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ON A COLLECTION OF MAMMALS FROM BHUTAN

By

S. CHAKRABORTY

Zoological Survey of India

(One Text-figure)

INTRODUCTION

The Kingdom of Bhutan is situated in the heart of the Himalaya in its eastern part. The country spreads over an area of about 20,000 square kilometers lying between latitudes 26°45′ and 28°20′ N. and longitudes 89°10′ and 92°15′ E. Nevertheless, within this limited space one may travel from the tropical foothills in the south to the perpetual snows at about 8,000 metres high peak of Kula Kangri in the north, from the zone of tropical rain forest to alpine vegetation through the temperate coniferous forests. Adverse physical features, such as the rugged mountains, heavy rainfall and dense vegetation combined with the earlier policy of isolation, constituted a formidable barrier to modern exploration of Bhutan. In 1960, however, the King and the Prime Minister of Bhutan decided to abandon the country's policy of isolation. During the years 1966 (March-May), 1967 (November-December), 1969 (January-March), Dr. B. Biswas of this department and his party conducted faunistic surveys of the tropical rain forest and temperate coniferous forest areas of eastern, central and western Bhutan. They collected a large number of different groups of animals from the region they surveyed. The present paper deals with the mammalian collection which consists of 104 specimens comprising 20 species, together with those seen in the field but not collected. Except for some stray reports of Pemberton (1839), Blyth (1842), Gray (1842), Blanford (1888, 1891), Pocock (1939, 1941), Ellerman (1963), Moore and Tate (1965) and Holmes (1970), the available information on the mammalian fauna of Bhutan is negligible. The results of these surveys are, therefore, of much biological interest. This paper aims at giving a list of mammalian species found in Bhutan, along with notes on their distribution, variations, taxonomic status and field observations. However, the list is only provisional and it is in no way complete, as the northern, high altitude areas are yet to be surveyed.

All measurements are given in millimetres and mean values are given in parenthesis. Measurements of Insectivora, Chiroptera and Rodentia are taken after Roonwal (1949), Khajuria (1952) and Ellerman (1963), respectively, while those of other groups are taken after Pocock (1939, 1941). External measurements and weights were taken by the collector in the field within a few hours after the animal was killed.

The colours given with initial capital letters in the text have been recognised according to Ridgway's (1886) nomenclature.

The following abbreviations have been used in the measurements.—

External: e. = Ear; f. = Forearm; H. & B. = Head and body length; H.F.= Hind foot; p.= Pollex; Tl.= Tail length; t. = Tibia.

Cranial: apf.= Anterior palatine foramina; bul.= Bullae; cb.= Condylobasal; cw.= Cranial width; c'—c'.= Shortest distance between the outer surfaces of the roots of canines; dia.= Diastema; fr.= Frontal; io.= Interorbital; mw.= Maxillary width; m^3–m_3.= Distance between the outer surfaces of the third upper molars; m.= Molar; nas.= Nasal; on.= Occipitonasal; or.= Orbit; pal.= Palatal; po.= Postorbital; pm. = Premolar; Tl.= Total length; TR.= Upper tooth row; zw.= Zygomatic width.

Systematic account

Order INSECTIVORA

Family Soricidae

Suncus murinus soccatus (Hodgson)

1845. *Sorex soccatus* Hodgson, *Ann. Mag. nat. Hist.*, **15** : 270.
1855. *Sorex heterodon* Blyth, *J. Asiat. Soc. Beng.*, **24** : 31.
1929. *Suncus soccatus*, Lindsay, *J. Bombay nat. Hist. Soc.*, **33** : 332.
1951. *Suncus murinus soccatus*, Ellerman and Morrison-Scott, *Checklist of Palaearctic and Indian Mammals:*, 66.

Material.—1♂, 1♀: Gaylegphug, *c.* 153 m., C. Bhutan; 10 Nov., 1967. 1♀: Rongtong, Manas Valley, *c.* 1740 m., E. Bhutan, 5 Apr., 1966.

Measurements:

External.— 1♂: H. & B. 141; Tl. 71; H.F. 21; e. 13.
2♀♀: H. & B. 110, 134; Tl. 66, 74; HF. 18, 20; e. 8, 12.
Cranial.— 1♂: Tl. 38.8; pal. 16; TR. 15.5; cw. 13.2.
1♀: Tl. 29.8; pal. 14; TR. 13.8; cw. 12.
Weights.— 1♂: 51 g.
2♀♀: 40 g., 40 g.
Mammae.—Three pairs, all inguinal.

Seasonal variation in the nature of fur is well marked. The fur is short and close in the April specimen while very long and soft with a slight silvery sheen in those of November.

This is the first record of the genus *Suncus* Ehrenberg from Bhutan.

Order CHIROPTERA

Family Pteropidae

Rousettus leschenaulti leschenaulti (Desmarest)

1820. *Pteropus leschenaulti* Desmarest, *Encycl. Meth. Mamm.*, **1** : 110.
1835. *Pteropus pyrivorus* Hodgson, *J. Asiat. Soc. Beng.*, **4** : 700.
1843. *Cynopterus marginatus* Gray, *List. Mamm. Brit. Mus.*, 38.
1870. *Xantharpyia seminuda* Gray, *Cat. Monkeys, Lemurs and Fruiteating Bats*, 115.
1870. *Eleutherura fuliginosa* Gray, *Cat. Monkeys, Lemurs and Fruiteating Bats*, 118.
1912. *Rousettus leschenaulti*, Andersen, *Catalogue of the Chiroptera in the collection of the Brit. Mus.*, 1. *Megachiroptera*, 35.

Material.—3 ♀♀, 1 subad. ♀: Panjurmane, *c.* 1525 m., C. Bhutan, 11 and 12 Dec., 1967.

Measurements:

External.— 3 ♀♀: H. & B. 109, 121, 124; Tl. 12, 12, 15; f. 76, 79, 80; H.F. 18, 20, 20; t. 32, 34.3, 38; e. 18, 19, 19; p. 23, 23.5, 24.2.

Cranial.— 2♀♀: cb. 40.8, 41; pal. 20.2, 20.4; zw. 22.3, 23; c′–c′ 6.8, 7; m^3–m^3. 11, 11.5; cw. 15.4, 16; io. 8, 8.1; TR. 13.4, 14.

