



HEINRICH BARTH INSTITUTE

for African Archaeology
and Environmental History e.V.

Archaeology of the Gulf Kebir National Park

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Cologne, July 2007

Report on the

ARCHAEOLOGY OF THE GILF KEBIR NATIONAL PARK

by Rudolph Kuper

in co-operation with Karin Kindermann and Jan Kuper

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Summary

The declaration of the “Gulf Kebir National Park” by the Egyptian Prime Minister at January 4th 2007 marks the up to now most important step towards the safeguarding of the natural and cultural heritage of north-east African deserts. It realises the idea, that as to their protection, man and landscape in their close historical context have to be regarded as a unity. For the first time the interrelation between man and environment and its multiple manifestations in the cultural and natural heritage became the essentials for such an enterprise. At the same time the question is raised: “how effective protection can be implemented for an area of more than 43,000 km² that lies 500 km distant from the nearest inhabited place with no road or track connection in between, but only barren, waterless desert?”.

Under this respect the Nature Conservation Sector (NCS) at the Egyptian Environmental Affairs Agency (EEAA) supported by the Italian Government and the Heinrich Barth Institute, Cologne, carried out an expedition into the new park area from February 17th to March 4th 2007. It was a great advantage of this first comprehensive inspection that among the participating experts from different disciplines (geology, botany, zoology, biodiversity, environment, conservation and archaeology) also three pre-historians (Karin Kindermann, Jan Kuper, Rudolph Kuper) took part in this operation. Together they contributed to the present report.

First the report tries to outline the special situation of archaeology in Egypt, that is characterised by the dominance of impressive buildings and the lack of appreciation for the close interrelation between cultural and natural heritage. This essentially hampers the prospects for raising awareness for the protection of the unimposing relics from the prehistoric past in the Nile valley and underlines the even greater difficulties facing the efforts to protect archaeological sites in more remote desert areas.

The next chapter gives a short outline of the ca. 5,000 years of Holocene human occupation of the eastern Sahara, pointing out the importance of the greater Gulf Kebir area for the cultural development in the whole of north eastern Africa and beyond. Starting with the re-occupation of the former desert in the ninth millennium B.C. a savannah like environment gave the background for the development of pastoral societies that with the new spread of the desert in the fourth millennium B.C. and the consequent retreat into more favourable regions essentially contributed to the base of the Pharaonic civilisation in the Nile valley.

The sources for this scenario are to be found in different kinds of archaeological features that regardless their humble appearance yield essential information about man's history in a changing environment. The different types of sites are shortly described together with their information potential.

On this base the observations and conclusions during the expedition are described and the possible threats are discussed. Examples of vandalism and the destruction of archaeological sites illustrate the need for immediate protective action.

Finally a number of recommendations are made to meet the specific demands of such a remote desert park as well as that of the different tasks and the different people concerned. Of paramount importance for the management of the new park is the realisation of the concept of “mental fences”. For this a continuation of the “Training Courses for Desert Drivers and Guides”, that started in October 2006 in Bahariya oasis, is indispensable. Their programme, however, should be more detailed, better oriented towards practice and supported by information brochures etc. Another necessary step is to include the military escorts into this education schema. In addition several practical proposals are made for the protection on the spot as well as for techniques of remote control. In conclusion it is pointed out how an approach of all the different kinds of desert travellers is handicapped by their differing specific structure that only can be met by a flexible protective organisation combining awareness raising education, un-bureaucratic administration and effective supervision.

1. Introduction

In spite of the close interdependence between history and environment, in Egypt archaeology until recently was not an essential issue with the planning and establishing of protected areas. Archaeological remains are omnipresent throughout the Nile valley, mainly represented by impressive monuments like tombs and temples, but they are not normally expected to feature in the remote wilderness areas that are invariably selected for protection because of their unique natural features. This view, however, does not take into consideration the millions of archaeological surface sites – historic and prehistoric ones – that consist only of inconspicuous accumulations of potsherds, bones and stone implements or settlement sites marked by simple stone settings and decayed mud brick structures. Regardless their unimposing appearance such places contain essential information about human history and behaviour particularly for times and places where no written records exist. This especially holds true for desert areas where archaeological remains easily become part of the landscape. Due to wind erosion, that strongly affects pottery and bones (**Fig. 1**) and the deflation of organic sediments, human occupation sites often are hard to distinguish from their natural surroundings (**Fig. 2**). For the trained eye of the archaeologist, however, such places offer a trove of information, but at the same time they provide an easy prey for souvenir hunters collecting prehistoric artefacts. Certainly, the number of archaeological sites in the deserts seems to be inexhaustible, as once did the number of whales or the tropical

forest. But even today there are already regions, where not one Stone Age settlement has been left untouched. The one tool taken could be the crucial link in a chain of information decoding a message from the past. An historical document missing an unknown number of pages is virtually as worthless as the pages themselves when they are taken out of their context.

Surely it is not a simple task to bring this to the awareness of tourists and their guides who, mostly due to lack of information, just do not know the effect of their doing. Already in Europe it is hard to replace the treasure-hunter-image of the archaeologist with a model of a detective, who is searching for historical information. Even more so this is the case in Egypt, where “treasures” dominate the mystique of archaeology and where, among professional archaeologists and Egyptologists, an understanding of the scientific view and methods of prehistoric research is rarely to be found. So even more a general appreciation and understanding of the value of the invisible heritage is not to be expected among the wider public - including desert travellers. Nevertheless their attention has to be directed towards the endangering of the cultural heritage and an understanding has to be raised for the notion that the desert is an open book of history, unveiled by the wind, in which stones and sherds are the letters reporting on the past

By establishing the Gilf Kebir National Park the chance for a new approach to this issue is given, mainly thanks to the fact that the NCS and the EEAA joins a group of open minded scholars for whom interdisciplinary work is daily practice, and that - on the other hand - the University of Cologne can provide the experience and results of 27 years of interdisciplinary archaeological and environmental research in the area.

