SCIENTIFIC RESULTS FROM THE MAMMAL SURVEY.

No. X.

A.—The Indian Bats assigned to the genus *Myotis*.

BY

Oldfield Thomas.

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In connection with the naming of certain bats obtained during the Bombay Survey by Messrs. Shortridge in Tenasserim, Crump in N. India and Mayor in Ceylon, I have re-examined all the members of the *Myotis* group, and made some preliminary notes on their characters and nomenclature; and these I now venture to publish, imperfect as they are. Practically nothing had been done in this direction since Dobson's Catalogue of 1878, as the publications of Anderson and Blanford were so entirely based on that as hardly to represent any material advance in knowledge.

To begin with I would suggest that as a matter of convenience, the sub-genus *Leuconoe*, containing the large-footed members of the group, should be recognised as a full genus, thus dividing one of the largest and most difficult genera of Bats. Not only is there a difference in the size of the foot, but there are even differences in habits between the groups, while the skull of *Leuconoe* has a more or less characteristic shape, which shows that the group is a natural one, difficult as it is to define. The best account of it is that in Mr. Miller's synopsis‡ of the European species of *Myotis*, where the characters of the three species of *Leuconoe*, *dasycneme*, *capaccinii*, and *daubentoni* are placed in contrast with those of the ordinary members of *Myotis*.

I.—Myotis proper.

Myotis myotis group.

Of this group of large grey species, the Indian representative is *M. blythii*, Tomes, of which the Museum contains the type (skin and skull) from Nusserabad (Boys), the type of *Vespertilio africanus*, Dobs. from unknown locality, and a male in spirit from Simla recently presented by Mr. P. T. L. Dodsworth.* It is probable that *M. dobsoni*, Trouess. (*V. murinoides*, Dobs.,) is also a synonym of *M. blythii*.

Myotis formosus group.

Examples of the handsome *M. formosus* are in the Museum from Nepal (Hodgson) (type); Mussoorie (Hutton); Dharmsala

‡ Cat. Mamm. W. Europe, p. 168, 1912.

* See Journ., Bombay N. H. Soc., 1914, p. 740.

(Bombay N. H. Soc.) and Lake Palti, Tibet. Also from Formosa (Swinhoe). *M. rufo-niger*, Tomes, from the Yang-tze is still more richly coloured, smaller, with smaller teeth and a differently shaped skull.

A species which appears to be allied to *M. formosus*, though without the characteristic coloration, is the following :—

Myotis sicarius, sp. n.

General size as in *M. formosus*, but the wing-bones longer. Ears about as in *formosus*, much smaller than in *blythii* or *dobsoni*, inner margin convex below, nearly straight above ; tip narrowly rounded off; outer margin slightly concave above, convex below, with a narrow basal lobe. Tragus rather short, its inner margin straight, outer margin slightly convex, the broadest part near the base of the inner margin ; basal lobule large rounded. Wings from the metatarsus near the base of the toes. Calcar reaching about half-way towards the tail-tip ; a narrow post-calcarial lobule present.

Colour dark-brown above and below, the extreme tips of the belly hairs whitish. Wing-membranes uniformly translucent brown.

Teeth exactly as in *M. formosus*, the small middle premolar similarly crowded inwards above and in the tooth-row, though crushed below. In *M. blythii* the small premolars are uncrowded both above and below. In *M. dobsoni* the " first upper premolar is very small, scarcely visible from without, and not much larger than the second," a condition which does not occur in any *Myotis* I have seen, and possibly abnormal.

Dimensions of the type (not quite fully adult) :—

Forearm 53 mm.

Tail 46 ; ear on inner margin 13·5 ; tragus on inner margin 5·3; third finger, metacarpus 46·5, first phalanx 12·5 ; tibia 21 ; hind foot 10·2.

Skull, front of canine to back of m^3 6·7 ; front of p^4 to back of m^2 4·6.

Hab.—Northern Sikim.

Type.—Immature skin in spirit, B. M. No. 91. 10. 7. 56, collected by L. Mandelli. Presented by W. T. Blanford.

The specimen on which this species is founded was in Mr. Blanford's collection, but was never definitely determined by him. At one time it was supposed to be *M. dobsoni*, but is distinguished from that animal (which probably equals *M. blythii*) by its much shorter ears and feet, and such other characters as distinguish it from the *M. myotis* group, to which *M. dobsoni* was said to belong. From *M. formosus* it is at once separated by the absence of the " dead-leaf " pattern.

Myotis peytoni, Wrought.

