ARCHEOLOGIE DU NIL MOYEN

Volume 2 - 1987

Editeur Francis GEUS

TABLE DES MATIERES CONTENTS

THE FAUNAL REMAINS COLLECTED BY THE BAGNOLD-MOND EXPEDITION IN THE GILF KEBIR AND JEBEL UWEINAT IN 1938

Joris PETERS[1]

1. Introduction

This succint report on the bone remains collected by the Bagnold-Mond expedition in southwestern Egypt (Gilf Kebir and Jebel Uweinat) is based on research carried out during our Ph.D. program focusing on archaeozoology of late Quaternary sites of central and eastern Sudan (Marks *et al.* 1985, 1987; Peters 1986a, 1986b)[2].

Until the middle of the 1920's, the Gilf Kebir and Jebel Uweinat were unknown to the scientific world. After the initial discovery of Jebel Uweinat in 1923 by Hassanein Bey (1924a, 1924b) and the pioneer explorations of the north-western Sudan by Newbold (1924), the area became the destination of a number of explorers and scientists (cf. McHugh 1982a). The first wave of visits, ending with World War II, is reflected in an impressive series of publications among which we cite : Kemal el Din 1928; Newbold 1928; Newbold & Shaw 1928; Shaw 1929, 1931, 1934, 1936a, 1936b; Bagnold 1931, 1933; Bagnold *et al.* 1931; Clayton 1933; di Caporiacco 1933; Rodd 1933; Sandford 1933a, 1933b, 1935a, 1935b, 1936; Penderel 1934; Almasy 1936. The last prewar scientific expedition to the Gilf Kebir-Jebel Uweinat region was led by Bagnold in winter and spring of 1938. It actually was a combined expedition, with R.A. Bagnold and R.F. Peel responsible for geological research while O.H. Myers and H.A. Winkler were responsible for the investigations of the archaeological sites and the rock art. The financial support for Myers' and Winkler's participation was provided by Sir Robert Mond. A number of publications resulted from this combined expedition; most of these are cited later in this paper.

After World War II, scientific research started again from the 1960's on, with expeditions by British, Egyptian, Belgian, American, Libyan and German groups : Williams & Hall 1965; Leonard 1969; Osborn & Krombein 1969; Wendorf *et al.* 1976, 1977; El-Baz *et al.* 1980; Kuper 1981; Pachur & Röper 1984 etc.

---

[1]Laboratorium voor Paleontologie, Geologisch Instituut, Rijksuniversiteit Gent, Krijgslaan 281/S8, B-9000 Gent.

[2]A comprehensive report on the fauna from Jebel Shaqadud will be published in the forthcoming publication of the excavations (A. Marks ed.).

The Gilf Kebir is a massive sandstone mesa rising 200-300 m above the surrounding rather flat desert in southwestern Egypt, about 600 km west of the Nile (fig. 1). It is intersected by numerous wadis, the largest being the Wadi (Ard) el Akhdar and the Wadi el Bakht. Apart from the well, reputed to exist in the Wadi el Malik, the whole region is absolutely waterless (Peel 1939) and rain falls only at irregular intervals. Jebel Uweinat is a smaller tabular mountain mass, which lies over 70 kilometres to the southwest of the Gilf Kebir plateau. Its height ranges from 600 to over 1900 meters, which makes it high enough to attract a little extra local rainfall and to maintain a poor vegetation (Bagnold 1941; Leonard 1969).

The present day fauna of the Gilf Kebir-Jebel Uweinat area is not well known, but it would include two gerbil species (*Gerbillus gerbillus, Dipodillus campestris*), a jerboa (*Jaculus jaculus*), a spiny mouse (*Acomys cahirinus*), Rüppell's sand fox (*Vulpes rueppeli*), fennec (*Fennecus zerda*), (Lybian) striped weasel (*Poecilictis libyca*), dorcas gazelle (*Gazella dorcas*), rhim (*Gazella leptoceros*), Barbary sheep (*Ammotragus lervia*), a few sedentary birds among which a kind of desert finch (*Rhodopectrys githaginea*) and a wheatear species (*Oenanthe leucopyga*), some lizards, a snake and a number of insects (Osborn & Krombein 1969; Misonne 1969, 1974, 1977; Capocaccia 1977). During the winter, a considerable number of birds visit the area, such as cranes (*Grus grus*), the longlegged buzzard (*Buteo rufinus*) and the Egyptian vulture (*Neophron percnopterus*) (Misonne 1974).

2. Description of the faunal remains

The following inventory and description is based on bone material collected by O.H. Myers in 1938 at five sites and stored in the Osteology Room of the British Museum (Nat. Hist.), London. The sites are labelled 15.000 and 17.000 in the Gilf Kebir, and Cave 73, Cave 73 (front of) and Cave 77 at Jebel Uweinat.

Neither the publications by Myers (1939) or Peel & Bagnold (1939), nor the preliminary faunal report written by D.M.A. Bate (British Museum, Nat. Hist.) in cooperation with J.W. Jackson (Manchester University) reveal the context of this material (i.e. exact provenance, archaeological context, sampling procedure etc.). However, a decade ago, McHugh published the results of the analysis of the artifactual assemblages from the same sites, housed in the Musée de l'Homme in Paris (McHugh 1974, 1975). On the basis of three unpublished manuscripts by Myers (*s.d.*, *fide* McHugh 1982b) which accompany the artefacts, McHugh was able to reconstruct Myers' archaeological activities during late winter and early spring 1938. Most of the time, Myers investigated a series of Palaeolithic sites, located a little to the north of the Wadi el Bakht at the eastern edge of the southern Gilf Kebir. Four other concentrations of artefacts close to or on the blocking dune in Wadi el Bakht were also sampled. These four sites were numbered as follows : 15, 16 Upper Dune, 16 Lower Dune and 17. From this, we can conclude that the site numbers accompanying the bone samples from the Gilf Kebir, 15.000 and 17.000 correspond with the 15 and 17 in Myers' manuscript. Their location is given in fig. 1. Myers apparently spent also several days in the Wadi (Ard) el Akhdar, but little specific information is available about his work there (McHugh 1982b).

