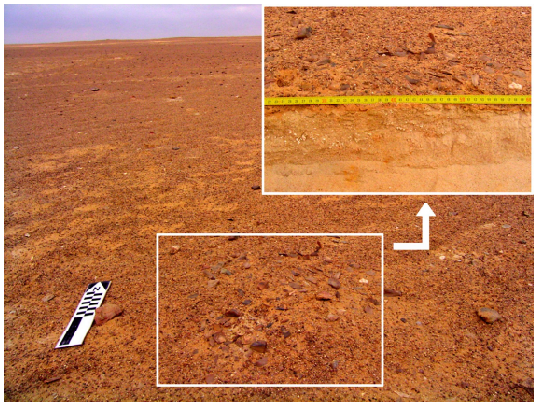


Fig.6.39. Lithic debitage concentration B at Site E29H1 Area D (looking north)

hearth field is covered by lithic artefacts, but nevertheless, those concentrations were quite noticeable due to their extremely high density and their isolation from other features like hearths. Those lithic concentrations are less than 1 m in diameter, and the accumulation of those debitage concentrations is not thick (**Fig.6.39**). Many debitage pieces sit firmly on slightly consolidated, very fine-grained sand. They look like spots where toolmakers collected debitage products and dumped them. It is probable that the debitage products were originally dumped in a shallow pit dug in the sand by toolmakers, but the light sand was later blown away, and heavier and more solid debitage products in the deeper parts remained intact and became gradually exposed on the surface as a discrete concentration. In order to better understand the nature of these features, two concentrations (lithic debitage concentrations A and B) were selected for the collection of all cores, debitage products and tools. After collecting, all pieces were classified on the basis of the colour and texture of a fresh and weathered surface, and the refitting of the pieces was attempted.

6.6.6. Lithic debitage concentration A

It turned out that this collection included only three tools (two backed bladelets and one denticulate), and the rest of the collection, which amounted to 454 pieces, was cores and debitage products (**Table 6.42**). In addition, although not included in the table, four pebbles of irregular shape with a few breakages were found. They may have been used as hammers.

	n
single platform core	14
opposed platform core	4
ninety-degree core	1
multiple platform core	4
core tablet	3
primary chunk	31
chip/chunk	37
primary flake	30
flake from single platform core	111
flake from opposed platform core	8
flake from ninety-degree core	5
flake from multiple platform core	7
unidentifiable flake	74
primary blade/bladelet	21
blade/bladelet from single platform core	86
blade/bladelet from opposed platform core	3
blade/bladelet from ninety-degree core	2
blade/bladelet from multiple platform core	1
unidentifiable blade/bladelet	12
backed blade/bladelet	2
denticulate	1
total	457

Table.6.42. Inventory of finds at Site E29H1 Area D lithic debitage concentration A

6.6.6.1. Lithic raw materials

Some unexhausted cores and one very successful refitting of debitage products suggest that the raw material is an elongated or oval flint pebble of 7-8 cm long and 2-3 cm wide. The surface of the pebbles is rounded and not heavily weathered. These characteristics are exactly the same as those of the pebbles found in the surface collection square of Area D. Hence it can be said that this remarkable lithic debitage concentration does not represent any special use of raw material or special toolmaking, but rather a common use of raw materials and toolmaking. The source of this raw material would also be the same as that mentioned before.

	n	%
single platform core	14	60.87
opposed platform core	4	17.39
ninety-degree core	1	4.35
multiple platform core	4	17.39
total	23	100.00

Table.6.43. Cores at Site E29H1 Area D lithic debitage concentration A

	n	mean (cm)	st.dev
length	18	3.13	1.12
width	18	2.52	0.63
thickness	18	2.03	0.99

Table.6.44. Metrical data of measured cores on pebbles at Site E29H1 Area D lithic debitage concentration A

	n	mean (cm)	st.dev
length	4	2.25	0.72
width	4	2.63	0.72
thickness	4	1.28	0.15

Table.6.45. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Site E29H1 Area D lithic debitage concentration A

	n	%
core tablet	3	0.70
primary chunk	31	7.19
chip/chunk	37	8.58
primary flake	30	6.96
flake from single platform core	111	25.75
flake from opposed platform core	8	1.86
flake from ninety-degree core	5	1.16
flake from multiple platform core	7	1.62
unidentifiable flake	74	17.17
primary blade/bladelet	21	4.87
blade/bladelet from single platform core	86	19.95
blade/bladelet from opposed platform core	3	0.70
blade/bladelet from ninety-degree core	2	0.46
blade/bladelet from multiple platform core	1	0.23
unidentifiable blade/bladelet	12	2.78
total	431	100.00

Table.6.46. Debitage products at Site E29H1 Area D lithic debitage concentration A

	n	mean (cm)	st.dev
length	209	2.46	0.90
width	209	1.50	0.52
thickness	209	0.48	0.28

Table.6.47. Metrical data of measured debitage products at Site E29H1 Area D lithic debitage concentration A

6.6.6.2. Cores

Cores are not numerous in the collection (**Table 6.43**). Cores can be divided into two different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.44**). The second is made on conical or hemispherical chunks with almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.45**). The majority are single platform cores (**Fig.6.40**). Platforms are created on one end of an elongated or globular pebble by one strike, forming an angle of approximately 90 degrees or less with the longer axis of pebbles. As a consequence, an unfacetted platform is the most common form of platform preparation.

6.6.6.3. Debitage products

The number of debitage products in the collection is 431 (**Table 6.46**), and they are fairly small in size (**Table 6.47**). The predominance of single platform core in this concentration is also indicated by a large number of flakes and blades/bladelets deriving from single platform cores. One notable kind of primary piece is a conical or hemispherical chunk with a complete cortex. The chunks often have an impact bulb on the naturally flat proximal end with no platform preparation, and a tiny breakage on the distal end, and the ventral face is flat with few or no surface undulations. This means that these primary chunks were produced by bipolar wedging, in order to create a platform on one end of globular or elongated pebbles. Bipolar wedging needs an anvil stone, but it is not certain which kind of stone was used. It is likely that fragments of limestone blocks which are seen on the desert surface could have been expediently used. Since the number of conical or hemispherical chunks reflects the number of