Weights.— 3♀♀: 55 g., 77 g., 80 g.

The dorsum of my specimens fits in well with the description given by Andersen (1912), but the venter is Smoke Gray instead of Drab or Isabella colour. Also, numerous white spots are present on the wings of two adult female specimens.

This is the first record of this species from Bhutan.

Sphaerias blanfordi (Thomas)

(Blanford's Fruit Bat)

1891. *Cynopterus blanfordi* Thomas, *Ann. Mus. Stor. nat. Genova*, **2** : 10

1912. *Sphaerias blanfordi*, Andersen, *Catalogue of the Chiroptera in the collection of the Brit. Musg.* **1**, *Megachiroptera:* 674.

Material.—2 ♂♂ : Ganglakha, *c.* 1860 m., W. Bhutan, 27 Jan., 1969.

Measurements:

External.— 2 ♂♂: H. & B. 84, 84; f. 52, 54; H.F. 12, 12; e. 18, 19; t. –, 19.3; p. 17, 18.

Cranial.— 1♂ : cb. 26.2; pal. 13.8; zw. 18; c′–c′ 6.4; m^3–m^3. 8.2; cw. 12.8; io. 5.4; TR. 8.

Body is covered with very long, close, soft fur, but wings are naked. Base of ear white but edges are brownish and not white as stated by Andersen (1912). Two Buff spots are present on the chin, which were not mentioned in earlier description.

According to Ellerman and Morrison-Scott (1951), this species is known to occur in Karin Hills, Burma, and in Siam. The present specimens constitute the first record of this species from Bhutan. Moreover, in the collection of the Zoological Survey of India, there is a subadult female specimen of *S. blanfordi* from Darjeeling, West Bengal, and recently Bhat (1968) has reported it from Western Himalaya in the Uttar Pradesh. The range of this species, therefore, appears much more extensive than hitherto known.

Order PRIMATES

Family CERCOPITHECIDAE

Presbytis geei Khajuria
(The Golden Langur)

1956. *Presbytis geei* Khajuria, *Ann. Mag. nat. Hist.*, (12) **9** : 86-88.

Material—1 ♂: Panjurmane, *c* 1525 m., C. Bhutan, 11 Dec., 1967. 1♂: Gaylegphu *c.* 153 m., C. Bhutan, 9 Nov., 1967.

Measurements:

External.— 1♂: H. & B. 530, Tl. 890; H.F. 195; e. 36. 1♀: H. & B. 505; Tl. 727; H.F. 166; e. 32.

Cranial.— 1♂: Tl. 98; cb. 81; zw. 77; or. 69; mw. 30. 1♀: Tl. 94; cb. 74; zw. 77; or. 63; mw. 25.

Compared with the male, in the female specimen the golden tinge is more conspicuous, particularly on the sides and hinder part of the body. The same difference is also exhibited by specimens of the type-series present in the Zoological Survey of India. It is evident, therefore, that there is sexual dimorphism in regard to the depth of the golden tinge in this species.

The male specimen is somewhat abnormal. The fingers of the right hand are without nails and are dwarfed. The first right upper premolar is absent, there being no place for it in the jaw. This animal was found on a terminal branch of the tree, and it was somewhat isolated from the troop.

The nipples of the female specimen were very prominent and it was found to be pregnant. On dissection a foetus was obtained. The foetus is entirely hairless and cream-coloured; its hands, feet and tail are well developed; trace of the fold of the lower eyelid and of external pinna are indicated. It measures, vortex-coccyx 50; tail 60.

Our knowledge of the distribution and behaviour of the Golden Langur has so far been due to Gee (1961) and Wayre (1968). According to them it occurs from the east of Sankosh river to the west of Manas river in Assam and in the Manas Wild Life Sanctuary of Bhutan just across Assam border. The Zoological Survey of India party observed *P. geei* in different parts of central Bhutan and collected specimens from far north of the known range. It will, therefore, be of interest to add a few lines from the collector's note as follows:

Gaylegphug: Hardly a kilometre north of the township of Gaylegphug a troop of the Golden Langur was seen on a Peepul (*Ficus religiosa*) tree, about 40 m. high by the side of the main road towards Tongsa. The troop consisted of about 18 individuals comprising of adult males, females, adolescents and youngs. Youngs were not clinging to their mothers. All were busy feeding on the berries and tender twigs of the tree and often leaping from branch to branch. As soon as they noticed the collector they began to move north-west, when a female was shot down. Immediately the troop began to flee but a large male (probably troop leader) jumped near the dead animal and howled loudly. A few hesitating adolescent animals were driven away by him while he himself occasionally moving near the dead animal and howled continuously. As the body was recovered by the Zoological Survey of India party, he went away and joined the troop.

Local people reported that the 'Sugrib' (the local name of the Golden Langur) is a permanent resident of Gaylegphug forests, often roaming from forest to forest usually along the banks of the Ai river.

Batase: No Golden Langur was seen here, but local people reported that there were many in the areas of Cardamon (*Amomum aromaticum*) plantation on the slope across the Rong river, which is surrounded by thick forests. There they are said to cause considerable damage to the cultivation.

Tama: On the slope of Tama Khola the Golden Langurs are in plenty. A troop of more than 20 individuals was seen, but owing to

the inaccessibility of the area, they could not be approached close enough. In this troop youngs were very few.

Panjurmane: Two troops were noticed, one in the evening roosting on a large tree (unidentified) and other on the road in an afternoon. Both the troops were made up of 15 to 20 individuals of all ages.

It is interesting to note that so far no Golden Langur has been seen, nor reported from the west of Sankosh river, and this agrees with the observation of Gee (1961) in Assam that the Golden Langur is restricted to the east of Sankosh river.

Regarding the correct authorship of this species, Biswas (1966) may be referred.

Order CARNIVORA

Family VIVERRIDAE

Herpestes sp.

Material.—1 subad. ♂ : Gaylegphug, *c* 158 m., C. Bhutan, 9 Nov., 1967.
Measurements:

External.— H. & B. 257; Tl. 228; H.F. 50; e. 17.

Cranial.— Tl. 57; cb. 57; zw. 26.5; io. 10.3; po. 13.2; mw. 9.9; pm^4. 6×4.4; m_1. 5×3.1.

