

XXV. *On the Anatomy of some of the Organs of Deglutition in the Capybara (Hydrochærus Capybara). By John Morgan, Esq. F.L.S.*

Read June 15, 1830.

THE very great advantage which a zoologist derives from the study of comparative anatomy, in the systematic arrangement of the different genera and species composing the animal kingdom, must be acknowledged by every one who has turned his attention to this branch of natural science ; and it will therefore be unnecessary that I should offer any apology for presenting the Linnæan Society with a paper upon a subject almost exclusively anatomical.

The details of my present communication may perhaps appear of trivial importance ; but as the dissections I have to describe are, I believe, entirely new, and as it is probable that the publication of new anatomical facts (although insulated and apparently of little interest in themselves) may eventually form a groundwork for the more important discoveries of our successors, I am induced to lay before this Society a short account of some anatomical peculiarities hitherto undescribed, which I have met with in dissecting certain organs connected with the process of digestion in several species of the order Rodentia. It is now more than a twelvemonth since I examined the body of a Capybara, one of the largest animals of the order to which it belongs, and in which therefore I conclude that the prominent distin-

guishing characters are more strongly marked than in most other species of the rodent animals.

The stomach is formed by a single membranous bag (TAB. XXVII. Fig. 1.), and as in the case of other mammiferous vegetable feeders, in which we find this simple form of stomach, it will be seen by reference to the plate (TAB. XXVII. Fig. 2.) that the cæcum is large and complicated in proportion.

Having met with nothing requiring particular notice in the remaining part of the alimentary canal, I proceeded to examine more particularly the structure of the mouth and throat. The grinding surfaces of the molar teeth are of very considerable extent, as will be seen in TAB. XXVIII.; and it must be obvious how necessary such an arrangement of parts must be to the health of the animal, when we consider the nature of its food, and the simple structure and limited functions of its most important digestive organ, a provision being thus made for the proper mastication of the hard vegetable substances upon which the animal must occasionally subsist. I found however, upon further examination, that there was another structure hitherto undescribed, by which the process of perfect mastication is rendered indispensable to the passage of food from the mouth to the stomach. The structure to which I allude, and by which the possibility of swallowing any portion of unmasticated nutriment is prevented, was shown in an extraordinary formation of the velum palati mollis, or soft palate: this membrane, which in other animals generally forms an imperfect floating septum, suspended from the back part of the roof of the palate, and interposed between the cavity of the mouth and pharynx, I found in the *Capybara* (and in some of its congeners) to be much more extensive in its attachments and different in its form and uses.

On separating the jaws and examining the fauces, the mouth
appears

appears to terminate in a nearly blind pouch ; for the communication with the pharynx seems as if shut by a strong membrane of a funnel shape, of which the concavity recedes towards the throat. (TAB. XXVIII. *a*.)

This membrane is an extended velum palati, attached to the whole circumference of the fauces and root of the tongue, and is prevented from forming a *complete* septum by the existence of a small, central, circular aperture, by which a communication between the mouth and the pharynx is established for passage of food ; so that through this small membranous funnel, or strainer (if I may be allowed the expression), it is physically impossible that any considerable portion of unmasticated nutriment should find its way by natural means, from the mouth into the alimentary canal : and from this circumstance the first process towards digestion must be rendered certain and complete ; for the *grosser* particles of food must remain in the mouth from the interposition of the membranous sieve or strainer, which is thus placed between the organs of mastication and those of digestion.

The same provision for the complete mastication of all solid substances, previous to their being swallowed, will be found in others of the same group. I shall, however, confine my description of the anatomy of these parts to the dissections I have made of the *Capybara*, as the parts are more fully developed, and more clearly seen in that animal than in any other I have met with. On removing the mucous membranes of the mouth and pharynx from the anterior and posterior surfaces of the whole of the velum palati, the muscles which support and lie between the two membranes were exposed, and were as follows.

The circumference of the funnel is supported on each side anteriorly by a strong muscular column, which arising from a projecting point in the middle of the os hyoides, passes through a deep groove in the fore part of the bone, to be continued upwards

wards behind the tongue, with the muscular structure of which its fibres at the lower part intermix. Each muscle ascending from behind the root of the tongue passes on the side of the funnel between the two layers of mucous membrane, forming the anterior and posterior surfaces of the velum, its fibres becoming more diffused and spreading over the upper part of the velum to join above the funnel with those of its fellow on the opposite side; the superior termination of the two muscular columns thus intermixing appears to be insensibly lost upon the palatine membrane.

The two muscles are connected with a thin circular band of muscular fibre, which forms an anterior sphincter to the circumference of the funnel. On the posterior part of the velum a lateral support is afforded in the same way by a band of muscle on each side, which having an attachment above to the palate is continued downwards, to terminate by intermixing with the muscular structure of the pharynx. These two posterior slips of muscle are connected above and below the aperture in the velum by transverse fibres.

To the four supporting muscles which I have now described, and which may perhaps be considered as analogous to the pillars of the fauces in other animals, the circumference of the funnel will be found attached by the connection of its muscular fibres with those already described: these are arranged in a circular order, and form a complete sphincter over the whole cone, by the contraction and dilatation of which the passage of any substance through its central aperture must be assisted or prevented.

It will be seen by the drawing in which these parts are represented (TAB. XXX.), that when any substance is passing from the mouth to the pharynx, the conical projection of the velum must necessarily pass over the epiglottis, and thus prevent
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the entrance of any part of the food into the larynx and trachea. It will be further seen that the membrane of the velum is so closely united with the epiglottis as to render it impossible to admit the projection backwards of the one, without the complete closure of the rima glottidis from the depression of the other, thus affording an additional protection for the entrance to the air passages.

The principal use, however, in the peculiar form of the velum palati, which I have described, appears to me to have reference to the digestive organs, and to be confined almost entirely to the process of deglutition.

EXPLANATION OF THE PLATES.

TAB. XXVII.

Fig. 1. Stomach.

Fig. 2. Cæcum.

TAB. XXVIII.

Head ;—the lower jaw, dislocated on one side, to show a section of the mouth ; *b*, pharynx, and *a*, funnel-shaped velum palati.

TAB. XXIX.

a. Root of the tongue, cut through to show the anterior muscular pillars of the velum palati, *b*.

TAB. XXX.

Fig. 1. Posterior view of the muscles of the velum palati; *a*, sphincter muscle of the funnel ; *b*, posterior muscular pillars.

2. Os hyoides.

3. Connection of the epiglottis with the membrane of the velum palati ; *a*, epiglottis.

XXVI. Notice

Fig. 1.

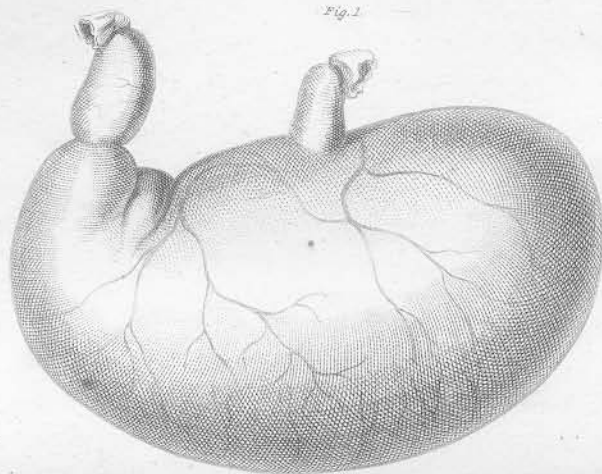


Fig. 2.