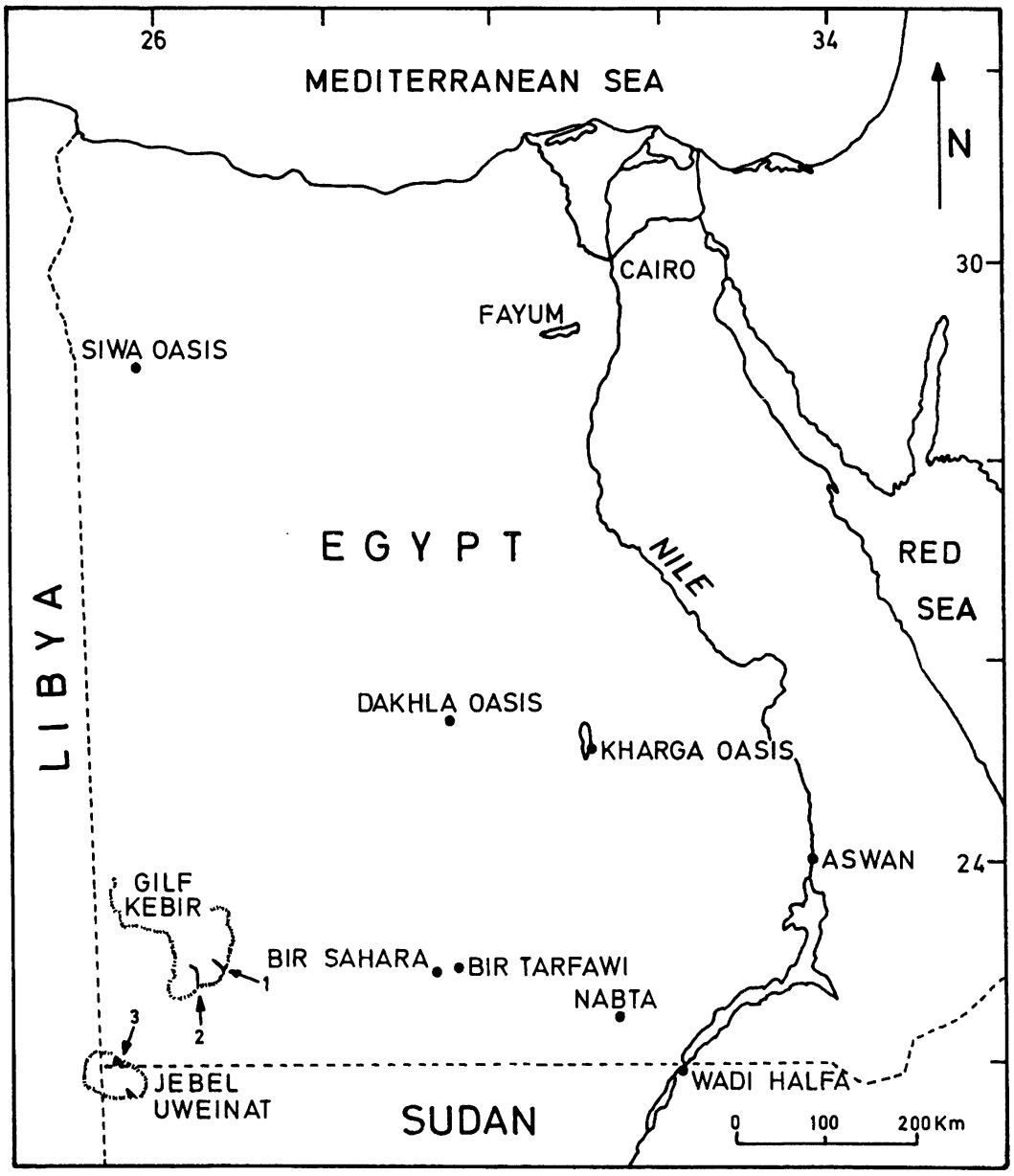

Fig. 1 Location of the sites discussed in the text.
(1) Wadi el Bahkt; (2) Wadi (Ard) el Akhdar; (3) Karkur Talh.

Myers also took samples from two or three of the Jebel Uweinat rock shelters with paintings. On the basis of the labels written by Jackson and through his identifications, given in his letters, we can deduce that a series of samples are derived from Winkler's sites 73, 73 (front of) and 77 in Karkur Talh (Winkler 1939a, 1939b).

The foregoing suggests that the collecting of bones was only an incidental activity and, no doubt, sampling took place by handpicking of larger fragments; this would explain the fact that remains from small vertebrates such as rodents or hyrax are lacking in the available samples. The foregoing biased sampling limits the interpretation of the material considerably.

