

The cub (the sex of which was not noted) is of a glossy black all over the back part of the body, inclining to brown on the nose, throat, and chest. The parts under the belly, especially between the hind legs, are of a light brown; and there is a yellow patch behind the fore limb.

The differences in colour, of which it is almost impossible to give an intelligible description on paper only, are extremely well illustrated in the accompanying figures (Plate XX.).

8. Notes on the Visceral Anatomy of *Lycaon pictus*, and of *Nyctereutes procyonides*. By A. H. GARROD, M.A., F.R.S.

[Received March 18, 1878.]

Having had the opportunity in my prosectorial capacity of dissecting a male specimen of *Lycaon pictus*, as well as several, both male and female, of *Nyctereutes procyonides*, I take the present opportunity of giving the results at which I have arrived.

*Lycaon pictus*.—This canine animal, so different from its allies in its digitation, is not at all aberrant in its visceral anatomy, which has not been previously described, so far as I am aware. The following are some of the most important details:—

The anterior portion of the palate is black, the pigment extending back as far as half an inch, onto the soft palate, of which the posterior one and a half inch is unpigmented. There is no uvula, a median shallow notch occupying its position. The tonsils are elongate, lunate, and vertical in position.

On the tongue the filiform papillæ are all small; and among them small papillæ fungiformes are sparsely scattered. Three circumvallate papillæ on each side, increasing in size from before backwards, and converging posteriorly, form the normal V. There is no trace of a lytta.

Of the salivary glands the compact submaxillaries are slightly larger than the irregularly shaped parotids. The zygomatic glands are as big as small chestnuts. The accessory submaxillary (or sublingual) glands are situated nearly in contact, in the middle line of the floor of the mouth.

The thyroid gland is formed of two parts, each of the size of a sheep's kidney, these being joined at the inferior internal angle by a narrow isthmus of thyroid tissue. The superior thyroid artery is enormous.

The stomach presented no differences from that of *Canis familiaris*. The following are the lengths of the intestines:—

	ft.	in.
Small intestine . . . . .	9	1
Cæcum . . . . .	0	7
Large intestine . . . . .	1	3

The cæcum is quite caniform, its curves being exactly represented in that of *Canis familiaris*<sup>1</sup>.

The liver is deeply fissured, upon the same plan as in all the Canidæ—and all the Carnivora, in fact,—the cystic fissure being very deep, which allows the fundus of the gall-bladder to appear on the diaphragmatic surface of the organ. The left lateral lobe is the largest, the right central and right lateral being slightly smaller. These last are half as large again as the caudate and left central, which are at least four times the bulk of the Spigelian, upon which latter there is a small accessory lobule.

In the generative organs, as in all Canidæ, the prostate is large, whilst Cowper's glands and the vesiculæ seminales are absent. The os penis is large, quite straight, four inches in length, and deeply grooved, as in all the Canidæ, along its lower surface.

In the lungs there are three lobes to the left, and four to the right, one of the latter being azygos. The median lobes of both sides are the smallest; the inferior the largest. The fissures between the lobes are all deep.

The brain of *Lycaon pictus* is perfectly dog-like, resembling that of *Canis lupus* (as figured by Leuret and Gratiolet<sup>2</sup>) in almost every detail, the division of the posterior limb of the gyrus third above the Sylvian fissure extending as far forward on the superior cerebral surface as in that species, or even further, the anterior superior angle of the gyrus next below it being rather more strongly developed. The sulcus between the uppermost (or fourth) gyrus and the third is parallel to the great longitudinal fissure between the hemispheres.

In *Nyctereutes procyonides* the tongue is covered with filiform papillæ smaller in size than in *Lycaon pictus*, allowing the proportionally larger fungiform papillæ to appear more conspicuously among them. These latter posteriorly become the papillæ circumvallatæ, five on each side, larger posteriorly, and arranged in a V-manner.

There is no uvula; and the soft palate embraces the upper end of the larynx with facility.

The stomach is not peculiar, except that it is more than usually muscular at its pyloric end.

In an adult male which died on the 2nd of February last, the father of a litter of six born on May 2nd 1877, the small intestine measured eight feet; the large, one foot and an inch, the cæcum being two inches long, rounded at the end, and slightly turned to the left side apically. It is figured in the accompanying sketch.

