

MISCELLANEOUS.

*The Theory of the Vertebrate Skeleton.**To the Editors of the Annals of Natural History.*

GENTLEMEN,—Is it that Mr. Seeley, before writing his letter contained in your last Number, did not re-read my letter published by you in December last? This seems a very improbable supposition; and yet, without some other supposition which I should be reluctant to make, I cannot account for the fact that Mr. Seeley ignores absolutely the essential point of my letter.

The first indication of his views he dates back to a paper on "Homologies of the Bivalve Mollusca," made public on March 17, 1862. He says they were again propounded in a paper read on Nov. 10, 1862. And he winds up his historical statement by saying "it is known to certain of my friends that the paper 'A Theory of the Skeleton' was written nearly in the form in which it is printed before any part of the 'Principles of Biology' could have been issued."

This has the appearance of being a sufficient reply. Every reader will, as a matter of course, infer from it that the view to which I had drawn Mr. Seeley's attention as in great measure identical with his own was first published in the 'Principles of Biology;' and every reader will conclude that, having traced back his view to an earlier date than the 'Principles of Biology,' Mr. Seeley has proved his case. Any one, however, who takes the trouble of referring to my letter of December last, will find that what Mr. Seeley proves is wholly beside the question. In that letter I pointed out to Mr. Seeley that, in "the 'British and Foreign Medico-Chirurgical Review' for October 1858, he will find, at the close of a criticism on Prof. Owen's 'Archetype and Homologies of the Vertebrate Skeleton,' a brief outline of the theory that the vertebrate skeleton is a product of mechanical actions;" and I referred to the 'Principles of Biology' merely as containing this theory "more fully worked out."

Thus Mr. Seeley passes over in silence the date of 1858, as that at which an outline of this theory was given by me; and saying that an indication of this theory was given by him in 1862, dwells on the fact that this is earlier than the issue of the 'Principles of Biology,' in which I have elaborated the theory.

I am, Gentlemen,

37 Queen's Gardens, Bayswater.

May 4, 1867.

Yours, &c.,

HERBERT SPENCER.

On the Type of a new Family of the Order Rodentia.

By A. MILNE-EDWARDS.

The class Mammalia has been studied with so much care, and is now so well known, that zoologists rarely meet with species belonging to it new to science; and in general these readily find their place in the generic divisions already established.

The animal which constitutes the subject of this memoir must therefore, it seems to me, interest naturalists in a very particular manner; for it had hitherto escaped their researches, and it differs so much from all the great Linnean genera that, in order to bring it under the existing classifications, it is necessary to establish for it in the order Rodentia, not only a new genus, but even a special family. I propose to give it the name of *Lophiomys Imhausii* (L'Institut, tome xxxv. p. 46, Feb. 6, 1867; Annals, May 1867, p. 372).

This little mammal lived for nearly two years in the Garden of Acclimatization in the Bois de Boulogne. I am indebted to the kindness of M. Alb. Geoffroy Saint-Hilaire for being able to undertake this investigation, and I eagerly take this opportunity to thank him publicly for the numerous services of this kind which he is constantly rendering me.

Lophiomys Imhausii is of the size of a small rabbit; but its aspect is very different; for it is provided with a long tufted tail, and the hairs of its back are erected in such a manner as to form a sort of longitudinal mane. The hairs of the flanks are likewise very long, but pendent; hence they are separated from the mane by a furrow, the bottom of which is occupied by hairs of a very singular aspect: they are of a greyish-fulvous colour, lying down upon the skin, thick and flattened: microscopic examination shows that their structure is spongy, and that the epidermic sheath which surrounds them constitutes an actual network with irregular meshes, in the midst of which longitudinal fibres are arranged. The remainder of the fur is mixed black and white.

The inner digit of the hind feet is well detached from the others, and by opposing itself to these can form a true prehensile hand, of which the animal makes use to seize forcibly the objects upon which it climbs.

The most important characters of *Lophiomys Imhausii* are furnished by its osseous framework, and more particularly by its head. The upper surface of this is entirely covered with miliary granulations, arranged with perfect regularity and symmetry. No mammal presents an analogous arrangement. Behind the orbits the head is extremely wide; but this is not due to the development of the cranial case, which is in reality narrower than in most rodents: it results from the ossification of the aponeuroses of the crotaphital muscles, which extend over the temporal fossæ in such a manner as to unite with the bones of the cheek and complete the orbital frame behind. I know of no example in the Mammalia of a similar mode of organization; and we find nothing analogous to it except in certain reptiles, and especially in *Testudo caretta*.

The dentary system differs less from that seen in various rodents, and enables us to ascertain that it is to the *Muridæ* that *Lophiomys* presents the most resemblance. There are in each jaw a pair of incisors, and three pairs of radicated molars, of which the first consists of three ridges separated from each other by deep grooves. The genus *Cricetus* is the only one in which we find an arrangement of the folds of enamel similar to that in *Lophiomys*.

