

movement, while the sperm, much reduced in size, is admirably adapted for rapid and long journeys.

In the highest forms these two conditions are most marked. Various stages of these modifications are met in the unicellular world, as already seen in *Pandorina*, *Eudorina*, and *Volvox*. In the case of *Pandorina* the conjugating cells are practically equal in size, in *Eudorina* an intermediate stage is witnessed, while in *Volvox* we have a marked differentiation both in size and mobility between the germ and the sperm. In the first two all the cells are vegetative, afterwards becoming reproductive ; in *Volvox*, however, we have one of the earliest indications of a definite separation, from the first, of somatic- or body-from reproductive- or germinal-cells.

SOME NOTES ON THE GAME ANIMALS OF JUBALAND

BY I. N. DRACOPOLI

Although Jubaland cannot boast of the quantity or variety of game found in other parts of the East African Protectorate, yet the study of those animals that are encountered within its borders cannot fail to interest the traveller, and this is especially the case with the race of Grant's gazelle and the zebra, that inhabit the more open districts of the country lying between Kismayu and Birkau to the west of the sandhills, and Hunter's antelope, which roams through the scrub-covered wilderness that stretches between the Tana and the Lak Dera. In the following notes I shall confine myself to a short description of these three animals, specimens of which I obtained myself in Jubaland.

Hunter's antelope belong to the sub-family *Bubalidinae*, and constitute part of a small group of ruminants known as 'Bastard Hartebeestes,' to which also belong the Topi (*Damaliscus corrigum*) the bontebok (*D. pygargus*), the blesbok (*D. albifrons*), and the tsessebe (*D. lunatus*). They are closely

akin to the typical hartebeestes (*Bubalis*) from which they are distinguished by the more moderate length of face, by the absence of the horn pedicle and by the simple lyrate form of the horns, while the withers are much less elevated above the hind quarters.

Standing about forty-eight inches at the shoulder, the arrola or Hunter's antelope (*D. Hunteri*) is of a light and attractive build while the horns are of a simple and graceful form—slanting first outwards and upwards, then bending backwards, after which the long slender points are directed upwards and outwards. The horns are heavily ringed for the lower half of their length, after which they are quite smooth. In young bulls the slender points are turned inwards, and may even cross and it is interesting to note that this sign of immaturity is also found in the impalla (*Æpyceros melampus*) and is due to the rotation of the horny sheath on the bony axis during growth. But, in the considerable number of female arrola that I saw, the inward inclination of the tips was never so pronounced as in the case of young bulls. This may be explained, perhaps, by the fact that the horns in the females are shorter and lack the strong backward bend so noticeable in the males.

The face is of medium length without any horn pedicle: the cheek teeth are remarkably large and are peculiar in that there are only two instead of the usual three premolars in the lower jaw.

The face glands were remarkably developed in all the specimens I shot and the pits in the skull corresponding to them, though shallow, were large. The glands are surrounded by white hair, and the central cavities exude a thick dark-coloured excretion. Lateral hoofs of large sizes are present. The arrola is of a uniform pale *café-au-lait* colour, the cows being somewhat lighter than the bulls. The inner surface of the ears, the belly, and the tail are white as in the inverted chevron on the forehead which joins the two white patches round the eyes. A marked peculiarity, found, I believe, only in this species, is a large roll of loose skin, underlain with fat, situated just behind the horns across the skull between the ears and the horns. This is especially noticeable when the

animals are in good condition and it is more fully developed in the males than in the females. What purpose it may serve, I am unable to say.

Writers on the game of East Africa have stated that the arrola is found on 'the plains bordering the Tana' or merely in great numbers in Southern Somaliland (!!) This is very misleading, and I took especial pains to discover the limits of its range. I have come to the conclusion that they are not found west of longitude 40° E. or north of latitude 0° 35' S. They do not inhabit the country south of the Tana nor the district immediately adjacent to the coast. The Somali apply the word 'arrola' to the impalla as well, and this has led to the report that Hunter's antelope is to be found in the Lorian district. This report I cannot credit, as the country near the swamp is unsuitable to their habits, and I saw no trace of any kind while I was there to lead me to believe they were to be found in that district.

