PROCEEDINGS

OF THE

SCIENTIFIC MEETINGS

OF THE

ZOOLOGICAL SOCIETY OF LONDON.

January 2, 1877.

Prof. Newton, F.R.S., V.P., in the Chair.

The following report on the additions to the Society's Menagerie during the month of December 1876 was read by the Secretary:—

The total number of registered additions to the Society's Menagerie during the month of December 1876 was 68, of which 36 were obtained by presentation, 10 by purchase, 1 by exchange, and 21 were received on deposit. The total number of departures during the same period by death and removals was 85.

The most noticeable additions during the month were:—

1. A Snowy Owl (*Nyctea nivea*) captured in the west of Ireland, and presented to the Society by Mr. John Kendall, December 4th.

I take this opportunity of calling the attention of the Society to the abundance of specimens of the Snowy Owl during the present winter. One of the dealers in Liverpool writes that he has received at least thirty specimens from vessels crossing the Atlantic to that port. Besides the present bird two other recently acquired examples are living in the Society's collection. Letters from America also speak of the unusual abundance of this bird in the Northern States, and in the adjoining districts of Canada.

2. Three Mexican Jays (*Cyanocorax luxuosus*), purchased December 9th, being the first specimens of this handsome bird that have reached us alive.

3. Two Orange-headed Ground-Thrushes (*Geocichla citrina*), two White-throated Laughing Thrushes (*Garrulax albogularis*), and one Horsfield's Whistling Thrush (*Myiophoneus horsfieldi*), from India, being likewise all representatives of species new to the Society's collection.

4. Two Black-headed Partridges (*Caccabis melanocephala*) and one Hey's Partridge (*Caccabis heyi*) from Hedyar near Mecca. Presented by Commander F. M. Burke, December 30th.

The birds of Arabia are so little known to us that we are always glad to receive specimens from that coast. Of the large black-headed *Caccabis* (see P. Z. S. 1837, p. 818) we have only once before received a living specimen.

Professor Newton exhibited a variety of the Guillemot (*Alca troile*) remarking:—"The specimen on the table has been kindly lent me by Mr. T. M. Pike, of Wareham, who shot it on the 29th of November last, at sea, between Poole and Christchurch. It is the first example I have seen of the curious variety briefly described by Dr. Krüper ('Naumannia,' 1857, p. 437), on the authority of Pastor Jon Jonsson, who saw one which had been taken, in July 1848, at Grimsey, off the north coast of Iceland, and seems to agree in all respects with the bird so described. It differs strikingly from the normal appearance of the species in the colour of the bill and legs, which, as will be seen, are of a bright yellow, while the claws are white. This last fact points, I think, to the variation originating from the cause which produces albinism in so many animals. Further than this I will only call your attention to a somewhat similar variety of *Pica rustica*, seen, though not obtained, by Mr. Harvie Brown in Scotland some years since (Zool. 1867, pp. 706, 757, 826, 877, 913), and again in Devonshire by Mr. G. F. Mathew (*tom. cit.* p. 1016), in which the bill was yellow—as well as to the yellow colouring of the bill occasionally found in examples of the variety of the Northern Diver which has been described under the name of *Colymbus adamsi*.

The following papers were read:—

1. Notes on the Visceral Anatomy and Osteology of the Ruminants, with a Suggestion regarding a Method of expressing the Relations of Species by means of Formulæ. By A. H. Garrod, M.A., Prosector to the Society.

[Received January 2, 1877.]

There is so little known of the differences in the visceral anatomy of the many genera and species of the ruminating animals, that I feel that no apology is necessary for bringing before this Society the facts which my prosectorial opportunities afford me with reference to parts which are either too large or too perishable to be easily preserved in our museums. The following "Notes" will be found to contain an account of those parts in certain species of the Cavicornia and Cervidæ (such as the stomach, liver, generative organs, and brain), which are subject to variation in the different species that I have had the opportunity of examining.

The *stomach* of the Ruminantia, on account of its complexity, presents features of special interest. As far as the general shape and proportions of its cavities are concerned, my observations tend to show that the relative size of the psalterium in the different genera is the only characterizing feature. In the abomasum I have not detected any variation.

The rumen varies as to the shape and distribution of the villi on its mucous membrane. In most of the smaller species the folds which constrict the viscus, as well as the pouches between them, are covered internally with villi, though these are larger in the latter situations. In most of the larger species the villi are absent on the folds, and are largest in the middle of the pouches. This is specially the case in the Rusine Deer. In the Sheep and its allies they are peculiarly scattered and broad at their bases, as is also the case in *Moschus*. In most of the smaller species of the order they are cylindrical or flattened cylinders, as close-set as the "pile" in velvet. In *Portax picta* they are very elaborate, close-set, pedunculated and foliaceous. In *Cervus alfredi* they are flattened and expanded apically, in other words tongue-shaped, as they are in *Camelopardalis giraffa*. In *Tetraceros subquadricornutus* all the villi are flattened, broad, and rounded, absent on the folds. In Table I. column VIII., further notes on the peculiarities in the rumen will be found.

The reticulum varies in the depth and size of its cells, but not to any great extent. I have not ever seen them deeper than in *Cervus duvaucelli* ($\frac{1}{6}$ inch), or shallower than in the Giraffe. In some species the cell-walls are thicker than in others, as may be seen on reference to Table I. column IX.

The psalterium varies more than any other section of the stomach; and a study of its laminæ brings to mind the septa of some of the more elaborate and fully calcified corals; for, as in them, the laminæ are of different lengths, and their arrangement is subject to definite laws.

This organ may be defined as a subglobose dilatation of the upper wall of the canal leading from the reticulum to the abomasum, the lumen of which is much reduced by the development from all but its lower wall of longitudinal villous-covered folds of its mucous lining. In size it differs greatly, being very large in the genus *Bos*, minute in *Nannotragus* and *Cephalophus*.

Of the laminæ there are a certain number (frequently ten) of a definitely greater depth than any of their neighbours; and these may be termed *primary* laminæ. Between each two of these there are *secondary* laminæ of smaller size; and such being the case, nineteen is the average number of the two sets combined. When the organ is more complex a still shallower *tertiary* lamina appears on each side of each secondary one; and there may be *quaternary* laminæ on each side of each tertiary, on either side, again, of which there may

TABLE I.

I. Name.	II. Gall-bladder.	III. Caudate Lobe.	IV. Spigelian Lobe.	V. Depth of Umbilical Fissure.
Cervus elaphus	Absent.	Lateral in young, small in adult.	Absent.	Almost nil.
— *cashmeerianus*	Absent.	....	....	....
— *dama*	Absent.	Almost nil.	Absent.	$\frac{1}{4}$
— *aristotelis*	Absent.	Square.	Oviform in one, rusiform in another.	$\frac{1}{4}$
— *swinhoii*	Absent	Large, square.	Rusiform.	$\frac{1}{4}$
— *kuhlii*	Absent.	Square.	Absent.	....
— *moluccensis*	Absent.	Squarish.	Oviform.	$\frac{1}{4}$
— *mariannus*	Absent.	Square.	Absent.	$\frac{1}{4}$
— *duvaucelli*	Absent.	Square.	Rusiform.	$\frac{1}{6}$
— *porcinus*	Absent.	Lateral.	An oviform rudiment.	$\frac{1}{3}$
— *alfredi*	Absent.	Large, square.	Oviform, small (juv.).	$\frac{1}{4}$
— *capreolus*	Absent.	Lateral.	Oviform and everted.	$\frac{1}{3}$
Cervulus muntjac	Absent.	Lateral.	Rudimentary.	$\frac{1}{2}$
— *reevesi*	Absent.	....	....	....
Elaphodus cephalophus	Absent.	Small, lateral.	Oviform rudiment.	$\frac{1}{2}$
Cervus pudu	Absent.	Lateral.	Absent.	
— *campestris*	Absent.	Lateral.	Absent or rudimentary.	Nil.
— *rufus*	Absent.	Squarish.	Absent.	$\frac{1}{3}$
— *mexicanus*	Absent.	Lateral.	Absent, or rudimentary.	$\frac{1}{6}$
Camelopardalis giraffa	Absent.	Absent.	Absent.	$\frac{1}{6}$
Moschus moschiferus	In fossa.	Small, lateral.	Large, rusiform.	$\frac{1}{3}$
Antilocapra americana	In fossa.	Very small, lateral.	Rusiform.	$\frac{1}{8}$
Ovis cycloceros	Very elongate.	Lateral.	Oviform.	$\frac{1}{4}$
Capra picta	Very elongate.	Short, lateral.	Oviform.	$\frac{1}{4}$
— *jemlaica*	Very elongate.	Short, lateral.	Oviform.	
Gazella dorcas	In fossa.	Small, lateral.	Absent.	$\frac{1}{4}$
— *granti*	In fossa.	Small, lateral.	Small, rusiform.	$\frac{1}{8}$
— *subgutturosa*	In fossa.	Small, lateral.	Oviform, or absent.	$\frac{1}{6}$
— *muscatensis*	In fossa.	Small, lateral.	Absent.	$\frac{1}{4}$
— *rufifrons*	In fossa.	Small, lateral.	Rudimentary.	$\frac{1}{5}$
— *arabica*	In fossa.	Small, lateral.	Oviform.	$\frac{1}{4}$
Nanotragus nigricaudatus	Present.	Rudimentary.	Modified, rusiform.	$\frac{1}{6}$
Cephalophus maxwelli	Absent.	Short.	Modified, rusiform.	$\frac{1}{8}$
— *pygmæus*	Absent.	Short.	Modified, or absent.	$\frac{1}{6}$
Tetraceros subquadricornutus	Present, as is cystic fissure.	Absent.	Absent.	$\frac{1}{6}$
Strepsiceros kudu	Elongate.	Lateral.	Rudimentary.	$\frac{1}{8}$
Oreas canna	Present.	....	Oviform.	....
Tragelaphus scriptus	Elongate.	Lateral.	Absent.	$\frac{1}{3}$
Damalis pygarga	Present.	Small, lateral.	Enormous, rusiform.	$\frac{1}{2}$
Catoblepas gnu	Elongate.	....	....	....
Addax naso-maculatus	Very elongate.	Very short.	Oviform.	Rudimentary.
Portax picta	Present.	Short.	Absent.	$\frac{1}{8}$

TABLE I.

