

# TAXONOMIC STUDIES ON SOME INDIAN CHIROPTERA.

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## 1. INTRODUCTION.

The present report is based on a number of small collections of spirit preserved bats in the possession of the Zoological Survey of India. The specimens have been collected from all over India and the adjoining countries in various seasons. Important variations and detailed measurements of body parts and skulls of twenty forms in all are presented in this paper. Geographical distributions of some of the forms, namely, *Taphozous melanopogon* Temminck, *Scoteinus pallidus* (Dobson), *Myotis caliginosus* (Tomes), *Pipistrellus mimus glaucillus* Wroughton, and *Kerivoula crypta* Wroughton, have been elucidated. Some light has also been thrown on the breeding seasons of *Cynopterus sphinx gangeticus* Andersen and *Megaderma lyra lyra* Geoffroy. The principal works followed during the study are Miller (1907), Andersen (1912), Wroughton (1918), Chasen (1940), and Simpson (1945).

Care has been taken to take measurements of only those body parts which could suffer but a negligible contraction due to the action of the preservative. The following abbreviations have been used in the measurements.—

### BODY.

*d2(mt)*, metacarpal of second digit ; *d2(ph1)*, first phalanx of second digit ; *d2(ph2)*, second phalanx of second digit ; *d3(mt)*, metacarpal of third digit ; *d3(ph1)*, first phalanx of third digit ; *d4(mt)*, metacarpal of fourth digit ; *d4(ph1)*, first phalanx of fourth digit ; *d5(mt)*, metacarpal of fifth digit ; *d5(ph1)*, first phalanx of fifth digit ; *f*, forearm ; *ft*, foot ; *p*, pollex ; *p(mt)*, metacarpal of pollex ; *p(ph1)*, first phalanx of pollex ; *t*, tibia.

### SKULL.

*c1-c1*, the shortest distance between the outer surfaces of the roots of the upper canines ; *cb*, condylobasal length, measured from the hindmost point of the occipital condyle of one side to the anteriormost point of the premaxilla\* of that side ; *c1-m1*, maximum length between the anterior surface of the root of the upper canine and the posterior surface of the root of the first upper molar of that side ; *c1-m3*, similar distance between the upper canine and the upper third molar ; *c1-m3*, similar distance between the lower canine and the third lower molar ; *cr*, coronoid height, measured from the highest point of the mandibular condyle to the lowermost point on the under surface of the mandibular ramus of that side ; *cw*, cranial width, the maximum width of the cranium measured just above the squamosal roots of the zygomatic arches ; *iw*, the least interorbital width, measured between the inner borders of the orbits at right angles to the axis of the skull ; *l*, maximum length of the skull, measured from the hindmost point of the occipital surface in the middle line to the anteriormost point of the premaxillary symphysis or of the maxilla if the premaxillae are absent ; *mdo*, median depth of the occiput, measured from the highest point on the upper surface of the occiput to the lowermost point on the lower border of the foramen magnum ; *ml*, mandibular length

\* Maxilla is substituted where premaxilla is absent.

the distance between the hindermost point of the mandibular condyle to the anterior-most point on the symphysis of the two rami ; *m1-m1*, the distance between the outer surfaces of the last upper molars ; *m3-m3*, the distance between the outer surfaces of the third upper molars ; *on*, occipitonasal length, measured from the hindermost point of the occiput to the anteriormost point on the nasals ; *pl*, palatal length, measured from the posterior border of the root of the upper incisors to the hindermost point of the palate ; *pml*, postmolar length, measured from the posterior surface of the last molar to the posterior surface of the condyle of that side ; *zw*, the greatest zygomatic width, the greatest distance between the outer surfaces of the zygomatic arches at right angles to the axis of the skull.

All the measurements are in millimeters and represent the shortest distances between the two points defined.

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## 2. SYSTEMATIC ACCOUNT.

### Suborder *MEGACHIROPTERA*

#### Family PTEROPODIDAE

#### Subfamily PTEROPODINAE

#### *Cynopterus sphinx gangeticus* Andersen.

1910. *Cynopterus sphinx gangeticus* Anderson, *Ann. Mag. Nat. Hist.* (8)VI, p. 623 (Lucknow).

6♂, 10♀, and 1 sub-ad. ♀.—Uttar Pradesh (United Provinces) : Lucknow (18-21 March, 1945), Banaras (4 June 1948). 1♂ and 1♀—Madhya Pradesh (Central Provinces) : Nagpur (1949).

#### Measurements.\*

Abbreviations of measurements.	Males.		Females.	
	Lucknow.	Nagpur.	Lucknow.	Nagpur.
<b>Body.</b>				
. 72.7-77.3(75.3) .	.	77.0	70.2-77.3(73.6)	70.7
<i>p(mt)</i> 9.9-11.4(10.4) .	.	13.5	9.1-12.2(10.2)	10.3
<i>p(ph1)</i> . 14.3-18.5(17.0)	.	15.7	14.7-18.3(17.2)	15.7
<i>d2(mt)</i> . 32.6-36.6(34.6)	.	35.5	29.1-35.6(33.3)	30.7
<i>d2(ph1)</i> . 8.5-10.3(9.4)	.	9.5	8.4-10.1(9.4)	8.7
<i>d2(ph1)</i> . 6.2-7.7(6.9)	.	6.9	5.2-7.6(6.7)	5.6
<i>d2(mt)</i> . 48.0-52.2(49.5)	.	49.5	44.4-52.1(48.7)	46.0
<i>d3(ph1)</i> 29.7-33.7(32.0) .	.	32.1	28.3-33.9(31.9)	30.5
<i>d4(mt)</i> . 46.2-48.5(47.9)	.	46.2	41.0-50.2(46.1)	42.5

\*Only the adult specimens are measured. Figures in parentheses indicate mean values.

