

therefore a most difficult, almost a hopeless task to work out the synonymy with any degree of satisfaction. In conclusion, I may venture to express the hope that any ornithologists here present who may not hesitate to plunge into so misty a subject as Eagles will render me what assistance they can in the prosecution of my researches. I have just received a note from Mr. W. E. Brooks stating that he is busy on this subject and that we may soon see his opinions in print, so we shall be able to judge as to whether he and I agree in our conclusions. I must apologize for bringing forward the matter before having *fully* worked it out, but have done so hoping thereby to obtain further information than I otherwise should do.

June 3, 1873.

The Viscount Walden, F.R.S., President, in the Chair.

The following report by the Secretary on the additions to the Society's Menagerie during the month of May 1873 was read:—

The total number of registered additions to the Society's Menagerie during the month of May 1873 was 188, of which 55 were by birth, 52 by presentation, 54 by purchase, 7 by exchange, and 20 received on deposit. The total number of departures during the same period, by death and removals, was 105.

The most noticeable additions during the month were:—

1. An example of the new Chinese Water-Deer, described and figured in the Society's 'Proceedings' by Mr. Swinhoe as *Hydropotes inermis* (P. Z. S. 1870, p. 89, pl. vii.), presented to the Society by Mr. Swinhoe, and received May 8th.

The animal is very shy, and hardly bears to be looked at. Its general appearance is well given in the figure above referred to; but the fur is not at present so rufous in colour. The large canine teeth are exerted and plainly visible.

2. Five Terrapins, procured by Mr. Swinhoe at Ningpo, and forwarded by the same opportunity, belong to two species—*Clemmys reevesi* (Gray), and an allied species, probably new, concerning which I propose to give particulars on a future occasion*.

3. Four Indian Hedgehogs, presented by Mr. Andrew Anderson,

* Whilst preparing my notes on this subject, I have been anticipated by Dr. J. E. Gray, who, in the 'Annals' for July last, has described the new species as *Damonia unicolor*, from examples in spirits sent to the British Museum by Mr. Swinhoe (Ann. N. H. ser. 4, vol. xii. p. 77). Dr. Gray gives "Shanghai" as its habitat; but Mr. Swinhoe, in a letter to me dated Shanghai, March 13, 1873, says:—"In Ningpo I procured two species; three of each of which I brought here with me. One I make to be *Emys reevesi* (Wong-po, 'wong' meaning yellow), the other, a dark purple species (Woo-cheu, 'cheu' meaning black), is probably new."

There can be no doubt, therefore, that Ningpo (and not Shanghai) is the proper habitat of this species, for which I shall adopt Dr. Gray's specific title *unicolor* instead of the MS. name which I had given to it in the Society's Gardens, and shall enter the species in our register as *Clemmys unicolor*.

The accompanying illustration (Plate XLIV.) represents the dorsal view of

F.Z.S., of Futtteghur, N.W.P., and received May 17th, are apparently referable to *Erinaceus collaris*, Gray. I am not aware that this animal has been previously brought alive to Europe.

4. Three Guans of the genus *Pipile*, purchased, along with other animals received from Para, of a Liverpool dealer, May 25th, appear referable to *Pipile cujubi* (Pelzeln)*, a scarce species even in museums, and one that I have never previously seen alive.

5. A second example of the New-Caledonian Rail (*Ocydromus lafresnayanus*), presented by Dr. G. Bennett of Sydney, and received by the 'Paramatta,' May 28th. It has been placed in company with the former specimen of this rare species (received in 1869), for which we are indebted to the same generous donor.

I am sorry to have to add that some Fruit-Pigeons of the Samoan Islands (*Ptilonopus fasciatus*), and other birds, sent to us by our Corresponding Member Mr. Whitmee† by the same opportunity, were lost during the voyage, with the exception of a Porphyrio (*Porphyrio indicus*).

A letter was read from Dr. G. Bennett, referring to the supposed existence of a species of Tree-Kangaroo (*Dendrolagus*) in Northern Queensland, some such animal being apparently well known to the blacks of Cardwell.

Mr. Sclater remarked that this might account for the stories of the supposed "Native Tiger" in the same country ‡.

Sir Victor Brooke exhibited a skin and two skulls and two mounted heads of the Andean Deer (*Cervus antisiensis*), which had been sent to him by Mr. Henry, of Lima, Peru. Mr. Henry had obtained them from the neighbourhood of Tinta, Peru. The skull of the female so closely resembled that of the so-called *Xenelaphus leucotis* of Dr. Gray, of which Sir Victor had likewise a typical specimen obtained by Mr. Whitely, that there could be no doubt of their belonging to the same species, whereas the head of the male perfectly agreed with D'Orbigny's figure. He had therefore no hesitation in agreeing with the view recently put forward by Mr. Sclater (Ann. N. H. ser. 4, vol. xi. p. 213), that the horns described and figured by Dr. Gray, P. Z. S. 1869, p. 496, were merely a monstrous form of those of *Cervus antisiensis*.

The following objects were exhibited:—

1. An egg of the Spotted Bower-bird (*Chlamydodera maculata*), obtained by Mr. A. N. Foot in Northern Queensland, and a photo-

Clemmys unicolor from one of the specimens living in the Society's Gardens. It is readily distinguishable from its near ally *C. reevesi* by the generally darker colour of the shell, and the absence on the head of the bright yellow lines which in *C. reevesi* border each side of the occiput.

* Cf. *Scl. et Salv. P. Z. S.* 1870, p. 530.

† See *antea*, p. 152.

‡ See *P. Z. S.* 1871, p. 629, and 1872, p. 355.

graph of the egg of Flinders's Cuckoo (*Eudynamys flindersi*), dropped by a bird shot by Mr. Masters, Subcurator of the Australian Museum. The latter was of a uniform white. These were sent for exhibition by Dr. G. Bennett, F.Z.S., of Sydney, N.S.W.

2. A series of photographs of various novelties lately added to the Australian Museum, Sydney, transmitted to the Society by Mr. G. Krefft, C.M.Z.S. Amongst these were figures of a supposed new venomous Snake from the Northern Territory, discovered by Mr. T. G. Waterhouse, of Adelaide, and supposed to form the type of a new genus; also of a new species of *Chelodina* from the Burnett River, Queensland.

3. The skin of the adult *Casuarus bicarunculatus* figured P. Z. S. 1872, p. 495, pl. xxvi., which had died April 1, 1873, exhibited by the Secretary, who, in reference to some previous remarks on the distribution of the Cassowaries, read the following extract from a letter addressed to him by Dr. George Bennett, F.Z.S., of Sydney:—

“I observe, in the Society's ‘Proceedings’ for 1872, p. 150, it is mentioned that the habitat of the Mooruk (*Casuarus bennetti*) is the Solomon Islands as well as New Britain. This must evidently be an error, and appears to be founded on a specimen of that bird at Auckland, which was supposed (certainly erroneously) to have been brought from the Solomon Islands.

“Now I have never heard from any of the traders to the islands that the Mooruk had ever been found at any other island than that of New Britain; and if a Cassowary had been found at the Solomon Islands it would probably be of a new species.

“When at Brisbane, I met Captain Fergusson, of the ‘Captain Cook,’ who had visited the Solomon Islands, New Britain, and New Ireland, and had obtained two living Mooruks, which died on the passage, and also a number of eggs; but he told me he had obtained them at New Britain. I recollect a Mooruk was sent to Sir George Grey from Sydney; and very probably the one alluded to is the identical bird.”

Mr. Selater added that he had no doubt that Dr. Bennett was correct, and that the Solomon Islands should be expunged from the habitat of *Casuarus bennetti*, as given *l. s. c.*

4. A series of skins and skulls of the new Muntjac from Ningpo, China, lately described by Mr. Swinhoe as *Cervulus sclateri* (P. Z. S. 1872, p. 813).

These embraced a skin and skull of an adult male from Ningpo, killed in November 1872, a flat skin with skull of another male, killed at Kinkiang in January 1873, and a skin and skull of a young female, killed at Ningpo in November 1872.

These were sent for exhibition by Mr. Swinhoe.

Lord Walden read a memoir on the Birds of the Philippine archipelago, commencing with the following preliminary remarks:—

“In the month of December 1871 and the first three months of the following year some of the principal islands of the Philippine archipelago were visited by Dr. A. Bernhard Meyer, the well-

known German naturalist. During that short period this indefatigable collector obtained a large series of ornithological specimens, representing ninety-six species. The islands visited by him were Luzon, Negros, Zebu, Cuyo, and Guimaras, the last being a small island adjoining the southern coast of Panay, and lying in the channel which separates Panay from Negros. Hitherto most of the authentic so-called Philippine specimens of birds contained in European collections have been procured in Luzon, collected at no very great distance from the town of Manilla, its capital; and nearly all the zoological travellers who have visited the Philippines have confined their researches to the vicinity of that town. It follows, consequently, that 'the Philippines,' so frequently occurring as a geographical expression in our lists, from the days of Brisson to the recent date of Mr. G. R. Gray's 'Hand-list,' must be taken to mean the country adjacent to the town of Manilla. To this rule Sonnerat is an exception.

"After residing at Manilla, and forming collections in the interior of Luzon, Sonnerat visited Antigua, the capital of the island of Panay, and then Zamboanga, the chief Spanish settlement in the large island of Mindanao. Panay does not seem to have been revisited by any ornithologist*; but in 1839, D'Urville's second expedition in the 'Astrolabe' remained two months at Zamboanga, and obtained a few zoological specimens.

"It is possible that the late Mr. Hugh Cuming may have visited all these localities and many others during his long residence in the Philippines; but as his large collection of birds was broken up without being catalogued, and as they were brought to Europe at a time when geographical distribution attracted less attention than now, we possess no published record of the exact localities where his specimens were obtained†.

"After Sonnerat fifty-eight years appear to have elapsed before the Philippines were again visited by an ornithologist, when in 1829 Kittlitz touched at Manilla, and there procured several undescribed species. Since that date Manilla has been visited from time to time by different travellers and exploring expeditions, and new species have been obtained, which on being brought to Europe have been described and named‡. In 1871 new ground was broken by Mr. L. C. Layard, who made a small collection of birds in the islands of Negros and Guimaras§; and, lastly, Dr. A. Bernhard Meyer has explored the equally unknown island of Zebu. Dr. Meyer having with great courtesy placed the great bulk of his collections at my

* At least there does not appear to be any published record of Panay having been again visited, although Mr. Cassin (U.S. Exp. Exped. p. 143) certainly enumerates an example of *Irena cyanogastra* as having been obtained in this island.

† A large portion of his ornithological collection was made in the southern part of the island of Luzon (cf. P. Z. S. 1839, p. 93); but it has since become scattered, and the individual specimens cannot now be identified.

‡ For a full account of the principal ornithological collectors in the Philippines, cf. Dr. v. Martens, Journ. f. Orn. 1866, p. 5.

§ Cf. Ibis, 1872, p. 93.

disposal, it was my original intention to confine myself to a bare catalogue of its contents; but, it having been suggested to me that a complete list of the known Philippine* birds would prove more generally useful, and would supply a want much felt in the ornithological literature of the Indian region, I have ventured, with much diffidence, to prepare this catalogue of authentic Philippine birds. It is true that a valuable list of the Philippine birds has already been published in 1866 by Dr. Eduard v. Martens†, from which I have derived the greatest assistance; still in it several authentic species are omitted, in some instances titles belonging to the same are treated as belonging to distinct species, and moreover some new species have been discovered and described since Dr. v. Martens wrote. Nor in the somewhat intricate synonymy is the subject in all instances exhaustively dealt with; and it has been one of my objects to endeavour to fix on a firm basis the nomenclature of all the birds known to possess a Philippine origin.

“The literature of the subject practically commenced with Brisson‡, who in his well known work published original descriptions of many species said to have been obtained in the Philippines. Most of these are true Philippine species; but several of them were obtained in other parts of the world, and have no claim to a Philippine habitat.

“The next, and certainly the most important, writer was the

* I restrict the Philippines to that group of islands which is separated from Northern Borneo by the Balabac Strait and the Sea of Mindoro, exclusive of the Sooloo archipelago, and from Celebes by the Sea of Celebes. It may be necessary, when the fauna of the Sooloo archipelago is better known, to include it also within the Philippine area; but, on the other hand, when the fauna of the island of Palawan has been investigated, that may have to be separated from the Philippine area. The positions both of Palawan and of the Sooloo Islands (at present all but zoological blanks) are of the highest geographical interest; for Palawan, stretching out for 260 miles, unites the northernmost point of Borneo to Luzon through the Calamines, and the island of Mindoro and the islands of the Sooloo archipelago form a succession of connecting links between Mindanao and the most north-east point of Borneo.

† Journ. f. Orn. 1866, pp. 8–31.

‡ No titles were founded on the Jesuit Camel's well-known paper, “*De Avibus Philippensibus*.” The following is a list of the principal authors who have written on Philippine ornithology:—

BRISSON, M. J. *Ornithologia* (1760).