The study of the skeleton of our rodent offers a great number of interesting facts, upon which I shall not at present dwell, but confine myself to mentioning the state of extreme imperfection of its clavicles (which are suspended in the flesh as osseous styles), and the great number of the dorsal vertebræ (of which there are sixteen, whilst in most cases only thirteen exist).

The stomach of *Lophiomys* is very remarkable: it is unilocular, and presents in its interior two crest-like folds, festooned on their free margins, which extend parallel to each other from the orifice of the œsophagus to the commencement of the pyloric portion. These folds enclose a deep furrow, which, by the approximation of their margins, may be converted into a channel, by means of which liquid aliments may flow from the œsophagus into the neighbourhood of the pylorus without falling into the general cavity. This arrangement is very remarkable, and apparently can only be compared with the subœsophageal channel of the ruminants.

Upon the lower border of the stomach we observe, in the abdominal cavity, a large appendage, in the form of the finger of a glove, which opens near the pylorus by an orifice surrounded by a sort of sphincter. The walls of this diverticulum are thick, and appear as if villous; and their inner surface is riddled by a multitude of pores, which are the orifices of the same number of secretory tubes: these, under the microscope, appear cylindrical, long, and very narrow; their diameter is only about $\frac{1}{20}$ millim.; they are parallel, very close together, and present neither ramifications nor an initial inflation. The stomach of no mammal presents a similar arrangement. In its form the finger-like appendage somewhat resembles the pyloric cæca of fishes; but it appears to me to be due rather to the localization of the pepsic glands, which, instead of being, as usual, disseminated through the thickness of the walls of the stomach, are concentrated in a peculiar appendicular organ.

The small intestine presents nothing remarkable; but the arrangement of the pancreas deserves notice. The excretory canals of this gland, instead of opening directly into the intestine, pour their products into the choledochal canal, and it is by the intervention of this latter that the pancreatic juice reaches the duodenum.

The cæcum has the form of a subcylindrical sac; but it is far from being so much developed as in most of the Rodentia.

The male generative apparatus of *Lophiomys* resembles that of the Hamster more than that of any other species of the same order.

The preceding zoological and anatomical details suffice to show that *Lophiomys Imhausii* differs considerably from all the known types of Rodentia: and it appears to me indispensable to form of it not only a new genus, but a new family; for the peculiarities of structure which we meet with in it are superior in zoological value to those which have served as bases for the establishment of the other secondary groups of the order Rodentia, whether called tribes or families.

I can give no precise information as to the native country of *Lophiomys*. It was bought, in 1865, at Aden, by M. Imhaus,

Receiver-general of Finances. It is therefore probably derived either from Southern Arabia or from the opposite coast of Africa—that is to say, Nubia or Abyssinia. Unfortunately, M. Imhaus could not obtain from the owner of the animal any information that might serve to elucidate this question.—*Comptes Rendus*, April 22, 1867, pp. 812–814.

On the Spontaneous Movements of Colocasia esculenta.

By H. LECOQ.

There are few plants the organs of which do not spontaneously execute various movements: and here we distinguish these movements from those which are the result of some provocation, and which botanists designate under the name of *irritability*. Most of the spontaneous movements are due to the more or less rapid evolution of the organs, and the eye cannot follow them. We only know *Hedysarum gyrans* in which the leaves, or rather the two lateral leaflets, are endowed with regular movements visible at all times. I can add a new example of spontaneous oscillation, which was presented to me by *Colocasia esculenta*, Schott.

On the 13th January last, in passing through my stove, I thought I observed a slight movement in a leaf of *Colocasia*. I ascribed it at first to the displacement of the air by my passage; but a more careful examination proved to me that the movement occurred not only in the leaf which I had noticed, but also in four other leaves, the plant having only five in all. One leaf, smaller than the others, and at least one year old, was agitated like the younger ones. The movement was, in all, a sort of regular trembling, and was so sensible that the leaves of *Colocasia* communicated it to the neighbouring plants.

Every day after the 13th January, I carefully observed this plant of *Colocasia*, the only one in my stove, and noted the phases of its agitation. Sometimes this agitation persisted night and day; most frequently it occurred from 9 o'clock to noon, and then became weakened. The plant also had whole days, and even weeks of absolute repose. It then occurred to me, in order that I might be warned of the hours and periods of movement, to attach to my plant a certain number of little bells: these were not always sufficiently shaken to make them sound, but never failed to give me notice of the great crises.

Thus on the 18th January the agitation commenced at 2 o'clock A.M., and continued through a great part of the morning. The little bells rang, and the leaves of the *Colocasia* struck upon the neighbouring plants with sufficient force and distinctness to enable me, by means of a watch with a second-hand, to count the pulsations, which were from 100 to 120 per minute.

Several times I had the opportunity of witnessing violent fits of shaking,—among others, on the 20th January and 2nd March. On the latter day, in the morning, although the temperature of the stove was lowered to 7° C. (=45°·6 F.), the agitation was considerable



Milne-Edwards, Alphonse. 1867. "On the type of a new family of the order Rodentia." *The Annals and magazine of natural history; zoology, botany, and geology* 19, 436–439.

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