The osseous remains available for restudy were the following : Site 17 (Gilf Kebir) produced the richest assemblage. On the basis of the degree of fossilisation, the collection can be divided into three groups : (1) Grey-coloured material, (presumably of Pleistocene age), coated with poorly sorted clastics and heavily fossilised, may be derived from a Palaeolithic occupation (see further); (2) Red to dark brown or black coloured material, sometimes coated with sand; the similarities in colour and fossilisation between these remains and those collected by Wendorf *et al.* (1976) at the same site indicate that our collection was originally associated with the Neolithic occupation there. Our material also underwent considerable aeolian erosion, reflected in the abraded articular bone surfaces and fractures, suggesting a long exposure on the surface; (3) White to yellow or orange coloured, and presumably younger bone fragments, almost not fossilised and rather heavily weathered (stages 3 to 5 *sensu* Behrensmeyer 1978). Part of this material may well be kitchen refuse of nomadic tribes who recently visited the wadi with their animals, as for example the Tubus (cf. Van Noten 1978 : 22).

The oldest group only contains one fragment, i.e. an incomplete incisor of a hippopotamus (*Hippopotamus amphibius*). The interpretation of this find remains a problem (see further).

As said, the bulk of the material of site 17 consists of bone material (group 2), which we associate with the Neolithic. At least four wild and two domesticated mammalian species were recognised, i.e. giraffe (*Giraffa camelopardalis*), addax (*Addax nasomaculatus*), dorcas gazelle (*Gazella dorcas*), dama (*Gazella dama*), goat (*Capra aegagrus* f. hircus) and cattle (*Bos primigenius* f. taurus). With the exception of the giraffe, identified on the basis of postcranial remains, all the species are represented by incomplete horn cores, maxillas and/or mandibles.

Due to the pronounced fragmentation and the lack of diagnostic features, a number of postcranial remains could not be attributed specifically. We classified them in size categories (cf. Peters 1986a and *supra* p. 251, note 2) : medium antelopes (*Gazella/Ammotragus*), large antelopes (*Addax/Oryx*) and small bovids (sheep/goat and/or *Gazella dorcas*).

Among the younger remains (group 3), we recognised an incomplete mandible of a canid (*Canis* sp.), a fragment of a lower jaw with broken molars of cattle and two tarsal bones, pertaining to either small to medium antelopes or to small livestock. Whether the canid mandible belongs to a domestic dog could not be established; if not, it can be referred most probably to the golden jackal (*Canis aureus*).

In contrast with site 17, site 15 of the Gilf Kebir produced a poor assemblage : a lot of bone chips and an incomplete humerus, perhaps of a reptile (turtle?). Both their colour and the degree of fossilisation indicate an age closer to that of group 3 from site 17.

The material from Cave 73 (Jebel Uweinat) can also be divided according to its preservation state. Most of the fragments (group 1) are slightly fossilised and in that sense comparable with the material of group 2 at site 17. A second group contains material comparable with that of group 3 at site 17.

The fossil bone fragments from Cave 73 (group 1) contain few identifiable specimens : a lower molar of dorcas gazelle, an incomplete molar of cattle and four fragments of small bovids. The younger remains

from Cave 73 (group 2) yield four phalanges (2 medial, 2 distal), presumably from one, subadult dorcas gazelle.

The following remains were found in front of Cave 73 : two shells of the tiny land snail *Zootecus insularis*, three incomplete phalanges (two proximal, one medial) of dorcas gazelle and 14 tooth fragments (one individual ?) which we ascribed to cattle. The state of these specimens suggest an age close to that of group 1 from the Cave 73 collection.

Cave 77 yielded four identifiable specimens : a metacarpus fragment, which we ascribed to a small bovid, and three fragments classified as unidentified bovids.

The Museum collections furthermore produced some interesting specimens also collected by the Bagnold-Mond expedition. Their exact provenance is not known, but given the labels added by Jackson (*in litt.*), a Jebel Uweinat origin may well be considered. The specimens are the following : circa 20 fragments (one individual) of the skeleton of a sea urchin (? *Clypeaster* sp.), one incomplete cowrey shell (*Cypraea pantherina* ?), one shell fragment of a large bivalve (? *Aspatharia* sp.), three *Zootecus insularis* shells and one ostrich egg shell fragment.

The collections of the British Museum also contain a lot of bone specimens which we could not identify. Because of the selective sampling method used, we did not pay much attention to their quantification.

Three interesting bone fragments (from Jebel Uweinat ?), mentioned by Jackson (*in litt.*; see also the preliminary faunal report by Bate) remained in Manchester and were never sent to the British Museum : a gazelle horn core, a horn core from Barbary sheep (*Ammotragus lervia*) and a large bone (a radius ?), tentatively ascribed to *Loxodonta africana* by Jackson. This specimen appeared to be very fragile with many pieces broken off (Jackson, *in litt.*). As giraffe, which has quite bulky bones, is present in the collections, the identification of this specimen as elephant may not be valid. In addition to these bones, Jackson reported the presence of ostrich egg shell fragments, presumably also from Jebel Uweinat.

3. Evaluation and interpretation of the faunal remains

3.1. *Taphonomy*

Historically seen, the faunal samples described above, are interesting, but their scientific value is rather limited because of problems concerning their provenance, the fact that sampling was done by incidental handpicking, and most important because of the absence of a clear subdivision of the material according to its archaeological context. The resulting data should therefore be handled with caution.

In principle, two taphonomic categories (Gautier, in press) are present, namely animals (or their products such as for example eggs) which were brought to the site by man, and those for which man is not responsible, i.e. the intrusive elements. The first category can be

divided into two groups : (1) animals brought to the sites for various reasons, the most important being foodsupply, and (2) the exotic elements. No doubt the remains of giraffe, gazelle, addax, cattle and goat represent essentially kitchen refuse. The exotic elements include the incomplete shells of a cowrey (*Cypraea* sp.), a large bivalve (? *Aspatharia* sp.) and a sea urchin (? *Clypeaster* sp.). These faunal elements point to some sort of connection with the Nile Valley, the Red Sea and perhaps with the Mediterranean.