2. Prehistory of the Libyan Desert

The Gilf Kebir National Park comprises the core area of the Libyan Desert (**Fig. 3**). This vast region of the size of Western Europe makes up the by far largest part of the eastern Sahara. With its different types of landscapes – sand sheets and rocky plateaus, dune seas and vast hammadas - it provides unique opportunities for studies into the interrelation between man and environment. Since the area of 1.200 x 600 kilometres between Siwa and the Wadi Howar and the oases Dakhla and Kufra respectively is not influenced by any higher mountains and void of any human occupation, roads and other activities, it can serve as an ideal laboratory for the climatological studies, in particular the specific influences of the summer- and winter rain belt on human occupation. Outside the few, groundwater fed oases human life was solely dependent on rain and thus archaeological remains can directly serve as relevant indicators for climate change.

Due to its extreme aridity and the lack of routes and roads, the central eastern Sahara, the so called Libyan Desert, has been completely unexplored until the first part of the 20th century. **(Fig. 4).** The first who crossed a part of the area was the Egyptian diplomat Ahmed Hassanein Bey who in 1923 on his caravan journey from Kufra to Darfur reached Jebel Ouenat. There he met a group of Goran herdsmen, who at that time still found sufficient pasture in the valleys of the mountain. In his report (Hassanein Bey 1925) we find the first photographs of rock pictures that later made the area so famous.

The next to arrive there was the Egyptian explorer Prince Kemal el Din. On his expedition from Kharga to Ouenat in 1925, carried out by Citroen caterpillar vehicles, he was the first to see the eastern escarpment of the Gilf Kebir plateau and coined its name, meaning "The Big Cliff", however without visiting it. The beginning of the 1930's saw a rather rapid increase in the exploration of the Libyan Desert, facilitated by the introduction of Ford A model motorcars that had been especially adapted to the demands of the desert. Geologists like John Ball and the surveyor Patrick Clayton mapped large areas between the Mediterranean and the Sudanese border including Gilf Kebir and Jebel Ouenat. Young British officers spent their free time and private money in desert exploration. The most famous and successful among these was Ralph Bagnold, who in 1938 also carried out the first interdisciplinary expedition into the Gilf Ouenat region, focussing on archaeology. The Hungarian count Lazlo Almasy, recently made famous by the film "The English Patient", was especially on search for the mythical "lost oasis" of Zerzura and discovered among other rock art sites the so called "Cave of Swimmers" in Wadi Sura. In 1933 he guided the German scholars Leo Frobenius and Hans Rhotert, who in 1934/35 carried out an extensive scientific expedition into the Libyan Desert, that resulted in a comprehensive documentation of the rock art of Jebel Ouenat and Gilf Kebir (Rhotert 1952). During the war the area was the domain of the British "Long Range Desert Group", founded by Ralph Bagnold, and only once crossed by Almasy when he brought two German spies from Libya to the Nile. After 1945 the Egyptian Geological Survey mainly was present in the area and also carried out the interdisciplinary NASA-expedition of 1978 aiming at comparing the geological structures of the Gilf Kebir with those of Mars (Issawi 2006). Geo-scientific work was also started in the 1970's by the Free University of Berlin and complemented from 1980 onwards by the interdisciplinary archaeological expeditions of the University of Cologne, carried out within the projects B.O.S. and ACACIA and lasting till today.

3. Environment and human occupation

With regard to its geographical premises described above, from 1980 onwards the region was chosen for comprehensive studies into the interrelation between changing environmental conditions and human occupation during the Holocene (Kuper & Kröpelin 2006). For this period, starting at about 10.000 BC, the results of geomorphological, archaeobotanical, archaeozoological and prehistoric studies allow to develop a scenario of the environmental and cultural developments that support the idea that the desiccation of the Sahara with the consequent movements of people was – and in parts is to the present day – an engine of African history, including the rise of the ancient Egyptian civilisation. Moreover, beyond the common climatologic models based on Greenland ice cores and deep sea drillings, the data from the eastern Sahara provide a safe base for the reconstruction of past climate that is directly related to man. With regard to the fact that these results of world-wide significance are essentially based in the Gilf Kebir area, the following short summary of the history of man and climate during the Holocene, highlights the importance of the new status of the region for future research (**Fig. 5**).

Before 10.000 B.C.,

During the terminal phase of the ice ages, the Saharan desert extended about 400 km further south than today, covering more than one third of the African continent. Numerous prehistoric sites along the Nile contrast clearly with the complete lack of archaeological evidence from the desert. At c. 12,000 B.C., during the so called “Wild Nile” stage, living conditions along the river became harsh and caused conflicts for land and food as indicated, for example, by the late Paleolithic Nubian cemetery of Jebel Sahaba where many of the buried individuals died a violent death. The background to this is that increasing rainfall, at the headwaters of the Nile, were causing high floods destroying the livelihood of people while the rains themselves did not reach the desert.