*Measurements\*—contd.*

Abbreviations of measurements.	Males.		Females.	
	Lucknow.	Nagpur.	Lucknow.	Nagpur.
<b>Body—contd.</b>				
<i>d4(ph1)</i>	21.5-26.0(23.8) . . .	26.0	22.1-30.4(25.1)	23.2
<i>d5(mt)</i>	. 46.9-50.0(48.4) . . .	48.2	43.3-50.7(49.2)	44.3
<i>d5(ph1)</i>	21.0-24.4(23.1) . . .	23.1	21.8-24.5(22.8)	21.2
<i>ft</i>	. . 15.1-17.7(16.2)	. . .	13.7-18.4(16.8)	13.6
<i>t</i>	. 27.4-32.2(28.6) . . .	28.4	26.7-31.6(29.4)	27.6
<b>Skull</b>	. (Lucknow specimens only).			
<i>l</i>	32.6-34.7(33.6) (4 specimens)	. . .	31.2-34.7(33.4)	
<i>eb</i>	. 31.7-33.9(33.2) (4 specimens)	. . .	30.3-33.2(31.9) (9 specimens).	
<i>on</i>	33.1-33.9(33.2) (3 specimens)	. . .	30.1-34.0(32.7)	
<i>zw</i>	. 20.8-22.4(21.6) (4 specimens)	. . .	20.8-22.6(21.7)	
<i>iw</i>	6.0-6.6(6.3) (5 specimens)	. . .	5.8-6.7(6.3)	
<i>cw</i>	. 14.0-14.6(14.3) . . .	. . .	13.1-14.6(14.3)	
<i>mdo</i>	7.8-8.2(8.0) . . .	. . .	6.9-8.4(7.6) (7 specimens).	
<i>pml</i>	. 19.3-20.6(20.0) (4 specimens)	. . .	18.7-20.0(19.5) (9 specimens).	
<i>pl</i>	. 17.2-18.6(17.9) (5 specimens)	. . .	17.3-18.7(18.0) (7 specimens).	
<i>c1-m1</i>	11.1-11.7(11.4) . . .	. . .	10.2-12.0(11.3)	
<i>c<sub>1</sub>-m<sub>2</sub></i>	. 11.8-13.7(13.0) . . .	. . .	10.7-13.8(13.0)	
<i>m1-m1</i>	. 10.0-10.7(10.3) . . .	. . .	9.4-10.7(10.2)	
<i>c1-c1</i>	. 6.9-7.7(7.3) . . .	. . .	6.7-8.2(7.4)	
<i>ml</i>	. 25.3-26.7(26.0) . . .	. . .	23.7-26.7(25.7)	
<i>cr</i>	. 14.4-13.6(12.9) . . .	. . .	11.7-13.7(12.3) (8 specimens).	

The general pattern agrees with that given by Andersen (1912). The ventral side is paler than the back and the throat still paler. All the females have fully developed young ones in their uteri, indicating that the end of March or beginning of April is the time when young ones are brought forth. The male from Nagpur is very peculiar inasmuch as the tail is about 2.5 mm. This reduction does not seem to be due to any injury. An attempt was made to obtain more specimens from Nagpur, but none could be obtained with the tail reduced to such an extent. I would, therefore, consider the specimen only as an abnormal individual of the race.

Kemp (1924) recorded the sub-species from Garo Hills, Assam. His specimens were identified by Mr. Robinson of the Federated Malaya States Museums, Singapore. According to the findings of the Mammal

\*Only the adult specimens are measured. Figures in parentheses indicate mean values.

Survey, however, Assam falls within the range of distribution of the nominate race. As shown by measurements, there is no sexual dimorphism in size.

**Cyopterus sphinx sphinx** (Vahl).

1797. *Vespertilio sphinx* Vahl, *Skr. Nat. Selsk.*, IV, p. 123 (Madras).

1♂.—Bengal: Calcutta (16-12-1939). 1 sub-ad. ♂.—Madras: Bimlipatam, Dist. Vizagapatam (18-9-1947).

*Measurements*.—Specimen from Calcutta.—*Body*: *f*, 71.7; *p(mt)*, 8.6; *p(ph1)*, 14.7; *d2(mt)*, 30.4; *d2(ph1)*, 8.7; *d2(ph2)*, 4.8; *d3(mt)*, 41.7; *d3(ph1)*, 25.7; *d4(mt)*, 38.6; *d4(ph1)*, 20.4; *d5(mt)*; 39.2; *d5(ph1)*, 18.7; *t*, 27.6.

*Skull*: *l*, 33.2; *cb*, 31.7; *on*, 32.3; *zw*, 21.1; *iw*, 6.7; *cw*, 13.8; *mdo*, 8.0; *pml*, 19.6; *pl*, 17.7; *c1-m1*, 10.8; *c1-m2*, 12.5; *m1-m1*, 10.4; *c1-c1*, 7.3; *ml*, 24.5.

The male from Calcutta is darker with underside slightly paler here and there. Its rump is paler than the fore-back. The bones of its arms and digits are in highly pathological condition showing numerous swellings and constrictions.

**Pteropus giganteus giganteus** (Brünnich).

1782. *Vespertilio giganteus* Brünnich, *Drynes Historie*, I, pp. 45 and 59 (Bengal).

One unsexed adult skin from Goa.