The landsnail *Zootecus insularis* can be considered an intrusive element : its small size makes it improper for consumption and both the Gilf Kebir and Jebel Uweinat lie within its zoo-geographical range (Verdcourt 1960). We assume that this snail may well be a penecontemporaneous intrusive, as is the case in many other northeast African sites as for example at Jebel Shaqadud (*supra* p. 251, note 2).

The hippopotamus incisor poses a problem. Perhaps it is an element derived from a local Palaeolithic site, in which case it may be a fossil brought to the Neolithic site by man, i.e. a local manuport. It may also be an exotic manuport, or even a bone picked up by the expedition on its way and inadvertantly mixed with the site 17 material.

The canid mandible from site 17 (group 3) can be derived either from a carcass of a dog left by post-Neolithic visitors or inhabitants of the site, or from a carcass of a wild canid, in which case it is not necessarily associated with the human occupation.

3.2. *Palaeoeconomy*

As already pointed out it is difficult to evaluate the significance of the samples described. Fortunately, the same areas have been visited by other expeditions, and additional information concerning the archaeology and the age of Myers' and other sites has been gathered (Wendorf *et al.* 1976; Van Noten 1978; Kuper 1981, McHugh 1982b; Pachur & Röper 1984a, 1984b; De Paepe 1986).

In the Gilf Kebir, two areas have been revisited, namely the Wadi el Bakht close to the blocking dune and the Wadi (Ard) el Akhdar. In 1974, Wendorf and his team carried out excavations, presumably at the same spot where Myers took his samples (Wendorf *et al.* 1976). An ostrich egg shell fragment found in the uppermost playa sediment yielded a radiocarbon date of 6980 ± 80 BP (SMU 273) for the final stage of the playa (Haynes 1983). This date is succeeded by others obtained by Pachur and Röper in 1977 (1984a, 1984b) on calcified roots in aeolianites (7585 ± 80 BP; Hv 11 648) and charcoal ($8715 \pm {}^{970}_{870}$ BP; Hv 11 644) from playa sediments below the surface.

In 1978, another interdisciplinary group visited the Wadi el Bakht blocking dune (El-Baz 1983; El-Baz *et al.* 1980). Archaeological investigations were carried out by McHugh (1982b) and confined to the northern part of the ancient lake deposits and to the north shoulder and west of the blocking dune. Unfortunately, no datable material has been recovered. The same group also paid a brief visit to Wadi (Ard) el Akhdar.

The team led by Kuper (cf. Kuper 1981) carried out five seasons of fieldwork to investigate mainly archaeological sites in the Gilf

Kebir and in the Wadi Howar, but the final results of this project are not published yet. Preliminary results, however, indicate that the playa formation, observed at the blocking dune in Wadi el Bakht, also happened in the Wadi (Ard) el Akhdar. The playas in both wadi's may have essentially the same age. The human occupation from Wadi (Ard) el Akhdar dates from about 7700 ± 60 BP to 3860 BP (Kuper 1981).

From Jebel Uweinat, additional information has been gathered by a Belgian-Libyan team in the fall and winter of 1968-69. The archaeological investigations focused mainly on Palaeolithic sites, although Neolithic sites in Karkur Talh and Karkur Ibrahim were also sampled (de Heinzelin *et al.* 1969; Van Noten 1978).

The identified faunal remains collected by Myers and later groups are listed in table 1. We did also include information concerning the sampling area, the collector(s) and the person who carried out the faunal analysis; the dates refer to the publication(s) in which the faunal remains are mentioned or described. A few comments should be added to this table; numbers between brackets correspond with those in the table. (1) The carnivore remains from Wadi el Bakht were erroneously labelled domestic dog; in fact they pertain to the striped hyaena, *Hyaena hyaena* (Gautier, pers. comm.). (2) The elephant molar, collected at Jebel Uweinat, is a surface find associated with Neolithic lithics and ceramics (Van Noten 1978 : 29); however, its taphonomic status is not clear : kitchen refuse ? Or a local or exotic manuport ? (3) The identification of a few bone fragments from Jebel Uweinat (Karkur Talh) as Sömmerrings gazelle (*Gazella soemmerringi*) by Misonne (in Van Noten 1978 : 29) should probably be rejected. This species is today confined to the east of the Nile, ranging from eastern Nubia to the Red Sea, and from northern Ethiopia to southern Somalia (Haltenorth & Diller 1979 : 80); we doubt whether this gazelle ever roamed west of the Nile. Most likely, this material can be attributed to *Gazella dama* because dama has approximately the same size and its present day distribution includes large parts of the Sahara and the Sahel zone, west of the Nile. (4) We classified the *Bubalus* remains mentioned by Pachur and Röper (1984a) as large bovid. (5) The large, unidentified bones from Wadi (Ard) el Akhdar can most probably be attributed to large bovids (Gautier, pers. comm.).