Circa 8,500 B.C.,

With the arrival of monsoon rains, savannah-like environments turned the Eastern Sahara into a habitable region swiftly used by prehistoric settlers. Groups from the south, already adapted to savannah ecology, extended their traditional way of life following the northward shifting rains while Nile dwellers may have left the inhospitable valley. Their epipaleolithic tool kit as well as archaeozoological evidence define them as hunter-gatherers, possibly already practicing some animal husbandry. While this pastro-foraging economy needs further confirmation, the associated “wavy line” decorated pottery – the very first African ceramics – is a key achievement of the 9th millennium B.C. and also present in the Gilf Kebir. Epipaleolithic camp sites in the Regenfeld area dated to 8,000 – 7,000 B.C. demonstrate a

rather rapid northward migration of populations over several hundreds of kilometers into the central Great Sand Sea where they encountered satisfactory living conditions in what is today the Libyan Desert's most barren part.

After 7,000 B.C.

Human settlement became well established throughout the Eastern Sahara by way of economical and technological adaptations to regionally different ecological requirements. On the Egyptian Abu Muhariq Plateau, bifacial technology obviously rooted in the Levant caused a complete change in the lithic tool kit that later can be traced into the pre-dynastic cultures of the Nile valley. Impression-decorated pottery of Sudan tradition, on the other hand, is represented as far north as the Egyptian oases and the Great Sand Sea. The most important achievement of this phase is the introduction of domestic livestock. Sheep and goat, for which an early record also exists in Egypt's Eastern Desert, must have been introduced from their wild progenitors in western Asia while cattle appear to have been domesticated locally. Livestock keeping, well documented e.g. at Nabta Playa, became an essential component of a multi-resource pastoral economy that marks the beginning of African pastoral societies.

According to the deficiency of occupation sites, regular monsoonal rains have ceased to reach the Egyptian Sahara not later than 5,300 B.C.E. At Djara and on the Abu Muhariq Plateau there is a significant decline in radiocarbon dates. Another abrupt end of occupation is observed in the central Great Sand Sea while the few younger dates from Abu Minqar may be linked to local springs and transhumance from the oases depression. A comparable pattern of semi-nomadic occupation underlies the evidence for cattle in the Eastpans region, when living conditions in the more distant parts of the Abu Ballas region had already deteriorated. With the end of the Formation phase at 5,300 B.C.E., multi-resource pastoralism appears to have become the vital human subsistence strategy in the Egyptian Sahara while at the same time first farming communities developed in the Fayum.

After 5,300 B.C.

The retreat from desiccating regions into ecological niches such as the Gilf Kebir and the beginning exodus to the Sudanese plains where rainfall and surface water were still sufficient, fostered more regionally differing socio-cultural adaptations. The few dates from the western fringes of the Great Sand Sea, from the Abu Ballas area and the Abu Muhariq Plateau reflect only sporadic occupation, while the eastern Abu Minqar and Abu Ballas areas lie within the range of transhumance from the Farafra and Dakhla oases. Certain ceramic traditions that originated in the Gilf Kebir later occur in the Laqiya region of Northern Sudan, where progressive southward movement is reflected, e.g., by the distribution of distinct grinding implements. The previously ubiquitous "wavy line" pottery is replaced by more local

pottery styles. Of particular significance is the rise of specialized cattle pastoralism, which was later to become a basic way of life throughout sub-Saharan Africa. Cereal farming does not seem to have been a constituent of this Saharan “Neolithic revolution”, since the mid-Holocene savannah still provided sufficient wild-growing grains, fruits and tubers.

Paradoxically, in certain landscapes the decreasing trend in annual precipitation may have been associated with an increase in the vegetation cover because of a change in seasonality. Geo-archaeological evidence from the Gilf Kebir suggests that the intense summer monsoon rains during of the early Holocene pluvial have resulted in less grass growth than the quantitatively lesser winter rains of the terminal humid phase. These favorable circumstances may have maintained the rich culture of cattle keepers depicted in the rock art of the Jebel Ouenat and Gilf Kebir.

The large-scale exodus from the Egyptian Sahara coincides with the rise of sedentary life along the Nile. The first Neolithic communities in Fayum and Merimde, starting around 5,000 B.C. with already fully developed cultivation of wheat and barley, are clearly rooted in Near East traditions. At the same time, essential social and cognitive aspects can be traced back to Saharan cattle herders and their spiritual heritage. Neolithic settlements of the Badari culture in the Nile valley recall African livestock enclosures and suggest a rather mobile existence. The practice of cattle burials is a presumably religious custom that has been recorded in the Egyptian Sahara from the fifth millennium B.C.. Saharan traditions of cattle pastoralism have thus become an essential component of Neolithic life in the Nile valley.

After 3,500 B.C.

Rains had virtually ceased, even in ecological niches such as the Gilf Kebir, and permanent occupation was restricted to southern areas such as Laqiya and Wadi Howar in Northern Sudan. For the Pharaonic empire, well established after 3,000 B.C., the Western Desert obviously played a marginal role. Generally considered a “country of evil and death”, it was thought to separate the Egyptian Nile valley from the Sudanese Sahara, where cattle herders still practiced their Neolithic lifestyle. Sporadic finds of Egyptian pottery near Laqiya support rare historical reports about desert journeys during the 6th Dynasty, that were considered as daring advances into the unknown.