VI. Length of Cæcum and Sex of specimen.	VII. Intestinal lengths.	VIII. Papillæ of Rumen.	IX. Cells of Reticulum.	X. Psalterium.
$1\frac{1}{6}$ ft. ♀, adult.	S.I. 42 ft. L.I. $30\frac{1}{2}$ ft.	Cylindroid, elongate, flattened.	Not deep.	Quadruplicate, 13.
....	....	....	....	Quadruplicate, 10.
♂, adult.	....	Cylindrical, except longest (1 in.), flattened and expanded.	Shallow.	Triplicate.
♂, nearly adult.	....	Cylindroid.	Broad-walled.	Quadruplicate, 10.
$1\frac{1}{3}$ ft. ♂, adult.	S.I. $48\frac{1}{2}$ ft. L.I. $25\frac{1}{2}$ ft.	Cylindroid, slightly flattened.	Broad-walled.	Quinquiplicate, 12.
5 in. ♂, adult.	S.I. $29\frac{1}{2}$ ft. L.I. 10 ft.	Cylindroid, slightly flattened.	....	Quadruplicate, 9.
$1\frac{1}{2}$ in. ♂, new-born.	S.I. $14\frac{1}{3}$ ft. L.I. $3\frac{1}{3}$ ft.	....	....	Quadruplicate, 10.
10 in. ♀, adult.	S.I. $39\frac{1}{2}$ ft. L.I. 15 ft.			
1 ft. ♀, aged.	S.I. 45 ft. L.I. $25\frac{1}{2}$ ft.	Cylindroid and tongue-shaped.	Deep, $\frac{1}{8}$ inch.	Quadruplicate.
7 in. ♂, a year old.	S.I. $25\frac{1}{2}$ ft. L.I. $13\frac{1}{2}$ ft.	Slender, small, cylindroid.	Broad-walled.	Quadruplicate.
10 in. ♂, adult.	S.I. 34 ft. L.I. 18 ft.	Some large and tongue-shaped.	Fairly deep.	Quadruplicate, 10.
10 in. ♂, adult.	S.I. $31\frac{2}{3}$ ft. L.I. $15\frac{1}{2}$ ft.	Cylindrical.	Very shallow.	Quadruplicate.
7 in. ♂, adult.	S.I. $18\frac{1}{2}$ ft. L.I. $8\frac{1}{2}$ ft.	Cylindrical.	....	*Triplicate*, 10.
$9\frac{3}{4}$ in. ♂, not adult.	S.I. $23\frac{1}{6}$ ft. L.I. $9\frac{1}{3}$ ft.			
6 in. ♂.	S.I. $24\frac{5}{6}$ ft. L.I. $9\frac{1}{3}$ ft.	Cylindrical and slightly flattened.	Very shallow.	*Triplicate*, 10.
11 in. ♀, adult.	S.I. $28\frac{5}{6}$ ft. L.I. $16\frac{1}{2}$ ft.	Cylindrical.	....	*Quadruplicate*, 9.
$5\frac{1}{2}$ in. ♂.	S.I. $29\frac{2}{3}$ ft. L.I. $9\frac{1}{2}$ ft.	Short, flattened.	Very shallow.	*Quadruplicate*, 11.
$2\frac{7}{12}$ ft. ♀, adult.	S.I. 196 ft. L.I. 75 ft.	....	....	*Quadruplicate*, 18.
.... $1\frac{1}{6}$ ft. ♀, adult.	....	....	....	*Duplicate*, 19.
.... $1\frac{1}{4}$ ft. ♂, adult.	.... S.I. $45\frac{1}{2}$ ft. L.I. 19 ft.	....	....	*Quinquiplicate*, 9.
$1\frac{1}{4}$ ft. ♂, adult.	S.I. $45\frac{1}{2}$ ft. L.I. 19 ft.			
$8\frac{1}{2}$ in. ♀.	S.I. $42\frac{1}{2}$ ft. L.I. $15\frac{1}{2}$ ft.			
$8\frac{1}{2}$ in. ♂.	S.I. $36\frac{3}{4}$ in. L.I. $11\frac{1}{2}$ ft.	Small, slightly flattened.	Shallow.	*Triplicate*, 10.
$5\frac{1}{2}$ in. ♂.	S.I. 19 ft. L.I. $9\frac{7}{12}$ ft.			
♂, juv.	....	Uniformly short and a little flattened.	Fair depth.	*Triplicate.*
7 in. ♂.	S.I. $16\frac{3}{4}$ ft. L.I. 11 ft.	Mostly cylindrical, some tongue-shaped.	Fair depth.	*Duplicate*, 9.
8 in. ♂.	S.I. $21\frac{2}{3}$ ft. L.I. $9\frac{1}{6}$ ft.	Cylindrical and short.	....	*Duplicate*, 10.
6 in. ♂, adult.	S.I. $20\frac{5}{6}$ ft. L.I. $9\frac{1}{2}$ ft.	Cylindrical and short.	Fair depth.	*Triplicate*, 10.
6 in. ♀.	S.I. $20\frac{1}{4}$ ft. L.I. $9\frac{1}{6}$ ft.	All flattened.	Shallow.	Triplicate, 10.
$2\frac{1}{2}$ ft. ♂, adult.	S.I. 108 ft. L.I. 78 ft.			
8 in. ♂, adult.	S.I. $26\frac{1}{2}$ ft. L.I. 16 ft.	All flattened and tongue-shaped.	....	*Quadruplicate*, 9.
0 in. ♀. $1\frac{1}{4}$ ft.	S.I. $42\frac{1}{3}$ ft. L.I. $17\frac{1}{12}$ ft. Total length of intestines $118\frac{1}{6}$ ft.	Sparse, flattened.	Fair depth.	*Quadruplicate*, 15.
1 ft. 5 in. ♂, aged.	S.I. $53\frac{3}{4}$ ft. L.I. $29\frac{1}{2}$ ft.	Mostly elongated, cylindrical, some foliaceous.	Shallow.	*Quadruplicate*, 15.
$1\frac{3}{5}$ ft. ♀, adult.	S.I. $82\frac{1}{2}$ ft. L.I. 42 ft.	Large and foliated.	Well developed.	*Quinquiplicate*, 10.

be a row of papillæ indicating the rudiments of laminæ of a fifth power; for, when disappearing, laminæ always end as rows of papillæ.

In the case of a transverse section of a quadruplicate psalterium (in other words, of one in which there are laminæ of four powers), the quaternary folds being rudimentary, imagine it to be cut through longitudinally along the middle of its groove, and opened out in such a way that the outer wall forms a straight line, whilst the laminæ depend from it; then the appearance will be that of fig. 1.

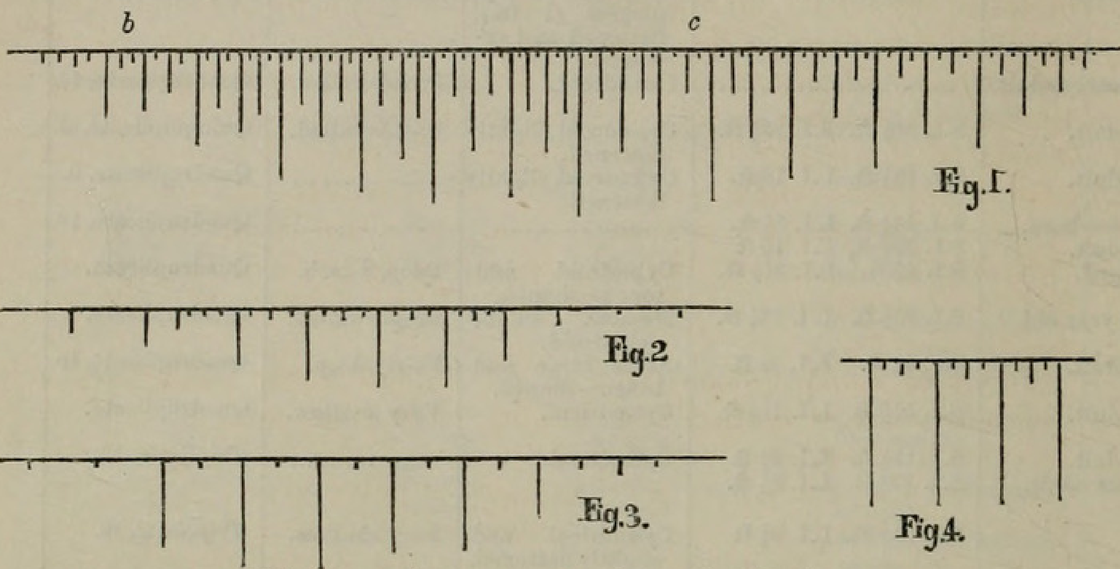


Diagram of transverse sections of psalterium.

