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1. *Chalk*, with marine exuviae.
2. *First Fresh-water Formation*, consisting chiefly of plastic clay, brown-coal, and sand. This is probably the same with our brown-coal formation, and contains fresh-water shells principally; but in the upper stratum both fresh-water and marine shells together; of the latter, *Cerithia*, *Ampullariæ* and Oysters, in particular.
3. *First Marine Formation*. Limestone and sand. The characterizing shells here belong to the genera *Cerithium*, *Lucina*, *Cardita*, *Cardium*, *Voluta*, *Ovulites*, *Turritella*, *Cytherea*, *Crassatella*, and *Corbula*.
4. *Second Fresh-water Formation*, containing siliceous limestone, gypsum and marle. The gypsum contains the well-known bones of remarkable land animals; but the marle lying above it always contains the remains of marine animals, particularly *Cerithia*, *Cytherea* and Oysters.
5. *Second Marine Formation*; compounded of gypseous-marle, sand, sandstone, limestone and calcareous-marle. Here the genera *Oliva*, *Fusus*, *Cerithium*, *Melania*, *Crassatella*, *Pectunculus*, *Cytherea* and *Ostrea* are particularly found.
6. *Third Fresh-water Formation*; consisting of marle and sand. Our stratum of sand near Magdeburg must be referred, in all probability, to the second marine formation.

LXXIV. *Remarks on some of the American Animals of the Genus Felis, particularly on the Jaguar, Felis Onca Linn.*
By T. S. TRAILL, M.D. F.R.S.E. &c.*

AMONG the genera into which Linnæus has distributed the higher animals, none seems more natural, or better defined, than the genus *Felis*; yet such are the vague descriptions given by most travellers, and by the older naturalists, that we are still in uncertainty respecting several of the species which compose it. My attention has been particularly drawn to this genus, by accidentally meeting with skins, and occasionally with living animals belonging to it, which I have in vain endeavoured to reconcile to the descriptions of authors; and the magnificent collection of zoological drawings in the possession of Lord Stanley has made me acquainted with several of the feline genus, which do not appear to have attracted the attention of our best systematic writers.

The feline animals belonging to the American Continent are numerous, and have generally been ill described by naturalists. Indeed there appears to be a singular prejudice respecting them in the minds of many zoologists. Because neither the

* From the Memoirs of the Wernerian Society, vol. iv. Part II. p. 468.
lion

lion nor the tiger (the monarchs of the forest in the Old World) is found in America, it was a favourite dogma with a celebrated author, that the beasts of prey of the New Continent were inferior in courage and ferocity to those animals of the Old World, which they most nearly resembled. It is true, that none of the beasts of prey of America equal in size and power the lion of Africa, or the great tiger of Bengal: but the jaguar, the puma, and black tiger of South America, equal in courage and ferocity the panther, leopard, and onca, the animals of the other continents which they approach most nearly in size and habit.

Buffon and some other writers have described the jaguar and puma as destructive to other quadrupeds, but as cowardly and fleeing from the approach of man. It is now well ascertained that Buffon has confounded the true jaguar of South America with the ocelot, a much smaller and less formidable animal; and his account of the puma seems to be taken from the descriptions of those who have only seen the animal in the vicinity of human civilization. That eloquent writer has admitted the commanding influence of the experience of human prowess in subduing the courage of even his favourite animal the lion. "A single lion of the desert will frequently attack a whole caravan; and if, after a violent and obstinate encounter, he experiences fatigue, instead of flying, he retreats fighting with a bold front to his pursuers. Those lions, on the contrary, who dwell in the neighbourhood of the towns and villages of India and Barbary, being acquainted with man, and having felt the power of his weapons, have lost their native courage to such a degree, that they fly from the threatenings of his voice, and dare not assail him. They content themselves with preying on small cattle; and will fly before women and children, who make them indignantly quit their prey, by striking them with clubs."

Had Buffon not been trammelled by a favourite hypothesis respecting the alleged inferiority of the animal kingdom in America, he would have seen that the writers who notice the cowardice of the larger beasts of prey of that continent, only speak of them as observed near European colonies, where their native ferocity has been compelled to acknowledge the superiority of human intellect and arms. Recent observations have shown how ill founded these speculations of the French naturalist have been.

Humboldt mentions many instances of the ferocious courage of the great jaguar. Among others, an animal of this species had seized a horse belonging to a farm in the province of Cumana,

mana, and dragged it to a considerable distance. "The groans of the dying horse," says Humboldt, "awoke the slaves of the farm, who went out armed with lances and cutlasses. The animal continued on its prey, awaited their approach with firmness, and fell only after a long and obstinate resistance. This fact, and a great many others, verified on the spot, prove that the great jaguar of Terra Firma, like the jaguaret of Paraguay, and the real tiger of Asia, does not flee from man, when it is dared to close combat, and when it is not alarmed by the great number of its assailants. Naturalists are now agreed, that Buffon was entirely mistaken with respect to the largest of the feline genus of America. What that celebrated writer says of the cowardly *tigers* of the New Continent relates to the small ocelots; and we shall shortly see, that on the Orinoko the real jaguar of America sometimes leaps into the water to attack the Indians in their canoes."