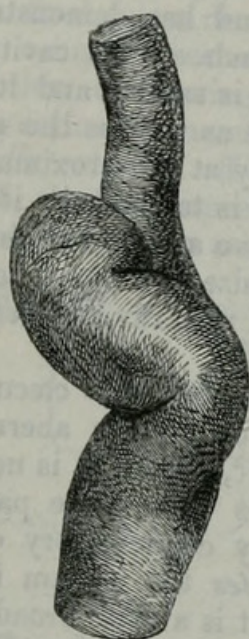
In three other specimens, not adult, the following were the intestinal lengths:—

<sup>1</sup> Vide P. Z. S. 1873, p. 748, fig. 13.

<sup>2</sup> Anatomie comparée du Système Nerveux (Paris: 1839-1857), pl. iv. fig. Loup.

	♀, half-grown.	♀, a month old.	♀, a month old.
Small intestine .....	4.25 feet.	5.75 feet.	7.3 feet.
Large intestine .....	6 inches.	8 inches.	8 inches.
Cæcum .....	1.25 inches.	1.5 inches.	2 inches.

There is evidently not much constancy in the length of the viscera, even in specimens of the same age and sex.



Cæcum of *Nyctereutes procyonides*.

The liver differs from that of *Lycaon pictus* and other Canidæ in the great size of the Spigelian lobe. In this the accessory lobule, referred to above, is enlarged to form part of the lobe itself, which is, by its presence in a semi-independent condition, rendered bifid apically. In the depth of the cystic fissure, and all other respects, it is quite caniform.

The lungs are not peculiar, the fissure between the left upper and middle lobes only being less developed than in many of its allies. The azygos lobe is present on the right lung.

The prostate is well developed; Cowper's glands are absent, as are the vesiculæ seminales. The os penis is three inches in length, straight, and deeply grooved inferiorly to transmit the urethra. The glans penis is bluntly conical, the urethra opening terminally, much as in the American Cervidæ.

In *Nyctereutes procyonides* the brain is perfectly caniform. The posterior limb of the third convolution is bifurcate, the bifurcating sulcus not being lengthy, going upwards and forward with-

out having any extension directly onwards to the anterior extremity of the hemisphere. There is scarcely any tendency in the second gyrus to form an antero-superior angle; and the sulcus between gyri three and four is not quite parallel to the great longitudinal fissure, it diverging slightly from the middle line as it goes forward. In these respects the brain more resembles that of *Canis vulpes*<sup>1</sup> than those of *Canis familiaris* or *C. lupus*.

In the peritoneal cavity of the adult male *Nyctereutes* (which, like the half-grown female, had excessive atheroma of all its larger arteries) I found an immense number of parasitic worms, collected especially about the abdominal surface of the liver and the stomach.

These worms had "heads" much like those of the *Bothriocephali*, but larger. My friend Mr. F. G. Penrose has most kindly made sections of them, and has demonstrated the existence of a most peculiar cavity in each. This cavity is coiled up within the ovate "head;" its lumen is small; and its walls are plicated very extensively, the magnitude as well as the number of the folds being great. It opens externally at its proximal extremity by one of its ends only. The "body" is tænioid in its proportions, and is not segmented. It is about two and a half inches in total length, the "head" being about the size of a hemp-seed or a little smaller.

There are a few general remarks suggested by the above recorded facts.

First, with reference to the colic cæcum in the Canidæ, I have on a previous occasion noticed the aberrant form of that appendage in *Canis cancrivorus*<sup>2</sup>, where it is nearly straight. Two other specimens of the species have since passed through my hands, which have been entirely confirmatory of my earlier observation. In *Nyctereutes procyonides* the cæcum is slightly more caniform than in *C. cancrivorus*; it is a little broader also.

From the examination of other Canidæ, I find that the cæcum, in its twistings, resembles that of *Canis familiaris* in being turned about twice and a half upon itself in *C. laniger*, *C. lagopus*<sup>3</sup>, *C. anthus*, *C. fulvus*, *C. antarcticus*, *C. azaræ*, *Otocyon lalandii*, and *Lycaon pictus*.

In *Canis aureus* I have found the terminal twist wanting, the apex of the cæcum turning down as in *C. famelicus*.

In *Canis cancrivorus* and in *Nyctereutes procyonides* the cæcum is nearly straight.