This being from an actual specimen, there is a slight want of uniformity at *b* and *c*, which is usually found to be the case. The laminæ of each cycle, or power, gradually diminish in size laterally; and it will be noticed that, though the organ is quadruplicate where the folds are relatively largest, the smallest laminæ disappear at the sides. This is nearly always the case, as it is also that near the orifice of communication with the reticulum they are stronger than they are further on.

In different genera the relative depths of the laminæ which constitute the separate cycles is not always the same. The arrangement depicted above is the most usual, in which the secondary folds are about two thirds the size of the primary, a similar difference existing between them and the tertiary, and so on.

Fig. 4 is from the psalterium of *Gazella arabica*, in which, though the disposition is triplicate, it is seen that the secondary laminæ are very little larger than the papillary rows which form the tertiary cycle, the primary laminæ being of considerable depth. The structure in *Cephalophus* is the same, only that, the psalterium being much smaller, all the parts are much reduced in size, the lateral laminæ especially so. In *Nannotragus nigricaudatus* the equally small psalterium is even more simple, there being but six primary laminæ of any depth; and these are covered with peculiarly large and pointed papillæ, three more being evidently their lateral homologues, although reduced to papillary rows. The conditions are represented in figs. 2 (*Cephalophus*) and 3 (*Nannotragus*).

The psalterium of *Moschus moschiferus* differs essentially from any other with which I am acquainted. Prof. Flower has fully described and figured it[1], at the same time that he has pointed out how much the specimen in the Museum of the College of Surgeons differs from that the account of which is given by Pallas[2]. Mr. Flower has kindly permitted me to examine the specimen. The nineteen plicæ all belong to the primary cycle without doubt; and as this number is that of the primary together with the secondary folds in most ruminants of the same size, it appears to me that their peculiarity consists in the exaggerated development (to the size of the primary) of the second cycle. These laminæ are also peculiarly close to one another at their lines of attachment, which is further in favour of this view. Between some of the folds I have detected lines of papillæ; but their presence is the exception, not the rule.

Where the psalterium is large it is sometimes found that longitudinal rows of papillary lines are present at intervals on the primary folds, and even the secondary laminæ. These are very conspicuous in *Portax picta*.

In some quadruplicate and in all quinquiplicate psalteria the cycles of smallest laminæ are nothing more than rows of papillæ. In other quadruplicate psalteria the cycles of the fourth power are developed as true folds without any ultimate lines of papillæ. Whether or not this is the case is indicated in Table I. (p. 5) by the descriptive name in column X., whatever the power, being printed in roman letters or italics. When in italics the laminæ of the highest power are only represented by papillary rows.

The *liver* is always simple and small, being situated almost entirely on the right side of the median line. The umbilical fissure never extends more than one half through the organ, generally less. The lateral fissures never exist.

The gall-bladder is absent in all the Cervidæ, according to my observations, and in the genus *Cephalophus* among the Bovidæ.

The caudate lobe is very variable in size, and is frequently smaller in adult than in young individuals. In most species it is elongate, slender, and lateral, forming little more than an incomplete cap to the right kidney; in some it is quadrate from the development ventrally of its basal portion.

The Spigelian lobe is frequently entirely absent, as such. When present it is a development of the median portion of the posterior margin of the portal fissure, extending so as to overlap it. When its base is broad, as in the Sheep, it may be termed *oviform*; when it is pedunculate, as is generally the case in the genus *Rusa*, it may be termed *rusiform*.

Variations of slight degree are found in individuals of the same species. From Table I. (pp. 5, 6) the peculiarities of the different varying parts of the organ in the specimens which I have had the opportunity of examining may be determined (columns II. to V.).

[1] P. Z. S. 1875, p. 170. [2] Spicilegia Zoologica, fasc. xiii. (1779).

Livers of various Ruminants.