Suborder **MICROCHIROPTERA**

Family RHINOPOMATIDAE

**Rhinopoma hardwickei** Gray.

1831. *Rhinopoma hardwickei* Gray, *Zool. Misc.*, p. 37 ("India").

2♂.—Uttar Pradesh (United Provinces): Bainti, Pratabgarh (June, 1949).

*Measurements*.—*Body*: *f*, 59.2—62.6; *p(mt)*, 5.0-5.9; *p(ph1)*, 5.2-6.7; *d2(mt)*, 42.1-44.3; *d2(ph1)*, 4.2-5.0; *d3(mt)*, 43.1-46.9; *d3(ph1)*, 8.4-9.2; *d4(mt)*, 35.8-40.0; *d4(ph1)*, 11.7-12.0; *d5(mt)*, 42.1-45.7; *d5(ph1)*, 9.7-9.9; *t*, 28.5-29.4.

*Skull*: *l*, 18.7-19.2; *cb*, 17.5-18.0; *on*, 16.4-16.7; *zw*, 11.5; *iw*, 3.0-3.1; *cw*, 8.2-9.0; *mdo*, 6.2; *pml*, 10.5-10.7; *c1-m3*, 6.4-6.7; *c1-m3*, 7.3-7.5; *m3-m3*, 8.6-8.9; *c1-c1*, 4.7-5.1; *ml*, 13.0.

Jerdon (1867, p. 31) gave the length of tibia as  $1\frac{1}{2}$  inches (=37.5 mm.) which appears to be abnormal for the species.

**Rhinopoma kinneari** Wroughton.

1912. *Rhinopoma kinneari* Wroughton, *J. Bombay Nat. Hist. Soc.*, XXI, p. 767 (Bhuj, Kuchh).

1♂.—Madhya Pradesh (Central Provinces): Nagpur (August, 1949).

*Measurements*.—*Body*: *f*, 71.5; *p(mt)*, 5.5; *p(ph1)*, 7.4; *d2(mt)*, 51.6; *d2(ph1)*, 5.5; *d3(mt)*, 51.2; *d3(ph1)*, 11.5; *d4(mt)*, 43.2; *d4(ph1)*, 16.2; *d5(mt)*, 50.2; *d5(ph1)*, 11.3; *t*, 27.8.

*Skull*: *l*, 21.3; *cb*, 20.4; *on*, 18.5; *zw*, 12.5; *iw*, 2.6; *cw*, 9.2; *mdo*, 6.7; *pml*, 11.9; *c1-m3*, 8.5; *m3-m3*, 9.5; *c1-c1*, 5.5; *ml*, 15.2.

There is a large deposit of fat at the posterior hairless part of the body. Such accumulations of fat are also present in specimens from Agra and Kuchh in the collection of Zoological Survey of India. This character does not seem to have been recorded as occurring in this species.

## Family EMABALLONURIDAE

***Taphozous longimanus* Hardwicke.**

1824. *Taphozous longimanus* Hardwicke, *Trans. Linn. Soc.*, XIV, p. 525 (Calcutta).

2♂.—Madhya Pradesh (Central Provinces) : Nagpur (1949).

*Measurements*.—*Body* : *f*, 58.7-61.6 ; *p(mt)*, 6.2-6.3 ; *p(ph1)*, 4.2-4.7 ; *d2(mt)*, 56.6-56.8 ; *d3(mt)*, 58.6-59.8 ; *d3(ph1)*, 21.6-22.2 ; *d4(mt)*, 46.2-48.1 ; *d4(ph1)*, 12.4-12.0 ; *ft*, 10.3-11.0 ; *t*, 23.8-23.9.

*Skull* : *l*, 18.2-19.3 ; *cb*, 18.5-18.7 ; *on*, 17.6-18.4 ; *zw*, 12.3 ; *iw*, 4.8-5.2 ; *cw*, 9.7 ; *mlo* 6.7-7.3 ; *pml*, 11.4 ; *pl*, 7.6-7.7 ; *c1-m3*, 8.4-8.5 ; *c1-m3*, 9.6-9.7 ; *m3-m3*, 8.7-8.8 ; *c1-c1* 4.2-4.3 ; *ml*, 16.0-16.2.

In one of the specimens there is a large blind tubular structure with thickened border on the throat.

***Taphozous melanopogon* Temminck.**

1841. *Taphozous melanopogon* Temminck, *Mon. Mammal.*, II, p. 287 (Java).

4♀.—Andaman Islands (4-11-1931).

*Measurements*.—*Body* : *f*, 59.5-64.7(62.2) ; *p* (*mt*), 4.5-5.7(5.3) ; *p(ph1)*, 4.1—4.7(4.4) ; *d2(mt)*, 53.3-57.9(55.6) ; *d3(mt)*, 54.4-57.7(56.1) ; *d3(ph1)*, 2 specimens, 19.4-21.0 ; *d4(mt)* 43.4-46.8(45.9) ; *d4(ph1)*, 12.2-13.5(12.4) ; *d5(mt)*, 34.2-35.5(35.0) ; *ft*, 2 specimens, 9.6-10.7 ; *t*, 22.5-23.1(22.5).

*Skull* : *l*, 19.6-19.7(19.6) ; *cb*, 18.5-19.2(18.8) ; *on*, 18.2-18.3 (18.2) ; *zw*, 12.0-12.5(12.2) ; *iw*, 5.2-5.3(5.2) ; *cw*, 9.6-10.2(9.9) ; *mlo*, 6.9-7.1(7.0) ; *pml*, 11.2-11.5(11.4) ; *pl*, 7.3-7.7(7.5) ; *c1-m3*, 8.2-8.6(8.5) ; *c1-m3*, 9.6-9.8(9.7) ; *m3-m3*, 8.6-8.8(8.7) ; *c1-c1*, 4.0-4.4(4.2) ; *ml*, 15.6-16.1(15.9).

