ENVIRONMENTAL CHANGE AND HUMAN CULTURE
IN THE NILE BASIN AND NORTHERN AFRICA
UNTIL THE SECOND MILLENNIUM B.C.
Poznań 1993
PL ISSN 0866-9244 ISBN 83-900434-1-6

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Neolithic settlement patterns in the Gebel Kamil area, Southwestern Egypt

From 1980 to 1985 the B.O.S. research group of the University of Cologne, financed by the German Science Foundation, conducted several expeditions into the Eastern Sahara of Western Egypt and Northern Sudan (Kuper 1981; 1988). In 1983 the surveys were carried out in southwestern Egypt near the Sudanese border. In this area, a high conical hill, Gebel Kamil, is a widely visible landmark. This quartzitic inselberg (Sabaya formation) rises abruptly from a flat dune covered sand sheet to more than 300 feet (Fig. 1). To the south there is an elongated east-west orientated basin structured by several small depressions

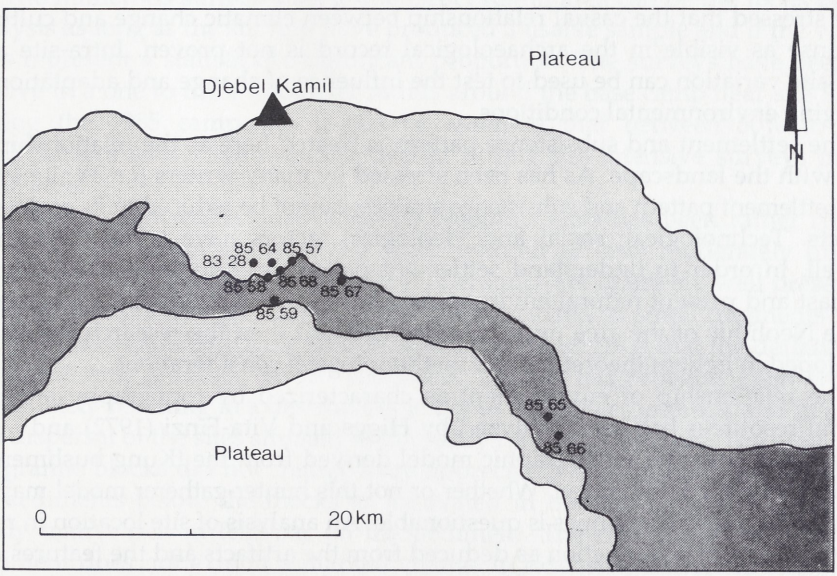

Fig. 1. Major excavated or tested Gebel Kamil sites;
1: 83/28-1; 2: 83/28; 3: 85/64; 4: 85/54; 5: 85/58; 6: 85/68; 7: 85/59; 8: 85/67; 9: 85/65; 10: 85/66.

and a quartzitic hamada. In its deeper slopes a granitic formation (red granite) has been exposed with its characteristic rounded and dome-shape block fields. The basin may be a deflation depression but its orientation indicates that it has been a part of the tertiary "Radar" fluviatile system of the Sahara (Wendorf *et al.* 1987). Minimally it dates to before the Acheulean because four sites with hand-axes have been found to the north of the major deflation basin. No Old or Middle Palaeolithic has been discovered on the basin floor. A recent fill of the basin can be assumed which does not exclude erosional processes having removed the Palaeolithic sediments.

During the 1983 survey a number of Neolithic surface sites were found in various parts of this basin. But a small test excavation in a granite rock shelter seemed most promising: starting from surface finds, artifacts and pot sherds occurred up to 40 cm in depth. Therefore the stratigraphy was expected at this point, made more interesting by the fact that, in front of the granite blocks, surface finds extended well into the north-south running wadi. In the 1985 campaign, the excavation of this rockshelter and the adjoining area was one of the major research goals. Extensive surveys conducted by car and on foot added a number of other Stone Age sites in the Kamil area.