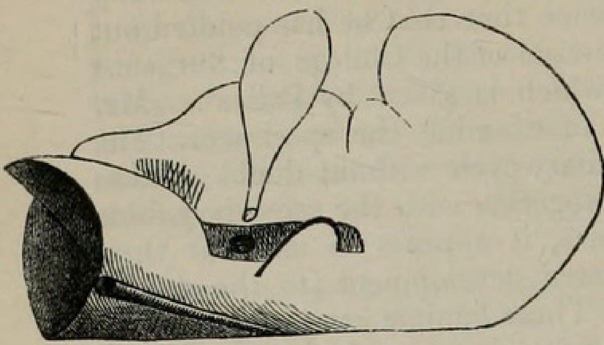


Fig. 5. *Ovis aries.*

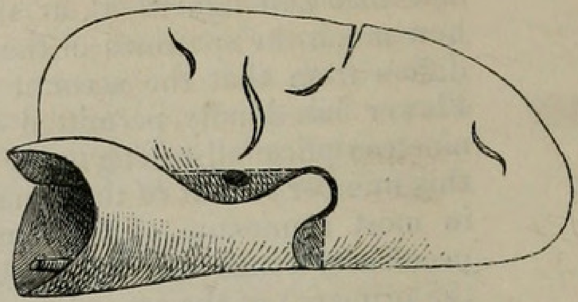


Fig. 6. *Cephalophus maxwelli.*

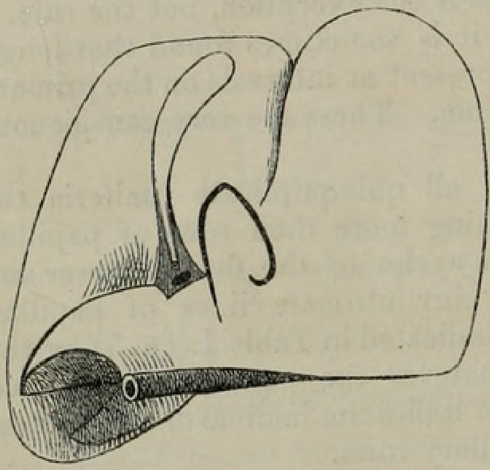


Fig. 7. *Damalis pygarga.*

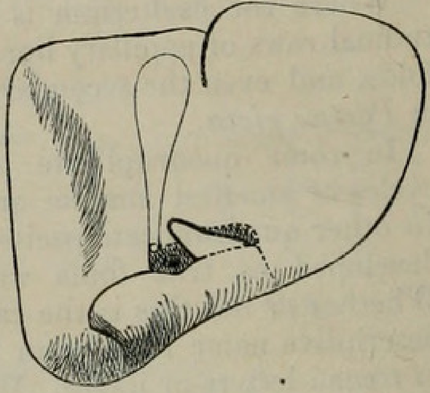


Fig. 8. *Nannotragus nigricaudatus.*

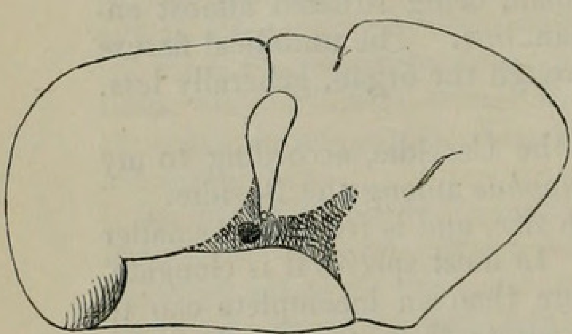


Fig. 9. *Tetraceros subquadricornutus.*

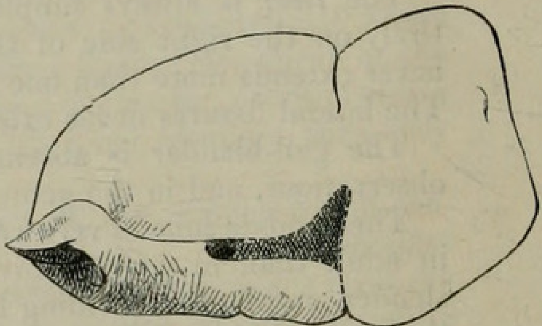


Fig. 10. *Cervus mexicanus.*

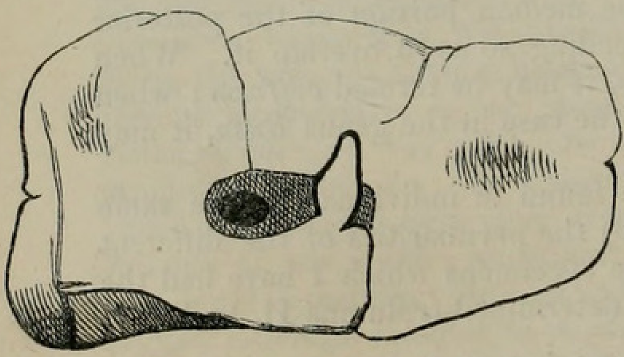


Fig. 11. *Cervus swinhoii.*

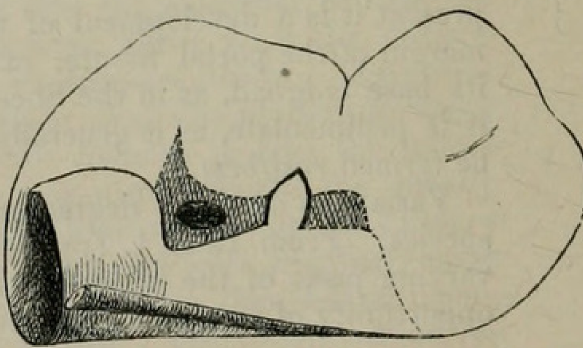


Fig. 12. *Cervus duvaucelli.*

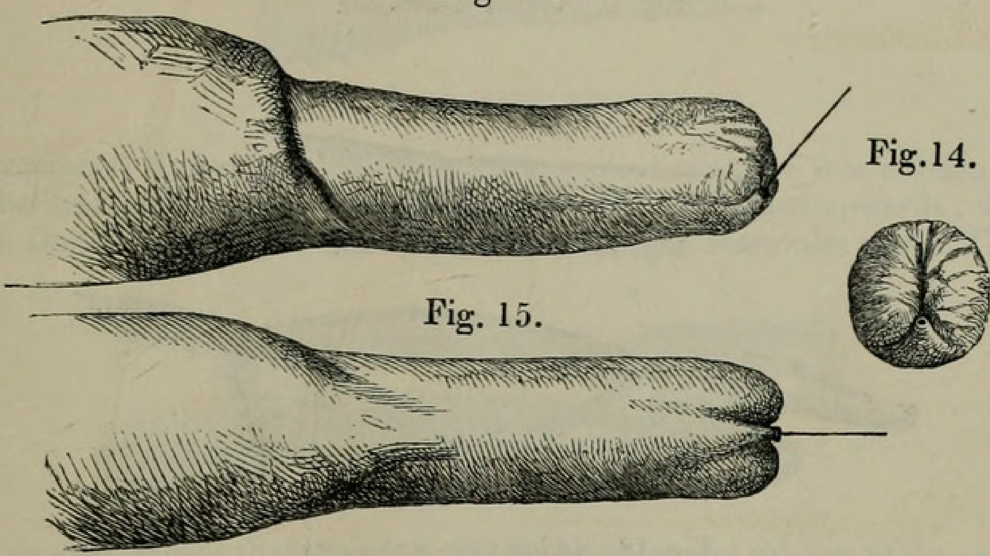
The *generative organs* of the Ruminantia present many features of interest bearing on classification. These are mainly to be found in the shape of the glans penis, the development of Cowper's glands, and the number of cotyledons in the placenta.

The glans penis is very different in shape in the various genera of the Ovidæ as well as of the Cervidæ. In all it is the case that the terminal portion of the urethra is extremely small in calibre. Figs. 13–15 give views of the lateral, anterior, and inferior surfaces

Fig. 13.

Fig. 14.

Fig. 15.



Penis of *Cervus cashmeerianus.*

of the organ in *Cervus cashmeerianus,* with which the following species agree in structure—*C. elaphus, C. dama, C. aristotelis, C. moluccensis, C. kuhlii, C. alfredi,* and *C. porcinus.* In them the glans constitutes a cylinder, slightly flattened from side to side, about one fourth as deep as it is long, measured from the preputial reflection. Its extremity is obtuse, vertically grooved, and slightly flattened, the orifice of the urethra appearing on the apex of a simple blunt cone about one sixth of an inch in height, the base of which is slightly included in the lower termination of the apical vertical fold, near its lower or frenal margin.

In *Cervus mexicanus, C. pudu,* and *C. campestris* the arrangement is somewhat different, the vertical groove being absent, the termination of the glans being a blunt cone, with the urethral orifice at its apex, as is seen in fig. 16 (p. 10).

In *Capreolus caprea, Cervulus muntjac,* and *Elaphodus cephalophus* the glans is peculiarly long and slender, at the same time that it is nearly cylindrical, with a rounded apex, at the lower part of which the urethra opens by a simple orifice. This is seen in fig. 17 (p. 10) taken from the Roebuck. In *Tragelaphus scriptus* it is the same.

In *Bos taurus* the glans is elongated, forming an irregular cylinder, smoothly rounded at the apex, the urethra (which has no free terminal extension) opening below it at a little distance from the extremity in a downward direction. This is seen in fig. 19 (p. 10).

In the Sheep the apex is somewhat enlarged, but not uniformly so, the expansion forming a partial twist from below and behind, upwards and forwards to the tip, along the left side of the organ. The actual point at which the attached part of the urethra ter-

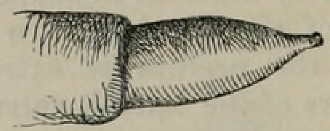


Fig. 16. *Cervus mexicanus.*

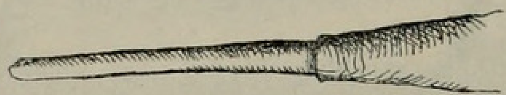


Fig. 17. *Capreolus capræa.*

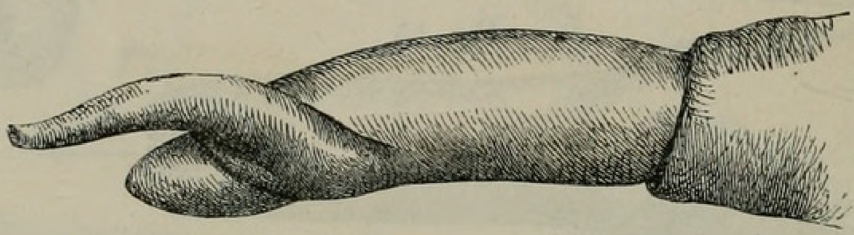


Fig. 18. *Addax naso-maculatus.*

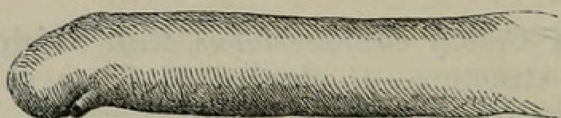


Fig. 19. *Bos taurus.*

minates is nearly the same as in the Ox, from which, besides the turn it takes, it differs in that it continues on free, as a filiform tube, for an inch at least.

The glans in *Capra* (*picta* and *jemlaica*) and *Gazella* (*arabica, sub-gutturosa, rufifrons*) is the same; as is that of *Cephalophus* (fig. 20)

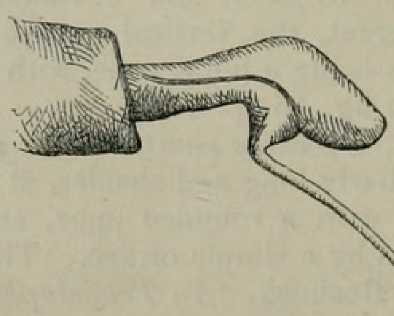


Fig. 20. *Cephalophus maxwelli.*

(*maxwelli* and *pygmæus*), except that it is more symmetrical. In *Addax naso-maculatus* an almost identical condition obtains; the glans, however, is nearly regular in shape and cylindroid, whilst the free filiform urethra, an inch in length, turns upwards round it to the left (fig. 18).

In the other Cavicornia the glans penis is different. In *Nannotragus* (*nigricaudatus*) it does not in the least resemble that of *Cephalophus*; for it forms a slender, elongated, tapering cone, beyond which the urethra, which is free from it for the terminal $\frac{1}{8}$ of an inch, continues straight on for $\frac{1}{8}$ of an inch (fig. 21). *Tragelaphus*

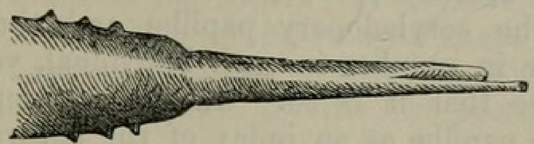


Fig. 21. *Nannotragus nigricaudatus.*

(*scriptus*) differs but little from this, except that the free portion of the urethra is wanting, and the end of it slightly turned upwards; and in *Damalis* (*pygarga*) (fig. 22) the arrangement resembles that of *Tra-*

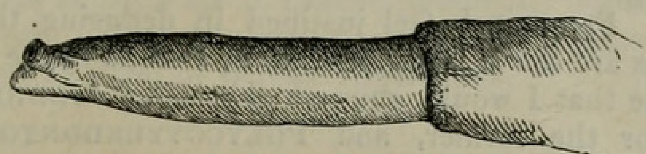


Fig. 22. *Damalis pygarga.*

gelaphus, except that the whole glans is shorter and thicker, at the same time that it is flattened from side to side. According to Dr. Murie's accounts of the Prongbuck[1] (*Antilocapra americana*) and the Saiga[2] (*Saiga tartarica*) the glans in these two animals differs from that in any of those above described, whilst from Pallas's account of the Musk (*Moschus moschiferus*)[3] its penis is apparently ovine, as is that of the Giraffe (*Camelopardalis giraffa*) (fig. 23).