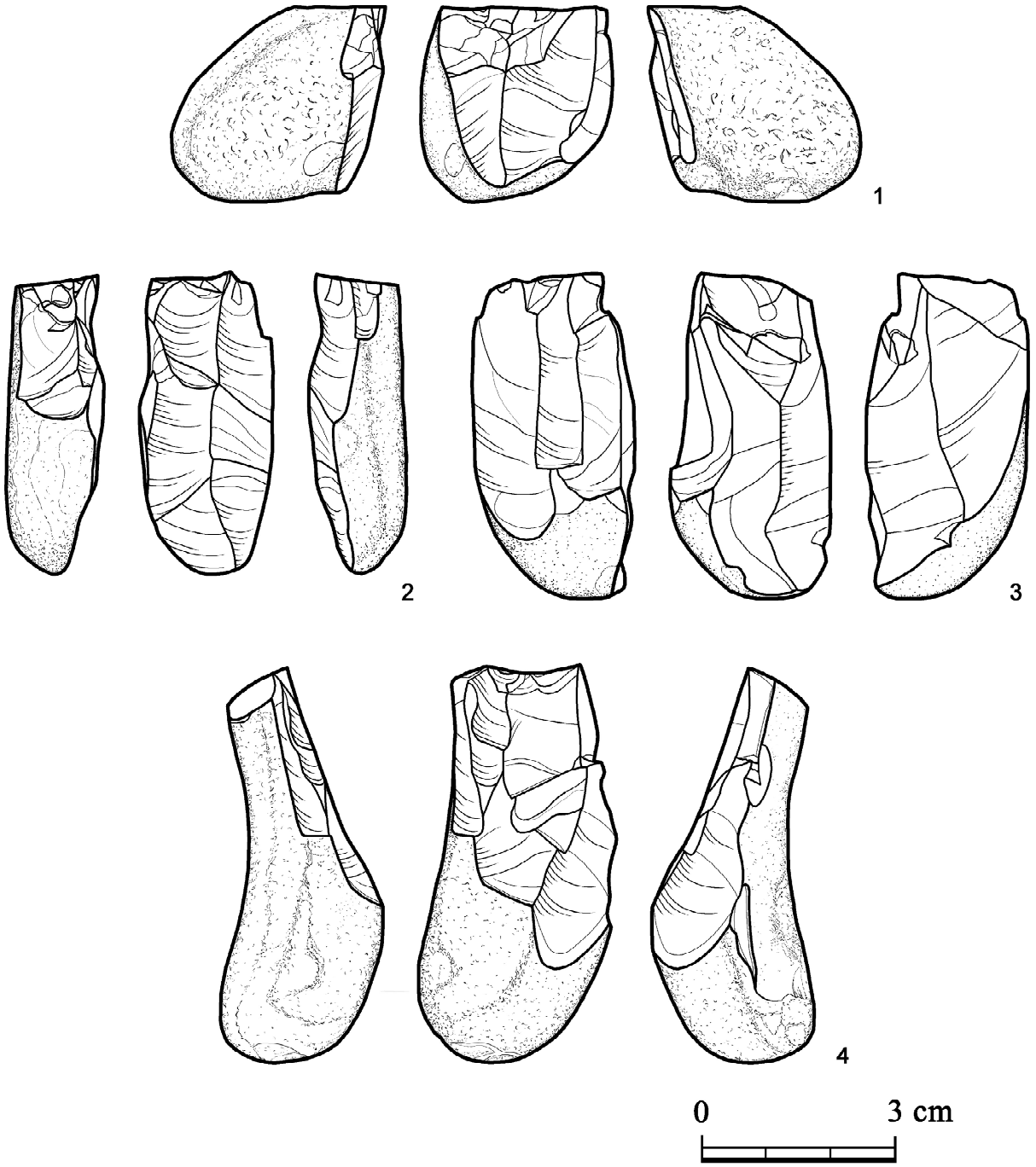


Fig.6.40. Cores collected at Site E29H1 Area D lithic debitage concentration A

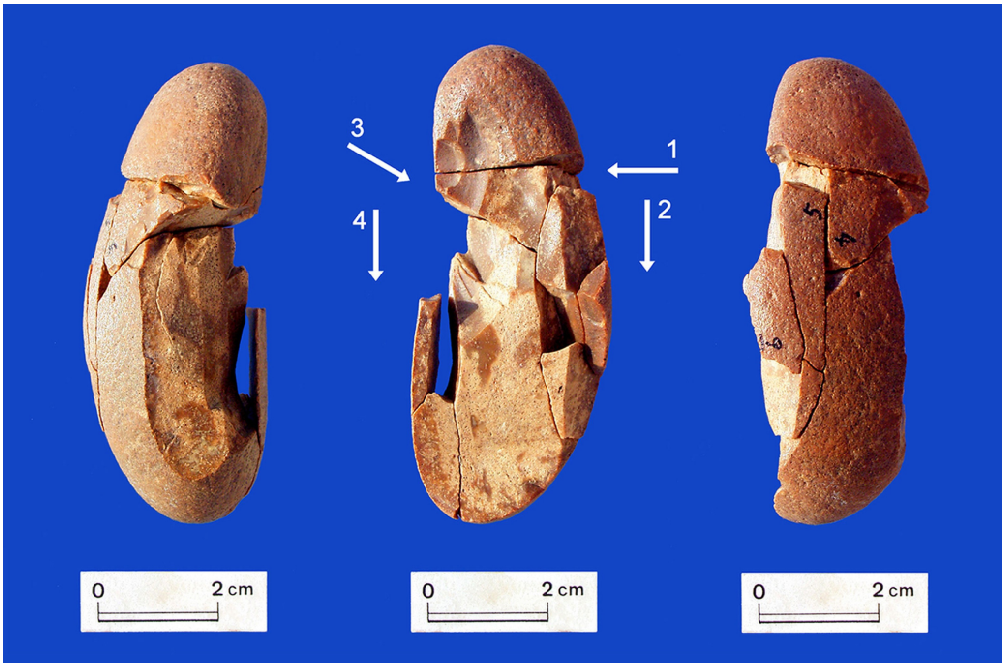


Fig.6.41. A refitted single platform core collected at Site E29H1 Area D lithic debitage concentration A

pebbles, it can tentatively be concluded that there were at least 31 flint pebbles.

6.6.6.4. Lithic manufacture

The manufacturing process which could be reconstructed from a successful example of refitting is as follows (**Fig.6.41**). Firstly, one end of an elongated or oval flint pebble (approximately a quarter of a piece) is struck off by bipolar wedging in order to create a flat, unfacetted platform. Then, cortical flakes and blades/bladelets were taken off continuously along the longer axis of the pebble by striking the edges of the platform. And finally, non-cortical blades/bladelets and flakes were obtained in the same manner of striking the edges of the platform. This example also shows that the platform was rejuvenated by way of removing a core tablet. Other debitage products which could not be refitted also suggest that blade/bladelet production was quite standardised by employing mainly single platform knapping.

6.6.6.5. Tools

The tools which were made from the cores mentioned above are evidently bladelets of 3-4 cm long. There is no complete bladelet of such a size in the collection, and only one complete straight-backed, pointed blade of 5 cm long with no basal retouch (Tixier's Type 45) was found. There was no core which can be associated with this blade, and hence this blade would have been included here by accident. Another broken backed bladelet included in this collection can reasonably be associated with debitage products. One denticulate was made on a non-cortical flake.