General approach

A short summary of the theoretical background treated here is presented. According to cultural ecological theory it is assumed (Steward 1977) that climatic change influences human settlement patterns and economies. But it has to be stressed that the casual relationship between climatic change and cultural response as visible in the archaeological record is not proven. Intra-site and inter-site variation can be used to test the influence of change and adaptation to changing environmental conditions.

The settlement and subsistence pattern is treated here as the relationship of man with the landscape. As has been stressed by many writers (*i.e.* White 1985; 4), a settlement pattern and subsistence strategy cannot be reduced to its ecological aspects. Technological, social and ideological factors have to be considered as well. In order to understand settlement pattern and subsistence strategies, the past and present natural environments have to be discussed, a background to the Neolithic of the area must be presented and then the research results be developed in light of theoretical and methodological considerations.

The relationship of environment as characterized by topography and the natural resources has been analyzed by Higgs and Vita-Finzi (1972) and Vita-Finzi (1978) using an ethnographic model derived from the !Kung bushmen as to the catchment area utilized. Whether or not this hunter-gatherer model may be used for Neolithic economies is questionable. An analysis of site location in relation to relief and site function as deduced from the artifacts and the features can provide indications of landuse. Unexcavated surface sites rich in material cannot be used to infer residential sites used by a large group of people in contrast to

small sites with few artifacts which have been used for a special purpose for a short period by few people. This simple equation, often used in archaeology, surely is not valid except under the most controlled conditions. Rich sites may correspond to a repeated short-term occupations by few people. Sites poor in remains may have been settled by people who did not leave much trash depending on activities, technology or refuse disposal. However, from an ecological point of view, a site rich in material, no matter how often and how long occupied, should signal a special location in the landscape. Though social and ideological reasons may sign for this intensive reoccupation, certain natural resources can be responsible and have to be sought first. The occurrence of artifacts in sites does not necessarily mean that related activities were executed here. Lithics and expedient tools and the locale of their abandonment does not always correspond to the place of their use (Binford 1976: 242). There is probably a difference as to heavy, barely movable artifacts, Binford's "site furniture" like grinding stones. These may be produced at special raw material sites, but once moved, they are left in the site and used during the subsequent occupation until the area is abandoned or the grinding stone is unusable.

Past and present environments

The research conducted in the Kamil area is preliminary, most of the material has not yet been analyzed. Therefore the goal of this paper can only be to state the problems and present hypotheses will have to be tested in future field work.

The numerous surface sites in the Gebel Kamil area can be the focus of our analysis as long as the surveys have produced a usable sample and if the visible sites represent a statistically significant proportion. The surveys have been intensive in a one to three kilometer radius around the base camp near site 83/27 during the 1985 campaign. It can be assumed that between 50% to 80% of all surface sites have been discovered during the intensive surveys in the small area.

The deflation which uncovered the Neolithic sites has been rather recent. Generally the lithics are relatively fresh without or only moderately dulled, rounded or abraded edges and surfaces. Ceramics are relatively well preserved with the exception of site 85/67 where they occurred in small fragments with heavily wind abraded edges. This supports the assumption that the deflation in the Kamil area is rather recent. The humic top soil has probably been eroded rather lately resulting in a destruction of bones and some ceramics, and in a certain dispersal of the sites situated in the valleys and on the slopes. The erosion of the granite blocks did not change them appreciably during the last 4,000 years: the sediments below the blocks as excavated in the site 83/28-1 consist of a sandy matrix rich in feldspar on the pediment. The rock face buried by this pediment does not exhibit a marked change in extension nor form. The waste from the granitic rocks has been swept over the small wadis and into the main basin. Even if today, the Kamil area is extremely arid, some water erosion may

have been active in addition to deflation. The artifact accumulation of 83/27, in a valley fill without any evident structuring, may be a redeposited site originally situated farther upslope, which surely did not move any great distance. If this is so, the site must have been slightly displaced, but probably not with much water, because the artifacts are rather fresh.