The present specimen is very peculiar as it shares the characters of both *H. auropunctatus* (Hodgson) and *H. palustris* Ghose. General tint is dark brown, with minute nearly Ochraceous speckling. The contour hairs are short. This agrees with the description of new summer coat of *H. auropunctatus* given by Pocock (1941). The number of bands on the individual contour hairs is five, but a few hairs at the tail tip are entirely black. Muzzle is black like that of *H. palustris.*

Skull without any sagittal crest. The postorbital width is greater than that of interorbital width. This characteristic is found in the subadult specimens of both *H. auropunctatus* and *H. palustris.*

Based on the collection present in the Zoological Survey of India, the present specimen may be compared with *H. auropunctatus* (2 ♀♀ : Golaghat, Assam; 1♀: Goalpara, Assam; 1♂: Howrah, West Bengal), and *H. palustris* (15♂♂; 4 ♀♀ : topotypes) as follows:

Characters	Present specimen	*H. auropunctatus*	*H. palustris*
Muzzle:	Black	Brown	Black
Grizzling of pelage:	Fine	Fine	Coarse
Coat:	Smooth and silky	Smooth and silky	Rough
Tail tip:	Black	Concolorous with tail base.	In 11 concolorous with tail base but in eight black tipped.

In view of the fact that I have only a single subadult specimen from Bhutan and that I do not have sufficient comparative material of *H. auropunctatus*, the specific identification of the present specimen is withheld.

Family FELIDAE

Felis bengalensis horsfieldi (Gray)

(The Leopard Cat)

1842. *Leopardus horsfieldi* Gray, *Ann. Mag. nat. Hist.*, **10** : 260.
1844. *Felis pardochrous* Hodgson, *Calcutta J. nat. Hist.*, **4** : 260.
1939. *Prionailurus bengalensis horsfieldi*, Pocock, *Fauna of Brit. India including Ceylon and Burma*, **1** : 271.
1951. *Felis bengalensis horsfieldi:* Ellerman and Morrison-Scott, *Checklist of Palaearctic and Indian Mammals:* 313.

Material.—1♂: Honka, W. Bhutan; 20 Jan., 1969.

Measurements:

External.— H. & B. 519; Tl. 280; H.F. 110; e. 45.

Cranial.— Tl. 90; cb. 88; zw. 63.1; io. 15; po. 25; mw. 12.5.

External features agree with the description given by Pocock (1939).

The type skin of *F. b. horsfieldi* was designated by Gray (1842) as from Bhutan, but Pocock (1939) believed that it came from upper Assam. However, the present specimen constitutes an authentic record of the occurrence of *F. b. horsfieldi* in Bhutan.

Order ARTIODACTYLA

Family CERVIDAE

Muntiacus muntjak vaginalis (Boddaert)

(The Barking Deer)

1785. *Cervus vaginalis* Boddaert, *Elench. Anim*, **1** : 136.
1833. *Cervus ratwa* Hodgson, *Asiatick Res.* **18** (2) : 139.
1845. *Cervus styloceros* Schinz, *Synop. Mamm.* **2** : 549.
1852. *Stylocerus muntjacus* Kelaart, *Prod. Faun. Zeylan:* 85.
1951. *Muntiacus muntjak vaginalis*, Ellerman and Morrison-Scott, *Checklist of Palaearctic and Indian Mammals:* 356.

Material.—1 subad. ♀: Tama, *c* 1130 m., C. Bhutan; 26 Nov., 1967.

Measurements:

External.— H. & B. 1160; Tl. 180; H.F. 280 (to the tip of hoof).

Cranial.—Tl. 183.

Facial region Bistre instead of usual brown. Body is uniform brown in colour without any white spotting.

On the basis of the skull of this specimen and the adult skulls present in the Zoological Survey of India, interesting variations are noticed between the deciduous and permanent set of teeth. In the permanent set pm^1, pm^2, pm^3 and pm_3 are single lobed, while in the deciduous set pm^1, pm^2 and pm^3 have two lobes and pm_3 has three lobes.

The present specimen constitutes the first record of the occurrence of the Barking Deer in Bhutan.

Order RODENTIA

Family SCIURIDAE

Petaurista magnificus (Hodgson)
(Hodgson's Flying Squirrel)

1836. *Sciuropterus magnificus* Hodgson, *J. Asiat. Soc. Beng.*, **5** : 231. Nepal
1842. *Sciuropterus nobilis* Gray, *Ann. Mag. nat. Hist.*, **10** : 263. Darjeeling
1844. *Sciuropterus chrysotrix* Hodgson, *J. Asiat. Soc. Beng.*, **13** : 67. Nepal
1947. *Petaurista magnificus*, Ellerman, *J. Mammal.*, **28** : 254.

Material.—1♂, 1♀: Paro, *c* 2440 m., W. Bhutan; 14 Feb., 1969. 1♂: Gomchu, *c* 2500 m., E. Bhutan; 28 Mar. 1966. 1♀: Mithangar, *c* 1525 m., E. Bhutan; 7 May 1966.

Measurements:

External.— 2♂♂: H. & B. 390, 415; Tl. 495, 510; H.F. 80, 81; e. 48, 51.
2♀♀: H. & B. 414, 487; Tl. 464, 522; H.F. 79, 85; e. 45, 50.

Cranial.— 1♂: on. 72; pal. 38.1; nas. 22.1; fr. 16.1; or. 26.1; TR. 17.8. 1♀: on. 75.5; pal. 39.8; nas. 22.4; fr. 17; or. 28; TR. 18.

Mammae.—1—2 = 6.

Forehead is yellowish buff in colour. A dark maroon saddle is present on the back, which bifurcates in the region of the neck and extends along the sides of the head up to the nose. A few yellowish buff hairs are also present on the mid region of dark maroon saddle. Sides of the body and parachute are yellowish orange and sharply marked off from the back. Margin of parachute is rose red in colour. Hands and feet are Maroon. Tail is tricolored; more than half of its proximal part yellowish buff, followed by rose red and terminally black. Ventral fur soft, woolly and light orange in colour. The greatest lengths of the head and body, occipitonasal, palatal and orbit differ somewhat from the recorded measurements in published works; these are 487, 75.5, 39.8 and 28 respectively in the present material as against 420, 72.9, 36.5, 27.2 recorded in literature.