SONNERAT. *Voy. à la Nouvelle Guinée* (1776).

V. KITTLITZ. *Mémoires présentés à l'Acad. Imp. Sc. de St. Pétersb.* vol. ii. (1833). *Kupfertafeln z. Naturgesch. d. Vögel* (1832–33). Lütke, *Voy. autour du Monde* (Postels), vol. iii. (1836).

VIGORS. *P. Z. S.* 1831.

J. F. MEYEN. *Nov. Act. C. L. C. Nat. Cur.* vol. xvi. suppl. prim. (1834).

EYDOUX et SOULEYET. *Voy. autour du Monde sur la Bonite. Zoologie*, vol. i. (1841).

PEALE. *Zool. Un. St. Exp. Exped. Vincennes*, 1st edition (1848).

JACQUINOT & PUCHERAN. *Voy. au Pôle Sud, l'Astrolabe et la Zélée. Zoologie*, vol. iii. (1853).

CASSIN. *Unit. St. Exp. Exped. Vincennes. Ornith.* 2nd edition (1858).

E. v. MARTENS. *Preussische Exped. nach Ost-Asien. Zool.* (1865). *Journal für Ornithologie* (1866).

WALDEN & LAYARD. *Ibis*, 1871, p. 93.

French traveller Sonnerat. He described and figured sixty-five species as having been obtained by him when in the Philippines; but recent researches tend to prove that only thirty are inhabitants of that archipelago. Several of his species remain to this day undetermined; yet the descriptions and figures were probably taken from actual specimens; for, although frequently most inaccurate in the localities assigned, Sonnerat does not appear, like Levaillant, to have wilfully described manufactured species and attributed false habitats. Besides the species made known in his 'Voyage to New Guinea,' Sonnerat brought to Paris several Philippine specimens, which were subsequently described by Buffon or by Montbeillard, and figured by D'Aubenton. On many of the Brissonian descriptions Linnæus founded titles; and to nearly all the plates in Sonnerat's work Scopoli, and after him Gmelin, gave binomial designations; while some of the species described in the 'Histoire Naturelle,' or figured in the 'Planches Enluminées,' received names from either Ludwig Statius Müller, Gmelin, or Latham, and in some cases from all of these writers. Generally subsequent authors named the species they described; and consequently little difficulty is encountered in the endeavour to recognize their species.

"The first and only attempt to construct a complete list of the Philippine avifauna was made by Dr. v. Martens, to whom I have already alluded. That learned naturalist enumerates 194 * species. From these I have been obliged to deduct 24,—4 from being undeterminable, 7 because they are not found in the Philippines, 2 because the Philippine habitat is not satisfactorily established, and 11 because they bear as distinctive titles the synonyms of species already catalogued under other titles.

"Thus the list is reduced to 170 species, to which I have been able to add only 46, making the number of authentically known Philippine birds 216. This number is small, and may be eventually increased when the archipelago has been more completely investigated. Yet it may be fairly doubted whether the Philippines will ever be found to be so rich in species as the remainder of the Indo-Malayan subregion. Our knowledge of this avifauna is not sufficient to support any general conclusions; but enough is known to establish the fact that the Philippine archipelago, like Celebes, is a border land linking, as it were, the Papuan and Indian regions. As we quit the mainland of the Indian region in the south-east, it is well known that the Indo-Ethiopian types diminish in number, and in the Philippines, as in Celebes, they may be said to be at their minimum. But along with them many Indo-Malayan types also disappear from both these insular areas; while, on the other hand, they are replaced by peculiarly Papuan generic forms, and by a few peculiar forms not in numbers sufficient to balance the absence of the Indo-Ethiopian and the Indo-Malayan. We consequently find an ornithology more anomalous in its admixture of forms, but poorer as regards species. So far as we know, it may be asserted that, after

* The numbering reaches to only 192; but *Dasylophus cumingi*, although catalogued, is not numbered, and the number 154 is repeated.

Celebes, the Philippine archipelago is the least rich in Indian genera and species of all the subareas of the Indian region; while, like Celebes, it is stamped with a marked Papuan character by the presence of *Cacatua* and *Megapodius*, and by its richness in members of the *Psittacidæ*, *Alcedinidæ*, and *Columbidæ*.

"A glance at the table below will show the dearth existing in the Philippines of Indo-Malayan forms. Nine of these absent genera occur in Celebes, while the remaining sixty genera are wanting in both areas. On the other hand, thirty Indo-Malayan genera wanting in Celebes occur in the Philippines.

"Table showing the principal Indo-Malayan Genera wanting in the Philippines.—NB. Those occurring also in Celebes are marked with an asterisk.

* <i>Polioaëtus</i> .	<i>Alcippe</i> .	<i>Temnurus</i> .
* <i>Neopus</i> .	<i>Timalia</i> .	<i>Dendrocitta</i> .
<i>Ketupa</i> .	<i>Garrulax</i> .	<i>Crypsirhina</i> .
<i>Bulaca</i> .	<i>Pomatorhinus</i> .	<i>Eulabes</i> .
<i>Phodilus</i> .	<i>Pteruthius</i> .	<i>Ploceus</i> .
<i>Batrachostomus</i> .	<i>Analcipus</i> .	<i>Mirafra</i> .
<i>Eurylaimus</i> .	<i>Myiophonus</i> .	<i>Palæornis</i> .
<i>Psarisomus</i> .	<i>Phyllornis</i> .	<i>Megalaima</i> .
<i>Corydon</i> .	<i>Iora</i> .	<i>Meiglyptes</i> .
<i>Cymbirhynchus</i> .	<i>Brachypodius</i> .	<i>Hemicircus</i> .
<i>Calypdomena</i> .	<i>Iole</i> .	<i>Micropternus</i> .
<i>Nyctiorhis</i> .	<i>Criniger</i> .	<i>Chrysophlegma</i> .
<i>Chalcoparia</i> .	<i>Enicurus</i> .	<i>Tiga</i> .
* <i>Anthreptes</i> .	<i>Platylophus</i> .	<i>Sasia</i> .
* <i>Æthopyga</i> .	<i>Tephrodornis</i> .	<i>Dendrophila</i> .
* <i>Arachnothera</i> .	<i>Buchanga</i> .	<i>Rhopodytes</i> .
* <i>Prionochilus</i> .	<i>Dissemurus</i> .	<i>Coccystes</i> .
* <i>Geocichla</i> .	<i>Chaptia</i> .	<i>Peloperdix</i> .
<i>Brachypteryx</i> .	<i>Bhringa</i> .	<i>Perdula</i> .
* <i>Trichastoma</i> .	<i>Hemipus</i> .	<i>Pavo</i> .
<i>Mixornis</i> .	<i>Tchitrea</i> .	<i>Argusianus</i> .
<i>Malacopteron</i> .	* <i>Myiolestes</i> .	<i>Polyplectron</i> .
<i>Macronus</i> .	<i>Cissa</i> .	<i>Euplocamus</i> .

"The number of species peculiar to the Philippine archipelago, namely 107, amounts to nearly half of the total of known Philippine birds. This proportion is considerably less in the island of Celebes, where, out of a known total of 205 species, 73 only are peculiar to that island. Not one single species is common to the Philippines and Celebes which does not at the same time possess a more extended range; and *Prioniturus* is the only genus which is common to the two areas and unknown to extend beyond. The Papuan affinities of the Philippine ornithology are only generic; for no Philippine species with a Papuan range occurs which does not also range into other areas. On the other hand, the great bulk of Philippine birds, exclusive of the Palearctic, which are nearly all migratory

forms, are Indo-Malayan in character. But here, again, the Indo-Malayan affinities are mostly generic, and not specific—a result easily explained by the fact that, of the 150 Philippine species belonging to the *Rapaces*, *Picariæ*, *Passeres*, and *Columbæ*, 95 are peculiar to the archipelago.

“The table annexed shows that the whole of the Philippine members of the families *Psittacidæ*, *Cuculidæ*, *Bucerotidæ*, *Pittidæ*, *Irenidæ*, *Paridæ*, *Meliphagidæ*, *Nectariniidæ*, and *Dicruridæ* are peculiar to the archipelago, while the greater proportion of the *Strigidæ*, *Picidæ*, *Alcedinidæ*, *Campephagidæ*, *Muscicapidæ*, *Brachypodidæ*, *Corvidæ*, *Treronidæ*, and *Columbidæ* are also unknown beyond its limits.

“Table showing by Families the proportion of Species peculiar to the Philippine Islands.

Families.	Number of Species.	Number peculiar.
<i>Psittacidæ</i>	8	8
<i>Falconidæ</i>	14	4
<i>Strigidæ</i>	4	3
<i>Picidæ</i>	6	5
<i>Trogonidæ</i>	1	1
<i>Meropidæ</i>	2	1
<i>Coracidæ</i>	1	0
<i>Alcedinidæ</i>	12	7
<i>Capitonidæ</i>	2	0
<i>Cypselidæ</i>	2	0
<i>Caprimulgidæ</i>	3	2
<i>Cuculidæ</i>	9	9
<i>Bucerotidæ</i>	4	4
<i>Laniidæ</i>	3	1
<i>Artamidæ</i>	1	0
<i>Campephagidæ</i>	6	4
<i>Dicruridæ</i>	2	2
<i>Muscicapidæ</i>	6	4
<i>Hirundinidæ</i>	2	0
<i>Oriolidæ</i>	2	2
<i>Turdidæ</i>	2	0
<i>Pittidæ</i>	2	2
<i>Crateropodidæ</i>	2	0
<i>Irenidæ</i>	1	1
<i>Brachypodidæ</i>	4	3
<i>Saxicolidæ</i>	5	2
<i>Sylviidæ</i>	6	4
<i>Motacillidæ</i>	3	1
<i>Paridæ</i>	1	1
<i>Meliphagidæ</i>	1	1
<i>Nectariniidæ</i>	4	4
<i>Certhiidæ</i>	1	1
<i>Corvidæ</i>	1	1

Families.	Number of Species.	Number peculiar.
<i>Sturnidæ</i>	4	2
<i>Fringillidæ</i>	1	0
<i>Ploceidæ</i>	4	3
<i>Treronidæ</i>	10	8
<i>Columbidæ</i>	4	3
<i>Gouridæ</i>	4	1
<i>Phasianidæ</i>	1	0
<i>Tetraonidæ</i>	2	1
<i>Turnicidæ</i>	1	1
<i>Rollulidæ</i>	1	1
<i>Megapodiidæ</i>	1	0
<i>Charadriidæ</i>	8	0
<i>Glareolidæ</i>	1	0
<i>Gallinulidæ</i>	4	1
<i>Rallidæ</i>	8	2
<i>Parridæ</i>	1	0
<i>Scolopacidæ</i>	9	1
<i>Ardeidæ</i>	11	1
<i>Anatidæ</i>	4	2
<i>Procellariidæ</i>	1	0
<i>Laridæ</i>	5	0
<i>Podicipidæ</i>	1	1
<i>Pelecanidæ</i>	6	0
<i>Plotidæ</i>	1	0

“By the subjoined table, showing the geographical distributions of all the known Philippine species, it will be seen that 11 of the genera are peculiar, namely *Pseudoptynx*, *Dasylophus*, *Lepidogrammus*, *Penelopides*, *Pseudolalage*, *Zeocephus*, *Rhabdornis*, *Gymnops*, *Phapitreron*, *Ptilocolpa*, and *Amaurornis*.

“It will be further observed that the precise habitat of 54 Philippine birds remains still unrecorded, and that out of the total number of Philippine species 85 are recorded from Luzon alone. Of the 76 species known to inhabit other islands of the archipelago, 49 possess also a Luzon habitat. If we assume, which we may fairly do, that the 54 species classed under the general term of Philippine in the table are nearly all, if not all, inhabitants of Luzon, the total number of species known to inhabit that island will be 139. The number of species known to inhabit the remaining islands is given at the bottom of their respective columns, the incompleteness of our knowledge with regard to them being illustrated by the small total of 19 representing the number of authentic species in the large and important island of Mindanao, and also by the entire and enforced omissions of many other large islands. Of Mindanao, with an estimated area of 36,000 square miles, the few species we know come from the immediate neighbourhood of Zamboanga. Of Luzon, the whole of the island north of Manilla has yet to be explored. The islands of Palawan, Mindoro, Samar, Leyte, Masbale, Bohol, the

Calamines, and the multitude of smaller islands are almost absolutely unknown.

"As might be anticipated from analogy with other isolated areas, some of the Philippine islands, although only separated by narrow seas, possess species peculiar to themselves. Although well defined, these are strictly representative forms. Those that are known are given below; and doubtless many more cases of representation will be discovered when the islands have been more thoroughly explored.

"Table showing the Representative Forms which are known to inhabit the Philippines only."