Of greater interest, perhaps, to the naturalist than to the big game hunter is the race of Grant's gazelle, inhabiting the coastal region of Jubaland north of the Aruoleh River. In 'The Game Animals of Africa,' by Mr. R. Lydekker, F.R.S., it is stated, on the authority of Mr. O. Neumann, that Grant's gazelle is not found within 150 miles of the sea, its place there being taken by the closely allied form, Peter's gazelle. The latter animal was originally described in 1884 as a distinct species, but it is now generally regarded merely as a race of Grant's gazelle. Moreover, it was commonly believed that *Petersi* gazelles were to be found all along the coast north as well as south of the Tana. On investigation this, however, proved to be quite an erroneous idea, and my own experience leads me to believe that *Petersi* gazelles are not found anywhere north of the Tana, and in this Mr. A. B. Percival agrees with me. Their place along the coast between the Tana and the Juba rivers is taken by a closely allied race, almost perfectly intermediate in form between *G. G. Brighti* and *G. (Granti) Petersi*.

It differs from the former in its smaller bodily size, the paler tint of its body colour, and in its shorter and straighter horns, while the white area of the rump patch intrudes even

further into the fawn of the back, completely surrounding the tail. The dark bands to this patch, which in the *G. G. Brighti* are well-nigh obsolete, are in this race broad, black, and well defined.

It resembles *G. (Granti) Petersi* in its small bodily size, and in the shape and length of its horns, but differs from it in the character of the rump patch, and in the absence of flank bands which are present, though faint, in the adult *Petersi* of both sexes. The fawn of the back in the latter race is extended

	No. 1. <i>Equus B. Granti</i> , shot on Athi Plains	No. 2. Shot in Joreh, Jubaland
Stripes . . .	Black, broader than intervening spaces	Black, narrower than intervening spaces; more numerous than in No. 1.
Dorsal stripes	Broad in centre, narrowing towards tail and withers	Very narrow: connected by two short black patches with nearest obliquely longitudinal body stripe
Ventral stripes	Medium	Narrow
Nose stripes . .	Ten	Eleven
Ears . . .	Striped	White, edged with black
Pasterns . . .	Stripes fused into black patch	Fully striped (not fused) to hoof
Tail . . .	White with black blotches detached from medium black strip	Fully striped. Tail tuft very full
Mane . . .	Medium, chiefly black. A few white hairs with black tops	Absent as though clipped

so as to divide the white of the rump patch into two equal halves and continues down the upper surface of the tail.

The *G. G. Brighti* is found in considerable numbers in the Lorian district, and I believe also to the north, but in Southern Jubaland no Grant's gazelle is to be found between Lorian and the district of Joreh. It would seem probable that *G. G. Brighti* and the race under consideration merge into one another somewhere near El Wak, and it would be interesting if specimens of the gazelle from that district could be obtained for comparison.

In Northern Jubaland and in the Lorian district Grévy's zebra is met with in considerable numbers, but it does not occur anywhere between the Lak Dera and the Tana. Here

arid conditions obtain their maximum development and only essentially desert dwellers are found within the borders of that inhospitable region. But in Joreh and Biskaya there are a very few zebra closely akin to the *E. Burchelli Granti*. I was unable to obtain a sufficient number of specimens to be satisfied that the differences I noted were constant, or were due merely to individual variation or peculiarity.

I include the table on p. 120, which may be of interest.

In conclusion, I may say that the giraffe (*G. reticulata*) occurs in astonishing numbers, elephants are fairly plentiful, but buffalo, rhino, and lion are extremely scarce. Topi, oryx, and lesser kudu are to be met with frequently in Joreh or Biskaya, and gerenuk and dik dik are common enough throughout Jubaland. In all the larger antelopes, however, except at Lorian, the effects of scanty grazing and the severe physical conditions of the country they inhabit are shown in their small bodily size and horn measurement, and this is especially noticeable in the topi and the oryx.

SOME NOTES ON FISHES IN BRITISH EAST AFRICA AND UGANDA

BY F. G. AFLALO, F.R.G.S.

Looking at the fishes of the two Protectorates from the angling, and not the museum, standpoint, the traveller is certain to be amazed by at once (apart from those of the coast, which are for the most part travellers themselves) the remarkable lack of variety of type and the excellent sport which they afford.

Of the koli-koli, nguru, and other kinds to be found at Mombasa, Mr. R. J. Cuninghame has already written most instructively in these pages, and I gladly endorse his remarks, with the rider that, treating his subject perhaps intentionally from a somewhat academic standpoint, he did not, if memory serves me (and it must be nearly three months since I read