The present day environment of the Kamil area is that of an arid desert practically devoid of vegetation. No surface water is available. Animal life is restricted to snakes, scorpions, desert rats and some insects. Several dead mummified barbary sheep partially buried, seem to have died in the recent decades indicating worsening climatic conditions. The limited excavations give to date some indications of prehistoric environments, mainly derived from fauna. These must be supplemented with data from the Gilf Kebir (Kuper 1981; Kröpelin 1987; Haynes 1982; Neumann 1987) to the North and the Bir Kiseiba (Wendorf *et al.* 1984) to reconstruct the climate of the Early Holocene.

The Bir Kiseiba Early Holocene climatic sequence (Wendorf *et al.* 1984: 405) consists of 3 humid Playa phases:

I: 10,000 to 8,200 B.P.,
II: 8,100 to 7,900 B.P.,
III: 7,700 to 5,400 B.P.

Each of these is separated by an arid interval. There is no direct agreement with the neighboring Nabta sequence nor with the local changes between dry and more humid phases from the Gilf Kebir (Kuper 1981: 231 - 236) nor the more distant Paleo-Chad basin. In the Wadi el Akhdar of the Gilf Kebir, Playa sediments have been dated to 9,400 B.P. Playa sediments with evident root structures are dated to 7,750 B.P. and a site on the surface to a later period *ca.* 5,700 B.P. The 4 m section indicates 7 humid and arid phases ending by 5,000 B.P. Kröpelin (1987) gives a less dramatically fluctuating climatic reconstruction: between 9,500 and 6,000 B.P. the climate was arid but showed rare heavy rainfalls, the period between 6,000 to 5,000 B.P. less arid with rains up to 100 mm/year. To the south of the Kamil area rain was more intense, as assumed by the presence of a snail-limicularia (Haynes and Mead 1987). It is therefore possible that the Kamil area was not as dry as the Gilf Kebir with somewhat intermediate climatic conditions. Charcoal remains analyzed by Neumann (1987) give similar results of rather arid conditions with a reduced vegetation and a slightly more humid period around 6,000 B.P.

A few radiocarbon dates for the Kamil area have been processed, whose results correspond to the sequences established for the neighboring northern and eastern areas:

83/28-1 (Abri) ostrich egg shells 4,310 ± 65 B.P. (KN-3975),
85/58-2 surface site, ostrich eggs 6,520 ± 70 B.P. (KN-4031).

The first date compares well to the late occupational period of the Wadi Shaw in the Sudan, whose dates are grouped between 4,000 and 3,600 B.P. It also corresponds to the last settlement in the Wadi el Akhdar, site 80/14 (Kuper 1981: 248). In the general radiocarbon histogram for the Western Desert (Kuper 1988: Fig. 9) it falls into the Phase D. As it comes from near the surface, it may also as well be the last occupation of the Gebel Kamil area.

Table 1

Faunal remains from Neolithic sites of Gebel Kamil area.

Faunal remains	Sites					
	83/28-1	85/57	85/59-1	85/59-2	85/68	Total
Gazella dorcas	1	3		1	1	6
Large bovid (cf. *Oryx*)	1	3	1	3		8
Unident. mammals	?	478	245	186	16	945
Total	2?	484	246	190	17	959

The earlier date fits the presumed favourable climatic conditions much better. At the same time, it indicates that the late prehistoric occupation may have spanned – with long interruptions – the time between 7,000 and 4,000 B.P. Environmental data are restricted to one floral determination of acacia by K. Neumann and the faunal determinations by W. van Neer which are the only means to reconstruct the environment during the human occupation of the Gebel Kamil area. Five sites yielded the remains of *Gazella dorcas* and a large bovid, cf. *Oryx* (Table 1).