So far as I know, the species has not heretofore been reported from the Andaman Islands.

***Taphozous kachhensis kachhensis*\* Dobson.**

1872. *Taphozous kachhensis* Dobson, *J. Asiat. Soc.*, p. 221 (Kachh).

1♂.—Bengal : Calcutta (21-4-1939).

*Measurements*.—*Body* : *f*, 72.7 ; *p(ph1)*, 5.7 ; *d2(mt)*, 61.7 ; *d3(mt)*, 66.8 ; *d3(ph1)*, 26.7 ; *d4(mt)*, 53.3 ; *d4(ph1)*, 16.7 ; *d4(ph2)*, 8.3 ; *d5(mt)*, 46.8 ; *d5(ph1)*, 14.2 ; *d5(ph2)*, 8.2 ; *ft*, 13.7 ; *t*, 30.3.

*Skull* : *l*, 25.2 ; *cb*, 23.6 ; *zw*, 15.5 ; *iw*, 5.3 ; *cw*, 12.5 ; *mlo*, 7.7 ; *pml*, 14.0 ; *c1-m3*, 14.0 ; *c1-m3*, 12.5 ; *m3-m3*, 10.7 ; *c1-c1*, 5.7 ; *ml*, 20.1.

There is no accumulation of fat at the root of the tail in this specimen. This is evidently due to its collection in the beginning of summer. Certain differences from the Type Specimen, which is present in the collection of the Zoological Survey, have been noted. In the skull the occipital crest is markedly blunt and the sagittal and the occipital ridges are not developed. The size is larger and the gular pouch deeper. Due to the lack of sufficient material, however, no more useful remarks on the identity of the specimen can be given.

## Family MEGADERMATIDAE

***Megaderma lyra lyra* Geoffroy.**

1810. *Megaderma lyra* Geoffroy, *Ann. Mus., Hist. Nat.*, XV, p. 190 (East coast of Madras).

\*Thomas (1922, p. 266) separated this species, along with the allied forms, to a distinct genus *Liponycteris*, but I agree with Tate (1941) that the groups can better be considered as a sub-genus.

5♂ and 4♀.—Uttar Pradesh (United Provinces) : Lucknow (21-3-1945).

*Measurements.*

Abbreviations of measurements.	Males.	Females.
<b>Body.</b>		
<i>f</i> . . .	63.9-69.7(65.3)	66.2-68.3(67.2)
<i>p(mt)</i>	7.7-9.2(8.2)	8.7-9.7(9.2)
<i>p(ph1)</i> .	6.8-7.7(7.2)	6.7-9.2(8.0)
<i>d2(mt)</i> . .	51.2-60.3(55.2)	56.6-58.7(58.0)
<i>d2(ph1)</i> .	5.0-6.9(6.3)	6.8-7.7(7.4)
<i>d3(mt)</i>	44.8-50.4(46.8)	48.8-49.5(48.9)
<i>d3(ph1)</i>	25.7-28.6(26.9)	28.1-29.6(28.5)
<i>d4(mt)</i> . .	50.0-56.7(52.2)	53.5-56.3(55.2)
<i>d4(ph1)</i> .	15.3-16.5(15.8)	15.7-16.8(16.4)
<i>d5(mt)</i> . . .	55.7-61.6(58.5)	58.3-60.9(59.6)
<i>d5(ph1)</i>	17.3-20.5(18.3)	18.3-19.6(19.1)
<i>ft</i> . . .	13.5-15.3(14.3)	14.6-16.6(15.4)
. . .	30.4-33.9(32.2)	32.9-34.2(33.7)
<b>Skull.</b>		
<i>l</i> . . .	26.6-27.8(27.3)	27.3-28.0(27.7)
<i>cb</i> . . .	24.0-25.0(24.5)	25.1-26.1(25.5)
<i>on</i> . . .	21.5-22.9(22.2)	22.2-22.7(22.5)
<i>zw</i> . . .	16.1-16.8(16.4)	16.3-16.5(2 specimens).
<i>iw</i> . . .	4.6-5.0(4.8)	4.7-5.0(4.9)
<i>cw</i> . . .	12.0-12.6(12.3)	12.2-12.7(12.5)
<i>mdo</i> . . .	7.0-7.8(7.4)	6.9-7.4(7.1)
<i>pml</i> . . .	13.7-14.4(13.9)	14.0-14.6(14.3)
<i>pl</i> . . .	10.0-10.6(10.3)	10.2-10.9(10.6)
<i>c1-m3</i> . . .	10.2-11.0(10.5)	10.1-11.2(10.5)
<i>c1-m3</i>	11.7-12.3(12.1)	11.7-12.2(12.0)
<i>m3-m3</i>	9.6-10.1(9.4)	9.4-10.9(10.1)
<i>c1.c1</i> . . .	5.5-5.9(5.7)	5.5-6.2(5.8)
<i>ml</i>	19.1-20.4(19.6)	19.4-20.5(19.5)

The characters of the specimens closely agree with those given by Dobson (1876) and Blanford (1891). In one of the specimens, the wing membrane originates from a point just behind the third toe and not from the first or from the space between the first and the second. The fur surrounding the bases of the ears is white and is distinctly contrasted with that on the rest of the body. On the posterior surfaces of the pinnae it extends upward for some distance. The white fur is also scattered here and there on the other parts of the pinnae, especially on the sides of the angle formed by the union of the two pinnae.

