

·5 inch ; extent of wings, 11·5 inches ; length of head ·7 inch ; of ear, ·7 inch ; of tragus, ·36 inch.

Of the two specimens in the Colonial Museum, one was obtained in the Hutt Valley, near Wellington, and the other in Milford Sound, on the south-west coast of the South Island.

Dr. Gray named this bat *tuberculata*, under the impression that he was describing the *Vespertilio tuberculatus* of Forster ; but it is evident from Forster's description that his bat was the short-eared kind. As, therefore, Dr. Gray's name was given in error, and as confusion is likely to arise if both our bats have the same specific name, I propose to call this species *velutina*, from the velvet like nature of its fur.

ART. XXVI.—*Observations on the New Zealand Bats.*

By F. J. KNOX, L.R.C.S.E.

[Read before the Wellington Philosophical Society, 16th September, 1871].

BATS take a high place among the Mammalia, and are chiefly distinguished from the other orders of this great family, by an extension of the common integuments on the pectoral and pelvic extremities, in or on which hair is not developed. Even in the Bimana the inter-space between the fingers is more or less palmated, and in the aquatic Mammalia, as in the seal, the integumentary envelope extends to the roots of the nails. In the *Cheiroptera*, however, although the human type of the skeleton has been strictly adhered to, the skeleton of the pectoral extremities is so developed by elongation, more especially of the bones of the hand, that the bat can soar in the free expanse of the heavens, and thus look down upon his less-favoured brethren. This, however, must be only taken figuratively, for it is a question whether he regulates his aerial movements by means of sight or touch, the eyes being extremely minute, defying even microscopic inspection, and it is supposed that the sense of touch is rendered exceedingly acute by the extent of the tegumentary tissues with nerves and blood-vessels, and thus supplies the want of sight.

An equally interesting modification may be observed in the construction of the pelvic extremities, and more especially in that of the foot. Had the whole Bat family ceased to exist during any of the sweeping changes which have taken place on the earth's surface, and bats become extinct—in other words fossil—and a footprint, or even the bones of the foot, been discovered in some cave, even a Cuvier would have been greatly puzzled to reconstruct the animal. The foot of the bat resembles the quadrumanous or monkey type. The toes are all of equal length, the first or great toe on a line with the others, all furnished with sharp claws, and consequently not fitted to move on *terra firma*, or

to grasp the branches of trees, although it should be remarked that one of the specimens I have to describe was caught amongst the rigging of Her Majesty's Ship 'Clio' in Milford Sound. The ears in this specimen measured $\cdot 5$ inch from base to tip, the tragus was about half the length, narrow, but admirably formed to protect the meatus from the entrance of any minute insect.

In July, 1843, a similar bat was kindly presented to me, and after examining it with great care, I sent the skeleton, skin, and other parts, to the British Museum. Of this specimen I possess pencil sketches, and a tolerably minute anatomical description. I remark from my Ms. observations—and by making a reference to the pencil sketches—that the tail projected free from the inter-femoral integumentary expansion. A well-defined line ran from the wrist-joint, sweeping round to the elbow, knee, and setting on of the tail, dividing the wing-shaped pectoral extremity, so that on the internal segment hair was developed, whilst on the external segment, the integumentary expansion was perfectly smooth, so that when the fore-arm and hand was completely drawn in or retracted, the tail being free, the animal resembled in every respect, even in that of colour and soft silky hair, a little mouse, and the small short thumb, with its peculiar nail, would rest on the ground. Numerous strong hairs surrounded the upper lip on each side, and formed a very respectable moustache. The stomach was nearly globular, the wall being extremely thin; intestines seven inches in length, with a calibre of three lines, and walls stronger than that of the stomach. No *cæcum*. A small quantity of *débris* of a black inky colour floated in the intestine; liver, human type; spleen, $\cdot 75$ inch long by $\cdot 08$ inch broad; kidneys large, $\cdot 33$ inch long, smooth, indicative of the carnivorous character; the tongue was $0\cdot 75$ inch in length, narrowing from the base to the apex, and crossed by nine ridges of such a nature as to prevent the escape of any insect, however minute.

A short time ago (August, 1871), another specimen of the same bat was kindly put into my hands by Dr. Hector, with a request that I would examine it anatomically. The examination of this specimen has not been so complete, in consequence of its having been immersed in a solution of carbolic acid, which had hardened the whole, but more especially the viscera, into a solid mass, which also rendered it impossible to prepare the skin in an entire state. The skeleton, however, which is now before the Society, has turned out better than I could have anticipated, seeing that it had escaped the destructive clutches of the "stuffer." This mode of exhibiting the skeleton of the bat was adopted by me many years ago, as being the best to display its very remarkable construction, and at the same time obviate the necessity of handling.

The other bat, which is placed by Dr. Gray in the genus *Scotophilus*, appears to be the more common of the two species as yet found in New Zealand. There are now many specimens of this bat in the Museum, varying, however,

considerably in size and even colour; and the skeleton now before the Society will, it is hoped, facilitate the determination of any future species which may be met with. The skeleton having been prepared from a specimen which had been deviscerated for the purpose of stuffing, prevented my examination of the viscera or ascertaining the sex. The tongue has, however, escaped, and presents a marked distinctive character from that of the *Mystacina*, being shorter, broader, and almost free from the above-mentioned transverse ridges.

Upon referring to the measurements annexed to this paper, the chief differences between the skeletons of the two New Zealand bats, although not very striking, clearly determine a generic distinction. It is interesting to remark that, although the number of vertebræ in all the regions of the spinal column are the same, the proportional length of the tail is peculiar, the excess in the length of that of *Scotophilus* being made up by the elongation of the bodies of the vertebræ composing it. Again, in the dentition, the total number of the teeth is the same, although the formula shows a well-marked generic distinction.

The number of vertebræ in both is:—7 cervical, 12 dorsal, 5 lumbar, and 8 coccygeal. There are also 12 ribs in both.

The dentition presents a marked difference, there being in *Mystacina*:—

$$\frac{2}{2} \text{ incisors ; } \frac{2}{2} \text{ canines ; } \frac{10}{10} \text{ maxillary ;}$$

And in *Scotophilus*:—

$$\frac{2}{6} \text{ incisors ; } \frac{2}{2} \text{ canines ; } \frac{8}{8} \text{ maxillary.}$$

GENERAL DIMENSIONS COMPARED.

	<i>Mystacina.</i>	<i>Scotophilus.</i>
Total length	2·8	3·5
Expanse of wing	12·0	10·8
Pectoral extremity—		
Arm	·9	·9
Fore-arm	1·6	1·5
Hand	3·1	2·6
Pelvic extremity—		
Thigh	·6	·5
Leg	·6	·6
Foot	·6	·4