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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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5. The Fayum Epipalaeolithic and Neolithic in the light of new survey results

5.1. Introduction

Since 2003, the UCLA-RUG Fayum Project has obtained permission to carry out archaeological fieldwork in the northeastern part of the Fayum Depression. The concession area of the project runs between Kom Aushim (the ancient Karanis) in the east and Qasr el-Sagha in the west, and includes the northeastern shore of Lake Qarun in the south and the rocky terrain in the north which marks the northern fringe of the Fayum Depression. Given the limited time for fieldwork and logistical difficulties, the 2003-2006 seasons' fieldwork concentrated on the eastern half of the concession area. It is 12 km wide east-west, and 20 km long north-south (**Fig.5.1**, **Fig.5.2** and **Fig.5.3**).

It must be stressed that this fieldwork project is not the first attempt made in this part of the Fayum. Several research teams have conducted archaeological and geological fieldwork in this area in the last century, and valuable information about the archaeological site distribution and material culture of different periods has been obtained. In particular, this concession area has been known to contain a number of Epipalaeolithic and Neolithic sites, and has provided evidence for the earliest wheat/barley farming combined with sheep/goat herding in Egypt. The 2003-2006 survey area included two remarkable Neolithic occupation loci named Kom K and Kom W, as well as clusters of Neolithic granary pits named the Upper and Lower K Pits in the proximity of Kom K (Caton-Thompson and Gardner 1934: 22-54). Notably, based on the lack of substantial dwelling remains, it has been argued that there was no clear evidence for year-round occupations in these loci, despite the fact that the inhabitants relied on farming and herding at least as part of their subsistence. Therefore, a question remains as to how the Fayum people organised their residence and subsistence. Another question is what type of mobility strategy enabled people to continue traditional foraging on the one hand, and to introduce farming and herding on the other, at the transition from the Epipalaeolithic to the Neolithic period.

It was expected that these questions might be partially answered through re-investigating the well-known Neolithic occupation loci, finding more Epipalaeolithic and Neolithic remains in their surroundings, and considering the patterns of land use and natural resource exploitation by Epipalaeolithic and Neolithic people in a wider environmental context. In other words, this field survey aimed to know what has been overlooked or neglected by previous researchers and to re-examine old information, not in terms of culture history but in terms of human adaptive behaviour, by using new data obtained in the field, and then to better understand the patterns of various land uses by people in prehistoric times.

5.2. The survey area

The Fayum Depression has been formed through long geological history since the Eocene, but the surface of Tertiary rocks and lacustrine deposits has not only been carved and polished due to intense aeolian action but also been washed and covered due to the erosive and sedimentary action of surface runoff water. Erosive aeolian action on rocks results in the formation of sand dunes near cliffs (Issawi 1976; Pawlikowski 1983). Furthermore, recurrent climatic cycles of wetting and drying have caused the formation of crusts of soluble minerals on the land surface deposited by evaporation of subsurface moisture. The development of crusts over the land surface has consolidated its surface layers and has

protected it from further aeolian erosion (Aref 2003). The geomorphology of the survey area has been understood through looking at various surface features. The major geomorphic indicators of natural forces which have caused the erosion of the surface of rocks and deposits and the subsequent redeposition of clastic materials and sand as well as the formation of surface crusts in the survey area include beaches, yardangs, dunes, escarpments, and wadis.

The low desert between the contour line of 40 m above sea level (abbreviated as asl) and the present lakeshore which is around 40 m below sea level (abbreviated as bsl) is where most of the archaeological remains from the Epipalaeolithic to Ptolemaic and Roman periods have been found. This low desert records erosional and depositional events on the past lakeshores caused by oscillating lake water and wind. According to a reconstruction of lake level fluctuations in the Pleistocene and Holocene (Hassan *et al*. 2006), the water margin of the lake has moved within this vertical range, while the lake level dropped drastically and remained lower than 0 m bsl after the Ptolemaic period.

In general, the low desert is covered by fine-

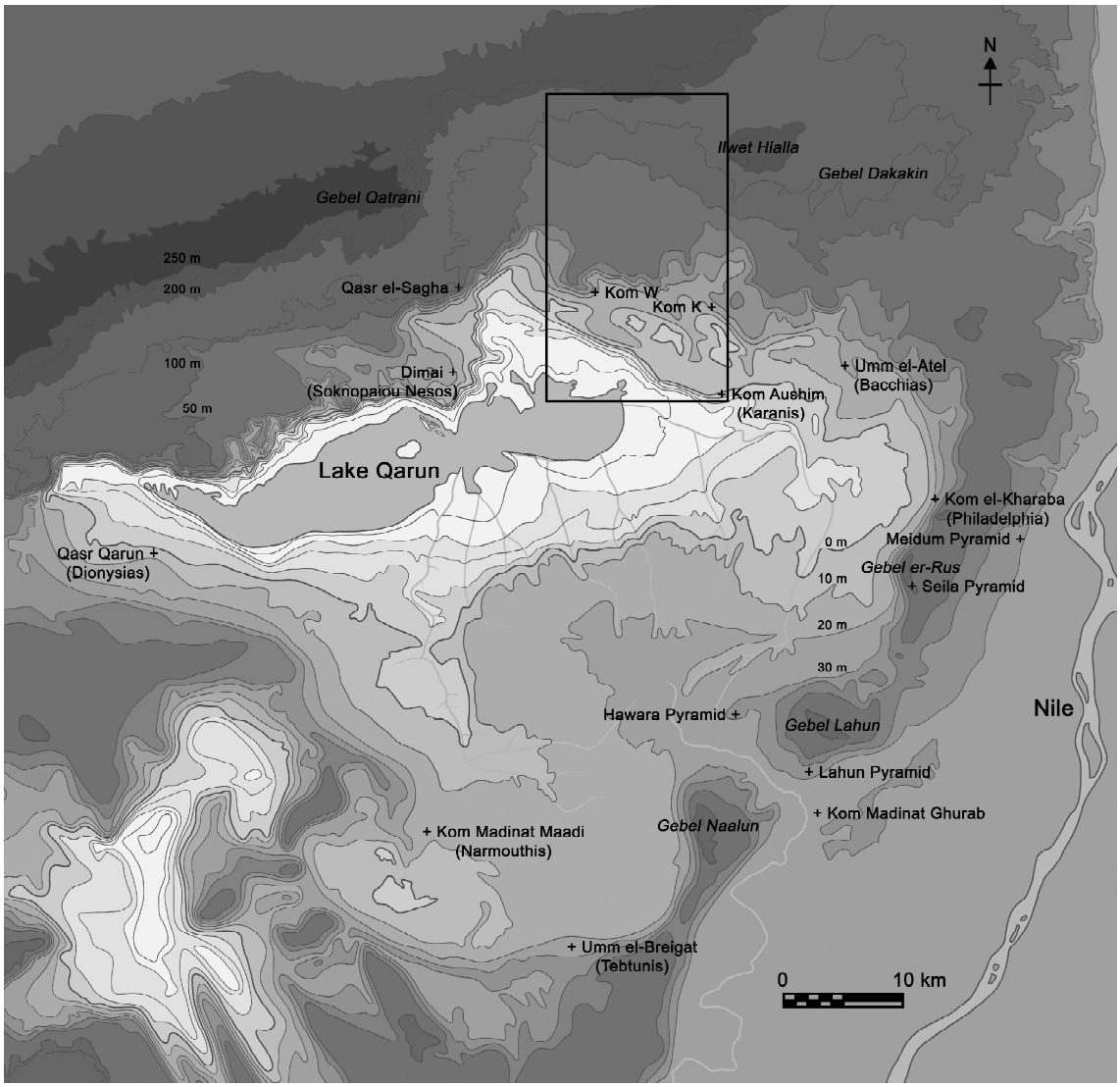

Fig.5.1. Location of the 2003-2006 season's survey area

Fig.5.2. Contour map of the survey area on satellite photo

grained alluvial and aeolian sand, but many parts of the low desert actually lack aeolian deposition of loose sand due to deflation. In places where deflation has been severe, fine-grained loose sand is blown away, leaving a residual deposit of heavier and larger objects like flint fragments on the consolidated surface of alluvial sand deposits with calcified nodules of sand clast. Extensive scatters of subrounded flint fragments are noticeable in the area of the 10 m asl contour line from the northern and western shores of the X Basin to the southern shore of the Z Basin, and they seem to have been washed by oscillating lake water. The area around the 40 m asl contour line is also marked by dense flint gravels, which are supposed to be the shingle beach of the Pleistocene lake (Caton-Thompson and Gardner 1934: pl.CIX; Sandford and Arkell 1929: folding map). The bedrock of the low desert is Upper Eocene limestone of the Qasr

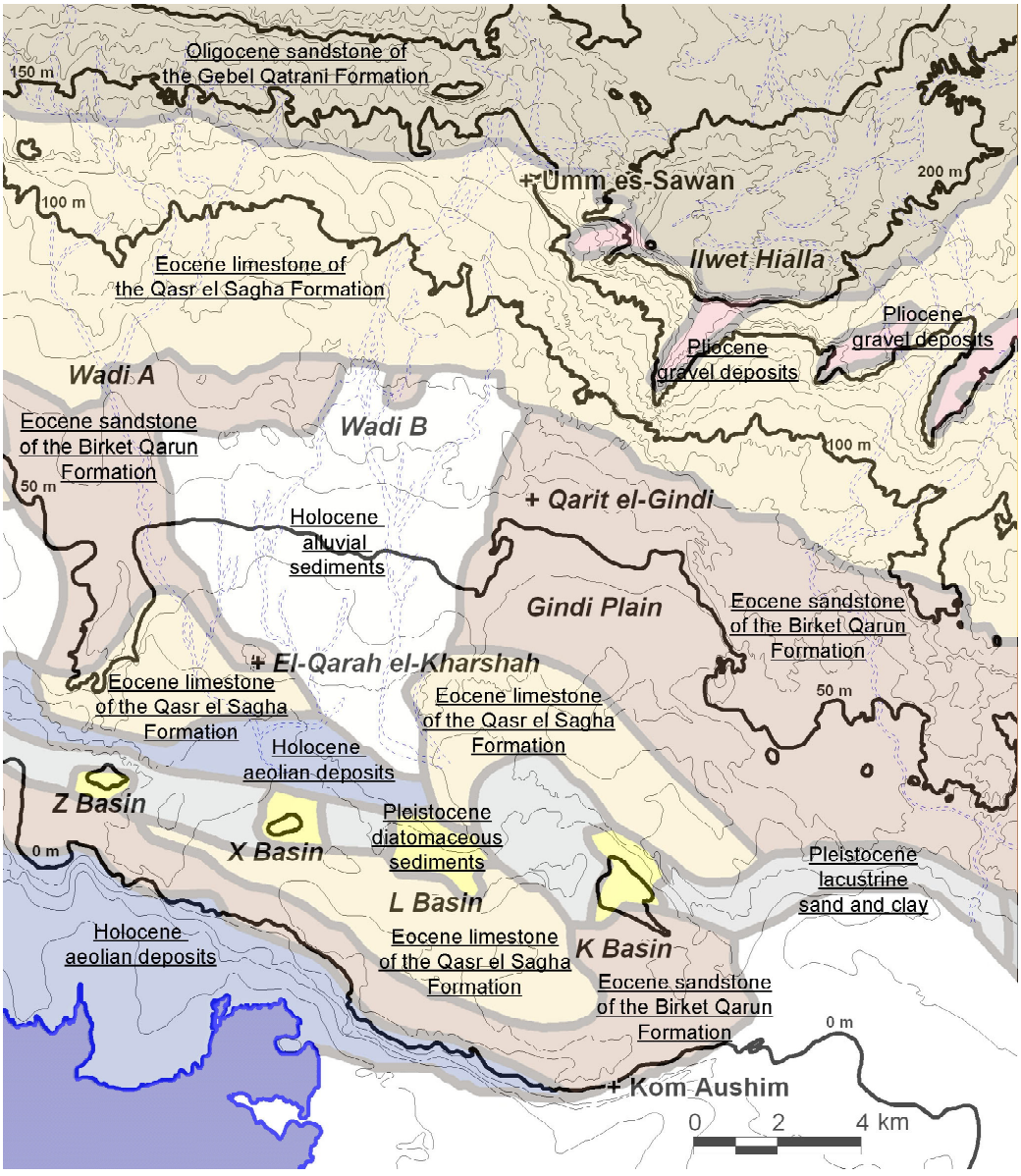

Fig.5.3. Geological map of the survey area

el-Sagha Formation, and it is sporadically exposed on the surface, with the cover of limestone fragments and fossil shells which have eroded out of highly fossiliferous bed. A particularly extensive exposure of the bedrock is seen around the 10-15 m asl contour line a few kilometres to the north of the present lakeshore.

Major topographic features in this low desert are four large basins which are aligned approximately 4-5 km away from the present lakeshore. They have been named by Caton-Thompson from the west to the east as the Z Basin, X Basin, L Basin, and K Basin respectively (Caton-Thompson and Gardner 1934: pl.CIX). These basins were probably huge residual pools off the shore of the perennial lake, and would have been filled with water as long as the lake level was higher than 10-15 m asl. Light yellow to orange silty sediments with

numerous white calcium carbonate pellets as well as mottled dark grey silty sediments, which mark the water margins or beaches in the past, are seen at many locations on the gentle slopes of the northern shores of the L Basin, X Basin and Z Basin (**Fig.5.4**). In addition, the peripheries of the Basin shores are often capped by white to light grey calcrete duricrusts of a few centimetres thick (**Fig.5.5**), which are indicative of the accumulation of calcium carbonate deposited by evaporation of moisture in the shore sediments, and there are also many calcified plant root casts in the duricrusts. Most archaeological remains of the Early-Middle Holocene have been found at elevations of approximately 10-20 m asl around the Basin shores and have been associated with these features. The Basins are filled with diatomaceous earth, and its white colour is quite visible from a distance (**Fig.5.6**). The Basin bottom is thinly covered by fine-grained aeolian sand, and the accumulation of fine-grained loose sand is thicker near the foot of the Basin slope.

Yardangs on the low desert show the traces of severe wind erosion and thus record wind directions in the past. Dunes on the low desert also suggest wind directions when the dunes were formed. In the present-day Fayum, the wind predominantly blows from the north or northwest (Mohamed 2003: Fig.16), and sand ripples seen elsewhere on the terrains of loose sand expand east-west and perpendicularly to the prevailing wind from the north (**Fig.5.7**). This is because the trade winds blow in the low latitudes towards

Fig.5.4. Calcium carbonate pellets on the northern shore of the Z Basin (looking southwest)

Fig.5.6. Diatomaceous sediments in the L Basin (looking southwest)

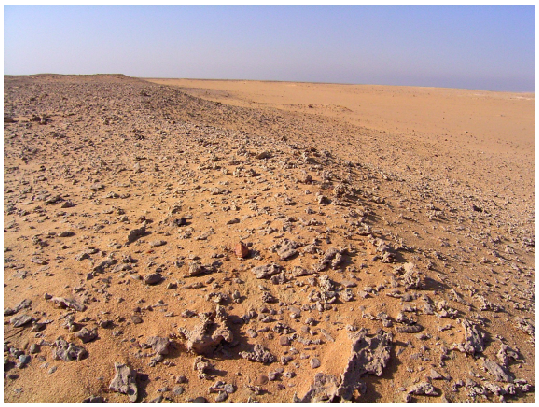

Fig.5.5. Calcrete duricrusts on the eastern shore of the Z Basin (looking south)

Fig.5.7. Sand ripples in the Z Basin area (looking northwest)

the Intertropical Convergence Zone, which is shifting north-south near the equator (Nicholson and Flohn 1980; Said 1993: 82-91). However, yardangs on the northeastern shore of the Z Basin (**Fig.5.8**) are eroded not only on their north side but also on their west side. Furthermore, several large dunes of the transverse type extend parallel from the northeast to the southwest in the area between the X Basin and Z Basin. According to general dune formation patterns (Goldberg and Macphail 2006: 130*ff*), the fact that these dunes have a slip face on their east side suggests that they have been formed by the wind from the west. It has been revealed by geomorphological studies in other parts of Egypt that although the wind from the north is dominant in Egypt at present, the wind from the west or northwest has predominated in the Early-Middle Holocene (Brookes 2003). This is because the westerlies, which presently blow in the middle latitudes to the north of Cairo, have migrated southward following the overall shift of atmospheric circulation, and/or because the westerlies meandered extremely reaching as far south as the low latitudes due to a large difference in air temperature between the north pole and the equator (Nicholson and Flohn 1980). It is highly probable that the erosion of yardangs and formation of dunes by the intensification of the westerlies in the Fayum took place during arid periods known in northeastern Africa in the Early-Middle Holocene.

Sporadic limestone outcrops exist everywhere irrespective of elevation, but more terrace-like extensive escarpments of a few metres high are exposed at elevations between 20 m and 30 m asl in the north of the K Basin, L Basin and Z Basin. The surface of these escarpments is littered with flint and limestone pebbles and their fragments. These escarpments are interpreted as prehistoric shorelines representing fluctuating lake levels. The escarpments exhibit irregular, discontinuous ridges, and hence seem to have been severely modified by wind and water erosion.

Another topographic feature in the survey area higher than 30 m asl is the Gindi Plain. It is a vast plain named after an isolated sandstone outcrop of approximately 50 m high which is called Qarit el-Gindi (**Fig.5.9**). The Gindi Plain is located on the Upper Eocene sandstone bed of the Birket Qarun Formation and is covered by coarse-grained aeolian sand, relatively large rounded flint pebbles, and subangular flint

Fig.5.8. Yardangs in the Z Basin area (looking west)

Fig.5.9. Qarit el-Gindi (looking west)

Fig.5.10. A very shallow part of Wadi B (looking northeast)

fragments. Therefore, the area is regarded as gravel desert which is conventionally called *serir* in the local terminology, and is far from rough stony desert which is called *hamada*.

Further topographic features in the survey area are two large wadis which run with a very gentle gradient from the rocky fringe of the Fayum Depression in the north towards the lake in the south through the Gindi Plain. Wadi refers to a gully, valley, or any dry stream bed which is formed by erosion due to occasional surface water flow, but the two wadis mentioned here are dry stream beds which are for the most part only slightly lower than the surrounding terrain (**Fig.5.10**). These wadis are approximately 15 km long. The western wadi named Wadi A by the UCLA-RUG Fayum Project runs from the northwest diagonally between the X Basin and L Basin, and the eastern wadi named Wadi B runs straight and bends southeastwards between the L Basin and K Basin, though the southern extent of both wadis is obscured by modern surface disturbance. The floor of the wadis is covered by fine-grained sand with few flint fragments and the edges of the wadis are quite visible. But at some places, the wadi edges are obscured by accumulations of aeolian sand. Dried plants are sporadically seen in the wadi floor. It is not known exactly how heavily rain fell in the past, but secondary deposits of eroded surface soils of desert origin, which were most likely caused by periodical torrential rain, have been observed in between Middle Holocene lacustrine sediment layers at Qasr el-Sagha (Kozlowski and Ginter 1993: 330*ff*). Therefore, it is probable that a certain amount of winter rainfall in the Early-Middle Holocene caused occasional surface runoff and played a role in creating and maintaining this drainage system.

5.3. The cultural heritage management orientation

Remarkably, the expansion of irrigation canals and farmland into the low desert and the mining of hard clay outcrops around the K Basin and L Basin, and the quarrying of basalt outcrops in the northeastern ridge of the Fayum Depression are rapidly destroying the environment. Therefore, the survey had to be undertaken with an explicit objective of cultural heritage management.

Cultural heritage management is an idea which has developed particularly in the United States since the 1970s, and its principle is that all cultural heritages which survived a long period of time have potential value or use in the present or future, and hence must be preserved wherever feasible or must be investigated as much as possible if destruction is unavoidable (Banning 2002: 177-196; Tainter 2004). This principle has been understood and practised in Europe and other developed countries as well.

Cultural heritage management orientation is gradually becoming common in the archaeology of Egypt. However, the principle of cultural heritage management is generally not well appreciated in the case of prehistoric sites. This is firstly because there are very few monumental structures or other visible features on sites, and hence it is difficult for non-specialists to understand their historical value or significance. A second reason is rapid population increase in Egypt in the past decades and growing demands for more cultivable areas and for more places for the living and the dead. As a consequence, most prehistoric sites on the alluvial plain and low desert adjacent to modern villages, farmlands and cemeteries are doomed to be cultivated, or levelled and built over by villages and cemeteries. Such unfortunate situations have been repeatedly reported by archaeologists working at prehistoric sites in the Nile Delta (van den Brink 1987), the Nile Valley (Bard 1989; Holmes 1992b; Vermeersch 2000) and the Western Desert (Simmons and Mandel 1986), but their efforts to let the local antiquities inspectorate and local people know about the significance of prehistoric sites and to protect the sites were not always successful.

Therefore, even though special attention was paid to prehistoric archaeological remains, this fieldwork project started from knowing the present condition of the concession area and the spatial distribution of archaeological remains by means of a walking survey, while locating

previously-published sites and recording any other archaeological and geological features that were encountered. Then, the significance of recorded archaeological remains and the impact of modern land use activities on their preservation were assessed, and the priority for further archaeological investigations in the later stage of the research project was determined.

5.4. Artefact collecting by previous visitors

Since the late 19th century, the Fayum has been well known for the vast scatters of beautifully-shaped flint tools, and local people and European antiquarians have collected such artefacts on the surface over the past hundred years. While archaeologists have made clear the provenance of surface artefacts which they collected, most of the surface artefacts collected by non-archaeologists and presently housed in museums in Egypt and Europe have no information about their provenance. It is impossible to know which sites have been surface-collected and consequently have been severely altered or have become almost invisible. Even at present, the Fayum is a popular place for foreign tourists and the inhabitants of Cairo to visit on holidays, and it is difficult to prevent them from collecting surface artefacts. Present artefact scatters on sites are not in an original, undisturbed state. Therefore, it is essential to take into account the past artefact collecting by antiquarians and archaeologists when the spatial distribution of sites is studied and the state of their preservation is accessed.

French antiquarians in the late 19th century started their flint tool collecting at prominent Pharaonic and Greco-Roman sites in the Fayum such as Umm el-Atel (the ancient Bacchias), Kom Aushim, Qasr el-Sagha, and Dimai (the ancient Soknopaiou Nesos), according to the publications of their collections (de Morgan 1896: 72-75; 1926: 54-68). Since Umm el-Atel, Qasr el-Sagha and Dimai are out of the UCLA/RUG concession and Kom Aushim is not included in the area of ongoing survey (**Fig.5.1**), the past artefact collecting at these sites is unproblematic.

Seton-Karr, who is one of the earliest British antiquarians wandering in the Fayum around the turn of the 19th century, published sketch maps of where he collected hundreds of flint tools and a number of heavy grinding stones. According to his sketch maps (Seton-Karr 1904: fig.1; 1905: plate I) and Caton-Thompson's account (Caton-Thompson and Gardner 1934: 23, 31, 75, and 78-79), it is highly probable that one area of Seton-Karr's intensive collecting was Kom W and its vicinity including Site V and Site Z, and another area was Caton-Thompson's Site ZI, which is identical to Puglisi's Site MB and the Combined Prehistoric Expedition's Site E29G1. Moreover, it seems that Seton-Karr already recognised more sites which were later named by Caton-Thompson as Kom K and Site L, and by the Combined Prehistoric Expedition as Site E29H1. However, it is not clear from Seton-Karr's writings whether he collected flint tools at these sites.

It is also not certain where in the Fayum the followers of Seton-Karr and Caton-Thompson visited, and how many flint tools they collected. For instance, Puglisi, who came to the Fayum in the 1960s, did not publish all artefact collections in detail, except for some Epipalaeolithic artefact assemblages (Mussi *et al*. 1984). Therefore, it is impossible to know whether Puglisi altered the state of sites by collecting surface artefacts when he visited Kom K, Kom W and its vicinity including Site Z.

It is likely that non-archaeologists firstly came to the area around Kom Aushim, because this is the most prominent and most easily accessible place. It seems that the area around Qasr el-Sagha was also a popular flint collecting place, judging from many flint tools which were collected by non-archaeologists and labelled as 'from Qasr el-Sagha' and are presently housed in museums in Egypt and Britain. Kom W is at present located near an asphalt road and a desert track which go to Qasr el-Sagha, and hence it is quite accessible to tourists who have some knowledge of Fayum prehistory. Therefore, there is little doubt that the areas around Kom W and Qasr el-Sagha are still being plundered. In contrast, other areas which are far from desert

tracks or edges of farmland are not easily accessible, and thus the probability of being plundered by tourists or local people may be much lower. Keeping these probabilities in mind, the state of preservation of individual sites is assessed.

5.5. The definition of an archaeological site

In archaeology, the meaning of the 'site' has long remained implicit. Any small occupation locus of hunter-gatherers and a town in an early state can be equally called a 'site'. On the other hand, there have been discussions among field surveyors and geographers over the recognition and delineation of 'site' during survey and in the analysis of the subtle variation in surface artefact density across the landscape, and they have been aware that distinguishing a 'site' and setting its boundaries was merely an act of decision or interpretation and not observation (*e.g.*, Bintliff 2000: 200; Dunnell and Dancey 1983: 271-274; Wagstaff 1991). Especially after the advent of cultural heritage management, it has been required that site conceptions should be explicit and consistent, because management decisions like registration and protection are entirely dependent on the perceived nature of the archaeological remains being managed (Dunnell and Dancey 1983: 281-282). This has encouraged archaeologists to reflect on site conceptions for academic research as well. Consequently, a number of site definitions have appeared, but there is still no consensus, and some of the site definitions are arbitrary and thus problematic (Tainter 2004: 438*ff*).