	Luzon.	Panay.	Negros.	Zebu.	Mindanao.
<i>Loriculus philippensis</i>	*				
— <i>regulus</i>	*	...	*
— <i>hartlaubi</i>	*
— <i>chrysonotus</i>	*	
<i>Chrysocolaptes hæmatribon</i>	*				
— <i>xanthocephalus</i>	*		
<i>Actenoides hombroni</i>	*
— <i>lindsayi</i>	*				
<i>Penelopides manilla</i>	*				
— <i>panini</i>	*			
<i>Dicrurus balicassius</i>	*				
— <i>mirabilis</i>	*		

"Only one species is common to a Philippine island and to any one other non-Philippine island, namely *Xantholæma rosea*, which is restricted to the islands of Negros and of Java. *X. hæmacephala*, the common Luzon Barbet, which ranges all over India and is found in Sumatra and the Malay peninsula, does not seem to occur in Negros, where *Z. rosea* appears to represent it, as it also does in Java.

"It is also a remarkable fact that the only Philippine representative of the highly characteristic Indian family of the *Pericrocotidæ* is the abnormal and only migratory member of the group, *P. cinereus*."

This paper will be printed in full in the Society's 'Transactions.'

The following papers were read:—

1. On some Points in the Anatomy of *Steatornis*.

By A. H. GARROD, B.A., F.Z.S., Prosector to the Society.

[Received May 28, 1873.]

Through the kindness of Prof. Flower, I have had the opportunity of examining two specimens of *Steatornis caripensis* preserved in spirit, as well as the skeleton of another; and Mr. Sclater has also kindly given me a skin to assist in the study of the pterylosis, and a nestling, which I have dissected.

Many points in the osteology of this bird, as well as the description of the larynx, are to be found in a paper by Johannes Müller* ; and further details are given in the works of L'Herminier†, Selater‡, and Murie§. The following notes relate almost entirely to the pterylosis and the anatomy of the soft parts, the skull being only described so far as to make it comparable with those in Prof. Huxley's paper on the classification of Birds||.

Pterylosis (fig. 1, p. 528).—All the top of the head is covered with a scattered feathering, which is very much the strongest between the eyes. There is no tendency to the formation of longitudinal bands in this region, like those in the Caprimulgidæ. Above each eye there are two rows of closely set very stiff feathers, running parallel to one another and to the border of the upper eyelid, forming a double eyebrow. The upper of these is slightly the stronger ; it is situated $\frac{1}{8}$ of an inch above the lower one, with a bare space intervening. The stiff feathers of which it is composed are slightly more than $\frac{1}{4}$ of an inch long and are directed outwards. The lower eyebrow is $\frac{1}{8}$ of an inch above the margin of the lid, which has no eyelashes and is bare : it does not extend quite so far forward or backward as the one above it ; and its component feathers are not quite so long. The external auditory orifice is nearly circular and $\frac{1}{3}$ of an inch in diameter ; there is no operculum. It is surrounded by a single row of feathers, much like those of the eyebrows ; they are all directed backwards, the anterior being slightly the longer and acting as a protection to the entrance of the ear. Several (about a dozen on each side) stiff simple vibrissæ, many more than $1\frac{1}{2}$ inch long, spring from the side of the upper beak, and run directly forwards, partially covering the apertures of the nostrils.

The dorsal tract, where it commences, is narrowed on account of there being a bare space above each ear ; but when it reaches the upper part of the neck it broadens, and continues down the back of the neck as a not strong tract, which becomes narrower and stronger as it descends, till at a short distance above the tops of the shoulder-blades it is very strong indeed. It continues on in this condition, and bifurcates between the scapulæ to form a well-developed fork, with long branches, which become considerably weakened near their extremities. Between the lower ends of this fork the continuation of the dorsal tract commences, not connected with it at all, but quite free, as an upward-turned weak arrow-head, situated in the middle line. The axis or shaft of this arrow-headed tract, as it descends, becomes narrower and stronger till it ceases abruptly at the base of the long infundibuliform nude oil-gland, which closely resembles that of the Owls. In the upper part of the loins, above the arrow-head, at a short distance on either side of, and parallel with, the mid-dorsal tract, is a single row formed by four strong feathers, which are distinctly separated from the rest. All over the loins, behind

* Müller's Arch. f. Anat. 1842, p. 1-11, and elsewhere.

† Nouv. Ann. du Mus. tom. iii. 1834, p. 321, and elsewhere.

‡ P. Z. S. 1866, p. 126.

§ Ibis, 3rd ser. vol. iii. No. 9, p. 81.

|| P. Z. S. 1867.

b

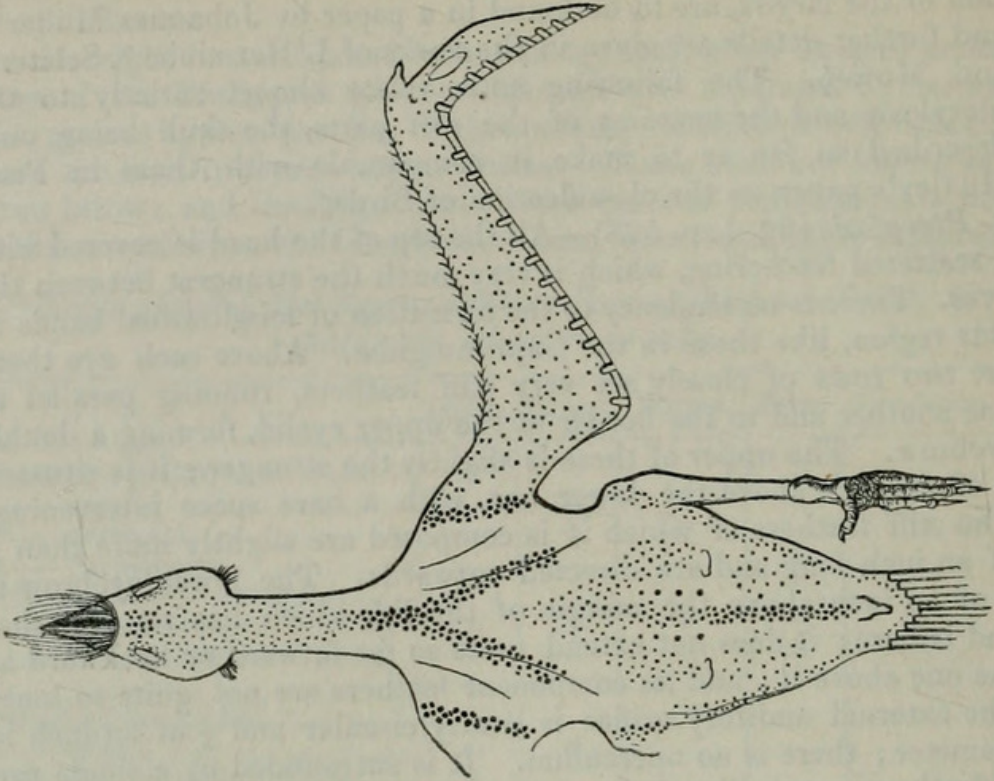
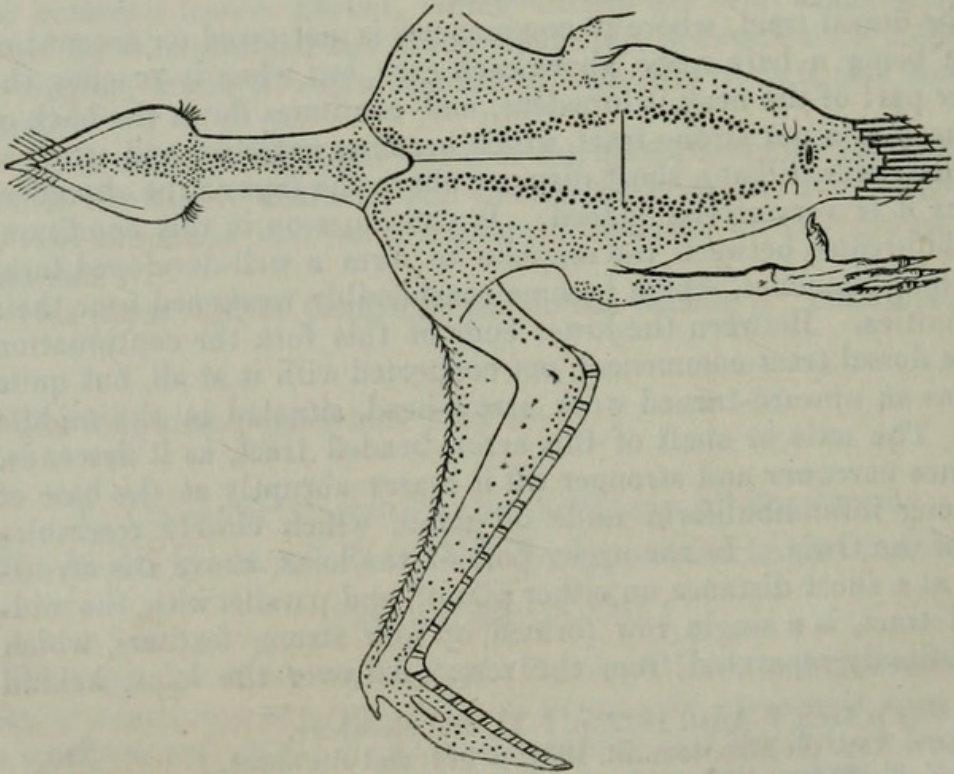


Fig. 1.

a



Pterylosis of *Steatornis*. *a*, ventral surface; *b*, dorsal surface.

the acetabula, there is a weak feathering which blends with the lumbar tracts. These last are consequently not very distinctly defined, and consist mainly of weakly feathered tracts, running from the knee obliquely downwards and backwards, leaving the tibiae almost bare, with the exception of a few semiplumes which are scattered below the front of the knee.

Between the rami of the jaws the large triangular surface is naked at the sides and weakly feathered along the middle line up to the symphysis (as in the Owls), where there are a few vibrissæ, directed forwards. From this submaxillary feathered portion the inferior neck-tract springs; and behind the angle of the jaw a weak branch is sent up, on each side, to join the dorsal tract and head-covering behind the ears. A little lower down the inferior tract becomes more defined, though not strong; it continues simple as it descends, being of the same breadth as the lateral neck-spaces. Just above the upper or scapular extremities of the furcula it ceases in the middle line, leaving a bare interclavicular space; but it develops a branch on either side, which expands over the chest to form the pectoral tracts. The pectoral tract of each side is double, the inner of its divisions being the continuation of the main tract, which descends, narrow and strong, close to the carina sterni in its upper part, but further separated below, leaving over the epigastric region of the abdomen a considerable median space, which lower down is again reduced by their convergence to the anus, just in front of which they terminate.

Each outer pectoral branch of the inferior tract is weak and very diffused, covering the sides of the body, leaving a narrow space between it and the main stem, except at the points just in front of the scapular ends of the furcula, from which they spring, and below the inferior margin of the sternum, where they again blend, and continue down side by side, after their contact, nearly to the anus, the outer branch being the weaker and less defined.

There is a weak hypopteral tract continued from the outer margin of the external pectoral branch. The under wing-surface is feathered along the forearm in several rows. The margin of the patagium is thickly set with short strong plumes. The humeral tract is strong and separated by a narrow space from the well-covered upper wing-surface.

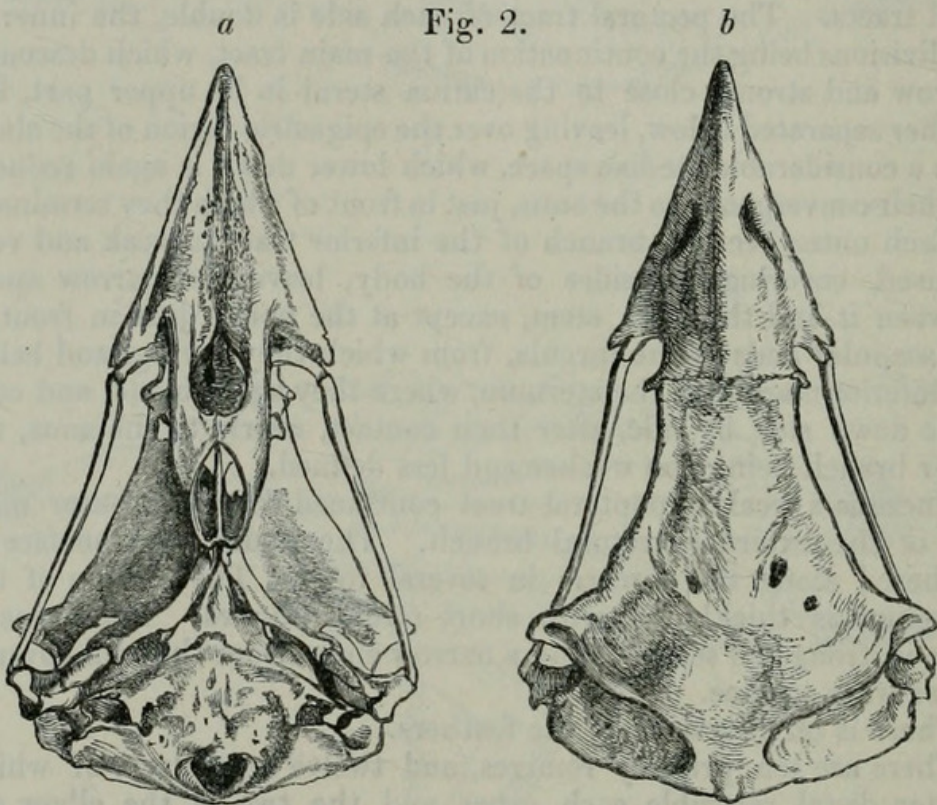
There is no aftershaft to the feathers.

