

in flight, in order to regulate their course during that vigorous species of locomotion. These muscles are in number two on each side, arising from the posterior extremities of the *ischia*, and inserted into the expanded anchylosed *vertebrae*. From the disposition of these muscles it is obvious that after the proper *elevators* have raised the tail to a certain height, they also become dorsad of the centre of motion, combine their forces with the *elevators*, and by this addition of power terminate the act of throwing up the tail by a jerk: Mr. Vigors in his observations on the living animal observes, that "in these movements the tail seemed to turn as if on a hinge that was operated on by a spring."

The osseous portions of the mandibles of the Toucan are disposed in a manner adapted to combine with the great bulk of those parts a due degree of strength and remarkable lightness, and the bony structure is consequently of a most beautiful and delicate kind. The external parietes are extremely thin, especially in the upper beak: they are elastic, and yield in a slight degree to moderate pressure, but present considerable resistance if a force is applied for the purpose of crushing the beak. At the points of the mandibles, the outer walls are nearly a line in thickness; at other parts, in the upper beak, they are much thinner, varying from 1-30th to 1-50th part of an inch, and in the lower beak are from 1-20th to 1-30th of an inch in thickness.

On making a longitudinal section of the upper mandible, its base is seen to include a conical cavity, about two inches in length and one inch in diameter, with the apex directed forwards. The walls of this cone consist of a most beautiful osseous network, intercepting irregular angular spaces, varying in diameter from half a line to two lines. From the parietes of this cone, a network of bony fibres is continued to the outer parietes of the mandible, the fibres which immediately support the latter being almost invariably implanted at right angles to the part in which they are inserted.

The whole of the mandible anterior to the cone is occupied with a similar network, the meshes of which are largest in the centre of the beak in consequence of the union which takes place between different small fibres as they pass from the circumference inwards. It is remarkable that the principle of the cylinder is introduced into this elaborate structure: the smallest of the supporting pillars of the mandibles are seen to be hollow or tubular, when examined with the microscope. The structure is the same in the lower mandible, but the fibres composing the network are in general stronger than those of the upper mandible.

The medullary membrane lining these cavities appears to have but a small degree of vascularity. Processes of the membrane, accompanying vessels and nerves, decussate the conical cavity at the base of the beak. The principal nerves are two branches of the fifth pair, which enter at the lower part of the conical cavity, and diverge and ascend as they pass forwards to the end of the bill, giving off branches, which are distributed to the horny covering, and supply it with sensibility.

The air is admitted to the interior of the upper mandible from a cavity situated anterior to the orbit, which communicates at its posterior part with the air-cell continued into the orbit, and at its anterior part with the maxillary cavity. The nasal cavity is closed at every part, except at its external and internal apertures, by the pituitary membrane, and has no communication with the interior of the mandible.

The organ of smell is confined to the base of the upper jaw. The canal, which is traversed by the air and odorous particles in inspiration, forms a sigmoid curve in the vertical direction. The external orifice is on precisely the same perpendicular line as the internal one. It is situated at the posterior surface of the upper mandible, where it is raised above the level of the cranium; the orifice is consequently directed backwards, secure from all injury that might happen to it in the act of penetrating dense or interwoven foliage.

The olfactory canal is at first of almost a cylindrical form, and about two lines in diameter. It passes forwards for about half an inch, receiving from the mesial aspect the projection of the first spongy bone; it then bends downwards and backwards, and is dilated to admit the projections of the two other spongy bones: from this point it descends vertically to the palate, at first contracted, and afterwards dilating to form the internal or posterior orifice. The first or outermost spongy bone is almost horizontal, and has its convexity

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