A very distinct species, characterised by its considerable size (forearm 45-46 mm., skull length 17-18) and the crushing in of its middle premolars, both above and below. It shows no approximation to *Leuconoe* either in foot or skull.

Myotis muricola, Gray.

Not so common a bat as has been supposed, three out of the four synonyms assigned to it by Blanford being really referable to the *mystacinus* group. *V.* (*Pternopterus*) *lobipes*, Peters, from Arakan is alone correctly placed under *muricola*.

The skull is broader and more solidly built than in the *mystacinus* group, and the teeth, especially the canines, are heavier, and the posterior of the two small premolars is more crowded inwards. There is a narrow post-calcarial lobule.

Bats referable to *muricola* occur from Kashmir through the Himalayas and down further India to Borneo and Java.

Myotis amboinensis, Peters's "*Vespertilio adversus* var. *amboinensis*"† not mentioned in Dobson's Catalogue, is a larger ally of *M. muricola* found in Celebes, Buru, Amboina and Ceram.

Myotis mystacinus group.

To this group are referable quite a number of the names which have been applied to the smaller Indian members of *Myotis*. Thus *siligorensis*, Tomes, *darjelingensis*, Tomes, *caliginosus*, Tomes, *blanfordi*, Dobs., *nipalensis*, Dobs., and *moupinensis*, M. Edw., all seem to be assignable to this group.

How many Indian species there are in it I am not at present able to determine, but all may be distinguished from the European *mystacinus* by the deeper and more sharply defined notch on the outside of the ear. There appear to be at least two distinguishable forms, one with low brain case and the canines of normal size, about as in *mystacinus*, and the other with a high crown and the canines much reduced, especially below. For the first the earliest name is *caliginosus* (syn. *blanfordi* and perhaps *nipalensis*), and for the second *siligorensis* (syn. *darjelingensis*), both represented by their types in the British Museum.

Bats of this group have as yet only been found along the mountainous regions of N. India, not in the South, nor in Ceylon.

II.—Leuconoe.

The genus *Leuconoe* is richer in Indian species than has been supposed, and I find that five different forms may be recognised. Blanford includes four species, but one of these is the European

† MB. Ak. Berl., 1866, p. 400.

M. daubentoni, whose occurrence in India is extremely doubtful, and he gives separate headings to *L. longipes* and *L. megalopus*, which I believe to be identical.

On comparing a co-type of the first of these with the actual type of the second (B. M. Nos. 76. 3. 10. 4 and 73. 4. 16. 1), I find that they are similar in all respects and should undoubtedly be united. The name should be *L. longipes*, Dobs., as I agree with Blanford that Blyth's *Myotis theobaldi* must be set aside as indeterminable.

The types of the latter are lost, and the measurement of the foot, "$\frac{7}{16}$ in." does not agree with that in *L. longipes*, nor, without knowledge of how it was taken, or with what exactitude, can it be fitted to any other species.

The Indian species of *Leuconoe* may be distinguished by their skulls as follows :—

A.	Skull length 16 mm. or more. Breadth of brain case over 8 mm.	
a.	Middle premolar crushed inwards, less than one-third the size of p^1. Ceylon, Java.	*L. hasselti.*
b.	Middle premolar not or little crushed inwards, at least two-thirds the size of p^1.	
a^2.	Larger, brain case less swollen, $p.^3$ about two-thirds the area of $p.^1$ Bombay.	*L. peshwa.*
b^2.	Smaller, brain case more swollen. p^3 nearly equal to p^1. Tibet, Formosa.	*L. taiwanensis.*
B.	Skull length 15 mm. Breadth of brain case 7·4 mm. Andamans.	*L. dryas.*
C.	Skull length 14 mm. Breadth of brain case 7 mm. Kashmir.	*L. longipes.*

Leuconoe hasselti, Temm.

Six skins from Kokopeetchie, Eastern Province, and A' Pura, Northern Central Province, Ceylon, obtained for the Survey by Major Mayor are indistinguishable from authentic Javan specimens of *L. hasselti* in the British Meseum.

There is also in the Museum an immature spirit specimen obtained in Ceylon by Dr. Ontdaatje in 1888.

Leuconoe peshwa, sp. n.

A medium sized dark coloured species allied to *L. horsfieldi*. Size rather larger than in *horsfieldi*. Fur fine and velvety; hairs on shoulders rather less than 7 mm. in length; on hind back

4 mm. Colour above dark sepia brown, darker than in Ridgway; extreme tips of dorsal hairs white, giving an inconspicuous hoary powdered effect. Undersurface pale brown, becoming greyer on belly and greyish-white in inguinal region. Ears rather short, not quite reaching the tip of the nose when laid forward; their inner margin evenly convex, outer slightly concave above, convex below, with a small outer basal lobe. Tragus not long, its inner margin straight, its tip rounded, outer margin convex, with well marked outer basal lobule. Wings to the side of the metatarsus about halfway between ankle and base of the toes. Length of foot going about once-and-a-half in that of the tibia. Calcar fairly long with well-defined tip, practically no postcalcarial lobe.