Each female has a single foetus in the uterus. This is in conformity with the observations of Hodgson (quoted by Blandford, 1891), except that the specimens examined by him were collected at the end of February. He also observed that the males greatly exceed females in number. However, out of the nine specimens examined by me, five were males. As shown by the measurements, the females appear to be slightly larger than the males.

#### Family HIPPOSIDERIDAE

#### *Hipposideros fulvus* Gray.

1838. *Hipposideros fulvus* Gray, *Mag. Zool. Bot.*, II, p. 492 (Dharwar).

1♂.—Uttar Pradesh (United Provinces) : Banaras (12-3-1945). 1♂—Bombay : Panchgani, Satara (4,000'—5,000').

#### Measurements.

Abbreviations of measurements.	Banaras.	Bombay.
<b>Body.</b>		
<i>f</i>	38.6	39.2
<i>p(mt)</i>	5.9	6.0
<i>d2(mt)</i>	31.1	32.0
<i>d3(mt)</i>	28.4	28.1
<i>d3(ph1)</i>	18.1	18.4
<i>d4(mt)</i>	29.3	29.6
<i>d4(ph1)</i>	11.1	11.6
<i>d5(mt)</i>	30.0	30.0
<i>d5(ph1)</i>	11.6	12.6
<i>t</i>	17.8	18.1
<i>ft</i>	6.2	6.8

## Measurements—contd.

Abbreviation of measurements.	Banaras.	Bombay.
<b>Skull.</b>		
<i>l</i>	16.3	16.0
<i>cb</i>	14.2	14.2
<i>on</i>	14.9	14.9
<i>zw</i>	8.6	8.6
<i>iw</i>	2.6	2.3
<i>ow</i>	7.6	8.0
<i>mdo</i>	4.3	4.6
<i>pml</i>	8.7	8.8
<i>pl</i>	2.7	2.7
<i>el-m3</i>	5.4	5.4
<i>e<sub>1</sub>-m<sub>3</sub></i>	6.2	6.3
<i>m3-m3</i>	6.2	6.2
<i>c1-c1</i>	3.6	3.2
<i>ml</i>	10.7	10.7

## Family VESPERTILIONIDAE

## Subfamily VESPERTILIONINAE

**Myotis caliginosus** (Tomes).

1859. *Vespertilio caliginosus* Tomes, *Proc. Zool. Soc. London*, p. 73 ('India').

1♀.—Chamba State, Himachal Pradesh (May, 1927).

*Measurements*.—*Body* : *f*, 33.3 ; *p*, 3.0 ; *d2(mt)*, 29.6 ; *d3(mt)*, 31.3 ; *d3(ph1)*, 11.6 ; *d4(mt)*, 31.3 ; *d4(ph1)*, 9.6 ; *d5(mt)*, 30.3 ; *d5(ph1)*, 8.0 ; *ft*, 5.3 ; *t*, 13.1.

*Skull* : *l*, 12.6 ; *on*, 11.6 ; *zw*, 7.8 ; *iw*, 3.4 ; *ow*, 6.2 ; *mdo*, 3.6 ; *pl*, 6.2 ; *c1-m3*, 5.0 ; *c<sub>1</sub>-m<sub>3</sub>*, 5.9 ; *m3-m3*, 5.4 ; *c1-c1*, 3.1 ; *ml*, 9.2.

The species has so far been known from Sikkim and Simla. The present record extends the range further northwestward.

**Scoteinus pallidus** (Dobson).

1876. *Scotophilus pallidus* Dobson, *Cat. Asiat. Chiropt.*, p. 186 (Mian Mir, Panjab).

1 ♂.—Uttar Pradesh (United Provinces) : Lucknow (23-3-1945).

*Measurements*.—*Body* : *f*, 35.9 ; *p*, 4.6 ; *d2(mt)*, 31.6 ; *d3(mt)*, 34.5 ; *d3(ph1)*, 10.5 ; *d4(mt)*, 34.3 ; *d4(ph1)*, 10.3 ; *d5(mt)*, 33.8 ; *d5(ph1)*, 9.1 ; *ft*, 6.7 ; *t*, 13.1.

*Skull* : *l*, 13.8 ; *cb*, 13.7 ; *on*, 11.5 ; *iw*, 4.1 ; *mdo*, 7.5 ; *pml*, 5.2 ; *pl*, 8.5 ; *c1-m3*, 5.1 ; *c<sub>1</sub>-m<sub>3</sub>*, 5.6 ; *m3-m3*, 6.3 ; *c1-c1*, 4.9 ; *ml*, 10.8.



The easternmost record of this species is from Mian Mir, Lahore District, Punjab. My specimen from Lucknow, coupled with another preserved in the collection of the Zoological Survey from Rajmahal, Eastern Bihar, extends the range much further eastward. The colour of the Type specimen was described by Dobson (*loc. cit.*) as 'pale buff or very pale approaching white'. On examination, it was found to have become perfectly white. Compared with the description given by Dobson as well as with other specimens in the collection of the Zoological Survey, the present specimen is quite darker.

***Pipistrellus ceylonicus indicus* (Dobson).**

1878. *Vesperugo indicus* Dobson, *Cat. Chiropt. (Brit. Mus.)*, p. 222 (Mangalore, Malabar Coast).

1 ♂ and 2 ♀.—Bombay : Belgaum (1928).

