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Abstract: In this comparison of the previous and current (1972 to 1977) status of large mammals in the Meridional Darfour (Republic of Sudan), only one cheetah observation dating from 1917 has been found, in the Tebella massif region north-west of the country and an aerial survey in 1976 has detected the cheetah occurrence in the same area, although it is very scarce. A young cheetah has also been reported at Nyala in 1948 before his expedition in Dublin zoo.

Dans cette comparaison du statut passé et actuel (1972 à 1977) des grands mammifères du Darfour méridional (République du Soudan), seule une observation de guépard datant de 1917 a pu être trouvée, dans la région du massif de Tebella au nord-ouest du pays et un survol aérien en 1976 a également détecté la présence d'un guépard dans cette zone, bien qu'il soit très rare. Un jeune guépard a également été rapporté à Nyala en 1948 avant son expédition au zoo de Dublin.

# Wildlife in Southern Darfur, Sudan : Distribution and status at present and in the recent past

by

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L'auteur compare dans ce travail le statut passé et présent de 49 grands mammifères du Darfour méridional, région qui couvre 160 000 km<sup>2</sup>, à l'ouest de la République du Soudan. Beaucoup d'informations anciennes proviennent d'archives difficilement consultables. Les données concernant l'état actuel de la faune ont été recueillies de 1972 à 1977.

La plupart des espèces ont subi une sévère réduction en nombre et on constate aussi une contraction de leur répartition au cours des 75 dernières années ; seules quelques-unes cependant ne sont plus représentées dans la province. Par destruction de l'habitat, l'homme et le bétail domestique sont les principaux responsables de la dégradation du statut de la plupart des espèces sauvages. L'éléphant et la girafe sont victimes du braconnage et de la chasse traditionnelle. Les grands carnassiers sont systématiquement exterminés pour protéger le bétail.

Il faut malheureusement s'attendre à de nouvelles réductions du peuplement des espèces sauvages du fait de la concurrence du bétail toujours plus abondant.

The province of Southern Darfur, in the west of the Republic of the Sudan, occupies an area greater than 160,000 km<sup>2</sup>, bounded approximately by latitudes 9°30' N to 13°15' N and 22°30' E to 27°00' E. This area and its relation to north-east Africa as a whole is shown in Figure 1.

The ecology and domestic livestock resources of the south-central part of the area have been described recently (Wilson & Clarke, 1975) : the climatic conditions, landforms and vegetation over much of the eastern and western areas of the province, as well as domestic live-stock densities and the semi-nomadic pastoral system of land-use are similar to those of the southern area. The climate can generally be considered to be semi-arid with rain (varying from 900 mm in the south to about 400 mm in the north) from June to September and a long dry season of about eight to nine months. Average annual temperatures of the order of 27 °C prevail but diurnal variations in excess of 20 °C are common in the dry season. Vegetation is largely of a low-rainfall woodland savanna type with thorny, predominantly *Acacia*, species in the north being replaced by more dense, taller deciduous trees in the south. Topography is generally level to gently undulating with an average elevation of 500 m to 600 m.

The north-western corner of the province is dominated by the dormant tertiary volcano, Jebel Marra, which has a maximum elevation of over 3,000 m. Several descriptions of this part of the area are available, of which that by Lebon and Robertson (1961) is the most comprehensive. Both the seasonal duration and the amount of rainfall are affected by the mountain massif, as is temperature, with frosts occurring at higher altitudes. The middle and upper

slopes of the mountain are largely covered by man-made terraces and have been cultivated for centuries, as a result of which only remnants of the original vegetation remain. The very highest slopes, above 2,800 m, and the caldera itself are mainly covered with short grass with a few scattered *Olea laperrini* trees. The lower slopes and the pediments are again mainly acacia scrub. The water courses, dry for most of the year, have considerable stands of *Acacia albida* on the flood terraces.