6.6.7. Lithic debitage concentration B

It turned out that this collection included only two backed bladelet and one unfinished backed bladelet. Apart from one whole pebble of 5.8 cm long, the rest of the collection, which amounted to 326 pieces, was cores and debitage products (**Table 6.48**). The debitage products could be easily divided into several categories

	n
whole pebble	1
single platform core	11
opposed platform core	2
multiple platform core	1
primary chunk	23
chip/chunk	9
primary flake	23
flake from single platform core	96
flake from opposed platform core	2
flake from ninety-degree core	2
flake from multiple platform core	8
unidentifiable flake	18
primary blade/bladelet	16
blade/bladelet from single platform core	108
blade/bladelet from opposed platform core	3
blade/bladelet from multiple platform core	2
unidentifiable blade/bladelet	2
backed bladelet (including 1 unfinished)	3
total	330

Table.6.48. Inventory of finds at Site E29H1 Area D lithic debitage concentration B

	n	%
single platform core	11	78.57
opposed platform core	2	14.29
multiple platform core	1	7.14
total	14	100.00

Table.6.49. Cores at Site E29H1 Area D lithic debitage concentration B

mentioned above. The success rate of refitting debitage products in this concentration was much higher than that in the other concentration.

6.6.7.1. Lithic raw materials

Some unexhausted cores and several successful refittings of debitage products suggest that the raw material is an elongated to oval or irregularly-shaped subangular flint pebble of 7-8 cm long and 2-3 cm wide. The surface of the pebbles is rounded and not heavily weathered. These characteristics are exactly the same as those of the pebbles in the other concentration.

	n	mean (cm)	st.dev
length	12	3.33	1.04
width	12	2.22	0.41
thickness	12	2.08	0.83

Table.6.50. Metrical data of measured cores on pebbles at Site E29H1 Area D lithic debitage concentration B

	n	mean (cm)	st.dev
length	2	2.10	0.00
width	2	2.25	0.05
thickness	2	2.20	0.50

Table.6.51. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Site E29H1 Area D lithic debitage concentration B

6.6.7.2. Cores

Cores are not numerous in the collection (**Table 6.49**). Cores can be divided into two different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.50**). The second is made on conical or hemispherical chunks with almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.51**). The majority are single platform cores. Platforms are created on one end of an elongated or globular pebble by one strike, forming an angle of approximately 90 degrees or less with the longer axis of pebbles. As a consequence, an unfacetted platform is the most common form of platform preparation.

6.6.7.3. Debitage products

The number of debitage products in the collection is 312 (**Table 6.52**), and they are fairly small in size (**Table 6.53**). The predominance of single platform cores in the collection is also indicated by a large number of flakes and blades/bladelets struck from single platform cores. One notable kind of primary piece is a conical or hemispherical chunk with a complete cortex, which is the same as that seen at another debitage concentration. The chunks often have an impact bulb on the naturally flat proximal end with no platform preparation, and a tiny breakage on the

	n	%
primary chunk	23	7.37
chip/chunk	9	2.88
primary flake	23	7.37
flake from single platform core	96	30.77
flake from opposed platform core	2	0.64
flake from ninety-degree core	2	0.64
flake from multiple platform core	8	2.56
unidentifiable flake	18	5.77
primary blade/bladelet	16	5.13
blade/bladelet from single platform core	108	34.62
blade/bladelet from opposed platform core	3	0.96
blade/bladelet from multiple platform core	2	0.64
unidentifiable blade/bladelet	2	0.64
total	312	100.00

Table.6.52. Debitage products at Site E29H1 Area D lithic debitage concentration B



Fig.6.42. Refitted single platform cores collected at Site E29H1 Area D lithic debitage concentration B

	n	mean (cm)	st.dev
length	190	2.18	0.73
width	190	1.28	0.47
thickness	190	0.32	0.23

Table.6.53. Metrical data of measured debitage products at Site E29H1 Area D lithic debitage concentration B

distal end, and the ventral face is flat with few or no surface undulations. This means that these primary chunks were produced by bipolar wedging, in order to create a platform on one end of globular or elongated pebbles. Since the number of hemispherical or conical chunks reflects the number of pebbles, it can tentatively be concluded that there were at least 23 flint pebbles.

6.6.7.4. Lithic manufacture

The manufacturing process which could be reconstructed from some successful examples of refitting (**Fig.6.42**) is the same as described earlier. One end of an elongated or oval flint pebble is struck off in order to create a flat, unfacetted platform. Then, cortical flakes and bladelets were taken off continuously along the longer axis of the pebble by striking the edges of the platform. Finally, non-cortical flakes and bladelets were obtained in the same manner of striking the edges of the platform.

6.6.7.5. Tools

The tools which were made from the cores mentioned above are evidently bladelets of 3-4 cm long. Three backed bladelets including one broken piece and one unfinished piece were all less than 3 cm long. One complete one is a straight-backed, pointed bladelet with no basal retouch (Tixier's Type 45), and another broken one is an arch-backed bladelet with no basal retouch (Tixier's Type 56).

6.6.8. Some considerations on life at Site E29H1

It is significant to consider life at Site E29H1 in terms of the disposal acts of site occupants (Binford 1978). As mentioned, the association of individual hearths with the scatters of lithic debitage products and bone fragments in and around the hearths is not always clear because taphonomic processes must have affected their preservation to some extent. It is not certain whether the present scatter patterns precisely reflect dropping or tossing acts of the site occupants in prehistory.

In many cases, lithic debitage products are sparsely scattered in and around hearths, and they are not refittable to each other. Therefore,

it is unlikely that this scatter pattern is a precise reflection of flint knapping and debitage dropping acts of some toolmakers which took place near the fire in the past. In contrast, some cases (Hearths 12 and 15) show clear concentrations of debitage products next to hearths, and such concentrations may perhaps suggest the presence of knapping activity areas. On the other hand, it must be kept in mind that the concentrations of debitage products do not necessarily indicate the exact place of toolmaking, but may indicate a least-used area. Supposedly lithic debitage dumping spots found in Area D seem to be a clear indication of collective dumping acts by toolmakers. Lithic debitage dumping acts are quite normal if people stay at a site continuously, because the scatter of debitage products on the living floor is dangerous to their bare feet. Therefore, lithic debitage dumping acts may be regarded as evidence for the long stay of the site occupants.

As for animal and fish bone fragments around hearths, it is more difficult to interpret their scatter or concentration patterns. Like lithic debitage products, bone fragments would have been dropped or tossed around hearths by people who dined there, or collectively dumped away from hearths. Therefore, concentrations of bone fragments do not necessarily indicate the exact place of butchering, cooking, or eating. While some hearths (Hearths 11, 12, 13 and 14) are accompanied by numerous bone fragments, other hearths are not accompanied by bone fragments. The former situation may suggest that residues of cooking and eating at the hearths remain scattered. The latter situation may mean that bone fragments were collectively dumped away from the hearths in order to keep the hearth area clean and tidy, or, bone fragments which had been scattered around the hearths were later taken away by scavenging animals. Several isolated concentrations of bone fragments found in the hearth field may indicate either dumping acts by site occupants or scavenging acts by carnivores.