The Dorcas gazelle has a wide distribution in the Sahara where it prefers dry savanna to desert environments. Its habitat is characterized by a scarcity or even absence of water, low humidity and extreme temperatures. If the large bovid is indeed the *Oryx*, its environmental characteristics are similar. It forages often in company of the Dorcas and Dama gazelles, the latter surprisingly missing from the faunal list. This may be due to the small numbers. These wild animal forms identified point to an environment of desert or dry savanna where ephemeral grasses that spring up after rain on dry sand and gravel may have provided the pastures for the Dorcas gazelle and possibly the *Oryx*. Both species can do without water for a limited period at least, but a prolonged human occupation of the Gebel Kamil area could not. Vegetation had to have been present at low level: some acacia, seasonal grasses and sufficient ground water in the basins accessible for a human occupation.

Cultural chronology

The Neolithic in the Gebel Kamil area is characterized by rather hard-burned, fine-grained pottery, red to strong brown (7.5 YR 5/6 to 10 R 4/6), with an impressed comb decoration. The motif is a herring bone design of vertical or oblique lines, delimited by horizontal lines (see Fig. 4: 10). The fine tempered potsherds are dated in the Gilf Kebir area to the 4th to 3rd millennium B.C. and named "Gilf pottery" by Kuper (1981).

The stone technology is based on flakes and large, long blades, made from quartzitic sandstone, and on a fine-grained creamy opalic flint. The latter has been used to produce triangular microliths, segments or small, narrow perforators made by abrupt retouch. The blades served as blanks for end-scrapers

and denticulated blades. Some of the attributes correspond to those described by Wendorf *et al.* (1984: 416) for their Middle Neolithic. Generally, only indicators for a Middle or mainly Late Neolithic exist. Comparisons with other regions are not possible at this stage of the analysis. The special handstones with a longitudinal groove as described from the Gilf Kebir as the Gilf type (Kuper 1981: 251 - 252) also occur in the Kamil site of 85/67. Thus links may be more pronounced with the Gilf Middle to Late Neolithic than with the northern Sudanese Neolithic of the Wadi Shaw and Wadi Sahal (Schuck 1988).

The sites

Generally, the size of the surface scatter and the amount of artifacts give indications on the use of the landscape. At this stage of the study, only medium and small sites are distinguished. Large sites which contain several tens of thousands of artifacts and many hundred tools are apparently not represented. Both large and medium sites are difficult to ascertain, however. Without spatial analyses and refitting the record will not be sufficiently fine-grained to allow us to distinguish several superimposed short-term occupations from single, extended and extensive occupations.

A total of 27 sites has been discovered of which 10 were partially excavated (Fig. 1). These will be described briefly.

Site 83/28

This surface site is situated in a small north-south running valley which transverses the granitic belt. As to its surface area and wide artifact spread it is one of the largest sites in the Gebel Kamil area. Its tools consist of large blades and flakes which served as blanks for end-scrapers, laterally retouched pieces, burins, denticulates. Smaller blades were transformed into perforators. Microliths are rare and comprise trapezes and segments. The pottery is the incised red-brown Late Neolithic one. Two upper grinding stones of the Gilf type are also present.

Site 83/28-1

This is a rockshelter in the granitic belt, discovered and tested in 1983. A small surface was excavated in 1985. The assumed stratigraphy consists only of surface finds and some artifacts in the sandy sediment rich in feldspars dispersed over more than 40 cm. No accumulation in levels could be discerned, except for irregular clusters and a gradual decrease of finds (Fig. 1). Careful inspection of the sediments during the excavation revealed that some of the deep occurrences were associated with animal burrows, barely visible in the uniformly colored sand. It is therefore probable that the stratigraphy is indeed due

to the vertical dispersal in sandy soils (Cahen and Moeyersons 1977), where strong disturbances occur due to the nature of the soil and the presence of roots and burrowing animals. This had to be tested by the final analysis of the artifacts, *e.g.* through refitting.

The finds themselves consist of debitage, some microliths and decorated potsherds. The microliths are composed of segments, some irregular, trapezes and triangles, some very small.

Site 85/58

This large surface scatter of artifacts and potsherds, grinding stones is situated on the southern slope of the main depression. It is as rich as the site 83/28. The rather dispersed finds indicate an intensively reoccupied site. Upper grinding stones *in situ* near lower ones suggest that the site is at least partly intact. Besides some denticulates, segments are the main distinguishing element in its artifact assemblage.