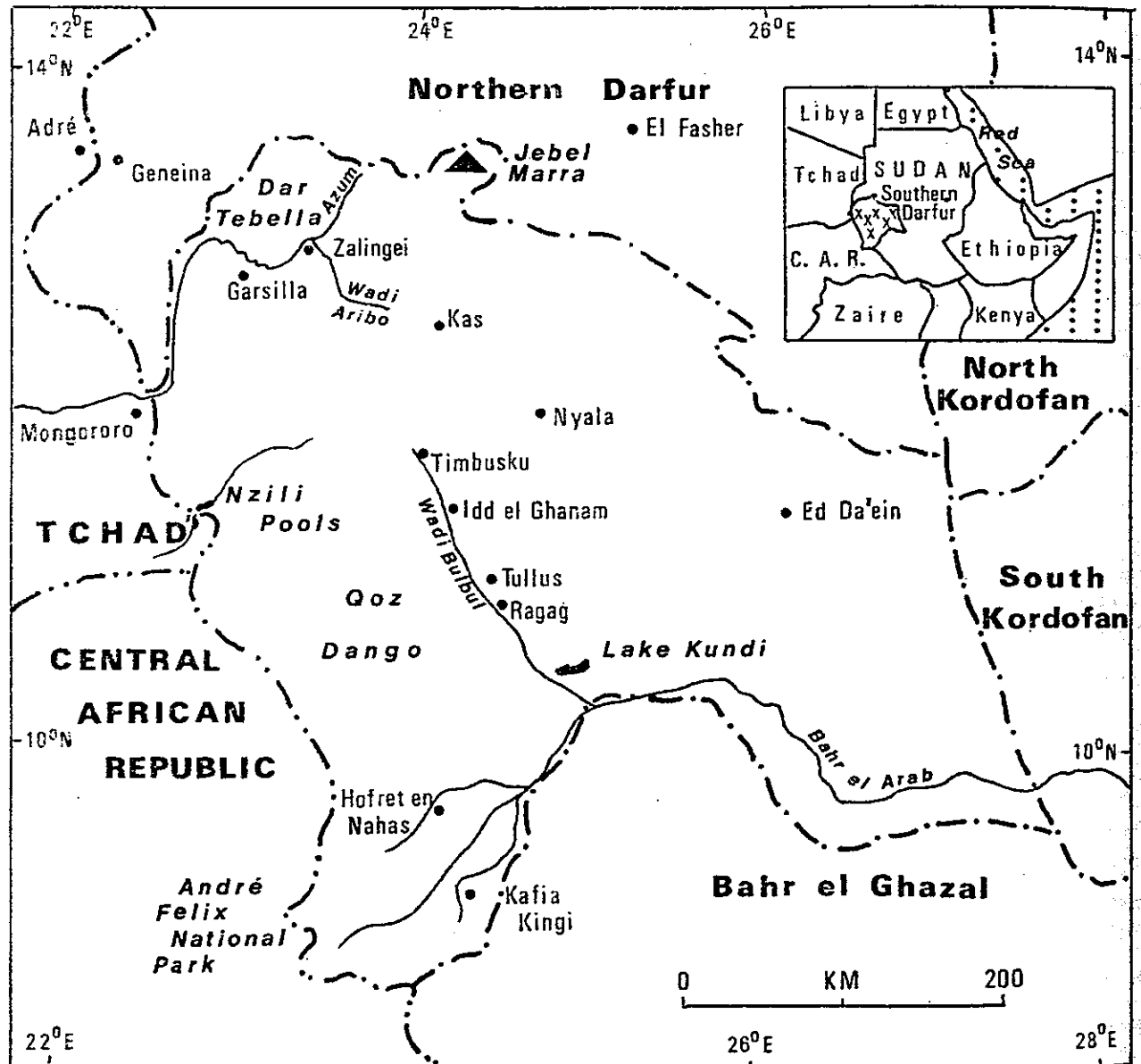


Fig. 1. — Southern Darfur and its location.

### SOURCES OF INFORMATION

Few formal studies on the wild mammalian fauna of Southern Darfur exist, and information on distribution in time and space, and on status, has

been obtained from a number of sources. Works of early travellers in and close to Darfur often contain references to distribution and give some information on relative abundance (Browne, 1779 ; Burckhardt, 1819 ; Nachtigal, English edition 1971). The reminiscences and memoirs of members of the Egyptian army and the Sudan Political Service provide considerable information (French-Comyn, 1911 ; Boustead, 1971) although as far as Darfur is concerned some are disappointing (Chapman, 1921 ; Dugmore, 1924) if not actually misleading in their titles — although in fairness it must be remembered that much of what now constitutes Darfur was not reincorporated into the Sudan until 1916. The first serious attempt to provide a comprehensive cover of the Sudan's game, by a former Chief Game Warden (Brocklehurst, 1931), is a mine of facts, but perhaps seems rather quaint by modern standards.

An invaluable and rich source is to be found in the archival material in the Sudan Library of the University of Khartoum. In particular, the Intelligence Reports of the Governor-General from 1892 to 1924 are, perhaps surprisingly, remarkably rewarding ; as are the regular reports — the Darfur Monthly Diary — of the Provincial Commissioner for Darfur in the years 1944 to the immediate pre-independence period in 1954. Subsequently in this paper, these two sources will be referred to respectively as S I R with a reference number and date and D M D followed by a date. The journal of the Philosophical Society of the Sudan, *Sudan Notes and Records*, also contains many references to and notes about wildlife from 1918 onwards.

The first, and still the only really comprehensive study on the mammals of Darfur was made on animals collected in 1921 and 1922 by Lynes and Lowe around Jebel Marra and to the west of it along the Wadi Aribo (Thomas and Hinton, 1923). Of the 62 species represented in the collection, the majority of them small rodents, insectivores and bats, 19 were described as new, either as full species, or as subspecies. A further study of the mammals of Jebel Marra was made during the 1960 s (Happold, 1966). A study of museum material (Setzer, 1956) relating to the whole of the Sudan Republic provides some useful information on systematics, although, as has already been pointed out (Happold, 1967) there is a number of omissions for the country as a whole, and for Jebel Marra in particular, perhaps because there is a lack of specimens from the Sudan. A catalogue of wild ungulates (Mackenzie, 1954) is rather disappointing in its textual material, in general being content simply to list the species of animals ; in this work the maps of each species distribution are of too small a scale to be of more than general use. The distribution and abundance of mammals in the former French colonies to the west has, in contrast, been fairly adequately documented (Blancou, 1958a, 1958b, 1963 ; Happold, 1969) and it is possible to extrapolate for the immediate Sudan/Tchad and Sudan/Central African Republic border areas from these.

Finally, up to date information has been obtained from four main sources : personal correspondence and intercourse with Southern Darfur residents and visitors ; from a report prepared for the Department of Wildlife and Fisheries (Field, 1974) which is considering establishing a Game Reserve in the extreme south-west of the Province ; from two aerial surveys carried out in 1975 and 1976 ; and from observations by the author on journeys totalling more than 40,000 kilometres by car, by camel and on foot during residence in the area from 1972 to 1974 and again in 1976 and 1977.

## DISTRIBUTION AND STATUS

## CHIROPTERA, INSECTIVORA AND RODENTIA

Seven bats, five insectivores and 28 rodents were collected by the Lynes-Lowe Expedition (Thomas and Hinton, 1923) and some evidence was adduced that one further bat might be present. Of the 40 mammals represented in these three orders, thirteen were considered to be new species and three to be new subspecies. Only one short collecting expedition since then, of ten days duration, (Happold, 1966) appears to have been undertaken in Darfur. In this expedition the dominant rodent at the lower altitudes *Praomys fumatus* had not been recorded by Lynes and Lowe and had previously been recorded only from the extreme south of the Sudan. Although none was collected by Lynes and Lowe, Happold discovered evidence of Porcupine on Jebel Marra, but had been pre-empted by Browne (1799) who gave the name as *Histrix ciestria*: the latter also recorded the presence of Jerboa, which he noted was an Arabic word, and gave the species as *Mus jaculus*. Collections and objective observations of these three orders have been confined to Jebel Marra and its western environs and it is probable that further study of other parts of Southern Darfur would produce further new species or subspecies.

Of the easily observed mammals in these groups both the Striped Ground Squirrel, *Xerus erythropus*, and the Hedgehog, *Atelerix albiventris*, are common and widespread. The latter tends to commensalism in dwellings, the main breeding season being in September and October.

## LAGOMORPHA

The Cape Hare, *Lepus capensis*, was the only species collected by Lynes and Lowe over a wide range of ecological conditions from semi-desert to high altitude grassland at almost 3,000 m. There appears to be no reason that Crawshay's Hare, *L. crawshavi*, should not also occur, particularly in the savanna areas in the south. Hares are ubiquitous and fairly plentiful, and as they are expressly forbidden by the Koran as food there appears to be no reason that their present status should change.