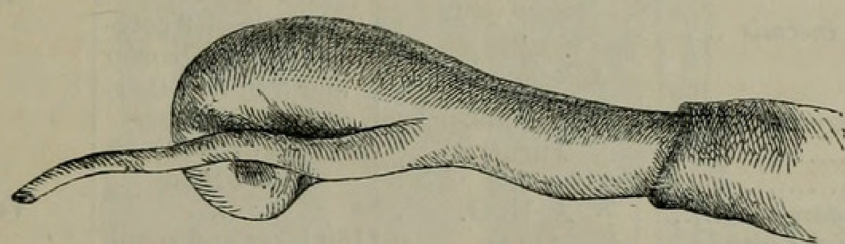


Fig. 23. *Camelolepardalis giraffa.*

Cowper's glands are present, according to my observation, in *Cervulus muntjac* and *Cervus mexicanus*; and I have noted that they are small in *C. alfredi.* Their absence I have recorded in *C. elaphus, C. dama, C. cashmeerianus, C. aristotelis, C. moluccensis, C. porcinus, C. kuhlii,* and *C. campestris.* Prof. Flower found them in *C. pudu.* I have seen them also in all species of *Ovis, Capra,* and *Gazella* examined, as well as in *Cephalophus* (*maxwelli* and *pyg-*

[1] P. Z. S. 1870, p. 352. [2] P. Z. S. 1870, p. 485.
[3] Spicilegia Zoologica, fasc. xii.

mœus), *Nannotragus* (*nigricaudatus*), *Tragelaphus* (*scriptus*), *Damalis* (*albifrons*), and *Addax* (*naso-maculatus*). According to Dr. Murie they exist in the Prongbuck and Saiga; in *Moschus* according to Pallas, and in the Giraffe according to Prof. Owen[1].

In the uterus of the Cotyledontophora it is well known that there are papilliform developments of the inner walls which serve for the attachment of the cotyledons in the impregnated organ. Although it has not been actually proved, so far as I am aware, by direct evidence that the cotyledonary papillæ and the cotyledons are exactly the same in number in each individual, yet there is every reason to believe that it is so. On this assumption I take the number of these papillæ as an index of the nature of the placenta itself, this being so difficult to obtain on account of the universal habit among the females to eat it immediately it is expelled, parturition generally occurring at night-time.

The following Table contains a statement of the number of papillæ or cotyledons (as the case may have been) which I have found, together with those made by Prof. Turner on the same subject[2]. From it I feel justified in deducing the law that the cotyledons are few in the Cervidæ, numerous in the Bovidæ—at the same time that I would suggest the name OLIGOCOTYLEDONTOPHORA for the former, and POLYCOTYLEDONTOPHORA for the latter.

TABLE II.

Name.	Authority.	Number of Cotyledons.	Number of Papillæ.
Cervus elaphus	Turner & A. H. G.	12 or 8.	
—— *duvaucelli*	A. H. G.	....	4 in each cornu.
—— *campestris*	,,	9, 8 large and 1 small.	
—— *rufus*	,,	....	5 in one cornu, 4 in the other.
Hydropotes inermis	,,	2 fœtus, with 3 cotyledons in one cornu and 5 in the other.	
Capreolus caprea	Bischoff.	5 or 6.	
Ovis aries	Turner.	60 to 100.	
Bos taurus	,,	60 to 100.	
Damalis pygarga	A. H. G.	....	Very many.
Camelopardalis giraffa...	Owen.	180 large and small.	
Rupicapra tragus	A. H. G.	As in *Ovis*.	
Rangifer tarandus	Spec. No. 2755 in R. C. S. Museum, and Catalogue description.	....	4 in one cornu.

Osteologically, among the Cervidæ, the skull presents features which correspond in great measure with their geographical distribution; and, dentally, the peculiarities of the third lower premolar are most instructive. The consideration of these latter I hope to be able

[1] Trans. Zool. Soc. vol. ii. p. 240.
[2] Comp. Anat. of Placenta, 1875, p. 66.

to bring before the Society on a future occasion, when my material has become more abundant.

In all Old-World Cervidæ examined by me, with the exception of the Reindeer, the vomer is not so much ossified as to divide the posterior osseous nares into two distinct orifices, whilst in *Rangifer tarandus* and all the New-World Deer, excepting *Alces machlis* and *Cervus canadensis*, it is so. I have seen most of the skulls of Deer which are to be found in the superb osteological collection of the British Museum ; and it is upon the study of them that this generalization is based. In the following species the vomer is completely ossified behind, so as to separate off the two posterior nares in the macerated skull :

Cervus pudu.	*Cervus leucotis.*
—— *campestris.*	—— *antisiensis.*
—— *columbianus.*	—— *virginianus.*
—— *leucurus.*	—— *mexicanus.*

Neither in *Alces machlis* nor in *Cervus canadensis* is the vomer so extended posteriorly. The condition described is represented in fig. 24 which is from the skull of *Cervus virginianus.*

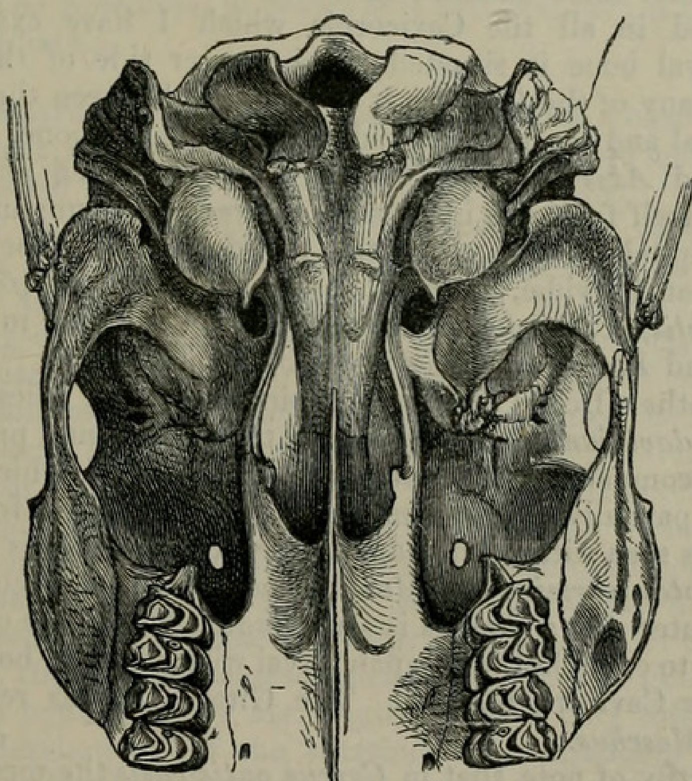


Fig. 24. Base of the skull of *Cervus virginianus*, from below.

In his 'Catalogue of Ruminant Animals in the British Museum,' Dr. Gray lays considerable stress upon the degree of development of the nasal processes of the premaxillary bones, whether or not they meet the nasals. In *Rangifer tarandus* they do not do so, the gap being filled up by the appearance, superficially, of portions of the nasal turbinal. This is also the case in *Cervus pudu* and *C. columbianus*. In *C. leucurus* the nasal processes of the præmaxillæ are also very short, and they therefore do not join the nasal bones; nor do they in *C. campestris*, nor, generally, in *C. rufus*, and only just in *C. virginianus*. They do join the nasals in *C. leucotis* and *C. antisiensis*. In *Alces machlis*, on account of the extreme shortness of the nasal bones, the premaxillary processes do not meet them; but in all the Old-World Cervidæ the line of junction of the two is considerable, except in *Elaphodus cephalophus* and *Cervulus reevesi*.

In all the American Cervidæ and in the Reindeer the floor of the posterior osseous nares is prolonged backwards more than in their Old-World allies, from the extension backwards of the palatine plates of the palatal bones. In *Cervulus* there is a tendency to this condition, but not in any other Old-World genus.