It is also important to consider the life of Epipalaeolithic people at Site E29H1 in terms of their adaptive subsistence strategies. The site location strongly suggests that the major subsistence activities were the exploitation of resources on the gently-inclined basin shore and in the shallow water of the X Basin, and this suggestion has been supported by faunal remains obtained at Site E29H1, consisting of mammals like aurochs (wild cattle), hartebeest and hippopotamus, and fish like tilapia, clariid catfish, cyprinid, puffer and Nile perch (Gautier 1976b: Table I-7, Van Neer and Linseele 2007). This suggestion is also supported by the study of the technological organisation of the site occupants. The natural condition of the site, which is devoid of rock materials like flint pebbles suitable for tool making and limestone/sandstone cobbles suitable for hearth making, suggests that the site occupants recognised it adaptive and optimal to bring all necessary materials to the site from somewhere else and to prepare for food procurement and consumption at the site. This is opposed to making necessary tools in advance of visiting the site, exploiting food resources at the site, and then taking them away immediately back to their residential bases elsewhere. If they had gone hunting on a desperate stalking basis, or if they had been under time stress to exploit available food resources as quickly as possible, they could not have afforded to sit down and to start making tools upon arrival at the site.

The large number of lithic debitage products at the site suggests that the whole lithic reduction sequence took place there, and that this was made possible by a continuous supply of flint pebbles from nearby sources. The fact that people could afford to start making tools at the site suggests that the wild food resources which they exploited were predictable, stable, and not easily depleted, and that their exploiting strategy entailed watching, ambushing and trapping, and not stalking. Fishing and fowling, which have been considered as the major subsistence of Fayum Epipalaeolithic people (Brewer 1989a; 1989b), are surely the activities achieved through watching, ambushing and trapping. As for mammals, it is not surprising if the sedentary mammals listed above were hunted by the Epipalaeolithic people in the same manner.

It is not certain whether their subsistence activities were performed by small groups of people for immediate daily consumption, or the activities were done by more than a few groups of people and included mass production of smoke-dried fish for later consumption, as has been attested at Late Palaeolithic sites in Middle and Upper Egypt (Gautier and Van Neer 1989; Vermeersch *et al*. 1989; Vermeersch *et al*. 2000). The multiple hearths at Area D of Site E29H1 would have been suitable for such mass production at one time, though insufficient faunal data have not supported the possibility of such mass exploitation of fish. It seems reasonable for the large number of flint tools produced at the site that they were made in order to process large amounts of fish as soon as they were caught. Such a demand for tools and probably their quick exhaustion may be one reason for numerous bladelets without backing retouch and a small number of formal tools in the collection. On the other hand, it is also possible that a large number of lithic artefacts in the hearth field are simply a cumulative result of repeated occupations. Based on the present evidence, several different interpretations are possible.

Since the faunal data are not good enough to know the seasonality of site occupation, it is hard to discuss the degree of sedentariness of the site occupants purely on the basis of faunal data. However, the geographic stability of the site and the persistence of a cyclical mobility pattern for some length of time are obvious from the evidence discussed above. In addition, it seems probable that the supply of flint pebbles and limestone/sandstone cobbles which were unavailable in the basin environment was made possible through short-distance return trips by task persons sent off from the site. Therefore, it is almost certain that the hearth field in Area D was continuously and repeatedly occupied, probably several times a year for many years, by Epipalaeolithic people. But referring to controversial discussions on the definition of sedentariness (Chatters 1987: 347-348; Rafferty 1985: 113-116), it is difficult to say that the people who stayed there were sedentary, unless it is revealed that at least part of the site occupants remained there throughout the entire year. As mentioned, the site seems to have experienced inundations even during the Epipalaeolithic period, and therefore, sedentary occupation in a strict sense was physically impossible. However, temporary upward and downward shifts of habitation in this basin environment according to the water level could be one option. If the inhabitants did adopt such shifts and remained there, then their habitation may perhaps be called semi-sedentary.

6.7. Epipalaeolithic lithic assemblage at a watching station in Wadi B

6.7.1. Introduction

It has been revealed by previous research that Epipalaeolithic people were dependent heavily on aquatic resources on the lakeshore. Furthermore, it has been suggested that most Fayum Epipalaeolithic sites might reflect seasonal fishing occupations, and that a very different economic emphasis might possibly be indicated for the same group when they utilised a different microenvironmental situation or in the base camps wherever they were located (Wendorf and Schild 1976: 317). However, this suggestion has never been substantiated by the discovery of base camps and other kinds of sites in different environmental situations.

New discoveries of the remains of Epipalaeolithic human activities were made in a desert wadi which connects the northern rocky terrain of the Fayum Depression and the lakeshore. Some Epipalaeolithic tools were found along the wadi during the survey, and the most important discovery in the wadi was a concentration of Epipalaeolithic lithic artefacts on a high wadi bank, which is approximately 15 km to the north of the Epipalaeolithic lakeshore. The findspot (N29.71137° E30.86858°) is located on an edge of the eastern bank, whose elevation is around 130 m asl, overlooking the wadi floor to the northwest (**Fig.6.43**). There are no structural remains like hearths and no faunal remains in the surroundings. Therefore, the study



Fig.6.43. An Epipalaeolithic watching station in Wadi B (looking north)


Fig.6.44. Scatter of lithic artefacts on the gravelly surface of a watching station in Wadi B

of this isolated concentration of lithic artefacts is the only way of understanding the nature of this locality.

6.7.2. Lithic assemblage at the watching station

The surface of the bank is covered by flint gravel and fine-grained aeolian sand (**Fig.6.44**). On this gravelly surface, 105 pieces of lithic artefacts, including a number of blade/bladelet cores and only a few retouched tools, were concentrated within an approximately 5 m radius. They sit on a slightly consolidated surface, but it is not certain whether more pieces are buried beneath the surface, because no excavation was carried out. All of the surface artefacts were collected and studied (**Table 6.54**).

	n
single platform core	21
multiple platform core	3
core tablet	2
primary chunk	4
chip/chunk	9
primary flake	7
flake from single platform core	22
flake from opposed platform core	1
flake from ninety-degree core	1
flake from multiple platform core	7
primary blade/bladelet	2
blade/bladelet from single platform core	17
blade/bladelet from opposed platform core	1
blade/bladelet from multiple platform core	2
unidentifiable blade/bladelet	1
backed blade/bladelet	1
retouched flake	4
total	105

Table.6.54. Inventory of finds at Wadi B watching station

	n	%
single platform core	21	87.50
multiple platform core	3	12.50
total	24	100.00

Table.6.55. Cores at Wadi B watching station

6.7.2.1. Lithic raw materials

One raw material at this site is a rounded and weathered/abraded flint cobble of light to dark brown. Most cobbles commonly have a brown to dark brown cortex, but some have a calcareous cortex. Although the examples are fragmentary, the whole shape of the cobble seems to be oval with some flat faces. Such cobbles are not seen in the surroundings, and hence it is supposed that they were transported from elsewhere.