## PHOLIDOTA

There appear to be no records in any literature of the presence of pangolins, but the Cape or Temminck's Pangolin, *Manis temmincki*, is widespread in the central part of the province and probably fairly common.

## PRIMATES

Two primates were noted by Browne (1799) who recorded them by their Arabic names as 'Abelang' and 'Kurd': the former to which he applied the scientific name of *Simia Aethiops* is probably the Patas Monkey, *Erythrocebus*

*patas*; the latter, which he called *Simia cynamolgos* is the Olive Baboon, *Papio anubis*. In addition to these, the Lynes-Lowe expedition collected a Grivet monkey now confirmed as a Jebel Marra endemic, *Cercopithecus aethiops marrensis*, and a Galago, *G. sennaariensis*. References to baboons and monkeys on Jebel Marra are made by several of the early authors (Gillan, 1918; Lynes, 1921) but they appear to have been of no interest to the early military and civil administrators of the area and are not recorded from elsewhere in the province. Baboon and Grivet were recorded by Happold (1966) and he also notes that Lynes and Lowe recorded the Patas: rather surprisingly he has a note to the effect that these three primates occur only on Jebel Marra and are not found elsewhere in Darfur.

In fact all the four primates discussed in this section are widespread and fairly common throughout Southern Darfur, although it is possible that the Grivet occurring away from Jebel Marra is a different subspecies. It is also probable that more than one species of Galago is present. Large troops of monkeys and baboons of up to 150 individuals of mixed ages and sexes are common but single male Patas and small groups of male Baboons also regularly occur.

Baboons often cause damage to crops during the growing season, particularly in the southern area (e.g. DMD July, 1950) but tend to congregate along watercourses in the dry season. At this time of year densities of 3.4 per km<sup>2</sup> have been counted over long lengths of the Bahr el Arab and similar densities occur on the Wadi'Azum in the west. Lesser densities occur throughout much of the central and north-eastern parts of the province in vegetation types associated with sandy soils and soils of the Basement Complex.

#### CARNIVORA

The larger carnivores of the families Canidae, Hyaenidae and Felidae have undoubtedly declined in numbers and geographic distribution, perhaps more particularly in the last 25-30 years. While nowadays it is rare to see or even hear a Hyaena, and during my time in Southern Darfur I have only seen one Leopard and no Lions, the Darfur Monthly Diary reports 76 Lion, 20 Leopards, 688 Hyaena and 656 Jackals and Foxes legally shot or poisoned by the Veterinary Department in the six-year period 1947-52, which undoubtedly points to their abundance at that time. It was during this period that "lions continued to cause tremendous damage to stock and it is intended to use poison on them as satisfactory staff for shooting can not be recruited". (Game Preservation Branch, 1951.)

The Common Jackal, *Canis aureus*, is still widespread and fairly numerous in most of the area. The Sand Fox, *Vulpes pallida*, was reported as living in large colonies on Jebel Marra (Thomas and Hinton, 1923) and was also caught on the Wadi Aribo, but it was not reported by Cloudsley-Thomson (1965) or Happold (1966) and it has probably undergone a severe reduction in numbers. Wild Dog, *Lycaon pictus*, were recorded from over 2,900 m on Jebel Marra (Lynes, 1921) and a pack was seen in S. E. Darfur in the middle 1950 s. (Sweeney, 1973). Both these were probably fortuitous meetings with vagrant packs from the north where they have been recorded fairly frequently.

Both the Striped Hyaena, *Hyaena hyaena*, and the Spotted, *Crocuta crocuta*, occur: the former is the less numerous of the two and probably does not extend to the southernmost part of the province.

Shortly after Darfur was re-incorporated into the Sudan the country to the north of the Bahr el'Arab was reported to be infested with Lions, *Panthera leo*, (Boyce, 1926) and in the midthirties, when what was probably the only purely sporting trip to Southern Darfur took place, both Lions and Leopards, *Panthera pardus*, were abundant (Henriques, 1938). As late as 1949 when 14 Lions had been poisoned and 5 shot in one month, there were still reported to be 28 in the Wadi Bulbul near Timbusku in central Southern Darfur (DMD April, 1949) and a pride of four Lions held up traffic for several days on the main Nyala — El Fasher road in 1954 (DMD January, 1954). A very few Lion now survive in the southwestern areas. Although the Leopard was reported to be "common" on Jebel Marra in the early sixties (Wickens, 1966) the information came from local sources and the term is undoubtedly only relative. There is one early report (SIR No. 270 June, 1917) of Cheetah, *Acinonyx jubatus*, in the Tebella Massif area in the north-west and at the aerial survey in 1976 Cheetah were again seen in the same area, although they are certainly very uncommon. One Cheetah cub was also brought to Nyala in 1948 (DMD December, 1948) and later flown to Dublin zoo. Little can be said of the past or present status of the smaller cats, there being only one record each in the literature of *Felis libyca*, the African Wild Cat, and *F. serval*. The Serval is seen occasionally but it is difficult to be sure about the wild cat because of its similarity to many feral domestic cats and the possibility of its hybridisation with them.

Various members of the Mustelidae and Viverridae occur but nowhere appear to be common. The Zorilla, *Ictonyx striatus*, is reported from Jebel Marra (Thomas and Hinton, 1923) and the Ratel, *Mellivora capensis*, is widespread. The Civet, *Viverra civetta*, was said to be frequent in the south (Browne, 1799) but many were kept "in cages in the houses of the rich", the women applying "the odour extracted from them to add to their personal allurements"; several have been seen in the foothills of Jebel Marra in 1976. Of the other viverrids only the Slender Mongoose, *Herpestes sanguineus*, has previously been recorded (Thomas and Hinton, 1923), but the Common Genet, *Genetta genetta*, the White-tailed Mongoose, *Ichneumia albicauda*, the Egyptian Mongoose, *Herpestes ichneumon*, and the Banded Mongoose, *Mungos mungo*, also occur.

#### TUBULIDENTATA

The Aardvark, *Orycteropus afer*, is recorded from south-west Kordofan (Setzer, 1956) and there is evidence of its presence in considerable numbers across central Southern Darfur, where it is often reported by cultivators as being a nuisance in their fields where it digs its burrows.