In his invaluable paper[1] "On the Evidences of Affinity afforded by the Skull in the Ungulate Mammalia," Mr. H. N. Turner remarks:—"I have noticed that in the Moschidæ [*Hyomoschus*, *Tragulus*, and *Moschus*] the styloid process [tympano-hyal] becomes free almost immediately at the base of the auditory process, while in the Bovidæ, or Cavicorn Ruminants, it is enclosed, more or less completely, for some distance in the downward and forward direction." And in all the Cavicornia which I have examined, the tympano-hyal bone is situated on the outer side of the petrosal; whilst in many of the Cervidæ it is posterior, between the petrosal of the temporal and the paramastoid of the occipital bone. In *Cervus porcinus* and *Axis maculata*, however, the expanded auditory bulla insinuates itself from the inner side, between the tympano-hyal and the paroccipital process, as in the Cavicornia. Neither in any of the American Cervidæ, except *C. leucotis*, nor in *Rangifer tarandus*, *Alces machlis*, *Capreolus caprea*, *Cervus dama*, nor in the genera *Cervulus* and *Elaphodus*, does it do so.

In the other Deer (Elaphine, Rusine, and their allies), including *Elaphurus davidianus* and *C. leucotis*, there is a small process of the petrosal, incomparably less than in the Cavicornia, which, from the inner side, partially or just removes the tympano-hyal from the paroccipital (as seen without damage to the skull). This is well marked in *Hydropotes inermis*; and *Moschus moschiferus* is peculiar, in that from the outer side a process is sent inwards to join the other, and so completely to encircle the tympano-hyal with a ring of bone in a very suspiciously Cavicorn manner. The Giraffe, in this respect, much resembles *Moschus*.

It is worthy of note that in *Cervus antisiensis* the median incisors are not triangular, in which respect it agrees with *Rangifer* and *Moschus* and differs from the Cervidæ generally. In *C. leucotis* they are so. In *C. pudu*, as in *Moschus*, the Giraffe, and many Cavicornia, there is only one submental foramen on each side—not two, as in by far the majority of the Deer.

The peculiar way in which, on each side, the palatal surface of

[1] P. Z. S. 1849, p. 152.

the interval between the canine tooth and the first premolar is cut away in all the true Ruminantia, and not in the Tragulidæ, is interesting as a separating feature. In the Cervidæ there is a difference from the Cavicornia in the arrangement of the region just in front of this. In the Sheep and its allies the median palatal process of each premaxillary bone extends back in the palatal region between the maxillæ for some distance behind the most anterior portion of the facial surface of the maxillary bone, broadening as they go backwards for some distance, and then narrowing to a point somewhat abruptly. In no Deer which carries antlers have I found this arrangement, the median palatal processes of the præmaxillæ in them being always slender (sometimes only incompletely developed), of uniform breadth, and terminating posteriorly at a point scarcely behind the line which joins the canine teeth. Both *Moschus moschiferus* and *Hydropotes inermis* agree with *Ovis* in this respect, as does the Giraffe.

Again, in the squamosal of the temporal there is a feature of value in the separation of the two major divisions of the typical Ruminantia. In the Cervidæ this bone is deeper from above downwards than in the Bovidæ; in other words, the parieto-squamosal suture is situated nearer the upper border of the temporal fossa (more than halfway up it) in the former group, the general proportions produced by which are more easily recognized by inspection than from description. The squamosal of *Moschus* is oviform, that of *Camelopardalis* intermediate.

Whilst comparing the skulls of the Cervidæ which I have examined, the antlers have naturally attracted my attention; and many of their peculiarities seem to me to be subject to definite laws.

What may be called the typical antler is composed of a bifurcate beam, with a brow-antler springing from the front of its basal portion. These three parts may be termed A, B, and C, as in the accompanying diagram (see p. 16). They occur, uncomplicated, in the genus *Rusa*, in *C. porcinus*, *C. axis*, and *C. alfredi* (fig. 25. 1).

On the assumption that most of the complicated many-pointed antlers that occur are the result of the exaggerated development of one or other or both of the extremities B and C, their special features may be explained. For instance, imagine that both B and C bifurcate, remaining of equal size, and we arrive at the condition found in *Cervus schomburgki* (fig. 25. 2). *C. duvaucelli* differs in that B is extra-developed at the expense of C (fig. 25. 3), the latter often being not bifurcate, though sometimes so to a small extent. Following out the ingenious hypothesis of Mr. Blyth[1], *C. eldi* only differs in the still greater development of the anterior of the branches of B (fig. 25. 4). With this last-named form *C. virginianus* and *C. mexicanus* agree, as does *Rangifer tarandus*, as far as its beam-branches are concerned.

In *Cervus dama*, and in the species included in the genus *Pseudaxis* by Dr. Gray (*C. sika*, *taëvanus*, and *mantchuricus*), a different condition maintains, B being reduced greatly and C correspondingly

[1] P. Z. S. 1867, p. 835.

enlarged (fig. 25. 5). In the Elaphine Deer this is carried further, the continuation of the beam C being divided terminally into many points (fig. 25. 6) in *C. elaphus*, *C. canadensis*, *C. maral*, and *C. cashmeerianus*. According to Mr. Blyth, *C. sika* "belongs strictly to the *Elaphine*, and not to the *Axine*, group"[1] of Deer; and the con-

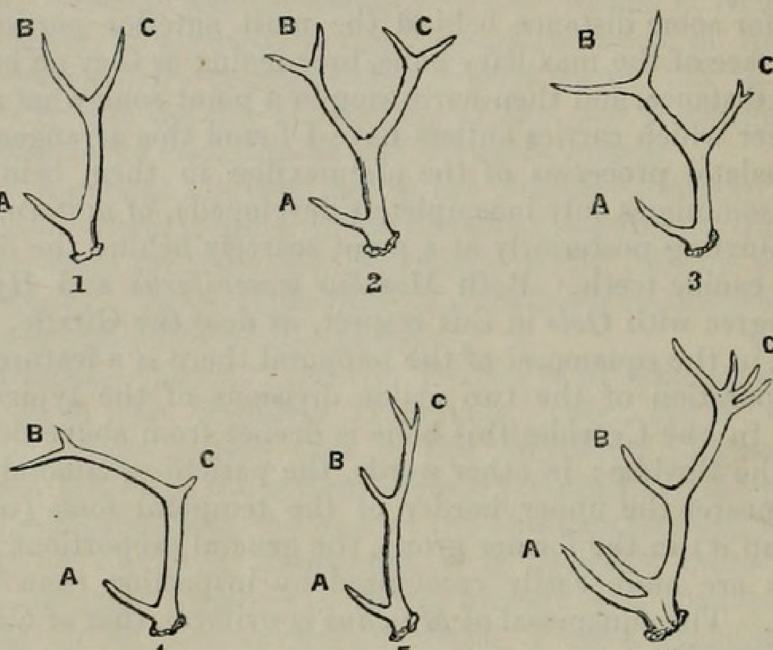


Fig. 25. Diagram of types of antlers.

formation of its horns is decidedly in favour of this view. Nevertheless it must be noted that in its ally, *C. mantchuricus*, and in *C. kopschi* (Swinhoe)—I cannot find a skull of *C. sika* in any museum for comparison—the auditory bulla is considerably inflated, as in *C. porcinus* and *C. axis*. This feature is not, however, of particular importance, as *C. virginianus* in this respect differs from most of the American Cervidæ, possessing a very inflated bulla.

With reference to the brow-antler (A), it is evident that its duplication in the true Elaphine Deer and in *Rangifer* is more associated with the actual size of the antlers than with any other peculiarity.

The antlers of *Elaphurus davidianus* are at present quite beyond my comprehension.

General Remarks.

Whilst working at any special group of animals, there is nothing which must strike most students so much as the inefficient scientific capacities of the Linnæan binomial nomenclature as it is at present employed. For the simple identification of species among themselves and of genera it is excellent, no doubt; but immediately the generic position is assigned to any collection of related species, the animals or plants which constitute them are, so far as nomenclature is concerned, lost in the plurality of mundane organized forms. In the science of chemistry—an older one, it is true—the case is very

[1] J. A. S. B. xxix. p. 90.

different. There, the knowledge of the composition of any non-elementary substance is sufficient for the determination of the name by which it should be designated; and, *vice versâ*, from the name its composition may be inferred. Why should we not be able to do the same in biology? We form estimates as to the mutual affinities of genera which can bear the test of criticism as well as any rational chemical formula; is it not just as possible to express them in our nomenclature as do the chemists in theirs? It is quite conceivable that it should be done; and I have the boldness, on the present occasion, to endeavour to make a step in the direction indicated, taking the Cervidæ to illustrate my method. I should not desire any one to think that the method I am about to suggest is at all a final one; for it only comprehends a single small group of Mammalian animals. Nevertheless, if by it I am able to demonstrate its practical utility, and to develop in others a desire that it should be extended in its scope, there is nothing easier than to expand it.

From what has been remarked earlier in this paper, it is evident that there are osteological reasons for separating off the Old-World from the New-World Cervidæ. Representing degrees of slightly more than generic importance by Roman capitals, this difference between the two groups may be indicated by the employment of letters separated by some distance in the alphabet. I therefore commence with A in formulating the Old-World species, and with P in those of America. Following the initial capital, I place a small letter, which represents the genus; and the species of each of the latter are indicated by numbers following, raised above the line, as in mathematics when the square, cube, &c. are expressed. When a species, like the Elk, stands by itself, it is not necessary to append the smaller signs. With this amount of explanation, the following Table (III.) will need no further description:—

Table III.