There are ten primary remiges, and twelve secondary, of which the ten distal resemble each other, and the two at the elbow are reduced in size. The upper wing-coverts do not extend more than or quite so much as halfway down the secondary remiges. There are ten rectrices.

The above described pterylosis clearly indicates that in the arrangement of its feathers *Steatornis* more closely resembles the Strigidæ than the Caprimulgidæ, though it differs considerably from both. It resembles the Strigidæ and differs from the Caprimulgidæ in having no aftershaft to the contour feathers, in not having the occipital tract divided up into narrow longitudinal rows, in having spaces on each side of the submaxillary tract, in having

the pectoral portion of the inferior tract in two parts, of which the inner approaches the carina sterni above and separates from it as it descends, in having the upper wing-surface uniformly feathered, and in having a large infundibuliform oil-gland. In none of the Caprimulgidæ does the inferior tract continue simple down the neck, whilst in *Strix flammea* as in *Steatornis* it does not bifurcate till in the region of the furcula. But *Steatornis* resembles the Caprimulgidæ and differs from the Strigidæ in having ten rectrices. It differs from both, however, in that the inferior portion of the dorsal tract does not unite at all with the scapular fork of the superior portion, in having the outer branch of the pectoral tract diffused and descending far over the abdomen, and in the general tendency to scattering of the feathers.

In the skull the lachrymal bones are not developed as they are in the Strigidæ and Caprimulgidæ. The palate is strongly desmognathous, as in the Falconidæ, and much more so than in the Strigidæ, which are almost schizognathous. The palatine bones also meet



Skull of *Steatornis*. *a*, base; *b*, superior surface.

across the middle line, for $\frac{1}{8}$ of an inch, in a manner which is quite peculiar, and can be best understood by a reference to the drawing, each bone being apparently folded on itself behind the point of junction with its fellow, and articulating with the basisphenoid rostrum, as well as anchylosing with the vomer by its inflected and upward-turned margin; each develops a very short slender anteriorly directed process close to the vomer, which projects forwards on each side of it near its middle. The vomer itself is a quarter of

an inch long, slender and quite blended with the palatines ; its anterior pointed extremity advances as far forwards as the posterior border of the median palatine symphysis mentioned above. The posterior external angles of the palatines, so large in *Caprimulgus* and *Podargus*, are not developed. The basipterygoid facets are large. In the eye the sclerotic ossifications are not considerable, as in the Owls, being not at all unusually developed.

In the atlas the cup for articulation with the occipital condyle is incomplete behind ; and the odontoid process of the axis is situated near its posterior margin. In this conformation, the classificational importance of which was first pointed out by Mr. Parker, *Steatornis* agrees with the Strigidæ and the Caprimulgidæ, but not with the Cypselidæ, in the one or two cases which I have had the opportunity of observing.

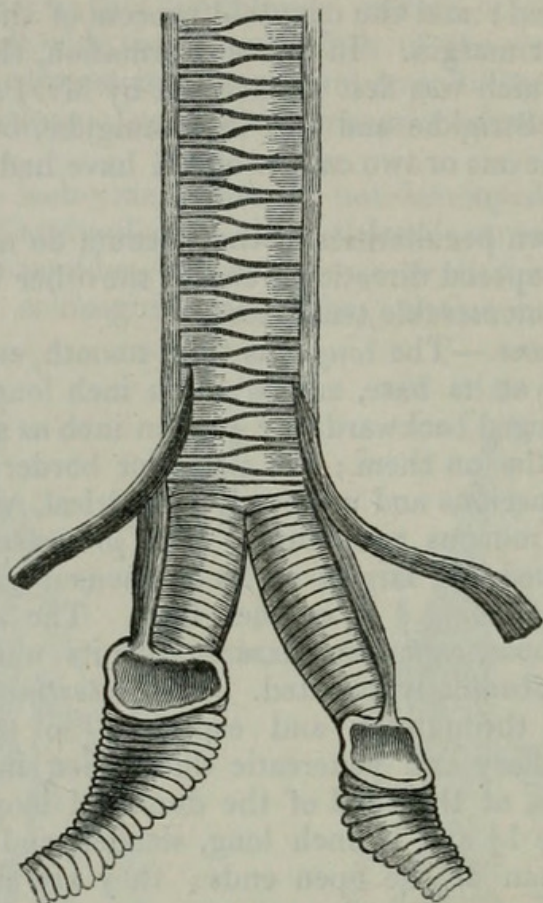
The well-known peculiarities of the sternum do not seem to point definitely in any special direction ; and in the other bones I have not observed any demonstrable tendencies.

Digestive organs.—The *tongue* is thin, smooth, and triangular ; it is $\frac{1}{4}$ inch broad at its base, and $\frac{5}{8}$ of an inch long ; the posterior angles are prolonged backwards for $\frac{1}{6}$ of an inch as angular processes with small papillæ on them ; the posterior border is simple. The *œsophagus* is capacious and uniformly cylindrical, with longitudinal plications in its mucous membrane. The *proventriculus* is zonary and well developed, the largest of its component glands, which are slightly racemose, being $\frac{3}{8}$ of an inch long. The *stomach* forms a thin-walled, globose, capacious gizzard, with its mucous membrane, as usually, longitudinally plicated. The *intestines* are 22 inches long, capacious throughout, and especially so near the pyloric portion ; the biliary and pancreatic ducts open into it $2\frac{1}{2}$ inches from the pylorus, at the bend of the duodenal loop. The two intestinal *cæca* are $1\frac{1}{2}$ and $1\frac{1}{8}$ inch long, slender, and a little broader at the cæcal than at the open ends ; they are situated 2 inches from the cloaca.

The *trachea* is a little more capacious above than below. As in many birds, the separate rings of which it is composed are not so deep in the middle line as they are laterally ; and as in each ring the upper and lower margins of one side in one ring, and of the other side of the next above and below, are slightly everted, whilst those of the other half are inverted to the same extent, when the rings are superimposed they produce the appearance seen in the accompanying drawing, as if each ring were narrow on one side and broad on the other. The *syrinx* (fig. 3, p. 532), as has been described by others, is extremely peculiar, because it is formed in each bronchial tube, instead of at the bifurcation of the trachea. The trachea bifurcates at its lower end much in the same way that it does in Mammalia ; and each bronchus continues down towards the lungs as a cylindrical or slightly flattened tube, composed of simple and entire rings of cartilage. In a specimen that I once saw, there were fourteen of these rings on each side ; but in the one before me, which is figured here, the bronchi are not equal in length, the left bronchus containing

thirteen and the right ten complete rings above the commencement of the syrinx. Each semisyrinx, as it may be termed, is formed on the same principle as that of the combined organ in most of the non-singing birds. Taking for description that of the left side in the specimen figured, it is there found that the thirteenth

Fig. 3.

Front view of the syrinx of *Steatornis*.

bronchial ring is complete, though considerably flattened from side to side; the fourteenth is not complete in the middle of its inner surface, it is a little longer from before backwards than the one above, and not so long as the one following it. The fifteenth is only a half ring, its inner portion being deficient; it is slightly convex upwards, and articulates, both at its anterior and posterior ends, with the fourteenth incomplete ring and the sixteenth half ring. The sixteenth half ring is concave upwards, and so forms an oval figure in combination with the one above, which is filled with a thin membrane, to form part of the outer wall of the bronchus. There is a membrane also between the ends of these and the succeeding half rings, which completes the tube of the bronchus internally. The half rings which follow the sixteenth reduce in size, and are considerably smaller before they reach the lung. The lateral muscle of the trachea extends down the outer side of each bronchus, to be

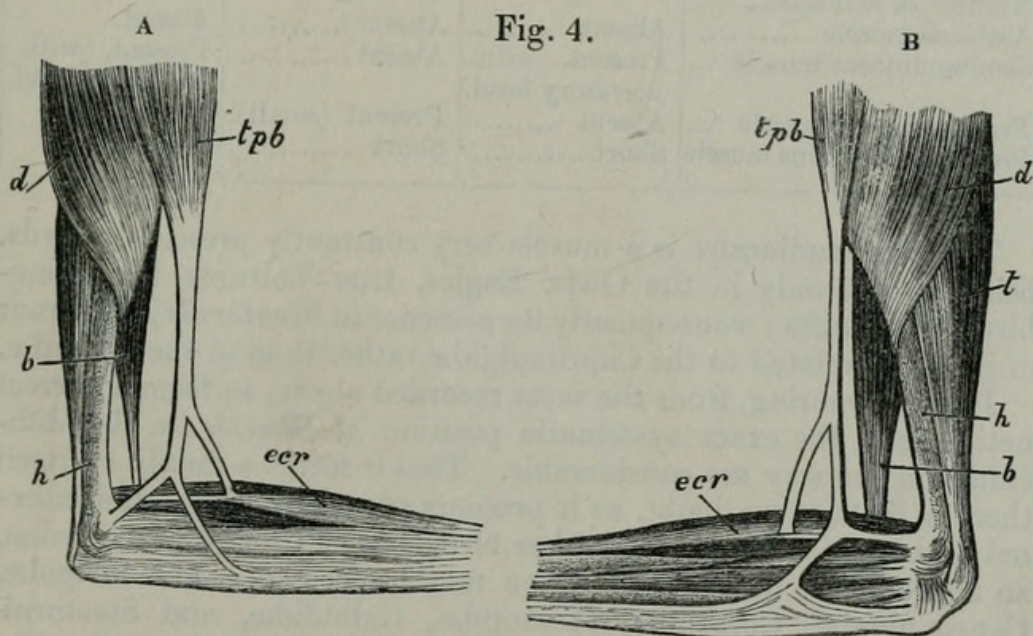
attached to the middle of the first fully developed half ring. The depressor muscles of the trachea are independent of these.

Steatornis has two carotid arteries, as have both the Strigidæ and Caprimulgidæ.

With regard to the myology of this bird, the only muscles which will be considered are those which have been found to have some bearing on the systematic position of birds generally.

In the thigh, the *ambiens* (Sundevall)—the slender muscle which in many birds runs from the innominate bone, just above the acetabulum, along the inner side of the thigh to the knee, which it crosses obliquely in the fibrous capsule below the patella, and then blends with the flexor perforatus digitorum—is absent, as it is in the Strigidæ and Caprimulgidæ.

The *semitendinosus*, the outer of the two muscles which form the lower fold of the thigh (the *semimembranosus* being the inner), and which runs from the region of the lower end of the innominate bone to the tibia, is present, as in the Caprimulgidæ, it being quite absent in all the Strigidæ. As in the Caprimulgidæ also, this muscle



Muscles at the outer side of the elbow: A, of right wing of *Caprimulgus europæus*; B, of left wing of *Steatornis*.

t p b, tensor patagii brevis; *e c r*, extensor carpi radialis; *b*, biceps; *d*, deltoid; *t*, triceps; *h*, humerus.

receives an accessory head from the lower end of the femur, which helps to send a partial insertion of the muscle down the leg.

The *femoro-caudal* (which runs as a narrow muscular ribbon from the middle of the linea aspera of the femur to the coccyx, covered by the semitendinosus and crossed superficially by the sciatic artery and nerve) is quite absent; it is well developed in the Caprimulgidæ, small in the Strigidæ, and absent in very few birds.

In the upper limb the *second pectoral* (*subclavius* of Rolleston) is not large, extending about halfway down the sternum, as it does

in the Strigidæ, whilst in the Caprimulgidæ it is more developed, reaching the lower margin of that bone.

The *tensor patagii brevis*—a muscle very constant in its insertion in the different families of birds, which arises mainly from the superior extremity of the furcula on each side, and is inserted, after running in the patagial fold parallel to the humerus, into the outside of the forearm near the elbow—in *Steatornis* agrees entirely with that of many of the Strigidæ, and differs slightly from that of the Caprimulgidæ, as may be seen from the accompanying drawings (fig. 4, p. 533), where, in the former, the main tendon becomes attached to the extensor carpi radialis longus directly, whilst in the latter it joins a second more superficial tendinous slip which runs back to the outside of the elbow, much as in the Passeres.