Recent discoveries, however, throw new light on Pharaonic activities in the Egyptian Sahara. Besides an elaborate desert station of King Khufu, the builder of the great pyramid, the 30 outposts between Dakhla and the Gilf Kebir indicate the first trans-Saharan trail into the interior continent. At first related to Ain Azil, Ancient Egypt’s westernmost town in Dakhla, and then throughout dynastic times, these desert stations indicate watch-posts concerned with prospecting or trading, or the prevention of smuggling, of African goods to the Nile valley. Since the camel was introduced to Africa only during the first millennium B.C.E., any

long-distance travel through waterless desert had to rely on donkeys. Their water needs required extraordinary logistical skills and geographical knowledge — an example of how early societies have coped with the challenges of hyper-arid environments.

Archaeological sources

The overview given above constitutes a consistent model of how past climate changes, over a coherent region of sub-continental scale, have affected human societies throughout the last 12,000 years. Its complex climatological and historical implications are based on observations and laboratory results from numerous archaeological sites in the eastern Sahara that regardless their humble appearance yield essential information about man's history in a changing environment. For a better understanding of the significance of these sources in the following main characteristic types of archaeological occurrences are listed together with their possible information potential.

Types of Sites

- a) Single finds (e.g. grinding stones, hand axes, pottery)
indicate the distribution of various types of artefacts and thus the range of influence of specific cultural elements.
- b) Small surface scatters of artefacts
may represent workshops for flaking stone tools and provide information about the state of technology; the origin of raw materials also reveals long distance contacts.
- c) Large surface scatters of stone artefacts, potsherds, bones etc.
mark extended settlement areas including specific patterns of activity such as living areas, workshops for different purposes (cooking, flaking etc.), hearths and stone structures. Their context provides insight into social structures, the chronological sequence of settlement phases and the state of technology and economy.
- d) Artefacts embedded in playa sediments (former temporary lakes)
associated with bones and plant remains allow the correlation between climatic sequences and human occupation
- e) Concentrations of hand-sized stones of 1–3 m diam. ("Steinplätze") *usually represent hearths as indicated by burnt pebbles, charcoal and other plant remains. These can*

- allow the reconstruction of the environment at a certain time fixed by radiocarbon dating.*
- f) Stone circles of 2-3m diameter, sometimes arranged in groups,
mostly represent the sub-structures of huts, the upper part of which was built of organic material long gone.
 - g) Stone cairns of different shape and size
may represent e.g., road marks (“alamat”) or superstructures of graves.
 - h) Trails and tracks
may indicate caravan roads and other past lines of traffic or the presence of animals that are to be identified by hoof imprints.
 - i) Rock shelters
served as dwelling places and may frequently contain remains of subsequent human occupation phases in stratigraphic position and therefore are the most essential sources of relative chronology.
 - j) Rock paintings and engravings
provide immediate and vivid illustrations of the daily life of past communities, their social behaviour and ideological conceptions.
 - k) Modern remains of early exploration or political events like WW II
may be the essential proofs and historical sources about activities and events that took place in remote desert areas but are not recorded otherwise.

Observations during the NCS / EEAA Expedition.

With its different types of landscapes – rocky plateaus, vast gravel plains, dune seas and granite outcrops - the Gilf Kebir National Park provides a multifaceted background to human occupation. Most important for its essential role in the history of settlement of the eastern Sahara, however, is the position of Jebel Ouenat and the Gilf Kebir Plateau as islands in the surrounding plains, where during periods of increasing aridity favourable living conditions lasted longer than in the flat lands around. This history is well reflected in the various archaeological sites observed during the EEAA expedition that well represent the spectrum of archaeological occurrences listed above.

Surface sites

Most of the sites encountered during the expedition belong to the types a) to c) described above. As small surface scatters easily escape the eye while driving sometimes larger artefact scatters were recognised too late and the cars stopped only in the midst of a site (**Fig. 6**). If this can happen under the conditions of an expedition led by experienced desert guides and archaeologists, how the more often will such incidents occur during the usual type of desert trips? To avoid such incidents seems hardly possible. The danger, however, can be limited by defining routes and tracks, that have to be followed by all desert tour operators.

Worse than the fact that a vehicle accidentally impacts a prehistoric site, are visitors' activities. Notwithstanding that the collection and removal of artefacts are criminal acts punishable by the Egyptian Antiquities law up to 25 years in jail or a fine up to LE 250,000, and the frivolous rearrangement of artefacts as observed at Abu Ballas (**Fig. 7**) and Wadi Gubba (**Fig. 8**), any displacement of an artefact can destroy its context and ruin the scientific value of the site. The attendant tour personal and military escorts must be enabled and obliged to prevent such activities. The same situation applies for playa sites as in Wadi Bakht (**Fig. 9**). In addition to the above mentioned threats careless walking on the hard playa surface might destroy embedded bones or pottery.

Stone structures

Only a few stone structures have been visited during the tour. Accumulations of stones in constructions like cairns or circles and hearths, site types e) to g), are rarely in danger to be hit by cars, except perhaps the "Steinplätze" (type e) that often are strongly affected by erosion and thus hard to recognise. With regard to cairns, however, one has to counter the eagerness of amateur archaeologists who for instance hope to discover graves. Such illicit actions have to be stopped and in case of lack of understanding the responsible tour leader has to make a report from the authorities.

Tracks

Camel routes, marked in the desert surface by sometimes hundreds of parallel lines grooved into the gravel, represent historic long distance roads like the "Darb el Arbain" that led from Assiut to El Fasher in Sudan. They are mainly threatened by modern road building that has already destroyed large parts of this evidence of Egypt's important connections into the continent. Extremely sensitive to vehicle traffic are the up to 5,000 years old donkey trails that are to be found between Dakhla and the Gilf Kebir (**Fig.10**) along the Abu Balas trail. These trails should be given wide berth by vehicles to avoid damage. A rare example of

fossilised hoof imprints of a large bovid has been observed on the playa surface at “Willmann’s Camp” (**Fig.11**). Also at this site special arrangements have to be made with regard to the protection of the prehistoric settlement.