Blanford (1891) regarded *P. nobilis* and *P. chrysotrix* as synonyms of *P. magnificus*, in which dorsal colour changes seasonally. He believed (p. 364), *P. nobilis* and *P. chrysotrix* "to be the summer garb, the body, neck and head are deep maroon, generally with a more or less well-marked yellow median line, commencing with a broad spot on the forehead" and *P. magnificus* as the winter garb with no median dorsal line, "the body and head are chestnut above, more or less grizzled by some of the longer hairs being whitish near the tip". Wroughton (1911) retained only *P. nobilis* believing *P. magnificus* to be a synonym of *P. albiventer* Gray. Robinson and Kloss (1918) reverted to Blanford's nomenclature and so also did Ellerman (1940, 1947, 1963) and Ellerman and Morrison-Scott (1951). In the specimens from Bhutan collected in both summer and winter no seasonal change can be marked, and all of them fit in well with the description of the summer garb of *P. magnificus* given by Blanford (*op. cit.*) and with the paratype of *P. magnificus*

present in the Zoological Survey of India collection. A re-examination of the further material present in the Zoological Survey of India (1♀: no locality, August; 1 ad. and 1 subad.: Sikkim, unsexed and without date; 1 adult: no history) reveals that all of them are very similar to the paratype of *P. magnificus*. Moreover, the original descriptions of *P. nobilis* and *P. chrysotrix* are applicable to the paratype of *P. magnificus* as well. It may therefore, be concluded that *P. magnificus* is a distinct species with a constant pelage colour, and that *P. nobilis* and *P. chrysotrix* are nothing but its synonyms. *Petaurista magnificus* differs from all other species of the genus *Petaurista* Link by having a constant dark maroon saddle on the back even in the subadult stage, which may sometimes partly or fully be divided down the spine by a yellowish buff line.

Callosciurus erythraeus bhutanensis (Bonhote)

1901. *Sciurus erythraeus bhutanensis* Bonhote, *Ann. Mag. nat. Hist.*, (7) **7** : 161. Bhutan
1961 (1963). *Callosciurus erythraeus bhutanensis*, Ellerman, *Fauna of India including Pakistan, Burma and Ceylon, Mammalia*, **3** [*Rodentia*]: 125.

Material.—1♂: Putlibir, *c* 2103 m., W. Bhutan, 5 Mar., 1969. 1♀: Phuntsholing, *c* 610 m., W. Bhutan; 20 Jan., 1969. 2♀♀: Gaylegphug, *c* 153 m., C. Bhutan, 11 Nov. 1967. 2♀♀: Mithangar, *c* 1525 m., E. Bhutan; 3 and 4 May 1966.

Measurements:

External	1♂	5♀♀
H. & B.	212	213, 217, 218, 230, 233
Tl.	208	182, 193, 209, 211, 222
H.F.	49	46, 49, 49, 51, 55
e.	22	19, 19, 20, 22, 22

Cranial.— 4♀♀: on. 52.5, 53.1, 54.4, 55; pal. 26, 27, 27, 27.2; nas. 15.4, 15.6, 17, 18; fr. 192, 19.4, 19.8, 20; or. 16.3, 17, 17, 18; TR. 10, 10, 10, 10.2.
Weights.— 1♂: 345 g. 4♀♀: 355 g., 365 g., 375 g., 400 g.
Mammae.—1 —1 = 4.

Dorsal hairs are basally slate gray, apically with three or four Rufous annulations alternating with black. Ventral pelage varies seasonally. In two specimens (1♂, 1♀) of March and January, the venter is concolorous with the dorsum. In specimens of May (1♀) and November (2♀♀) sides of the venter Ochraceous Rufous with a median longitudinal stripe which is made up of furs similar to those of the back. The other May specimen (1♀) appears to be moulting. Its venter is poorly haired and entirely Rufous. Tail tip black but in the two specimens from Gaylegphug there are also a few white hairs mixed with the black ones. Muzzle and inner border of ear distinctly Rufous in all the specimens.

Baculum consists of two parts, a slightly bend rod-like shaft or capsulus of about 21.5 mm. long and a sharp blade or lamina about 8.8 mm. long, attached to the shaft only at the distal part (Text-fig. 1a).

A May specimen from Mithangar was pregnant; its uterus contains two embryos at very early stage of development.

Bonnhote (1901) described *bhutanensis* with the forehead Rufous and similar in coloration to the underparts. Robinson and Kloss (1918), and Ellerman (1963) without having sufficient material regarded it as a doubtful subspecies. They were not sure whether reddish face was a good character or individual or seasonal variation. Moore and Tate (1965) regarded the type of *bhutanensis* as an intergrade between *C. e. erythrogaster* (Blyth) and *C. crumpi* Wroughton, and placed *C. crumpi* as a synonym of *bhutanensis*. From the present material it is obvious that Rufous face is a constant and, therefore, sufficiently good character to accept *bhutanensis* as a distinct subspecies. From an examination of one specimen of *C. crumpi* present in the Zoological Survey of India and from the description given by Ellerman (1963), it becomes obvious that *C. crumpi* differs from *bhutanensis* by having brownish dorsal pelage, lighter tail tip, dark belly, slightly smaller frontal (18.7–19.1 *vs.* 19.8–20) and orbit (16–16.3 *vs.* 16.8–18). In all the above-mentioned external features *C. crumpi* comes closer to *C. caniceps* (Gray). I would, therefore agree with Ellerman (1963) in treating *C. crumpi* separate from *bhutanensis* and considering it as a subspecies of *C. caniceps*.

This squirrel is very common in the forest floor and prefers shelter behind the bushes.

Callosciurus pygerythrus lokroides (Hodgson)
(The Hoary bellied Himalayan Squirrel)

1836. *Sciurus lokroides* Hodgson, *J. Asiat. Soc. Beng.*, **5** : 232.
1867. *Macrozus similis* Gray, *Ann. Mag. nat. Hist.*, **20** : 281.
1947. *Callosciurus pygerythrus lokroides*, Ellerman, *J. Mammal.*, **28** : 266.

Material.—2♂♂: Gaylegphug *c* 153, m., *C.* Bhutan; 13 Nov., 1967.

Measurements:

External.— 2♂♂: H. & B. 162, 172; Tl. 148, 174; H.F. 39, 41; e. 18, 19.
Cranial.— 2♂♂: on. 43.5, 46.3; pal. 21.3, 22.9; nas. 12.3, 13; fr. 15, 15; or. —, 15; TR. —, 8.9.
Weights.— 2♂♂: 117 g., 188 g.