By placing the above-mentioned facts in a tabular form, the comparison between *Steatornis* and its allies will be more clearly seen.

	<i>Steatornis.</i>	<i>Strigidæ.</i>	<i>Caprimulgidæ.</i>
Number of carotids.....	2	2	2
Ambiens muscle	Absent	Absent	Absent.
Semitendinosus muscle ...	Present, with accessory head.	Absent	Present, with accessory head.
Femoro-caudal muscle ...	Absent	Present (small)	Present.
Pectoralis secundus muscle	Short	Short	Long.

The semitendinosus is a muscle very constantly present in birds, being absent only in the Owls, Eagles, true Vultures, Humming-birds, and Swifts; consequently its presence in *Steatornis* is in favour of its being related to the Caprimulgidæ rather than to the Strigidæ.

In endeavouring, from the facts recorded above, to form a correct notion as to the exact systematic position of *Steatornis*, the difficulties in the way are considerable. That it forms a family by itself there is little or no doubt, as it presents pterylographical and internal peculiarities found in no other birds. By a process of exclusion, an approximate idea of its position may be formed. The Strigidæ, Caprimulgidæ, Coraciidæ, Momotidæ, Galbulidæ, and Steatornithidæ all agree in possessing the following characters—two carotids, well-developed cæca, a nude oil-gland, and no ambiens muscle. Among these, the Strigidæ differ from all the rest and resemble the Eagles, in having no semitendinosus; and the Steatornithidæ are equally peculiar in having no femoro-caudal muscle. In its pterylosis, as shown above, *Steatornis* resembles the Strigidæ much more than any of the allied families, except that there are only ten rectrices. I have not dissected *Podargus*; but it agrees so closely with *Caprimulgus* in its pterylosis, according to Nitzsch, that it most probably must be included in the same family. As Mr. Sclater has shown, *Podargus* has no oil-gland, that organ being very small in the Caprimulgidæ generally, but large in *Steatornis*.

If the absence of the ambiens muscle in the Strigidæ has the significance which I put on it, and is sufficient justification, in

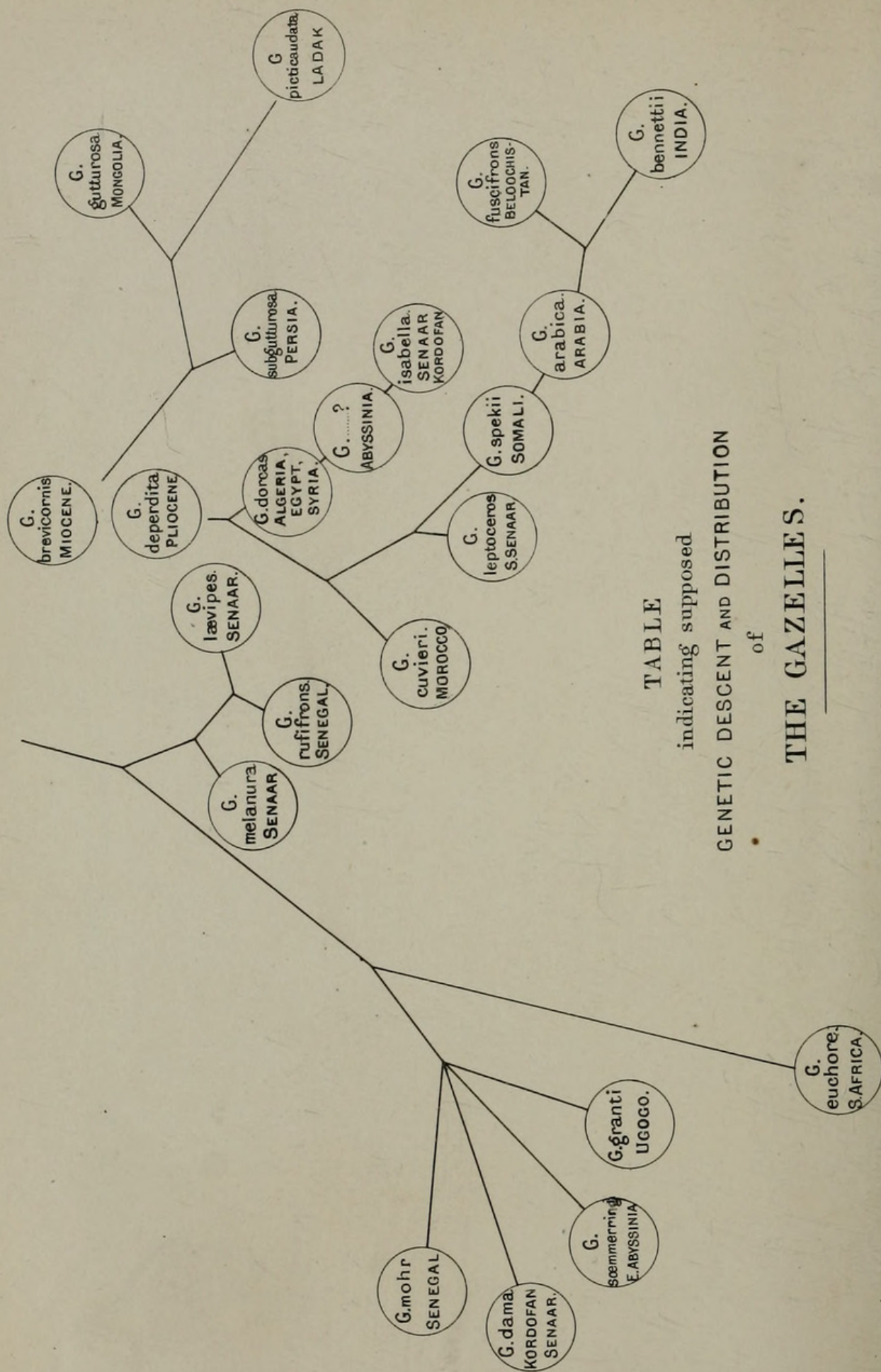


TABLE
indicating supposed
GENETIC DESCENT AND DISTRIBUTION
of
THE GAZELLES.



J. Smit. lith.

M & N Hanhart. imp.

conjunction with other differences, for the entire separation of this family from the other Accipitres, then the above mentioned group of families seems a natural one*; but if the Strigidæ are intimately related to the Falconidæ and Vulturidæ, it is so difficult to believe that the Coraciidæ and their allies are related to the Falconidæ, that the entire separation of the Strigidæ from the Caprimulgidæ seems essential, in which case the position of *Steatornis* becomes more doubtful.

2. On the Antelopes of the Genus *Gazella*, and their Distribution. By Sir VICTOR BROOKE, Bart., F.Z.S.

(Plates XLV. & XLVI.)

Whilst at Berlin last year I noticed in the gallery of the Royal Museum a large Gazelle (No. 3207 in the Catalogue), which struck me as being different from any thing I had before seen. Upon mentioning the specimen, which was unnamed, to Professor Peters, he informed me that it had been brought from the far south of Senaar by Casanova, but that, being unable to refer the specimen to any described species, he had preferred to leave it unnamed rather than to run the risk of giving it a specific title in the absence of a sufficiency of materials to establish its right to this distinction. Observing my interest in the matter, Professor Peters with great generosity handed the investigation of it over to me, requesting me to describe the species in the Society's 'Proceedings' should I come to the conclusion that it was unknown and new. This, so far as I have been able to make out, is not the case, the *Antilope melanura* described by Heuglin (*Antilopen und Büffel*, p. 6) agreeing very exactly with the Berlin specimen. The matter, however, is not the less interesting; and as the species is at present only known by Heuglin's short description, and appears to be represented in European museums solely by this specimen, I have thought it desirable to describe it more fully. At the same time the very scattered and fragmentary condition of our knowledge of the entire group *Gazella* has induced me to take this opportunity of passing in review the various persistent modifications of the form which have been deemed by former authors worthy of specific distinction. Although I have retained in an equality as to specific rank all the modifications mentioned in the following list, yet I am desirous of stating that I only do so from absolute inability to do otherwise without introducing complications into the list, which would, I fear, militate against its practical usefulness. The laws of variation and persistent modification are at present so imperfectly understood that it is difficult, if not impossible, to connect terms of value with the phenomena of differentiation—terms which shall be sufficiently definite to express what we know and are sure of, and yet sufficiently plastic to meet the requirements of future research. The principle which suggested the term "persistent modification" to

* Prof. Newton has for some time believed the Steatornithidæ and Caprimulgidæ to be distinct families (*cf. Zool. Rec. vi. p. 67*).

Professor Huxley, in dealing with analogous ethnological difficulties, appears to me to obtain with like force in the present instance. Prof. Huxley thus writes * : "I speak of 'persistent modifications' or 'stocks,' rather than of 'varieties' or 'species,' because each of these last well-known terms implies, on the part of its employer, a preconceived opinion touching one of those problems the solution of which is the ultimate object of the science." Throughout this paper, however, I shall use the terms "species" and "persistent modification" synonymously, although, for two reasons, the latter term appears to me infinitely the preferable :—first in that (assuming evolution) it of necessity contains the former, and therefore in being more comprehensive better suits our present uncertainty ; and, secondly, in that it points towards a definite biological fact, in favour of which certainly all the evidence as yet collected tends, viz. that the existing forms of *Gazella* are but modifications, which appear to us persistent, of some as yet unknown extinct Artiodactyle form. At the close of my paper I shall again allude to this subject, and shall endeavour to indicate the manner in which I conceive it possible to account for the present modifications and distribution of the group.

For the sake of convenience, and the avoidance of constant repetition, and also to throw into relief the traces of genetic affinity afforded by coloration, I will describe the typical ground-plan which may be seen underlying each variation, the uniformity of the arrangement of the more salient and characteristic markings (where they appear) throughout the group clearly showing the existence of such a plan.

To each of these more prominent features, indicating what may be provisionally called genetic coloration, I will apply a definite name which I shall make use of in the following descriptions.

The anterior facial region in Gazelles, from the base of each horn to the muzzle, is cut off from the sides of the face on both sides by white streaks, which, starting externally to the base of each horn, run downwards to within 2 inches of the nostrils ; the former I shall call the *central facial band*, the latter the *light facial streaks*. From the corner of the suborbital gland, running downwards immediately below the light facial streak, and of about equal width, is a dark line ; this I shall refer to as the *dark facial streak*. Bordering the white of the belly on each side, and extending from above and behind the ulna, to above and in front of the patella, are two bands, the lower of which is darker, the upper lighter than the colour of the back and flanks. The former I shall speak of as the *dark*, the latter the *light lateral band*. Lastly, bordering the white of the rump is frequently seen a narrow indefinite darkish band, which may be conveniently called the *pygal band*.

The difficulty of expressing differences dependent to a large extent upon shades of colour and texture of hair sufficiently sharply to give a just impression of the effect produced by such differences upon the eye, may cause the distinction of some of the forms below mentioned to appear doubtful. I can only say that upon occasions when I have had ample opportunity of subsequently verifying

* Critiques and Addresses, p. 134.

my identification, I have never experienced any difficulty in referring specimens entirely new to me to their proper name and habitat.

The descriptions must be taken as applying to thoroughly typical specimens, the intensity of the markings and length and curvature of the horns being subject to great individual variation.

The height given is that taken in a straight line from the ground to the point of the shoulder, the male being the sex measured, excepting where the contrary is stated.

GAZELLA.

Frame slender. Muzzle ovine. Colour sandy. Skull with ante-orbital vacuity, and a moderate or small anteorbital fossa; auditory bulla large. Median incisors expanded.

A. Back unstriped. Dentition i. $\frac{0}{3}$, c. $\frac{0}{1}$, p. $\frac{3}{3}$, m. $\frac{3}{3}$.

A'. White of rump not encroaching on the fawn-colour of the haunches.

A. Males and females bearing horns.

a'. Horns lyrate or semilyrate.

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| 1. <i>Gazella dorcas</i> . | 4. <i>Gazella lævipes</i> . |
| 2. — <i>isabella</i> . | 5. — <i>melanura</i> . |
| 3. — <i>rufifrons</i> . | |

b'. Horns non-lyrate.

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|-----------------------------|-----------------------------|
| 6. <i>Gazella cuvieri</i> . | 9. <i>Gazella arabica</i> . |
| 7. — <i>leptoceros</i> . | 10. — <i>bennettii</i> . |
| 8. — <i>spekii</i> . | 11. — <i>fuscifrons</i> . |

B. Females hornless.

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|-----------------------------------|---------------------------------|
| 12. <i>Gazella subgutturosa</i> . | 14. <i>Gazella picticauda</i> . |
| 13. — <i>gutturosa</i> . | |

B'. White of rump projecting forwards in an angle into the fawn-colour of the haunches.