Another raw material is an abraded/polished pebble. The pebbles are subangular to rounded, the shape is elongated to oval, but there are flat

	n	mean (cm)	st.dev
length	4	2.43	0.61
width	4	4.00	0.42
thickness	4	2.98	1.29

Table.6.56. Metrical data of measured cores on pebbles at Wadi B watching station

	n	mean (cm)	st.dev
length	7	2.94	0.76
width	7	3.07	0.77
thickness	7	2.40	1.00

Table.6.57. Metrical data of measured cores on fragments of pebbles at Wadi B watching station

	n	mean (cm)	st.dev
length	2	2.25	0.05
width	2	2.85	0.25
thickness	2	3.30	0.50

Table.6.58. Metrical data of measured cores on conical or hemispherical chunks of pebbles at Wadi B watching station

	n	mean (cm)	st.dev
length	11	3.81	1.53
width	11	3.56	0.79
thickness	11	2.25	0.52

Table.6.59. Metrical data of measured cores on fragments of cobbles at Wadi B watching station

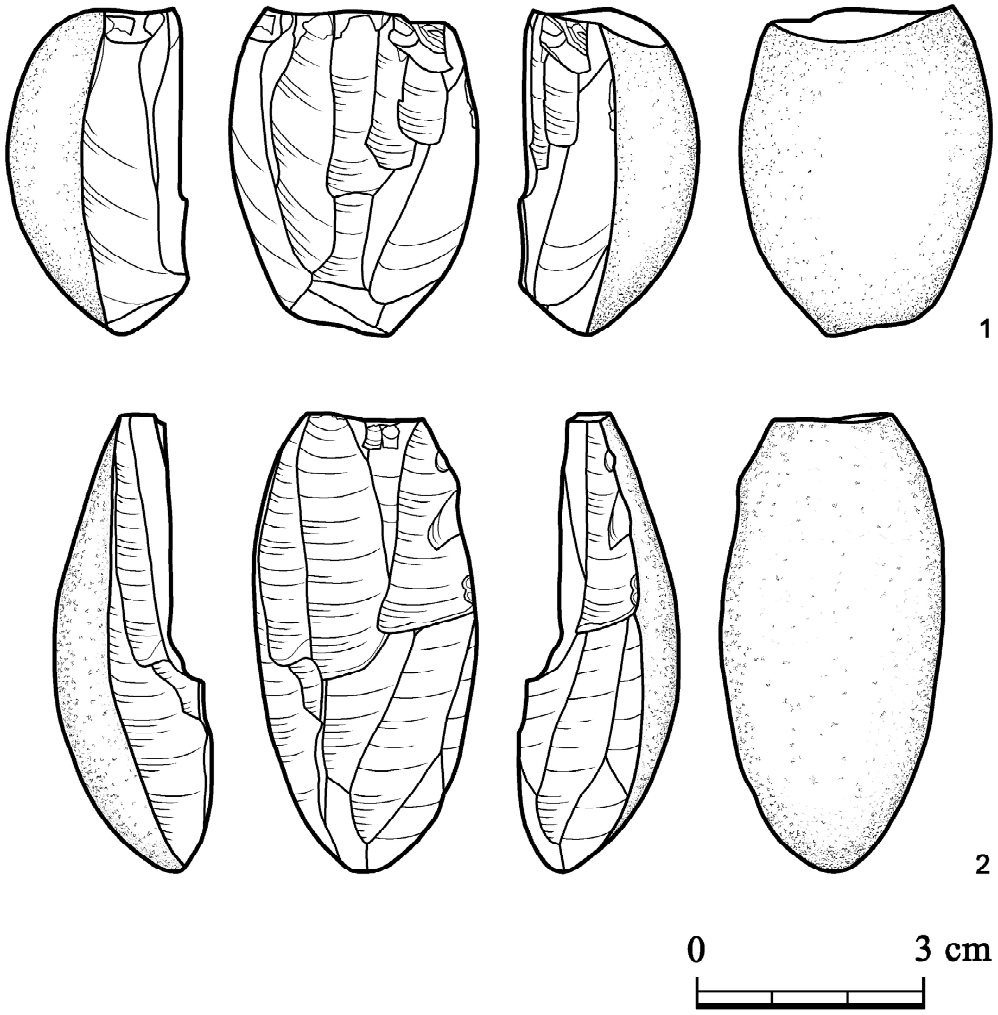


Fig.6.45. Single platform cores collected at Wadi B watching station

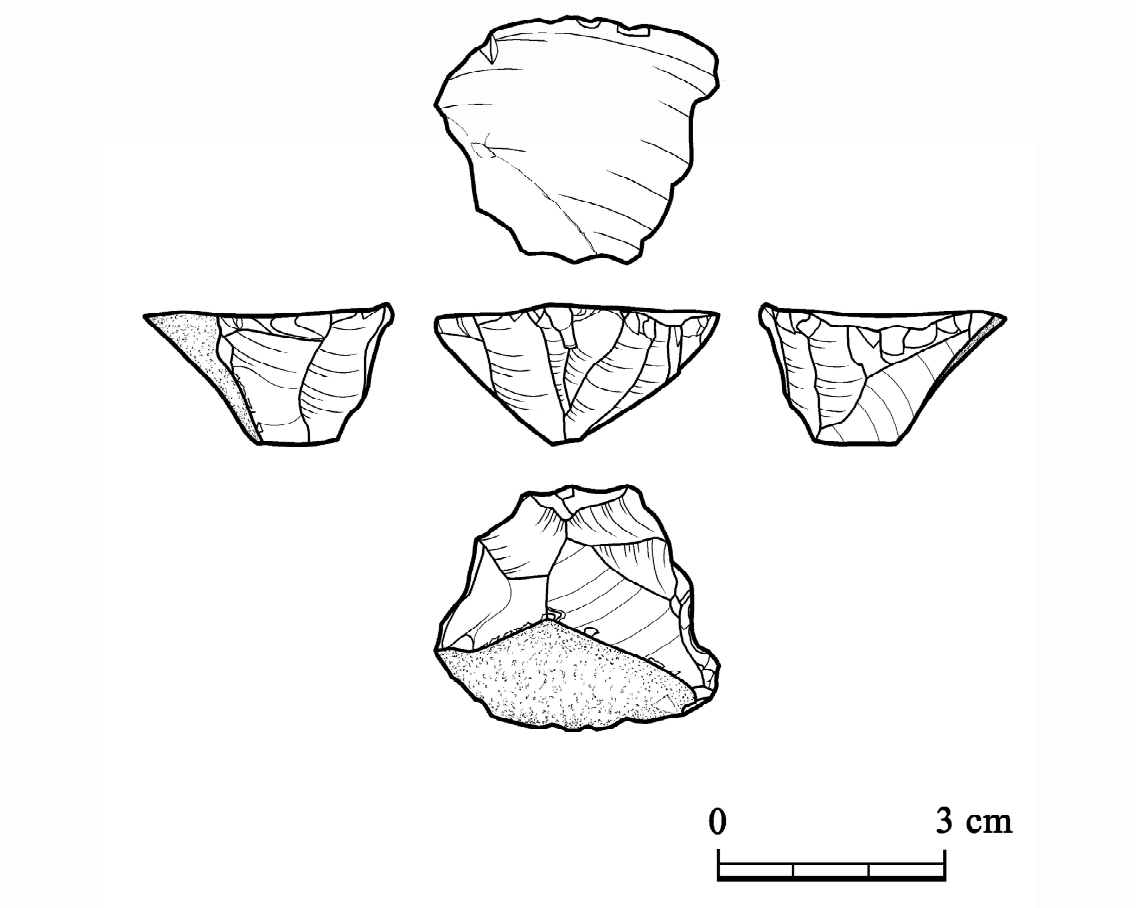


Fig.6.46. A single platform core collected at Wadi B watching station

and irregular-shaped varieties. The surface is generally smooth and not undulated. Such pebbles of 6-7 cm long and 3-4 cm wide are abundantly scattered in this area, and it is highly likely that these were picked up and used.

6.7.2.2. Cores

Cores are numerous against debitage products in the collection (**Table 6.55**). Cores can be divided into four different categories based on their original shape. The first is made on pebbles of various shapes (**Table 6.56**). The second is made on fragments of pebbles (**Table 6.57**). The third is made on conical or hemispherical chunks with an almost 100 % cortex, which derived from elongated or globular pebbles, and the ventral face of the chunks were flaked (**Table 6.58**). The fourth is made on fragments of cobbles (**Table 6.59**). Cores are dominated by single platform cores (**Fig.6.45**-1 and 2, and **Fig.6.46**), amounting to 21. Opposed platform cores (**Fig.6.47**-1 and 2) and multiple platform cores are few. Eight of the 21 single platform cores are made on subangular or rounded fragments of weathered/abraded cobbles. The rest are made on locally-available pebbles of various size and shape and their fragments.