Cervidæ.

A. *Alces machlis.*	Ca^5. *R. swinhoii.*
Ba^1. *C. elaphus.*	Ca^6. *R. mariana.*
Ba^2. *C. canadensis.*	Ca^7. *R. peronii.*
Ba^3. *C. cashmeerianus.*	Ca^8. *R. kuhlii.*
Ba^4. *C. barbarus.*	Ca^9. *R. alfredi.*
Ba^5. *C. maral.*	Cb. *C. axis.*
Ba^6. *C. affinis.*	Cc. *C. porcinus.*
Bb^1. *Dama vulgaris.*	Cd^1. *Rucervus schomburgkii.*
Bb^2. *D. mesopotamica.*	Cd^2. *R. duvaucelli.*
Bc^1. *Pseudaxis sika.*	Cd^3. *R. eldi.*
Bc^2. *P. mantchuricus.*	D. *Elaphurus davidianus.*
Bc^3. *P. taëvanus.*	Ea^1. *Cervulus muntjac.*
Ca^1. *Rusa aristotelis.*	Ea^2. *C. reevesi.*
Ca^2. *R. hippelaphus.*	Eb. *Elaphodus cephalophus.*
Ca^3. *R. moluccensis.*	F. *Capreolus caprea.*
Ca^4. *R. equina.*	G. *Hydropotes inermis.*

TABLE III. (*continued*).

P. *Rangifer tarandus.*
Qa^1. *Cariacus virginianus.*
Qa^2. *C. mexicanus.*
Qa^3. *C. leucurus.*
Qa^4. *C. macrotis.*
Qa^5. *C. columbianus.*
Ra^1. *Cervus campestris.*
Ra^2. *C. paludosus.*
S. *C. antisiensis.*
T. *C. leucotis.*
Va^1. *C. nemorivagus.*
Va^2. *C. simplicicornis.*
Va^3. *C. rufus.*
Va^4. *C. superciliaris.*
W. *Pudua humilis.*

This synoptical sketch of the affinities of the different species of the Deer tribe expresses much more with reference to the mutual relationships of its component members than could be done by the employment of the binomial nomenclature. For instance, taking the Barasingha Deer, here expressed by Ca^2. In that it is of the C group, its close affinities to the Sambur, Axis, and Hog-Deer is asserted. C being next to B (Elaphine), its not great distance from the Elaphinæ is expressed; whilst, although the Reindeer and the Long-tailed Deer have their antlers developed on very similar types, the distance of their relationship is signified by their alphabetical interval—that between C and P or Q.

Further, in that *Rucervus duvaucelli* is represented by Cd^2, the d proves that there are other genera closely allied to it, namely a, b, and c, at the same time that, as there is a figure appended, it is to be inferred that there is more than a single species in the genus. On the whole, I know no so concise a way of expressing the relationships of species.

As to the affinities of the genera here expressed, some are more certainly based than others. *Capreolus caprea* is one of the most difficult of the Deer tribe to localize; and I have placed it not far from *Cervulus* on account of the configuration of its glans penis. *Dama vulgaris*, as well as *Dama mesopotamica*, from the shape of their antlers—neglecting the palmation, an evidently insignificant character—are intimately allied to the Pseudaxine group; and, as the late Mr. Blyth has so satisfactorily demonstrated, there is no reason why Eld's Deer should be in any genus other than that in which the Barasingha is situated. The abnormal furcation of the antlers of *Elaphurus davidianus* renders it extremely difficult to place that species in any definite position among the Old-World Cervidæ.

2. Descriptions of eight new Species of South-American Birds. By P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN, M.A., F.R.S.

[Received January 2, 1877.]

(Plate I.)

During our past year's work on the specimens in our Cabinets, we have found it necessary to designate by MS. names the following

J.Smit del.et lith.

M.& N. Hanhart imp.

CHLORONERPES DIGNUS, ♂.

species of Birds, of which we now beg leave to submit descriptions to the Society.

1. EUPHONIA FINSCHI, sp. nov.

Violaceo-nigra: pilei dimidio antico et abdomine toto saturate castaneo-aureis: subalaribus et remigum marginibus internis albis: rectricibus omnino nigris immaculatis. Long. tota 3·5, *alæ* 2·1, *caudæ* 1·2.

Hab. Demerara (*Wilkens*).

Mus. P. L. S.

Sclater's collection contains a single skin of this *Euphonia*, which belongs to the group of *E. concinna.* It is most nearly allied to *E. saturata* (Cab.)[1], having a similar chestnut tinge on the abdomen, which, however, is even more strongly developed. But it differs from *E. saturata* in that only the front half of the top of the head up to the eyes is yellow, instead of the whole cap.

The type specimen of this species having been received in exchange from the Bremen Museum, we propose to call it after its worthy Director Dr. Finsch. The collector's name is stated to be Wilkens.

2. PHEUCTICUS CRISSALIS, sp. nov.

Pheucticus aureiventris, Scl. P. Z. S. 1858, p. 551.

Supra niger, uropygio flavo nigro variegato: interscapulii quoque plumis intus flavo transfasciatis: speculo alari et maculis tectricum alarum, secundariorum et caudæ tectricum superiorum albis: subtus aureo-flavus, in pectoris lateribus parce nigro striatus, crisso albo: cauda nigra, hujus rectricibus tribus utrinque externis plaga quadrata alba in pogonio interiore ornatis: subalaribus flavis: long. tota 7·7, *alæ* 4·5, *caudæ* 3·6.

Hab. Ecuador, Riobamba (*Fraser*); Sical (*Buckley*).

Obs. Proximus *P. uropygiali,* sed gutture aureo et crisso albo distinguendus.

In describing *Ph. uropygialis* (P. Z. S. 1870, p. 840) we observed that two skins obtained by Mr. Fraser at Riobamba, in Ecuador, and originally referred to *P. aureiventris* by Sclater, might possibly belong to *P. uropygialis.* It now appears, however, from additional specimens of the same form recently obtained by Mr. Buckley in the same district, that the species of the highlands of Ecuador is quite distinct.

This, therefore, will make a sixth species of *Pheucticus* to be placed between *P. tibialis* and *P. chrysogaster*[2].

3. OCHTHŒCA LEUCOMETOPA, sp. nov.

Ochthœca leucophrys, Scl. & Salv. P. Z. S. 1867, p. 986; 1868, p. 569; 1869, p. 154; & 1874, p. 677; Scl. P. Z. S. 1871, p. 750; 1873, p. 780.

Supra murino-brunnea, dorso postico rufescenti lavato: super-

[1] *Phonasca saturata,* Cab. J. f. O. 1860, p. 336, et *Acroleptes saturatus,* ibid, 1861, p. 91, et 1865, p. 407.

[2] See the list of the species of this genus, P. Z. S. 1870, p. 840.

ciliis longis in fronte conjunctis albis; alis caudaque fusco-nigris, illarum tectricibus et secundariis externis rufescenti anguste limbatis, hujus rectrice una utrinque extima in pogonio externo alba: subtus pallide cinerea, in ventre crissoque alba: rostro et pedibus nigris: long. tota 6·0, *alæ* 3·0. *caudæ* 2·7.

Hab. Western Peru, prov. of Cuzco (*Whitely*); district of Junin (*Jelski*).

Mus. P. L. S. et S.-G.

Obs. Diversa ab *O. leucophryi* (quacum hucusque confusa) dorso minus rufescente et fasciis alarum castaneis omnino absentibus.

The receipt of a skin of the true *O. leucophrys* (Lafr. et D'Orb.) from Bolivia, has enabled us to separate from it this more northern representative of the same form.

4. Ochthœca arenacea, sp. nov.

Supra obscure arenaceo-brunnea unicolor, alis caudaque fuscis, illarum tectricum fasciis duabus terminalibus et secundariorum marginibus externis pallide rufescenti-ochraceis: loris et corpore subtus flavicanti-albis, plaga utrinque pectoris fusca: subalaribus ventre concoloribus: rostro et pedibus obscure corneis: long. tota 5·0, *alæ* 2·7, *caudæ* 2·6.

Hab. Columbia int.

Mus. S.-G.

Obs. Proxima *O. rufo-marginatæ* Lawrencii, ex Æquatoria, sed colore supra pallidiore, fasciis alarum ochraceis, nec castaneis, et rostro latiore distincta.

We have as yet seen but a single "Bogota" skin of this distinct *Ochthœca*, which in general style of colour is much like *O. setophagoides*, but has a much broader bill.

5. Chloronerpes dignus, sp. nov. (Plate I.)

Supra oleagineo-flavus, pileo toto cum nucha necnon dorsi superioris plumarum marginibus ruberrimis: alarum tectricibus ochraceo parce punctatis: subtus flavus, saturato viridi crebre transfasciatus, ventre imo et subcaudalibus immaculatis: subalaribus flavis: remigibus subtus in pogonio interiore obscure viridibus, flavido regulariter notatis: cauda nigra, rectricibus duabus utrinque externis flavis nigro transfasciatis: rostro et pedibus nigris: long. tota 6·5, *alæ* 4·0, *caudæ* 2·2.

