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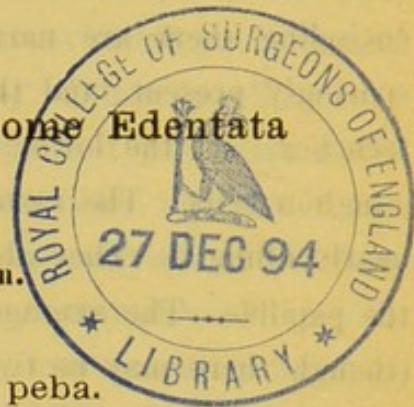
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On the Gustatory Organs of some Edentata

by

Frederick Tuckerman.



The Tongue of *Dasyus peba*.

The material consisted of two spirits specimens, a whole tongue and the back part of a smaller one.

General Description. — The tongue is long and narrow, and tapers gradually to a point. It measures 51 mm. in length and, near the bone, is 10 mm. in diameter. It is free for 34 mm. from the fraenum, two thirds of its entire length, and is thus capable of great prehensile power. The under surface is finely wrinkled, and marked by a median ridge extending from the fraenum to the tip. The ridge is impressed longitudinally by two parallel grooves. It is likewise transversely furrowed, the furrows being parallel and 1,5 mm. apart. The anterior two-thirds of the papillate surface is sheathed with a thick layer of partially cornified epithelium. The posterior third is transversely wrinkled, the furrows being parallel and running across the tongue. The basal end of the organ bends somewhat abruptly downwards, forming a kind of pit. From this pit a deep groove extends along the middle of the dorsum for a distance of 6 mm. Fungi-form papillae are not numerous, but are quite evenly distributed over the middle and anterior dorsal surface and upon the sides. Some of the papillae appear to be set in trench^s, with their summits below the level of the lingual surface. The circumvallate papillae are two in number. They are 5 mm apart, and 15 mm from the base of the organ. I failed to find the lateral gustatory organs in this species, but I think there can be but little doubt of their existence.

Gustatory Structures.

The Circumvallate Papillae. — The papillae are 0,40 mm. in diameter and 0,95 mm. in height. Their upper surfaces are more or less flattened, and their sides are vertical or nearly so. The trenches encircling them are narrow and very deep. Serous glands are but sparingly present, and their ducts open at or near the bottom of the trenches. At the lower part of the papillary axis are a few isolated ganglion cells. The taste-bulbs are disposed on the lateral area, often nearly filling it. They also occur to some extent on the free surface of the papillae. The average number of tiers appears to be about eighteen (though there may be twice as many), a well-filled tier containing from sixty to seventy bulbs. The bulbs show some indications of a neck, and measure 0,054 mm. in length and 0,030 mm. in breadth. No bulbs were detected either in the fungiform papillae or the epiglottis. 6

The Tongue of Dasypus villosus.

I received three specimens of this tongue. They had been kept in spirit, and the tissues were in a fair state of preservation.

General Description. — The organ is long and narrow, and tapers gradually to a point. It measures 81 mm. in length, and is perfectly free for 50 mm. from the fraenum. At its posterior part it is 12 mm. in breadth and 14 mm. in thickness. The under surface is marked by a distinct median ridge leading from the fraenum to the tip. The extreme basal portion of the organ is bent somewhat abruptly downwards, as in *Dasypus peba*. The upper surface is quite densely papillate over nearly its entire area. Papillae of the fungiform type are sparingly scattered over the dorsum and sides of the tongue. The two circumvallate papillae are on the same transverse line, and are set quite close to the lateral margins of the organ. They are 7,3 mm. apart, and 17 mm. from the base of the tongue. There is a lateral gustatory organ at each side of the base. The organs are marked externally by three or four small, irregular openings, running transversely to the long diameter of the tongue.

The Mechanical Papillae. — These papillae differ in some respects from the compound filiform papillae of the marsupial tongue.

The secondary papillae are fewer in number, there being not more than five or six to a papilla as a rule, and resemble somewhat the stout, hard spines of the Carnivora. Many of the papillae are surmounted at each lateral border by a single recurved spine, the space between being packed with epithelium. When viewed in horizontal section they present a horseshoe-shaped cavity. These papillae may be looked upon as representing an intermediate type between the „coronate“ and „fasciculate“ papillae of Marsupialia and the corresponding papillae of still higher forms. Another, and more simple form of papilla occurs on this tongue near the lateral margins. It consists of a single papillary upgrowth of the mucosa, overspreading which is a layer of stratified epithelium. From the bed of epithelium rises a single sharp-pointed spine. The spine is cornified at its upper part, and directed inwards and backwards.

