

Psophia it is B,XY, as it is in *Cariama* (in *Chunga* B is also absent). In *Balearica regulorum* the formula is XY; in *Grus antigone* it is AB,XY, the femoro-caudal being reduced to almost a thread; in *Anthropoides virgo* the formula is AB,XY, as it is in *Ibis* and *Platalea*, as well as in *Eurypyga*. Myology therefore does not militate against the Gruine affinities of *Aramus*.

Further, as in *Grus*, the tensor fascia covers the *biceps cruris*; the *biceps humeri* muscle sends a special belly into the patagium; the *expansor secundariorum* is Ciconine; the obturator internus has a triangular origin*.

Alimentary canal.—The *tongue* is $2\frac{1}{2}$ inches long, very slender, quite smooth, nearly cylindrical, and tapering to a fine point in front. It has a slight papillary fringing at its posterior edge. The *œsophagus* is very capacious, although no crop is developed. The *proventriculus* is zonary; its glands are cylindrical and short. Between it and the gizzard is a capacious dilatation of the termination of the gullet, lined, apparently, with squamous epithelium, the volume of which is greater than that of the interior of the gizzard itself. The gizzard is not large, and its muscular walls are not thick. The *liver* has the left lobe a little larger than the right, a condition far from common among birds; the gall-bladder is present. The average-sized, or slightly narrow, *intestines* are 40 inches in length. The *cæca* are somewhat dilated toward their blind ends; they are 2 and $2\frac{1}{4}$ inches long. They are peculiar in being situated laterally, and close together, instead of opposite one another, a condition approximated to in most of the non-columbine Schizorhinal birds, and in them only; the small intestine therefore enters the colon by a lateral, slit-like opening. In the Cranes the *cæca* are generally between 5 and 6 inches long; and they being so much larger, the comparative size is much the same. In *Ibis*, *Platalea*, and *Eurypyga* they are very much shorter; in *Cariama* they measure 10 inches, whilst in *Psophia* their length is much the same as in *Aramus*.

2. On the past and present Geographical Distribution of the Large Mammals of South Africa. By T. E. BUCKLEY, B.A., F.Z.S.

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After I had made arrangements for an expedition to South Africa, principally for the purpose of sport, in 1873, the University of Cambridge offered me a grant from the "Wort's Fund," on the condition that I should send home a collection of specimens equal in value to the amount of the grant, and should also make a report to the Vice-Chancellor, detailing any observations that I thought of sufficient importance to be preserved.

As the larger Mammals are yearly receding further into the interior, and as their total extinction is only a question of time, I thought I

* For further reference to these points, *vide* P. Z. S. 1876, p. 195.

could not do better than set down the limits of each of the most important species at the time of my visit, as accurately as it was in my power to ascertain them, adding thereto such particulars as could be obtained from the accounts of former travellers, as to the range of the species at the time of their visit.

Considering the number of people who year by year visit South Africa for the purpose of shooting, it is wonderful how very little, comparatively speaking, has been written on its zoology. Many books on the sport to be met with there have appeared at different times; and from these a great deal may be learnt; but this information requires a vast amount of collating and sifting. On the larger mammals, of which we are now alone speaking, Harris's 'Wild Animals of Southern Africa' is perhaps the best book, giving, as it does, a plate and description of all those met with by the author. Dr. A. Smith's work on the Zoology of South Africa gives us descriptions and plates of only ten of the larger animals: the plates are decidedly inferior to those of Harris; and the colouring in one or two instances is wrong. These two are the latest works on South-African mammals; and when we consider the enormous number of animals killed year by year there, and the consequent impending extermination of these creatures, some of which even now are extremely scarce, it is to be hoped that some one will before long take in hand to set forth their complete life-history.

I am glad to say that now there are game-laws both in Cape colony and Natal, which, late though it is, will at least preserve a remnant of some of the larger animals, such as the Hartebeest and Eland. Of the smaller Antelopes there are still plenty; the existence of any of the larger species in the colonies will be noticed under the proper heading, when I could get reliable information concerning them.