From the combined evidence, it becomes obvious that the Neolithic inhabitants of the Gilf Kebir and Jebel Uweinat area relied on hunting-gathering-herding for their foodsupplies. Hunting is illustrated by the remains of dassie, dorcas gazelle, dama, addax, Barbary sheep, giraffe and maybe also elephant. Herding practises, on the other hand, are reflected by the presence of cattle and small livestock among the bone fragments. Goats appear in the faunal record, but the presence of sheep could not be established. This picture is confirmed to a large extent by the numerous rock paintings and engravings which occur in both areas, figuring antelopes, Barbary sheep, giraffes, cattle and goats; other species, absent in the collections but present in rock art are scimitar-horned oryx, lion, dog and camel (e.g. Bermann 1934; Winkler 1939a, 1939b; Rhotert 1952; Misonne & Van Noten 1969; Van Noten 1978). According to Van Noten (*ibid.*), cattle and dogs may have been introduced in the area first, later followed by goats; the introduction of the camel dates from the post-Neolithic period. This sequence is based on a tentative classification of the rock art by the same author, not accepted by all specialists (cf. Muzzolini 1983).

TABLE 1

Available collections / Vertebrate group/species(*)	General area	GILF KEBIR							JEBEL UWEINAT		
	Specific area	WADI EL BAKHT				WADI (ARD) EL AKHDAR			KARKUR TALH		KARKUR IBRAHIM
	Main collector Identified/revised by	MYERS PETERS	WENDORF GAUTIER (1980)	McHUGH (1982) GAUTIER (1982)	PACHUR (1984b) UERPMANN	McHUGH GAUTIER (1982)	KUPER (1981) UERPMANN	PACHUR (1984a)	MYERS PETERS	VAN NOTEN (1978) MISONNE	VAN NOTEN (1978) MISONNE
Birds											
Ostrich (Struthio camelus; egg shell fragments)		-	-	●	-	-	●	-	-	●	-
Aves indet.		-	-	-	-	-	-	●	-	-	-
Wild Mammals											
Striped hyaena (Hyaena hyaena)		-	●(1)	-	-	-	-	-	-	-	-
African elephant (Loxodonta africana)		-	-	-	-	-	-	-	-	-	●(2)
Dassie (Procavia sp.?)		-	-	-	-	-	●	-	-	-	-
Giraffe (Giraffa camelopardalis)		●	-	-	●	-	●	-	-	-	-
Addax (Addax nasomaculatus)		●	-	-	-	-	-	-	-	-	-
Dorcas gazelle (Gazella dorcas)		●	●	-	-	-	-	-	●	-	-
Sömmerrings gazelle (Gazella soemmerringi)		-	-	-	-	-	-	-	-	●?(3)	-
Dama (Gazella dama)		●	-	-	-	-	-	-	-	●?(3)	-
Barbary sheep (Ammotragus lervia)		-	-	-	●	-	-	-	-	-	-
Medium antelopes		●	-	-	-	-	-	-	-	-	-
Large antelopes		●	-	-	-	-	-	-	-	-	-
Gazelle		-	-	-	●	-	●	-	-	-	-
Antelope		-	-	-	-	-	●	-	-	-	-
Domesticated Mammals											
Goat (Capra aegagrus f. hircus)		●	-	-	-	-	-	-	-	-	-
Small livestock (goat and/or sheep)		-	●	●	-	●	-	-	-	-	-
Cattle (Bos primigenius f. taurus)		●	●	●	-	-	-	-	●	-	-
Wild or domesticated Mammals											
Small bovid		●	-	●	-	-	-	-	●	-	-
Large bovid		●	-	●	●(4)	●?(5)	●	-	-	-	-

* The numbers between brackets are explained in the text.

The gathering activities certainly included the collecting of plant foods, such as cereals (cf. milling stones) and ostrich eggs. Presumably the plant species or products exploited were locally available under their wild forms, but the possibility of domesticated cereals cannot be discounted.

Although it is difficult to assess the quantitative importance of the different food items on the basis of the available evidence, it is clear that the bio-environment provided varied resources which enabled people to adopt a diffuse economy *sensu* Cleland (1976). Such a strategy is generally characterised by a careful scheduling in time and space to maximize the exploitation of the available resources. For the moment, several exploitation models can be suggested and defended : seasonal or year round occupation, with differences between early herders and later inhabitants and so on. Our knowledge is, however, too limited to make a deliberate choice among the possible (hypothetical) models.

3.3. *Palaeoecology/palaeoclimatology*

Archaeozoological data can be used to make a tentative reconstruction of the paleoenvironment (e.g. Gautier 1983; Peters 1986a). Such a reconstruction is based on the actual ecological requirements of the animals encountered. As far as the wild mammals listed in table 1 are concerned, similar requirements can be noted. Dorcas gazelle, dama, addax, Barbary sheep feed on grasses as well as foliage of trees and shrubs; they are considered mixed feeders. Giraffes, on the other hand, are predominantly browsers, utilising a wide range of food plants, although they will graze occasionally on fresh sprouting grasses (Smithers 1983 : 595). The diet of dassies consists mainly of browse, but herbs, fruits, insects and even small vertebrates are also eaten (Haltenorth & Diller 1979 : 110).

All the species mentioned are almost completely independent of water, obtaining their moisture requirements from their food plants.

The two domesticated species found in the assemblage are cattle and goat. Cattle are typical grazers, and good quality pasture as well as surface water is necessary to keep them in good health. Goats are less particular about their food requirements, but still need water to survive dry living conditions.