Secondly, with reference to the brain, Prof. Flower has done much to condense and classify the facts to be arrived at from the study of the convolutions<sup>4</sup>, which latter, in my estimation, throw much light upon the mutual affinities of the Fissiped Carnivora.

It seems to me that the typical major convolutions of the Carnivorous brain form three complete and uniformly broad gyri round

<sup>1</sup> Leuret and Gratiolet, *loc. cit.* pl. iv. fig. 2, Renard.

<sup>2</sup> P. Z. S. 1873, p. 748.

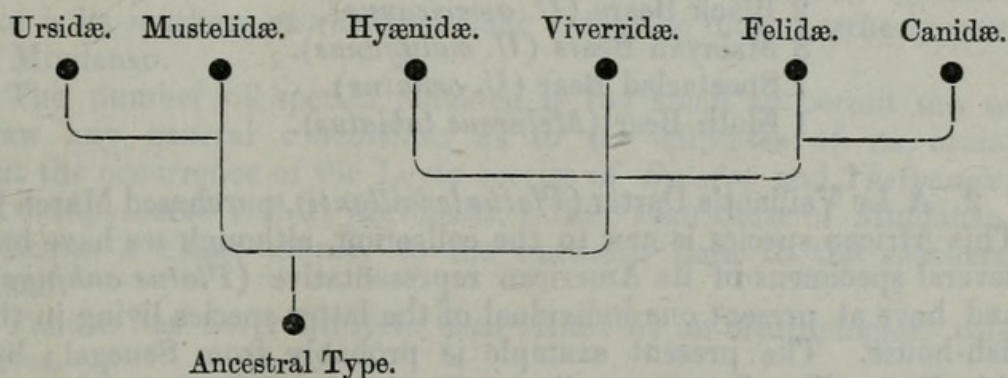
<sup>3</sup> Vide Flower. "Hunterian Lectures," 'Medical Times and Gazette.' London, June 1st, 1872, p. 622.

<sup>4</sup> P. Z. S. 1869, p. 482.

the Sylvian fissure, which in the Mustelidæ and in the Genets remains as such, notwithstanding that these two latter groups had otherwise diverged before the brain began to modify. From the Musteline animals (the Arctoid ancestral type) the Ursidæ seem to have diverged, the superior or third cerebral convolution broadening and tending to divide, whilst the others persist unmodified.

Those Viverridæ which are more modified than the genus *Genetta*, acquire a broadening of the lowest or first circum-Sylvian convolution, especially in its posterior limb, in which a perpendicular sulcus is formed; and this peculiarity is more strongly marked in *Hyæna*, as well as in *Proteles*. In the Felidæ the anterior as well as the posterior limb of this first circum-Sylvian gyrus broadens, and becomes perpendicularly bisected to such an extent that if in them there were a longitudinal sulcus developed in the upper median portion of the gyrus, a complete secondary gyrus would appear. Such a gyrus, evidently thus originating, is found in the Canidæ, in which the extra convolution is therefore a reduplication of the first, dependent on the differentiation off of its outer moiety.

On the assumption of the correctness of this hypothesis, the classification of the Fissiped Carnivora might be represented thus:—



By Prof. Flower<sup>1</sup>, after a most careful analysis of their cranial and other peculiarities, the Canidæ are placed between the Arctoidea and Æluroidæ; but from the same facts Mr. H. N. Turner<sup>2</sup> placed the three major groups in the same order of sequence that the brain-markings indicate, namely Ursidæ, Felidæ, and Canidæ, which makes it evident that such an arrangement is not opposed to the teaching of the parts other than the cerebral hemispheres.

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April 2nd, 1878.

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

The Secretary read the following report on the additions to the Society's Menagerie during the month of March 1878.

The total number of registered additions to the Society's Menagerie during the month of March was 74, of which 32 were by pre-

<sup>1</sup> P. Z. S. 1869, p. 4.

<sup>2</sup> P. Z. S. 1848, p. 83.

sensation, 7 by birth, 7 by purchase, 4 were received on deposit, and 24 by exchange. The total number of departures during the same period, by death and removal, was 105.