Rock shelters

At Abu Ballas the small cave, that some years ago had been subject of archaeological investigations by the University of Cologne but not yet had been completely excavated, now has completely been emptied by illegal digging (**Fig.12**). Also in the cave of Wadi Sura II the sand covering the floor has been removed in front of the back wall, obviously in order to uncover more paintings (**Fig.13**). It was not possible during the expedition to assess to what extent the archaeological remains may have been affected.

Rock art

At Abu Ballas, in addition to the previously known tourist engravings besides the Pharaonic hunting scene, new graffiti has now been inscribed (**Fig.14**). The “Cave of Swimmers” at Wadi Sura I has long served as a memorial panel for tourists (**Fig.15**). Apparently some of them later returned to the place and erased their names. This might indicate a change of opinion of some of these people, but underlines the necessity of encouraging tour leaders not to tolerate such activities. The evident fragile state of preservation of the rock surface in Wadi Sura I apparently showed relatively little change for the worse in comparison to the state documented by the Frobenius Expedition in 1933. But this observation does not cut down on the general prescription not to touch or moisten the rock art to improve contrast for photography.

Modern remains

Besides the omnipresent four gallon tins left by pre-war expeditions and during WW II, camp remains also allow researchers to pinpoint early expedition activities and to authenticate respective reports; occasionally the remains may allow scientists to calculate the velocity of dune movement. Some wrecked cars from WW II times provide evidence and vivid illustrations of military activities far behind the lines in the North (**Fig.16**). Also more recent events not previously recorded can be revealed e.g. by the remains of a large camp discovered by the expedition in Jebel Ouenat. It probably can be ascribed to the Tubu people, who apparently had to abandon the site in haste leaving their property behind (**Fig.17, 18**). The historical background of such an event, dated by some remains as sometime in the late 1970s, might be enlightened by observations such as these.

Action needed

The arrangements proposed in the following focus on the protection of the archaeological heritage but in many cases might equally apply to the conservation of geological features and other natural resources in the GKNP.

1. As already stated elsewhere any efficient protection is related to the implementation of the concept of “mental fences” that again is depending on the preparedness of:

- the tour personal, including the military escorts, to take responsibility and to perform control,
- the institutions concerned to provide the necessary information and instruction courses,
- the tourists to accept a certain code of behaviour.

The instructions concerning archaeology cannot be limited only to single lectures that may impart a general understanding of the role and the different manifestations of archaeology in the desert, but should follow an special curriculum and also comprise

- practical training and field courses
- an illustrated field guide or hand booklet.

Both will strengthen the position of tour leaders towards their clients and raise their reputation and thus also retroact relating to business.

2. Tourist tours should be limited as far as possible to fixed routes. This, however, shall not prevent from free driving where the conditions of the terrain make it necessary or may allow it without objections as e.g. in parts of the Great Sand Sea. Since most of the tour operators have their distinct own routes they should deliver a proposal with the intended track to the GKNP office for checking. Perhaps it should be considered that during the initial phase of the new desert regulations all tours should be accompanied by an expert (environmentalist, geologist, archaeologist), who can help to check the routes and to implement the rules. Excursions off the track should only be made on foot and might adequately satisfy the tourist's claims for discovering. But there should exist the possibility to carry out special tours with particular targets that, however, would require exceptional authorisation.

3. All desert travellers strictly have to adhere to the prohibition to remove, collect or alter any kind of artefact or archaeological structure. Certainly tourists interested in prehistory would like to inspect and perhaps photograph artefacts at close range. This should not be generally forbidden but conceded only provided that the piece remains in its position on the spot. Concerning rock art sites it has to be emphasised, that cars have to stop at a suitable distance of at least 50 m from the site and that in order to prevent fading of colour and rock

exfoliation the engravings and paintings never should be touched or moistened for better visibility.

4. At specific sites, so for example at Wadi Bakht, access has to be restricted (**see Appendix 1**). Blocked routes, camping areas etc. can be marked by rows of stones and explained by information panels. These at some selected sites also should provide information about the specific place and the suitable behaviour. At the same time this might serve the purpose to make aware, that even the remotest part of the desert is not a no man's land. As a place of basic information about the desert, its natural and cultural heritage, its vulnerability and its need for protection a museum and information centre is planned at Dakhla oasis. It shall serve the local population as well as foreign tourists and also house the administrative base of the GKNP.

5. Albeit the willingness of all concerned parties and the concept of "mental fences" effective protection needs control. This also seems necessary in order to support tour guides who have to cope with stubborn and recalcitrant tourists. Effective monitoring of tours can be performed by modern electronic devices of automatic satellite tracking of vehicles and satellite phones that allows authorities to monitor and if necessary contact a group at any time and place. The respective equipment should be obligatory to all desert tours – also with regard to the safety of the participants. In addition, however, a team of rangers is required, most suitable based at Dakhla. They should be organised in two groups with two cars each comprising two experts (geologist, environmentalist, archaeologist etc.), an official (military or police) and a mechanic. Certainly they cannot carry out permanent control, but only the awareness that such a patrol might show up unexpectedly will help to foster self-discipline among the tours.