#### HYRACOIDEA

The Rock Hyrax occurring on Jebel Marra, *Procavia rufigeops marrensis*, is endemic to the mountain (Thomas and Hinton, 1923). The form found in

other parts of Darfur is referred to simply as *P. ruficeps*, but outside the mountain massif there are few suitable habitats and the animal is not at all common.

### PROBOSCIDEA

Ivory, second only to slaves, and followed closely by ostrich feathers, was for long one of the principal exports of Darfur. It is not surprising, then, that there are scores of references to it and to the Elephant, *Loxodonta africana*, in both official and unofficial sources.

Early reports regarding numbers and distribution are rather confusing. Browne (1799) contents himself with reporting their presence and twenty years later Burckhardt (1819) on the evidence of pilgrims questioned in Cairo remarked that they were "very common in the country". They were said to be very numerous in Southern Darfur in 1903 (SIR No. 104 March, 1903 ; SIR No. 105 April, 1903 ; French-Comyn, 1911) and between that year and 1913 quantities of ivory are reported being legally shipped out of Darfur (as well as the seizure of amounts of illegal ivory) often as part of the Sultan's tribute to the Sudan government, culminating in the sending to Mecca as part of the pilgrimage of 600 kg (SIR No. 231 October, 1913). Many tracks of Elephant were seen south-east of Zalingei and numerous Elephants were noted in the bush to the west of Zalingei in 1917 (SIR No. 270 January, 1917). Dugmore (1924), in spite of the rather grandiose title of his book, had obviously never been to Darfur and mentions, merely, that the Elephant presumably extends to there. Brocklehurst (1931) likewise does not specifically mention them in the context of Darfur. Shortly afterwards local hunters were said to be having to travel 35 days each way into French territory to the west to get big tusks and that only small tuskers moved into the Qoz Dango during every rains (Lampen, 1933). An increase in the price of ivory in 1944 led to an increase in the legal marketing of tusks from 15 in 1942 to 72 and 78 in 1944 and 1945 (DMD September, 1945) and in 1944 it was decided to impose an annual quota of six Elephants each on the two southern tribes of the Habbaniya and the Rizaygat (DMD July, 1946). (The Game Preservation Branch's efforts at conservation at this time — they had published a desire to buy wild animals — resulted in the capture of an Elephant by one enterprising individual who was intending to deliver it to Nyala to claim his reward : it was noted, perhaps with tongue in cheek, that the problem of transport from there to railhead — at El Obeid, almost 700 km away — was likely to prove difficult).

In the forties and early fifties Elephant appear to have been present rather far north in considerable numbers. There are numerous reports of crop damage during the harvesting period in the cold dry season : a large herd damaging crops in Western Darfur (DMD November, 1945 ; December, 1945 ; February, 1946) ; considerable damage in Dar Tebella in Western District (DMD, December, 1946 ; January, 1947) ; a big herd of Elephants 25 miles from Zalingei (DMD April, 1947) ; Elephant in Qoz Dango (DMD September, 1947) from whence they obviously moved north to raid crops in Dar Tebella again (DMD October, 1947 ; November, 1947) ; again damaging crops in Western Darfur (DMD October 1948 ; November, 1948 ; December, 1950) ; two herds of 40 each in Western Darfur (DMD October, 1949) ; "normal migration



reported through Zalingei" with damage to cultivation (DMD December, 1952) and "on routine annual move and drinking in places near Garsilla in Zalingei district" (DMD October, 1954 ; November, 1954). In 1951, however, it was estimated that there were 100 Elephants in Western Darfur with a sex ratio of four females to one male because of ivory poachers, in addition to a small herd usually being present in the Jebel Marra area (Game Preservation Branch, 1951).

In other areas they appear to have been rare, one herd of 23 cows and calves being reported in the south-west (DMD February, 1950) and two individuals being reported at Tullus, and later at Ragag, in central Southern Darfur (DMD September, 1954).

Two were seen on the southern slopes of Jebel Marra in 1966 and one was reported from Idd el Ghanam during the rains of 1972, but it appears that Elephants, probably because of harrassment in cultivation areas and poaching, are now confined to the very sparsely inhabited and tsetse-infested areas in the south-west of the province and even these areas are only visited during the rainy season. None was recorded during the aerial surveys of 1976.

#### PERISSODACTYLA

Rhinoceros were reported to be fairly numerous in the extreme south-west, between Hofret-en-Nahas and Kafia Kingi on a number of occasions in the early twentieth century (SIR No. 105 April, 1903 ; French-Comy n,1911) as well as having been previously recorded by Browne (1799) and Burckhardt (1819). These observations do not record whether it was the Black Rhinoceros, *Diceros bicornis*, or the White, *Ceratotherium simum*, which was seen. However, it was "pretty well established that White Rhino are still extant in South Kordofan and seems highly probable that it also exists in Southern Darfur" (SIR No. 114 January, 1904) : this presumably refers to the area north of the Bahr el'Arab. There do not appear to be any later references to them in Darfur other than in 1951 (Game Preservation Branch, 1951) which says that the "White Rhino possibly occurs along the Bahr el'Arab". The most recent actual report of Rhinoceros near to our area was, however, of Black Rhino in 1946 near to Wau about 300 km to the south of the Bahr el 'Arab (Blancou, 1958).

It is certain that neither species now occurs in Darfur, and they have probably been extinct in the whole province for at least forty years.

#### ARTIODACTYLA

Both Browne (1799) and Burckhardt (1819) record the Hippopotamus, *H. amphibius*, as present in Darfur. Mackenzie (1954) says that it is common in all tributaries of the Nile. With the one exception of Boustead (1971) who travelled in south-west Kordofan in 1933 and said that the Bahr el 'Arab was full of hippo at that time, there are no modern records for Darfur. Local residents say that an occasional hippo can be found in the area of the Bahr el 'Arab and Lake Kundi during the rains and the last remembered hippo in Western Darfur was killed near Nzili Pools on the Tchad border in about 1964.

Field (1974) saw four south of Kafia Kingi in early 1974 and thought there might be more : some were seen during the aerial survey in late 1976 but it is obvious that this animal has been severely reduced in numbers and restricted in range in the last 40 years.