As described below, previous researchers in the Fayum have found a number of archaeological remains, and have named them 'sites'. However, the spatial extent of the 'sites' and the thickness, density and diversity of cultural and faunal deposits at the 'sites' are considerably different. As for prehistoric 'sites', the most salient Neolithic occupation loci like Kom K and Kom W are low mounds of more or less than 100 m in basal diameter, covered by dense artefact scatters of less than 1.5 m thick with no substantial stratigraphy, and contain structural remains like firepits and sunken storage jars. On the other hand, most of the other published 'sites' are merely scatters of artefacts or faunal remains on the desert surface, and their spatial extent and density are varied, from a few metres in diameter to more than a few hundred metres wide. In other cases, individual excavation trenches of a few square metres have been named 'sites', even though the trenches were opened in a vast area of dense artefact scatter, which may otherwise be called a single 'site'. Inconsistency in the manner of 'site' naming is quite obvious.

The problems in delineating 'sites' must be considered in terms of their state of preservation. Most of the known archaeological 'sites' in the northeastern part of the Fayum are concentrated around the Basins in the low desert adjacent to the present lakeshore. These Basins were filled with water when the lake level was much higher in the past, and thus it is reasonable that the Basin shores were the loci of past human activities. However, this situation causes difficulties in identifying discrete archaeological entities or 'sites'.

Even those who survey ethnographic sites of a few days or a few decades old would face the problem of defining the outer limits of a site, because human activities may disperse rare artefacts far away from the densest concentrations of artefacts (Gifford-Gonzalez *et al*. 1999: 403-404). The archaeologist studies the spatial artefact distributions on the surface that have accumulated through prolonged human activities. Therefore, an archaeological 'site', defined as a high density cluster of archaeological remains, does not necessarily correspond with a discrete settlement or other locus of activity, but may present a set of overlapping distributions, each representing a different activity or set of activities at different times. 'Sites' in the sense of high artefact densities can occur where there was no cultural activity at any time in the past, simply because the peripheries of several artefact clusters overlap there (Banning 2002: 18-19).

It has also been known that post-depositional processes might affect surface artefact

distributions and their visibility. Archaeological remains on a slope can be removed downslope by soil movement caused by sheetwash and small rills (Allen 1991). Recurrent wave action on a beach and occasional surface runoff in a dry stream bed, for example, can create a high density cluster of sorted artefacts which might look like a discrete 'site' (Banning 2002: 72-73; Morton 2004: 45-54; Rapp and Hill 1998: 56-59). There is no doubt that archaeological remains on Basin shores and on wadi beds and terraces in the Fayum have suffered from water erosion and subsequent wind erosion and the redeposition of aeolian sand. On the other hand, it is said that under rapidly rising calm water, archaeological remains on lake margins can be buried and well protected by the cover of lacustrine silty sediments which tend to deposit in deeper parts of lakes (Goldberg and Macphail 2006: 114; Rapp and Hill 1998: 57-59).

Moreover, the effects of deflation on surface artefact distributions cannot be underestimated. In aeolian environments, fine-grained loose sand is blown away, leaving a residual deposit of heavier and larger objects like lithic artefacts on a consolidated surface, and consequently, lithic artefacts originally contained in different deposits from successive occupations can be found together within the seemingly same assemblage (Goldberg and Macphail 2006: 122-129). Therefore, this new survey aimed to understand natural alternation to the morphology and distribution of archaeological remains in alluvial, colluvial and aeolian environments. Considering the problems of delineating 'sites' in this situation, the term 'locality' was used by this survey for recording and documenting a high density cluster of archaeological remains. However, concerning the localities which have been studied and named as 'sites' by previous researchers but actually do not deserve the designation of 'site', the previous names were adopted without change by this survey, in order to avoid confusion caused by giving new names.

Remarkable archaeological remains which drew the attention of archaeologists who had special research interests or specific expertise have tended to be recognised as 'sites' and given site names or site numbers. On the other hand, it has been uncertain whether there were more archaeological remains which failed to draw archaeologists' attention. It is understandable that low density surface artefact scatters were prone to be overlooked by previous surveys. However, as described below, even though not thoroughly surveyed, it was revealed that the survey area contains a number of more salient and hence easily-recognisable occupation loci like hearths which have never been published before. For the study of the land use patterns by prehistoric people, such occupation loci must be taken into account. Therefore, it was attempted to record carefully previously-overlooked archaeological remains.

The 'hearths' mentioned here in the Fayum look like heaps or circles of sandstone and fossil shell-bearing limestone cobbles, and the concentrations of the rocks are generally 1-2 m in diameter. Such rock concentrations have been conventionally called 'stone places' or *Steinplätze* in Saharan archaeology (Gabriel 1987; 2002). According to Wright (2005), the term 'hearth' which usually refers to any evidence for repeated use of fire must be more clearly defined, and seven types of ancient fire features can be distinguished on the basis of their construction and the frequency of their use. The seven types are; (1) firepatches, (2) fireplaces, (3) firepits, (4) stone-bordered fireplaces, (5) stone-filled pit hearths, (6) stone-bordered pit hearths, and (7) stone-lined pit hearths. Most heaps or circles of rocks seen in the Fayum look identical to either stone-filled or stone-lined pit hearths, but it is not certain whether all of such heaps or circles of rocks are really hearths if no trace of the use of fire is found. A previous survey report has drawn concentrations of rocks on the desert surface as 'hearths' on a sketch map of a Neolithic site E29G3 Area B near Qasr el-Sagha (Wendorf and Schild 1976: fig.147), but the reason why they were considered to be hearths was not explained. On the other hand, an excavation of a concentration of rocks at a Neolithic site QS VIE/80 near Qasr el-Sagha to the west of the survey area revealed that it was definitely a hearth and that rocks were put

together in a shallow depression for distributing heat or supporting items to be heated (Dagnan-Ginter *et al*. 1984: fig.21).

Given these previous research reports, it is necessary to investigate whether every single 'stone place' found during the new survey is really a hearth, but such an investigation was not always feasible and no careful excavation could be carried out during the survey. In many cases, rocks are fire-cracked, or the underside of rocks is blackened and charcoal still remains beneath the rocks. Hence such cases are considered to be hearths. In the other cases, however, rocks sit on the sandy surface and there is no trace of the use of fire, even though there are sparse scatters of artefacts around the rocks. In a desert environment, stone-filled or stone-lined hearths could be denuded and deflated, and lighter materials like charcoal and ashes could be washed or blown away, leaving weathered rocks alone (Gabriel 2002: 52-53). Therefore, no trace of the use of fire does not necessarily indicate that a 'stone place' under investigation is not a hearth. The new survey in the Fayum found no example of 'stone place' which suggests other purposes like a landmark, burial marker, or stockpiling of rocks. Therefore, in the following, all 'stone places' are tentatively described as hearths.

The variety, size, and number of rocks for making hearths seen in the survey area are not equal between the hearths, and the degree of discreteness of features like rock layout and artefact scatter in their proximity are also not the same. Such various degrees of feature discreteness should be indicators of the duration and repetition of hearth use (Chatters 1987). During the first use of a hearth, the rock layout is distinct and encompasses charcoal and refuse. If people remained several weeks, the hearth size might grow, and its position might be shifted, and parts of the original hearth might be removed and used to make a new one while disrupting the original feature, according to the changes of wind direction and needs of shelter. Between the first occupation and subsequent visits, vegetation and water distributions over the site might change, necessitating a repositioning of activities. During subsequent visits, the rock layout might be moved, while leaving a lens of ashes and trash to be trampled by users, scavenged by wild animals, or scattered by wind, or washed away by rising lake water or surface runoff of rain water. New hearths might be made from parts of one or more old hearths, and the older hearths might be obliterated. In other words, hearth stones should be regarded as features of site furniture, and should be considered as reused repeatedly by visitors (Binford 1979). After several seasons, there is a general scatter of rocks, ashes, and hearth trash with one or more rock circles in various states of repair. Repeated occupations would be more disruptive to feature integrity, due to the greater probability of spatial nonconformity of activities between habitation events than would be expected of longer-term single occupation. As the duration of occupation increased to permanence, it might become indistinguishable from repeated site use (Chatters 1987: 346). Keeping these assumptions in mind, all hearths encountered during the survey were recorded for the interpretation of how long or how repeatedly individual hearths were used and how many hearths were operational at one time.

Other supposedly immobile items which were often encountered in isolation or in association with artefact scatters include heavy grinding stones made of limestone and sandstone blocks/slabs. They have a shallow depression on one face of a block/slab and hence can easily be understood as items for grinding or mashing/pounding something on them. Such heavy items may be regarded as site furniture, which is usually not transported from place to place but rather left at one place by mobile people in anticipation of a future revisit (Binford 1979; Nelson and Lippmeier 1993), and should be considered to have been used repeatedly by visitors. In other words, the place where heavy grinding stones were found may be a locus of subsistence activities where people visited regularly or fortuitously for grinding cultivated crop grains or mashing/pounding sedge tubers.

Previous researchers who surveyed on the north side of the lake in the Fayum have

mentioned the sporadic occurrence of grinding stones, but have not thoroughly recorded their findspots, number and details. Hence it is not known how many grinding stones have actually been found at which sites and thereafter taken away, except for ten grinding stones taken from Kom W by Seton-Karr and presently housed in the Egyptian Museum in Cairo, and another six grinding stones excavated at Kom W by Caton-Thompson (Caton-Thompson and Gardner 1934: 31-32; Seton-Karr 1905: 186). Therefore, during this survey, special attention was paid to grinding stones, and their findspots were recorded. The term 'site' was principally given by this survey to a concentration of substantial and immobile remains like hearths and grinding stones. As will be described below, however, such concentrations are not common and hence only a few 'sites' were newly recognised by this survey.

Furthermore, another attempt by this survey was a sort of off-site or non-site survey. Previous 'salient site oriented' surveys in the Fayum have found several remarkable occupation loci, but the catchment analysis of such loci has not been sufficiently attempted. Although the patterns of fish and animal exploitation in prehistory have been studied at several selected localities in the Fayum (Brewer 1989a; 1989b; Gautier 1976b), it has not been thoroughly investigated what varieties of wild food resources were available around salient occupation loci, where the inhabitants of the salient occupation loci procured raw materials for tool making and clay for pottery making, where they went out for animal hunting and herding, and where they cultivated crops. Not only high density surface artefact scatters but also low density surface artefact scatters around salient occupation loci and in between salient occupation loci could give clues to know the locations visited or passed by people over some length of time.

High or low density scatters of animal/fish bones and their fragments are frequently encountered during the off-site or non-site survey, but it is difficult to interpret their scatter or concentration patterns especially when there are few artefacts around. How a scatter or concentration of bones and bone fragments is formed at one place depends firstly on how the sequence from catch to consumption took place. Removing inedible or low-utility portions of animals and fish upon catch prior to their transport back to field camp or residential base is quite common among foragers in African ethnographic records (*e.g.*, Gifford-Gonzalez *et al*. 1999; Kent 1993; O'Connell *et al*. 1988), and this behaviour could leave a scatter or concentration of the bones of specific body parts at the place of catching and butchering. When the animals and fish were eaten immediately after catching at one place, bones would have been dropped around the place of catching, cooking and eating by people who dined there, or collectively dumped away from the place. Therefore, it has been argued that concentrations of bones and bone fragments would not necessarily indicate the exact place of catching, butchering, cooking, or eating (*e.g.*, Gifford-Gonzalez 1991). Furthermore, bones are likely to be disturbed by scavenging acts of carnivores like jackals and vultures, and hence it is less possible for them to remain intact (*e.g.*, Lupo 1995). It was attempted to understand the implications of such bone scatters, thereby identifying the loci of subsistence activities.

In addition to these problems of displacement and disturbance, the preservation of bones is dependent on how long and whether they remained exposed on the desert surface or were buried under lacustrine silty sediments or aeolian sand, because bones are weathered and fragmented by various natural forces and reduced to unidentifiable splinters. Some empirical data have suggested that the preservation of bones must be understood as essentially fortuitous in the harsh desert environments of Egypt (Van Neer and Uerpmann 1989: 311). Furthermore, the differences in resistance to weathering and fragmentation between bones of different animals and their different body parts are not well known in the prehistoric archaeological record in Egypt (Gautier and Van Neer 1989: 138). The scatters or concentrations of bones and bone fragments on the present surface in the Fayum can only be

considered as indicating that they have been well protected beneath the past surface and were exposed on the present surface very recently by deflation. In other words, if scatters or concentrations of bone fragments are not sporadic but are widespread in a large area, then the archaeological remains in the entire area may be regarded as having been well preserved and retaining to some extent the primary context.

Off-site or non-site surveys were particularly necessary in the northern half of the concession area. It is virtually barren desert fringed by terrace-like escarpments in the north and also marked by Wadi A and Wadi B running from the rocky terrain through the barren desert. Except for Old Kingdom gypsum quarrying workshops found at Umm el-Sawan at a northern fringe of the Fayum Depression, no archaeological remains have been reported in this terrain. Therefore, it was expected to know whether the lack of information actually meant the lack of human activities in this terrain in the past.

5.6. Method of survey and recording

A modern topographical map of the northeastern part of the Fayum, which was produced on a 1:50000 scale by the Irrigation Management Systems Projects and was issued as 'Kawm Ushim NH36-E5b' by the Egyptian General Survey Authority in 1995, was used as a base map for the field survey. The archaeological site maps made and published by Caton-Thompson and Gardner (1934: pl.CIX), Wendorf and Schild (1976: fig.95), Mussi, Caneva and Zarattini (1984: fig.1) and Brewer (1989b: fig.18) were also used as references in order to locate the sites which they have investigated.

A grid system was set up in order to cover the survey area, following the true north-south axis. The survey area was divided into 60 squares, each of which is 2 km (east-west) x 2 km (north-south), just for the convenience of walking and recording in the field. Within each square, the same manner of transect walking could not equally been employed, because the physical condition of each square was different from each other, and it was not practical to apply the same setup of transects. In the case of squares covering the K Basin and L Basin, the area is severely disturbed by modern land use activities, and it was difficult to go straight across farmland following transects. Therefore, the survey was limited to accessible margins of farmland and undisturbed terrains. In the case of squares covering the X Basin and Z Basin, the area is not severely disturbed. Thus a series of parallel transects were firstly walked, and then a second set of transects at right angles to the first were walked at a different time of the same day or on a different day, in order to increase the probability of encountering archaeological remains.

Artefact concentrations and other archaeological remains were generally quite visible on the desert surface, marking a sharp contrast with the barren parts of the desert completely covered by aeolian sand. The presence of artefact concentrations and other archaeological remains was often quite predictable in relation to the natural relief and depressions of the desert. Considering the demand of large area coverage by a few persons within limited time periods, it was impossible to employ meticulous transect walking with a rigid, equally-spaced interval in a given square and to collect or count every single artefact on the surface in order to see the density of artefact scatters over the land. Therefore, the direction and interval of parallel transects were flexible and were based on the surface conditions. It must be stressed that due to this flexible manner, the resultant record of the spatial distribution of artefact scatters and other archaeological remains is different from an objective sample obtained through a well-controlled survey, and hence has no statistical meaning. Less visible artefacts and other archaeological remains in sandy parts of the desert may have been missed. In the case of squares covering Wadi A and Wadi B, assuming that the remains of past human activities would be located along the Wadis, it was not cost-effective to employ transect walking in the entire square, and hence, the survey transect was not extended more than 500 m far away from the

terraces of the Wadis.

The rough dating of localities/sites is based on diagnostic artefacts seen on the surface. The strengths and weaknesses of archaeological survey and study of surface-collected artefacts have been discussed elsewhere in comparison with the strengths and weaknesses of archaeological excavation and the study of excavated subsurface artefacts (*e.g.*, Dunnell and Dancey 1983; Millett 2000). While a survey enables broad spatial coverage of the area under study, a weakness of surface-collected artefacts is apparently that they lack precise chronological information. Surface artefacts are loosely spatially associated with each other, and it cannot simply be assumed that all artefacts or structural remains found on the same surface of a particular spot were deposited at broadly the same time. Therefore, well-dated lithic sequences or pottery sequences produced through controlled excavations are necessary to date the surface artefacts, but such artefact sequences are not yet available in the Fayum.

Pottery sherds seen on the surface of the survey area are dated to either the Neolithic, Old Kingdom, or Greco-Roman. As described in Chapter 3, Neolithic pottery of the Fayum is made from local clay and shale, and is handmade and coarse. Hemispherical bowls and tall bag-shaped jars are the most common pottery types. Most of Neolithic pottery sherds seen on the surface of the survey area are heavily-worn porous body sherds of such vessels. They are easily distinguishable from Old Kingdom pottery sherds which have much finer fabric and are well-fired, and Greco-Roman pottery sherds which are often made from hard marl clay and are better preserved. Actually, the occurrence of Old Kingdom and Greco-Roman pottery sherds is sporadic in the survey area. The presence of Neolithic pottery sherds on a locality/site can be used as an indicator of Neolithic occupation, but it does not indicate at which time within the long span of the Fayum Neolithic period the locality/site was occupied. Poorly-published Epipalaeolithic lithic assemblages obtained through controlled excavations at Site E29G1 and Site E29G3 by the Combined Prehistoric Expedition as well as the Epipalaeolithic-Neolithic tool class sequence proposed in Chapter 3 are presently usable as references to roughly date quite diagnostic Epipalaeolithic and Neolithic lithic artefacts on the surface of the survey area. A Predynastic lithic assemblage obtained at Qasr Qarun by Caton-Thompson (Caton-Thompson and Gardner 1934: 69-70 and pls.LII-LIII) and an Old Kingdom lithic assemblage obtained at Kom IV by Caton-Thompson (Caton-Thompson and Gardner 1934: 97-101 and pls.LIV-LV) are also usable as references to roughly date quite diagnostic Predynastic and Old Kingdom lithic artefacts on the surface of the survey area. As Caton-Thompson recognised when she investigated her surface sites (Caton-Thompson and Gardner 1934: 71-87), mixed assemblages of Epipalaeolithic, Neolithic, Predynastic, Old Kingdom and Greco-Roman artefacts on the present surface are not unusual in the Fayum due to overlapping occupations and severe surface deflation. Such situations were repeatedly encountered during this survey. Therefore, the possible date(s) of occupation of a locality/site encountered often had to be recorded for instance as 'Epipalaeolithic/Neolithic' or 'Neolithic/Old Kingdom'.

All information about individual locations with archaeological remains and their possible date(s) was recorded by using the record sheet, with the aid of a hand-held Garmin GPS receiver to obtain their coordinates. The datum is 'Old Egyptian', and the grid is described as latitude/longitude hddd.ddddd^{o}. The information was processed on the Garmin MapSource ver.6.8 and the GIS software MapInfo Professional ver.7.0, and was graphically displayed. A contour map made by using this GIS software on the basis of the above-mentioned topographical map 'Kawm Ushim NH36-E5b' is superimposed on a satellite picture obtained from Google Earth. While the coordinates of individual locations were recorded by using the GPS receiver without difficulty, it was difficult to obtain their elevations, because this device is not suitable for measuring accurate elevations. Approximate elevations of most archaeological localities/sites

and topographic features described below were obtained after they were plotted on the contour map. These GIS data are the basis for gaining a general overview of the large concession area, and for subsequently carrying out more intensive and systematic investigations including excavations at promising localities/sites in later stage of research.

5.7. Field observations of the survey area

5.7.1. The K Basin-L Basin area

The K Basin-L Basin area is defined as the area centring on the K Basin and L Basin (**Fig.5.11**). At present, the K Basin and L Basin are transformed into reservoir and farmland, and their surroundings are actively cultivated, whereas the plots more than 1 km to the north of both Basins have been cultivated once but are abandoned due to the failure of water supply and subsequent soil deterioration through salination. In spite of such a severe situation, dry canals and ditches are still being extended a further few kilometres northwards beyond the abandoned farmland and destroying desert environments. The access to this area is facilitated by an asphalt road which extends westwards from the Cairo-Fayum Road No.22, and many dirt tracks extend northwards and southwards from the asphalt road.

5.7.1.1. Kom K

Kom K (N29.58737° E30.87825° in the centre) is located in the low desert to the northwest of the K Basin, and its top elevation is approximately 20 m asl. The surface of this low desert is covered by fine alluvial silty sand, but this area has extensively been cultivated, and other kinds of soils and flint pebbles seem to have been brought from somewhere else as fertiliser or paving stones. At present, Kom K is in the middle of farmland, but still retains its shape as a very low mound (**Fig.5.12**). Many plough tracks and remains of plants are visible on the Kom (**Fig.5.13**), and scatters of artefacts including large flint cobbles, flint debitage products, and pottery sherds are seen in between the tracks around the highest elevation in its centre. These artefact scatters are apparently those that were excavated and left there by Caton-Thompson and thereafter ploughed. Therefore, they do not retain their original context at all but nonetheless can roughly be viewed as the representatives of this site, which has kept cultural deposits of approximately 30 cm thick (Caton-Thompson and Gardner 1934: 38*ff*). The study of the artefacts collected here will be described in Chapter 7.

5.7.1.2. Site K

Site K, which was indicated on a map and briefly described by Caton-Thompson (Caton-Thompson and Gardner 1934: 72) and Site 3, which was surveyed by Brewer in the 1980s (Brewer 1989a; 1989b), must be located somewhere in the modern farmland to the southeast of Kom K, but that area is at present actively cultivated, and hence is not accessible. It is highly probable that these sites are completely buried or destroyed.

5.7.1.3. The Upper K Pits and Lower K Pits

Approximately 1 km to the northeast of Kom K, an extensive ridge built of hard clay runs over 3 km from the northwest to the southeast. Presently an asphalt road and concrete and stone-built canals run parallel at the foot of this ridge. The surface of the ridge is covered by coarse-grained aeolian sand with many abraded flint gravels, many small lacustrine shells and fossilised shells. Some abraded flint flakes found among the gravels seem to be Levallois flakes and hence to be dated to the Middle Palaeolithic. It has been suggested that this ridge was a part of the Pleistocene lakeshore (Caton-Thompson and Gardner 1934: 41). The stratigraphic profile of the ridge on the walls of another modern canal dug deeply in the middle of the ridge perpendicularly show that surface flint gravels and hard clay overlie bands of Tertiary indurated shales and conglomerates.

Caton-Thompson and Gardner reported that

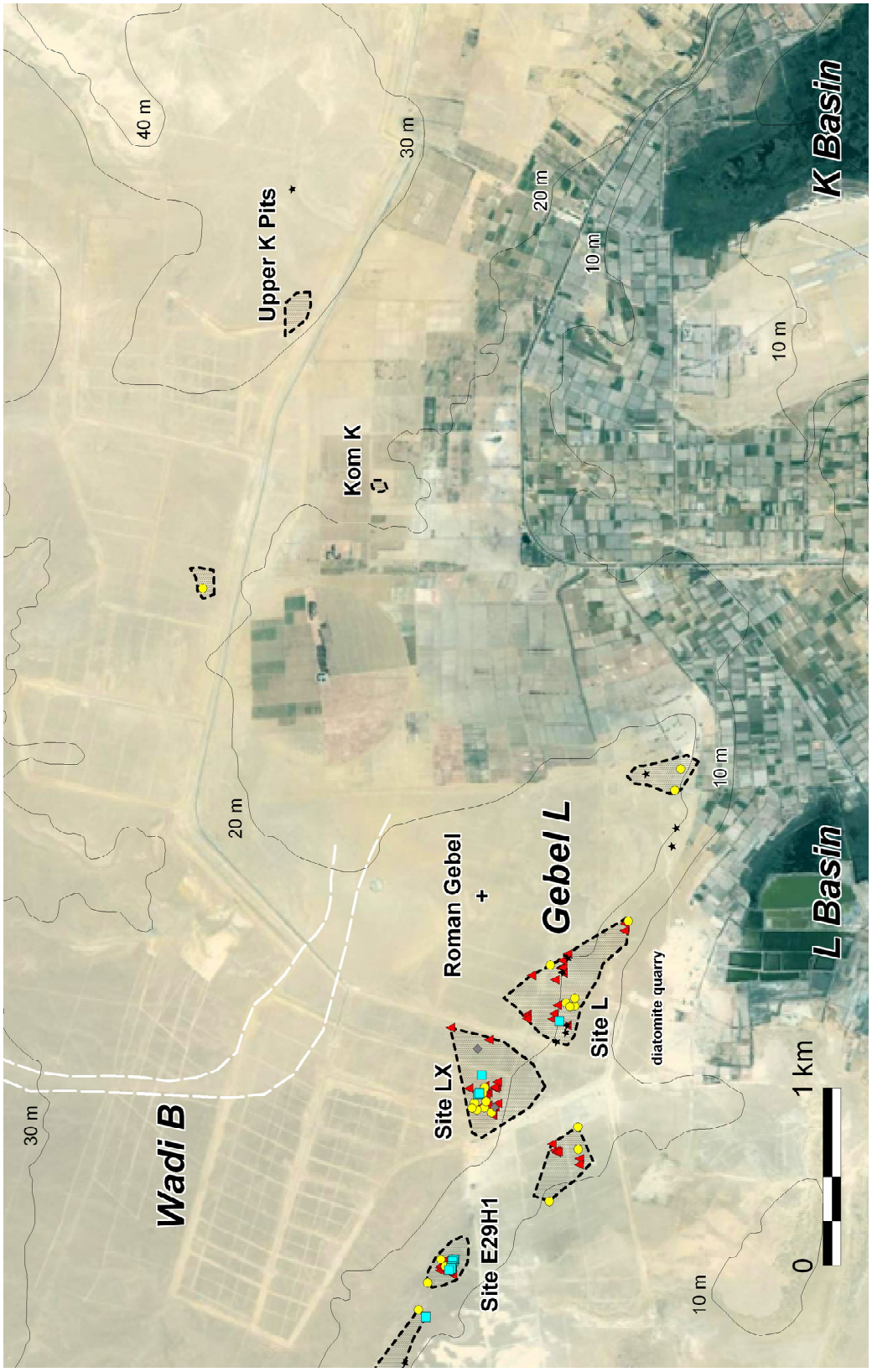

Fig.5.11. The K Basin - L Basin area (triangle: hearth, circle: grinding stone, square: animal bone, star: Neolithic projectile point, diamond: Neolithic sickle blade)

Fig.5.12. Present state of Kom K in the middle of farmland (looking southwest)

Fig.5.14. Present state of the Upper K Pits (looking west)

Fig.5.13. Kom K from a distance (looking northeast)

Fig.5.15. Supposed location of the Lower K Pits (looking south)

the Upper K Pits were spread in an area of approximately 180 m long by 45 m wide on top of a projecting northwestern spur of this ridge named the K Ridge at an elevation of approximately 30 m asl at its highest, whereas the Lower K Pits were distributed further westwards at lower elevations of around 20 m asl (Caton-Thompson and Gardner 1934: 41). A number of circular shallow depressions of less than 1 m in diameter are still visible on the surface of the higher ridge (N29.59089° E30.88955° in the centre), and a bifacially-retouched, serrated sickle blade was collected on the surface. Therefore, this locality is certainly the Upper K Pits. Comparison of the present topography with the map of the Upper K Pits made by Caton-Thompson and Gardner (Caton-Thompson and Gardner 1934: pl.XXIV) showed that a concentration of shallow depressions presently seen on the ridge corresponds to a major concentration of pits on their map. However, it is also recognised that the most obvious of those depressions are not Neolithic granary pits but are probably later robbers' pits. The location of Neolithic granary pits is often indicated only by a circular clearance which has a lower density of flint gravels.