I am personally acquainted with gentlemen who have hunted the jaguaret in Paraguay, and who describe it as a very courageous and powerful animal, of great activity, and highly dangerous when at bay. Both this species and the puma are rendered more formidable by the facility with which they can ascend trees. I have been assured by several friends, who have repeatedly hunted the tiger in India, that even this "most beautiful and cruel of beasts of prey," as it is termed by Linnæus, generally endeavours to escape from the hunters, unless hard pressed, or surprised in a situation from which retreat is difficult; and one gentleman informed me, that, on a shooting excursion, to his great horror he found himself without a companion in a small field, in which he espied a tiger watching him; that, finding retreat impossible, he advanced against the animal firmly, when it slowly retired, until he had an opportunity of dispatching it with his rifle.

Such instances show that there is no striking difference between the habits and courage of the beasts of prey of the Old and New Continents, as imagined by Buffon.

While naturalists have been so unjust to the *character* of the American animals of this genus, the forms of these quadrupeds have not been more fortunately delineated in our engravings. For instance; the figure of the black tiger in Buffon, and in his copyist Shaw, is so wretchedly drawn, and its limbs are so distorted, that not a trace of the genuine form is preserved; but it is considerably better given in the respectable work of Pennant. The figures of the jaguar and puma, in both the former works, are inaccurate in many respects, especially in the form of the heads, and in giving no idea of the
fierce

fierce expression of the countenances. The figure of the ocelot, in Shaw, is an absolute caricature, and conveys no idea of the sprightly motions and strength of this beautiful miniature of the leopard.

These circumstances have induced me to lay before the society a fine drawing of a very beautiful jaguar from Paraguay*, which was some time ago alive in Liverpool. When the animal arrived, it was in full health, and, though not fully grown, was of very formidable size and strength. The captain who brought it could venture to play with it, as it lay in one of the boats on deck, to which it was chained; but it had been familiarised to him from the time it was the size of a small dog. I did not venture to take measurements of it; but it appeared to be between six and seven feet in length (including the tail), and to stand between two and three feet in height at the shoulder. The size of the fore-legs seemed very great in proportion to the bulk of the body, and especially of the hind-legs and rump of the animal. The ground-colour is bright fulvous; the fur is short, thick, and glossy, all over the body. It is variegated by long chain-like spots. A chain of such spots passes down the spine from the shoulders to the tail, which consists chiefly of single spots; but some of them are double. On each side of this chain are several rows of open spots, formed by a glossy border of black, including one or more spots of the same colour. As they descend the sides of the animal, these borders become interrupted, and present the appearance of clusters of four irregular oblong spots, with occasionally one or more small central dots. Viewed from above, the back has no inconsiderable resemblance to the markings of the shells of some species of tortoise, from the peculiar arrangement of the colours, and the equality of the spaces between each cluster of spots. The face, sides of the neck, and both sides of the legs, are thickly studded with small black spots. The ground-colour of the lower part of the body and inside of the thighs is dull-yellowish white; but the belly is spotted with large, black, irregular marks.

The hair of the tail is not glossy: its upper part is marked with a zigzag pattern, as in the figure; and its lower part is annulated with two or three broad blackish-brown rings, separated by dull yellow stripes. There are two distinct sets of vibrissæ; the first of which are the longest, and are placed two or three inches before the scanty hairs of the other set. The teeth are very large and strong. The whole animal had

* The drawing was made by Mr. Alexander Mosses, a young artist of great merit, who was employed by me for this purpose, and has succeeded admirably in giving the character of the animal.

an appearance of activity and strength, which fully confirmed the accounts of its prowess collected by Humboldt.

FELIS PUMA.

For this animal I would propose the following specific character, which appears necessary to distinguish it completely from *Felis unicolor*, described by me in the third volume of the Society's Memoirs.

FELIS, *corpore dilutè badio; aurilus nigris; caudâ claviformi, apice nigricanti.*

CAT, *with a light-bay body; black ears; a claviform tail, brownish-black at the tip.*

I had an opportunity of inspecting several skins of this animal, the property of Mr. Edmonston, who had killed them in the interior of Demerary. None of them were without the marks indicated in the specific character. The whiskers of all arose from a dark-coloured spot on the face. The blackish tip of the tail measured five inches; and, from the length and position of the hairs, made the extremity the thickest part of the tail, or gave it a claviform shape. One of these animals was a female, shot while searching for prey in a lofty tree: its whelp was at the bottom, feeding on a monkey, which had probably been killed by the mother. The young one was also shot. The body of the latter measured, from nose to tail, two feet, and the tail one foot one inch. The upper part of the body was not of an uniform colour like the dam, but it had three chains of blackish-brown spots along its back, with several scattered markings of the same colour on its sides, neck, and shoulders. The crown of the head had several obscure stripes; but the blackish spot at the roots of the vibrissæ, and the black backs of the ears, were very conspicuous. The lower part of the body, and the insides of the limbs, were of a dirty yellowish-grey, with dull brown bars. These marks disappear in the full-grown animal.

The largest of Mr. Edmonston's specimens seemed an animal of prodigious power. It had a much larger head, in proportion to its size, than the figures of Buffon and Shaw; and its canine teeth were enormously large. The dimensions are as follow:

							Feet.	Inch.
Length from nose to tail	...	...	...	...	...	...	4	9
— of tail	...	...	...	...	...	...	2	6
Total length	...	...	...	...	...	...	7	3
Length of the head	...	...	...	...	...	...	1	0
Circumference of ditto	...	...	...	...	...	...	1	9½
Length of the large canine teeth above the jaw...	...	...	...	...	...	...	0	1¼

Liverpool, November 1822.