6. The discussed measures have to take into account that the different groups travelling in the Sahara have a quite different background regarding their organisation, their structure and their motivation. There is, however, a growing awareness, that the desert if once having lost its pristine nature by rubbish and looting will not any more be attractive to tourists. As to the "mental fences" the groups as characterised below, require a different approach.

a) Greater tour companies, mostly based in Cairo, that in general are well equipped and organised.

The heads of these companies generally are ready to co-operate and to support the training of their personnel. Control is possible by the obligatory military permit.

b) Small companies or individual operators, some based in Cairo, but mainly in Bahariya and Farafra.

With their generally closer relation to the desert these are to a large extent open for co-operation, but limited in their financial facilities. They normally act under the obligatory security regulations.

- c) Individual tour operators in Bahariya and Farafra.
They are estimated to several hundreds, with modest logistic and financial facilities and difficult to contact. Many of them, with regard to the costs, risk carrying out their tours without permits. To represent their interests against the larger companies and the governmental institutions and to make them at the same time seizable they should be encouraged in joining together in an NGO.
- d) Expatriates with residence in Egypt,
People working in embassies, international companies or schools often own four-wheel drive vehicles and undertake desert tours, mostly without permits. To approach them needs a special information programme using informal contacts as well as the communication facilities of the diplomatic institutions, the companies and the internet.
- e) Individual tourists entering Egypt by car from outside.
Their number is relatively small but they are hard to contact and among this group the most active looters of archaeological sites can be found. Besides spreading appeals among the desert circles of their home countries, respective information and warnings at border posts, in museums, in hotels and possibly also at certain points inside the desert should try to reach them.
- f) Groups entering Egypt illegally from Libya.
They mainly come for illicit hunting or collecting silica glass for commercial purposes.. They can only be stopped by co-operation with the Libyan border forces.

Conclusion

The general situation of prehistoric archaeology in Egypt, the special requirements of the desert and the spectrum of measures necessary to implement the protection of the Gilf Kebir National Park calls for the establishment of a flexible body of personnel. Since local archaeologists with the necessary scientific training and a passionate interest in the desert presently are rare in Egypt it is suggested that the authorities responsible for the implementation of the GKNP should try to establish a network of dedicated people, who are ready to act as advisors, to prepare training programmes and to teach courses, to accompany tours and to serve as rangers. These tasks should be carried out jointly with young Egyptians of the disciplines concerned, who after a period of introduction might take over completely. This model might perhaps work also as a pilot project for other parks in Egypt.

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APPENDIX 1

Prominent sites in the GKNP. *Proposals to their management.*

Wadi Bakht

Even after two decades of extensive field research in the region, the main geological section in Wadi Bakht may still be considered the most important key stratigraphy for documenting the climatic evolution of the central Eastern Sahara during the past 12,000 years. This situation arises as a consequence of the nearly constant trade winds, blowing roughly north-south and carrying sand from the Great Sand Sea in the north across the plateau of the Gilf Kebir. This has resulted in the accumulation of dune barriers that have partly or completely blocked the upper courses of the west-east trending valleys (**Fig. 19**). This specific set of geomorphologic factors has permitted the deposition of more than 8 metres of fine-grained still-water sediments (so-called “playa” deposits) in particular during the humid periods of the early and middle Holocene. The temporary water pools fed by local rainfall and runoff, attracted human occupation (**Fig. 20, 21**) especially during that crucial phase after 5,000 BC when the Sahara started drying up again and man had to retreat to favoured localities such as the Gilf Kebir (Linstädter 2005).

The gorge Wadi Bakht was first seen from the air by R. Clayton East and H. Penderel in 1932, but research started only in 1938 with the “Sir Robert Mond Expedition” led by Ralph Bagnold. After the war Wadi Bakht was visited shortly in 1975 by Fred Wendorf’s “Combined Prehistoric Expedition, while during the NASA-expedition of 1978 W.P. McHugh carried out some excavations there. Finally extensive archaeological and geological fieldwork took place in 1980, 1982, 1983, 1999 and 2000 within the frame of the Cologne-based projects B.O.S. and ACACIA.

*Although the sensitive state of the geological and archaeological evidence at this unique site - including 8,000 years old root casts - would normally command the complete closure of the area, its value as a demonstrative and vivid representation of the interrelation between environmental and human history, deems that it should remain accessible under certain precautions (**Fig. 22**). These have to imply that a parking area (a) has to be fixed where all vehicles have to stop. From there a foot path (b) has to be marked leading through the playa gorge onto the playa surface (**Fig. 23**). Along this a location should be defined from where the dense artefact material that is scattered on the dune can be viewed (c). A bypass should guide those, who want to climb the plateau, to the most suitable ascent (d). However any intrusion beyond the marked area must be completely forbidden.*

Wadi el Akhdar

Closely neighboured to Wadi Bakht, but accessible only by a detour through Wadi Wassa, the upper end of Wadi el Akhdar shows a similar geomorphological situation as Wadi Bakht. Here an amphitheatre shaped basin of 2 to 1,5 km provides a vivid and romantic impression of a large prehistoric occupation area (**Fig. 24**). It has been filled with playa deposits due to a blocking dune alike Wadi Bakht, that during the early Holocene had closed the narrow entrance. On the surface of the playa many prehistoric remains can be found. In the 1980s they were subject to extensive archaeological investigations by the B.O.S. Project of the University of Cologne.