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|---------------------------|-----------------------------------|
| 15. <i>Gazella dama</i> * | 17. <i>Gazella sømmerringii</i> . |
| 16. — <i>mohr</i> . | 18. — <i>granti</i> . |

B. Back with a white median stripe. Dentition i. $\frac{0}{3}$, c. $\frac{0}{1}$, p. $\frac{3}{2}$, m. $\frac{3}{3}$.

19. *Gazella euchore*.

1. GAZELLA DORCAS.

1764. *La Gazelle*, Buff. Hist. Nat. vol. xii. p. 249, pl. 23.

— *Kevel*, Buff. Hist. Nat. vol. xii. p. 258, pl. 26.

1766. *Capra dorcas*, Linn. Syst. Nat. p. 96?

1766. *Antilope dorcas* and *A. kevela*, Pallas, Misc. p. 6 (after Buff.).

* I include *G. dama* in this subsection, as, although from the great extension of white over the posterior parts of the back the characteristic angular white patch is not visible, the general form of the animal leaves no doubt as to this being its proper position.

1767. *Antilope dorcas*, Pall. Spic. Zool. fasc. i. p. 11.
 1777. *A. dorcas* and *A. kevela*, Erxl. Regn. An. pp. 285, 287 (part.).
 ——— *A. dorcas* and *A. kevela*, Zimm. Zool. Geogr. p. 543.
 1781. *Barbary* and *Flat-horned Antelope*, Penn. Quad. p. 81.
 1788. *A. dorcas* and *A. kevela*, Gmelin, Syst. Nat. p. 187.
 1801. *Barbary* and *Flat-horned Antelope*, Shaw, Zool. pp. 350, 351.
 1812. *Gazella dorcas*, Licht. Berl. Mag. Naturk. vi. p. 168.
 1816. ———, Blainv. Bull. Soc. Phil. p. 75.
 1820. *Antilope dorcas*, Desm. Mamm. p. 453 (part.).
 1827. ——— (and *A. kevela*?), H. Smith, G. Anim. Kingd. vol. v. p. 332.
 1829. ———, Fisch. Syn. p. 459 (part.).
 1835. ———, Rüpp. Wirbelth. p. 24 (part.).
 1843. *Gazella dorcas*, Gray, Cat. Mamm. B. M. p. 160 (part.).
 1844. *Antilope dorcas*, Wagn. Schreb. Suppl. iv. p. 405 (part.).
 1844. ———, Schinz, Syn. p. 398 (part.).
 1846. ——— and var. β & γ , Sund. Pec. p. 268 (part.).
 1850. *Gazella dorcas*, Turner, P. Z. S. p. 168.
 1852. ———, Gray, Cat. Mamm. Brit. Mus. p. 56 (part.).
 1855. *Antilope dorcas*, Wagn. Säugeth. p. 403 (part.).
 1855. ———, Gervais, Hist. Nat. Mamm. p. 203.
 1858. *Gazella dorcas*, Loche, Cat. Mamm. de l'Alg. p. 13.
 1859. ———, Gieb. Säugeth. p. 305 (part.).
 1863. *A. dorcas*, Heugl. Ant. und Büffel, p. 5 (part.).
 1866. *G. dorcas*, Tristram, P. Z. S. 1866, p. 86.
 1869. *A. dorcas*, Heugl. Reis. Weis. Nil, p. 315 (part.).
 ——— *A. arabica*, Heugl. *ibid.*
 1872. *G. dorcas*, Gray, Cat. Rum. Mamm. p. 38 (part.).

Hair rather long and coarse. Central facial band rufous above, inclining to fawn-colour towards the nostrils; a dark nose-spot sometimes present, not dependent on age or sex; light facial streak distinct, encircling the eye; dark facial streak definite, brownish rufous; upper and under lip, breast, and belly white; dark lateral and pygal bands very definite, rufous brown; light lateral band distinguishable from the rich fawn-colour of the upper parts of the back by its more silvery hue. Knee-brushes well developed, in colour variable. Tail black, long, and tapering. Horns long and annulated, rather slender, with their points bent inwards and forwards. Ears about $5\frac{1}{2}$ ". Height at shoulder barely 24".

Hab. Syria (*Tristr.*); N. Arabia (*Rupp.*)?; Egypt; Algeria (*Loche, Grant*); Morocco? Senegal? (*Ham. Smith* and *Buff.*).

If I am right in including as a synonym of this species the Kevella of Buffon, and the Gazelles mentioned under the same name by Hamilton Smith, it will render the geographical range of the form very extensive. The only Gazelle belonging to this subsection of the group at present known for certain to inhabit the deserts of Senegal is the *Gazella rufifrons* of Gray. Now to this species must be undoubtedly referred the Corinna of Ham. Smith and Buffon,

an animal which both these authors considered distinct from their Kevella. If, therefore, the Kevella be not *Gazella dorcas*, it must represent a form of which we as yet know but little.

In the Senckenbergian Museum at Frankfort I noticed two Gazelles which had been brought in 1827 by Rüppell from Arabia Petræa. They stood labelled as *G. dorcas*, var. *arabica*. These specimens appeared to me to differ decidedly from the *Gazella arabica* of Ehrenberg from South Arabia, and, in the lyrate form of their horns and in their markings, to be more nearly allied to the species under consideration. In their larger size and stouter build, softer and finer coat, as also in the paleness of their facial and lateral markings, they presented considerable peculiarity; and I have no doubt that similar characters will be found to distinguish the Gazelles of Northern Arabia from those of Syria. Referring doubtless to this larger race, Mr. Tristram (to whom I am indebted for a very beautiful and typical specimen of *Gazella dorcas*, obtained in Syria) thus writes in a letter with which he has kindly favoured me on the subject: "*Gazella arabica*, Ehr., is common east of Jordan, and I have had specimens. . . . I believe both species are there equally abundant, but in rather different kinds of country." Now, to be strictly consistent, a race so persistently modified, and so easily distinguishable as this appears to be, should bear a definite title; for the present, however I shall content myself with alluding to it, the materials available being quite insufficient for a thorough understanding of the differentiation and distribution of the form in these countries. In the same letter above quoted, Mr. Tristram writes:—"In Algeria I noticed and obtained two *Gazella dorcas* and one specimen which I presume was the *Gazella corinna*, Cuv." (more probably *Gazella cuvieri*). "The smaller *Gazella dorcas* I found everywhere as far as the Oran Sahara. The larger species I never got east of Biskra (Constantine). My impression was that the two species overlapped in Algeria."

Some very beautiful frontlets and horns brought by Colonel Grant from Algeria, which I have had the pleasure of examining, appear to me, as far as it is possible to judge from the horns alone, undoubtedly referable to *Gazella dorcas*.

2. GAZELLA ISABELLA.

1827. *Antilope dorcas*, Licht. Darst. t. 5.

1843. *Gazella dorcas*, Gray, Cat. Mamm. Brit. Mus. p. 160 (part.).

1846. *A. dorcas*, a, Sund. Pec. p. 267.

1846. *Gazella isabella*, Gray, Ann. & Mag. Nat. Hist. p. 214 (vol. xviii.); Gray, Knowsl. Menag. p. 4.

1850. ———, Gray, P. Z. S. p. 113.

1852. ———, Gray, Cat. Mamm. Brit. Mus. p. 57.

1853. *Gazella dorcas*, Temm. Esq. Zool. p. 193.

1855. ———, Wagn. Säugeth. p. 403 (part.).

1859. ———, Gieb. Säugeth. p. 305 (part.).

1863. ———, Heugl. Ant. und Büff. p. 5 (part.).

1869. *A. dorcas*, Heugl. Reis. Weiss. Nil, p. 315 (part.).

1870. *G. dorcas*, Blanf. Geol. and Zool. Abyss. p. 261.

Hair very short and soft. Central facial band sandy rufous. Nose-spot absent. Light facial streak present but indefinite, running into the dark facial streak, which is in some specimens but faintly marked; dark lateral band almost obsolete; light lateral band of a delicate pale fawn-colour, distinctly visible against the isabelline sandy fawn-colour of the back and haunches. Tail variable, but generally rufous for a large part of its length, the tip blackish. Horns short, massive, and strongly ringed, the tips bent suddenly forwards and inwards. Ears very long. Height less than that of the last species.

Hab. Kordofan; Senaar.

The principle which I have allowed to influence me in retaining under a name and description distinct from that applied to the Gazelles of Egypt and N. Africa, the Gazelles from Senaar and Kordofan, is contrary to that which generally obtains in like cases. It is not that I believe that the diagnosis above given will be found invariably to sever the individuals obtained in one locality from those obtained in the other. On the contrary, I am convinced that every intermediate degree will be found represented in the intermediate countries, if not upon the confines of the countries which are supposed to be the home proper of each race or persistent modification.

I have lately received from Mr. Gerrard some specimens of a Gazelle from the Bogos country. In these the general texture of the hair is entirely that of *Gazella isabella*, while the intensity of the facial and other markings, and the intermediate growth and character of the horns, places them in a position exactly intermediate to those of Egypt and Kordofan. At the same time, perhaps, amongst the smaller Gazelles, no two species could produce two more dissimilar animals than typical specimens of *Gazella dorcas* and *Gazella isabella*. Having seen both animals living, I speak with more confidence than would be the case from the examination of museum specimens alone. If, therefore, a command of a large series of specimens reveals intermediate forms between two well-marked and persistent races, a considerable probability is afforded that, all conditions being alike, where, from a paucity of knowledge and specimens, two persistent modifications or species of the group appear definitely severed, a larger number of specimens would produce similar intermediate forms.

3. GAZELLA RUFIFRONS.

1764. *La Corine*, Buff. H. N. xii. p. 261, pl. 27, ♀.

1781. *Corine*, Pennant, Quad. p. 89.

1801. —, Shaw, Zool. p. 353, plate 194.

1818. *Le Kevel* }
1822. *Le Corine* } , F. Cuvier, H. N. M. plates.

1820. *Antilope dorcas*, Desmarest, Mamm. p. 453 (part.).

1829. *A. dorcas* ♀, Fisch. Syn. p. 459.

1836. *A. corina*, Goldf. Schreb. Suppl. v. p. 1193, pls. 270, 271.

1846. *Gazella rufifrons*, Gray, Ann. Nat. Hist. xviii. p. 214.

1850. *Gazella rufifrons*, Gray, Knowsley Menagerie.
 1853. *G. kevelia*, Temm. Esq. Zool. p. 193.
 1855. *G. lævipes*, Wagn. Säugeth. p. 404 (part.).
 1858. *G. corinna*, Loche, Cat. Mamm. de l'Alg. p. 14?
 1863. *A. lævipes*, Heugl. Ant. u. Büff. p. 6.

Central facial streak uniform sandy yellow; light facial streak indefinite; dark facial hardly distinguishable from the colour of the cheeks, which are sandy yellow; dark lateral band distinctly marked, brown; light lateral band plainly shown between the dark streak and the yellowish fawn-colour of the back and haunches; pygal band indistinct. No knee-brushes. Height a little over two feet.

Hab. Senegal.

4. GAZELLA LÆVIPES.

1846. *A. lævipes*, Sund. Pec. p. 266.
 1855. *G. lævipes*, Wagn. Säugeth. p. 404 (part.).
 1863. *A. lævipes*, Heugl. Ant. und Büff. p. 6.
 1869. ———, Heugl. Reis. Weiss. Nil, p. 315.

Central facial band rufous, an indefinite nose-spot sometimes present; light facial streak fairly distinct, encircling the eye; dark facial streak scarcely distinguishable against the fawn-colour of the cheeks; dark lateral band very strongly marked, almost black; light lateral band very indistinct; back and flanks of a deep foxy rufous; pygal band almost or entirely obsolete. Knee-brushes sometimes absent and sometimes well developed. Tail long, black. Horns short, compressed, strongly annulated, with the points turned suddenly and pointing towards each other, and occasionally even backwards and downwards. Ears rather short. Size considerably larger than *Gazella dorcas*.

Teeth. First molar in the lower jaw sometimes, but not invariably, showing a supplementary column.

The horns of the female in typical specimens nearly straight, annulated, and slightly bent forwards from about half their length.

Hab. Senaar (*Sund.*); Bogos country.

As may be seen from the above descriptions, the points of difference between the *Gazella rufifrons* of Gray and the *Gazella lævipes* of Sundevall are of the most trivial and insignificant nature. I have, however, considering the widely separated localities from which the type specimens of the two descriptions were obtained, thought it better for the present to leave the two names separate in this list. The *Gazella lævipes* appears to be the larger and more brightly coloured animal of the two. In some specimens I have found the knee-brushes wanting, as described by Professor Sundevall. This, however, is by no means an invariable character. In a large series of the skins of this Gazelle lately received by Mr. Gerrard from the Bogos country, and which I had the pleasure of examining with him, I found the knee-brushes invariably present, but varying very greatly in length and colour. In all these skins, as also in a living specimen entirely devoid of knee-brushes, which I saw in the Zoolo-

gical Gardens in Berlin, the dark lateral band was very strongly marked, forming a conspicuous feature in the animal's appearance. The *Gazella rufifrons* of Senegal is only known, so far as I am aware, from the specimens originally described by Dr. Gray.