The K Ridge is at present in the early stage of development by the Egyptian government, and is being destroyed by activities such as digging deep canals, scraping surface gravels, and paving roads with flint cobbles which are transported

from elsewhere. The Upper K Pits locality is presently divided into two (the eastern part and westernmost part) by a deep canal running north-south (**Fig.5.14**). The eastern part which contains the major concentration of pits mentioned above is not severely disturbed by modern activities, because this part is higher and more undulating than surrounding areas and thus less suitable for cultivation. The westernmost part is the place where an isolated pit numbered 67 has been found by Caton-Thompson. In this westernmost part, many intact pits which had been overlooked by Caton-Thompson were found and partially excavated (Schepers *et al*. 2006; Wendrich and Cappers 2005). Surface loose sand is not thick on this ground, and most pits have been dug through compact sand into hard clay.

On the other hand, the exact location of the Lower K Pits is not clear, because Caton-Thompson did not publish the map and plan of the Lower K Pits but described them only briefly (Caton-Thompson and Gardner 1934: 52-54). The supposed location of the Lower K Pits (**Fig.5.15**), which was said to be approximately 800 m to the north of Kom K and to the northwest of the Upper K Pits, is presently covered by flint gravels and loose sand, and seems to be more heavily eroded than the area of the Upper K Pits, as Caton-Thompson has already noted. No depressions of a granary pit size can be found on the surface. It is also probable that the supposed location of the Lower K Pits has been mostly destroyed by the canals mentioned above.

Most of the area to the north of both the Lower and Upper K Pits is severely disturbed by recent expanding dry canals and ditches. Some undisturbed parts were barren, and no archaeological remains were found in this area except for a stray Neolithic concave-based arrowhead found on the side of a dirt track. The areas to the southwest and northwest of the supposed location of the Lower K Pits are also severely disturbed by recent land use activities, and no archaeological remains were found. In the area to the west of the Lower K Pits, a low desert ridge extends from the east to the west, and on the north of the ridge, a number of sandstone cobble clusters accompanied by pottery sherds were seen on the desert surface. Lithic artefacts are few, and they look different from those of prehistory. Some pottery sherds are apparently later than the Neolithic period. Therefore, it may be presumed that this locality was occupied in later periods. Since most occupation loci in later periods have been found at lower elevations to the south, the nature of this curious locality must be considered further.

5.7.1.4. Gebel L

The northern shore of the L Basin is marked by a flat brownish limestone escarpment, which was named Gebel L by Caton-Thompson (Caton-Thompson and Gardner 1934: 73). She has reported that there were one Neolithic surface site named Site L on the southern spur of Gebel L, one Old Kingdom site named Kom IV, and one Roman site named the Roman Gebel on the flat top of Gebel L (Caton-Thompson and Gardner 1934: 73-74, 97-100, and 158). The eastern half of the northern spur of Gebel L is at present occupied by modern farmland, and an archaeological survey was not possible. The southwestern part of Gebel L is occupied by two large military hangars, which were abandoned many years ago and are presently not in use. Its surroundings are flattened, and military rubbish is widely scattered. To the north of the military hangars are presently uncultivated plots divided by dry ditches (**Fig.5.16**). A noticeable limestone outcrop in the middle of the uncultivated plots is the Roman Gebel (N29.58217° E30.85390° in the centre) (**Fig.5.17**). Several supposedly rock-cut graves are present, but they are badly damaged by robbers' pits and shelters made by local people as watching stands for illegal falcon hunting. Scatters of Roman pottery sherds are seen around the outcrop.

At the southeastern end of the limestone escarpment approximately 500 m to the east of the military hangars, wide scatters of lithic artefacts were located on the flat surface. The southern spur of this flat area is covered by lithic artefacts as well as pottery sherds not only of the Neolithic but also of later periods, though there are no pottery sherds on top of the flat area.

It is likely that this area was flattened by military bulldozers and surface artefacts were removed downslope to the south. Kom IV must be located somewhere around here, but it seems to be destroyed by this activity. Surface scatters of lithic artefacts and pottery sherds are spread further toward modern farmland in the south. The surface of one locality of artefact concentration seems to have been burnt very recently, and Neolithic flint tools and relatively well-preserved pottery sherds as well as a typical Old Kingdom flint crescent drill were collected on the surface. Close proximity to Kom IV may be an explanation for the presence of an Old Kingdom artefact. Another locality of surface artefact concentration next to the first one is more chaotic, and pottery sherds of obviously later periods are mixed with Neolithic pottery sherds

Fig.5.16. Present state of Gebel L (looking south from Roman Gebel)

Fig.5.17. Roman Gebel (looking northeast)

and Neolithic flint tools in fine-grained aeolian sand. All of these surface artefact scatters may be included in the eastern end of Caton-Thompson's Site L. However, it was also reported by Gardner that there was a Ptolemaic settlement around there (Caton-Thompson and Gardner 1934: 145-149). Therefore, a part of the pottery sherd scatters may belong to this Ptolemaic settlement.

5.7.1.5. Site L

According to Caton-Thompson, Site L is located on the southern slope of Gebel L, and it extends more than 1 km wide, and between 10 m asl and 20 m asl. The area at the foot of this limestone escarpment is covered by limestone slabs and blocks which fell down from the edge of the escarpment, and thus, few archaeological remains can be seen. In contrast, the areas to the east and west of these limestone slabs and blocks are not much disturbed, though the entire area is covered by thick accumulations of fine-grained aeolian sand. Surface scatters of artefacts are sparsely seen on this sand, where Caton-Thompson collected a number of Epipalaeolithic and Neolithic tools. The area further downslope of the scatter of limestone slabs and blocks exhibits light yellow to orange silty sediments which are supposed to be beach sediments and lacks aeolian deposition of sand. The artefact scatters extend on these silty sediments, and it is difficult to discern between Epipalaeolithic and Neolithic lithic artefacts. The southern end of this area is occupied by two large conical limestone buttes. Sparse scatters of supposedly Roman pottery sherds are seen around these buttes.

The slope surface of the western half of Site L is thinly covered by coarse/fine-grained aeolian sand with few flint fragments (**Fig.5.18**). As can be observed on the walls of a deep canal dug north-south, there is a lamination of very fine-grained alluvial sand and silty sediments of different colours and different extent of induration accumulated beneath the surface. It shows that this slope has repeatedly experienced inundation and desiccation events caused by

fluctuating basin water levels, though the age and duration of each event cannot be understood by the visual observation of stratigraphy alone. The ground at lower elevations of the slope is very soft, and many cracks are seen on the surface and some parts are sunken or collapsed. At one location, a large band of silty sediments runs from a higher elevation downwards, and it seems to be a trace of surface runoff water of unknown age.

Most archaeological remains in the western half of Site L such as scatters of lithic artefacts and pottery sherds, and clusters of sandstone/ shell-bearing limestone cobbles which are supposed to be hearths, are spread between 15 m asl and 20 m asl, but they are also observed above 20 m asl. At the lower elevation, there are several patches of deflated light yellow silty sediments, and scatters of lithic artefacts and pottery sherds are seen on these silty sediments, and many of them are embedded in the sediments. Below 10 m asl, the desert surface is covered by fine-grained aeolian sand and a sparse growth of camel's thorn (*Alhagi maurorum*) and lotus trees (*Nitraria retusa*), and few artefacts are seen.

The density of archaeological remains is relatively low in the slope area, whereas it is very high in the flat area above 20 m asl. There seems to be a tendency that Epipalaeolithic artefacts are scattered at lower elevations whereas Neolithic artefacts are more densely scattered at higher elevations. At the middle elevation, both Epipalaeolithic and Neolithic artefacts seem to be mixed, due to either taphonomic processes or overlapping areas of activities, or both. Since Neolithic flint tools are sometimes seen at lower elevations, it is difficult to locate purely Epipalaeolithic artefact scatters. Sparse scatters of unworked flint cobbles are also noticed in these areas. Since these cobbles are apparently not local ones, they must have been transported from elsewhere as lithic raw materials by toolmakers. Neolithic pottery sherds are not numerous in these areas.

A cluster of four hearths accompanied by Neolithic pottery sherds and lithic artefacts were found on the deflated surface of a high flat area

Fig.5.18. Slope of the western half of Site L (looking west)

Fig.5.19. Hearths in Site L (looking south)

of 20 m asl, overlooking the L Basin in the southeast (**Fig.5.19** and **Fig.5.20**). It is noticeable that charcoal still remains beneath hearth stones. Lithic artefacts include a number of large flint cores and debitage products, and some of them could be refitted. These facts suggest that this location has not been disturbed severely, and it was assessed that this location might represent a well-preserved Neolithic occupation locus at a high elevation in this area. The study of the lithic artefacts collected here will be described in Chapter 7.

5.7.1.6. L Basin reservoir and clay mines

Although not indicated on the modern topographical map issued in 1995, a large part of the L Basin is presently transformed into a

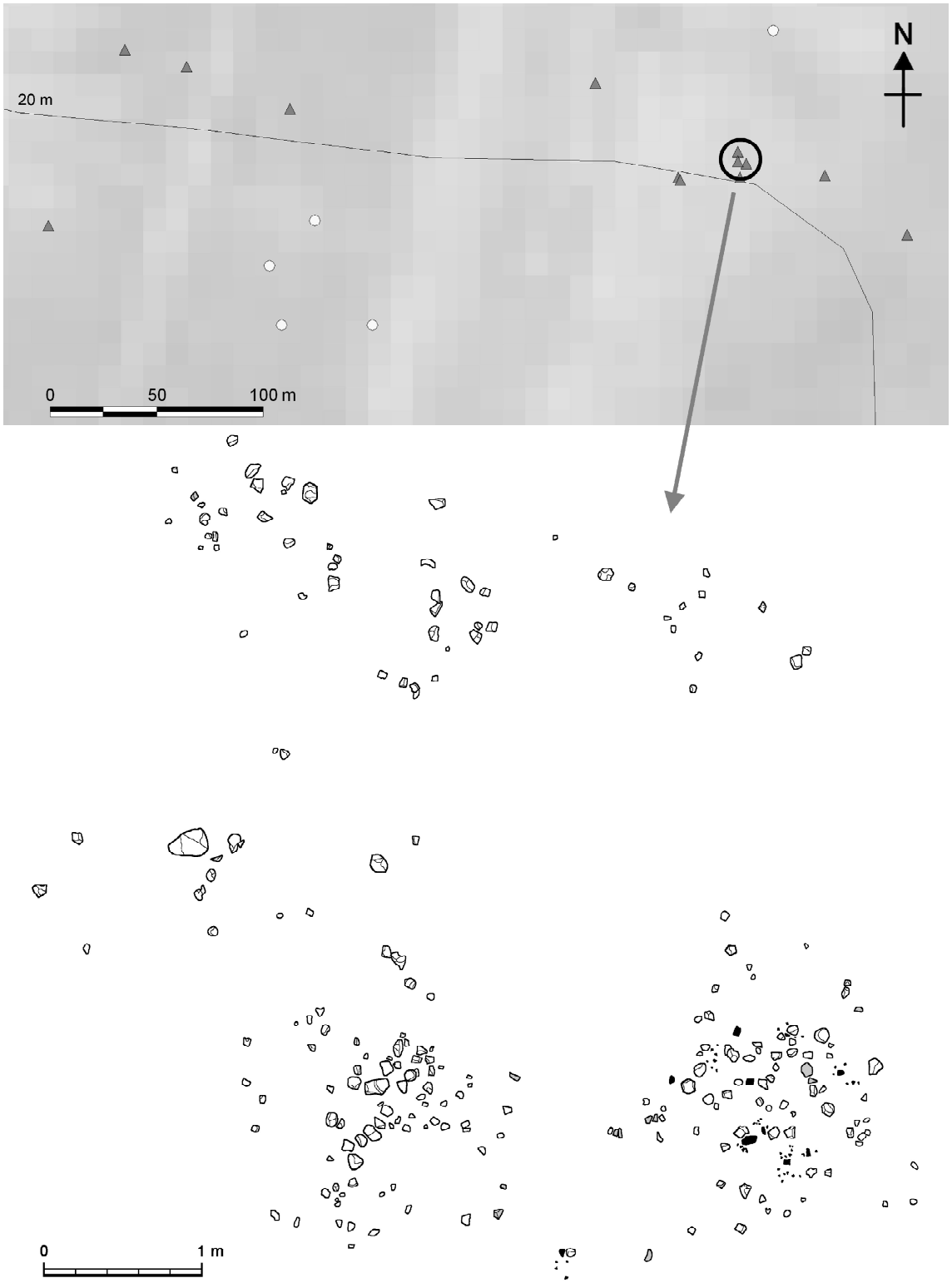

Fig.5.20. Site L (triangle: hearth, circle: grinding stone) and four hearths (sandstone in grey and pottery sherds in black)

Fig.5.21. Diatomite quarry at the northern fringe of the L Basin (looking northwest)

reservoir, and its surroundings are marshland and farmland, and are cultivated. The northern fringe of the L Basin exhibits the extensive exposure of diatomaceous earth, and blocks of diatomite are being quarried by mining machines. The accumulation of diatomaceous earth as seen on the walls of the quarry is more than 2 m thick (**Fig.5.21**), and this suggests that the bottom of the L Basin has been filled with water for a considerable length of time. Caton-Thompson has recorded an unnamed Epipalaeolithic locality on the southern shore of the L Basin (Caton-Thompson and Gardner 1934: 74, pls. CXII and CXIII), but this locality is probably in the middle of modern farmland, and could not be found.

Further to the south of the L Basin reservoir are large mining sites. Bulldozers and mining machines are levelling and digging outcrops of hard clay and shale, and dumper trucks are transporting tons of rubble on dirt tracks to nearby ceramic factories along the Cairo-Fayum Road. There is no hope of finding archaeological remains in this area.

5.7.1.7. Summary of the K Basin-L Basin area

The K Basin-L Basin area is disturbed or destroyed so severely by modern land use activities that it is difficult to imagine the original environment. Therefore, this area is not suitable for understanding the spatial distribution of past human occupation loci and natural resources and for considering human behavioural patterns in the given environment in prehistory. However, individual prehistoric localities/sites which survived recent surface disturbance but are presently under threat of destruction still deserve further study.

5.7.2. The L Basin-X Basin area

The L Basin-X Basin area is defined as the area centring on the L Basin and X Basin (**Fig.5.22**). This area has been known to include a large prehistoric locality on the northeastern shore of the X Basin. This locality has been indicated on a map and described briefly by Caton-Thompson (Caton-Thompson and Gardner 1934: 74 and pl.CX), and has later been investigated and named Site E29H1 by the Combined Prehistoric Expedition (Wendorf and Schild 1976: 182-199). On the other hand, little has been known about other parts of the area. Therefore, the entire stretch of the Basin shores was surveyed.

At present, this area is extensively disturbed by modern dry canals and ditches running east-west and north-south. Along the canals and ditches, there are many electric poles and small brick houses containing motor-powered water pumps, which are not yet in use. However, the plots divided by the canals and ditches are still intact, and natural depositional features and scatters of artefacts are clearly seen on the flat area around 20 m asl as well as on the gentle slope.

A linear band of rounded/subrounded pellets of calcium carbonate stretches northwest-southeast on the flat sandy surface along the 20 m asl contour line. As can be seen in the profiles of shallow ditches dug everywhere in this area, the accumulation of calcium carbonate pellets is not thick, and it seems to indicate a shoreline at certain times of high water of the X Basin. The surface of other parts of the flat area is covered by coarse-grained aeolian sand, and many patches of indurated light yellow silty sediments are seen. However, as can be seen in the profiles of shallow ditches dug everywhere, there are indurated light yellow to white silty

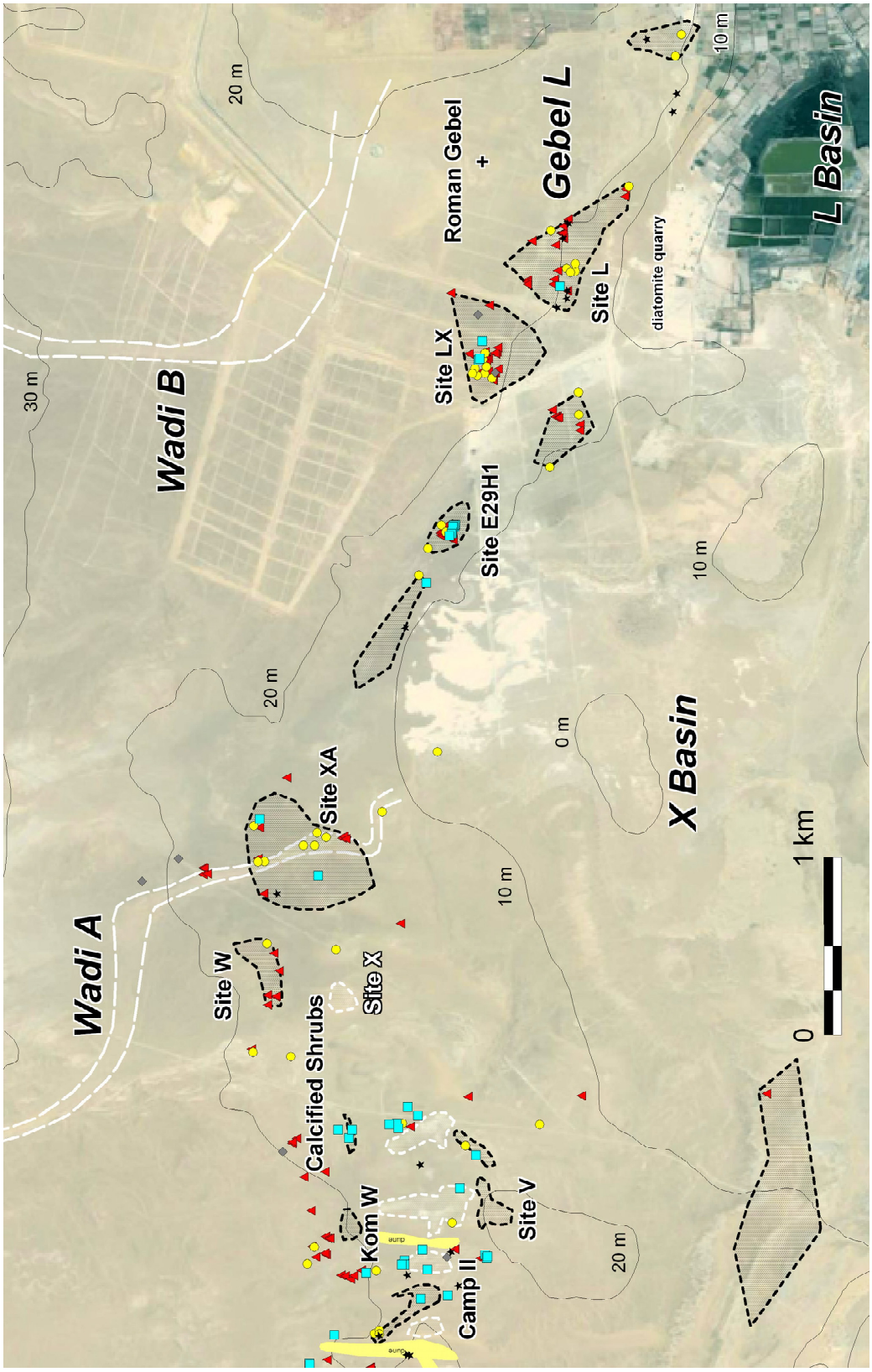

Fig.5.22. The L Basin - X Basin area (triangle: hearth, circle: grinding stone, square: animal bone, star: Neolithic projectile point, diamond: Neolithic sickle blade)

sediments beneath the surface, and beneath these silty sediments, there are thick dark grey sediments which must be rich in organic matter and are supposed to have been deposited under shallow water in a swampy environment (**Fig.5.23**). Usually, such organic matter undergoes biochemical decay or is destroyed by oxidation (Rapp and Hill 1998: 29). Good preservation of these dark grey sediments beneath the crust of silty sediments suggests a trend of rapidly rising basin water in a certain period. In other words, the swampy margins of a stagnant basin suddenly fell under deep water, thereby being buried by lacustrine silty sediments. This may also suggest that this high flat area has not repeatedly suffered from inundations and desiccations.

Fig.5.23. Section of a ditch dug in Site LX (looking north)

Fig.5.24. A concentration of burnt clay nodules in Site LX (looking east)

5.7.2.1. Site LX

At a high elevation of above 20 m asl a few hundred metres to the northwest of Site L, the deflated flat desert surface is thinly covered by fine-grained loose sand, calcified nodules of sand clast, porous calcrete duricrusts, calcium carbonate pellets, and calcified plant roots. A sparse growth of camel's thorn and lotus trees was also seen. Curious concentrations of burnt clay nodules (**Fig.5.24**), concentrations of lithic artefacts, curious scatters of ostrich eggshells as well as hearths (**Fig.5.25**) and grinding stones (**Fig.5.26**) were seen on the surface of the flat area. Lithic artefacts include a variety of typical Neolithic bifacially-retouched tools such as knives, scrapers, and sickle blades. Several lithic

Fig.5.25. A hearth in Site LX (looking north)

Fig.5.26. Two grinding stones in Site LX (looking north)

concentrations include cores, debitage products, and hammer stones. Elongated petrified wood splinters are sometimes accompanied by lithic concentrations, and hence, the petrified wood splinters may be related to toolmaking, and may have been used as soft hammers or punches. The dense concentration of such occupational features in a circular area of approximately 200 m in diameter indicates that various activities took place there. The concentration of hearths and grinding stones in this area (**Fig.5.27**) deserves the designation of 'site'. This remarkable area has never been reported by any previous researchers, although Caton-Thompson's L Basin Bench Mark for her survey may probably be located somewhere in this area and she mentions that she collected some Neolithic artefacts around the Bench Mark (Caton-Thompson and Gardner 1934: 74). Therefore, this area (N29.58210° E30.84314° in the centre) was designated as Site LX.

Part of the largest concentration of burnt clay nodules and fragments, whose diameter was approximately 3 m, were excavated. It was revealed that the accumulation of the burnt clay nodules and fragments was very thin on an indurated mud surface with many desiccation cracks, and that few charcoal and ashes remained. Therefore, it is difficult to say with certainty that these are the remains of a bonfire for pottery firing, even though it is possible. Given that some of hearths in this area still

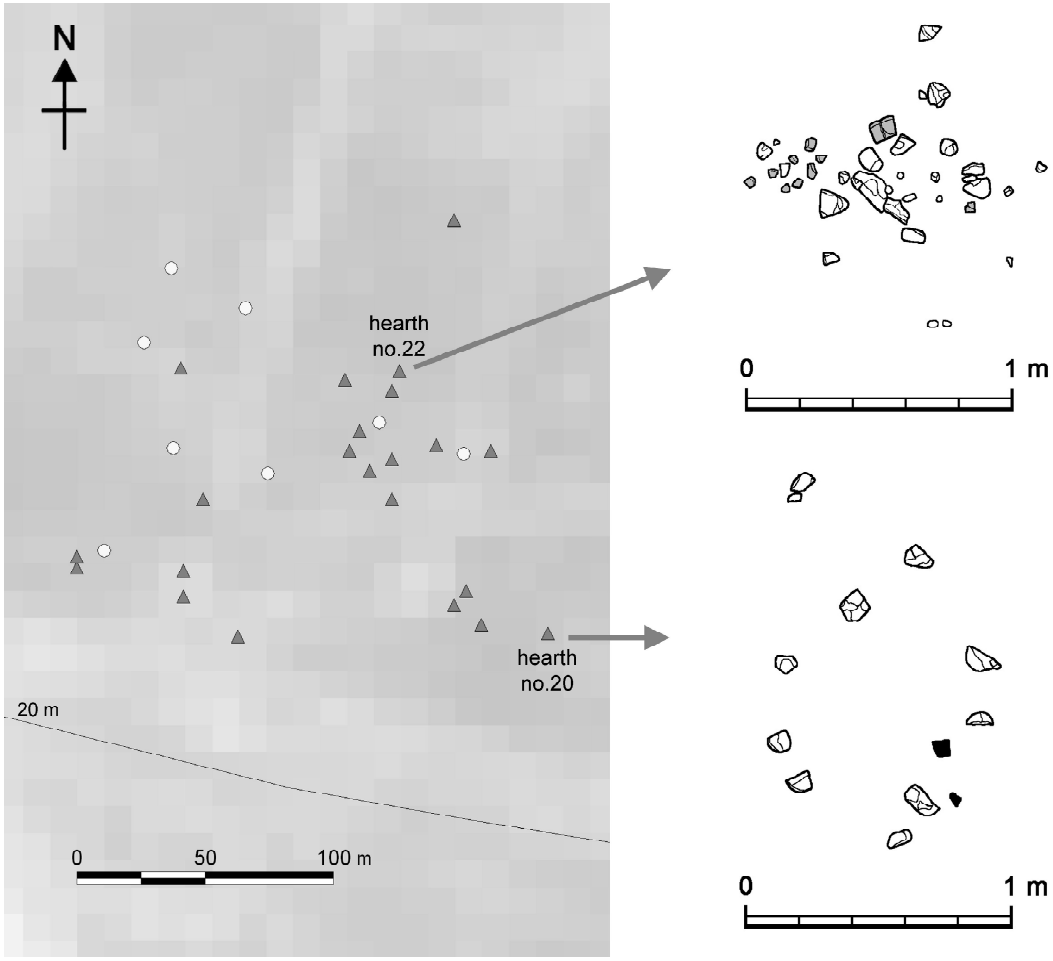

Fig.5.27. Site LX (triangle: hearth, circle: grinding stone) and two hearths (sandstone in grey and pottery sherds in black)

contained charcoal beneath hearth stones, differential effects of surface deflation and washing on varied material remains in this area must be considered.