The Bush Pig, *Potamochoerus porcus*, also occurs in the south. A reference to "wild boar" (SIR No. 105 April, 1903) almost certainly refers to this pig and four were recorded by game scouts in 1974 (Field, 1974). Elsewhere references to the Suidae are scanty and all refer to the Wartog, *Phacochoerus aethiopicus*. Brocklehurst (1931) records it to the fringe of the desert in the west and the distribution map of Mackenzie (1954) shows it as present in Darfur but no information is given on abundance. Testimony to the fact that the Warthog has long been common and widespread in the province is shown in the number of place names associated with it. During ground and aerial surveys from 1972 to 1976 it was still found to be abundant and ubiquitous and because of its prohibition as food for muslims its continued status should not be in doubt. It is probable that the Bush Pig, which is always difficult to see is also widespread and fairly numerous.

The Giraffe, *Giraffa camelopardalis*, was apparently widespread and numerous in Southern Darfur. So remarkable an animal was naturally commented on by both Browne (1799) and Burckhardt (1819). It was recorded many times by touring military and civil patrols from the extreme south-west in fairly dense savanna in the area of Kafia Kingi and Hofret-en-Nahas (SIR No. 105 April, 1903 - French-Comyn, 1911) to the north-west in the Tebella area (SIR No. 270 January, 1917) : it was also recorded about this period from Northern Darfur as far north as 16°50' N. The Sultan of Darfur, Ali Dinar, who, whatever his faults, could not be accused of lacking a sense of humour, on one occasion sent a live Giraffe to the Governor General of the Sudan as part of his tribute (Sudan Government Archives, Intelligence File 2/4-16, April, 1902). Giraffe have probably been seriously reduced in numbers owing to the practice of the Baqqara Arabs of hunting them on horseback — a full description of the hunting method is given by Cunnison (1956) — and more than forty years ago they were said to be confined to rough ground and thick bush because of hunting (Lampen, 1933), Mackenzie (1954) who allocates it to the subspecies *antiquorum*, shows its distribution as the whole of the southern part of the province, but remarks that it is scarce. In the former French territories of Tchad and the Central African Republic there was an estimated 6,000 Giraffe in the early sixties (Blancou, 1963), but these were said to have been reduced by shooting a few years later and they were rare in the Yata N'Gaya Reserve and the Andre Felix National Park in northeast C.A.R. but said to be increasing in south-east Tchad (Happold, 1969). This distribution to the west of the Sudan border appears to parallel that in Darfur within the Sudan : in the extreme southwest from Kafia Kingi to Hofret-en-Nahas, bordering the C.A.R. reserves there is still a number of these animals ; farther to the north where the Sudan borders Tchad at about 11° N, 23° E a few Giraffe, estimated at about 60 head, were present in April, 1976. No other Giraffe were seen at all in the other areas of the province between 1972 and 1976 and these sparsely populated areas are probably the only places where they are still extant, and where the aerial surveys have shown that they may total up to 1,800 head.

The Bovidae are well represented among the wild herbivores of Darfur with one or more members of the Tragelaphinae, Hippotraginae, Reducinae, Alcelaphinae, Antilopinae, Cephalophinae, Neotraginae and Bovinae being recorded: there are also records of an unidentified Dik-Dik, Madoquinae. Including the latter at least sixteen species have been recorded, and it is also possible that some vagrant, more northerly, species may occasionally have wandered into the geographical limits of Southern Darfur including the Addax, *Addax nasomaculatus*, the Scimitar-Horned Oryx, *Oryx dammah*, and the Addra or Dama Gazelle, *Gazella dama*: the Barbary Sheep, *Ammotragus lervia*, still to be found in some of the isolated hills and mountains of Northern Darfur does not appear to have ever been present in Southern Darfur.

The Giant or Lord Derby's Eland, *Taurotragus derbianus*, is said to have been much depleted by rinderpest to which it is very susceptible, in 1923-1927. (Brocklehurst, 1931). Although it is said to be very local and seldom found far from water, it was not recorded by the early military patrols, as it almost certainly would have been if it had been at all common, and it is likely that its numbers in the province have always been low, and that it has always been confined to fairly dense savanna in the extreme south-west. There is one note of a herd of 60 animals seen about 25 years ago (DMD February, 1950) and a very recent one of a herd of about 50 (Field, 1974); both records from the same area near the headwaters of the Bahr el 'Arab, and it is possible that this Eland continues to survive precariously at its former low levels.

The first apparent reference to the Greater Kudu, *Tragelaphus strepsiceros*, in Darfur was in the early nineteenth century (Burckhardt, 1819). Although recorded only on hearsay, and the descriptions being rather vaguely given as "about the size of a calf" the vernacular name 'Djalad' is quite specific. The first actual sightings were soon after Darfur was re-incorporated into the Sudan in 1916 (Gillan, 1918; Hobbs, 1918). These were on Jebel Marra, subsequent records also being from there — one stating that they were "fairly plentiful" (Hunting Technical Services, 1958). They were also reported to be found in fair numbers in Zalingei district (Game Preservation Branch, 1951): Brocklehurst (1931) also gives them as being present in west Darfur as does the distribution map of Mackenzie (1954). Recent hearsay evidence of their presence (Field, 1974) in the extreme south-west is of doubtful validity, and they probably do not occur in the province outside west Darfur. In the latter area they tend at present to be associated with outcrops of Basement Complex rocks in an area bounded by 11°30' to 13°00' N and 22°45' and 23°45' E where there are probably 400-500 and there are an estimated 200 head on the upper slopes of Jebel Marra itself centred on 13°00' N and 24°15' E. The population structure appears to be quite healthy and it is probable that the Greater Kudu is surviving very well where human and domestic livestock densities are not too great.

Bushbuck, *Tragelaphus scriptus*, have been recorded only from the area of Kafia Kingi, once in 1906 (French-Comyn, 1911), and again recently (Field, 1974) when a number was seen. Some were also seen in Western District during the aerial survey of 1976. Southern Darfur is at the Northern limit of the range of bushbuck and it is possible that any population which previously existed in other parts of the province but has died or been hunted out would not be replaced by immigration.