5. GAZELLA MELANURA. (Plate XLVI.)

1863. *Antilope melanura*, Heugl. Ant. und Büff. p. 6.

1869. *Antilope tilonura*, Heugl. Reis. Weiss. Nil, p. 315.

Central facial band rufous fawn; light facial streak indistinct, encircling the eye; dark facial streak very indistinct, almost indistinguishable; neck, back, uppersides, flanks, haunches, shoulders, root of the tail, anterior of fore legs, knee-brushes, and outer side of the hind legs sandy fawn colour; dark lateral band distinct, blackish, very narrow from above downwards; light lateral very indefinite; breast and belly white. Horns lyrate and strongly annulated.

Height 29"; length of ears $5\frac{1}{4}$ "; length of tail 8"; length of horns 11".

Hab. Bushy plains of the Anseba, Bogosland (*Heugl.*); South Senaar (*Casanova*).

6. GAZELLA CUVIERI.

1827. *Le Kevel gris*, F. Cuvier, H. N. M., with plate.

1840. *Antilope cuvieri*, Ogilby, P. Z. S. 1840, p. 35.

1849. ———, Fras. Zool. Typ. pl. 17.

1844. *A. arabica*, Schinz, Syn. p. 399.

1846. *A. dorcas*, var. γ^{**} , Sund. Pec. p. 268.

1852. *G. dorcas*, var. 3, Gray, Cat. Mamm. Mus. Brit. p. 57.

1855. *A. arabica*, Wagn. note, p. 403.

1859. *G. arabica* (part.), Gieb. Säugeth. p. 307.

1863. *A. arabica*, Heugl. Ant. u. Büff. p. 5 (part.).

1850. *G. vera*, Gray, Knowsley Menagerie, pl.

Hair long and rather coarse. Central facial band grizzled rufous brown above, darker below, sometimes forming a distinct nose-spot; light facial streak present but indefinite; dark facial streak blackish brown; breast, belly, and rump white; dark lateral and pygal bands blackish brown, running into and blending with the grizzled rufous brown of the upper parts of the body. Knee-brushes long, blackish; tail black. Horns strongly annulated, massive and long, diverging gradually for about two thirds their length, the upper third leaning more decidedly outwards and a little forwards. Ears very long.

Adult ♂: height $27\frac{1}{2}$ "; length of horns 12"; length of ears $7\frac{1}{4}$ ".

Hab. Morocco; Algeria.

The above description must be taken as applying to an average specimen, very great variety being exhibited by this large and well-marked species. In fact, out of a large series, including living specimens, I have never seen two for which the same description would suffice. The species, however, is easily known from all the other small Gazelles by its larger size, rough coat, dark colour, and un-

usually long ears. As I have said above, I think the larger Gazelle seen by Tristram in Algeria was probably of this species. A skull in my possession is very nearly as large as that of *Gazella scæmerringii*.

7. GAZELLA LEPTOCEROS.

1827? *Antilope leptoceros*, F. Cuvier, Hist. Nat. Mamm. ?

1844. ———, Wagn. Schreb. Supp. iv. p. 423.

1846. ———, Sund. Pec. p. 269.

1852. *G. dorcas*, var. 4, Gray Cat. Mamm. Mus. Brit. p. 57.

1853. *G. arabica*, Temm. Esq. Zool. p. 193.

1855. *Antilope leptoceros*, Wagn. Säugeth. p. 407.

1859. ———, Gieb. Säugeth. p. 309.

1863. ———, Heugl. Ant. u. Büff. p. 7.

1869. ———, Heugl. Reis. Weiss. Nil, p. 315.

The following is Heuglin's description of this species, which I extract, never having had the opportunity of examining specimens :—

“A species decidedly distinct from *A. dorcas*. The horns are weaker and longer, running parallel for about half their length, the points inclining first outwards and then very slightly inwards. . . . The nose-spot is at times very indistinct, occasionally sharply marked and dark brown. Between the brownish-yellow colour of the back and the sharply defined black side line of scarcely two inches breadth is seen a much paler line of about a hand's breadth, distinctly defined from the colour of the back.”

Hab. Berber ; banks of the Setit ; Senaar, Kordofan, and along the Bahr el Abiad.

The above description agrees very well with that given by Frederick Cuvier. There is a head of a female Gazelle in the British Museum collected by Captain Harris, which I believe to belong to this species. In this specimen the horns are of very great length, longer than I have ever seen in a female Gazelle.

8. GAZELLA SPEKII.

Gazella spekii, Blyth, Journ. Asiat. Soc. Beng. 1856, vol. xxiv. p. 296 ; Blanford, Geol. and Zool. Abyss. p. 261, pl. 1. fig. 5-5a.

Head and neck of male and female only known. “Ears of an ash-grey colour, contrasting strongly with the line of the neck, and doubtless also of the body. Horns robust, curved backwards and then upwards, and diverging but slightly. . . . The horns of the female are very much stouter than we have seen in any other female Gazelle. Muzzle whitish, with a strongly contrasting nose-patch.” (*Blyth.*)

Hab. Somali country (*Speke*).

Mr. Blanford has kindly furnished me with photographs of the type specimens of this species which are in the Calcutta Museum. The horns appear very like those of *Gazella arabica* ; but in the markings of the face, neck, and ears the Somali Gazelle appears to differ considerably from that inhabiting Arabia.

9. GAZELLA ARABICA.

1827. *Gazella cora*, Ham. Smith, Griff. An. Kingd. vol. v. p. 333?
 1827. *Gazella arabica*, Licht. Darst. t. 6.
 1828. ———, Hempr. & Ehr. Symb. Phys. t. 5.
 1829. ———, Fisch. Syn. p. 460.
 1843. *Gazella cora*, Gray, Cat. Mamm. Brit. Mus. p. 161.
 1844. *Antilope arabica*, Wagn. Schreb. Suppl. iv. p. 407; Schinz, Syn. p. 399.
 1846. *A. dorcas*, δ , Sund. Pec. p. 268.
 1850. *Gazella vera*, Gray, Knowsl. Menag.
 1852. *Gazella dorcas*, var. 1, Gray, Cat. Mamm. Brit. Mus. p. 56.
 1853. *Gazella arabica*, Temm. Esq. Zool. p. 193.
 1855. *Antilope arabica*, Wagn. Säugeth. p. 403.
 1859. ———, Gieb. Säugeth. p. 307 (part.).
 1863. ———, Heugl. Ant. und Büff. p. 5 (part.).
 1870. *Gazella arabica*, Blanf. Geol. and Zool. Abyss. p. 261, pl. 1. f. 3.

Hair very short and smooth. Central facial band rich bay above, darker below, forming a nose-spot; light facial streak very strongly marked, running from the base of the horn over the eye, stopping just below the nose-spot; dark facial streak distinct, blackish; breast and belly white; dark lateral and pygal bands grizzly brown; light lateral band grizzly fawn; upper parts of the sides and back rich grizzled bay in adult specimens, the younger animals being greyer. Knee-brushes well developed, blackish; tail black. Horns massive, the annulations wide apart, diverging gradually for two thirds their length, the upper third diverging more decidedly and leaning a little forwards. Ears moderate. Size about equal to that of *Gazella dorcas*.

Hab. South Arabia.

The above description was taken from the type specimens in the Berlin Museum, and applies fairly well to all the specimens from South Arabia which I have had an opportunity of examining. In comparison with the Gazelles from North Arabia, mentioned in my remarks upon *Gazella dorcas*, specimens from the south can be always distinguished by their stronger markings, richer colour, and straight non-lyrate horns.

10. GAZELLA BENNETTI.

1831. *Antilope bennettii*, Sykes, P. Z. S. p. 104.
 1843. *G. bennettii*, Gray, List. Mamm. Brit. Mus. p. 161.
 1844. *A. bennettii*, Schinz, Syn. p. 400.
 ——— *A. arabica*, Wagn. Schreb. Suppl. iv. p. 407.
 1846. *A. dorcas*, var. ϵ , Sund. Pec. p. 269.
 1849. *A. bennettii*, Fras. Zool. Typic. pl. 16.
 1850. *G. bennettii*, Turn. P. Z. S. p. 168.
 1852. *Tragops bennettii*, Gray, Cat. Mamm. Brit. Mus. p. 62.
 1855. *Ant. bennettii*, Wagn. Säugeth. p. 405.
 ——— *A. hazenna*, Wagn. l. c. p. 406.
 1859. *A. arabica* (part.), Gieb. Säugeth. p. 307.

1869. *G. bennettii*, Kinloch, Large Game of Thib. p. 57, and plate.

1870. — —, Blanf. Geol. & Zool. Abyss. p. 261, pl. 1. fig. 2.

1872. *Tragops bennettii*, Gray, Cat. Rum. Brit. Mus. p. 39.

Hair of moderate length. Central facial band rufous above, becoming darker below, often forming a distinct blackish nose-spot; light facial streak whitish; dark facial streak rufous fawn-colour; dark lateral and pygal bands very slightly indicated, being a little more rufous than the bay fawn-colour of the back, sides, and haunches; tail black. Knee-brushes well developed, colour variable. Size rather larger than that of *Gazella dorcas*. Horns present in both sexes, but rather small in the female; in the male they are strongly annulated, diverge gradually as they rise, with the points directed forwards and a little outwards.

Hab. India; Southern Baloochistan and Southern Persia (*Blanf.*).

Mr. Blanford's valuable paper, read at the Society's meeting on the 18th of last March, gives very exact details of the range of this species. The specimens brought by Mr. Blanford from Persia differ in no important characters from Indian specimens.

11. GAZELLA FUSCIFRONS.

Gazella fuscifrons, Blanf. P. Z. S. 1873, p. 317.

Central facial band strongly marked, grizzled black; light facial streak grey, fairly definite, as is also the blackish dark facial streak; cheeks and anterior of neck grey; back of the neck, back, sides, haunches and legs sandy; lateral streaks wanting; belly and rump whitish. Knee-brushes long, black. Ears very long. Horns (of ♀ only known) strong, annulated, bending forwards and very slightly inwards at the tips. Size about equal to that of *Gazella dorcas*.

Hab. Deserts of Jalk, separating Seistan from Baloochistan.

This species appears to be decided and well marked, as far as it is possible to judge from a single specimen. The remarkably bold forward curvature of the points of the horns, the long ears, dark face and neck, will, I have no doubt, be found to render specimens from the same locality justly entitled to equality with many of the species above mentioned.

12. GAZELLA SUBGUTTUROSA.

1778. *Antilope subgutturosa*, Guld. Act. Acad. Petrop. vol. i. p. 251, t. 9-12.

1788. — —, Gm. Syst. Nat. p. 186.

1816. *Gazella subgutturosa*, Blainv. Bull. Soc. Phil. p. 75.

1820. — —, Desm. Mam. p. 454.

1827. *A. subgutturosa*, Ham. Smith. Griff. An. Kingd. p. 331.

1829. — —, Fisch. Syn. p. 460.

1836. — —, Goldf. Schreb. Suppl. v. p. 1196.

1843. *Gazella subgutturosa*, Gray, Cat. Mamm. Brit. Mus. p. 160.

1844. *Antilope subgutturosa*, Wagn. Schreb. Suppl. iv. p. 406 ; Schinz, Syn. p. 402.

1846. ———, Sund. Pec. p. 269.

1850. *Gazella subgutturosa*, Turner, P. Z. S. p. 168.

1852. ———, Wolf & Sclat. Zool. Sketches, vol. i. pl. 22 ; Grav, Cat. Mamm. Brit. Mus. p. 58.

1855. *A. subgutturosa*, Wagn. Säugeth. p. 404 ; Gerv. Hist. Nat. Mamm. p. 204.

1859. ———, Gieb. Säugeth. p. 307.

1870. *Gazella subgutturosa*, Blanf. Geol. and Zool. Abyss. p. 261, plate 1. f. 4.

1872. ———, Sclat. Cat. Vert. Zool. Soc. Gard. p. 92.

Hair in winter rough and coarse, in summer much softer and smoother. During both seasons the dirty white of the face and cheeks is only relieved by the dark facial streak, which is short and narrow, but defined by a sprinkling of rufous hairs ; the lateral and pygal bands are very faintly indicated, the dark bands being more rufous, the light band rather paler than the grey fawn-colour of the upper parts of the body ; breast and belly white. Tail and ears moderate in length, the former blackish rufous. Horns absent in the female ; in the male long, annulated, and lyrate, the points projecting inwards. Height about 26".

Hab. High plateau of Persia ; Northern Baloochistan ; Afghanistan (*Blanf.*).

In the female being hornless, and in the slightly diminished length of the ears and tail, this species stands intermediate between the typical desert Gazelles and those inhabiting the high steppes of Central Asia.