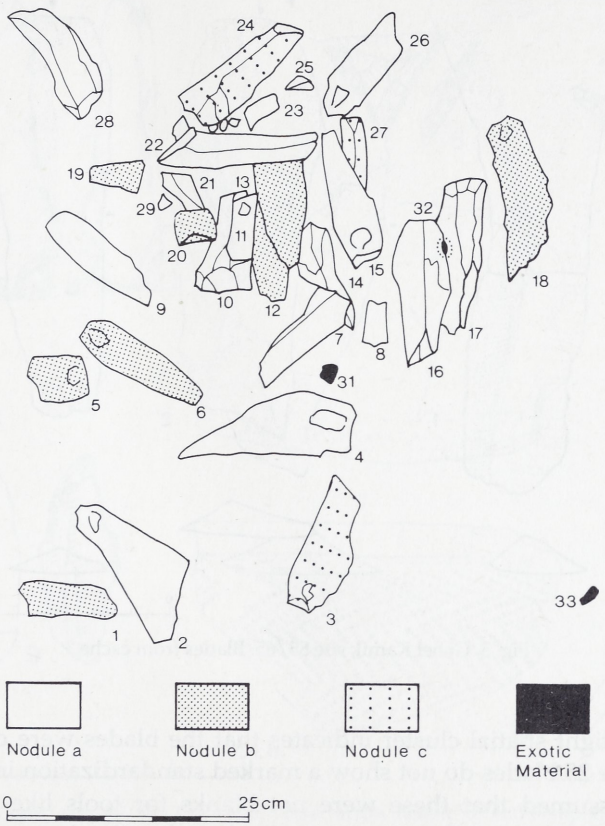

Fig. 2. Cache of blades at the 85/65 site near Gebel Kamil; a - d: nodules 1 to 4.

Site 85/57

This surface site, tested, is situated on the northern slope of the depression (Fig. 1). Large end-scrapers and denticulates on blades are the typical stone tools for this site as well as a grinding stone of the Gilf type.

Site 85/65

This site was discovered during a car survey in 1985 in a flat deflation depression southeast of Gebel Kamil (Fig. 1). On the surface measuring 55 by 40 cm (Fig. 2) 25 blades are concentrated which consist of 32 parts. Eleven of these can also be refitted on the dorsal surfaces originating from 4 nodules or cores

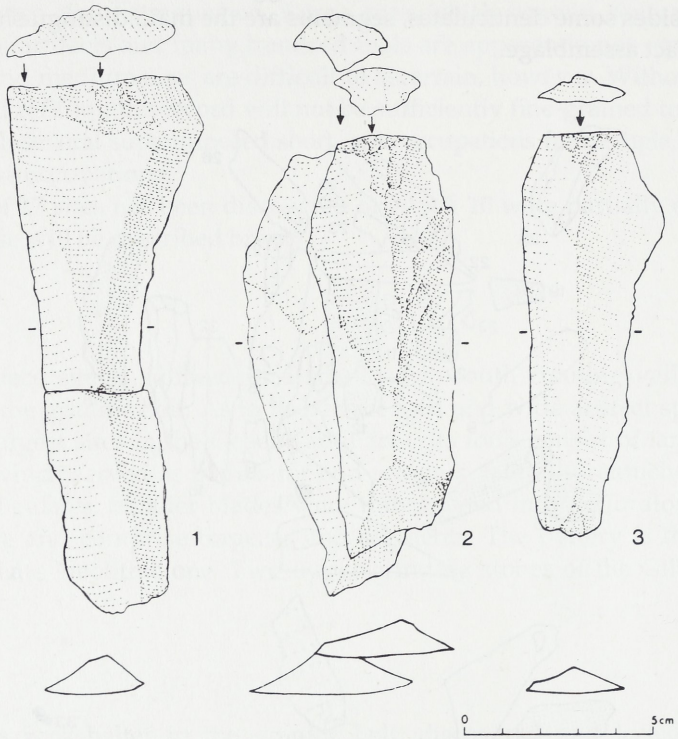

Fig. 3. Gebel Kamil, site 85/65. Blades from cache.