"There is also another animal, of the size of a cow, with large horns, called 'Abou Orf'. It is hunted by horsemen for its meat and skin" (Burckhardt, 1819). Once again the first record of a large mammal, in this case the Roan Antelope, *Hippotragus equinus*, is from hearsay, but it has been recorded several times since. They were present in numbers just north of Kafia Kingi (9°30' N) early in this century (SIR No. 105 April, 1903; French-Comyn, 1911), along the Bahr el 'Arab (Boyce, 1926) and again found in fair numbers in Zalingei district (Game Preservation Branch, 1951). Brocklehurst (1931) records them as "widely" and Mackenzie (1954) as "generally" distributed and fairly common to about 12° N. In Darfur at present their distribution appears to coincide with that of the Giraffe, although they are probably present in greater numbers, averaging perhaps 0.2 animals per km<sup>2</sup> over 10 to 15 thousand km<sup>2</sup>.

The Defassa Waterbuck, *Kobus defassa*, appears to have been first recorded in the area of Kafia Kingi (SIR No. 105 April, 1903) and has been reported occasionally since. The record head for the Sudan, with 38½ inch (97.8 cm) horns, was shot in 1920 in Southern Darfur (Brocklehurst, 1931) and the Game Preservation Branch (1951) recorded them as found in fair numbers in Zalingei district — as it did for Kudu, Roan, Tiang and Hartebeest. It was recorded during recent aerial surveys in the riverine bush along the Bahr el 'Arab but only in small numbers, and was also seen by Field (1974) and by the author in 1973. It can be deduced, however, from the paucity of records, that it has never been common or widespread.

The Kob, *Kobus kob*, recorded as Vaughan's Kob by French-Comyn (1911) and Mackenzie (1954) also still occurs in suitable habitats, with numbers and distribution similar to that of the Waterbuck. Over the western border of the Sudan in Tchad and the Central African Republic it is recorded to 13° N (Blancou, 1958) but it is unlikely to occur this far north in Darfur even though there are considerable areas seasonally suitable for it.

Rather surprisingly the Reedbuck, *Redunca redunca*, was never specifically mentioned by either early military patrols or later by any of the civilian administrators. Brocklehurst (1931), however, has it as common to 15° N which, he says, is the northerly limit and it is shown on the distribution maps of Mackenzie (1954) as being present north of the Bahr el 'Arab. Although it certainly does not occur as far north as 15° N in Darfur it is present in considerable numbers along stretches of the Bahr el 'Arab, where an estimated 450 were calculated from aerial surveys in 15,000 km<sup>2</sup> in the southeast of the province in December 1976, and in the area of its headwaters around Kafia Kingi and Hofret-en-Nahas, where densities equal to or greater than this were observed on the ground by the author in March, 1973, and considerable numbers were again seen a year later (Field, 1974). A small number also occurs close to the Sudan-Tchad border at about 12° N.

The Hartebeest, *Alcelaphus bucelaphus*, in Darfur was usually referred to in the early days as Jackson's, for instance in the extreme south-west, where it was recorded several times (SIR No. 105 April, 1903; French-Comyn, 1911) and to the east of Zalingei (SIR No. 270 January, 1917). Lynes and Lowe also collected three south-east of Zalingei along the Wadi Aribo, which were later described as *Alcelaphus lelwel tschadensis* (Thomas and Hinton, 1923): attention was drawn on this occasion to black markings on the fore and hind legs

which were "unusually pronounced for these parts", the chin being "always black". Almost 50 years ago it was said to occur as far north as Western Darfur (Brocklehurst, 1931) and 30 years later it was "very common" in all savannas (Mackenzie, 1954). At about the time of this latter reference a re-examination of three specimens from the Wadi Aribo in the British Museum — presumably those of Lynes and Lowe above — led to the conclusion that the Hartebeest in Southern Darfur was indeed *A. b. tschadensis* (Setzer, 1956). This Hartebeest is now relatively numerous in the extreme south-west of Darfur and in the sandy soil and Basement areas as far north as 12° N along the Sudan-Tchad border during the rainy season. Estimates from the aerial census indicate a total approaching 6,000 in late 1976.

The Korrigum, *Damaliscus korrigum*, does not appear to have been specifically mentioned in the early days: possibly the early military patrols did not distinguish it from the Hartebeest, as the Darfur Arabic for the two animals is the same. Brocklehurst (1931) described it as being widespread in the Sudan from the Uganda frontier to Western Darfur, the Darfur race being *D. k. korrigum*, this subspecies extending east into Kordofan, where it is replaced by *tiang*. Mackenzie (1954) considered *korrigum* to be scarce and confined to arid scrub in north-west Darfur outside the geographical area covered by this paper. Darfur also provided the Sudan record head of this species with horns of 28 and 27  $\frac{3}{4}$  inches (71 and 70.5 cm). Its distribution now is very similar to that of the Hartebeest but it certainly occurs in much smaller numbers.

Records of Gazelle occur on innumerable occasions and it is apparent that they have always been plentiful and widespread. It is rather less usual for the species to be mentioned although the ones seen on the first expedition into Western Darfur after its re-incorporation into the Sudan were Red-fronted, *Gazella rufifrons* (SIR No. 270 January, 1917). Lynes and Lowe obtained specimens of both this species and Dorcas, *G. dorcas*, in the same area of the Wadi Aribo and one Red-fronted from over 3,000 metres on Jebel Marra. Although Lynes (1921) had remarked, perhaps rather surprisingly, that Gazelle only occasionally entered the foothills. Both Brocklehurst (1931) and Mackenzie (1954) give the northerly limit of the Red-fronted at about 14° N while Setzer (1956) shows the southern limit of the Dorcas at about 12° N. Although there is probably some overlap in the distribution of the two species, the Red-fronted is by far the most abundant throughout Southern Darfur and still occurs in considerable numbers throughout the province in a variety of habitats. In two sample areas, one in the south-east centred on about 10° N, 27° E in an area of 15,000 km<sup>2</sup> there were an estimated 300 Gazelle in March 1975 (although more than 75 per cent of these were counted on about 3,000 km<sup>2</sup>); in the other, covering the whole of the 40,000 km<sup>2</sup> of Western Darfur, there were about 1,250 Gazelle, although these were concentrated in the south at a density of about 0.075 Gazelle per km<sup>2</sup> and on the upper slopes of the Jebel Marra itself at a density of about 0.1 per km<sup>2</sup>. The total number of Gazelle in the province is probably about 7,000.

Of the cephalophines only Grimm's Duiker, *Sylvicapra grimmia*, has been collected and positively identified (Thomas and Hinton, 1923). Brocklehurst (1931) gives its distribution as far west as Western Darfur but Mackenzie's (1954) map shows the northern limit at about 12° N. In fact it occurs in small numbers over a wide range of habitats throughout the province.