Skull very similar to that of *L. horsfieldi*, but larger throughout, and the brain case more inflated in the frontal region. Middle upper premolar about two-thirds the size in cross-section of the anterior one, slightly drawn inwards, but not completely invisible from the outside. Below, the corresponding tooth is three-fourths the size of p^1, and stands quite in the tooth-row.

Dimensions of the type:—

Forearm 40 mm.

Skull, greatest length, 16·2; condyle to front of canine, 14·1; basi-sinual length 11·6; front of canine to back of m^3, 5·9; front of p^4 to back of m^3 3·5.

A spirit specimen measures:—

Forearm 40 mm.

Head and body 55; tail 37; ear (inner margin) 13; tragus on inner margin 5·5; tibia 16; hind foot 10·5, calcar 14·6.

Hab.—Poona, Bombay. Alt. 2,000′.

Type—An adult female; skin, B. M. No. 0. 9. 16. 1. Original Number 181. Collected 17th August 1900 by R. C. Wroughton. Another female in spirit.

This species is representative of and closely allied to the Javan *horsfieldi*, Temm., but is browner, more heavily built, with thicker limbs and larger skull. I have been able to compare it with the very fine series of *horsfieldi*, obtained at Tasikmalaja, Java, by Mr. Shortridge during the Balston Expedition. Bornean specimens which may be considered as representing *L. carimatæ*, Miller, have the skull more like that of *L. peshwa*, but have markedly shorter fur.

Leuconoe taiwanensis, Arnb. Chr. L.

A specimen recently obtained from Lake Palti, Tibet, proves quite similar to two co-types of the above *Leuconoe* from Formosa.

Lake Palti is comparatively so near the Indian frontier that I think it advisable to include the species in these notes.

Leuconoe dryas, K. And.

Myotis dryas, K. Anderson, Ann. Mus. Genov. (3) III., p. 37-1907. Andaman Island.

Leuconoe longipes, Dobs.

Syn. *Vesputilio megalopus*, Dobs. (see above).

Besides the characters detailed by Dobson and Blanford, *L. longipes* is at once distinguishable from its allies by the small size of the skull, only 14 mm. in length and 7 mm. across the brain case.

B.—Some Notes on the Viverrine Genus *Hemigalus*.

by Oldfield Thomas.

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Among the specimens obtained for the Survey by Mr. Shortridge in the extreme south of Tenasserim are two adult examples of the handsome banded Viverrine on which the genus *Hemigalus* (commonly misquoted as *Hemigale*) was founded, thus adding to the Fauna of British India a genus not hitherto known to occur there. Elsewhere *Hemigalus* ranges over the Malay Peninsula, Sumatra (including the Pagi Islands) and Borneo, but does not extend into Java.

On looking into the question of the proper technical name of the animal I find that it has almost always been known by the wrong specific name, in addition to the erroneous use of *Hemigale* for *Hemigalus*.

From the synonymy which follows it will be seen that the commonly used name *hardwickii* was invalid from the first, having been previously used for another animal, that the next author who wrote about it—Jourdan—used no Latin specific names, though he gave the genus name *Hemigalus*, and that therefore Gray's name of *derbianus* is the first available, and should accordingly be used.

Hemigalus derbianus, Gray.

Viverra hardwickii, Gray, Spic. Zool., pt. II., p. 9., 1830 (Malacca) *nec Viverra hardwickii* (misprinted *hardwichii*), Less. Man. Mamm., p. 172, 1827.

Hémigale zébré, Jourd., C. R. *v.*, p. 442, Sept. 1837 (no Latin specific name).

*Pardoxurus derbyanus**, Gray, Charlw. M. N. H., I., p. 599, Nov. 1837 (no locality).

Paradoxurus (?) *zebra*, Gray, l. c., Nov. 1837 (based on Jourdan's specimen)

Paradoxurus derbianus, Gray, P.Z.S., 1837, p. 67 (pub. Jan. 22, 1838—see P.Z.S., 1893, p. 437). (Malay Peninsula.)

Viverra boiei, Müll., Tijdschr. Nat. Ges., *v.*, p. 144, 1838. (S. E. Borneo.)