(Fig. 3). The tight spatial cluster indicates that the blades were originally in a container. The 25 blades do not show a marked standardization in their dimensions. It is assumed that these were not blanks for tools like end scrapers, denticulates or points but their use was to be that of cutting instruments.

Site 85/67

This medium sized site is situated at the mouth of a small tributary valley to the main east-west depression. From west to east four major artifact concentrations contain Neolithic with pottery, an upper grinding stone of the Gilf type, end-scrapers (Fig. 4: 8), perforators (Fig. 4: 9) and transverse arrowheads (Fig. 4: 1 - 7), handaxes and crude flakes, bifacial points and Levallois cores. Though some overlap exists, there are distinct accumulations of spots where bifacial points have been produced. Four accumulations of differently colored quartzitic sandstone flakes indicate flaking spots for bifacial points.

Detailed information is not yet available for all of these sites, but there seems to be no preference for special topographic features (Table 2).

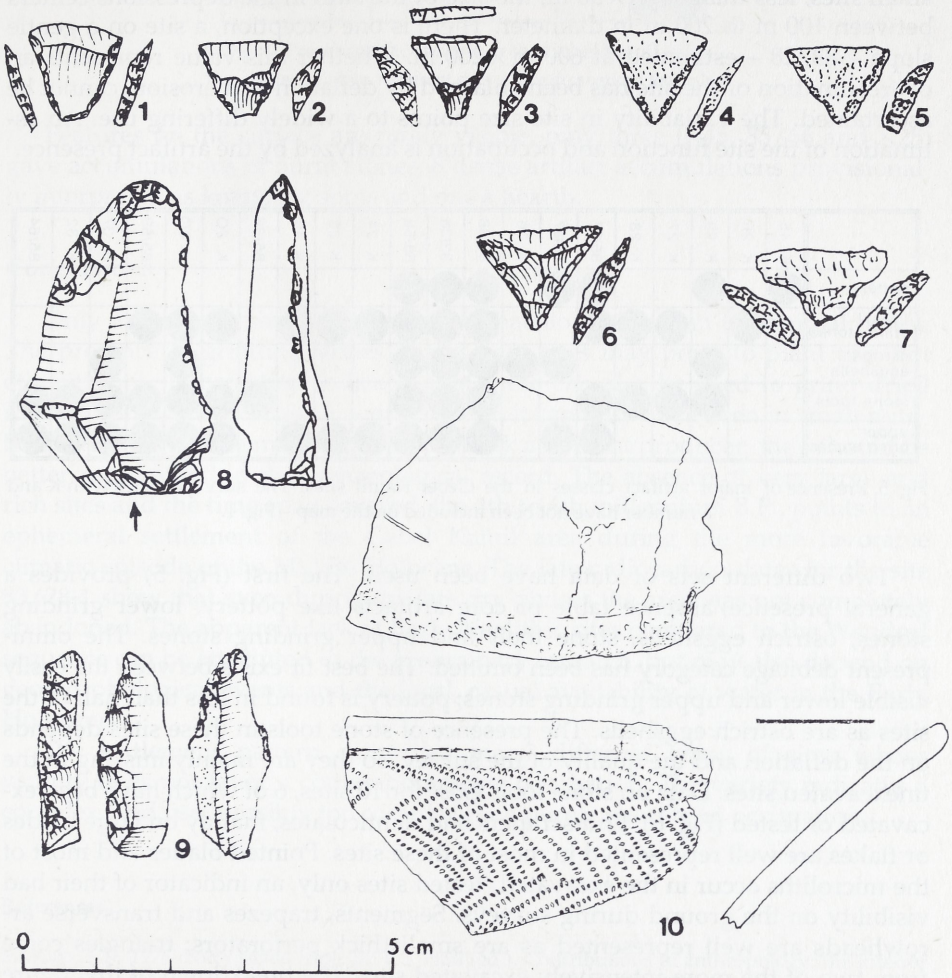

Fig. 4. Gebel Kamil, site 85/67; 1 - 7: transverse arrow heads; 8: end-scraper; 9: perforator; 10: decorated potsherd.