In the former French Central African territories the Oribi, *Ourebia ourebia*, was said to be found not farther north than 11° in the north east where it was there replaced by the Red-fronted Gazelle (Blancou, 1958). In Darfur, however, one male and one female were taken at about 12°45' N by Lynes and Lowe (Thomas and Hinton, 1923), and it is somewhat surprising in view of this that Brocklehurst (1931) said that it was not found in Darfur except in the extreme southwest corner and Mackenzie (1954) had it as common throughout central and southern Sudan but his distribution map showed it absent from Darfur. The Oribi is one of the commonest animals in the headwaters area of the Bahr el 'Arab (Field, 1976) and still occurs in the more northerly parts of Southern Darfur — I saw one myself east of Zalingei in April 1976 — although probably in very small numbers and in limited localities.

The Klipspringer *Oreotragus oreotragus*, has never been recorded in Darfur and there is little suitable habitat except on the Jebel Marra massif, but if it, as has been suggested, is present in the north-east of the Central African Republic (Blancou, 1958) it may possibly occur in isolated rock outcrops in the contiguous part of Darfur.

The status of Dik-Dik appears to be uncertain. None was collected by Lynes and Lowe but both Brocklehurst (1931) and Mackenzie (1954) have it as present in Southern Darfur, the latter giving it as common across the whole of Sudan, the former actually calling it *Madoqua saltiana*: perhaps both these references are attributions to a reference to Dik-Dik being seen between Kafia Kingi and Hofret-en-Nahas early in the present century (French-Comyn, 1911). More recently one has been seen on the southern slopes of Jebel Marra (Cloudsley-Thompson, 1965) but there are no other references in the literature and if it does occur it is now, as it must always have been, extremely uncommon.

The Buffalo, *Syncerus caffer*, naturally drew early attention to itself and both Browne (1799) and Burckhardt (1819) remarked its presence, the latter of course by hearsay, but they were reported to be in large herds and "very common in the country". Browne made a point of the fact that the Buffalo were in the Fur empire, that is in the northerly part of Southern Darfur, and Burckhardt is also probably referring to the north-west of the province. The early military patrols in the Hofret-en-Nahas area recorded them there (SIR No. 105 April, 1903; French-Comyn, 1911) but there is only one subsequent record (DMD July, 1945) when a bull buffalo which wounded two men near Kas was killed by spears. This latter was "at first thought to be a roan antelope, buffalo being seldom seen in these parts." Later in the year (DMD September, 1945) a small female buffalo thought to be the mate of the bull was seen five miles south of El Fasher, being described as the sensation of the month, no buffalo having been seen near Fasher within living memory. Almost certainly no buffalo have been in Southern Darfur since 1945, with the exception of the extreme south-west where they still occur seasonally in small numbers.

## DISCUSSION

Southern Darfur provides a variety of habitats suitable for a wide range of wildlife and it is certain that in the past wildlife were present in greater numbers than they are now. On the other hand, they have probably never

been particularly numerous except in the south and extreme south-west of the province. In this latter area 70 years ago it was possible to see "a lot of roan, buffalo, leopard, Vaughan's kob, dik-dik, hartebeest (Jackson's), waterbuck, bushbuck and 'fresh' tracks of lion, elephant, rhino and giraffe" all in a single morning's march with a large military patrol, and to find in a large village 109 elephant tusks of average weight under 5 kg. Farther north there were probably fewer animals even a hundred years ago although numbers probably increased temporarily during the period of the Mahdiya, when many Darfur tribesmen abandoned their domestic herds and moved to Omdurman, as is evidenced by a quotation in Moorhead (1960) "... in the province of Darfur... wild animals had taken possession of the empty plains".

After the return of these tribesmen in about 1898-1900 they set about rebuilding their herds, largely at the expense of the Elephant population whose ivory was traded for cattle (Cunnison, 1960). By the 1930s the Elephant had been much reduced in numbers and distribution over most of Darfur, but generally there were still large numbers of other animals, particularly in the south where the country was "teeming with game" (Boustead, 1971) and the area to the north of the Bahr el 'Arab was infested with Lion (Boyce, 1966).

Considerable numbers of the larger carnivores persisted into the late forties and early fifties as we have seen from the numbers reported as legally killed, but for the rest, numbers had already been much reduced and their range circumscribed to the remoter areas. Although there can be little doubt that fair numbers of Kudu, Roan and Hartebeest were still to be found in Western District in the late forties, it is unlikely that game was on the increase in Southern District as was said at the time (Game Preservation Branch, 1951). By this time the vaccination policy of the Veterinary Department had been in operation a number of years and domestic livestock were at this time already at a high level over much of the province.

With the exception of Elephants and the larger carnivores, and possibly Giraffe, it is the indirect effects of man and his animals — large increases in the numbers of both being due to peaceful conditions and improved medical and veterinary services — which have been responsible for the reduction in wildlife numbers. It is also noteworthy that the two most numerous large species in Southern Darfur — the Hartebeest and Roan Antelope — are almost insusceptible to Rinderpest (Carmichael, 1938) while highly susceptible species like the Buffalo, Eland and Giraffe have either disappeared or are found only in small numbers. Organised poaching for meat, skins or trophies is probably not very significant. The province is badly served by roads and there are very few motor vehicles other than market lorries and government vehicles and contact with the few remaining animals is rare, although such opportunities as there are are eagerly taken when they occur.

The semi-nomadic pastoralists who occupy much of the province have little against the wildlife. They provide little competition for graze and browse at the low biomass densities of 28 kg/km<sup>2</sup> even in the areas where the most game occurs, when domestic live-stock biomass averages 5,000-7,000 kg/km<sup>2</sup> over much of the province and 20,000 kg/km<sup>2</sup> for months at a time along the Bahr el 'Arab. These high stocking rates, and their effect on the vegetation will continue to exert inexorable pressures on the wildlife. Further reductions in numbers of most species of game are to be expected except in the south-

west where the tsetse makes the area unsuitable for most domestic stock and in areas close to this where wildlife are able to make use of land not used by domestic stock during the rainy season.

In general, the larger animals whose social structure requires them to live in groups have either already disappeared from the area or are doing so rapidly, the only notable exception being Hartebeest. Others, such as the Greater Kudu and the Gazelles which live in pairs or small groups are generally more numerous and will probably continue to survive precariously for some time.