*Measurements.*

Abbreviations of measurements.	Males.	Females.
<b>Body.</b>		
<i>f</i>	34.7	35.5—38.0
<i>p</i>	5.7	5.7—6.6
<i>d2(mt)</i>	31.4	32.8—35.3
<i>d3(mt)</i>	32.5	33.4—37.0
<i>d3(ph1)</i>	11.2	11.7—13.6
<i>d4(mt)</i>	30.6	32.2—35.6
<i>d4(ph1)</i>	10.4	12.0—12.9
<i>d5(mt)</i>	35.7	32.1—34.7
<i>d5(ph1)</i>	7.2	7.4—8.4
<i>ft</i>	6.3	6.7—6.8
<i>t</i>	13.6	13.6—14.6
<b>Skull (damaged).</b>		
<i>iw</i>	4.1	3.8 (one specimen)
<i>ow</i>	7.1	6.5 "
<i>pl</i>	6.7	6.6 "
<i>c1-m3</i>	5.4	5.5 "
<i>c1-m3</i>	5.6	5.6 "
<i>m3-m3</i>	6.6	6.3 "
<i>c1-c1</i>	4.7	4.4 "
<i>ml</i>	16.3	10.5 "

Except the slight differences in size, the specimens closely agree with the description given by Dobson (*loc. cit.*). The tips of hairs on the dorsal surface are more lightly coloured than the bases, but this may possibly be due to bleaching.

### **Pipistrellus babu** Thomas.

1915. *Pipistrellus babu* Thomas, *J. Bombay Nat. Hist. Soc.*, XXIV, p. 30 (Murree, 8,000', Panjab).

4 ♂ and 1 ♀.—Bombay : Panchgani, Satara, 4,000'—4,500'.

*Measurements*.—4♂.—*Body* : *f*, 34.7—35.6(35.4); *p*, 4.7—5.7(5.2); *d2(mt)*, 2 specimens, 32.6—34.5; *d3(mt)*, 2 specimens, 33.3—35.6; *d3(ph1)*, 10.3—13.1(11.6); *d4(mt)*, 2 specimens, 32.5—35.6; *d4(ph1)*, 2 specimens, 12.1—12.2; *d5(mt)*, 28.6—33.9 (31.1) *d5(ph1)*, 7.3—8.4(7.7); *ft.* 6.1—6.6(6.4); *t*, 13.2—14.1(13.5).

1♀ (damaged).—*f*, 33.5.

*Skull* (2 specimens) : *l*, 14.6; *cb*, 13.1—13.6; *on*, 12.4; *iw*, 3.9—4.0; *ow*, 7.1—7.5; *mdo*, 5.3; *pml*, 7.7—8.0; *pl*, 6.1—6.5; *c1-m3*, 4.6—5.3; *m3-m3*; 6.3—6.7; *c1-c1*, 4.2—5.1; *ml*, 10.6.

In all the specimens, the cusp of the first upper incisor is considerably reduced. There is a variation in the distribution of fur on the interfemoral membrane. From the typical condition in which it covers the basal third of this membrane, it varies to its restriction to only the root of the tail, and there are intermediates between the two extremes. The skull in these specimens seems to be slightly larger on the average. The metacarpal bones in all the males are in pathological condition showing great softening of their distal ends.

### **Pipistrellus coromandra** Gray.

1838. *Scotophilus coromandra* Gray, *Mag. Zool. Bot.*, XX, p. 498 (Coromandel Coast).

3 ♂ and 6 ♀.—Upper Burma : Indawgyi Lake, Myitkyina Dist. (1926).

#### *Measurements.*

Abbreviations of measurements.	Males.	Females.
<b>Body.</b>		
<i>f</i>	30.0—31.8 (31.3)	30.1—31.8 (31.1)
<i>p</i>	3.9—4.5 (4.3)	4.2—4.7 (4.5)
<i>d2(mt)</i>	28.5—29.7 (29.3)	29.5—31.6 (30.4)
<i>d3(mt)</i>	30.0—31.2 (30.5)	30.2—32.7 (31.4)
<i>d3(ph1)</i>	11.1—12.6 (12.1)	11.6—13.6 (13.0)
<i>d4(mt)</i>	28.0—31.4 (29.9)	30.0—32.6 (31.0)
<i>d4(ph1)</i>	11.6—12.6 (12.3)	11.6—12.6 (12.3)
<i>d5(mt)</i>	28.7—30.6 (2 specimens)	29.1—30.6 (29.6)

*Measurements—contd.*

Abbreviations of measurements.	Males.	Females.
<b>Body—contd.</b>		
<i>d5(ph1)</i> . . .	7.7—8.7 (2 specimens)	7.6—8.7 (8.0)
<i>ft.</i> . . .	4.4—4.5 ,, . . .	4.4—5.3 (4.8)
<i>t</i> . . .	12.7—13.1 ,, . . .	11.7—13.4 (13.1)
<b>Skull.</b>		
<i>l</i> . . .	12.3 (1 specimen)	12.1—12.4 (12.4)
<i>cb</i> . . .	11.3 ,, . . .	11.5—11.7 (11.6)
<i>on</i> . . .	10.8 ,, . . .	10.6
<i>zw</i> . . .	—	7.5—7.7 (2 specimens)
<i>iw</i>	3.3 (1 specimen)	3.2—3.4 (3.3)
<i>cw</i> . . .	5.9 ,, . . .	5.9—6.3 (6.1)
<i>mdo</i>	—	4.1—4.6 (4.2)
<i>pml</i> . . .	6.4 (1 specimen)	6.5—7.2 (6.9)
<i>pl</i> . . .	—	5.5—5.8 (5.7)
<i>c1-m3</i> . . .	4.4 (1 specimen)	4.4—4.6 (4.5)
<i>c<sub>1</sub>-m<sub>3</sub></i> . . .	4.5 ,, . . .	4.4—4.6 (4.5)
<i>m3-m3</i> . . .	5.3 ,, . . .	5.0—5.7 (5.2)
<i>c1-c1</i>	3.8 ,, . . .	3.6—3.9 (3.8)
<i>ml</i> . . .	—	8.2—8.9 (8.6)

Dobson (1876), who considered the species as synonymous with *Vesperugo abramus*, remarks that the fur on the wing membrane below extends to a line drawn from the elbow to the knee-joint. Neither in these specimens nor in other identified ones in the collection of the Zoological Survey of India, the fur extends to such an extent. It is more restricted in its distribution.