Table 2

Topographic setting of the Gebel Kamil sites.

Top feature sediment	Sand	Debris	Total
Slope	6	4	10
Plateau	2	2	4
Depression	7	2	9
Total	15	8	23

The surface sediment is mainly sand, even on the slopes where debris, including Serir and Hammada, are slightly, though not significantly, more numerous. As to size, there is a clear separation: on the slopes there are usually small sites, less than 80 m × 50 m, the size of the sites in the depressions centers between 100 m to 200 m in diameter. There is one exception, a site on a gentle slope – 83/28 – estimated at 600 m × 200 m. Whether this value represents an overestimation or the site has been enlarged by deflation and erosion, cannot be ascertained. The variability in site size points to a widely differing use. An estimation of the site function and occupation is analyzed by the artifact presence.

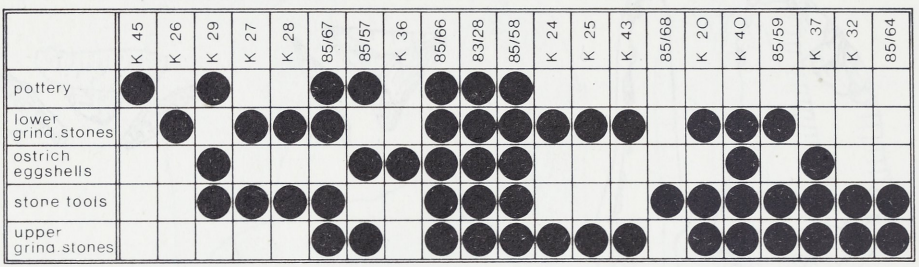

Fig. 5. Presence of major artifact classes in the Gebel Kamil sites. The surveyed sites with K and a number have not been included on the map – Fig. 1.

Two different sets of data have been used. The first (Fig. 5) provides a general presence/absence table of core artifacts like pottery, lower grinding stones, ostrich eggshells, stone tools and upper grinding stones. The omnipresent debitage category has been omitted. The best fit exists between the easily visible lower and upper grinding stones; pottery is found in less than half of the sites as are ostrich eggshells. The presence of stone tools in these sites depends on the deflation and the quality of the survey, so they are mainly missing in the unexcavated sites. Data on stone tools exist for 10 sites, 6 of which have been excavated or tested (Fig. 6). End-scrapers and denticulates, mainly on large blades or flakes are well represented in most of these sites. Pointed blades and most of the microliths occur in the excavated/tested sites only, an indicator of their bad visibility on the ground during surveys. Segments, trapezes and transverse arrowheads are well represented as are small thick perforators; triangles come from two of the more intensively excavated sites. If a breakdown of this figure is possible into classes of sites, it should be placed between the sites with exclusively end-scrapers and denticulates and those with microliths in addition.

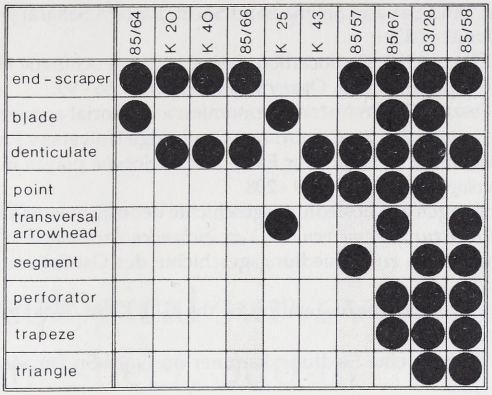

Fig. 6. Presence of tool types in the Gebel Kamil sites.
The shaded columns represent sites where excavations took place.