Hab. Columbia int. prov. Antioquia (*Salmon*).

Mus. P. L. S.

Mr. Salmon sends us a single specimen of this *Chloronerpes*, which is quite distinct from any thing with which we are acquainted. In its upper surface it is most like *C. malherbi*, and is of about the same size. But it is at once recognizable by the yellow of the lower part of the belly.

The sex of the single specimen is not marked; but, judging by its crimson cap, the bird is probably a male.

6. Celeus subflavus, sp. nov.

Celeus citrinus et *C. exalbidus* ex Bras. merid. or. auctt.

Celeopicus exalbidus (*jeune mâle varié*), Malh. Pic. vol. ii. p. 30, tab. lv. fig. 6.

Cinnamomeo-flavus: alis caudaque fuliginoso-nigris, remigum marginibus internis rufis: dorsi superioris et pectoris plumis fuliginoso-nigris flavo marginatis: rostro flavo, pedibus fuscis: long. tota 9·5, *alæ* 5·2, *caudæ* 3·4: *maris striga mystacali utrinque rubra.*

Hab. Brasil. merid. or. Bahia (*Wucherer*).

Mus. P. L. S.

Obs. A *Celeo flavo* dorso et pectore squamulatis necnon alis extus omnino fuliginoso-nigris distinguendus.

This S.E.-Brazilian form of *Celeus flavus* (sive *citrinus*) is so strongly marked that it seems necessary to distinguish it specifically.

In the typical form from Cayenne and Guiana the whole of the secondary wing-feathers are of a bright chestnut, and the wing-coverts are more or less edged with yellow.

In the Venezuelan and Trinidad form (*Celeus semicinnamomeus*, Reich. Handb. p. 407, et t. DCLXI. fig. 4386) the wing-coverts are immaculate yellow.

In the Upper Amazonian form there is an approach to the Brazilian species in the fuliginous colouring invading the secondaries; but the outer and inner edges of these feathers remain chestnut, though not so bright as in the typical form. Of this form, Salvin and Godman's collection contains an example from Chyavetas (*Bartlett*).

But in none of these local forms is there any appearance of the black markings on the breast and upper back which distinguish the S.E.-Brazilian bird.

Malherbe (*l. s. c.*) has figured the Brazilian form with tolerable accuracy. We propose to name it *Celeus subflavus*, under which term it has long stood in Sclater's collection.

7. Chamæpelia buckleyi, sp. nov.

♂ *griseo-vinaceus, pileo summo et uropygio cinerascentioribus; fronte et corpore subtus vinaceis, gula albescentiore: maculis alarum sicut in* C. talcapoti, *sed majoribus: subalaribus et caudæ parte apicali fusco-nigris, primariorum tectricibus nigerrimis: rostro pallide brunneo: pedibus flavis: long. tota* 7·0, *alæ* 3·5, *caudæ* 2·7, *rostri a rictu* 0·7, *tarsi* 0·7.

♀ *mari similis, sed corpore supra brunneo-cinnamomeo nec vinaceo: subtus quoque brunnescentior et in abdomine medio albescens.*

Hab. Santa Rita, Rep. Æquat. (*C. Buckley*).

Mus. S.-G.

Obs. C. talpacoti affinis, sed maris coloribus vinaceis (sicut in *C. griseola*) nec saturate cinnamomeis distinguenda: a *C. passerina* et speciebus aff. subalaribus nigris diversa.

In this apparently distinct species, of which Mr. Buckley has sent a pair, the male has the general coloration of *C. griseola*, but the black axillaries of *C. talpacoti* and *C. rufipennis*. The only described species of the latter section which we have not yet succeeded in recognizing is *C. godina*, Bp. (Consp. ii. p. 79) from Bolivia; but the character "uropygio tantum et tectricibus caudæ superioribus purpurascentibus" seems to preclude the possibility of the present bird belonging to that species. It may also be doubted whether *C. godina* is really distinct from *C. talpacoti*, inasmuch as we possess a specimen marked (with a doubt, however) by Bonaparte himself as *C. godina*, which is certainly only the female of *C. talpacoti*. The latter bird has several times been sent from Bolivia (*cf.* Bp. Consp. ii. p. 79, and Gray, List of Columbæ, p. 50, 1856); and we have examined specimens of it sent thence by Bridges which are now in the British Museum.

8. Crax erythrognatha, sp. nov.

Purpurascenti-nigra, ventre imo crissoque albis: cristæ plumis nigris, recurvis: loris nudis: cera et rostro basali rubris: hujus apice flavicante: pedibus in pelle sicca pallide corylinis: long. tota 28·0, *alæ* 16·0, *caudæ* 11·0, *tarsi* 4·5. Fem. *mari similis, sed cristæ plumis fasciis minutis albis variegatis.*

Hab. Columbia int.

Mus. S.-G.

Obs. Similis *C. alectori* et omnino ejusdem formæ sed rostro rubro diversa.

Of this near ally of *C. alector*, Salvin and Godman have recently obtained a pair of "Bogota" skins. As in that species, the female seems to be only distinguishable from the male by her slightly banded crest.

3. On new Species of Warblers in the Collection of the British Museum. By R. Bowdler Sharpe, F.L.S., F.Z.S., &c., Senior Assistant, Zoological Department, British Museum.

[Received December 29, 1876.]

(Plate II.)

All the species described in this paper have been added to the national collection during the past year; and as they are of considerable interest, I lose no time in bringing them before the Society. They are from Africa and Madagascar.

Apalis cerviniventris, sp. n.

Supra brunneus, uropygio et supracaudalibus vix rufescenti-fulvis: tectricibus alarum dorso concoloribus: remigibus saturate brunneis, dorsi colore extus lavatis: cauda brunnea, obscure undulata: pileo summo nuchaque nigris: facie laterali quoque

it. del.

Mintern Bros. imp.

1, BÆOCERCA FLAVIVENTRIS.
2, DROMÆOCERCUS BRUNNEUS.

nigra: genis et gula fulvescentibus: plaga magna jugulari nigra: corpore reliquo subtus aurantiaco-fulvo, abdomine medio pallidiore: tibiis brunneo lavatis: subalaribus aurantiaco-fulvis: rostro nigro: pedibus brunneis, unguibus flavidis. Long. tot. 4·7, *culm.* 0·55, *alæ* 2·0, *caudæ* 1·85, *tarsi* 0·85.

Hab. Gold Coast, W. Africa.

The description is taken from a specimen obtained from the Gold Coast. The British Museum contains a second example formerly in my own collection, which I received from Denkera from the native collector Aubinn, who was for some time working for me. This specimen is not in such good condition as the type, being imperfect about the tail; in general coloration, however, it is similar, excepting as regards the throat, which is entirely black, extending onto the fore neck, the sides of the latter being deep orange chestnut. I believe this to be the male bird, and the one described to be the female of a new species of *Apalis*, which is not closely allied to any of the members of the African Sylviidæ at present described.

BÆOCERCA FLAVIVENTRIS, sp. n. (Plate II. fig. 2.)

Supra olivascenti-viridis, tectricibus alarum dorso concoloribus: remigibus et rectricibus brunneis olivascenti-viridi marginatis, primariis extus flavo-limbatis: pileo cinerascenti-brunneo: loris et superciliis distinctis brunnescenti-fulvis: facie laterali brunnescenti-fulva, regione parotica anguste albo striata: genis brunneo maculatis: gutture toto brunnescenti-fulvo: corpore reliquo subtus sulphureo, crisso et subcaudalibus albicantibus: corporis lateribus olivascenti-viridibus: tibiis flavis: subalaribus flavis: remigibus infra cinerascenti-brunneis intus fulvescenti-albo marginatis. Long. tot. 2·9, *culm.* 0·45, *alæ* 1·95, *caudæ* 0·7, *tarsus* 0·65.

Hab. Gold Coast.

Of the same form as *Bæocerca virens* of Gaboon, but distinguished by its yellow belly, which is white in the Gaboon species. Two specimens collected by Governor Ussher on the Gold Coast were formerly in my own collection, and now form part of that of the British Museum.

DROMÆOCERCUS, gen. n.

Closely allied to *Phlexis*, Hartlaub, but distinguished at once by its pointed and loosely webbed tail-feathers, the webs being separate and distinct, as in an Emu-plume: hence the generic name.

The type is

DROMÆOCERCUS BRUNNEUS, sp. n. (Plate II. fig. 1.)

Supra rufescenti-brunneus, tectricibus alarum dorso concoloribus: remigibus nigricantibus extus sordide rufescentibus: rectricibus saturate brunneis, rachibus nitide nigris: loris rufescentibus: subtus dilutius rufescenti-brunneus: gutture pallidiore: subalaribus pectore concoloribus. Long. tot. 5·9, *culm.* 0·45, *alæ* 1·95, *cauda* 2·5, *tarsi* 0·75.