***Pipistrellus mimus glaucillus* Wroughton.**

1911. *Pipistrellus mimus glaucillus* Wroughton, *J. Bombay Nat. Hist. Soc.* XXVI, p. 769 (Multan, Panjab).

1♀.—North-West Frontier Province (Pakistan) : Drosh, Chitral (1929).

*Measurements.*—*Body* : *f*, 29.4 ; *p*, 2.6 ; *d2(mt)*, 28.6 ; *d3(mt)*, 30.1 ; *d3(ph1)*, 10.8 ; *d4(mt)*, 29.4 ; *d4(ph1)*, 6.6 ; *ft.* 5.5 ; *t*, 10.7.

*Skull* : *l*, 11.4 ; *cb*, 10.7 ; *on*, 10.1 ; *zw*, 7.2 ; *iw*, 3.4 ; *cw*, 6.1 ; *mdo*, 4.1 ; *pml*, 6.4 ; *pl*, 4.9 ; *c1-m3*, 4.2 ; *c<sub>1</sub>-m<sub>3</sub>*, 4.3 ; *m3-m3*, 3.1 ; *c1-c1*, 8.1.

The subspecies has so far been known from the Punjab only. The present record extends the range further northwestward. The fur is thicker and longer than in *mimus*.

**Pipistrellus mimus** Wroughton.

1900. *Pipistrellus mimus* Wroughton, *J. Bombay Nat. Hist. Soc.*, XII, p. 722 (Maheshkatri, Surat Dangs).

1 ♂.—Bengal : Palta, Calcutta (25-8-1938). 1 ♂.—Bombay : Ratnagiri (29-10-1912).

*Measurements.*

Abbreviations of measurements.	Palta.	Ratnagiri.
<b>Body.</b>		
<i>f</i>	24.2	27.2
<i>p</i>	4.2	3.6
<i>d2(ml)</i>	23.2	23.8
<i>d3(ml)</i>	24.5	24.7
<i>d3(ph1)</i>	9.3	9.1
<i>d4(ml)</i>	24.6	23.1
<i>d4(ph1)</i>	9.6	7.7
<i>d5(ml)</i>	23.2	24.2
<i>d5(ph1)</i>	6.8	5.6
<i>ft</i>	5.3	4.5
<i>t</i>	11.1	9.9
<b>Skull.</b>		
<i>l</i>	10.3	..
<i>cb</i>	9.4	..
<i>on</i>	9.2	..
<i>io</i>	3.5	..
<i>cw</i>	6.0	..
<i>mdo</i>	4.2	..
<i>pml</i>	5.7	..
<i>c1-m3</i>	3.5	4.2
<i>c<sub>1</sub>-m<sub>3</sub></i>	3.5	..
<i>m3-m3'</i>	..	5.1
<i>c1-c1</i>	..	3.6

**Scotophilus kuhli** Leach.

1821. *Scotophilus kuhli* Leach, *Trans. Linn. Soc.*, XIII, p. 71 (Madras).

1♀.—Uttar Pradesh (United Provinces) : Banaras (6-6-1945). 1♀.—Burma, Nayunglabin (7-11-1926). 1 sub-ad. ♂ and 1♀.—Madhya

Pradesh (Central Provinces): Nagpur, 1♀.—Bombay; Panchgani, Satara.

Abbreviations of measurements	<i>Measurements.</i>			
	Banaras.	Burma.	Nagpur.	Panchgani.
<b>Body.</b>				
<i>f</i>	60.4	60.8	58.1	63.0
<i>p(ph1)</i>	5.7	6.5	6.0	6.3
<i>d2(mt)</i>	57.3	60.3	55.9	59.6
<i>d3(mt)</i>	58.7	59.3	57.4	61.6
<i>d3(ph1)</i>	19.1	19.7	20.7	20.1
<i>d3(ph2)</i>	17.0	16.2	17.2	17.7
<i>d4(mt)</i>	56.2	58.5	58.7	60.6
<i>d4(ph1)</i>	15.2	16.7	16.2	16.0
<i>d5(mt)</i>	52.7	54.0	55.8	57.3
<i>d5(ph1)</i>	9.7	10.4	10.4	10.7
<i>ft</i>	11.1	11.9	11.3	11.6
<b>Skull.</b>				
<i>l</i>		21.0		21.4
<i>cb</i>		19.5		18.8
<i>on</i>		18.0		18.3
<i>zw</i>		15.5		15.9
<i>iw</i>		5.3		5.3
<i>cp</i>		10.6		10.4
<i>mdo</i>		9.0		9.2
<i>pml</i>		12.2		1.6
<i>pl</i>		9.7		10.2
<i>c1-m3</i>		7.3		7.8
<i>e1-m2</i>		8.0		..
<i>m3-m3</i>		9.8		10.1
<i>c1-c1</i>		7.3		7.5
<i>ml</i>		15.7		15.6

**Scotophilus wroughtoni Thomas.**

1897. *Scotophilus wroughtoni* Thomas, *J. Bombay Nat. Hist. Soc.*, XI, p. 275.