6.7.2.3. Debitage products

The number of debitage products seems to be small against the number of cores (**Table 6.60**). Debitage products also indicate that they derived from two distinct raw materials; abraded/polished flint pebble and weathered/abraded flint

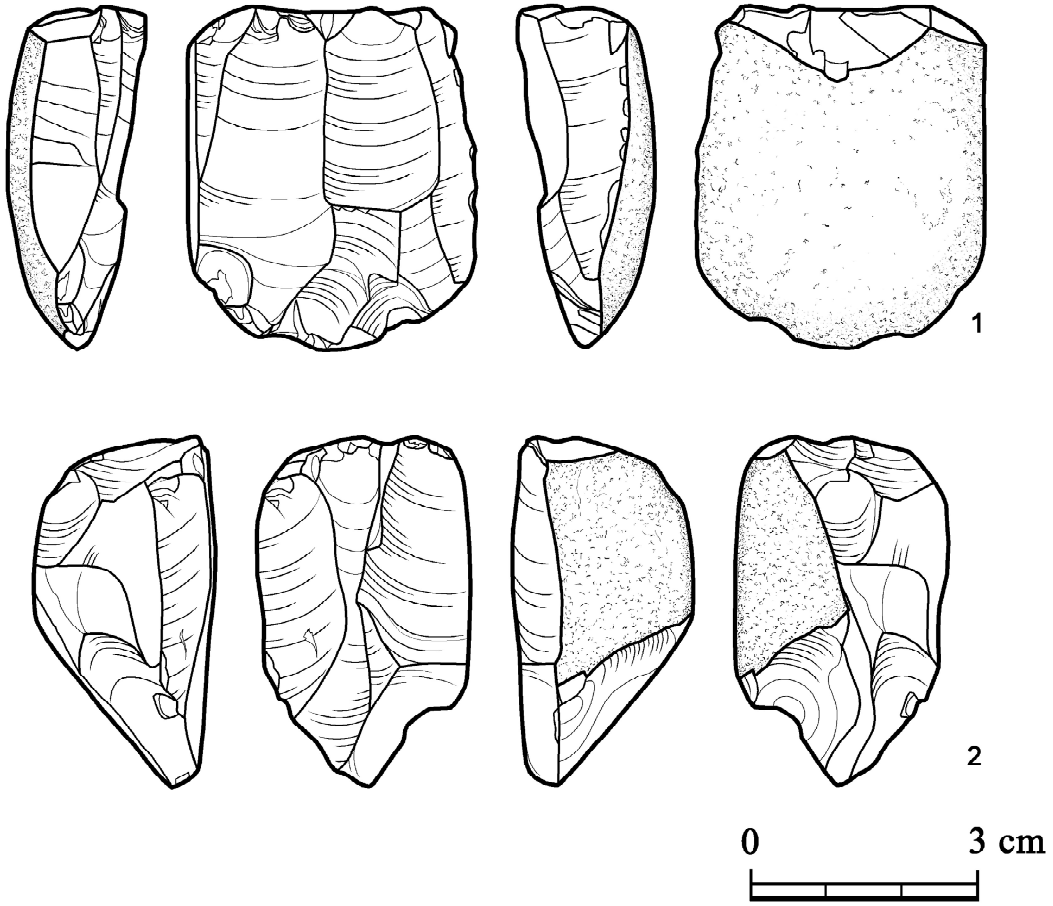


Fig.6.47. Opposed platform cores collected at Wadi B watching station

	n	%
core tablet	2	2.63
primary chunk	4	5.26
chip/chunk	9	11.84
primary flake	7	9.21
flake from single platform core	22	28.95
flake from opposed platform core	1	1.32
flake from ninety-degree core	1	1.32
flake from multiple platform core	7	9.21
primary blade/bladelet	2	2.63
blade/bladelet from single platform core	17	22.37
blade/bladelet from opposed platform core	1	1.32
blade/bladelet from multiple platform core	2	2.63
unidentifiable blade/bladelet	1	1.32
total	76	100.00

Table.6.60. Debitage products at Wadi B watching station

	n	mean (cm)	st.dev
length	38	3.85	0.94
width	38	2.47	0.78
thickness	38	1.00	0.61

Table.6.61. Metrical data of measured debitage products at Wadi B watching station

cobble. The large size of debitage products suggests that they were struck from cobbles rather than pebbles (**Table 6.61**). Non-cortical blades/bladelets, flakes, and chunks are not numerous, and most debitage products have a cortex. Therefore, it is likely that knapping was initiated here from whole pebbles and cobbles. An attempt of refitting these debitage products was not successful, even though it was recognised that several debitage products

belonged to particular pebbles or cobbles. This may suggest that this locality was visited briefly but repeatedly, and that the rate of transport of usable flakes and blades/bladelets to other places was high.