The most noticeable additions during the month of March were as follows:—

1. An Isabelline Bear (*Ursus isabellinus*, Horsf.), received in exchange from the Zoological Gardens of Calcutta, March 7th. The acquisition of this animal, which has been placed in the Bears' dens next to its near relative the Syrian Bear (*Ursus syriacus*), renders the series of Bears now living in the gardens nearly perfect. It consists of 21 individuals, referable to 11 species, as follows:—

*List of Bears living in the Menagerie.*

- 2 Polar Bears ♂, ♀ (*Ursus maritimus*).
- 4 Brown Bears (*U. arctos*).
- 1 Hairy-eared Bear (*U. piscator*).
- 2 Grizzly Bears (*U. ferox*).
- 1 Syrian Bear (*U. syriacus*).
- 1 Isabelline Bear (*U. isabellinus*).
- 3 Himalayan Bears (*U. tibetanus*).
- 2 Black Bears (*U. americanus*).
- 3 Malayan Bears (*U. malayanus*).
- 1 Spectacled Bear (*U. ornatus*).
- 1 Sloth Bear (*Melursus labiatus*).

2. A Le Vaillant's Darter (*Plotus levaillanti*), purchased March 9. This African species is new to the collection, although we have had several specimens of its American representative (*Plotus anhinga*), and have at present one individual of the latter species living in the fish-house. The present example is probably from Senegal; but this Darter likewise occurs all over Southern and Eastern Africa up to 12° N. lat.<sup>1</sup>

3. Two examples of the very singular Water-tortoise of the Amazons, generally known as the Matamata (*Chelys matamata*), remarkable for the long pendent filaments on its neck. The larger of the two measures about 13½ inches in length.

This species is new to the collection, and, so far as I know, has not been previously brought alive to Europe.

I take this opportunity of recording the fact that the large female Anaconda (*Eunectes murinus*), which was purchased on the 15th February, 1877, and which (as I stated P. Z.S. 1877, p. 303) began to produce young (dead) the 2nd April, 1877, continued to produce young Snakes (mostly in a more or less decomposed condition) up to about three months since, when fifteen finally came forth. In all sixty-two young were produced.

This Snake is further remarkable for its long fast. Up to the 15th March, when she killed and ate a single duck, all offers of food were refused; so that she must have fasted thirteen months.

<sup>1</sup> Cf. Finsch & Hartl. Vögel Ost-Afrika's, p. 841.

It is impossible to *say* how long she may have been without food previous to her arrival at the gardens. One thing is certain, however, that she could not have taken food while in the box in which she arrived from South America, as she was so closely packed as to be barely able to move.

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The following papers were read :—

1. Contributions to the Ornithology of the Philippines. No. VII.—On the Collection made by Mr. A. H. Everett in the Island of Panaon. By ARTHUR, Marquis of Tweeddale, F.R.S., President of the Society.

[Received March 6, 1878.]

The small collection, of which it is proposed to give an account, was made by Mr. Everett at San Francisco, on the west coast of the small island of Panaon. This island is situated to the south-east of Leyte, from which it is separated by a narrow channel. Nor is its southern extremity distant from the most northerly part of Mindanao.

The number of species obtained is too small to permit me to draw any general conclusions as to the affinities of its ornithology. But the occurrence of the Leyte species of *Buceros* and *Thriponax*, *B. semigaleatus* and *T. pectoralis*, rather than those of Mindanao, indicates a closer affinity to the northern than to the southern island.

Panaon has never hitherto been visited by an ornithological collector.

1. CACATUA HÆMATUROPYGIA (1).

[Panaon, ♀, October.]

2. PRIONITURUS DISCURUS (2).

[Panaon, ♂, October.]

3. THRIPONAX PECTORALIS.

*Thriponax pectoralis*, Tweeddale, *anteà*, p. 340.

[Panaon, ♂, ♀, October.]

4. CHRYSOCOLAPTES LUCIDUS (32).

[Panaon, ♀, October.]

Crest and crown dark brown, with ruddy fulvous spots.

5. EURYSTOMUS ORIENTALIS (37).

[Panaon, ♂, ♀, September.]

6. ENTOMOBIA GULARIS (44).

[Panaon, ♂, ♀, October.]



Garrod, A. H. 1878. "Notes on the Visceral Anatomy of *Lycaon pictus*, and of *Nyctereutes procyonides*." *Proceedings of the Zoological Society of London* 1878, 373–379. <https://doi.org/10.1111/j.1469-7998.1878.tb07971.x>.

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