The Tsetse fly has been of great service in preserving animals, comparatively few hunters caring to shoot on foot in such a hot climate. This is the reason why the Zulu country has so long held large game, its southern boundary being only some seventy miles from D'Urban; but now, since it has become the fashion for the hunters to arm natives to shoot for them, even in this country, favoured as it is by abundance of grass, water, and shelter, extermination is going on rapidly—so much so that a friend writes me saying that after next winter he does not think that it will be worth his while going to hunt in his old haunts; and yet this very country only some ten or fifteen years ago swarmed with game to an incredible extent. The result of the extermination of the game is that the Tsetse disappears, thus giving a greater extent of country for the rearing of domestic cattle.

The Tsetse appears to be found mostly where there are large herds of buffaloes, and is said, in some cases, even to migrate with these animals; at other times it appears a very local insect,—in one case a well-beaten road up country passing very close to its haunts; and, I believe, at night cattle may be driven through these localities with perfect safety, care being taken to be outside before the break of day.

My route from Natal was as follows:—I left Pietermaritzburg on the 15th of May, crossed the Drakenberg range on the 6th of June; on the 8th the bullocks were lost, which delayed me about a week; but I reached Pretoria on the 28th of June. I left again on the night of the 30th, and struck the Crocodile or Limpopo river on the 10th of July, and travelled slowly along the river for the sake of some shooting. Bamangwato was not reached until about the 5th or 6th of August. I was detained here about a week, but at last left on the 12th. Unfortunately I took a wrong road on the way to the Tati, and had to retrace my tracks for some considerable way, which delayed my arrival there until the 28th of August. I left the Tati on the 1st of September, and reached the Samouqui river, my furthest point, about the 12th of the month. The route on my return journey was precisely the same, but took less time, owing to the much lighter load to be carried down. My waggon arrived in Pietermaritzburg on the 3rd of January 1874.

My stay in the country having been very short, from the end of April till the middle of the following January, and not much more than the half of that time having been spent in a game country, my notes cannot be very extensive. I shot twenty-two different species of animals, and saw others,—a fair number, considering I had to do all my shooting on foot, and with very little aid from the natives.

I have been aided in my notes by friends whose experience was much greater than mine, and also by such books as I could get; but, being so far away from a library, there were, of course, many to which I could not refer: this must be taken as an excuse for many errors into which I may have fallen. I have purposely avoided giving descriptions of any animals, as they are mostly described in Harris's book from actual specimens.

In the Table exhibited (see pp. 291, 292) I have endeavoured to give the geographical distribution of these larger animals in Southern Africa, as far as I could gather it, both at present and formerly; but I could get no information concerning Natal and the countries immediately south of it, though it is probable that the coast-line, where it represents the Zulu country, would be occupied by the same animals.

Apparently most of the South-African Antelopes have their representatives to the north and west; thus the Waterbuck is represented by the Sing-Sing on the west, and the Méhédet of Baker on the north. Many other instances might be mentioned. Some species, again, are common to the whole of Africa, as the Giraffe and one species of Black Rhinoceros; others, again, are very limited in range, as the Blesbock.

The horns of all species of Antelope, whatever their shape may be hereafter, are the same when young, and consist of two small stumps three or four inches long, standing almost straight up. While the horns are growing, especially during summer, their bases are quite soft, and for a considerable way up can be pulled off in flakes.

1. ELEPHAS AFRICANUS. (The Elephant.)

Excepting the few still preserved by Government in the Knysna

Forest, the Elephant may be considered extinct in the Cape colony and Natal. Seven and twenty years ago it was found in the bush around the town of D'Urban in the Natal colony, but now is almost exterminated even in the Zulu and Amaswazi countries. In the great reed-beds that exist in the neighbourhood of Santa-Lucia Bay in the former country, a few still remain, owing to the almost impossibility of getting at them; and in the Amaswazi country a few, I am told, are occasionally found under the Bombo Mountains. North of Delagoa Bay they get more numerous, especially so, I am told, in Umsila's country. In the Matabili land the Elephant is to a certain extent preserved, no one being allowed to hunt these animals without the permission of the king. North of the Zouga they are still fairly numerous; but with the immense number of hunters and traders, the destruction must be great indeed, and bids fair to exterminate the race in South Africa altogether, especially when we consider the very slow rate at which these creatures increase, and that cows and bulls are shot indiscriminately.

