



Note on the phenomena of digestion and on the structure of the digestive apparatus in the Phalangida. (Abstract by the author.)

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attention of zoologists. This mammal, the affinities of which have been long disputed, is still very rare. Travellers have scarcely ever studied it in the living state; and the observations they have been able to make upon its habits and manners are almost insignificant; we therefore think it useful to indicate some new particulars as to its mode of life.

The aye-aye constructs in trees true nests resembling enormous ball-shaped birds' nests; and it is in the interior of these constructions that the female brings forth her young and nourishes it. We have just received one of these nests found by M. Soumagne, honorary consul of France in Madagascar, in the belt of forest situated halfway up the eastern slope of the great granitic mountain mass a short distance from Tamative. It is made with much care and art at the fork of several large branches of a dicotyledonous tree; its outer surface is formed of large rolled-up leaves of the *Ravinala* (or traveller's tree), which constitute a sort of impermeable covering and protect the interior, in which there is an accumulation of small twigs and dry leaves. The aperture is narrow and placed to one side. M. Soumagne surprised a female with her young one in this nest.

The most highly organized species of the Lemurine group (the Indrisinæ and true lemurs) always carry their young attached to the back or the breast, where it can easily reach the pectoral mammæ of the mother. The lower representatives of the order, however, are furnished with several pairs of mammæ, and they do not carry their young in this manner; they deposit them either in holes of trees (*Lepilemures* and *Chirogalei*) or in true nests (*Microcebi*). Each litter consists of several young, which remain for a considerable time confined to their retreat, without being able to accompany their parents. One of us has examined the nest of *Microcebus myoxinus*. It resembles on a small scale that of a crow, and is composed of small twigs interlaced, in the midst of which there is a depression with a bed of hairs, in which the young repose.

In its mode of nidification, therefore, the aye-aye closely approaches the more degraded representatives of the order Lemurina, and departs from the Indrisinæ and true Lemurs.—*Comptes Rendus*, Jan. 22, 1877, p. 196.

Note on the Phenomena of Digestion and on the Structure of the Digestive Apparatus in the Phalangida *. By FÉLIX PLATEAU. (Abstract by the author.)

The 'Annals and Magazine of Natural History' have already given abstracts of several of my memoirs relating to the phenomena of digestion in the Articulata †. The present memoir is, properly speaking, only a detached chapter of a long series of researches on

* Bulletin de l'Académie Royale de Belgique, 45^e année, 2^e sér. tome xlii. p. 719, 1876.

† Annals and Magazine of Natural History, 4th series, vol. xvi. p. 152, (1875), vol. xviii. p. 355 (1876), vol. xviii. p. 437 (1876).

the digestion of the Arachnidans. The very special organization of the Phalangida permitted this separation.

It is not my intention to summarize here the anatomical part of my note; but I must say a few words on the arrangement of the digestive tube of the Araneida and of the Phalangida in order to show the bearing of the physiological results.

The Araneida, or spiders properly so called, are sucking animals. Their digestive tube comprises:—first, a buccal intestine entirely situated in the cephalothorax, and consisting of an œsophagus with chitinous walls, terminating with an apparatus of suction, accompanied by a series of five pairs of lateral cœca; then, in the abdomen, a middle intestine, followed by a terminal intestine. The middle intestine is here characterized by the fact that it receives on the right and left the excretory canals from the voluminous abdominal gland, hitherto called the *liver* in the Araneida. The terminal intestine, dilated into a reservoir, receives at its origin, as in all the Articulata, the crustaceans excepted, the Malpighian or urinary tubes.

We know by the works of Ramdohr, Treviranus, Tulk, Blanchard, &c., that the digestive apparatus of the Phalangida is quite different. Here the animal does not suck its prey, but devours it entirely. The digestive tube consists, in the first place, of a buccal intestine reduced to a short œsophagus; then of an immense median sac, into which open dorsally about thirty voluminous cœca filling nearly all the cavity of the body; lastly of a short terminal intestine, characterized, as I show for the first time, by the insertion of the Malpighian tubes. It is to be remarked that here the body is no longer distinctly divided into a cephalothorax and an abdomen, and also that, as in the Araneida, a certain number of cœca penetrate into the coxopodites of the feet.

All authors taking for their basis a simple resemblance of form, regard the cœca of the Phalangida as the analogues of the cephalothoracic cœca of the Araneida. This is for want of histological observations and above all of physiological experiments.

Experimental researches already far advanced have convinced me that the voluminous gland called the *liver* in the Decapod crustaceans, and which empties its products into the middle intestine of those animals, is nothing but the organ of secretion of the digestive liquid intended for the emulsion of the fats and for the solution of the albuminoids*. Recently M. Jousset de Bellesme has informed me that he has arrived at perfectly similar results; finally a number of experiments on the so-called *liver* of the Araneida†, the ducts of which also open into the middle intestine, have proved to me that

* I have already alluded to it in my 'Recherches sur les phénomènes de la digestion, etc. . . des Myriapodes,' p. 42, note 4.

† I take this opportunity of calling the attention of the reader to the importance of the results of my experiments on the Araneida. The memoir in which they, together with numerous other facts, are to be found, and which I hope to complete shortly, will, I hope, be read with interest.

this also was only a liver in appearance, that the liquid secreted was also the principal digestive liquid emulsionizing the fatty bodies, transforming the albuminoids into peptones and producing glucose at the expense of amylaceous matters.

The epithelium, consisting of voluminous cells, of the cæca of the Phalangida has the most analogy with the cellular elements of the supposed liver of the Araneida; but, what is more positive, the liquid secreted in abundance also transforms the feculents into glucose slowly, dissolves the albuminoids actively, and energetically emulsionizes the fats.

The cæca of the Phalangida are therefore not the analogues of the cephalothoracic suctorial sacs of the Araneida, but the evident analogues of their abdominal digestive gland. It results from this, (and direct observation also proves it), that the large median sac is the principal place for digestion, and consequently the middle intestine.

The Gourami and its Nest.

By M. CARBONNIER.

I have of late years had the honour of making known to the Academy the curious and interesting habits of certain fishes of the group Labyrinthici. In these species, at the time of reproduction, the males become adorned with the most vivid colours, construct a nest to shelter the products of the spawning, and during the embryonic development, as also after hatching, give a careful and efficacious protection to their progeny—facts which indicate a highly developed instinct in these creatures, and reveal the existence of faculties of which they have heretofore been regarded as destitute. Among these are the *Macropodi* of China and the *Colisæ* of India. The study of another fish of the same family, the Gourami (*Osphromenus olfax*) has furnished me with subjects of no less astonishment and admiration.

The Gourami, an inhabitant of the fresh waters of China and India, is remarkable for the large size to which it may grow and for the goodness of its flesh, which renders it a valuable article of food.

My trials in former years not having given any result, I determined last spring to keep my fishes in a medium maintained artificially at a constant temperature of 25° C. (=77° F.), which it appeared to me must be suitable for their reproduction. With this view, my fishes were placed in an aquarium containing about 48 gallons of water. In a few days I saw the bodies of the males become adorned with vivid colours; they pursued each other, and seemed to struggle furiously for the possession of the females. I then selected the finest male, whose lips were tumefied in an abnormal fashion, and left him alone in the aquarium with a female which he seemed to pursue perseveringly. He soon commenced in one of the angles of the aquarium the formation of a nest of froth, which in a few hours attained a considerable size—6 to 7¼ inches in diameter, and 4 to 4½ inches in height.

In the Chinese *Macropodus* the male draws directly from the outer