1♀.—Bengal : Palta, Calcutta. 1♀.—Madhya Pradesh (Central Provinces) : Nagpur. 1♀.—Bombay : Panchgani, 4,000'—4,500'.

*Measurements.*

Abbreviations of measurements.	Calcutta.	Nagpur.	Panchgani.
<b>Body.</b>			
<i>f</i>	47.0	50.0	48.9
<i>p(ph1)</i>	4.8	5.0	3.8
<i>d2(mt)</i>	45.4	50.1	48.0
<i>d3(mt)</i>	46.7	50.0	48.9
<i>d3(ph1)</i>	16.3	17.7	16.3
<i>d3(ph2)</i>	13.2	12.5	12.2
<i>d4(mt)</i>	46.4	50.1	47.0
<i>d4(ph1)</i>	12.7	14.2	12.2
<i>d5(mt)</i>	41.8	46.4	44.9
<i>d5(ph1)</i>	8.1	8.5	7.7
<i>ft</i>	8.7	8.2	8.5
<i>t</i>	18.2	19.8	17.2
<b>Skull.</b>			
<i>l</i>	17.9	18.6	18.4
<i>cb</i>	16.7	17.2	17.0
<i>on</i>	15.3	15.9	16.1
<i>zw</i>	13.0	13.2	..
<i>iw</i>	4.8	4.9	5.0
<i>cw</i>	9.4	9.3	9.0
<i>mdo</i>	7.2	7.5	7.7
<i>pml</i>	10.2	10.7	..
<i>pl</i>	8.5	8.7	..
<i>c1-m3</i>	6.5	6.2	6.3
<i>c1-m3</i>	8.0	7.4	7.3
<i>m3-m3</i>	8.7	8.3	8.6
<i>c1-c1</i>	6.3	6.2	6.2
<i>ml</i>	12.9	14.0	13.3

Subfamily *KERIVOULINAE**Kerivoula crypta* Wroughton.1912. *Kerivoula crypta* Wroughton, *J. Bombay Nat. Hist. Soc.*, XXII, p. 14 (Shimoga, Mysore).

10 ♂ and 5 ♀.—Assam : Chekrima, Naga Hills (17-2-1937).

*Measurements.*

Abbreviations of measurements.	Males.	Females.
<b>Body.</b>		
<i>f</i> . . . .	30.6—33.7 (32.7)	31.5—32.5 (31.9)
<i>p</i> . . . .	5.6—6.9 (6.5)	5.8—6.9 (6.5)
<i>d2(mt)</i> . . . .	31.0—34.4 (32.1)	33.7—36.4 (34.5)
<i>d3(mt)</i> . . . .	34.4—35.9 (35.6)	34.5—36.9 (35.7)
<i>d3(ph1)</i> . . . .	15.0—16.0 (15.6)	14.5—16.4 (15.8)
<i>d4(mt)</i> . . . .	34.4—35.7 (34.4)	34.1—36.3 (34.9)
<i>d4(ph1)</i> . . . .	10.2—11.6 (10.3)	10.3—11.7 (10.5)
<i>d5(mt)</i> . . . .	32.7—34.7 (33.4)	32.3—35.9 (33.7)
<i>d5(ph1)</i> . . . .	7.8—9.0 (8.3)	8.2—9.3 (8.9)
<i>ft</i> . . . .	5.7—6.9 (6.0)	5.6—6.9 (6.0)
<i>t</i> . . . .	15.7—16.7 (16.2)	14.5—16.7 (15.8)
<b>Skull.</b>		
<i>l</i> . . . .	13.4—14.1 (13.5)	13.3—13.7 (13.6)
<i>cb</i> . . . .	12.2—13.2 (12.9)	12.6—13.1 (12.9)
<i>on</i> . . . .	11.0—11.8 (11.7)	11.1—11.7 (11.4)
<i>zw</i> . . . .	8.4—8.7 (8.6)	8.5—8.9 (2 specimens).
<i>iw</i> . . . .	3.1—3.6 (3.3)	3.1—3.5 (3.3)
<i>cw</i> . . . .	6.8—7.7 (7.2)	7.0—7.4 (7.3)
<i>mdo</i> . . . .	4.6—5.1 (4.9)	4.6—4.7
<i>pml</i> . . . .	7.1—7.7 (7.4)	7.3—7.7 (7.5)
<i>pl</i> . . . .	6.9—7.7 (7.4)	7.2—8.0 (7.5)
<i>c1-m3</i> . . . .	5.2—5.7 (5.5)	5.4—5.6 (5.5)
<i>c<sub>1</sub>-m<sub>3</sub></i> . . . .	5.4—5.9 (5.7)	5.6 (2 specimens)
<i>m3-m3</i> . . . .	5.4—5.7 (5.5)	5.2—5.7 (5.5)
<i>c1-c1</i> . . . .	3.4—3.7 (3.6)	3.3—3.6 (3.4)
<i>ml</i> . . . .	9.1—10.4 (9.4)	10.1 (1 specimen)

So far the species has only been recorded from North-West Mysore. The present investigation shows that it has a much wider range. As the specimens have been preserved in spirit for quite a long time, the true nature of their colour cannot be judged. A study of the fresh material will reveal whether or not the population from the Naga Hills differs from that of Mysore.

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