Hip patches which are usually met with in this subspecies, are not visible in the present specimens from the dorsal side, but ventrally two distinct reddish areas can easily be marked. General coloration is similar to the description given by Moore and Tate (1965) with the following variations:

Hands, feet and forehead are darker than back; a light brownish streak extending from the throat to the hindermost part of the belly, is present in the venter of one specimen.

This is the most common arboreal as well as ground squirrel of Bhutan.

Tamiops macclellandi macclellandi (Horsfield)
(The Himalayan Striped Squirrel)

1839. *Sciurus macclellandi* Horsfield, *Proc. zool. Soc. Lond.*: 152.
1842. *Sciurus pembertonii* Blyth, *J. Asiat. Soc. Bengal.*, **11** : 887.
1900. *Sciurus macclellandi manipurensis* Bonhote, *Ann. Mag. nat. Hist.*, **5** : 51.
1965. *Tamiops macclellandi macclellandi:* Moore and Tate, *Fieldiana, Zool.*, **48** : 237.

Material.—2♂♂: Susuna, Ha Road, *c* 2350 m., W. Bhutan, 10 Feb., 1969. 1♀ : 18 km. N.E. of Simtokha, *c* 3200 m., W. Bhutan; 23 Feb., 1969. 1♂, 1♀: Shamgong, *c* 1960 m., C. Bhutan; 3 and 4 Dec., 1967. 1♂: Bulfai, *c* 2800 m. E. Bhutan; 30 Mar. 1966. 1♂: Gomchu, *c* 2500 m. E. Bhutan; 7 Apr., 1966. 1♀: Kaling *c* 2200 m. E. Bhutan; 11 Apr. 1966.

Measurements:

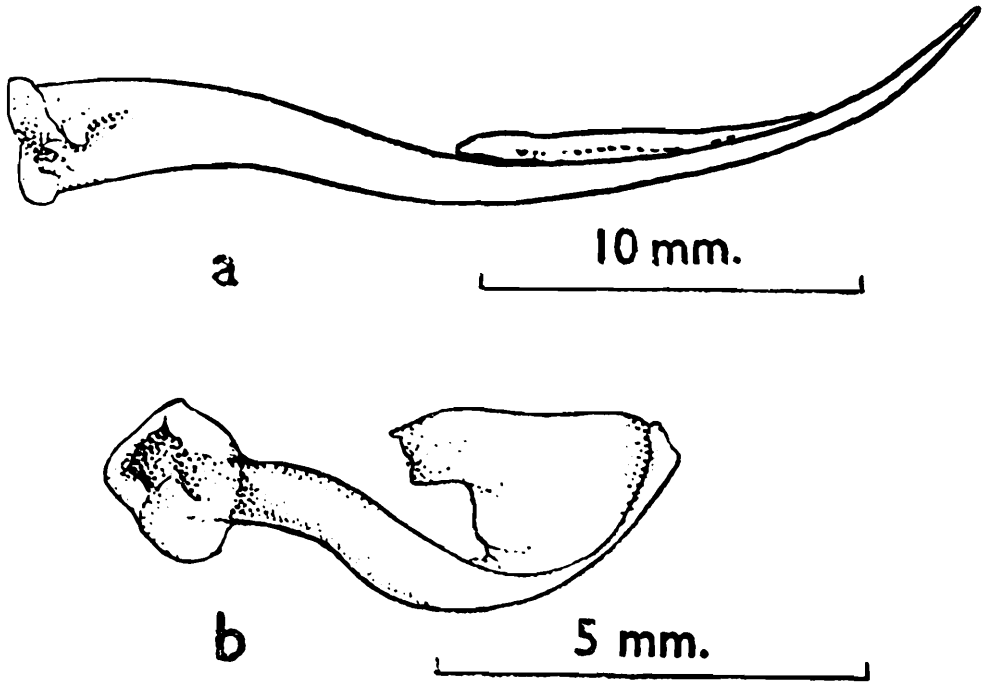
External.—	5♂♂	3♀♀
H. & B.	116, 117, 120, 120, 120	103.5, 111, 125
Tl.	91, 95, 98, 103, 104	93, 102, 110
H.F.	18(?), 24, 27, 27, 28	26.5, 27.5, 27.5
e.	12, 12.5, 13, 14, 14	11.5, 13, 13.

Cranial.—	3♂♂	1♀
on.	32.2, 32.9, 33.1	34
pal.	15.5, 15.5, 16	15.4
nas.	9, 9.1, 9.2	9
fr.	11.9, 12, 12.2	12.3
or.	8.8, 9.6, 10	10.2
TR.	5.2, 5.2, 6	6

Weights.— 4♂♂: 52 g., 54 g., 54 g., 59 g. 1♀: 64 g.

External features fit in well with the description given by Ellerman (1963).

Baculum is a curved hook like structure, made up of a bend shaft, at the distal end of which a thin triangular blade is attached. The shaft is slightly swollen at the base (Fig. 1b).



TEXT-FIG. 1(*a*). Baculum of *Callosciurus erythraeus bhutanensis*
(*b*). Baculum of *Tamiops macclellandi macclellandi*.

It may not be out of place to discuss the status of the genus *Tamiops* Allen. It was treated as a subgenus of *Funambulus* Lesson by Zahn quoted by Moore and Tate (1965) and of *Callosciurus* Gray by Osgood

(1932), Ellerman (1940) and Simpson (1945). The question was recently re-examined by Moore and Tate (1965), and they have shown that *Tamiops* have enough distinguishing characters from allied genera to be honoured with a generic rank. The present study reveals that the structure of baculum is also very different from that of both *Funambulus* and *Callosciurus*. I have, therefore, no hesitation in concurring with Moore and Tate (1965).

Dremomys lokriah bhotia Wroughton

(The Orange-bellied Himalayan Squirrel)

1916. *Dremomys lokriah bhotia* Wroughton, *J. Bombay nat. Hist. Soc.*, **24** : 425. Sedonchen, Sikkim.