6.7.2.4. Lithic manufacture

In the case of cobble use, a cobble is half-split or quarter-split along the longer axis, and the ventral face of a fragment is struck from an unfacetted platform repeatedly to obtain blades/bladelets. Informal large fragments from cobbles were also used as multiple platform cores. In the case of pebble use, the basic knapping technique is quite similar to that observed in the X Basin and Z Basin areas. One end of an elongated or globular pebble is chopped off to make an unfacetted platform, and then several bladelets were flaked from this.

6.7.2.5. Tools

Tools are not numerous in the collection. Only several blades with or without a retouched edge and informally retouched tools made on flakes are included. There is one curious elongated scraper with backing retouch on one lateral margin. The cores suggest that major objectives of the toolmakers were to produce not only blades of approximately 5 cm long but also flakes of approximately 2 cm long.

6.7.3. The mobility and subsistence of Epipalaeolithic people in a wadi

A remarkable thing about these debitage products is that many of them are produced from apparently large cobbles which are not seen in the immediate surroundings. Although rounded and abraded/polished, elongated pebbles which had been commonly used by Epipalaeolithic toolmakers of the X Basin and Z Basin naturally occur on the wadi bank, they were not exclusively used. Many cores are so fragmentary that it is not easy to imagine the original shape of the cobble, but it seems that the most commonly used cobbles are rounded and weathered/abraded, flat and oval cobbles, or irregularly-shaped or subangular cobbles. It is probable that the sources of these cobbles are Pliocene gravel deposits which are to the south and northeast of Ilwet Hialla (Sandford and Arkell 1929: 16-22).

Several isolated Epipalaeolithic finds along a wadi have already indicated that Epipalaeolithic people had passed through the wadi while making and using flint tools, but a concentration of lithic debitage products at a location on the wadi bank very far to the north of the lake substantiates that Epipalaeolithic people did stop and stay at such a distant locality. Considering this odd situation and the location with a fine view, it is most likely that this was a watching station or hunting stand, where Epipalaeolithic hunters sat down and made tools while watching for game animals in the wadi. They stayed there for a while, perhaps overnight. These findings require reconsideration of the subsistence and mobility strategies of Fayum Epipalaeolithic people.

It must be considered that the Epipalaeolithic people who resided on the lakeshore had occasionally organised long distance hunting and monitoring trips to the wadi. A concentration of lithic debitage products at a wadi locality strongly suggests that people did not bring ready-made tools but brought raw materials there from elsewhere and made tools as the occasion arose. As mentioned, provided that sources of the raw materials are located further to the east and northeast of the locality, it can be said that lithic raw material procurement was combined with, or embedded in, hunting and monitoring trips. This means that their hunting did not entail desperate stalking but was on an ambush basis. The rarity of backed blades which must have been made from large cobbles at this locality suggests that finished tools were taken away with the hunters to their lakeshore habitat. This can explain the presence of backed blades and the absence or rarity of large cores for blade production in the X Basin and Z Basin sites.

This wadi locality is approximately 15 km far away from the nearest Epipalaeolithic habitation localities on the lakeshore, and there

is no permanent standing water around the wadi locality. Therefore, it is assumed that the people could visit this wadi locality only when sufficient surface water became available by winter rain, and that hunting in the wadi was basically a winter activity and the appearance of game animals was predictable. Since no similar localities were found in the vicinity, it is unlikely that their visit to this wadi locality was the seasonal migration by the entire group of people who usually inhabited the lakeshore. It is more likely that a small task group was sent off to the wadi locality from the lakeshore residential base, and the majority of people remained on the lakeshore. This implies a logistical manner of mobility by basically sedentary people. As an ethnoarchaeological study has suggested, a watching station or hunting stand was primarily an information gathering location, and hence animals were rarely killed directly from such a place, while the place was not necessarily the place for consumption of hunted animals (Binford 1978). Therefore, there may probably be the remains of butchering or camping in the wadi, but large portions of meat must have been transported to the lakeshore residential base.

6.8. The procurement of flint pebbles/cobbles, core reduction techniques, and tool use in the Fayum Epipalaeolithic

Although the sampling method and the size of sample were not consistent between studied localities/sites, the collected data give some new ideas about the similarity and variability in the uses of flint pebbles/cobbles and core reduction techniques in the Fayum Epipalaeolithic. Since tools were not numerous in this study, previous knowledge of the tool assemblages did not have to be revised considerably. Instead, knowledge was surely augmented and strengthened by the information about what kind of flint pebbles/cobbles had preferentially been procured, from which sources, and how they had actually been knapped and discarded.

There is no reason to believe that the Epipalaeolithic people who resided in the X Basin and Z Basin travelled so far westwards as to the Qasr el-Sagha escarpments in order to procure flint pebbles, because the Qasr el-Sagha escarpments are not the sole sources and similar flint pebbles are readily available on the gravelly escarpments to the north of the X Basin and Z Basin. Therefore, contrary to the previous idea about the source of flint in the Fayum (Wendorf and Schild 1976: 311), it must be emphasised that the procurement of most commonly-used raw material in the Fayum Epipalaeolithic did not necessarily entail long distance trips. This may also affect the previous image that Fayum Epipalaeolithic people were highly mobile. People could actually procure lithic raw materials within easy walking distance from their subsistence loci.

The frequency of specific core types in the Fayum Epipalaeolithic is definitely determined by the availability or accessibility of raw materials. As described in detail, the most common raw material in Site Z and Site E29H1 was an elongated flint pebble of less than 7 cm long, and predominant single platform cores were followed in percentages by opposed platform cores. It is obvious that the size and shape of the raw material guided flint knappers to the easiest way of holding by hand and flaking. Creating a platform by breaking off one end or two ends of an elongated pebble and flaking along the longer axis of the pebble is actually the best way of making cutting edges of blades/bladelets as long as possible, though it is difficult to obtain blades of more than 5 cm long from these pebbles. The rarity of microburins in Fayum Epipalaeolithic assemblages is quite reasonable, simply because blades which are long enough to be snapped by the microburin technique are not usually available.