5.7.2.2. Surroundings of Site LX

The condition of the surface is totally different at the same high elevation of above 20 m asl approximately 500 m to the northwest of Site LX. The surface is covered by coarse-grained aeolian sand with many inclusions of flint fragments and fossil shells, and a number of badly abraded flint flakes and Levallois cores were found among the fragments. They are apparently datable to the Middle Palaeolithic. Neolithic artefacts are not seen at all on this gravel surface. Stratigraphic profiles on the walls of a modern canal dug deeply in the middle of this area also show the transition from the accumulations of a series of aeolian and lacustrine sand in the southeast to bands of hard clay and shale in the northwest, indicating that this high elevation is built of deposits similar to those seen at the K Ridge. This high elevation looks high enough to escape from inundation during the Neolithic period, and thus it must have been an ideal place for the permanent habitation of Neolithic people. However, judging from the spatial distribution of Neolithic structural remains and artefacts in this area, it can be concluded that Neolithic people avoided gravel ground and preferred sandy ground for their habitation.

5.7.2.3. Site E29H1

Site E29H1 is even at present a quite visible wide distribution of numerous archaeological remains. There are many concentrations of sandstone/shell-bearing limestone cobbles, which are supposed to be hearths (**Fig.5.28**), as well as several distinct concentrations of lithic cores and debitage products and sporadic concentrations of large animal bones and their fragments. These numerous archaeological remains are spread on the gentle slope of light yellow silty sediments thinly covered by fine-grained aeolian sand,

Fig.5.28. Hearths in Site E29H1 (looking south)

mostly around 10-13 m asl. The spatial extent of this distribution is approximately 100 m by 300 m in an oval, extending from the northwest to the southeast, and both the northwestern and southeastern ends are marked by narrow colluvial fans. Judging from the location of two hillocks and a colluvial fan (described as a wadi) indicated on the sketch map made by the Combined Prehistoric Expedition (Wendorf and Schild 1976: fig.121), there is no doubt that Site E29H1 corresponds to this area (N29.58393° E30.83304° in the centre), although the elevation of the area in question is almost the same as indicated on Caton-Thompson's map but is approximately 5 m lower than that indicated on the Combined Prehistoric Expedition's map. The traces of a series of 18 trenches dug by the Combined Prehistoric Expedition in the centre of Site E29H1 are not presently seen on the surface.

Concentrations of archaeological remains are particularly dense in the eastern part of Site E29H1, but strangely, many of these remains have not at all been mentioned by Wendorf and Schild. As they reported, the majority of lithic artefacts presently scattered in Site E29H1 seem to be Epipalaeolithic and look fresh, whereas more heavily abraded Neolithic lithic artefacts are sparsely scattered in the periphery (Wendorf and Schild 1976: 182*ff*). No Neolithic pottery sherds are seen on the surface. Considering the extraordinary surface features of the eastern part of Site E29H1, surface collecting of artefacts

and faunal remains and surface recording of hearths were carried out in the 2004 and 2005 seasons. Unfortunately, this work has drawn the attention of local people, and a part of the site was severely destroyed by someone's random digging after the 2005 season. The study of artefacts collected here will be described in Chapter 6.

5.7.2.4. Surroundings of Site E29H1

Another relatively sparse scatter of Epipalaeolithic and Neolithic artefacts with occupational features such as hearths and grinding stones was found approximately 500 m to the southeast of Site E29H1 and at the same elevation. Heavily abraded lithic artefacts and seemingly fresh lithic artefacts are mixed up in coarse-grained sand with many flint fragments. The lithic artefacts include both Epipalaeolithic and Neolithic, but it is hard to discern the boundaries between Epipalaeolithic and Neolithic artefact scatters. This locality seems to have suffered from complex alluvial and colluvial events, and is divided from Site E29H1 by a narrow colluvial fan, which stretches from the higher elevation where Site LX is located. This colluvium is apparently a consequence of the erosion of gravels at the higher elevation mentioned above. A further relatively sparse scatter of Epipalaeolithic and Neolithic artefacts without occupational features was found approximately 200 m to the northwest of Site E29H1 across a narrow colluvial fan and at the same elevation. This area is covered by thicker accumulations of fine-grained aeolian sand, and hence surface archaeological remains are obscured.

On the whole, the northern-northeastern margin of the X Basin on the contour line of around 10-15 m asl is occupied by these three large archaeological localities/sites, separated by colluvial fans or wadis. The total width of the three localities/sites is approximately 2 km. It may be said that the entire stretch of the shore has been densely inhabited or repeatedly visited by both Epipalaeolithic and Neolithic people.

5.7.2.5. Intersection of the X Basin and Wadi A

The landscape rises from the 15 m contour line of the northern margin of the X Basin towards the north, and is dominated by a series of gentle desert ridges, which extend from a rocky summit called Gebel Abyad or El-Qarah el-Kharshah approximately 3 km to the north of the X Basin shore. Wadi A and its meandering branches run between the ridges. The surface of the ridges is covered by coarse-grained aeolian sand with many flint pebbles and fragments. Archaeological remains are rare to absent. One apparently Neolithic flint axe and one large worked flint flake of unknown date were found on a gentle slope overlooking the wadi, but no other archaeological remains were found. On another desert ridge closer to the X Basin, many shallow depressions whose diameter is around 50 cm were found. This cluster of small depressions does not look like granary pits of the Neolithic period, but rather seems to be created by rain water or wild animals.

A remarkable modern disturbance in this area is an asphalt road made by the military many years ago. It comes from the Sixth October City in Giza, and ends in this area. This road is still in use not only by the military in order to come here for exercises but also by tourists coming from Cairo and going to Qasr el-Sagha to the west.

In the desert around the intersection of Wadi A and the asphalt road, there are sparse scatters of Neolithic lithic artefacts and pottery sherds without any structural remains. To the east of the asphalt road, there are many clusters of sandstone/shell-bearing limestone cobbles accompanied by lithic artefacts and Neolithic pottery sherds. In some cases, charcoal still remains beneath the surface sand cover of the cobble clusters, suggesting that these were hearths and were not severely deflated.

5.7.2.6. Site XA

A few hundred metres to the south of this hearth field, there are other scatters of artefacts. The elevation is approximately 15 m asl, and the

surface is covered by fine-grained aeolian sand, but nevertheless, a number of Neolithic pottery sherds, lithic artefacts and structural remains are quite visible (**Fig.5.29**). Epipalaeolithic flint tools are also seen, but they are apparently quite few. Many shells of large lacustrine bivalves (*Mutela nilotica*), some of which had traces of use on the edge as a side-scraper or knife, were noticed in this area. Many grain rubbers and grinding stones made of sandstone were also found. Circular clusters of sandstone/shell-bearing limestone cobbles, which are presumably hearths, are also seen in this area. In addition to them, strange arrangements of sandstone and shell-bearing limestone cobbles were seen. One is S-shaped or keyhole-shaped, and another is square. Since one grooved limestone block which looks like a tethering stone (Gabriel 2002; Pachur 1991) was found nearby (**Fig.5.30**), these stone structures may be a sort of pen for domesticated animals. All of these are spread along the eastern terrace of Wadi A which runs to the southeast into the X Basin.

There are other wide scatters of Neolithic lithic artefacts and pottery sherds on the western terrace of Wadi A. The surface is very thinly covered by aeolian loose sand, and the crust of silty sediments, which is broken into polygons, is exposed. There are scatters of transparent gypsum crystals and so-called desert roses (aggregates of gypsum crystals with sand grains) on and around this crust surface. At one particular locality marked by several hillocks of less than two metres high, a dense concentration of unworked non-local flint cobbles, large lithic cores and blanks was noticed (**Fig.5.31**). They were accompanied by several elongated petrified wood splinters and some large basalt and sandstone blocks which may be anvil stones. The surface features suggest that this locality has been inundated, but this unusual concentration of non-local flint cobbles and lithic artefacts does not seem to be caused by torrential runoff water. It is more likely that this particular locality was a kind of flint knapping workshop, and that the cobbles were transported from elsewhere. The study of artefacts collected here will be described in Chapter 7.

Fig.5.29. Site XA (looking southeast)

Fig.5.30. A tethering stone found in Site XA

Fig.5.31. Site XA (looking northwest)

All of these features spreading on both sides of Wadi A, which have never been reported by previous researchers, seem to represent a

habitation locus at an elevation of 15 m asl at some time during the Neolithic period. The diversity and moderate spatial scale of the features within an area of a few hundred metres in width and length deserve to be called a 'site'. Therefore, this area (N29.58978° E30.81465° in the centre) was named Site XA after the abuttal of the X Basin and Wadi A.

5.7.2.7. Other features

The locality approximately 500 m to the south of Site XA is a mound whose northeastern side is eroded by meandering Wadi A running into the X Basin. The surface of this mound is covered by abraded flint gravels containing a number of Levallois cores and points as well as some Epipalaeolithic flint tools. The floor of Wadi A which abuts this mound at this elevation (around 10 m asl) exhibits a wide scatter of Epipalaeolithic and Neolithic artefacts without any structural remains on the sandy surface. Considering its location and elevation, it seems probable that such a mixed artefact scatter was a consequence of the disturbance of an Epipalaeolithic occupation locus by runoff water coming from upstream of Wadi A and by rising water from the X Basin. In the periphery of the wadi floor, many patches of dark grey silty sediments are exposed beneath the surface coarse-grained sand, and one heavily-eroded human skeleton of an unknown date was found embedded in the dark grey sediments.

The bottom of the X Basin (below 10 m asl) is filled with diatomaceous earth, and desiccation cracks are everywhere. There are several trial pits dug by someone, probably for checking the quality and thickness of diatomite. Stratigraphic profiles on the walls of the trial pits show continuous accumulations of diatomite without breaks. This suggests that the bottom of the X Basin has also perennially been full of water. Since the trial pits are not deep, the stratigraphic history of the X Basin must be examined in more detail by deeper boring. Scatters of flint cobbles, cores and debitage products of unknown date are sporadically seen on the surface of the diatomaceous earth, but it is unlikely that they are in primary context.

5.7.2.8. Summary of the L Basin-X Basin area

Modern disturbances in the L Basin-X Basin area have not severely affected the preservation of archaeological remains on the surface. The archaeological remains in this area have not sufficiently been recorded by Caton-Thompson and other researchers, or have never been investigated and published. Therefore, this area is presumed to be less disturbed by scholarly activities, and it is worthwhile to study these features in more detail for a better understanding of land use patterns in prehistory.

5.7.3. The X Basin-Z Basin area

The X Basin-Z Basin area is defined as the area centring on the X Basin and Z Basin (**Fig.5.32**). This area includes a number of Epipalaeolithic and Neolithic localities/sites such as Site X, Kom W, Site V, Camp II and Site Z, which have been thoroughly reported by Caton-Thompson, and has been considered as the most densely occupied area in the prehistory of the Fayum (Caton-Thompson and Gardner 1934: 22-36 and 74-79). However, little has been reported about other parts of the area. Therefore, the entire area was surveyed. Although this area is partially disturbed by modern dirt tracks as well as the asphalt road mentioned earlier, it seems that these disturbances do not severely affect the preservation of archaeological remains.

5.7.3.1. Site X and Site W

Approximately 500 m to the west of Site XA, there is a wide and dense scatter of Neolithic lithic artefacts and pottery sherds. This artefact scatter is located on and around a shallow, circular depression of approximately 150 m in diameter and at an elevation of 15 m asl, which is surrounded on the northwest and the west by a sand dune which has a slip face on the east side and hence looks like a cove (**Fig.5.33**). The surface of this locality exhibits the deflated crust of silty sediments which is broken into polygons,

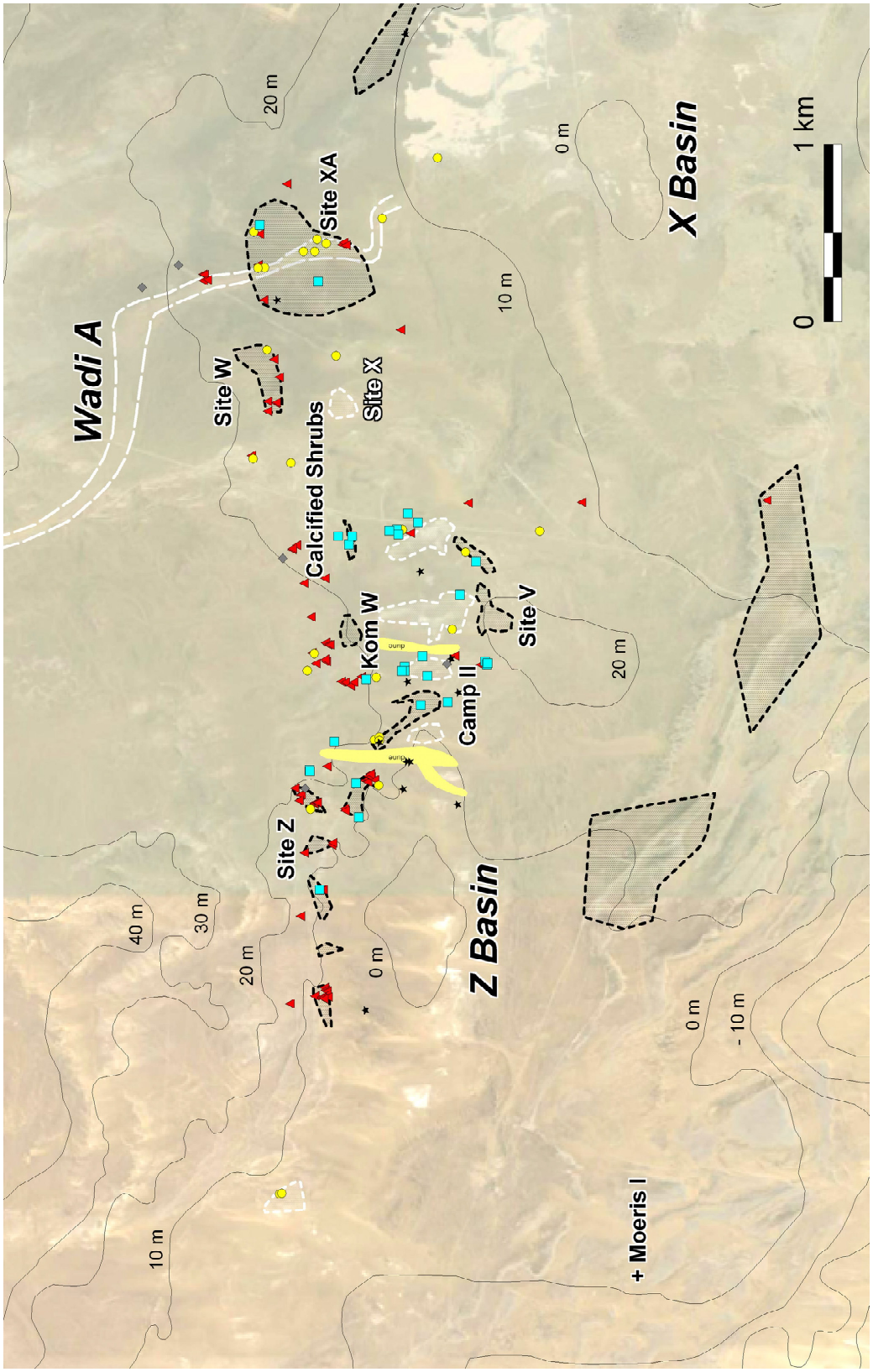

Fig.5.32. The X Basin - Z Basin area (triangle: hearth, circle: grinding stone, square: animal bone, star: Neolithic projectile point, diamond: Neolithic sickle blade)

and there are scatters of transparent gypsum crystals and desert roses on and around this crust surface. Several large lacustrine bivalves (*Aspatharia rubens*) which were embedded in the silty sediments were also noticed. These suggest the presence of water for a considerable length of time in the past. This cove-like locality (N29.58924° E30.80651° in the centre) is certainly identical to Caton-Thompson's Site X (Caton-Thompson and Gardner 1934: 74-75).

As Caton-Thompson has reported, there are no structural remains like hearths and no artefacts of the Epipalaeolithic, Predynastic and Old Kingdom in this locality. On the other hand, the scatter of Neolithic pottery sherds and non-local large flint cobbles, lithic cores and blanks is enormously wide and dense, and in particular, numerous large flint cobbles and lithic cores are quite noticeable. Although Caton-Thompson collected hundreds of formal Neolithic flint tools at Site X, she did not mention the presence of these cobbles and cores. Therefore, these neglected cobbles and cores can be a good clue to know more about Neolithic tool making. The study of cobbles and cores collected here will be described in Chapter 7.

Another notable wide scatter of artefacts was located on the higher flat area approximately 300 m to the north of Site X beyond the dune. Although the artefact scatter is not as dense as that of Site X, it is quite widespread, and some concentrations of Neolithic pottery sherds and lithic artefacts were noted. There are also some stone-built hearths and the rock scatters which may have been hearths. The diversity and moderate spatial scale of the features within an area of a few hundred metres in width deserve to be called a 'site'. Therefore, this area (N29.59331° E30.80759° in the centre) was named Site W.

5.7.3.2. Other features

The middle of the X Basin-Z Basin area is marked by a high dune which extends from the northeast to the southwest and has a slip face on the east side. No artefact scatter is seen on the dune, but there are a number of surface artefact scatters on the lower flat area at the foot of this high dune.

In the area to the southwest of the X Basin and to the south of the high dune, which is around 5-10 m asl, the environment is generally flat with some surface undulation, and gently falls southwards. Deflated concentrations of cobbles which may be hearths or workshops were observed sporadically, and scatters of Neolithic lithic artefacts were sparsely seen, but Neolithic pottery sherds were rare to absent. Further to the southwest of the X Basin, the ground surface is covered by coarse-grained aeolian sand with many inclusions of flint fragments and fossil shells, and a number of badly abraded flint flakes and Levallois cores and points and some Epipalaeolithic tools were noticeable. Neolithic artefacts are not seen on this gravel surface.

5.7.3.3. Kom W and its vicinities

Kom W (N29.58894° E30.79248° in the centre) is presently an isolated, huge excavation dump surrounded by flat desert (**Fig.5.34**), and its top elevation is approximately 22 m asl. The surface of Kom W is thinly covered by fine-grained aeolian sand, but the traces of Caton-Thompson's excavation trenches (Strips A-T; Caton-Thompson and Gardner 1934: pls.III, IV and V) are still clearly visible (**Fig.5.35**), and a great number of lithic artefacts and pottery sherds discarded by Caton-Thompson remain scattered on the surface (**Fig.5.36**). The thick accumulation of fine-grained sand on the south side of the Kom obscures the scatter of artefacts on this side. Although a small number of lithic artefacts in the neighbourhood of Strip E have been collected and studied by Kozlowski and Ginter in the 1980s (Kozlowski and Ginter 1989), lithic scatters are still enormous. One small trench dug just outside of the south end of Strip Q and another small trench dug at the southwest corner of Strip T by the Combined Prehistoric Expedition in 1969 (Wendorf and Schild 1976: 211*ff*) are not visible on the surface at all.

The area to the north of Kom W is virtually

Fig.5.33. Site X (looking northwest)

Fig.5.34. Kom W from a distance (looking southwest)

Fig.5.35. Traces of Caton-Thompson's excavation trenches on Kom W (looking north)

Fig.5.36. Scatter of lithic artefacts and pottery sherds on Kom W

Fig.5.37. A sickle blade found to the northeast of Kom W (looking southwest)

Fig.5.38. A flaked axe found to the northeast of Kom W (looking southwest)

flat desert covered by coarse-grained aeolian sand and transparent gypsum crystals, but many patches of light yellow silty sediments beneath the sand and dried plants are seen. These suggest that this area has been inundated in the past. A number of isolated hearths consisting of burnt pale limestone fragments are seen in this area, but they are accompanied by very few artefacts, and thus it is hard to date them. One hearth is accompanied by probably Old Kingdom pottery sherds, and the rest of the hearths may also perhaps be dated to the Old Kingdom. An apparently Neolithic bifacially-retouched knife was collected close to a trace of surface runoff water which is approximately 400 m to the north of Kom W, and this is the northernmost findspot of Neolithic artefacts in this area. To the north farther than this findspot, it is definitely barren desert covered by flint gravels, and no more archaeological features were found. Approximately 900 m to the north of Kom W, there are several isolated conical buttes and terrace-like low ridges covered by flint pebbles and transparent gypsum crystals. It may be concluded that this area was out of the range of major human activities when Kom W and other nearby localities were occupied in prehistoric and historic times, though flint pebbles on the ridges may possibly have been exploited by people for tool making. Remarkably, there are remains of modern military camps on and around the ridges. There are several large circles made by sand bags, and the ground is dug up and levelled, while rusty metal fragments are scattered widely. They cause severe disturbance of the environment.

At a distance of approximately 100-200 m to the west of Kom W, there are two remarkable concentrations of Neolithic pottery sherds and lithic artefacts. They are scattered on and around the patches of light yellow silty sediments, and some are embedded in the sediments. Apart from them, other archaeological remains to the west of Kom W are isolated hearths consisting of pale limestone fragments. These hearths are accompanied by very few artefacts, and hence it is difficult to date them. However, lithic artefacts among sparse scatters in this area include several Neolithic bifacially-retouched knives, and the hearths may be dated to the Neolithic. Alternatively, their close proximity to other supposedly Old Kingdom hearths mentioned above may suggest that all of these hearths were made in the Neolithic habitation during the Old Kingdom period.

A large area approximately 200-300 m to the northwest of Kom W is covered by pale limestone fragments and fossil shells, and few artefacts are seen on this shelly surface. It seems that the stones of the hearths mentioned above were obtained from this area. Further to the west and northwest of this shelly area, the ground is completely covered by a well-developed dune which runs north-south and forms the eastern edge of the Z Basin. There are no artefacts and no archaeological features on this vast dune.

The area to the northeast of Kom W is very gently rising, and is characterised by some meandering traces of surface runoff water which come from the north to the south, though the southern end is not clear. Several hearths consisting of pale limestone cobbles were seen, but some of them are accompanied by Old Kingdom flint tools as well as Neolithic flint tools. Therefore, it is presumed that Neolithic hearths were reoccupied by Old Kingdom people or hearth stones were reused by Old Kingdom people.

Regardless of whether the date of artefacts is the Neolithic or the Old Kingdom, the scatter of artefacts is quite sparse in this area, but these few artefacts were often found close to the traces of surface runoff at the elevation of 20 m asl. The artefacts include a bifacially-retouched sickle blade (**Fig.5.37**), bifacially-retouched knife blades, a flaked axe (**Fig.5.38**), a bifacially-retouched hoe of the Neolithic period, and a serrated blade of the Old Kingdom. There are no arrowheads and no animal bone scatters in this area. To the north of this elevation towards the highest point in this area which is approximately 600-700 m away from Kom W, the surface is covered by flint gravels, and no more artefacts and structural remains are seen. Judging from this situation, possible subsistence activities in this area both in the Neolithic and

Old Kingdom periods were not hunting, but are something else dependent on surface runoff water which must have become available through winter rainfall. A few flint tools suggest harvesting activities relying on seasonally available water. Contrary to the assumption that farming was practised close to the shores of permanent water bodies like large basins and small depressions, it seems probable that farming was practised in other locations where surface runoff water was collected by natural drainage and remained in ephemeral ponds. Considering that farming of wheat and barley was basically rain-fed farming in their original habitat in the Levant and that there must have been more winter rainfall in the Fayum in the Early-Middle Holocene than that at present, it is probable that the area which collected surface runoff water in the northeast of Kom W was used as a farming plot. Alternatively, it is necessary to consider the possibility that the flint sickle blades mentioned above were not used for harvesting domesticated wheat and barley but for harvesting other wild plants which thrived with surface water.

In the east of Kom W, there are wide scatters of Neolithic pottery sherds and lithic debitage products. These artefact scatters expand northeastwards, and it seems that they derived from Kom W. It is possible that these artefacts were transported and spread out by rising lake water coming from the south in the past. Another large scatter of artefacts was located 100 m to the northeast of the artefact scatter mentioned above. In contrast to the low mound of Kom W, this area is generally flat, and covered by coarse-grained sand and flint pebbles/fragments. Some surface undulations caused by sand ripples are seen. The artefact scatter consists of a large number of small Neolithic coarse pottery sherds as well as unworked flint cobbles and lithic artefacts. Such a wide scatter of pottery sherds has not been seen in the surroundings, and hence it makes this area quite remarkable.

Approximately 300 m to the east of Kom W, there is a wide scatter of calcified plant roots (**Fig.5.39**). In contrast to its surroundings characterised by fine-grained loose sand sheet and well-developed sand ripples, this dense scatter of calcified plant roots is quite remarkable, and it is approximately 200 m wide. To the north of this calcified plant field, several isolated concentrations of large animal bones and their fragments, including those of hippopotamus, were noticed.