Material.—1♂: *c* 36 km. from Simtokha on Wangdu Phodrang Road, Menchuna Valley, *c* 2377 m., W. Bhutan; 26 Feb., 1969. 1♀: Chasilakha, *c* 1860 m., W. Bhutan; 1 Feb., 1969. 1♀: Susuna, Ha Road, *c* 2350 m., W. Bhutan; 11 Feb., 1969. 1♂: Panjurmane, *c* 1525 m., C. Bhutan; 12 Dec., 1967. 3♀♀: Gomchu, *c* 2500 m., E. Bhutan; 8 and 12 Apr., 1966.

Measurements:

External.—	2♂♂	5♀♀
H. & B.	177, 189	160, 173, 175, 175, 205.
Tl.	134, 142	114, 115, 120, 130, —.
H.F.	41, 46	38, 40, 40, 46, —.
e.	20, 22	18, 19, 19, 20, 23.
Cranial.—	1♂	4♀♀
on.	51	47, 47.6, 48.5, 51.5
pal.	24.3	23, 23.4, 23.8, 26.
nas.	15.6	14.1, 14.2, 14.5, 17.
fr.	14.8	14.5, 14.5, 14.5, 16.5
or.	15	14, 14.5, 14.6, 14.8.
TR.	8.4	8.2, 8.2, 8.3, 8.8.

Weights: 1♂: 200 g. 5♀♀: 139 g., 148. g., 150 g., 172 g., 260 g.
Mammae: 1—1—1 = 6.

General colour of back is dark olive. Individual hair is slate black at base, and apically having three or four olivaceous annulations alternating with black. A few entirely white hairs are not uncommon. Feet blackish.

The palate of the female specimen from Chasilakha is more than half of the occipitonasal length, which is very unusual for this species.

Wroughton's (1916) *D. l. bhotia* from eastern Sikkim, was synonymized with *D. l. lokriah* (Hodgson) by Ellerman (1947), and this treatment was supported by Moore and Tate (1965). The present specimens as well as two from Bhuntang, Sikkim when compared with five specimens of Central Nepal present in the Zoological Survey of India, are found to be distinctly darker and olivaceous against the browner pelage of the specimens of Nepal. Moreover, the colour of foot is brownish in *D. l. lokriah* but blackish in *D. l. bhotia*. I would, therefore, accept *bhotia* as a distinct subspecies. Here it will be worthwhile to mention that, Palmajua, Darjeeling, West Bengal, though geographically nearer to Sikkim, five specimens (3♂♂, 2♀♀) of June and July from that

area present in the Zoological Survey of India, collection are similar to the specimens of *D. l. lokriah* from Central Nepal.

The genus *Dremomys* Heude is generally separated from *Callosciurus* Gray by the length of its nasal being greater than that of frontal. Ellerman (1963) stated that the length of nasal in *Dremomys* is often subequal to frontal, and in two out of 24 measurable skulls it is actually shorter. In the present series from Bhutan also two specimens out of five have nasal shorter than frontal. This character should not therefore, be given much importance.

This species is often met with on the floor of mixed, wet forest. Its individuals congregate at dusk and then break up into groups of seven or eight. Its call sounded somewhat like 'Chikwik. .Kwik. Chikwik' A female taken in February from Chasilakha was lactating.

Ratufa bicolor gigantea (McClelland)

(The Large Malay Squirrel)

1839. *Sciurus giganteus* McClelland, *Proc. zool. Soc. Lond.,*: 150.
1849. *Sciurus macruroides* Hodgson, *J. Asiat. Soc. Beng.*, **18** : 775.
1923. *Ratufa gigantea stigmosa* Thomas, *J. Bombay nat. Hist. Soc.*, **29** : 86.
1947. *Ratufa bicolor gigantea*, Ellerman, *J. Mammal.*, **28** : 260.

Material.—1♂: Chasilakha, *c* 1860 m., W. Bhutan; 5 Feb., 1969. 1♂: Panjurmane, *c* 1525 m., C. Bhutan; 8 Dec., 1967. 1♀: Shamgong, *c* 1960 m., C. Bhutan; 3 Nov., 1967. 1♀: Batase, *c* 1433 m., C. Bhutan; 17 Nov. 1967. 1♀: Langsaran, *c* 1250 m., E. Bhutan; 3 May 1966.

Measurements:

External.— 2♂♂: H. & B. 371, 379; Tl. 482, 501; H.F. 74, 78; e. 33, 35. 3♀♀: H. & B. 362, 390, 405; Tl. 422, 440, 481; H.F. 77, 80, 87; e. 27, 34, 37.

Cranial.— 2♂♂: on. 73.5, 76.1; pal. 31.8, 34; nas. 22.1, 22.1; fr. 29.2, 30; or. 25, 26.4; TR. 14, 14.3. 2♀♀: on. 76, 78; pal. 33.1, 33.8; nas. 23, 24; fr. 31, 31.5; or. 26.8, 27; TR. 14.4, 15.

Mammae: 2—1 = 6.

Tail tip brown with a little admixture of white. The fleshy part of the tail tip of the specimen from Langsaran was abnormally swollen, presumably an after-effect of some earlier injury.

Family Muridae

Rattus rattus brunneusculus (Hodgson)

1845. *Mus brunneusculus* Hodgson, *Ann. Mag. nat. Hist.*, **15** : 267.
1919. *Rattus rattus sikkimensis* Hinton, *J. Bombay nat. Hist. Soc.*, **26** : 394.
1947. *Rattus rattus brunneusculus*, Ellerman, *J. Mammal.*, **28** : 380.

Material.—2♀♀: Wangdu Phodrang, Punakha Valley, *c* 1372 m., W. Bhutan; 23 and 24 Feb., 1969. 1 subad. ♂: Gaylegphug, *c* 153 m., C. Bhutan; 9 Nov. 1967.

Measurements:

External.— 1 subad. ♂: H. & B. 129; Tl. 131; H.F. 29; e. 19. 2♀♀: H. & B. 166, 180; Tl. 178, 192; H.F. 32, 32; e. 22, 23.

Cranial.— 1 subad. ♂: on. 34.4; pal. 18.4; apf. 6.8; nas. 11.9; TR. 6.4; bul. 6; dia. 9. 2♀♀: on. 40, 41.5; pal. 22.4, 24.5; apf. 7, 7.9; nas. 14, 15.9; TR. 6.9, 6.9; bul. 6.8, 6.8; dia. 10.6, 11.5.

Weights.— 1 subad. ♂: 45 g. 2♀♀: 110 g., 140 g.