As the successful refitting of debitage products and the presence of unworked pebbles and numerous cortical flakes/bladelets indicate, elongated pebbles were brought from source areas without decortification, and core reduction began at habitation or task localities. Considering the small size and light weight of pebbles and the short distance to the supposed source areas, transporting a whole handful of

pebbles repeatedly would not have been burdensome. Most single platform cores made on elongated pebbles were discarded after a few non-cortical bladelets of a certain length were obtained, and hence the use of pebbles seems to have been wasteful. Such seemingly wasteful use of raw material for bladelet production is known in other regions of Egypt. A study in the Nabta-Kiseiba region of the Egyptian Western Desert has revealed that bladelets were almost identical in size even when the cores could have produced longer blanks, and that cores which could no longer produce bladelets of the required size were abandoned even though they were still able to yield smaller blanks and even though the raw material source was far away (Close 1999; 2002a: 36). Therefore, it is possible to argue that the size of bladelets could have been constrained by cultural and functional rather than purely economic reasons, and considerations of hafting and/or composite use were the most likely reasons. In the case of the Fayum, however, the wasteful use of raw materials would have been facilitated by a constant supply from nearby source areas, and the gap between the required size of bladelet and the size of available core was much smaller. On the other hand, in the Fayum Epipalaeolithic, the use of conical or hemispherical chunks which derive from elongated pebbles for obtaining a couple of microbladelets from the ventral face has repeatedly been seen. This manner of chunk use does not seem to be merely expedient raw material use, but may be a kind of habitual economising behaviour to make the most of debitage products (Odell 1996).

It is assumed that making bladelets quickly by using readily-available raw materials wastefully and replacing worn or broken bladelets frequently by new ones would have been recognised by Fayum Epipalaeolithic toolmakers as cost-efficient. This is in contrast to making and maintaining elaborate tools that cost very much in terms of time and labour to procure raw materials and to work on them meticulously but achieve the foraging goals without failure and/or persist for a long time. It has been described that backed bladelets were extremely frequent whereas geometrics and microburins were very rare in the Fayum Epipalaeolithic (Wendorf and Schild 1976: 311). However, in terms of the idea of lithic technological organisation, the extreme frequency of backed bladelets can be regarded as a consequence of the Fayum toolmakers' efforts to optimise their use of the most readily available raw material to meet the technical requirements for their major subsistence activities.

Without microwear analysis, it is difficult to know how the bladelets of the Fayum Epipalaeolithic were actually hafted and used and on what material. A microwear study of similar bladelets from a Late Palaeolithic site in the Nile Valley of Lower Nubia has suggested that the bladelets were most likely used for scraping unknown soft materials (Becker and Wendorf 1993). Another microwear study of similar bladelets from a Late Palaeolithic site in the Nile Valley of Upper Egypt has revealed that they were used for thrusting, cutting and scraping, and on materials including skin, hide, bone and wood (Longo 1997). A further microwear study of blades and bladelets from the Epipalaeolithic sites of Elkab in the Nile Valley of Upper Egypt and Tree Shelter near the Red Sea coast of the Eastern Desert, which are contemporaneous with the Fayum Epipalaeolithic, has also revealed that some of the blades and bladelets were used for meat cutting, hide working and wood working, but that most of the backed bladelets studied had no traces of use (Kweakason 2008). An important insight obtained through these microwear studies of bladelets is that subtle differences in tool morphology are not related to differences in the actual utilisation of the tools. This may also be the case with the bladelets of the Fayum Epipalaeolithic, and the versatility of bladelets must always be kept in mind.

Nonetheless, given the mass production and supposedly frequent replacement of bladelets at use locations as reflected in debitage dumping spots in Site Z and Site E29H1, it is reasonable to presume that the Fayum bladelets may have been used for tasks which caused quick

exhaustion or breakage of pointed edges or lateral edges in the short term. Furthermore, given the range of available wild food resources in the circumscribed lacustrine environment of the Fayum, it is assumed that the bladelet-using tasks in question would have been mainly catching and processing fish, which come in large numbers near lakeshores seasonally. The general mobility/residential strategies of Fayum Epipalaeolithic people must also be reconsidered in the light of their raw material procurement and tool making/using activities. It can be assumed that they principally maintained residential bases near lakeshores and relied on lacustrine resources, while procuring additional resources through logistical moves by individuals or small task groups.

As for other tools in the Fayum Epipalaeolithic, notches and denticulates made on large, thick flakes deriving from flint pebbles are noticeable though not numerous. Hence their general paucity in the Fayum can probably be understood in terms of curated/expedient toolmaking. Considering the multifunctionality of bladelets, the only asset of notches and denticulates made on large, thick flakes may be their durability for heavy-duty tasks like whittling or straightening wooden branches and bones for making shafts and handles. Making shafts and handles is generally more time-consuming and labour-intensive than making and replacing hafted stone tools, and hence shafts and handles tend to be more repeatedly used once they are made (Keeley 1982: 800). Therefore, if shafts and handles were not frequently replaced, there might have been relatively fewer occasions on which notches and denticulates were needed.

On the other hand, the occurrence of locally-unavailable flint cobbles in the lithic assemblages at Site Z and the Camp II Ridge suggests that Fayum Epipalaeolithic toolmakers did make extra efforts to procure raw materials from distant sources. It can be said that the lithic technological organisation in the Fayum Epipalaeolithic was not always expediently-oriented, but was adjusted as opportunity or necessity arose. A question is when this might have happened. Since no absolute dates of the studied localities/sites were obtained, it is not certain whether the deviation from the basically expedient technological organisation occurred usually and elsewhere throughout the Epipalaeolithic period depending on seasonal and annual fluctuations of available food resources, or occurred gradually towards a more time-consuming and labour-intensive technological organisation in order to exploit profitable but risky resources and/or depleting resources by all means available. Nonetheless, as already suggested, it is unlikely that Epipalaeolithic people moved their residential bases frequently, but more likely that lithic raw material procurement was achieved logistically and was embedded in foraging or monitoring trips by a task group dispatched from a residential base. Therefore, the occurrence of locally-unavailable cobbles in the lithic assemblages at Site Z and the Camp II Ridge may not reflect a radical change in the general mobility strategy of Epipalaeolithic people, but may suggest the rise in demand for larger raw materials in response to the optimisation of technological investment in subsistence activities. Demands for longer cutting edges for more time-efficient cutting and scraping tasks would be behind the appearance of locally-unavailable cobbles.

6.9. Concluding remarks

Previous studies have suggested that most Fayum Epipalaeolithic sites might represent seasonal encampments mainly for fishing on the grounds that few substantial structural remains have been found. However, given the harsh Fayum environment which has suffered from severe deflation, the lack of substantial structural remains should not necessarily be taken as a lack of evidence for sedentary life in the Fayum Epipalaeolithic. The study of several Fayum Epipalaeolithic sites and lithic technological organisation at the sites has demonstrated that Epipalaeolithic people's stay on lakeshores was not short and that the people were unlikely to move their residential bases frequently over long

distances. The lithic technological organisation of the Fayum Epipalaeolithic as revealed through the study of raw material procurement and use suggests that Fayum Epipalaeolithic people principally adopted a logistical mobility strategy, while maintaining residential bases near lakeshores in order to make the most of lacustrine resources. Therefore, it must be stressed again that the transition from the Fayum Epipalaeolithic to Neolithic should not simplistically be supposed as a shift toward sedentism or toward food production, but should rather be investigated as an optimisation in technological investments in subsistence activities under changing environmental and demographic conditions.