At many places in this calcified plant field, the bottom parts of the trunk still remain standing (**Fig.5.40**). A large number of unworked and worked flint cobbles and flakes deriving from them are scattered only on and around this calcified plant field. Many worked globular flint cobbles are undoubtedly single platform cores. As for other worked flat, oval cobbles, one end of the cobbles is struck once from one face, and by using the flake scar as a platform, a few flakes are struck off from the other face. Therefore, they look like choppers, which have been seen frequently at other Neolithic localities including Kom W during this survey. Except for one presumably Neolithic bifacially-retouched knife, no formal tool was encountered in this calcified plant field. Although there is no concrete clue to determine how old these calcified plant roots are and what species they are, the scatters of choppers on and around this field may suggest that these plants are not sedges but shrubs, and that these tools were used for cutting the plants in the Neolithic period, probably by the inhabitants of Kom W. Therefore, this remarkable locality (N29.58880° E30.79805° in the centre) was designated as Locality 'Calcified Shrubs'. The study of flint cobbles and lithic cores collected here will be described in more detail in Chapter 7.

The area in the southeast of Kom W is almost barren, and the surface is covered by fine-grained aeolian sand. Farther to the southeast of Kom W, the ground gradually becomes gravelly, and from around 500 m to the southeast of Kom W, the ground is slightly depressed and covered by calcareous white silty sediments. A number of lacustrine gastropods (*Bithynia* sp. and/or *Cleopatra* sp.) of approximately 2 cm tall are scattered on the surface of this depression, and many lacustrine bivalves (*Aspatharia rubens*) of more than 10 cm wide remain embedded vertically in the sediments. These suggest the

Fig.5.39. A concentration of calcified plant roots (looking west)

Fig.5.40. Calcified plant field (looking southwest)

presence of water for a considerable length of time in certain periods. On this shallow depression, which is named the CS Depression after Locality 'Calcified Shrubs', artefacts are only sparsely scattered, and they include Old Kingdom flint tools like a bifacially-retouched knife with handle and Old Kingdom pottery sherds as well as some supposedly Neolithic flint tools. Neolithic pottery sherds are rare to absent. Several large animal bone concentrations were seen in the northeastern margin of the CS Depression (**Fig.5.41**), and they may be dated to the Old Kingdom, because some of them were accompanied by Old Kingdom artefacts. Major modern disturbances around this depression are some large craters made by bombing exercises of the military and a dirt track running north-south.

Fig.5.41. A concentration of animal bones (looking west)

The southern end of this depression, which is approximately 700 m away from Kom W, is marked not only by an extensive linear exposure of pale limestone bedrock but also by a high ridge which stretches southwest. Wind-eroded outcrops of indurated white calcareous clay sediments are seen elsewhere in the northern margin of this high ridge. The surface of the ridge is covered by porous calcrete duricrusts and fine-grained loose sand. Artefact scatters on this ridge are quite dense, and concentrations of Neolithic pottery sherds are seen everywhere.

Neolithic flint tools found there include concave-based arrowheads, all of which are broken, and tiny arrowheads of the types which have been abundantly found at Camp II by Caton-Thompson. Many broken blades/bladelets were collected among these lithic scatters, but except for one piece, none of them have backing retouch, and hence it is not certain whether they are dated to the Epipalaeolithic. It has been reported that blades/bladelets without backing retouch were common in the Old Kingdom in the Fayum (Caton-Thompson and Gardner 1934: pls.LIV and LXXXI), and indeed, one Old Kingdom handled knife was found there. However, none of those blades/bladelets have basal notches which are the characteristics of the Old Kingdom blades/bladelets. Therefore, even though it is certain that Old Kingdom people visited this high ridge, it is not certain

whether those blades/bladelets belong to them. There are a number of unworked and worked flint cobbles, and cubic core fragments deriving from flint cobbles apparently for bladelet production. Therefore, it can be said that the people of the Epipalaeolithic, Neolithic and possibly Old Kingdom have brought flint cobbles to this ridge and made tools there. The absence of animal bone concentrations and hearths on this ridge may suggest that the people visited and stayed there shortly for some tasks.

5.7.3.4. Site V and the Site V Depression

To the south of Kom W, there is a dune which stretches southwards. On the east of this dune, there is a large, oval, shallow depression of approximately 500 m north-south and 300 m east-west, and the northern shore of the depression is approximately 150 m to the south of Kom W. The surface of this depression is covered by white calcareous silty sediments and scatters of transparent gypsum crystals and desert roses (**Fig.5.42**), and beneath the surface, there is a thin layer of dark grey fine-grained sand. A number of lacustrine gastropods (*Bithynia* sp. and/or *Cleopatra* sp.) of approximately 2 cm tall are scattered on this surface, and also many bivalves (*Aspatharia rubens*) of more than 10 cm wide remain intact and embedded vertically in this silty sediments (**Fig.5.43**). These suggest that this depression has been filled with water permanently or has been inundated repeatedly at certain periods of time.

Scatters of lithic artefacts and pottery sherds are seen on and around this depression, but particularly dense scatters of artefacts are seen on slightly higher mounds to its west. The surface of these higher mounds is also covered by silty sediments and tiny fragments of indurated calcium carbonate, but no lacustrine gastropods and bivalves are seen on the mounds. This may mean that inundations of the mounds were not long enough for lacustrine gastropods and bivalves to inhabit there and to grow up. As for the dense scatters of artefacts on the mounds, the pottery sherds are undoubtedly dated to the Neolithic, and most lithic artefacts seem to be dated to the Neolithic, but several lithic artefacts can be dated to the Predynastic and Old Kingdom periods. Epipalaeolithic tools are rare to absent. This artefact scatter pattern suggests that there has been permanent water in this depression at some times during the Neolithic-Old Kingdom periods, and people had visited the shores of this pond. Many concentrations of bones of catfish and large mammals including hartebeest are also seen on and around the depression, and hence it is highly likely that people came here for hunting and shallow water fishing. There are clusters of pale limestone cobbles and fragments on and around the depression, but it is not certain whether they are deflated stone-built hearths.

Caton-Thompson has speculated that this depression with marginal loams has been used as an agricultural field by the inhabitants of Kom W (Caton-Thompson and Gardner 1934: 75). As she has noted, several grinding stones made of sandstone and basalt were found in this locality. However, grinding stones are not necessarily related to domesticated wheat/barley grains, and no other material evidence for agricultural activities was found around this depression by this survey.

The southern end of this depression, which is approximately 700 m away from Kom W, is marked by a number of eroded mudstone yardangs. These yardangs are located on a ridge, which is actually the western extension of the ridge mentioned earlier and stretches further westwards. This ridge is much higher than the depression to the north. This entire ridge (N29.58182° E30.79320° in the centre) seems to be identical to Caton-Thompson's Site V (Caton-Thompson and Gardner 1934: 75-76), and therefore, the depression to the north is provisionally designated as the Site V Depression. The surface of the Site V Ridge is densely covered by porous calcrete duricrusts, calcified nodules of sand clast and calcified plant roots (**Fig.5.44**), and particularly in the eastern half, scatters of Neolithic pottery sherds and lithic artefacts were seen. While there are several concentrations of pottery sherds (**Fig.5.45**), scatters of lithic artefacts are rather sparse. Scatters of animal/fish bones and their fragments

are not as numerous as those on and around the depression to the north. According to Caton-Thompson, Site V has been plundered by local and other casual flint collectors for years, and she also collected a large number of formal Neolithic flint tools at Site V (Caton-Thompson and Gardner 1934: 75). Therefore, the present scarcity of Neolithic flint tools is apparently the result of surface collecting by previous visitors.

To the south of the Site V Ridge, the ground gently falls southwards, and the surface is covered by moderately sorted small flint pebbles and fragments, and there are several large hillocks. Caton-Thompson recognised this gentle slope area as a southern extension of Site V, and noted that the area was dominated by Epipalaeolithic lithic artefact scatters (Caton-Thompson and Gardner 1934: 75). However, Epipalaeolithic artefacts are presently quite rare to absent in this area. Instead, Neolithic pottery sherds and lithic artefacts are sparsely scattered on the surface. In this area, there must be another Epipalaeolithic locality named Site 2, where faunal remains have been intensively collected (Brewer 1989a; 1989b), but it could not be located. Therefore, the present rarity of Epipalaeolithic artefacts in this area may be a consequence of previous research endeavours.

5.7.3.5. Camp II, the Camp II Depression, and the Camp II Basin

Approximately 500 m to the southwest of Kom W, there is a low ridge. This is probably a part

Fig.5.42. The Site V Depression (looking west)

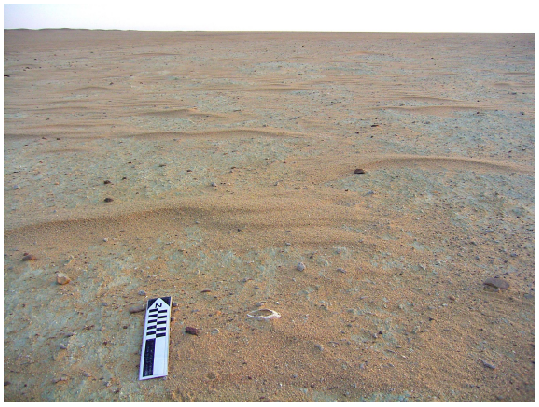

Fig.5.43. A bivalve embedded in silty sediments of the Site V Depression (looking north)

Fig.5.44. Surface of the Site V Ridge (looking east)

Fig.5.45. A concentration of pottery sherds on the Site V Ridge (looking west)

of Caton-Thompson's Camp II (Caton-Thompson and Gardner 1934: 75*ff*). The ridge stretches northwest-southeast, and the width of the ridge is approximately 100 m at most. This peninsular low ridge is marked by several yardangs of laminated siltstone, and the surface of the entire ridge is undulating and covered by porous calcrete duricrusts, calcified plant roots, and rounded/subrounded pellets of calcium carbonate. Hence, it forms a remarkably wide white strip, and shows a striking contrast to the flat desert area to the east (**Fig.5.46**). Some outcrops of laminated siltstone along the western edge of the ridge are heavily eroded from the west. Therefore, it can be concluded that this ridge was actually the eastern beach of the Z Basin, and that the beach has been eroded by high energy waves caused by the wind coming from the west, which is presumed to have blown in the Early-Middle Holocene (Brookes 2003).

Lithic artefact scatters are seen all over this peninsular low ridge, which is named the Camp II Ridge, but probably because of both intensive surface collecting by Caton-Thompson and severe erosion, there are few noticeable concentrations of artefacts. There are no Neolithic pottery sherds, and Neolithic lithic artefacts are not numerous in the northern half of the ridge. Some exceptionally high density concentrations of lithic artefacts were found in the eastern margin of the ridge, and they include a number of typical Epipalaeolithic cores and bladelets. The study of the artefacts collected here will be described in Chapter 6.

The Camp II Ridge, which is characterised by the above-mentioned white beach sediments, stretches further south toward the presumed southeast corner of the Z Basin, but artefacts and other features on the ridge are not evenly distributed. Neolithic pottery sherds and unworked/worked flint cobbles are seen only in the southernmost part of the ridge, and there are no Epipalaeolithic artefacts. Some supposedly hearths found in the southernmost part of the ridge consist of pale limestone fragments and are accompanied by Old Kingdom flint tools and pottery sherds.

According to Caton-Thompson, the area between Camp II and Kom W and between Camp II and Site V has been most intensively surface-collected by her (Caton-Thompson and Gardner 1934: 76), and probably for this reason, lithic artefacts scatters are sparse. A surface observation of this area revealed that there were wide patches of white calcareous silty sediments in which intact large lacustrine bivalves (*Aspatharia rubens*) remained embedded and on which transparent gypsum crystals were scattered (**Fig.5.47**). In the northern and northeasternmost margin of these silty sediment patches, there are many concentrations of animal bones, which belong to hippopotamus (**Fig.5.48**), soft-shelled turtle (**Fig.5.49**) and crocodile (**Fig.5.50**). Such concentrations of animal bones have not been described by Caton-Thompson. The western and southwesternmost margins of these silty sediment patches is marked by high density scatters of tiny carbonised fish bone fragments, most of which seem to belong to catfish. These fish bone scatters touch the eastern margin of the Camp II Ridge, and spread onto the middle of the ridge. Therefore, it seems certain that there was a water-containing depression which is similar to the Site V Depression to the east. This area, provisionally designated as the Camp II Depression, is presently separated from the Site V Depression by a dune which stretches from the south of Kom W southwards, but it is probable that the Site V Depression has been connected to the Camp II Depression and formed one large pond.

To the west of the Camp II Ridge, the ground falls steeply westwards, and leads to the bottom of a basin (**Fig.5.51**). The west and northwest sides of the basin are surrounded by a huge dune, and the basin is open to the south only. This deep and triangular depression (N29.58504° E30.78658° in the centre) seems to be the Camp II Basin, judging from Caton-Thompson's location map and description of topography (Caton-Thompson and Gardner 1934: 75*ff*). However, no trace of her camp was found, except for an unnatural concentration of unifacially/bifacially-retouched flint tools accompanied by several rocks, which may have been left by her. The basin floor is covered by fine-grained

Fig.5.46. The Camp II Ridge (looking northwest)

Fig.5.49. A concentration of soft-shelled turtle bones (looking northeast)

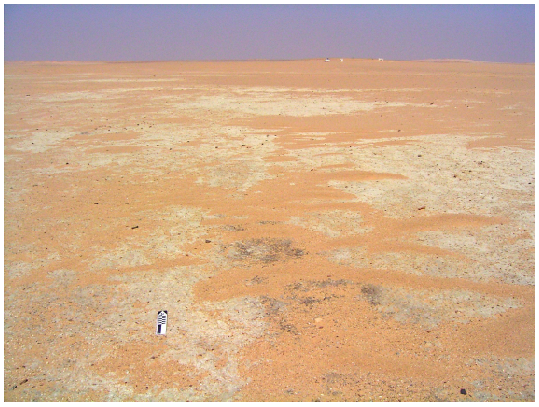

Fig.5.47. Silty sediments in the Camp II Depression (looking north)

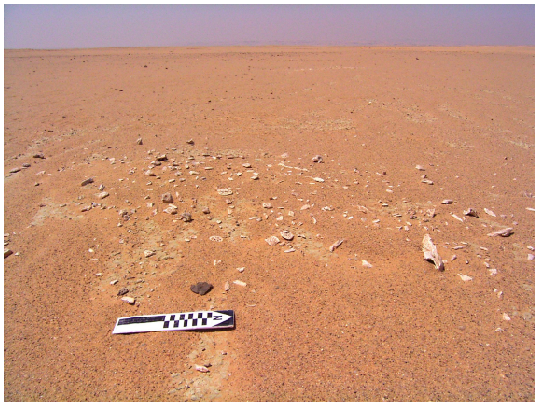

Fig.5.50. A concentration of crocodile bones (looking west)

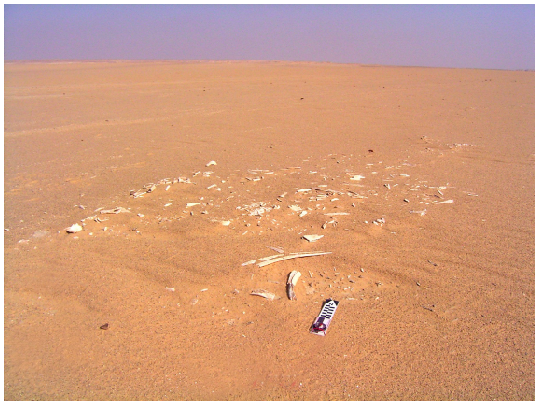

Fig.5.48. A concentration of hippopotamus bones (looking northwest)

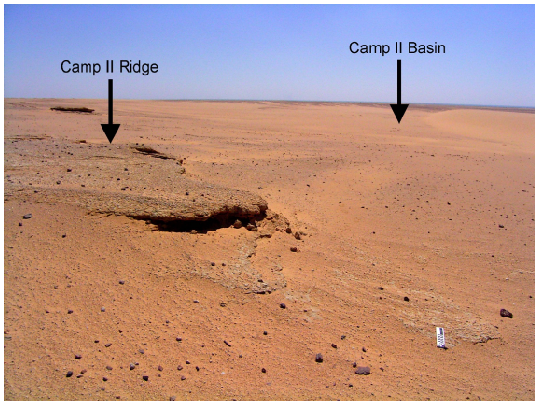

Fig.5.51. The Camp II Ridge and Camp II Basin (looking south)

aeolian sand. Artefact scatters on the basin floor are not quite visible, but this may be because artefacts were already intensively collected by Caton-Thompson. There are many dried plants on the basin floor, and several patches of white calcareous silty sediments are seen particularly in the south. As she described, many lithic artefacts seem to be washed down on the steep slope from the Camp II Ridge to the basin floor, and as a result, artefact scatters are the densest around the margin of the basin at the foot of this slope. Several tiny arrowheads of the types which she found at Camp II abundantly and whose dates are uncertain (Caton-Thompson and Gardner 1934: pl.LI) were collected on top of the easternmost edge of the peninsular ridge as well as at the foot of the basin slope.

On the slope between the Camp II Ridge and the Camp II Basin, curious concentrations of large lacustrine gastropods called apple snails (*Pila ovata*) of approximately 5 cm long and 4 cm wide were found to the west of Epipalaeolithic artefact concentrations on the Camp II Ridge (**Fig.5.52**). Each concentration includes at least 30 pieces of snails of various sizes, and some concentrations are partly embedded in mottled dark grey silty sediments, which are indicative of the accumulation of organic matter and hence a swampy environment (Rapp and Hill 1998: 37-38). No diagnostic artefact was found within this locality, and hence it is difficult to date these features, but it seems likely that those snails were intensively collected on the beach, and eaten, and then discarded there collectively by Epipalaeolithic or Neolithic people.

At an approximately 150 m distance to the southeast from these snail concentrations on the slope, there are dense concentrations of animal bones and lithic artefacts including unworked/worked flint cobbles and both Epipalaeolithic and Neolithic flint tools. Some concentrations of pale limestone fragments may probably be hearths. Further to the southeast of these artefact concentrations on the slope, there seems to be a colluvial deposit which runs east-west from the Camp II Ridge to the bottom of the Camp II Basin. Only in this strip of the colluvial deposit,

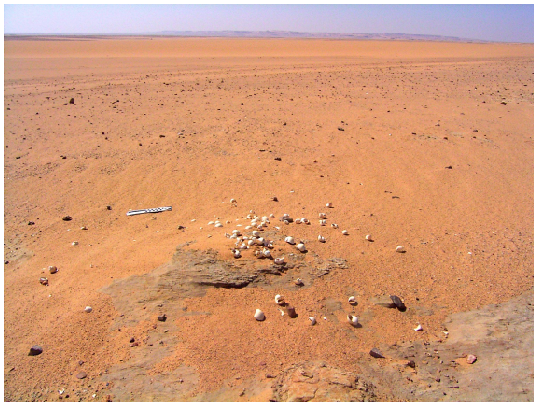

Fig.5.52. A concentration of apple snails on the Camp II Ridge (looking west)

there are Neolithic pottery sherds and bivalve shells which have otherwise not been seen on the slope. This may suggest a water outflow between the Camp II Depression and the Camp II Basin across the Camp II Ridge.

5.7.3.6. The dune on the west and northwest sides of the Camp II Basin

The dune which forms the western and northwestern sides of the Camp II Basin (**Fig.5.32**) is a key to understanding the environmental history of this area. This dune has a slip face on its east side and stretches from the north while overlying the northeastern beach of the Z Basin to the south, and reaches the gravelly southern shore of the Z Basin, thereby making a rectangular cove, namely the Camp II Basin, in the easternmost part of the Z Basin. The question is when this dune was formed. The northeastern beach of the Z Basin which is overlain by the dune is rich in Epipalaeolithic artefacts, and therefore, it is safely concluded that the dune was formed after the Epipalaeolithic period. If the assumptions that there was a hiatus of many hundreds of years between the Epipalaeolithic and Neolithic periods due to a severe desiccation, and that the Z Basin dried up during this hiatus, then it is reasonable to think that the dune was formed during this arid period by the westerly wind that transported a huge amount of sand. Accordingly, it is possible to suppose that the

Camp II Basin existed when Neolithic people reoccupied the eastern beach of the Z Basin after the Epipalaeolithic period.

On the west side of the dune around the intersection of the dune and the northeast beach of the Z Basin, there are a number of hearths accompanied by scatters of fish bone fragments, Neolithic lithic artefacts and pottery sherds. These Neolithic artefact scatters are spread over the slope down to the bottom of the Z Basin to the southwest. Around the foot of the slope, patches of indurated and wind-eroded light yellow silty sediments and a sparse growth of lotus trees are seen. These indicate that water stayed there in the Neolithic period and that underground water still remains. Neolithic artefact scatters are spread further to the south on this west side of the dune. Another dune stretches from the middle of this dune diagonally southwestwards, overlying the Neolithic artefact scatters on the west side of the first dune. Around the middle of the first dune, scatters of small lacustrine bivalves (*Mutela nilotica*) and Neolithic artefacts are still seen at higher elevations which are not overlain by the second dune, and the artefacts include Neolithic concave-based arrowheads. In the southern half of the first dune, no more Neolithic artefacts are seen. It can be said from these field observations that the dune which forms the western and northwestern sides of the Camp II Basin became the new eastern shore of the Z Basin after the Epipalaeolithic period, and the west side of the new eastern shore of the Z Basin was visited by Neolithic hunter-fishers. However, even after this new eastern shore of the Z Basin was formed, it seems probable that the original eastern shore of the Z Basin was still visited by Neolithic people, judging from the presence of Neolithic artefact scatters. This may suggest that the Camp II Basin had been inundated by the inflow of high-rising lake water coming from the south during the Neolithic period.

The dune which stretches diagonally from the first dune also reaches the gravelly southern shore of the Z Basin, while overlying an oval depression filled with indurated calcareous white clay sediments. The first dune, which became the new eastern shore of the Z Basin, and the second dune, and the southern shore of the Z Basin form there a triangular cove. Around this white clay-filled depression, there are numerous concentrations of animal/fish bones and their fragments, and scatters of artefacts include pottery sherds of apparently not Neolithic, and several typical Predynastic-Old Kingdom flint tools as well as some Epipalaeolithic and Neolithic flint tools.

5.7.3.7. The southern shore of the Z Basin

The southern shore of the Z Basin is covered by flint gravels, and at some places, extensive linear deposits of transparent gypsum crystals are seen along it. Several large depressions which are filled with indurated calcareous white clay sediments are distributed along the southern shore. Some complete skeletons of catfish and Nile perch are still embedded in the sediments, but there is no trace of human consumption. Lithic artefact scatters on the flint gravels of the southern shore are quite sparse and sporadic, and except for some Levallois flakes, there is no datable, diagnostic artefact. Therefore, it is probable that the southern shore of the Z Basin had seldom been visited by people, or else that any traces of human activities were washed away by oscillating water.

5.7.3.8. The northern shore of the Z Basin

The eastern half of the northern shore of the Z Basin is covered not only by rounded/subrounded pellets of calcium carbonate but also by porous calcrete duricrusts. Therefore, it forms a remarkably wide white beach at an elevation of approximately 15 m asl. A concentration of hearths was found at the easternmost part. It is located approximately 800 m to the west of Kom W. The hearths are accompanied by Neolithic pottery sherds, lithic artefacts, and animal/fish bone fragments, suggesting temporary Neolithic occupations. To the west of this location on the northern shore of the Z Basin, no more Neolithic pottery sherds were encountered.

Another remarkable feature of the eastern half

of the northern shore is the presence of two clusters of many wind-eroded yardangs of various sizes still standing 1-3 m high, in the north of the white beach at an elevation of 20 m asl. The extent of one cluster in the east is approximately 120 m x 160 m, and the extent of another in the west is approximately 250 m x 160 m. These two clusters are separated by an open, flat space of approximately 120 m wide, and its surface is covered by coarse-grained aeolian sand. These yardangs are composed of indurated lacustrine silty sand, and are heavily eroded by wind not only from the north but also from the west. Erosion on the western face of the yardangs indicates that the dominant wind was from the west in the Early-Middle Holocene (Brookes 2003), and hence it is assumed that the silty sand was deposited and indurated before the Holocene. The ground surface of the area exhibits indurated silty sediments and is undulating. The surface lacks aeolian deposition of sand. No artefact is embedded in these silty sediments. Although sparse artefact scatters are seen on the surface, no datable diagnostic artefact was noticed. This locality (N29.59061° E30.78256° in the approximate centre) seems to be identical to a part of Caton-Thompson's Site Z, which has yielded intact hearths with Epipalaeolithic and Neolithic artefacts beneath a collapsed yardang (Caton-Thompson and Gardner 1934: 77*ff*), and also identical to Puglisi's Site S4 (SS-4 and SES-4), where a number of Epipalaeolithic artefacts were collected and part of them were published (Casini 1984; Mussi *et al*. 1984: Puglisi 1967).

According to Caton-Thompson, surface artefacts at her Site Z were scattered between 6 m asl and 18 m asl, and the width of the artefact scatters was approximately 700 m (Caton-Thompson and Gardner 1934: 59-60, 77-78 and pl.CX). The intact hearths beneath a collapsed yardang mentioned above seem to have been located at the northeastern part of Site Z. At present, artefact scatters are actually spread on the gentle slope of 10-15 m asl over the entire stretch of the northern shore of approximately 1300 m wide (**Fig.5.53**). The eastern half of the slope surface is covered by two wide bands of coarse/fine-grained aeolian sand which stretch north-south, and very few artefacts are seen on these sand bands. The slope surface which is not covered by the bands of sand exhibits many indurated patches of light yellow, orange and dark grey silty sediments. The orange colour of the silty sediments can result from oxidation due to good drainage and aeration (Rapp and Hill 1998: 38), and is indicative of constantly fluctuating water levels in a basin margin environment. It is difficult to call such wide artefact scatters on the northern shore a 'site', but the name Site Z is adopted in order to avoid a confusion caused by giving new site names to individual clusters divided by sand bands.