*At present Wadi el Akhdar is not regularly visited by tourist groups. There should, however, arrangements be made to prevent cars from passing through the narrow thoroughfare besides the dune (**Fig. 25**). Camp has to be made before the dune and the basin should only be entered on foot.*

Magharet el Kantara

Situated about 40 km south of Wadi Bakht at the northern side of Wadi Firaq this site represents a rare example of cattle paintings in the eastern Gilf Kebir that otherwise are abundant in Jebel Ouenat. It was discovered in 1935 by W.B.K. Shaw and consequently also has been named "Shaw's Cave" (**Fig. 26**). It gives a vivid illustration to the life of the Neolithic cattle herders (**Fig. 27**) who after the seasonal rains used the pasture in the wide plains of the Selima Sand Sheet and then returned into the valleys of the Gilf where places like Wadi Bakht and Wadi el Akhdar provided the necessary living condition to overcome the next dry period.

Because the place is frequently visited by tourists it should be furnished with an information panel reminding the visitors of the appropriate behaviour.

Jebel Ouenat – Proposed World Heritage Site

In its South the GKNP includes the northern part of Jebel Ouenat. Being shared between Egypt, Sudan and Libya, but clearly defined by its unique geological features, this high mountain area of 25 x 50 km – as an "Inselberg" – constitutes the most prominent landmark within the vast, waterless plains of the Libyan Desert (**Fig.28**). It includes the highest point in the Eastern Sahara and thus provided favourable ecological conditions during past phases of climatic history up to present day's hyper aridity, attested by the continuous presence of a rich fauna and flora almost extinct elsewhere. The permanent availability of water attracted

human occupation since prehistoric times, particularly in that important phase, between 9,000 and 4,000 BC, when favourable climatic conditions in the Sahara enabled the development of the first African pastoralist societies. This ancient occupation is reflected by rich archaeological evidence, especially by a wealth of rock paintings and engravings, that – together with the undisputable scenic beauty of the mountain – serve as a great attraction for tourists. For this reason and with regard to its threat by traffic and military presence especially on the Libyan side UNESCO in co-operation with the Heinrich Barth Institute proposed to nominate Jebel Ouenat for its inclusion as a “Transboundary Cultural Landscape” of Egypt, Libya and Sudan into the World Heritage List (**Fig. 29**). An UNESCO workshop held in Libya in 2004 resulted in the recommendation that, as a first step, the three countries concerned should declare their share of the mountain a protected area, a condition, that Egypt now has fulfilled.

Situated on the Sudanese side of northern Jebel Ouenat, but best to reach from Egypt, Karkur Talh offers one of the richest and most impressive concentrations of prehistoric rock art in the entire Sahara. Already in 1923 during his camel expedition from Kufra to Darfur Ahmed Hassanein Bey took there photographs of engravings, and in the 1930s many expeditions contributed to the knowledge about this unique treasure trove. Extensive documentation work has been carried out by the Frobenius-Expedition of 1935 under Hans Rhotert and after WW II by Francis Van Noten during the interdisciplinary Belgian Uweinat expedition of 1968/69. Today the Hungarian amateur explorer Andras Zboray tries to establish a comprehensive digital data bank of the rock art in Jebel Ouenat (www.fjexpeditions.com). In his documentation also the rarely known examples of very fine rock paintings on the Egyptian side of northern Ouenat can be found (Winkler 1938, site 72) that have been visited by the NCS / EEAA expedition (**Fig. 30, 31**). In contrary to the granite boulders in the western (Libyan) part of Jebel Ouenat that allow only paintings, here the sandstone rocks provided surfaces suitable for engravings as well as for paintings. As to the dating of the rock art little is to say since archaeological excavations have not yet been carried out there. Using general criteria, the scenes of pastoral life must have been generated after 6,000 BC, the generally accepted time for the appearance of domesticated cattle in the area. On the other hand the engravings showing camels and iron weapons cannot be older than the beginning of our era after the camel had been introduced to Northeast Africa. Modern remains dating to the 1970s indicate that the area up to the present obviously provided suitable living conditions for temporary occupation.

The extraordinary role of Jebel Ouenat as a proposed World Heritage Site and the already at present quite frequent visits to Karkur Talh require special measures also for the protection of the Egyptian side from where most of the tourists enter the Sudanese part. As a

first and most important step a comprehensive survey of the Egyptian range is necessary with regard to the nomination file as well as to the development of suitable measures of management before tourism increases.

Wadi Sura

As backstage to the Hollywood drama “The English Patient” the “Cave of Swimmers” in Wadi Sura and their discoverer, Lazlo Almasy, became world famous (**Fig. 32**). Indeed, the first rock pictures discovered in the western Gifl were some engravings of giraffes that Patrick Clayton had found already in 1931 in Wadi Sura, while Almasy discovered there in 1933 the painted cave with the mysterious “swimmers” and showed it to the Frobenius expedition. Rhotert already mentions the fragile state of preservation and the deterioration seems to have proceeded since then (**Fig. 33**). Also the habit to leave one's name at such locations, obviously starting with British soldiers during the war, continues with today's tourists, some of which however have erased their graffiti during a later visit. A few years ago during a trip led by Ahmed Mistikaoui, about 10 km west of the “Cave of Swimmers” the Italian tourist Foggini discovered a second cave that is extremely rich in paintings showing several features not seen before. Besides hundreds of hand prints, about 20 strange, unidentifiable animals and crowds of dancing people, there appear also persons in the attitude of swimming. Most noteworthy not one domestic animal is to be found among the hundreds of figures, what underlines the extraordinary special character of this site.