13. GAZELLA GUTTUROSA.

1767. *Antilope gutturosa*, Pall. Spic. Zool. fasc. xii. p. 46, t. 2.

1777. *A. tzeiran?*, Zimm. Zool. Geogr. p. 543.

1812. *A. gutturosa*, Licht. Berl. Mag. Naturk. vi. p. 171.

1836. ———, Goldf. Schreb. Suppl. v. p. 1221, tab. 275.

1844. ———, Wagn. Schreb. Suppl. iv. p. 416.

1855. ———, Wagn. Säugeth. p. 408.

1862. ———, Radde, Reis. Süd. Ost-Sib. p. 254, t. xi. f. 6.

Hair in winter long and coarse. Anterior part of the face slightly darker than the pale grizzled fawn-colour of the sides of the face, neck, back, sides, and haunches ; facial and lateral markings wanting ; belly and anal disk, which surrounds the very short tail (the root of which is white, the tip fawn-colour), dirty white.

In summer all the parts which are grizzled fawn in winter are of an "intense isabel yellow" (*vid.* Radde). Ears very short. Horns short, weakly annulated, the curves as in the last species, but much less boldly shown. Height about 30".

Skull : anteorbital fossa very shallow ; nasals converge to a point and are rather elongated.

Hab. Mongolia.

The best account we have of this Gazelle is that given by Radde

in his description of the Mammals met with by him during his journey in Siberia. In this work Radde informs us that the species, even since the days of Pallas, has retreated south and east from the Russian boundary to a considerable distance, and that now it has entirely ceased, even in its winter wanderings, to visit the banks of the Upper Onon, in which locality a century ago it was plentiful. Even in Dauria there are, according to Radde, only two localities where the species remains during the summer and breeds. It appears to prefer bare hilly ground in the neighbourhood of small lakes. As winter approaches, enormous herds collect together and wander northwards, crossing the Argun river to the east of Suktui and Abagaitui. Radde considers the chief cause of these wanderings to be thirst; no snow falling in the desert of Gobi in the early winter, and the rivers and small lakes being so hard frozen that they can no longer break the ice with their feet, they are impelled to wander northwards in search of snow.

In the middle of June the female produces, as a rule, two young, which in three days are strong enough to follow their mother at full speed.

As far as Radde could ascertain, *G. gutturosa* is not found at the present day to the west of the upper Argun in Transbaikalia, upon Russian territory. It is unknown in Mantchuria.

14. GAZELLA PICTICAUDATA.

Procapra picticaudata, Hodgs. Journ. Asiat. Beng. xv. p. 334, tab. 2.

1869. *Procapra picticaudata*, Kinl. Large Game of Thib. p. 10.

Hair in winter long and softish. Facial and lateral markings wanting; breast, belly, and anal disk, which surrounds the tail, dirty white; the rest of the body grizzled fawn-colour, becoming more rusty towards the anal disk, a rusty line sometimes running through the disk to the short tail, the tip of which is rusty brown. The hair about the corners of the mouth elongated. In the summer the coat is short and of a slaty grey colour. Ears very short. Horns long, annulated, diverge as they rise, bending forwards and backwards, again forwards and a little inwards at the tips. Females hornless. Height about 18".

Skull: anteorbital fossa *very* shallow; nasals converging to a point and rather elongated.

Hab. Plains and valleys of Ladak.

Kinloch, in his work on the Large Game of Thibet, gives a very interesting article upon this species.

15. GAZELLA DAMA.

1766. *Antilope dama*, Pall. Misc. p. 5.

1788. ———, Gm. Syst. Nat. p. 183 (part.).

1812. ———, Licht. Berl. Mag. Naturk. p. 170 (part.).

1826. ———, Rüpp. Atlas, pp. 39, 43, pl. 14, 16.

1827. ———, Ham. Smith, G. A. K. p. 330 (part.); Licht. Darst. t. 3 & 4.

1828. *Antilope dama*, Hempr. & Ehr. Symb. Phys. t. 6.
 1829. ———, Fisch. Syn. p. 453 (part.).
 1833. ———, Benn. P. Z. S. 1833, p. 2.
 1835. ———, Rüpp. Wirbelth. p. 25.
 1844. ———, Wagn. Schreb. Suppl. iv. p. 408.
 1846. ———, var. *orientalis*, Sund. Pec. p. 266.
 1850. *Gazella mohr*, Turner, P. Z. S. 1850, p. 168 (part.).
 1852. *G. ruficollis*, Gray, Cat. Mamm. Brit. Mus. p. 60.
 1855. *Antilope dama*, Wagn. Säugeth. v. p. 404.
 1859. ———, Gieb. Säugeth. p. 307 (part.).
 1863. ———, Heugl. Ant. u. Büff. p. 6.
 1869. ———, Heugl. Reis. Weiss. Nil, p. 315.
 1872. *Gazella ruficollis*, Gray, Cat. Rum. Brit. Mus. p. 39.

Hair short and smooth. Facial and lateral markings wanting; neck and upper part of the back sandy red; face, spot on the throat, and the rest of the body and limbs white. Knee-brushes well developed. Ears moderate. Horns lyrate, strongly annulated, well developed in both sexes.

Hab. Desert of Korti (*Rupp.*); Southern Nubia and Kordofan (*Heugl.*).

16. GAZELLA MOHR.

1764. *Le Nanguer*, Buff. H. N. vol. xii. p. 213, pl. 34.
 1767. *Antilope dama*, Pall. Spic. Zool. fasc. i. p. 8.
 1777. ———, Zimm. Zool. Geogr. p. 541.
 1777. ———, Exleben, Règn. Animal. p. 280 (part.).
 1781. *Swift Antelope*, Penn. Quad. p. 76.
 1788. *A. dama*, Gm. Syst. Nat. p. 183.
 1801. *Nanguer*, Shaw, Zool. p. 359, pl. 197.
 1812. *A. dama*, Licht. Berl. Mag. vi. p. 170 (part.).
 1816. *Cervicapra (A.) dama*, Blainv. Bull. Soc. Phil. p. 75 ?
 1820. *Antilope nanguer*, Desm. Mamm. p. 458.
 1827. *Antilope dama* (part.), Ham. Smith, G. A. K. p. 330.
 1829. ———, Fisch. Syn. p. 463 (part.).
 1833. *A. mohr*, Benn. P. Z. S. 1833, p. 1.
 1836. *A. dama*, Goldf. Schreb. Suppl. v. p. 1199.
 1844. *A. mohr*, Wagn. Schreb. Suppl. iv. p. 410.
 1846. *A. dama*, β , var. *occidentalis*, Sund. Pec. p. 266.
 1850. *G. mohr*, Turn. P. Z. S. p. 168 (part.).
 1852. ———, Gray, Cat. Mamm. Brit. Mus. p. 59.
 1855. *A. mohr*, Wagn. Säugeth. p. 404.
 1859. *A. dama*, Gieb. Säugeth. p. 307 (part.).
 1872. *G. mohr*, Gray, Cat. Rum. Brit. Mus. p. 39.

Hair close-set and smooth. Central facial band grizzled rufous above, fading away below into the dirty white of the lower parts of the face and cheeks; dark facial streak thin, but definite, black; spot on the throat, breast, belly, anterior of hind legs and posterior of fore legs, rump, and tail (with the exception of the black tip) white; the white of the rump projects forwards into the deep rufous fawn-colour of the neck, back, sides, and haunches; this colour,

which is darkest on the neck, runs down the front of the fore and outside of the hind extremities; lateral bands wanting; pygal band blackish rufous, very thin and short. Ears moderate. Horns in both sexes; in the male very massive and rather short, strongly annulated, the points projecting suddenly and boldly forwards. Knee-brushes long. Height about 34".

Hab. Senegal.

Mr. Bennett was the first to point out the decided difference between this and the species last described. Specimens of *Gazella mohr* vary greatly, especially in the decision of the facial markings; but the much deeper shade and wider distribution of the red of the upper parts of the body, running as it does the entire length along the outside of the legs, and the much more massive and differently curved horns of the present species, render it always easy to distinguish it from *Gazella dama*.

17. GAZELLA SÆMMERRINGII.

1826. *Antilope sæmmerringii*, Cretzschm. Rüpp. Zool. Atl. p. 49, t. 19.

1829. ———, Fisch. Syn. p. 462.

1835. ———, Rüpp. Wirbelth. p. 25.

1843. *Gazella sæmmerringii*, Gray, Cat. Mamm. Brit. Mus. p. 161.

1844. *Antilope sæmmerringii*, Wagn. Schreb. Suppl. iv. p. 415.

1846. ———, Sund. Pec. p. 266.

1850. ———, Turner, P. Z. S. 1850, p. 168.

1852. ———, Gray, Cat. Mamm. Brit. Mus. p. 59.

1855. ———, Wagn. Säugeth. p. 405.

1859. ———, Gieb. Säugeth. p. 308.

1863. ———, Heugl. Ant. u. Büff. p. 7.

1867. ———, Schl. P. Z. S. 1867, p. 817, plate 37.

1869. ———, Heugl. Reis. Weiss. Nil, p. 315.

1870. ———, Blanf. Geol. & Zool. Abyss. p. 260.

1872. ———, Gray, Cat. Rum. Brit. Mus. p. 39.

Hair smooth and short. Facial band blackish, slightly rufous between the horns; light facial streak white, well marked; dark facial streak blackish, very definite, running through the eye and leaving its upper end as a black spot isolated above it. A spot below the eye, chin, throat, and a spot in front of the neck white; lateral bands wanting; breast, belly, tail, and rump white, the white of the latter encroaching into the sandy fawn-colour of the rest of the body and the haunches. Knee-brushes well developed. Ears long, bordered externally with black. Horns in the male lyrate, massive, and strongly annulated, well developed but less massive in the female. Height about 30".

Hab. Abyssinian coast of the Red Sea, Danakil and Somali countries, Berber, and East Senaar (*Heuglin*).

This Gazelle, according to Blanford, inhabits bush and low acacia-shrub-covered plains, never ascending the hills. They keep in large flocks and appear to drink daily. The intensity of the facial markings varies but is always remarkably strong in this species.

18. GAZELLA GRANTI.

Gazella granti, Brooke, P. Z. S. 1872, p. 601, pl. 41.

Central facial band indefinite, as is also the light facial streak; a dark spot on the nose is seen in both sexes in the sketches from which this description is taken; breast, belly, and rump white, the white of the rump running forwards in a point as in the last two species; pygal band blackish; lateral bands wanting; the rest of the body of a rich isabelline sandy fawn-colour. Knee-brushes present. Ears long. Horns very long and massive, present in both sexes. Size rather larger than the last species.

Hab. Ugogo (*Grant*).

This magnificent species is at present only known from Captain Speke's and Colonel Grant's sketches. In the immense development of its horns it exceeds all other known species. Its range appears to be remarkably limited.

19. GAZELLA EUCHORE.

1785. *Spring bok*, Sparrm. Voyage, vol. ii. pl. 4.

1812. *Antilope euchore*, Licht. Berl. Mag. vi. p. 169.

1816. *G. (A.) euchore*, Blainville, Bull. Soc. Phil. p. 75.

1820. *A. euchore*, Desm. Mamm. p. 455.

1821. *A. pygarga*, Blumenbach, Handb. d. Naturg. 10^{te} Ausg. p. 119.

1822. *A. euchore*, Burch. Trav. vol. i. p. 290, vol. ii. p. 109.

1827. ———, Ham. Smith, G. A. K. vol. v. p. 331; Licht. Darst. pl. vii.

1829. ———, Fisch. Syn. p. 461.

1836. *Antilope euchore*, Goldf. Schreb. Suppl. v. p. 1189, tab. 272.

1843. *G. euchore*, Gray, Cat. Mamm. Brit. Mus. p. 160.

1844. *A. euchore*, Wagn. Schreb. Supplem. iv. p. 414; Schinz, Syn. p. 400.

——— *Antilope dorcas*, var. *pygargus*, Licht. in Forst. Descr. An. p. 388.

1846. *A. euchore*, Sund. Pec. p. 271.

1850. *G. euchore*, Turn. P. Z. S. p. 168.

1852. *Antidorcas euchore*, Gray, Cat. Mamm. Brit. Mus. p. 63.

1855. *Antilope euchore*, Wagn. Säugeth. p. 407.

1859. ———, Gieb. Säugeth. p. 309.

1872. *Antidorcas euchore*, Gray, Cat. Rum. B. M. p. 41.

Hair rather long but smooth. The central facial band has the upper part distinctly marked, but ends in a point between the eyes, rufous; the light facial streaks meet below the eyes, white; dark facial streak thin from above downwards, but very definite, deep rufous; cheeks, line in front of the neck, breast, belly, inside of limbs, dorsal mane, starting from the anterior lumbar region, and tail (with the exception of the long black terminal hairs) white; dark lateral and pygal bands deep rufous, the former very broad and well defined; light lateral band very faintly shown, being of a less



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