If the animals, listed in table 1, are from individuals which died within the same period (middle Holocene ?), the faunal spectrum obtained suggests a dry environment around Jebel Uweinat and the Gilf Kebir, probably with Sahelian living conditions. We use the term Sahel for the transition zone between the Sahara and the savanna, with an average annual rainfall between 100 and 500 mm (Maley 1977). On the basis of the foregoing, we can imagine a floral pattern in the area consisting of grassy (seasonal ?) plains, probably with a disjunct ground cover, no doubt with some concentrations of bushes and trees at more favourable places such as wadis. Precise estimations of the annual precipitation cannot be based on wild mammals such as dorcas gazelle, dama or addax; these animals undertake large scale migrations if food becomes rare. Pastoralists are known to travel with their flocks according to the available pasture. Giraffes, however, do not migrate over considerable distances, although they are great wanderers because their food is generally well dispersed (Kingdon 1979 : 329). As a consequence, their home

ranges can be very extensive especially during the rains when the animals start wandering (650 km^2; Kingdon, *ibid.*); during the dry season, the animals remain in a relatively small area (in Tsavo National Park 160 km^2, cf. Leuthold 1977 : 44). We therefore consider the Gilf Kebir remains of giraffe to be derived from a local population. Such a population no doubt also has existed at Jebel Uweinat, as the rock art indicates. Whether at the moment the human sites were inhabited, the giraffes formed a kind of relict population, derived from a much larger (early Holocene ?) group, remains an open question. Anyhow, the food requirements of giraffes suggests a minimum annual precipitation of ca. 200 mm in the area around the Gilf Kebir and Jebel Uweinat. Both mountain masses probably received more rain, especially Jebel Uweinat (max. height ca. 1900 m !), part of which ended up in the wadis and the surrounding plains. In fact our estimate of 200 mm precipitation for the plains may be too high, because of this additional moisture resulting from rains in the jebels.

From the foregoing, we can conclude that the climatic conditions, prevailing during the time that the Gilf Kebir and Jebel Uweinat were inhabited by Prehistoric man, were better than today. It is clear, however, that new excavations and more dates are necessary to provide us with a more correct and detailed picture of Prehistoric man and his environment in the southwestern part of the eastern Sahara.

Acknowledgements

I am greatly indebted to Dr. J. Clutton-Brock and Dr. K. Bryan (Osteology Room, British Museum of Natural History, London) for giving me the opportunity to restudy this faunal material. I also want to thank Prof. Dr. A. Gautier for his suggestions concerning the treatment of the data and for reading the manuscript. Mrs. N. Reynaert typed the final version of the manuscript. This work was supported by a research grant of the I.W.O.N.L. (Brussels) and a travel grant of the Vlaamse Wetenschappelijke Stichting (Leuven).

References

ALMASY, L.E. de 1936 Récentes explorations dans le Désert Libyque (1932-1936). Publications de la Société Royale de Géographie d'Egypte, Le Caire.

BAGNOLD, R.A. 1931 Journeys in the Libyan Desert 1929 and 1930. The Geographical Journal, 78, 13-39.

1933 A further journey through the Libyan Desert. The Geographical Journal, 82, 103-126 and 211-235.

1941 The physics of blown sand and desert dunes. Methuen and Co. Ltd., London.

BAGNOLD, R.A., MYERS, O.H., PEEL, R.F. & WINKLER, H.A. 1939 An expedition to the Gilf Kebir and 'Uweinat, 1938. The Geographical Journal, 93, 281-313.

BAGNOLD, R.A., NEWBOLD, D. & SHAW, W.B.K. 1931 Journeys in the Libyan Desert, 1929 and 1930 : Note on the map, and appendices. The Geographical Journal, 78, 524-535.

BATE, D.M.A. not published Mammalian remains from the Gilf Kebir and 'Uwainat. Original report available at the Osteology Room of the British Museum (Nat. Hist.), London.

BEHRENSMEYER, A.K. 1978 Taphonomic and ecologic information from bone weathering. Paleobiology, 4 (2), 150-162.

BERMANN, R.A. 1934 Historic problems of the Libyan Desert. The Geographical Journal, 83, 456-463.

CAPORIACCO, L. di 1933 Le Pitture preistoriche di Ain Doua (Auenat). Archivio per l'Antropologia e la Etnologia, 63, Firenze, 275-284.

CAPOCACCIA, L. 1977 Rettili del Gebel Uweinat. Annales du Musée royal de l'Afrique Centrale, Tervuren, série IN-8°, Sciences Zoologiques, 217, 37-44.

CLAYTON, P.A. 1933 The western side of the Gilf Kebir. The Geographical Journal, 81, 254-259.

CLELAND, C.E. 1976 The focal-diffuse model : an evolutionary perspective on the prehistoric cultural adaptations of the Eastern United States. Mid- Continental Journal of Archaeology, 1 (1), 59-76.

DE PAEPE, P. 1986 La provenance de la céramique néolithique du Gebel Uweinat (Libye) : évidence minéralogique et chimique. Archéologie du Nil Moyen, 1, 149-159.

EL-BAZ, F. 1982 Chapter 1. Journey to Egypt's farthest corner, in El-Baz, F. & Maxwell, T.A. eds, Desert landforms of Southwest Egypt : A basis for comparison with Mars. NASA Scientific and Technical Informative Branch, Washington, D.C., 1-19.

EL-BAZ, F., BOULOS, L., BREED, C., DARDIR, A., DOWIDAR, H., EL-ETR, H., EMBABI, M., GROLIER, M., HAYNES, V., IBRAHIM, M., ISSAWI, B., MAXWELL, T., McCAULEY, J., McHUGH, W., MOUSTAFA, M. & YOUSIF, M. 1980 Journey to the Gilf Kebir and Uweinat, Southwest Egypt, 1978. The Geographical Journal, 146, 51-93.

KINGDON, J. 1979 East African Mammals, Vol. IIIB (Large Mammals). Academic Press, London/New York/San Francisco.