Tail though always longer than head and body, is somewhat shorter than that of the specimens present in the Zoological Survey of India. Compared with the measurements given by Ellerman (1963), too, my specimens have shorter tail.

In a specimen from Wangdu Phodrang the molars are worn out to such an extent that only the remnants of the first lamina of the left m^1, and the first and third laminae of the right m^1 are present.

This is the first record of *brunneusculus* from Bhutan.

Rattus rattus tistae Hinton.

1918. *Rattus rattus tistae* Hinton, *J. Bombay nat. Hist. Soc.*, **26** : 68.

Material.—3♂♂, 2 subad. ♂♂, 2 ♀♀: Wangdu Phodrang, Punakha valley, *c* 1372 m., W. Bhutan; 23 Feb. to 9 Mar., 1969. 3♂♂, 1♀: Putlibir, *c* 2103 m., W. Bhutan; 9 and 10 Mar. 1969. 1♀: Simtokha, Thimpu Valley, *c* 2408 m. W. Bhutan; 21 Feb. 1969. 1♂, 1♀, 3 subad. ♀♀ : Batase, *c* 1433 m. C. Bhutan; 18 to 20 Nov., 1967. 1♂: Tama *c* 1130 m., C. Bhutan; 26 Nov. 1967. 6♂♂, 5 subad. ♂♂, 9 ♀♀, 5 subad. : ♀♀. Shamgong, *c* 1960 m., C. Bhutan; Nov. and 1 Dec. 1967.

Measurements:

External.—	12♂♂	10♀♀
H. & B.	146, 147, 148, 150, 157, 160, 162, 162, 170, 175, 184, 190.	146, 155, 157, 173, 173, 175, 175, 178, 180, 185.
Tl.	130, 149, 151, 151, 151, 156, 166, 170, 175, 186, 194, —,	144, 145, 155, 169, 169, 175, 178, 178, 180, —.
H.F.	31, 33, 33, 34, 34, 34, 34, 34, 35, 35, 38, —.	32, 32, 33, 33, 34, 34, 35, 35, 35, 35.
e.	21, 21.5, 22, 22, 22, 22, 22, 22, 22, 23, 25, —.	21, 22, 22, 22, 22, 22, 22, 22.5, 23, 23.

Cranial.—	9♂♂	4♀♀
on.	30, 35.8, 36.1, 36.5, 37.2, 38.6, 39.5, 40.1, 44.6.	41, 43, 43, 43.3.
pla.	18.5, 19, 19.2, 19.8, 20.7, 20.8, 21.2, 22.3, 23.9.	22.4, 23.6, 23.8, 24.2.
apf.	5.2, 6, 6.1, 6.2, 6.8, 6.8, 6.8, 7.9, 8.1.	7.1, 7.6, 8, 8.

nas.	12.5, 12.8, 12.9, 13.9, 14, 14.3, 14.3, 16.2, 16.5.	15.6, 16, 18, 18.3,
TR.	6.2, 6.3, 6.3, 6.5, 6.5, 6.8, 6.8, 6.9, 7.	6.6, 6.8, 6.8, 7.
bul.	5.9, 6, 6, 6, 6, 6, 6, 6.1, 6.8.	6.2, 6.5, 6.5, 6.5.
dia.	8.4, 8.8, 9.2, 10, 10.3, 10.5, 10.8, 11.4, 12.9.	11, 11.9, 12, 12.

Weights	9 ♂♂	6 ♀♀
	30 g., 57 g., 82 g., 87 g., 100 g., 110 g., 135 g., 155 g., 210 g.	50 g., 56 g., 90 g., 140 g., 179 g., 186 g.

Mammae: 3—1—2 = 12.

This is the commonest house rat of Bhutan. In comparison with material of *tistae* in the Zoological Survey of India, fur in the present specimens is long and soft. The length of tail varies from 85.5% to 105% of the head and body length, agreeing with Ellerman's (1963) measurements but differing from those of Hinton (1918) who gave the tail length as 122% to 124%. Tail is dark and unicolored except in three specimens in which it is tipped with white. The greatest lengths of the hindfoot, occipitonasal, palatal and diastema differ somewhat from the recorded measurements in published works; these are 38, 44.6, 24.2, 12.9 respectively in my material as against 35, 42, 22.7 and 11.2 recorded in literature.

The specimens from Wangdu Phodrang and Putlibir appear to be pathological cases inasmuch as their fingers, toes, distal part of tail, and facial region are decayed much like in advanced cases of leprosy in man. In two specimens, even the nasal bones and teeth are affected.

Teats are not prominent in the females taken in November. A female taken in March from Wangdu Phodrang was pregnant.

This is the first record of *tistae* from Bhutan.

Rattus rattus tistae Hinton⇌**Rattus rattus brunneusculus** (Hodgson)

Material.—1 ♀: Batase, *c* 1438 m., C. Bhutan; 19 Nov. 1967.

Measurements:

External.— H. &. B. 182; Tl. 181; H.F. 33; e. 23.

Cranial.— on, 43; pal. 23.6; apf. 7.6; nas. 18; TR. 6.8; bul. 6.5; dia. 12.

The dark-bellied *tistae* occurs extensively with the white-bellied *brunneusculus*, so that Ellerman (1963) regarded the former as a commensal type. The present specimen is of much interest as its undersurface is dark for the greater part but with a distinct white streak along the midventral region extending from throat to anus. From the nature of the coloration of the belly it appears to be an intergrade between *tistae* and *brunneusculus*. This led me to examine 93 adult specimens of *tistae* and *brunneusculus* from Darbhanga (Bihar), Nepal, Darjeeling

(West Bengal), Sikkim, and Assam present in the Zoological Survey of India collection, in addition to those of Bhutan with a view to studying the nature of the coloration of the belly. The study reveals that considerable intergradation takes place between these two subspecies at least in the region of Nepal, Darjeeling, Bhutan and Assam (Table I).

TABLE 1.—Showing the percentage of intergrades between *Rattus rattus tistae* and *Rattus rattus brunneusculus*.