North of the Zambesi the Elephant is found through Central Africa into Abyssinnia, and along parts of the west coast. In some places they occur in vast herds, as seen by Livingstone (Zambesi Tributaries, p. 134), cows and bulls together. The number of trees destroyed by these animals is enormous; along the rivers Makloetze and Shashai, in the Bamangwuto district, the thick mimosa-groves which border their banks have been altogether destroyed by the ravages of these creatures.

The tusks of the cow Elephant are much thinner than those of the bull; but the hollow inside does not extend so far down. The largest tusk I heard of was one brought from Lake Ngami in 1872; this weighed 170 lb.; but its fellow was rotten and worthless. I have seen a pair weighing 90 lb. each; but such a perfect pair are, I believe, not common.

When Elephants are disturbed by shooting now, they often go great distances, passing through a large extent of thirst-land to a distant water; so fearful are they of fire-arms.

2. RHINOCEROS KEITLOA. (The Keitloa Rhinoceros.)

3. RHINOCEROS SIMUS. (The White Rhinoceros.)

Of African Rhinoceroses there are at least three distinct species, the fourth, *R. oswellii*, being, I fancy, rather a doubtful one. The two "black" species are *R. bicornis* and *R. keitloa*; they may at once be distinguished from the White Rhinoceros by their overhanging upper lip, which enables them to grasp the bushes on which they, I believe, exclusively feed. The only black species I met with was *R. keitloa*, observed on two occasions—once singly, another time an old female and her calf about half-grown, which latter was secured. Owing to incessant persecution these animals are now getting scarce, eight Rhinoceroses only having been seen by our party. At one time they must have been extremely common, judging from the number of skulls seen lying about. Harris, in his description of *R.*

simus, mentions having seen eighty of these animals in a day's march; and on one occasion in the space of half a mile he saw twenty-two and had to kill four in self-defence. A friend of mine whom I met on his way down from the Zambesi, told me he had only seen five, all *R. simus*, and all of which he secured.

At one time it was not at all uncommon to see *R. simus* with the anterior horn close on 3 feet and upwards in length; now, however, such animals are rare, most likely from the animal being shot down before it arrived at its full size. The dung of the black and white species differ materially; for whereas that of the former is light-coloured, more resembling that of an Elephant, that of the latter is very dark and much softer: thus a hunter, should he not be experienced enough in "spooring" to know which species he was after, would immediately do so on seeing the dung. Each species of Rhinoceros drinks every night, as may be seen by going in the morning to a waterhole, where their fresh spoor may be found, and the water is generally churned up into a filthy mass of mud. After leaving the water they go a long distance in Indian file should there be two or three together, when they spread out and begin to feed. Having had sight, by studying the wind and quietly (for a Rhinoceros is very quick at hearing) placing one's self near the line in which they are advancing, one may get an easy shot at any distance.

Nearly every Rhinoceros is accompanied by a few individuals of *Buphaga africana*, which rid it of its parasites and give it timely warning of danger. When the animal runs, these birds accompany it, hovering over it like flies above a horse's head, uttering a note something like *chirri-chirri-chit-chirri* all the time. The White Rhinoceros may often be found standing under a tree in the open plains; and at such places the dung collects into enormous masses, showing that the beast comes to the same tree day after day; when the mass gets very high the animal levels it with its horn. The Boreli (*R. bicornis*) always lives in the bush, and is one of the few animals that will charge and hunt a man unprovoked; this species often has a sore place behind the shoulder, which is supposed by the natives to be one of the causes of its savageness. *R. keitloa* is generally known to the hunters by the name of the Blue Rhinoceros.

4. EQUUS QUAGGA. (The Quagga.)

The animal commonly so called, is Burchell's Zebra; the true Quagga I never saw, though Harris mentions it as occurring in great herds, but only to the south of the Vaal river. Whether, since his time, it has become extinct or not is a question; but the few animals of this genus that were seen on the open plains were all clearly Burchell's Zebra. Some few years ago the three species of this genus were in little repute for their skins as compared with the Wildebeest and Blessbok; but of late years it has been discovered that they are of great use for, I believe, connecting-bands for machinery; at any rate their value increased so much that they have been shot down, until you may go for a week through the "High Veldt" and not see one, although there will be thousands of other animals.