The majority of the finds on the deflated slope surface are Epipalaeolithic lithic artefacts. Noteworthy Epipalaeolithic artefact concentrations tend to be located at relatively lower elevations. The study of the Epipalaeolithic artefacts collected at one concentration will be described in Chapter 6. Neolithic bifacially-retouched flint tools were very rarely found. The rarity of Neolithic flint tools on the northern shore of the Z Basin may perhaps be a consequence not only of plundering by antiquarians since the late 19th century, as Caton-Thompson mentions, but also of collecting by Caton-Thompson herself (Caton-Thompson and Gardner 1934: 77*ff*). However, the complete lack of Neolithic pottery sherds may suggest that this slope area was actually not frequently visited and occupied by the pottery-

Fig.5.53. Site Z on the northern shore of the Z Basin (looking west)

using people of the Neolithic.

The western half of the northern shore of the Z Basin is covered by pale limestone and fossil shell fragments, and this shelly beach is more heavily deflated, and consequently, more widely spread in the west. The surface of the gentle slope of the northern shore toward the bottom of the Basin is covered by several wide bands of coarse/fine-grained sand or limestone/shell fragments which flow north-south, and no artefact was seen on these bands. Apart from such obscured and disturbed areas of the slope, Epipalaeolithic artefacts are quite widespread over the slope, and they exhibit several concentrations, one of which seems to be the remains of tool production. The study of the artefacts collected from there will be described in Chapter 6.

The westernmost part of the northern shore of the Z Basin is dominated by an extensive exposure of water/wind-eroded pale limestone beds which stretch east-west approximately 1 km in length. A number of fossil shell-bearing limestone slabs and fragments are scattered downslope to the south. Epipalaeolithic artefact scatters were observed on the parts of the slope which are not disturbed by the flow of limestone slabs and fragments, and a concentration of many supposedly Epipalaeolithic hearths which consisted of limestone cobbles and were accompanied by Epipalaeolithic artefacts was found near the easternmost edge of the exposure. Another concentration of Epipalaeolithic artefacts was found on the southern end of the limestone exposure. The area to the west of this Epipalaeolithic artefact concentration is barren, and is covered by fine-grained aeolian sand.

The western end of the Z Basin area is marked by a heap of limestone slabs, and few artefacts are seen. In the north of this heap of limestone slabs, there is a large depression. It is approximately 200 m in diameter, and is filled with white clay sediments and marked by a sparse growth of lotus trees. It seems that there is a colluvial deposit from the northwestern part of the Z Basin into the southeastern corner of this depression, and an extensive scatter of Epipalaeolithic artefacts is seen on the southern shore of this depression. The western and eastern shores of the depression look almost barren due to the cover of fine-grained aeolian sand, but the northern shore of the depression is marked by an extensive exposure of limestone beds, and a number of Epipalaeolithic artefacts are scattered on the surface.

5.7.3.9. The barren terrain to the north of the northern shore of the Z Basin

The area to the north of the northern shore of the Z Basin is barren flat desert. The surface is generally flat, and is covered by flint gravels and gypsum fragments which must have derived from the Pleistocene beach terraces further to the north, and pale limestone fossil shell fragments which spread from the shelly northern shore of the Z Basin. The nearest Pleistocene escarpment, whose elevation is around 25 m asl, is approximately 400 m to the north of the northern shore of the Z Basin. The surface of this first escarpment is covered by small, angular flint gravels which are absolutely not suitable for any kind of tool making. The second and the third escarpments which are located approximately 800-1000 m away from the northern shore of the Z Basin and whose elevations are above 30 m asl, are covered by flint pebbles and cobbles. They are large enough to be used as lithic raw materials, and they are quite similar to those which were used by the Epipalaeolithic toolmakers in the Z Basin.

5.7.3.10. The terrain to the south of the southern shore of the Z Basin

Caton-Thompson located one Epipalaeolithic locality named Moeris I to the southwest of the Z Basin and studied the artefacts collected there (Caton-Thompson and Gardner 1934: 67-69). This locality is undoubtedly identical to Site MOE which was visited and surface-collected by Puglisi in the late 1960s (Mussi *et al*. 1984). This locality was located but could not be investigated in detail due to the lack of time.

Caton-Thompson indicates another unnamed Epipalaeolithic locality to the southeast of the Z

Basin on her map (Caton-Thompson and Gardner 1934: pl.CXIII), but the nature and date of this locality remain unclear. This locality and its vicinities were investigated in some detail. Around the contour line of 10-15 m asl, several continuous linear outcrops of pale limestone bed are seen on an undulating sandy surface. This limestone bed extends northwest-southeast, and seems to mark a lake bank at certain times in the past. The surface of this limestone bed is severely deflated by water and wind, and fragile limestone flakes are scattered on it. Lotus trees grow sparsely in the surface cracks. Artefact scatters in this area are located not only on these linear outcrops of limestone bed but also on the gentle slope and flat area adjacent to it. A modern dirt track, which is used mainly by tourists going to Qasr el-Sagha, runs northwest-southeast a few hundred metres to the south of these linear outcrops, and hence, surface artefact scatters are obscured.

Dense scatters of flint tools and debitage products, many of which are heavily abraded, were encountered at several places to the north and south of the dirt track, and their spatial distribution is approximately 2 km in width. This is much wider than that indicated by Caton-Thompson. No Neolithic pottery sherds, no faunal remains and few structural remains like hearths were found on the sandy and gravelly surface of this area, though some supposedly Roman pottery sherds are sparsely seen. Heavily abraded lithic artefacts suggest that archaeological remains in this area have not been protected by a cover of lacustrine sediments but have suffered severely from water rolling and wind erosion.

Many of the flint tools were backed bladelets, which are characteristics of the Epipalaeolithic culture. However, some unusually large pointed blades, retouched pieces and core tools collected at these localities have no parallel in other Fayum Epipalaeolithic assemblages, and it is not certain whether such odd pieces are dated to the Epipalaeolithic, or earlier, or later. One fragment of a bifacially-retouched, pointed knife or spearhead seems to be dated to the Predynastic, and a heavily abraded, perforated limestone ball,

Fig.5.54. Mushroom-like rocks near the present lakeshore (looking southeast)

which looks like a macehead, also suggests the presence of a Predynastic locality in this area. Some large retouched pieces and core tools in question may also perhaps be dated to the Predynastic.

To the south of these wide artefact scatters is undulating desert covered by sandstone and flint fragments and is marked by sporadic lotus trees. Sandstone/siltstone bedrock of the Birket Qarun Formation is exposed everywhere, and at some locations, there are numerous mushroom-like rounded rocks of more than 1 m in basal diameter (**Fig.5.54**), which are cemented concretions eroded out of the bedrock (Wanas 2008). The area around the 0 m asl contour line falls gently southwards, but also has steep cliffs at some places. On the slope below the 0 m asl contour line, there are scatters of stone slabs and flint fragments, but lithic artefacts are quite rare to absent.

5.7.3.11. Summary of the X Basin-Z Basin area

Archaeological remains of the X Basin-Z Basin area are not disturbed severely by modern destructive activities such as canal/ditch digging, although there are dirt tracks made at the eastern and southern ends of the area and still used by the military and tourists, some craters made by bombing exercises of the military at the eastern end, and a huge amount of rubbish left by the military at the northern end. As described, most

of the previously investigated archaeological localities/sites are still easily identifiable in their primary context. More importantly, there are many surface archaeological remains which have never been studied and published. Therefore, the X Basin-Z Basin area is an ideal place for the study of the palaeoenvironment and prehistoric human land use activities.

5.7.4. Wadi A and Wadi B in the Gindi Plain

Wadi A and Wadi B are very shallow wadis, and the wadi terraces are not notably developed, particularly in the south (**Fig.5.55**). The environment is generally flat with slight surface undulations, and the wadi bed is slightly lower than the surrounding terrain. Therefore, it is hard to see the width of the wadis at many places. The wadi bed is usually covered by fine-grained aeolian sand, and colluvial sediments consisting of pebbles and fragments of flint, quartz, and petrified wood are not always seen on the surface. Such sediments are better seen on the gentle slope of well-developed wadi terraces (**Fig.5.56**). Some parts of the wadi bed are also marked by a dense growth of lotus trees, suggesting the presence of underground water.

Particularly to the north of 70 m asl contour line, the environment is hilly with a number of large and small hillocks, and wadi banks which consist of limestone become more salient. It seems that the east bank is more severely eroded than the west bank. This may suggest that the wind came from the west in the past.

Wadi B bends northeastwards from around the area approximately 12 km to the northwest of Kom K, and around the location approximately 14 km to the northwest of Kom K, Wadi B runs further northeastwards while diverging and cutting through a remarkably high sandstone plateau of approximately 120-150 m asl (**Fig.5.57**). A plateau on the east side of Wadi B is called Umm es-Sawan (**Fig.5.58**). Umm es-Sawan is the western extension of the highest elevation in this area called Ilwet Hialla (Sandford and Arkell 1929: folding map). Ilwet Hialla is a plateau of the Oligocene Gebel Qatrani Formation which marks the northeastern boundary of the Fayum Depression, and stretches east-west. It forms steep cliffs and slopes on its southern face. The surface on top of the plateau of Umm es-Sawan is covered by enormous scatters of large petrified wood nodules and their splinters (**Fig.5.59**), fine/coarse-grained black sandstone slabs and cobbles as well as flint pebbles of elongated or irregular shape. Many circular depressions of a few metres in diameter fringed by black sandstone slabs on this plateau, which were interpreted by Caton-Thompson as hut circles used in the Old Kingdom (Caton-Thompson and Gardner 1934: 120-122, pl.LXIII-1 and 2), still exist. These depressions were recently reinterpreted as shallow quarries of sandstone slabs for the production of grinding stones (Bloxam and Heldal 2007; Heldal *et al*. 2006). In the lakeshore habitat in the Neolithic and Old Kingdom, sandstone slabs have commonly been utilised as raw materials for making grinding stones, and petrified wood nodules and splinters seem to have been used as grinders and hammers. It is probable that this plateau was the major source of these materials.

The southern face of the plateau of Umm es-Sawan is marked by three Old Kingdom gypsum quarrying workshops, which have been investigated by Caton-Thompson and designated as Workshop A (N29.71392° E30.87826°), Workshop B (N29.71340° E30.87966°), and Workshop C (N29.71244° E30.88125°) respectively (Caton-Thompson and Gardner 1934: 103-120), and they are still easily identifiable. The rock wall of the workshops exhibits relatively fresh, bright white gypsum deposits, and scatters of Old Kingdom pottery vessels and their sherds, unworked and worked flint cobbles, and quarried gypsum nodules are quite dense around these workshops. The surface of the flat area in the south of the plateau is an extensive exposure of deflated gypsum deposits (**Fig.5.60**), and artefacts are sparsely scattered.

On the opposite side of Umm es-Sawan across Wadi B, there is another sandstone plateau overlying limestone beds. It is approximately 2 km to the northwest of Umm es-Sawan, and is approximately 17 km to the northwest of Kom

Fig.5.55. Wadi A and El-Qarah el-Kharshah (looking east)

Fig.5.58. Plateau of Umm es-Sawan (looking east)

Fig.5.56. Wadi B (looking north)

Fig.5.59. A concentration of petrified wood on the plateau of Umm es-Sawan (looking south)

Fig.5.57. Wadi B running beside the plateau of Umm es-Sawan (looking north)

Fig.5.60. Gypsum outcrop at Umm es-Sawan (looking northwest)

K, and its elevation is higher than 150 m asl. This plateau is partly capped by thick layers of basalt nodules. There is an abandoned modern quarry of basalt on this plateau, and demolished brick and concrete buildings and wide scatters of rusty old drums and truck tyres still remain. The ground is dug up everywhere, and hence, the original environment seems to have been severely altered. To the north of this abandoned basalt quarry, there are some enigmatic rock tumuli on undisturbed desert slopes. To the west of the basalt quarry, a huge outcrop of quartzitic sandstone was found. There are some enigmatic rock tumuli around the quartzitic sandstone outcrop, and sparse scatters of Roman pottery sherds are noticed, though Roman activities in this remote area have not been known previously.

As described, Wadi B runs northeastwards while cutting through the high sandstone plateau which forms the northern boundary of the Fayum Depression. Hence it is probable that the wide dissection of the sandstone plateau at this location was used by people as a gate out of the Fayum Depression in the direction of Dahshur to the northeast, by way of a dirt track recognised by Caton-Thompson and Gardner and named as the Dahshur Road (Caton-Thompson and Gardner 1934: 109-110). Despite the lack of dating evidence, they discussed the probability that the Dahshur Road was used by Old Kingdom quarry workers for transporting the Fayum natural resources to Dahshur. This probability would explain the reason why the traces of not only Old Kingdom but also Roman human activities are concentrated on the sides of the dissection of the sandstone plateau.

The bed of Wadi B in the dissection of the sandstone plateau is marked by wide scatters of well-rounded black sandstone and basalt blocks. It is apparent that they derive from the top of sandstone plateau on both sides. A sparse growth of lotus trees is also seen on the wadi bed, but few artefacts were found.

At a locality in Wadi A, which is approximately 2 km to the northwest of Site XA and whose elevation is around 25 m asl, some isolated Neolithic flint tools and pottery sherds were collected, though no occupational feature was found. It is possible that these isolated Neolithic artefacts were transported there from the upstream of this wadi by surface runoff water, though these artefacts do not have clear traces of water rolling. In any case, this finding suggests that Neolithic people reached such a distant place via the wadi for some purposes, without leaving any material remains in between. It seems likely that the Neolithic people used this wadi as a track to go further northward to the rocky terrain of the Fayum Depression.

Isolated pottery sherds are not rare in the upstream of both wadis. Many of the sherds are so fragmentary and so abraded that it is difficult to date them. Some are made of fine-grained marl clay, and are wheel-made and well-fired. Therefore, they are apparently not Neolithic but probably Roman. There is no sherd of Islamic pottery.

Lithic artefact scatters were quite rare in the upstream of Wadi A, and several lithic artefacts including retouched tools of unknown date were collected only around the area of the 60-70 m asl contour line, which is approximately 7-9 km to the north of Kom W. In contrast, a number of lithic artefacts including cores, flakes and retouched tools which seem to range from the Middle Palaeolithic to the Neolithic were collected continually along Wadi B at elevations between 50 m asl and 150 m asl. Most of them are isolated finds, and there is no associated occupational feature around the findspots. Some lithic artefacts were found on high and low wadi terraces. But others were found on the wadi bed, and hence they may have probably flowed from the upstream of the wadi. The raw material of those lithic artefacts is flint, but it is apparently different from the one scattered in the wadi area in terms of colour, texture and size. Flint pebbles which naturally occur in the wadi area are too small to be used for toolmaking, but most lithic artefacts are made of larger flint cobbles which are not seen in the wadi area. Therefore, it is presumed that those lithic artefacts were brought from somewhere outside the wadis in the form of unworked cobbles, worked cores, blanks, or finished tools.

The most important discovery in Wadi B is a

concentration of Epipalaeolithic lithic artefacts on a high wadi bank, which is located approximately 14 km to the north of Kom K and approximately 1 km to the southwest of Umm es-Sawan. The findspot (N29.71137° E30.86858°) is located on the edge of the eastern bank overlooking the wadi bed to the northwest. The surface of the bank is covered by flint gravels and fine-grained aeolian sand. On this surface, 105 pieces of lithic artefacts, including a number of bladelet cores but few retouched tools, were concentrated within an approximately 5 m radius. Neither structural remains such as hearths or hut circles nor faunal remains were found in the surroundings. Considering such an odd situation and the location with a fine view, it is presumed 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. The study of artefacts collected here will be described in Chapter 6.

In summary, the Gindi Plain and two wadis are definitely understudied areas, and their potential importance for a better understanding of the Fayum inhabitants' mobility and land use activities is very high. In particular, it is quite likely that Wadi B was used as a track which connected the lake and the northern rocky terrain of the Fayum Depression and furthermore the Nile Valley by way of the Dahshur Road. It must be considered that not only Old Kingdom and Roman people but also Epipalaeolithic and Neolithic people walked between the Fayum and the Nile Valley on this track.

5.8. Radiocarbon dates

Because of the few amounts of collected samples, only one radiocarbon date for a sample from a Neolithic surface site was obtained by this survey, and no radiocarbon dates of Epipalaeolithic localities/sites were obtained. Except for samples from the Upper K Pits, all other dated samples are charcoal. The radiocarbon dates were calibrated by using the latest calibration software OxCal ver.4.0 (Bronk Lamsey 1995; 2001), and the 95.4 % probability (2 sigma) was taken (**Table 5.1**).

As mentioned in Chapter 3, the radiocarbon dates of the Upper K Pits and Kom W have been obtained by previous researchers. The newly-obtained radiocarbon dates of the Upper K Pits and Kom W do not contradict them, and enhance the probability that both the Upper K Pits and Kom W are dated to approximately 4600-4200 cal.BC and that the previously-obtained dates of the Upper K Pits and Kom W are not reliable because they contain great uncertainty. In addition, the contemporaneity of the Upper K Pits and Kom K, which has been discussed only on the ground of their close proximity to each other and their similarity in material items, is proved by the newly-obtained radiocarbon dates of the Upper K Pits and Kom K. These dates indicate that these prominent Neolithic sites have been used or occupied for a few hundred years or less in the second half of the Fayum Neolithic, which is supposed to be approximately 5480-4260 cal.BC. Furthermore, the dates of the Upper K Pits are actually the earliest dates of clear evidence for farming in the Fayum, but these dates give rise to the question as to exactly when farming started during the supposed time span of the Fayum Neolithic. It can be assumed that the first attempt of farming in the Fayum may have started much earlier, but given the presently-available data, it is not easy to substantiate this assumption.

One radiocarbon date from Site LX is slightly older than the supposed time span of the Fayum Neolithic. It is difficult to assess the preciseness or reliability of such an isolated radiocarbon date within the chronology of the Fayum. However, considering that most radiocarbon dates of the first half of the Fayum Neolithic have been obtained only in the N Basin area at the foot of the Qasr el-Sagha escarpments, the significance of the probability of such old habitation in the L Basin-X Basin area, which is comparable to that in the N Basin area, should not be underestimated. It would not be surprising if more localities/sites in the vicinity of Site LX are dated to the supposed first half of the Fayum Neolithic or even earlier. It suggests that the time span of the Fayum Neolithic can be extended

Upper K Pits, pit 68 (basket)	**5440±35 BP (GrA-31247)**	4348 cal.BC (95.4%) 4240 cal.BC	OxCal <IntCal04>
Upper K Pits, pit 75 (chaff)	**5640±35 BP (GrA-31248)**	4544cal.BC (74.4%) 4436 cal.BC	OxCal <IntCal04>
Kom K trench 202. unit 025	**5620±20 BP (UCIAMS-34422)**	4499 cal.BC (95.4%) 4368 cal.BC	OxCal <IntCal04>
Kom K trench 202. unit 018	**5680±20 BP (UCIAMS-33840)**	4546 cal.BC (95.4%) 4460 cal.BC	OxCal <IntCal04>
Kom K trench 202. unit 019	**5640±15 BP (UCIAMS-33841)**	4526 cal.BC (93.0%) 4447 cal.BC	OxCal <IntCal04>
Kom W trench 01.unit 031	**5710±20 BP (UCIAMS-33835)**	4612 cal.BC (94.5%) 4486 cal.BC	OxCal <IntCal04>
Kom W trench 01.unit 037	**5665±20 BP (UCIAMS-33836)**	4541 cal.BC (95.4%) 4456 cal.BC	OxCal <IntCal04>
Kom W trench 01.unit 013 hearth	**5660±20 BP (UCIAMS-33838)**	4538 cal.BC (95.4%) 4456 cal.BC	OxCal <IntCal04>
Kom W trench 01.unit 018 hearth	**5670±15 BP (UCIAMS-33839)**	4537 cal.BC (95.4%) 4460 cal.BC	OxCal <IntCal04>
Site LX hearth no.22	**6600±100 BP (UCIAMS-33842)**	5708 cal.BC (95.4%) 5372 cal.BC	OxCal <IntCal04>

Table 5.1. Recent radiocarbon dates

earlier, thereby reducing the controversial time gap between the Fayum Epipalaeolithic and Neolithic, which was discussed in Chapter 3. Therefore, it is tentatively redefined that the time span of the Fayum Neolithic could be approximately 5700-4240 cal.BC.

5.9. The spatial distribution of hearths and its implication for the land use pattern

About 150 hearths were recorded at localities/sites in the survey area, and no hearth was found far from the basin shores (**Table 5.2**). Hearths are not evenly distributed across the land. It is rare that a hearth is located in complete isolation, and hearths were often found in a cluster. It is not certain whether multiple hearths were used by a group of people at one time or were a consequence of repeated visits by different people at some time intervals. In either case, it is considered that the localities where hearths were made were favourable places to stay in certain periods. If the latter was the case, it is also probable that in a basically sandy basin shore environment, people tended to be drawn to the places where hearth stones of suitable size already existed for reuse, and consequently, a cluster of hearths was formed over a long time. Although not a few hearths yielded charcoal, radiocarbon dating of the charcoal samples could not sufficiently be conducted. Therefore, how a cluster of hearths was actually formed remains to be further investigated.

In the L Basin-X Basin area, clusters of hearths were found at Site L and Site LX, whose elevations are above 20 m asl, whereas clusters of hearths at Site E29H1 and its southeastern annex are below 15 m asl. In the X Basin-Z Basin area, hearth clusters at Site XA and Site W are located between 15 m asl and 20 m asl. Most of the hearths around Kom W are above 20 m asl. Site Z has three clusters of hearths. Two clusters in the northeastern and eastern localities of Site Z are located between 10 m asl and 20 m asl, whereas one cluster in the western locality is located below 10 m asl. There seems to be no preservation bias for certain topographic locations within the vertical range from ±10 m asl to ±20 m asl. Therefore, the elevations of these immobile structural remains are the most reliable indicators of lake levels when the loci were occupied. Hearth clusters which would be dated to the Epipalaeolithic are located at lower elevations, whereas those which would be dated to the Neolithic and Old Kingdom are located at higher elevations. These facts confirm the previous idea that the lake level was generally low in the Epipalaeolithic and rose up in the Neolithic and Old Kingdom.

5.10. The spatial distribution and nature of Epipalaeolithic localities/sites in the L Basin, X Basin and Z Basin areas

As described, a number of known and unknown Epipalaeolithic localities/sites were visited during this survey, and it was revealed how Epipalaeolithic localities/sites look like at present.