Features on the surface are rarely visible, only three (K45, 85/66 and K25) gave accumulations of burnt stones, 8 dense artifact accumulations provisionally interpreted as knapping spots and one a hearth.

Conclusions

Only a hunting economy is visible archaeologically from the animal bones. The presence of grinding stones in the large sites may point to plant use, but ethnographic information indicates that these can also be used to grind dried meat. If cattle, sheep or goats were present, it can only have been in small numbers. If they were the main food, blood, milk and meat producer, they should be better represented in the archaeological record. The absence of very large and rich sites and the time span covered, the 4th to 6th millennium B.P., points to an ephemeral settlement of the Gebel Kamil area during the more favorable climatic episode of the Middle Holocene. The late radiocarbon dates for the site 83/28-1 show that even during the late dry phases the area was not completely abandoned. The apparent lack of Early Neolithic sites compared to the Wendorf sequence can be attributed to the preliminary research, but may also depend on geomorphological events and the local, casual availability of water in the Early Holocene.

The settlement pattern comprises many different types of sites whose vicinity does not favor a contemporaneous occupation. The variety indicates a complex land use, possibly too complex for a purely short term occupation.

References

BINFORD, L.R. 1976. Forty seven trips. In: E.S. Hall (ed.), Contributions to anthropology: the interior peoples of Northern Alaska. *Archaeological Survey of Canada* 49: 299 - 351. Mercury Series.

CAHEN, D. and J. MOEYERSONS. 1977. Subsurface movements of stone artefacts and their implications for the prehistory of Central Africa. *Nature* 266: 812 - 815.

HAYNES, C.V. 1982. Great Sand Sea and Selima Sand Sheet, Eastern Sahara: geochronology of desertification. *Science* 217: 629 - 633.

HAYNES, C.V. and A.R. MEAD. 1987. Radiocarbon dating and paleoclimatic significance of subfossil Limnicolaria in Northwestern Sudan. *Quaternary Research* 28: 86 - 99.

HIGGS, E.S. and C. VITA-FINZI. 1972. Prehistoric economies: a territorial approach. In: E.S. Higgs (ed.), *Papers in economic prehistory:* 27 - 36. Cambridge: Cambridge University Press.

KRÖPELIN, S. 1987. Palaeoclimatic evidence for Early Mid-Holocene playas in the Gilf Kebir (Southwest Egypt). *Palaeoecology of Africa* 18: 189 - 208.

KUPER, R. 1981. Untersuchungen zur Besiedlungsgeschichte der östlichen Sahara. Vorbericht über die Expedition 1980. *Beiträge zur Allgemeinen und Vergleichenden Archäologie* 3: 215 - 275.

– 1988. Neuere Forschungen zur Besiedlungsgeschichte der Ost-Sahara. *Archäologisches Korrespondenzblatt* 18 (2): 127 - 142.

NEUMANN, K. 1987. Middle Holocene vegetation of the Gilf Kebir/SW-Egypt – a reconstruction. *Palaeoecology of Africa* 18: 179 - 188.

SCHUCK, W. 1988. Wadi Shaw – eine Siedlungskammer im Nord-Sudan. *Archäologisches Korrespondenzblatt* 18 (2): 143 - 154.

STEWARD, J.H. 1977. *Evolution and ecology. Essays of social transformation.* Urbana: University of Illinois Press.

VITA-FINZI, C. 1978. *Archaeological sites in their setting.* London: Thames and Hudson.

WENDORF, F., A.E. CLOSE and R. SCHILD. 1987. A survey of Egyptian radar channels: an example of applied archaeology. *Journal of Field Archaeology* 14: 43 - 63.

WENDORF, F., S. SCHILD and A.E. CLOSE (eds.). 1984. *Cattle-keepers of the Eastern Sahara. The Neolithic of Bir Kiseiba.* Dallas: Southern Methodist University.

WHITE, R. 1985. *Upper Palaeolithic land use in the Perigord. A topographic approach to subsistence and settlement.* Oxford: British Archaeological Reports, International Series 253.