

No. 5.—*The Ethmoid Bone in the Bats.* By HARRISON
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A COMPARISON of the ethmoid bones of the bats, upon which I have been of late engaged, has resulted in defining some interesting points in the anatomy of the organ of smelling in these animals. Awaiting opportunity for framing more elaborate descriptions, I propose formulating an account of the peculiar appearances of the ethmoid in the various families. I may here state, that, in every example I have examined, the detail in the arrangement of the scrolls of the ethmoid bone has yielded characters by which the genera and even the species can be readily determined.

The genera examined are the following: *Pteropus*, *Epomophorus*, *Rhinolophus*, *Phyllorhina*, *Megaderma*, *Nycteris*, *Antrozous*, *Plecotus*, *Corinorhinus*, *Vesperugo*, *Vesperus*, *Scotophilus*, *Atalapha*, *Vespertilio*, *Natalus*, *Miniopterus*, *Emballonura*, *Taphozous*, *Noctilio*, *Molossus*, *Nyctinomus*, *Chilonycteris*, *Mormoops*, *Macrotus*, *Vampyrus*, *Schizostoma*, *Phyllostoma*, *Carollia*, *Glossophaga*, *Artibeus*, *Vampyrops*, *Stenoderma*, *Chiroderma*, *Sturnira*, *Brachyphylla*, *Centurio*, and *Desmodus*.

The identifications of Dobson (Catalogue of the Chiroptera Br. Mus., 1878) have been accepted in framing the above list.

In all the genera examined, the ethmoid bone is composed of a vertical lamella projected from the cribriform plate, to which in most instances there is appended an outer (lateral) horizontal scroll.

(1.) In its simplest form, the vertical plate bears upon its median surface one or more rudimental scrolls. Examples of this variety are seen in the *Nycteridæ*. In *Nycteris*, *Rhinolophus*, *Phyllorhina*, and *Megaderma spasma*, the rudimental scrolls are horizontal; but in *Megaderma frons* they are vertical. The outer (lateral) scroll, which is present in *Nycteris* and *Phyllorhina*, tends to be directed inward.

(2.) In the next degree of complexity met with, the vertical lamella resembles the foregoing, but possesses a small lateral scroll, which arises independently from the cribriform plate. The vertical plate retains upon its median aspect two vertical rudimental scrolls. Example, the genus *Emballonura*.

(3.) In the third degree of complexity the vertical plate is revolute anteriorly, and (as seen from above) is sub-triangular or cylindroid in form. It retains upon its median surface two supplemental horizontal or oblique scrolls. The outer (lateral) scroll is present.

The vertical plate may project well in advance of all the other parts, or may be but slightly longer than they. No union exists between the outer (lateral) scroll and the vertical plate of the frontal bone in the orbit. Examples, *Vespertilionidæ*, the genus *Molossus*, its congeners, and *Noctilio*. *Natalus* is remarkable for lacking the outer (lateral) scroll.

In *Molossus*, *Nyctinomus*, and *Noctilio* the vertical plate projects scarcely at all in advance of the median supplemental scrolls, and never appears on the median surface below the level of the scrolls. In *Vespertilionidæ* it forms a conspicuous tapering process. It is seen below the plane of the supplemental scrolls in *Atalapha noveboracensis* and *Vesperus noctivagans*.

(4.) The vertical plate is short and ends abruptly anteriorly. It is visible beneath the supplemental scrolls on the median surface. The outer (lateral) scroll is as long as the vertical, and is united to the vertical orbital plate of the frontal bone. Example, the genus *Taphozous*.

(5.) The vertical plate is produced in advance of the position of the supplemental scrolls, as in the last-named group, but is compressed from side to side as seen from above, and is not revolute. It bears upon its median aspect posteriorly a lobule. The supplementary scrolls in general appearance are much as in the *Vespertilionidæ*. The lateral scroll is cylindroid. Examples, the *Phyllostomidæ*.

In *Desmodus*, the lobule upon the anterior portion of the vertical plate is relatively large.

(6.) The vertical plate is projected far in advance of the supplemental scrolls, which are horizontal in position and four in number. The lateral scroll is more or less adherent to the vertical plate, or by its outer border to the frontal bone. Examples, the *Pteropidæ*.

The *Pteropidæ*, *Nycteridæ*, and some *Phyllostomidæ* have a horizontal septum passing transversely from the under free edge of the vertical plate (as it lies beneath the lowest median supplemental scroll) to the nasal septum. The olfactory surface in such forms is thus withdrawn from the respiratory currents, since no direct outlet exists at the posterior nares.

The above descriptions have been drawn, for the most part, from specimens in the fine collection of the Museum of Comparative Zoölogy, Cambridge, Mass.



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