Area	Locality/site name	hearth number	Date	burnt/cracked stone	charcoal	Northing	Easting
L Basin	Site L	1	Neolithic	+	+	29.57819	030.85027
L Basin	Site L	2	Neolithic	+	+	29.57824	030.85023
L Basin	Site L	3	Neolithic			29.57820	030.85023
L Basin	Site L	4	Neolithic			29.57813	030.85024
L Basin	Site L	5	Neolithic			29.57813	030.84994
L Basin	Site L	6	Neolithic			29.57793	030.84689
L Basin	Site L	7	Neolithic			29.57789	030.85105
L Basin	Site L	8	Unknown			29.57814	030.85065
L Basin	Site L	9	Unknown			29.57812	030.84995
L Basin	Site L	10	Neolithic			29.57867	030.84726
L Basin	Site L	11	Neolithic			29.57860	030.84756
L Basin	Site L	12	Unknown			29.57842	030.84806
L Basin	Site L	13	Neolithic			29.57853	030.84954
L Basin	Site L	14	Epipalaeolithic/Neolithic			29.57502	030.85238
L Basin	Site L	15	Epipalaeolithic/Neolithic			29.57499	030.85281
L Basin	Site L	16	Neolithic			29.57994	030.84752
L Basin	Site L	17	Neolithic			29.57993	030.84741
L Basin	Site L	18	Neolithic			29.57995	030.84727
L Basin	Site L	19	Unknown			29.57970	030.84978
X Basin	Site E29H1	1	Epipalaeolithic			29.58370	030.83239
X Basin	Site E29H1	2	Epipalaeolithic		+	29.58383	030.83260
X Basin	Site E29H1	3	Epipalaeolithic			29.58390	030.83257
X Basin	Site E29H1	4	Epipalaeolithic			29.58398	030.83254
X Basin	Site E29H1	5	Epipalaeolithic			29.58403	030.83260
X Basin	Site E29H1	6	Epipalaeolithic			29.58406	030.83271
X Basin	Site E29H1	7	Epipalaeolithic			29.58417	030.83265
X Basin	Site E29H1	8	Epipalaeolithic			29.58434	030.83263
X Basin	Site E29H1	9	Epipalaeolithic			29.58433	030.83278
X Basin	Site E29H1	10	Epipalaeolithic			29.58430	030.83286
X Basin	Site E29H1	11	Epipalaeolithic		+	29.58410	030.83314
X Basin	Site E29H1	12	Epipalaeolithic			29.58402	030.83326
X Basin	Site E29H1	13	Epipalaeolithic			29.58394	030.83330
X Basin	Site E29H1	14	Epipalaeolithic			29.58390	030.83299
X Basin	Site E29H1	15	Epipalaeolithic			29.58385	030.83290
X Basin	Site E29H1	16	Epipalaeolithic			29.58390	030.83317
X Basin	Site E29H1	17	Epipalaeolithic			29.58379	030.83316
X Basin	Site E29H1	18	Epipalaeolithic			29.58380	030.83322
X Basin	Site E29H1	*19*	Epipalaeolithic			29.58381	030.83271
X Basin	Site E29H1	*20*	Epipalaeolithic			29.58393	030.83304
X Basin	Site E29H1	*21*	Epipalaeolithic			29.58411	030.83296
X Basin	Site E29H1	*22*	Epipalaeolithic			29.58380	030.83277
X Basin	Site E29H1 SE-annex	1	Unknown			29.57728	030.83911
X Basin	Site E29H1 SE-annex	2	Unknown			29.57730	030.83877
X Basin	Site E29H1 SE-annex	3	Unknown			29.57846	030.83959
X Basin	Site E29H1 SE-annex	4	Unknown			29.57855	030.83958
X Basin	Site E29H1 SE-annex	5	Unknown			29.57845	030.83949
X Basin	Site E29H1 SE-annex	6	Unknown			29.57837	030.83952
X Basin	Site E29H1 SE-annex	7	Neolithic			29.57869	030.83997
X Basin	Site LX	1	Unknown			29.58233	030.84277
X Basin	Site LX	2	Neolithic			29.58157	030.84212
X Basin	Site LX	3	Neolithic			29.58166	030.84212
X Basin	Site LX	4	Neolithic			29.58191	030.84220
X Basin	Site LX	5	Unknown			29.58167	030.84169
X Basin	Site LX	6	Unknown			29.58171	030.84169
X Basin	Site LX	7	Unknown			29.58237	030.84211
X Basin	Site LX	8	Neolithic			29.58147	030.84332
X Basin	Site LX	9	Unknown			29.58143	030.84234
X Basin	Site LX	10	Unknown			29.58191	030.84296
X Basin	Site LX	11	Unknown			29.58205	030.84296
X Basin	Site LX	12	Unknown			29.58215	030.84283
X Basin	Site LX	13	Unknown			29.58208	030.84279
X Basin	Site LX	14	Unknown			29.58201	030.84287
X Basin	Site LX	15	Unknown			29.58210	030.84314
X Basin	Site LX	16	Unknown			29.58208	030.84336
X Basin	Site LX	17	Unknown			29.58289	030.84321

Table 5.2. The list of hearths found during the survey

Area	Locality/site name	hearth number	Date	burnt/cracked stone	charcoal	Northing	Easting
X Basin	Site LX	18	Neolithic			29.58154	030.84321
X Basin	Site LX	19	Neolithic			29.58159	030.84326
X Basin	Site LX	20	Neolithic			29.58144	030.84359
X Basin	Site LX	21	Neolithic			29.58229	030.84296
X Basin	Site LX	22	Neolithic		+	29.58236	030.84299
X Basin	Site LX	23	Neolithic			29.58186	030.84604
X Basin	Site LX	24	Neolithic			29.58380	030.84675
X Basin	Site XA	1	Unknown			29.58930	030.81502
X Basin	Site XA	2	Unknown			29.58922	030.81513
X Basin	Site XA	3	Unknown			29.58911	030.81498
X Basin	Site XA	4	Unknown			29.59354	030.81384
X Basin	Site XA	5	Unknown			29.59327	030.81179
X Basin	Site XA	6	Neolithic			29.59348	030.81563
X Basin	Site XA-sw	1	Unknown			29.58636	030.81006
X Basin	Site XA-e	1	Unknown			29.59210	030.81854
X Basin	Site XA-n	1	Neolithic			29.59634	030.81329
X Basin	Site XA-n	2	Unknown			29.59627	030.81327
X Basin	Site XA-n	3	Unknown		+	29.59632	030.81292
X Basin	Site XA-n	4	Neolithic		+	29.59610	030.81295
X Basin	Site W	1	Neolithic			29.59275	030.80834
X Basin	Site W	2	Neolithic			29.59249	030.80730
X Basin	Site W	3	Neolithic			29.59307	030.80590
X Basin	Site W	4	Neolithic			29.59267	030.80579
X Basin	Site W	5	Neolithic			29.59262	030.80584
X Basin	Site W	6	Neolithic			29.59306	030.80533
X Basin	Site V-se	1	Greco-Roman			29.57722	030.80003
X Basin	Site V-se	2	Unknown			29.58294	030.79998
X Basin	Loc. SV-s	1	Greco-Roman?		+	29.56788	030.80016
Z Basin	CS Depression	1	Greco-Roman?			29.58586	030.79824
Z Basin	CS-n	1	Neolithic?			29.59018	030.79561
Z Basin	CS-n	2	Old Kingdom			29.59124	030.79531
Z Basin	CS-n	3	Neolithic			29.59161	030.79754
Z Basin	CS-n	4	Neolithic	+	+	29.59183	030.79727
Z Basin	CS-n	5	Neolithic	+		29.59181	030.79734
Z Basin	CS-Site W	1	Unknown			29.59389	030.80274
Z Basin	Kom W-n	1	Unknown			29.59082	030.79126
Z Basin	Kom W-n	2	Unknown			29.59063	030.79066
Z Basin	Kom W-n	3	Neolithic			29.59010	030.79077
Z Basin	Kom W-n	4	Neolithic			29.59017	030.79088
Z Basin	Kom W-n	5	Neolithic	+		29.59088	030.79336
Z Basin	Kom W-n	6	Old Kingdom?			29.59013	030.79186
Z Basin	Kom W-n	7	Old Kingdom?			29.59003	030.79174
Z Basin	Kom W-n	8	Old Kingdom?	+		29.58993	030.79173
Z Basin	Kom W-w	1	Neolithic			29.58833	030.78988
Z Basin	Kom W-w	2	Neolithic			29.58936	030.78960
Z Basin	Kom W-w	3	Neolithic			29.58915	030.78956
Z Basin	Kom W-w	4	Neolithic			29.58888	030.78936
Z Basin	Kom W-w	5	Neolithic			29.58872	030.78957
Z Basin	Camp II-Site V	1	Old Kingdom	+		29.58362	030.79111
Z Basin	Camp II-Site V	2	Old Kingdom			29.58233	030.79058
Z Basin	Site Z-e	1	Unknown			29.59006	030.78467
Z Basin	Site Z eastern hearth field	1	Neolithic	+		29.58816	030.78384
Z Basin	Site Z eastern hearth field	2	Neolithic	+		29.58806	030.78379
Z Basin	Site Z eastern hearth field	3	Neolithic	+		29.58801	030.78377
Z Basin	Site Z eastern hearth field	4	Neolithic	+		29.58799	030.78411
Z Basin	Site Z eastern hearth field	5	Neolithic	+		29.58784	030.78404
Z Basin	Site Z eastern hearth field	6	Neolithic	+		29.58787	030.78425
Z Basin	Site Z eastern hearth field	7	Neolithic	+		29.58787	030.78420
Z Basin	Site Z eastern hearth field	8	Neolithic	+		29.58767	030.78388
Z Basin	Site Z eastern hearth field	9	Neolithic	+		29.58918	030.78219
Z Basin	Site Z eastern hearth field	10	Neolithic			29.58915	030.78209
Z Basin	Site Z northeastern hearth field	1	Neolithic	+		29.59170	030.78340
Z Basin	Site Z northeastern hearth field	2	Neolithic	+		29.59145	030.78300
Z Basin	Site Z northeastern hearth field	3	Neolithic	+		29.59138	030.78302
Z Basin	Site Z northeastern hearth field	4	Neolithic	+		29.59148	030.78269

Table 5.2. The list of hearths found during the survey (continued)

Area	Locality/site name	hearth number	Date	burnt/cracked stone	charcoal	Northing	Easting
Z Basin	Site Z northeastern hearth field	5	Epipalaeolithic?	+		29.59072	030.78247
Z Basin	Site Z northeastern hearth field	6	Epipalaeolithic?	+		29.59072	030.78253
Z Basin	Site Z northeastern hearth field	7	Epipalaeolithic?	+		29.59061	030.78256
Z Basin	Site Z northeastern hearth field	8	Epipalaeolithic?	+		29.59056	030.78256
Z Basin	Site Z	1	Epipalaeolithic/Neolithic			29.58983	030.78009
Z Basin	Site Z	2	Epipalaeolithic/Neolithic			29.58978	030.78021
Z Basin	Site Z	3	Unknown	+	+	29.59122	030.77964
Z Basin	Site Z	4	Epipalaeolithic/Neolithic			29.59032	030.77749
Z Basin	Site Z	5	Epipalaeolithic/Neolithic			29.59027	030.77750
Z Basin	Site Z	6	Unknown			29.59194	030.77086
Z Basin	Site Z	7	Unknown	+		29.59142	030.77597
Z Basin	Site Z western hearth field	1	Epipalaeolithic			29.59019	030.77180
Z Basin	Site Z western hearth field	2	Epipalaeolithic			29.59015	030.77165
Z Basin	Site Z western hearth field	3	Epipalaeolithic	+		29.59008	030.77161
Z Basin	Site Z western hearth field	4	Epipalaeolithic			29.59007	030.77158
Z Basin	Site Z western hearth field	5	Epipalaeolithic			29.59007	030.77138
Z Basin	Site Z western hearth field	6	Epipalaeolithic		+	29.59002	030.77125
Z Basin	Site Z western hearth field	7	Epipalaeolithic		+	29.59069	030.77130
Z Basin	Site Z western hearth field	8	Epipalaeolithic			29.59034	030.77125
Z Basin	Site Z western hearth field	9	Epipalaeolithic			29.59031	030.77119
Z Basin	Site Z western hearth field	10	Epipalaeolithic			29.59023	030.77115

Table 5.2. The list of hearths found during the survey (continued)

It has been known that the spatial distribution of Epipalaeolithic localities/sites around major basins on the northeastern shore of the lake was limited to the 5-19 m asl contour lines, and was not expanded to higher elevations. As long as one looks at this situation, it is hard to imagine frequent vertical movements of Epipalaeolithic people according to the annual rise and fall of the lake level. Since all the localities/sites are not far from each other but are located within easy walking distance, the differences in density and extent between localities/sites around the basins seem to imply horizontal dispersal and aggregation of small groups of people within the narrow strip of aquatic resource-rich basin shores.

However, based on the fact that most Epipalaeolithic localities/sites are nothing more than surface scatters of lithic artefacts without clear structural remains, it has been suggested that these localities/sites were occasional or seasonal encampments, and that there must have been other residential bases or task locations occupied by the same people in different places, which represent different subsistence activities (Hassan 1986b: 496; Wendorf and Schild 1976: 317). It has also been suggested that Epipalaeolithic people were quite mobile and may have spent several months of the year away from the Fayum when lakeshore resources became scarce or when the lakeshore became inaccessible (Wetterstrom 1993: 191). According to the study of lake level fluctuations in the Early Holocene (Wendorf and Schild 1976: 222-226), during the long span of the Fayum Epipalaeolithic period, there were two peaks of high water which are named the Premoeris Lake and Protomoeris Lake respectively, and there was a considerable drop of the water level between these peaks. Therefore, it is certain that Epipalaeolithic people were subjected to long-term fluctuations of the lake water level. On the other hand, the suggestion concerning the seasonal migration of Fayum Epipalaeolithic people has never been substantiated by archaeological data, and hence sounds like mere speculation.

Most Epipalaeolithic localities visited during this survey were certainly just surface scatters of lithic artefacts with no structural remains. On the other hand, Site E29H1 in the X Basin and Site Z in the Z Basin are remarkable in terms of the presence of structural remains like hearths and supposedly lithic debitage dumping spots as well as clear concentrations of animal bones. They surely deserve the designation of 'sites', and may represent the occupation loci of Fayum Epipalaeolithic people. Therefore, some

Epipalaeolithic localities/sites are probably the remains of either residential bases for daily dining and resting or task locations for daily foraging. It would be too simplistic to regard all the Epipalaeolithic localities/sites equally as occasional or seasonal encampments. One is even tempted to suppose that the water level of the lake was fairly stable in the short term, and that people were quite sedentary, relying on aquatic resources in this environment in certain periods during the Fayum Epipalaeolithic.

However, such differences in the appearance of sites/localities may simply be the consequence of different degrees of taphonomic processes caused by natural forces as well as by overlapping occupations of later peoples. As mentioned above, the spatial distribution of Epipalaeolithic localities/sites in the L Basin, X Basin and Z Basin is limited to lower elevations, and it is certain that all Epipalaeolithic localities/sites were underwater when the lake level was generally higher during the Neolithic and Old Kingdom periods. Therefore, the Epipalaeolithic localities/sites on lake margins must have been either eroded by oscillating water or well protected by the cover of lacustrine silty sediments. The latter would particularly be the case with Site E29H1 and Site Z, both of which are located on the northern shores of the X Basin and Z Basin respectively and hence must have been under calm water coming from the south. They may not have severely suffered from high energy waves caused by the wind coming from the west. It is probable that Site E29H1 and Site Z have been protected by fine-grained lacustrine sediments which tend to deposit in deeper waters while the lake level was rapidly and calmly rising after their last occupation. Such a rapid rising trend of lake level, which may have reached 24 m asl, has indeed been observed at Site E29H1 in the Protomoeris lake stage that corresponds to the second half of the Fayum Epipalaeolithic period (Wendorf and Schild 1976: 225, fig.159). Then, these sites would have gradually been exposed on the present surface by water recession and wind erosion. In contrast, it is quite likely that the Camp II Ridge, an Epipalaeolithic locality on the eastern shore of the Z Basin which exhibits a remarkably dense concentration of Epipalaeolithic artefacts but lacks structural remains, was heavily washed and eroded by high energy waves caused by the wind coming from the west.

Given this likelihood, it may be assumed that the present surface situation of Epipalaeolithic localities/sites on the northern shores of the X Basin and Z Basin reflects the reality of a certain period in the past fairly better than those on the eastern shores of the Basins. That is, hearths, faunal remains and lithic debitage dumps tended to concentrate on one or two particular places on the northern shores of the Basins, whereas the entire northern shores of approximately 2 km wide were almost evenly exploited, as indicated by vast scatters of artefacts. This may perhaps suggest that a group of Epipalaeolithic foragers habitually located a residential base on the basin shore and walked from the residential base for daily foraging along the entire shoreline. This suggestion requires a reconsideration of the general image of the mobility and sedentariness of Fayum Epipalaeolithic foragers.

Faunal data have strongly suggested that Fayum Epipalaeolithic people could have heavily relied on fishing and fowling on the lakeshore almost all the year around (Wetterstrom 1993: 190-191). Indeed, aquatic resources like fish are not sparsely distributed but concentrated on basin shores, and they are abundant and not easily depleted. Moreover, they have predictable seasonality as exemplified by the seasons of spawning, aggregating and migrating. Considering these resource assets and the need for drinking water, it would not be surprising if the Fayum Epipalaeolithic foragers were tethered at residential bases on the basin shores even though seasonally and if they returned to the same residential base cyclically.

It is not certain whether the dense concentrations of hearths at Site E29H1 in the X Basin and at Site Z in the Z Basin reflect continuity of occupation by one group of people who stayed at the sites exclusively for a certain period of time, or show the consequence of regularly or irregularly repeated occupations of the same residential bases by one or many groups

of people for a length of time. The questions about the social organisation and mobility of the Epipalaeolithic people and the duration of site occupation are difficult to answer as long as one relies on the surface observations of sites without radiocarbon dates. Therefore, different approaches to these questions are needed. Since the basin shore localities/sites are quite sandy and devoid not only of flint pebbles suitable for making tools but also of rocks suitable for making hearths, these materials must have been transported from somewhere else. The study of the sources of pebbles and rocks found at these occupation loci can give a clue to gauge at least the mobility range of the people. This study will be dealt with in Chapter 6.

Although not sufficiently investigated, Epipalaeolithic localities far to the south of the L Basin, X Basin and Z Basin are distributed below 10 m asl, and this indicates rising and lowering lake water during the Epipalaeolithic period. If the localities below 10 m asl are contemporaneous with the localities/sites on the northern shores of the L Basin, X Basin and Z Basin, it is possible to suggest that the Epipalaeolithic people moved following the seasonal rise and fall of the lake water level within the vertical range of 0-15 m asl and the distance of no more than 2 km. It follows that the localities/sites on the northern shores of the L Basin, X Basin and Z Basin were occupied in the season of the highest basin water, that is, in late summer to autumn. However, if the localities below 10 m asl are not contemporaneous with the localities/sites on the northern shores of the L Basin, X Basin and Z Basin, then it must be considered that the different elevation of Epipalaeolithic localities/sites reflects changing levels of lake water and people's adaptation to it in the long term.

5.11. The spatial distribution of sickle blades and grinding stones and its implication for the land use pattern in the Fayum Neolithic

5.11.1. Sickle Blades

Given that sickle blades of the Fayum Neolithic were held firmly in a groove of a wooden shaft by resin (Caton-Thompson and Gardner 1934: 45, pls.XXVIII and XXX), it is unlikely that blades were frequently replaced by new ones during a sickle-using task at the location of their use, because blade replacement requires a fire to melt resin, and this is complicated and time-consuming work. A study of the distributional effects of hafting suggests that hafted tools are likely to be resharpened or replaced when it is convenient to do so rather than when it is necessary (Keeley 1982: 799*ff*). Therefore, it can be assumed that worn sickle blades were more frequently discarded and replaced at residential bases than they were at use locations. It can also be assumed that the findspots of sickle blades in the Fayum Neolithic indicate either residential bases or use locations.

According to the reports of the surface collection and excavations by Caton-Thompson, bifacially-retouched, pointed or square-ended sickle blades of complete shape have been collected or excavated at the following sites within the concession of the UCLA-RUG survey.

13 (9 pointed and 4 square-ended) from Site K
10 (8 pointed and 2 square-ended) from Kom K
10 (9 pointed and 1 square-ended) from Site L
5 (4 pointed and 1 square-ended) from Area L-X
15 (10 pointed and 5 square-ended) from Site X
12 (11 pointed and 1 square-ended) from Site V
31 (28 pointed and 3 square-ended) from Kom W
4 (2 pointed and 2 square-ended) from Triangle Area of Camp II-Kom W-Site V
20 (9 pointed and 11 square-ended) from the Camp II Basin
4 (2 pointed and 2 square-ended) from Site Z
4 (4 pointed) from the Z Basin

Despite the fact that Kom W and its vicinities have been most intensively surface-collected by antiquarians before Caton-Thompson visited, sickle blades were most numerously found at Kom W by her. This suggests that sickle blades tended to be made and discarded more frequently at habitation loci like Kom W than at use locations. Sporadic occurrence of sickle blades at other localities which do not seem to be associated with habitation, such as Caton-Thompson's Area L-X and Triangle Area of Camp II-Kom W-Site V, may indicate their use locations.

During the new survey, a small number of Neolithic bifacially-retouched sickle blades were found at different localities (**Fig.5.61**).

1 (pointed) from the surface of the Upper K Pits
2 (1 pointed and bilaterally-serrated and 1 square-ended) from the east terrace of Wadi A
2 (2 square-ended) from Site LX
1 (1 pointed) from a hilly terrain to the northeast of Kom W
1 (1 pointed) from the western shore of the Camp II Depression
1 (1 pointed) from Site Z

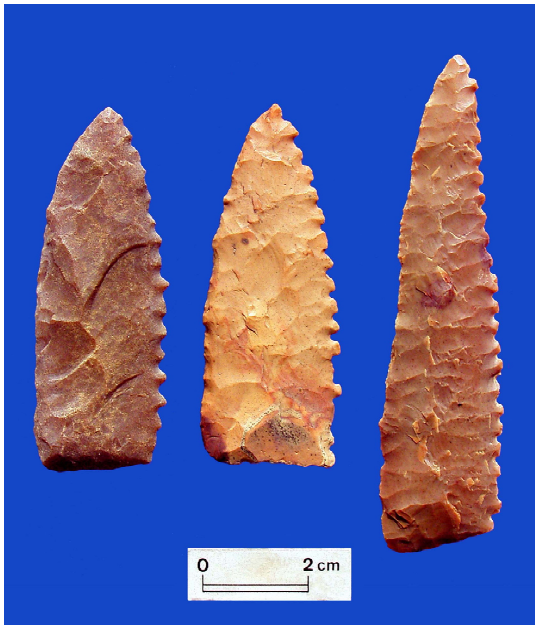

Fig.5.61. Three pointed sickle blades collected at different localities

Two square-ended sickle blades found at Site LX may be understood as supporting the probability that Site LX was a residential base where tools were resharpened or replaced. On the other hand, other sickle blades were collected in isolation at unexpected places, such as the terraces of desert wadi and surface runoff which are far from the water margins of the lake. Therefore, it is highly probable that these findspots were the use locations of the sickles and thus where plant harvesting took place. Although it is possible that wild plants were harvested there by sickles, it is significant to consider another possibility that wheat/barley farming has been attempted in places which became wet due to winter rainfall. These isolated sickle blades give a clue to understand the diversity of the subsistence and land use of Fayum Neolithic people.

5.11.2. Grinding stones

Although it was expected that the findspots of grinding stones might indicate the locations of plant grinding/mashing activity, it turned out that the use of grinding stones as a clue to know Neolithic activity loci was not easy. This is firstly because there is no direct means to date grinding stones, and other diagnostic artefacts around the grinding stones are the only clues to speculate the possible date of the grinding stones. Based on such a manner of speculation, very few grinding stone could be dated solely to the Epipalaeolithic, and many grinding stones could be dated either to the Epipalaeolithic or more likely to the Neolithic. Moreover, the grinding stones encountered during the survey do not always seem to retain their original positions, and some have apparently been moved for reuse very recently by local people or other visitors. Nonetheless, apart from such recently-moved grinding stones, it is assumed that many of grinding stones indicate their last use locations, even though they might have been reused and/or recycled and moved in the Neolithic, Predynastic, Old Kingdom and even Greco-Roman periods.

About 50 grinding stones were found at

Area	Locality/site name	grinding stone number	Date	Northing	Easting
K Basin	Loc. LKP-w	1	Old Kingdom? Greco-Roman?	29.59631	030.87230
L Basin	Site L	1	Neolithic	29.57875	030.85040
L Basin	Site L	2	Neolithic?	29.57751	030.84802
L Basin	Site L	3	Neolithic?	29.57751	030.84846
L Basin	Site L	4	Neolithic?	29.57795	030.84818
L Basin	Site L	5	Neolithic?	29.57776	030.84796
L Basin	Site L	6	Epipalaeolithic/Neolithic	29.57482	030.85296
L Basin	Site L SE-annex	1	Neolithic/Old Kingdom/Greco-Roman?	29.57216	030.86180
L Basin	Site L SE-annex	2	Neolithic/Old Kingdom/Greco-Roman?	29.57246	030.86056
X Basin	Site E29H1	1	Unknown	29.58429	030.83325
X Basin	Site E29H1	2	Epipalaeolithic/Neolithic	29.58496	030.83189
X Basin	Site E29H1	3	Epipalaeolithic/Neolithic	29.58496	030.83189
X Basin	Site E29H1	4	Unknown	29.58405	030.83284
X Basin	Site E29H1	5	Epipalaeolithic	29.58377	030.83268
X Basin	Site E29H1 NW-annex	1	Unknown	29.58541	030.83033
X Basin	Site E29H1 SE-annex	1	Unknown	29.57880	030.83663
X Basin	Site E29H1 SE-annex	2	Unknown	29.57734	030.83967
X Basin	Site E29H1 SE-annex	3	Unknown	29.57736	030.84098
X Basin	Site LX	1	Unknown	29.58173	030.84180
X Basin	Site LX	2	Unknown	29.58209	030.84208
X Basin	Site LX	3	Unknown	29.58246	030.84196
X Basin	Site LX	4	Unknown	29.58246	030.84196
X Basin	Site LX	5	Unknown	29.58258	030.84237
X Basin	Site LX	6	Unknown	29.58272	030.84207
X Basin	Site LX	7	Unknown	29.58200	030.84246
X Basin	Site LX	8	Neolithic	29.58218	030.84291
X Basin	Site LX	9	Neolithic	29.58218	030.84291
X Basin	Site LX	10	Unknown	29.58207	030.84325
X Basin	Site XA	1	Neolithic	29.59069	030.81461
X Basin	Site XA	2	Neolithic	29.59010	030.81508
X Basin	Site XA	3	Neolithic	29.59055	030.81533
X Basin	Site XA	4	Neolithic	29.59125	030.81460
X Basin	Site XA	5	Unknown	29.59320	030.81367
X Basin	Site XA	6	Unknown	29.59354	030.81365
X Basin	Site XA	7	Unknown	29.59375	030.81575
X Basin	Site XA-s	1	Unknown	29.58448	030.82006
X Basin	Site XA-s	2	Epipalaeolithic/Neolithic	29.58728	030.81655
X Basin	Site W	1	Neolithic	29.59309	030.80889
X Basin	Site W	2	Neolithic	29.59309	030.80889
X Basin	CS-Site W	1	Neolithic	29.59379	030.80256
X Basin	CS-Site W	2	Epipalaeolithic/Neolithic?	29.59188	030.80231
X Basin	Site X-Site XA	1	Epipalaeolithic/Neolithic?	29.58960	030.80854
X Basin	Site V-se	1	Unknown	29.57933	030.79836
Z Basin	Site V Depression-w	1	Neolithic/Predynastic	29.58375	030.79264
Z Basin	Kom W-n	1	Unknown	29.59070	030.79123
Z Basin	Kom W-n	2	Neolithic	29.59105	030.79024
Z Basin	Kom W-w	1	Neolithic	29.58758	030.78985
Z Basin	CS Depression	1	Old Kingdom	29.58625	030.79843
Z Basin	Site V-e	1	Epipalaeolithic/Neolithic	29.58307	030.79713
Z Basin	Camp II Ridge	1	Epipalaeolithic/Neolithic	29.58767	030.78620
Z Basin	Camp II Ridge	2	Epipalaeolithic/Neolithic	29.58741	030.78637
Z Basin	Camp II Ridge	3	Epipalaeolithic/Neolithic	29.58741	030.78617
Z Basin	Site Z eastern hearth field	1	Neolithic	29.58745	030.78355
Z Basin	Site Z northeastern hearth field	1	Epipalaeolithic?	29.59090	030.78217
Z Basin	NW depression E shore	1	Neolithic?	29.59246	030.75978
Z Basin	NW depression E shore	2	Neolithic?	29.59235	030.75982

Table 5.3. The list of grinding stones found during the survey

localities/sites on basin shores, and no grinding stone was found far from the basin shores (**Table 5.3**). Many of them are in their original shapes even though partly broken, but some are fragmentary. While sporadic occurrence of grinding stones was certainly seen at or around Kom W, Site V, Site X and Site Z as already mentioned by Caton-Thompson, two remarkable concentrations of more than a few grinding stones, which have never been reported before, were noticed in other areas. One concentration of grinding stones was seen in Site LX, and another concentration of grinding stones was seen in Site XA. Such concentrations of grinding stones are comparable to that at Kom W, which was reported by Caton-Thompson (Caton-Thompson and Gardner 1934: 31-32). It is assumed that these concentrations indicate the regularity or continuity of site occupation and the mass processing of grains or tubers.