*The painted wall of Wadi Sura II, that by the liveliness and density of its drawings is without compare all over the Sahara, apparently continues under the sand that fills the floor of the cave. Since there are good reasons for the supposition that it has protected the prehistoric occupation level below, it is absolutely necessary that any attempt to uncover more paintings has to be prevented (**Fig. 13**). As heaps of grinding stones piled by visitors in front of the cave vividly demonstrate, collectors have yet been active in the surroundings and obviously already have left not one prehistoric site untouched. In addition here as well as at Wadi Sura I, cars should not be allowed to drive close to the caves.*

Wadi Hamra and Wadi Abd el Melik

One main motivation of most of the early explorers of the Libyan Desert was to find the mythical “lost oasis” of Zerzura, that was subject of many Arab tales. After Almasy in 1932 had spied from the aeroplane some wadis in the Abu Ras Plateau showing green trees, and after having visited the largest one in 1933, he believed to have discovered Zerzura. He was even more sure of this after he had met an old sheikh of the Zueia of Kufra oasis, named Abd el Melik, who told him that after good rains he still used to pasture his camels, and

occasionally also some cows, in this valley, that consequently was named after him. The facts behind this story are that Wadi Abd el Melik and neighbouring valleys like Wadi Hamra receive considerable run-off from the plateau and provide groundwater storage capacity for a remarkable lush growth of trees and shrubs at certain places. The occurrence of some Sahelian plant species together with a localised relatively dense stock of *Acacia trees* (**Fig. 34**) resembles a typical Saharan Acacia-Panicum savannah, similar to the environment that once supported prehistoric life there. As with the botany, no systematic archaeological studies have been carried out in the area, with the exception of the recording of the rock engravings in Wadi Hamra by the Frobenius expedition of 1935.

Since frequent tracks of Barbary sheep proof them as habitat for this rare species at least the upper parts of the valleys should be closed for car traffic, at the same time serving the protection of the archaeological sites (Fig. 35). Since the wadis in general are accessed by car crossing the Abus Ras Plateau this will not affect their attraction for tourists. While camp can be arranged on the plateau the bottom of the wadis is easily to be reached by foot and offers wide possibilities for walking tours.

Silica Glass Area

After its discovery by P.A. Clayton on his first expedition across the Great Sand Sea in 1932 the Libyan Desert Silica Glass became another “Mystery of the Libyan Desert”, even more after the inspection by the mineralogist Spencer in 1934. Distributed within an area of not more than 80 km, this natural glass has no equivalent in any other comparable material on earth. For this reason it is looted to a large extent and today even sold in the internet for 5 \$ per gram. After 70 years of research, its origin by an extraterrestrial impact, 28,5 million years ago (probably a meteorite, that came too close to earth) receives more general acceptance, but there are still other ideas and a large number of remaining questions. To prehistoric man this rare material obviously has been nothing but just one among other raw materials that he could use for his tools (**Fig. 36**). So there were many flaking sites to be found, to a large extent spoilt in the meantime. The occupation site of “Willmann’s Camp”, stretching over more than 400 metres along the foot of a dune, revealed among millions of quartzite artefacts many microlithic tools made from desert glass. The radiocarbon dates range between 8,000 and 5,000 BC and thus show, that the place contains remains from many subsequent occupation phases all projected onto each other by wind erosion. In spite of this, detailed excavation technique and analysis gave surprising insights into its internal structure. However, already shortly after the first test excavations the eagerness of collecting tourist has destroyed the distribution pattern of the remaining part of the settlement. Since then no other comparable site has been discovered in the region.

*As an example of an unique prehistoric settlement area and its destruction (**Fig. 37**) the site of “Willmann’s Camp” should be marked and the restricted access should be explained by an information panel. This might serve as an on the spot explanation how invisible structures of surface scatters can be made visible and provide an insight into the daily life of prehistoric people. The commercial looting of Libyan Desert Glass demands effective control and can only be stopped by the rigorous enforcement of stern legal penalties.*

APPENDIX 2

Proposal for a code of behaviour for desert tourists.

General

Please realise that the desert is a very fragile and sensitive ecosystem. Enjoy your time in this unique landscape and leave it as you found it for others who come after you and may also have an enriching experience.

Driving and vehicles

Stay on the existing tracks. Driving off track damages the desert crust, destroys vegetation and increases the chance of accidentally damaging archaeological sites. If you get aware that you have hit such a site please warn the following cars.

Camp organisation and Management

Separate your garbage into organic and non-organic waste. Organic food remains should be buried; all other litter must be carried out. When choosing the camp site an appropriate toilet area has to be clearly defined and the suitable behaviour (burying and burning of toilet paper etc.) has to be observed.

Biodiversity

Avoid trampling desert plants – living plants waiting for rain may appear dead and they are very vulnerable at this time. Do not use dead plants for firewood and do never disturb, collect or hunt animals.

Archaeology

Please don't collect or move any artefacts – by doing so you destroy contextual information in the prehistoric distribution pattern of the site. Each artefact that has been lifted (perhaps for photographing) has to be replaced exactly to its spot. Do not touch or wet rock art as this causes damage. Never leave your own graffiti at archaeological sites.

Regulations

Visitors should be aware that the GKNP is established under Law 102 that forbids actions leading to the destruction or deterioration of the natural environment. Offenders are liable to prosecution under this law. Antiquities Law 117 of 1983 makes clear that collecting and stealing of artefacts will carry a sentence of up to 25 years in jail and a fine from 50,000 to 250,000 LE.