GAUTIER, A. 1980 Appendix 4. Contribution to the Archaeozoology of Egypt, in Wendorf, F. & Schild, R., Prehistory of the Eastern Sahara. Academic Press, New York/London/Toronto/Sydney/San Francisco, 317-342.

1982 Chapter 21. Neolithic faunal remains in the Gilf Kebir and the Abu Hussein Dunefield, Western Desert, Egypt, in El-Baz, F. & Maxwell, T.A. eds, Desert landforms of Southwest Egypt : A basis for comparison with Mars. NASA Scientific and Technical Information Branch, Washington, D.C., 335-339.

1983 Animal life along the Prehistoric Nile : the evidence from Saggai I and Geili (Sudan). Origini 13, Roma, 50-115.

in press Taphonomic groups : how and why ? Proceedings of the 5th International Conference of Archaeozoology, Bordeaux 25-30 August 1986, Archaeozoologia.

HALTENORTH, Th. & DILLER, H. 1979 Elseviers Gids van de Afrikaanse zoogdieren. Elsevier - Amsterdam/Brussel.

HASSANEIN, A.M. 1924a Through Kufra to Darfur. The Geographical Journal, 64, 273-291 and 353-366.

1924b Crossing the untraversed Libyan Desert. Geographic Magazine, 46, 233-278.

HAYNES, C.V. 1983 Quaternary Studies, Western Desert, Egypt and Sudan, 1975-1978. National Geographic Society Research Reports, 15, Washington D.C., 257-293.

HEINZELIN, J. de, HAESAERTS, P. & VAN NOTEN, F. 1969 VI. Géologie récente et préhistoire au Jebel Uweinat, in Expédition scientifique belge dans le désert de Libye - Jebel Uweinat 1968-1969. Africa-Tervuren, 15 (4), 120-125.

KEMAL EL-DIN, H. 1928 L'exploration du désert Libyque. La Géographie 50, Paris, 171-183 and 321-336.

KUPER, R. 1981 Untersuchungen zur Besiedlungsgeschichte der östlichen Sahara. Vorbericht über die Expedition 1980. Beiträge zur allgemeinen und vergleichenden Archäologie, 3, München, 217-275.

LEONARD, J. 1969 I. Préface, in Expédition scientifique belge dans le désert de Libye - Jebel Uweinat 1968-1969. Africa-Tervuren, 15 (4), 102-104.

LEUTHOLD, W. 1977 African Ungulates. A Comparative Review of Their Ethology and Behavioral Ecology. Zoophysiology and Ecology, 8, Springer Verlag, Berlin/Heidelberg/New York.

MALEY, J. 1977 Palaeoclimates of Central Sahara during the early Holocene. Nature, 269, 573-577.

MARKS, A.E., MOHAMMED-ALI, A., PETERS, J. & ROBERTSON, R. 1985 The Prehistory of the Central Nile Valley as seen from its Eastern Hinterlands : Excavations at Shaqadud, Sudan. Journal of Field Archaeology, 12, 261-278.

MARKS, A.E., PETERS, J. & VAN NEER, W. 1987 Late Pleistocene and Early Holocene Occupations in the Upper Atbara River Valley, Sudan, in Close, A.E. ed, Prehistory of Arid North Africa : Essays in Honor of Fred Wendorf. S.M.U. Press, Dallas, 137-161.

McHUGH, W.P. 1974 Cattle pastoralism in Africa - A model for interpreting archaeological evidence from the Eastern Sahara Desert. Arctic Anthropology, 11 - Supplement, 236-244.

1975 Some archaeological results of the Bagnold-Mond Expedition to the Gilf Kebir and Gebel 'Uweinat, southern Libyan Desert. Journal of Near Eastern Studies, 34 (1), 31-62.

1982a Chapter 2. A chronicle of research and exploration in the Gilf Kebir - Uweinat mountain region, in El-Baz, F. & Maxwell, T.A. eds, Desert landforms of Southwest Egypt : A basis for comparison with Mars. NASA Scientific and Technical Information Branch, Washington, D.C., 21-26.

1982b Chapter 20. Archaeological investigations in the Gilf Kebir and the Abu Hussein dunefield, in El-Baz, F. & Maxwell, T.A. eds, Desert landforms of Southwest Egypt : A basis for comparison with Mars. NASA Scientific and Technical Information Branch, Washington, D.C., 301-334.

MISONNE, X. 1969 V. La faune, in Expédition scientifique belge dans le désert de Libye - Jebel Uweinat 1968-1969. Africa-Tervuren, 15 (4), 117-119.

MISONNE, X. 1974 Les oiseaux de Kufra et du Jebel Uweinat. Le Gerfaut, 64, 41-73.

1977 Mammifères du Jebel Uweinat, désert de Libye. Annales du Musée royal de l'Afrique Centrale, Tervuren, série IN -8°, Sciences Zoologiques 217, 5-33.

MISONNE, X. & VAN NOTEN, F. 1969 VII. De rotsgraveringen en schilderingen van Uweinat, in Belgische wetenschappelijke Expeditie in de woestijn van Libië - Jebel Uweinat 1968-1969. Africa-Tervuren, 15 (4), 126-130.

MUZZOLINI, A. 1983 L'Art rupestre du Sahara Central : Classification et chronologie. Le Boeuf dans la Préhistoire Africaine. Thèse de Troisième Cycle, Université de Provence, Aix-Marseille I.