The difference in their environments is interesting to note. Site LX and Kom W are located at an elevation of slightly higher than 20 m asl, which is supposed to be around the margin of the highest-rising lake water in late summer in the higher stage of the Moeris Lake. On the other hand, Site XA is located at the abuttal of the X Basin and Wadi A at elevations of around 15 m asl. This location is supposed to be around the margin of high-rising lake water in late summer in the relatively lower stage of the Moeris Lake, and is supposed to become wet due to surface runoff caused by rainfall in winter. These two distinct locations with a supposedly similar subsistence activity imply either different seasons of occupation within the same time period according to the seasonal rise and fall of lake water level, or different time periods of occupation in the longer term.

5.12. The spatial distribution and nature of Neolithic localities/sites in the L Basin-X Basin area

The new field survey revealed that the area to the north of the L Basin and X Basin had some interesting Neolithic sites like Site L and Site LX (**Fig.5.62**). Despite the surface disturbance caused by natural erosion and recent expansion of dry canals and ditches, these sites seem to retain an original context to some degree, judging from the presence of immobile remains like hearths and fragile materials like charcoal beneath the hearth stones. Such well-preserved Neolithic remains can serve to reconstruct the land use patterns of the Neolithic people in this area.

As described earlier, this area consists of the high flat desert (above 20 m asl), the gentle slope (15-20 m asl), and the low flat desert (below 15 m asl). Neolithic artefact scatters are spread in this entire area. There seems to be no significant difference in the basic structure of individual hearths between elevations. The density of the distribution of hearths accompanied by other occupational features is particularly high at higher elevations above 20 m asl, whereas the distributions of artefacts on the gentle slope is relatively sparse. This gives the impression that the high flat area was a major Neolithic habitation area, which has been occupied for a certain length of time or has been visited and stayed at routinely or frequently, and that many different kinds of tasks were performed there. In particular, the location, variety and spatial extent of archaeological remains at higher elevations of Site LX are comparable to those of other well-investigated occupation loci like Kom K and Kom W.

However, differences in the appearance of localities/sites according to elevation in this area may again simply be the consequences of different degrees of taphonomic processes caused by natural forces. That is, undurable and fragile archaeological remains at lower elevations may have been prone to be eroded and washed away by oscillating water near the beaches of later times, whereas archaeological remains at higher elevations may have escaped from such erosional events. A field observation at Site E29H1 by the Combined Prehistoric Expedition and this survey that Neolithic lithic artefacts seen at this site are heavily abraded clearly suggests that Neolithic remains on the northeastern beach at an elevation below 15 m

asl tended to suffer from oscillating water for a considerable length of time and to be lost, instead of being buried by lacustrine sediments under deep water and protected.

On the other hand, although not comprehensively studied, Neolithic artefact assemblages appear to be slightly different from elevation to elevation, and thus the differences in artefact assemblages may give not only clues to understand the function of localities but also some ideas about the mobility and subsistence strategy of the Neolithic people in this basin shore environment. Localities at lower elevations were marked by the presence of bifacially-retouched arrowheads and spearheads, whereas localities above 20 m asl were noted for the absence of such hunting weapons and the presence of numerous grinding stones and pottery sherds, and some bifacially-retouched sickle blades and knife blades. These differences may perhaps reflect a general difference in subsistence activities and land use. The localities at lower elevations are obviously related to hunting or fishing on the receding basin shores. The sporadic presence of crude knives and denticulates at lower elevations may suggest that butchering or scaling were also performed there, and that large portions of meat were taken away to occupation loci at higher elevations. The low elevation localities must have been occupied or visited from winter to late spring when the water level of the basins was low and the flock of migratory waterfowl came. In contrast, artefact assemblages in the localities above 20 m asl suggest subsistence activities other than hunting and fishing. In addition, the existence of curious remains like the concentrations of burnt clay nodules and the supposedly stockpiles of flint cobbles and quartz cobbles at higher elevations of Site LX suggest craft working activities.

It is hard to say through a surface observation of artefacts and structural remains how many people inhabited the high flat desert of the L Basin-X Basin area at one time and how long they stayed there. This is related to a larger question as to the sedentariness of people in this habitation area. As is the case with Epipalaeolithic sites mentioned earlier, it is not certain whether a number of various archaeological remains on the high flat desert reflect continuity of occupation by one group of people for a certain period of time, or suggest the regularly or irregularly repeated occupations of the same place by one or different groups of people for a length of time. Only a single radiocarbon date for Site LX suggests that it has been occupied earlier in date in the Fayum Neolithic, but does not tell the duration of occupation. It can only logically be considered that the high flat desert would have been occupied at least in summer because it was high enough to escape from high-rising basin water in summer.

In order to answer the questions about the sedentariness of the Neolithic inhabitants of Site L and Site LX and the duration of site occupation, different approaches must be considered. Since the high flat desert of the L Basin-X Basin area is sandy or gravelly and is devoid not only of flint cobbles suitable for making tools but also of blocks/slabs suitable for making hearths and grinding stones, these materials must have been transported from somewhere else. The presence of a number of apparently non-local cobbles and blocks/slabs in Site L and Site LX suggests that the mobility range of Neolithic people was not limited to this basin shore environment. The fact that the mouth of Wadi B is located less than 1 km to the north of Site LX is important in this context. Although the mouth of Wadi B could not be surveyed due to the lack of time, it is probable that the Neolithic inhabitants of Site L and Site LX used Wadi B as a track when they walked to the sources of blocks/slabs in the rocky terrain of the Fayum Depression in the north. Given this probability, the location of Site L and Site LX is considered to be strategically quite favourable, because it could benefit from aquatic resource-rich basin shores in the south as well as a wadi in the north which may have brought runoff water caused by winter rainfall. It is possible that either wild or domesticated plants were harvested around the wadi when it became moist in winter. If this was really the case, year-round habitation in Site L and Site LX would not have

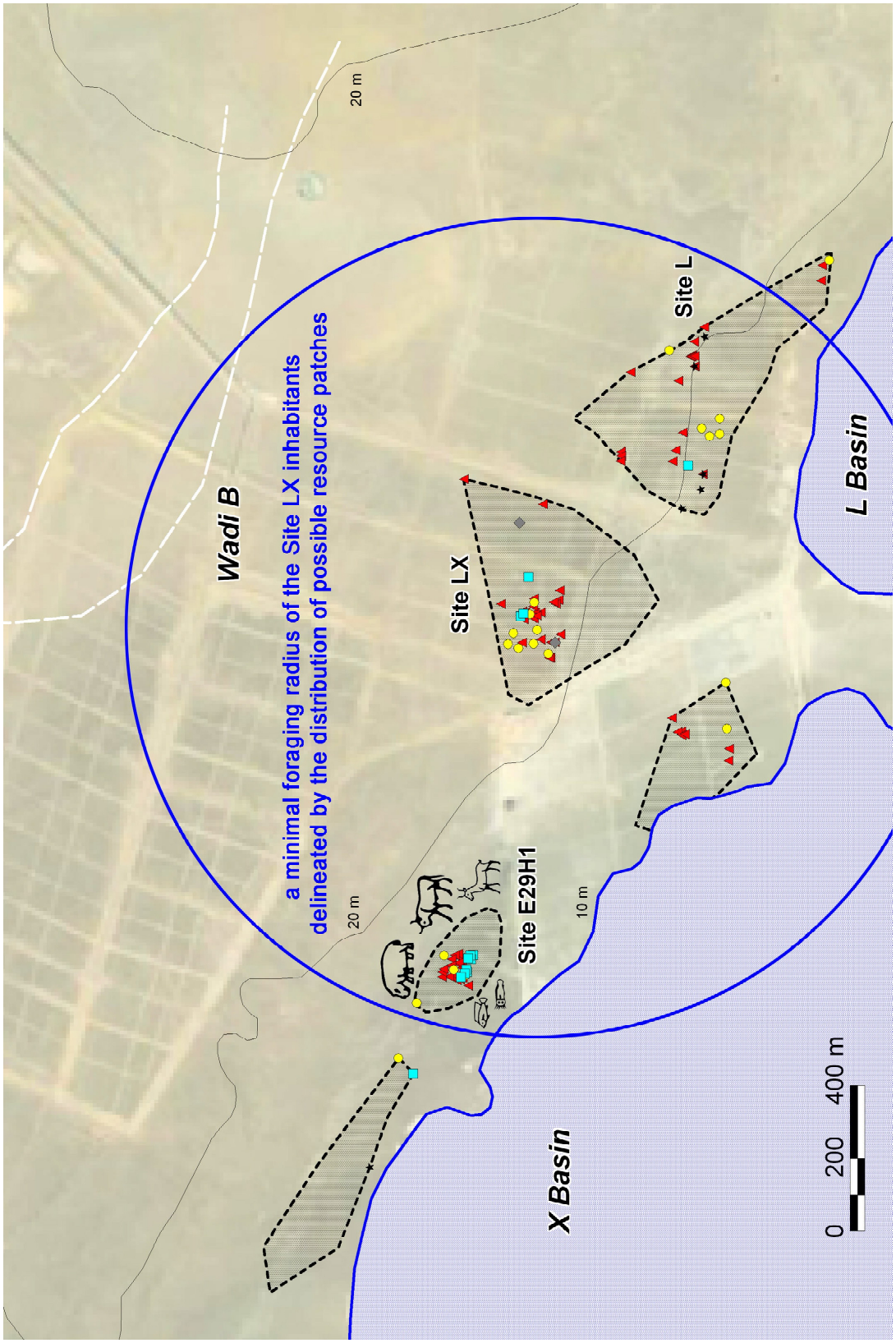

Fig.5.62. Palaeoenvironment of the L Basin - X Basin area

been unlikely.

Another habitation area to the north of the X Basin is interesting in terms of the natural environment. This habitation area named Site XA is where Wadi A drains into the X Basin, and it exhibits a different land use pattern from those around Site L and Site LX. Neolithic artefacts and other remains in this habitation area concentrate at elevations between 15 m asl and 20 m asl and overlie sparse Epipalaeolithic artefact scatters. Very few archaeological remains were encountered above the 20 m asl contour line. A vast mixed scatter of Epipalaeolithic and Neolithic artefacts is seen around the abuttal of Wadi A and the X Basin at elevations between 10 m asl and 15 m asl, and such a scatter may probably be caused by the combination of alluvial and colluvial events.

Hearths and other occupational features at elevations between 15 m asl and 20 m asl are distributed on both sides of Wadi A, and it is assumed that they were related to subsistence activities along the wadi. Hearths and enigmatic stone structures as well as a supposedly tethering stone suggest that this area was a herders' camp. If this was really the case, it is probable that the wadi was used as a track by the herders to go northwards for pastures. The finds like bifacially-retouched arrowheads and spearheads suggest that this area was a hunting ground at other times. On the other hand, the presence of sickle blades and grinding stones suggests that plant harvesting was also one of the subsistence activities along this wadi. It can be presumed on the basis of elevation that the occupation of this locality and the harvest of either wild or domesticated plants took place in winter and spring, when the water of the X Basin lowered and the wadi bed became wet due to runoff water caused by rainfall. Hunting may also have been practised when wild game animals were attracted by water and plants in the wadi in winter and spring.

5.13. The palaeoenvironment of the X Basin-Z Basin area and the foraging radius of the Kom W inhabitants in the Neolithic

The field survey in the X Basin-Z Basin area (**Fig.5.63**) revealed that the scatters or concentrations of relatively large animal bones and their fragments on the present surface is particularly dense in a wide area around Kom W at elevations of 15-20 m asl, whereas few or no animal bones were encountered at elevations lower than 15 m asl and higher than 20 m asl. This suggests that the archaeological remains in the surroundings of Kom W may be regarded as having been well preserved, and that recurrent lacustrine sedimentation events at elevations of 15-20 m asl have played a significant role in the protection of fragile faunal remains.

Apart from a small surface concentration of animal bones at Site E29H1 in the X Basin, the surface scatters of animal bones are sporadic to absent in the other areas even at elevations of 15-20 m asl. This suggests that taphonomic processes have not been homogeneous between areas even at the same elevation. The area around Kom W at elevations of 15-20 m asl is wide and relatively flat with little surface relief, whereas the area around other occupation loci like Site LX at elevations of 15-20 m asl is fairly narrow and is relatively steeply inclined. Such a difference in topography must have caused a different rate of lacustrine sedimentation in water margin environments, and have favourably affected the protection of archaeological remains in the flat area around Kom W.

It was also recognised through the survey that Kom W was quite strategically located. Although Kom W is approximately 600 m away from the Z Basin shore to the southwest, the vast flat area between Kom W and the Z Basin shore would have been inundated in summer, as suggested by large lacustrine bivalves embedded in the silty sediments of the Site V Depression and Camp II Depression, and the wadable area of seasonally rising water could have been good fishing grounds from summer to autumn. It is probable that part of this vast flat area contained water in

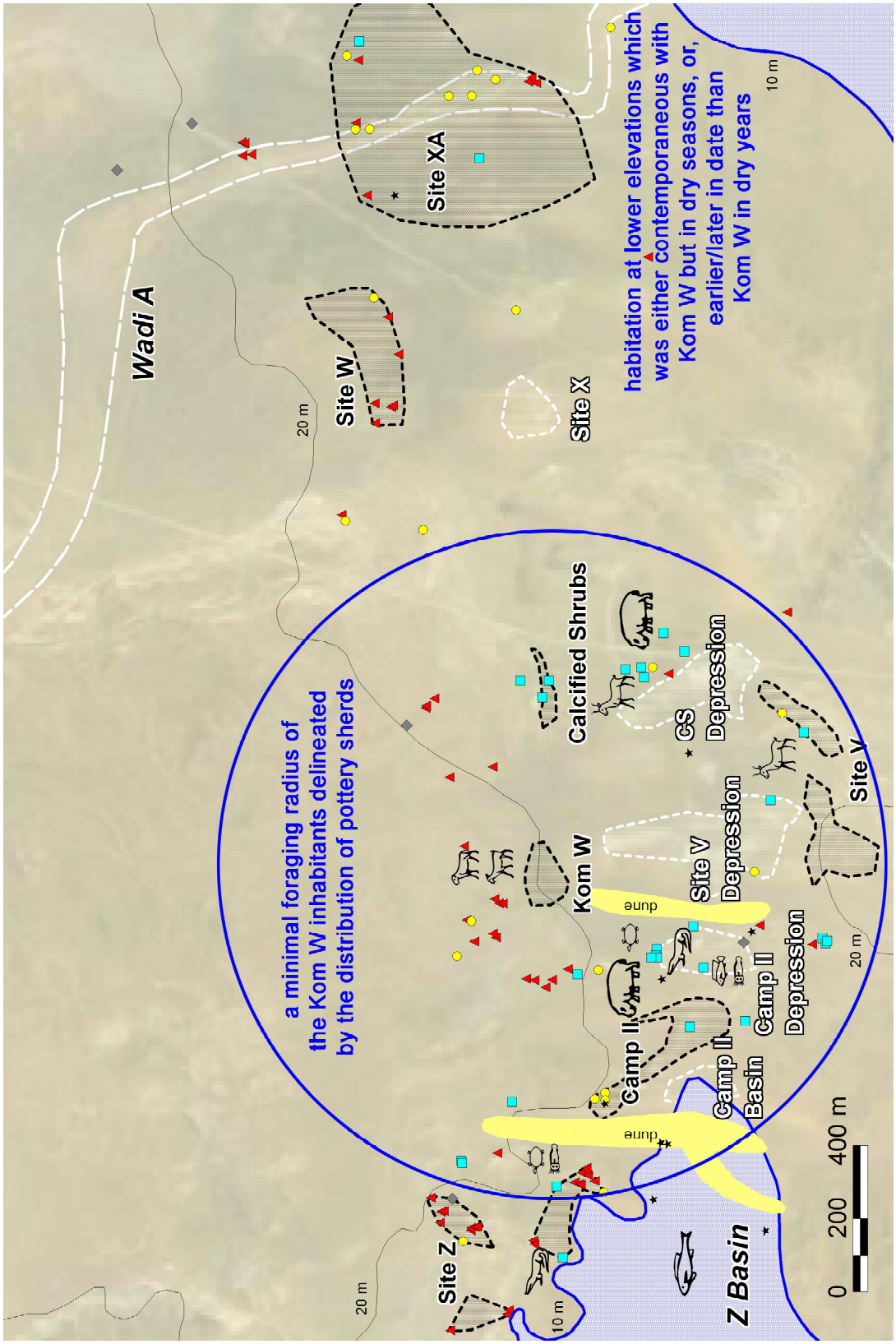

Fig.5.63. Palaeoenvironment of the X Basin - Z Basin area

residual pools for some length of time even after the seasonal high water receded from the flat area in autumn, and that some residual pools persisted until the next high water season. The residual pools must have given extra opportunities of catching fish trapped there. Even when the seasonal high water completely receded, given the depth of the Camp II Basin and the Z Basin, it is probable that these Basins contained a large body of water throughout the year and provided the Kom W inhabitants with drinking water and the opportunities for sedge/reed harvesting, fishing, shellfish collecting, fowling, and crocodile/hippopotamus hunting from winter to spring.

As evidenced by concentrations of calcified plant roots, the margins of seasonally rising basin water near Kom W must have been fringed with sedges and shrubs. These must have provided shade and shelter to wildlife as well as humans, and must have provided the Kom W inhabitants with not only edible rhizomes and seeds but also timbers and fibres for building and craft working, and fuels for warming, cooking and pottery firing. Also as suggested by the surface finds of the bones of hartebeest and hippopotamus, this flat area would have become grassland from autumn to spring, and large sedentary herbivores would have wandered and have been hunted there, though it is probable that some other mammals were wary of human presence and hence did not come close to the human habitat. Part of this vast flat area may have been used for farming, as speculated by Caton-Thompson (Caton-Thompson and Gardner 1934: 75). As suggested earlier, however, there is another area which may possibly have become moist due to winter rainfall and may have been used for farming to the northeast of Kom W. Considering the presence of wild and domesticated animals, special care to prevent them from eating crops before harvest must have been necessary, and it is no wonder if a farming plot was located far from the Z Basin shore where voracious hippopotamus inhabited.

In short, apart from rock materials for making various tools, vital natural resources like drinking water and fuels, as well as wild food resources which are aggregated seasonally and are renewed yearly, seem to have been almost constantly available within easy walking distance of Kom W. As has been argued regarding the reason for the choice of site location in the Nile Valley in the Late Palaeolithic (Van Neer *et al*. 2000: 282), the location of residence at Kom W may also have been chosen not only because it was just above the seasonally highest water level but because it was close to a large area which had been inundated but wadable. Given these conditions, it is considered that Kom W was certainly a residential base which may have been occupied for most of the year, and that the daily foraging of the Kom W inhabitants was in a radial pattern, though with little interest in the barren flat area to the north of Kom W.

Moreover, it may be possible to delineate more clearly the mobility range of pottery-using people in the Kom W area by focusing on the spatial distribution of Neolithic pottery sherd scatters on the surface, because the scatter of pottery sherds is the densest and widest at Kom W and its immediate vicinity, and tends to be sparse and small in the periphery of the Kom W area. A field observation that scatters of Neolithic pottery sherds continually spread westwards from Kom W to the northeastern shore of the Z Basin, which is 800 m away from Kom W, but no more pottery sherds are seen from there to the western end of the survey area, which is 3.5 km far away from Kom W, suggests that the vanishing point of pottery sherds on the northeastern shore of the Z Basin was the western end of the mobility range of pottery-using people in the Kom W area. Likewise, another field observation that scatters of Neolithic pottery sherds continually spread southwards and show some high density concentrations on the Site V Ridge but become rare to absent in the south of the Site V Ridge, which is approximately 800 m to the south of Kom W, suggests that this vanishing point was the southern end of the mobility range of pottery-using people in the Kom W area. Moreover, the Neolithic pottery sherd scatter does not continuously spread far to the east of Locality 'Calcified Shrubs', whose eastern end is

approximately 500 m away from Kom W, but the next remarkable concentration of pottery sherds is seen at Site X, which is approximately 1 km far from Kom W, whereas further scatters of pottery sherds are seen at Site XA, which is approximately 2 km far away from Kom W.

In terms of the economic zonation of foragers/collectors described in Chapter 4, a 800 m radius from Kom W delineated by the spatial distribution of Neolithic pottery sherd scatters may be considered as a play radius and a minimal foraging radius of the Kom W inhabitants. However, since the contemporaneity of localities/sites within this radius is not certain, it is difficult to assume that Kom W has always been the sole residential base or the central place within this radius and that all other localities/sites within this radius were left by people coming from Kom W. The spatial distribution of Neolithic pottery sherd scatters may simply suggest that this entire area have been permanently inhabited by Neolithic people and Kom W became an outstanding residential base at a certain time.

In order to substantiate the assumption about the foraging radius of the Kom W inhabitants and to answer the question as to whether this foraging radius expanded farther, it is necessary to find other possible residential bases and to elucidate whether the other possible residential bases were used by the people who moved from Kom W sequentially or by another group of people simultaneously. If the former was the case under conditions of low population density and high density distribution of resource patches, then the mobility pattern could have been either a half-radius continuous pattern, in which the residential base was continuously moved to the outer perimeter of the foraging radius previously covered with no development of logistical zones, or a complete-radius leapfrog pattern in which the residential base was moved to a distant place but the logistical zones of each residential base partially overlapped. If the latter was the case under conditions of high population density, it means that the foraging range of the Kom W inhabitants was determined and constrained by the presence of the foraging radius of another group of people, even though there was some overlap at the peripheries of the two foraging radii, and the necessary resources which were not obtained within the foraging radius of Kom W could be procured through logistical trips. Numerous stone tools made on raw materials which are not available within easy walking distance of Kom W indicate that the raw materials have been transported from distant sources either through logistical trips by task parties sent from Kom W or through residential moves by a group of people who went to and came back from the source area cyclically. This topic will be dealt with in Chapter 7.

Other possible residential bases which are comparable to Kom W in terms of the spatial scale of locality and the diversity and density of artefacts and structural remains are Site LX and Kom K. According to the radiocarbon dates, the contemporaneity of Kom W and Kom K is obvious, whereas Site LX is older in date. Given the 8 km distance between Kom W and Kom K, it may be possible that the Kom W inhabitants routinely moved to Kom K in a half-radius continuous pattern. However, considering the similar water margin environment at almost the same elevation of Kom W and Kom K and the supposedly similar seasonally-fluctuating availability of food resources in their surroundings which is naturally subject to the transgression and regression of lake water, it does not seem to have been beneficial for the Kom W inhabitants to move to Kom K on a seasonal basis after the seasonally-available resources around Kom W were depleted. Even when residential moves from Kom W on a seasonal basis had taken place, the moves should have been oriented toward more profitable resource patches close to receding water margins at elevations lower than that of Kom W. On this basis, it is reasonable and likely that the inhabitants of Kom W moved their residential base to the Site V Ridge to the south of Kom W or Site XA to the east of Kom W. The lack of grinding stones and hearths on the Site V Ridge is a weak point for arguing that Site V was a residential base, and some sunken pottery vessels found *in situ* on the Site V Ridge by Caton-

Thompson (Caton-Thompson and Gardner 1934: 75-76) are also not good evidence to support such an argument. Site XA is a more likely location to which the Kom W inhabitants moved after the seasonal high water receded.

It is tentatively concluded that in the second half of the Fayum Neolithic in the middle 5th millennium cal.BC, at least two distinct groups of people simultaneously occupied Kom W and Kom K respectively. It is assumed that Kom W and Kom K had their own foraging radius, with some possible overlap at the peripheries of the two foraging radii. This means that each foraging radius was around 4-5 km. It is also assumed that Kom W and Kom K developed their own logistical zones by using Wadi A and Wadi B respectively.

5.14. The distribution and nature of Epipalaeolithic and Neolithic localities in Wadi A and Wadi B in the Gindi Plain

A survey in the previously uninvestigated wadis in the Gindi Plain revealed that there were certainly Epipalaeolithic and Neolithic human activities in the wadis, and that the mobility range of the Epipalaeolithic and Neolithic people was not limited to the basin shores but was widely extended far away from the lake. The most unexpected thing is the discovery of a remarkable concentration of Epipalaeolithic artefacts at a particular spot in Wadi B. It was revealed by previous research that Epipalaeolithic people were heavily dependent on aquatic resources on the basin shores. Furthermore, it has also been suggested that most Fayum Epipalaeolithic localities 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. Several isolated Epipalaeolithic finds along Wadi B indicate that Epipalaeolithic people passed through the wadi while making and using flint tools, but a concentration of lithic debitage products at a particular spot on the wadi bank very far to the north of the lake suggests that Epipalaeolithic foragers visited such a distant place and stayed there for a while, perhaps overnight. These findings require a reconsideration of the subsistence and mobility strategies of the Fayum Epipalaeolithic people. These topics will be discussed in more detail in Chapter 6.

As for the Neolithic finds, although there were no clear concentrations of artefacts, sparse scatters of artefacts are not surprising. Neolithic people started to use sandstone blocks and slabs which were not available in their habitat on the basin shores but were available in the gravelly and rocky terrains of the Fayum Depression. Hence there is little doubt that they have visited these terrains. Furthermore, Neolithic people introduced wheat/barley farming and sheep/goat herding, which must have required them to organise pasturing trips in wider areas beyond the basin shore habitat, in order to feed sheep and goats, and more importantly, to keep them away from farming plots while crops were growing. The interpretation of the Neolithic localities or artefact scatters found along these large wadis must be a clue to understand the mobility of Neolithic people. However, the mobility type and mobility frequency of the Neolithic people are still not clear from the spatial distribution of finds. Given that the sources of flint for Neolithic tools could not be located by this survey, the mobility range of the Neolithic people must be far beyond the northern and northeastern ridges of the Fayum Depression. This topic will be discussed in more detail in Chapter 7.