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#### SUMMARY

The paper discusses the past and present status and distribution of 49 large mammals and refers to the literature on 40 smaller species in Southern Darfur, an area some 160,000 km<sup>2</sup> in extent in the west of the Republic of the Sudan.

Much of the information on past status and distribution has been taken from archival material which is not generally available while current status has been determined by ground and aerial surveys between 1972 and 1977.

Most species have undergone a severe reduction in numbers and suffered a contraction in their distributional range over the last 75 years, although only a very few animals which have been recorded in the province are not found there now.

The principal causes of the reduction in numbers and range are the indirect effects of man and his domestic animals through habitat destruction. This applies to all except Elephant and Giraffe, which have suffered from poaching and traditional hunting respectively; and the larger carnivores which were systematically exterminated as a livestock protection measure.

Due to the continuing influence of large numbers of domestic animals further reductions in the numbers and range of wildlife can be expected.

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#### BIBLIOGRAPHY

- BLANCOU, L., 1958*a*. — Distribution géographique des Ongulés d'Afrique Equatoriale Française en relation avec leur écologie. *Mammalia*, 22 : 294-316.
- BLANCOU, L., 1958*b*. — Note sur le statut actuel des Ongulés en Afrique Equatoriale Française. *Mammalia*, 22 : 399-405.
- BLANCOU, L., 1963. — A propos de la distribution de la girafe en Afrique. *Mammalia*, 27 : 311-312.
- BOUSTEAD, J. E. H., 1971. — *The Wind of Morning*. Chatto and Windus, London.
- BOYCE, A. A. R., 1926. — Daylight Hunting Lions. *Sudan Notes Rec.*, 9 : 83-84.
- BROCKLEHURST, H. C., 1931. — *Game Animals of the Sudan. Their Habits and Distribution*. Gurney and Jackson, London.
- BROWNE, W. G., 1799. — *Travels in Africa, Egypt and Syria from the year 1792-1798*. London.
- BURCKHARDT, J. L., 1819. — *Travels in Nubia*. John Murray, London.
- CARMICHAEL, J., 1938. — Rinderpest in African Game. *J. Comp. Path.*, 51 : 264-268.
- CHAPMAN, A., 1921. — *Savage Sudan: its Wild Tribes, Big-Game and Bird Life*. Gurney and Jackson, London.



- CLOUDSLEY-THOMPSON, J. L., 1965. — The Fauna of Jebel Marra, Western Sudan. *Sudan Silva*, 2 (16) : 24-28.
- CUNNISON, I. G., 1956. — Giraffe Hunting among the Humr Tribe. *Sudan Notes Rec.*, 37 : 49-60.
- CUNNISON, I. G., 1960. — The Social Role of Cattle. *Sudan J. Vet. Sci. & Anim. Husb.*, 1 : 8-25.
- DUGMORE, A. R., 1924. — *The Vast Sudan*. Arrowsmith, London.
- FFRENCH-COMYN, D. C. E., 1911. — *Service and Sport in the Sudan*. The Bodley Head, London.
- FIELD, P. A. G., 1974. — *Report on a Feasibility Study on a Proposed Conservation Area in Southern Darfur, Sudan*. Ministry of Overseas Development, London.
- GAME PRESERVATION BRANCH, 1951. — *Annual Report 1950-51*. Khartoum.
- GILLAN, J. A., 1918. — Jebel Marra and the Deriba Lakes. *Sudan Notes Rec.*, 1 : 261-267.
- HAPPOLD, D. C. D., 1966. — The Mammals of Jebel Marra, Sudan. *J. Zool., Lond.*, 149 : 126-136.
- HAPPOLD, D. C. D., 1967. — Additional Information on the Mammalian Fauna of the Sudan. *Mammalia*, 31 : 605-609.
- HAPPOLD, D. C. D., 1969. — The Present Distribution and Status of the Giraffe in West Africa. *Mammalia*, 33 : 516-521.
- HENRIQUES, R., 1938. — *Death by Moonlight*. Collins, London.
- HOBBS, H. F. C., 1918. — Notes on Jebel Marra, Darfur. *Geogr. J.*, 52 : 357-363.
- HUNTING TECHNICAL SERVICES, Ltd., 1958. — *Jebel Marra Investigations Report on Phase I Studies*. Ministry of Irrigation and Hydro-Electric Power, Khartoum.
- LAMPEN, G. D., 1933. — The Baggara Tribes of Darfur. *Sudan Notes Rec.*, 16 : 97-118.
- LEBON, J. H. G., and ROBERTSON, V. C., 1961. — The Jebel Marra, Darfur, and its Region. *Geogr. J.*, 127 : 30-49.
- LYNES, H., 1921. — Notes on the Natural History of Jebel Marra. *Sudan Notes Rec.*, 4 : 119-137.
- MACKENZIE, P. Z., 1954. — Catalogue of Wild Mammals of the Sudan occurring in the Natural Orders Artiodactyla and Perissodactyla. *Publs. Sudan Govt. Mus. nat. Hist.*, No. 4 : 1-21.
- MOORHEAD, A., 1960. — *The White Nile*. Hamish Hamilton, London.
- NACHTIGAL, G., 1889. — *Sahara and Sudan, IV Wadai and Darfur*. (Translated from the German by A. G. B. FISHER and H. J. FISHER, 1971). University of Los Angeles Press, Berkeley and Los Angeles.
- SETZER, H. W., 1956. — Mammals of the Anglo-Egyptian Sudan. *Proc. U. S. Nat. Mus.*, 106 : 447-587.
- SWEENEY, C., 1973. — *Background of Baobabs*. Collins, London.
- THOMAS, O., and HINTON, M. A. C., 1923. — On the Mammals obtained in Darfur by the Lynes-Lowe Expedition. *Proc. Zool. Soc. Lond.*, 1923 : 247-271.
- WICKENS, G. E., 1966. — *Present Land Use Survey of the United Nations Special Fund Jebel Marra Project in the Republic of the Sudan*. Food and Agricultural Organization, Rome.
- WILSON, R. T., and CLARKE, S. E., 1975. — Studies on the Livestock of Southern Darfur, Sudan. I. The Ecology and Livestock Resources of the Area. *Trop. Anim. Hlth. Prod.*, 7 : 165-185.