Gustatory Structures.

The Circumvallate Papillae. — The papillae were not developed alike in all the specimens. While some of them resemble the papillae of higher animals, others approach more closely the marsupial type. The former, or more recent type are 1,3 mm. in diameter and 1,1 mm. in height. They are flattened on top, and barely reach the level of the lingual surface. The bulbs are disposed around the lower part of the lateral area in eighteen closely-packed tiers. The circumvallate papillae of less recent type are taller than the foregoing, and their sides converge as they approach the opening of the trench. Their lateral area is filled with bulbs to within a short distance of the top, there being often thirty tiers of them. They measure 0,051 mm. in length and 0,030 mm. in breadth. Serous glands are quite abundant, the ducts opening into the trenches at their base and sides.

The Lateral Gustatory Organs. — The lateral gustatory organ of *Dasypus villosus* is not unlike that of *Procyon lotor* (described by the writer in the „Journal of Anatomy“, vol. XXIV, 1890). The superficial examination of this region showed several irregular slit-like openings, but I only succeeded in obtaining sections through one of them. This opening meas. 0,20 mm. in width, and led into a large irregular-

shaped cavity or recess, 0,55 mm. in depth and 1 mm. in diameter. The walls of the recess are not very thick, and are lined with stratified epithelium, resembling in the main that of the adjacent lingual surface. From the floor of the recess rise two ridges, which largely fill it. The larger of the two measures 0,40 mm. in diameter and 0,45 mm. in height. Serous glands are fairly abundant, and their ducts open into the spaces between the ridges, and also at the sides of the recess towards its deeper part. The ridges bear bulbs over their entire circumference. Bulbs are also very irregularly scattered in the walls of the cavity, and likewise occur in clusters near its mouth. They are small, measuring 0,042 mm in length and 0,024 mm. in breadth. The fungiform papillae appeared to be of the usual mammalian type, but were destitute of bulbs. The latter were likewise wanting in the epiglottis.

The Tongue of *Dasytus minutus*.

This specimen had been kept in spirits, but was not in a favourable condition for minute examination.

General Description. — The organ is 33 mm. in length, 5,5 mm. in breadth, and is free from the fraenum for 14 mm. The under surface has the usual ridge, the upper anterior region being grooved transversely. The tip was somewhat less pointed than in the other *Edentata* examined. Although the entire tongue was cut into sections, no circumvallate papillae or lateral gustatory organs were found. It is quite probably, however, that they were overlooked. The fungiform papillae were of good size, and contained bulbs. In a single section of one of them I counted no less than six. They measured on the average 0,039 mm. in length and 0,021 mm. in breadth. Simple and compound filiform papillae were numerous, the former being interspersed among the latter. The epiglottis was not examined.

The Tongue of *Chlamyphorus truncatus*.

I received only the anterior four-fifths of this tongue. The piece measured 36 mm. in length. It had been kept in spirits, and was sufficiently firm for cutting.

Gustatory Structures.

The Circumvallate Papillae. — The two papillae required the aid of a powerful lens to reveal their presence. They are as usual on the same transverse line, 1,7 mm. apart, and lie completely concealed in deep and narrow trenches, their apices, which are inclined inwards towards the median line, being slightly below the openings of the latter. At a short distance above their bases (which are constricted) the papillae measure 0,23 mm. in diameter, their height being 0,6 mm, or nearly three times the transverse diameter. I do not think it probable that the mouths of the trenches can be closed. The arrangement of the muscles beneath the papillae suggests a possible drawing downwards of the entire region, but not of the papillae alone. Glands of the serous type are sparingly scattered through the connective tissue stroma underlying the papillae, and their ducts open into the trenches at various levels.

The taste-bulbs are restricted to the lower two-thirds of the lateral area of the papillae. There may be seventeen or more tiers of them. They were not clearly-enough defined for me to determine the mean dimensions of the typical bulbs of this species. One which I measured, and which was probably somewhat below the mean, was 0,030 mm in length and 0,018 mm in breadth. No lateral gustatory organs were found on this piece of tongue.

The circumvallate papillae of *Dasypus peba* resemble in the main those of higher animals, while those of *Chlamyphorus truncatus* approach quite closely the marsupial type, the resemblance between them and the anterior papillae of *Belideus* and *Phalangista* being very marked. The papillae of *Dasypus villosus* appear to hold an intermediate position, both types being represented, although more or less modified.

Amherst, Mass. U. S. A.,

5. June, 1890.