MYERS, O.H. 1939 The Sir Robert Mond expedition of the Egypt Exploration Society, in Bagnold, R.A. et al., An expedition to the Gilf Kebir and 'Uweinat, 1938. The Geographical Journal, 93, 287-291.

s.d. Notes concernant les gisements fouillés. Manuscript in the Musée de l'Homme, Paris.

s.d. Evidence of the Lower Palaeolithic in the Gilf al Kabir region. Manuscript in the Musée de l'Homme, Paris.

s.d. Some problems in the later prehistory of the Sudan, the southern Sahara, and south Arabia. Manuscript in the Musée de l'Homme, Paris.

NEWBOLD, D. 1924 A desert odyssey of a thousand miles. Sudan Notes and Records, 7, 43-92.

1928 Rock-pictures and archaeology in the Libyan Desert. Antiquity, 2, 261-291.

NEWBOLD, D. & SHAW, W.B.K. 1928 An exploration in the south Libyan Desert. Sudan Notes and Records, 11, 103-194.

OSBORN, D.J. & KROMBEIN, K.V. 1969 Habitats, Flora, Mammals, and Wasps of Gebel 'Uweinat, Libyan Desert. Smithsonian Contributions to Zoology, 11, Smithsonian Institution Press, City of Washington, 1-18.

PACHUR, H.-J. & ROPER, H.-P. 1984a Die Bedeutung paläoklimatischer Befunde aus den Flachbereichen der östlichen Sahara und der nördlichen Sudan. Zeitschrift für Geomorphologie, N.F., Suppl. -Bd. 50, Berlin/Stuttgart, 59-78.

1984b The Libyan (Western) Desert and northern Sudan during the Late Pleistocene and Holocene. Berliner Geowissenschaftliche Abhandlungen (A)50, Berlin, 249-284.

PEEL, R.F. 1939 4. The Gilf Kebir, in Bagnold, R.A. et al., An Expedition to the Gilf Kebir and 'Uweinat, 1938. The Geographical Journal, 93, 295-307.

PEEL, R.F. & BAGNOLD, R.A. 1939 3. Archaeology. Additional Notes, in Bagnold, R.A. et al., An Expedition to the Gilf Kebir and 'Uweinat, 1938. The Geographical Journal, 93, 291-295.

PENDEREL, H.W.G.J. 1934 The Gilf Kebir. The Geographical Journal, 83, 449-456.

PETERS, J. 1986a Bijdrage tot de archeozoölogie van Soedan en Egypte. Doktoraatsthesis, Rijksuniversiteit Gent.

1986b A revision of the faunal remains from two Central Sudanese sites : Khartoum Hospital and Esh Shaheinab. Archaeozoologia, Mélanges publiés à l'occasion du 5e Congrès International d'Archéozoologie, Bordeaux-août 1986, 11-35.

RHOTERT, H. 1952 Libysche Felsbilder. Ergebnisse der XI und XII Deutschen Inner-Afrikanischen Forschungs-Expedition (DIAFE) 1933/1934/1935. L.C. Wittich, Darmstadt.

RODD, F.J.R. 1933 A reconnaissance of the Gilf Kebir by the late Sir Robert Clayton East Clayton. The Geographical Journal, 81, 249-254.

SANDFORD, K.S. 1933a 7. Geology and geomorphology of the southern Libyan Desert. The Geographical Journal, 82, 213-219.

1933b 8. Past climate and early man in the southern Libyan Desert. The Geographical Journal, 82, 219-222.

1935a Geological observations on the northwest frontiers of the Anglo-Egyptian Sudan and the adjoining part of the southern Libyan Desert. Quarterly Journal of the Geological Society of London, 91, 323-381.

1935b Sources of water in the north-western Sudan. The Geographical Journal, 85, 412-431.

1936 Appendix II. Notes on the geological data from the southern Libyan Desert, in Shaw, W.B.K., An Expedition in the southern Libyan Desert. The Geographical Journal, 87, 211-214.

SHAW, W.B.K. 1929 Darb el Arbain : The Forty Days Road. Sudan Notes and Records, 12, 62-71.

1931 Appendix IV : Botanical Notes, in Bagnold, R.A., Newbold, D. & Shaw, W.B.K., Journeys in the Libyan Desert, 1929 and 1930. The Geographical Journal, 78, 534-535.

1934 The Mountain of Uweinat. Antiquity, 8, 63-72.

1936a Rock paintings in the Libyan Desert. Antiquity, 10, 175-178.

1936b An expedition in the southern Libyan Desert. The Geographical Journal, 87, 193-217.

SMITHERS, R.H.N. 1983 The Mammals of the Southern African Subregion. University of Pretoria, Pretoria, Transvaal, Republic of South Africa.

VAN NOTEN, F. 1978 Rock Art of the Jebel Uweinat. Akademische Druck und Verlagsanstalt, Graz, Austria.

VERDCOURT, B. 1960 Some further records of Mollusca from North Kenya, Ethiopia, Somaliland and Arabia, mostly from arid areas. Revue de zoologie et botanique africaine, 61, 221-265.

WENDORF, F., SCHILD, R., SAID, R., HAYNES, C.V., GAUTIER, A. & KOBUSIEWICZ, M. 1976 The Prehistory of the Egyptian Sahara. Science, 193, 103-114.

WILLIAMS, M.A.J. & HALL, D.N. 1965 Recent expeditions to Libya from the Royal Military Academy, Sandhurst. The Geographical Journal, 131, 482-501.

WINKLER, H.A. 1939a 5. Rock-pictures at 'Uweinat, in Bagnold, R.A. et al, An Expedition to the Gilf Kebir and 'Uweinat, 1938. The Geographical Journal, 93, 307-310.

1939b Rock-drawings of Southern Upper Egypt II. The Egypt Exploration Society, London.