Locality	No. of specimens	White-bellied	Dark-bellied	Inter-grades	Percentage of intergrades
Darbhanga	3	0	3	0	0%
Nepal	14	10	2	2	14%
Darjeeling	46	14	27	5	11%
Sikkim	5	4	1	0	0%
Bhutan	31	2	28	1	3%
Assam	25	10	12	3	12%

Out of the 11 intergrades, the one from Bhutan has already been described. In five other specimens the undersurface is white but in the region of the chest it is dark. In two a dark stripe extends from the throat to belly. In the other three undersurface is dark but with a white streak about 70 mm. long, on the belly.

Rattus rattus brevicaudus n. subsp.

Material.—Holotype: Adult ♀; Tashigong, Manas Valley, *c.* 1800 m., E. Bhutan; 4 April, 1966; coll. B. Biswas. Skin and skull deposited in the Zoological Survey of India.

Paratypes: 3 adult ♂♂, 2 subad. ♂♂, 1 adult ♀; Tashigong, Manas Valley, *c* 1800 m., E. Bhutan; 4 Apr., 1966; coll. B. Biswas; deposited in the Zoological Survey of India.

Diagnosis.—Differs from all other known subspecies of the species by the possession of the following combination of characters: (1) Fur on the dorsal surface very long, soft, basally slate in colour, with a subterminal or terminal Orange-Ochraceous band, when subterminal there is a very narrow black terminal band. (2) Belly perfectly white. (3) Tail always shorter than head and body length (Table 2). (4) Hind-foot relatively smaller, being only 15 to 17% of the head and body length. (Table 2). (5) Mammae 8 or 10. (6) Skull moderately large, occipitonasal length more than 40 mm. (7) Bullae well developed and longer than upper tooth row (Table 2).

Rattus r. brevicaudus is allied to *R. r. brunneusculus* (Hodgson), *R. r. tistae* Hinton, *R. r. bullocki* Roonwal, *R. r. tikos* Hinton, but differs from them as follows: From *brunneusculus* by (*i*) tail being always shorter than head and body, (*ii*) length of bulla being greater than upper tooth row; from *tistae* by (*i*) the colour of the dorsal fur being Orange-Ochraceous occasionally with terminal black band, (*ii*) white belly, (*iii*) tail always shorter than head and body, (*iv*) having smaller hindfoot; from *bullocki* by (*i*) tail being always shorter than head and body, (*ii*) having smaller hindfoot; from *tikos* by (*i*) having tail always shorter than head and body, (*ii*) and shorter hindfoot.

TABLE 2.—External and Cranial measurements of five subspecies of *Rattus rattus* (Linnaeus).

Measurements	*brunneusculus*	*tistae*	*tikos*	*bullocki*	*brevicaudus*
Head and body length	14♂♂ 140—203(164) 15♀♀ 151—203(173)	17♂♂ 142—198(162) 12♀♀ 148—175(161)	9♂♂ 161—210(181) 7♀♀ 156—195(171)	40♂♂ 150—191(174) 41♀♀ 148—193(170)	3♂♂ 193—212(199) 2♀♀ 173, 183(178)
Tail length	14♂♂ 188—230(208) 15♀♀ 167—238(209)	17♂♂ 136—196(172) 12♀♀ 158—208(168)	9♂♂ 161—200(181) 7♀♀ 168—188(179)	40♂♂ 133—216(173) 41♀♀ 131—216(172)	3♂♂ 164—167(165.5) 2♀♀ 165, 168(166.5)
Percentage of tail length in relation to head and body length	14♂♂ 112—134%(121%) 15♀♀ 108—119%(116%)	17♂♂ 84—120%(106%) 12♀♀ 96—127%(108%)	9♂♂ 82—115%(102%) 7♀♀ 89—103%(105%)	40♂♂ 72—127%(100.4%) 41♀♀ 73—127%(100.5%)	3♂♂ 80—84%(82%) 2♀♀ 91%,93%(92%)
Hindfoot	14♂♂ 31—37(35.5) 15♀♀ 31—36(32.5)	17♂♂ 29—36(32) 12♀♀ 30—35(32)	9♂♂ 32—38(35.4) 7♀♀ 32—34(33)	40♂♂ 28—36(32) 41♀♀ 29—36(32)	3♂♂ 30—33(31) 2♀♀ 27.5, 31(29)
Percentage of hindfoot in relation to head and body length	14♂♂ 18—22%(19%) 15♀♀ 17—21.5%(19.2%)	17♂♂ 15—23%(19%) 12♀♀ 18—21.5%(20%)	9♂♂ 19—21%(19.5%) 7♀♀ 17—21%(19%)	40♂♂ 12—22%(19%) 41♀♀ 13—22%(18.2%)	3♂♂ 15—16%(15%) 2♀♀ 15%, 17%(16%)
Occipitonasal length	9♂♂ 38.5—43.7(42) 11♀♀ 38.5—43.5(40)	13♂♂ 36.1—44.6(39.8) 9♀♀ 38—43.3(40.5)	6♂♂ 39.6—44.3(41.7) 3♀♀ 40—41.3(40.8)	13♂♂ 37—43.5(40.3) 12♀♀ 36—43(40.1)	3♂♂ 41—41.8(41.3) 2♀♀ 40.3, 42(41.1)
Upper tooth row	9♂♂ 6.8—7.4(7.3) 11♀♀ 6.7—7.4(7)	13♂♂ 6.2—7.3(6.5) 9♀♀ 6.2—7(6.7)	6♂♂ 6.6—7.2(6.9) 3♀♀ 6.4—7(6.6)	13♂♂ 6.2—7.5(6.9) 12♀♀ 6.1—7.5(6.9)	3♂♂ 6.8—7(6.9) 2♀♀ 6.9, 6.9(6.9)
Bullae	9♂♂ 6.4—7.1(6.8) 11♀♀ 6.5—7.2(6.8)	13♂♂ 6—7.3(6.6) 9♀♀ 6.2—7.4(6.9)	6♂♂ 6.9—8(7.3) 3♀♀ 7.2—8(7.5)	13♂♂ 6.6—8.5(7.4) 12♀♀ 6.6—7.7(7.2)	3♂♂ 6.9—7.4(7.2) 2♀♀ 6.9, 7.3(7.1)

Measurements of holotype:

External.— H. & B. 183; Tl. 168; H.F. 31; e. 24.
Cranial.— on. 42; pal. 22.5; apf. 6.1; nas. 16.6; TR. 6.9;bul. 7.3; dia. 11.

Rattus niviventer ? niviventer (Hodgson)
(The White-bellied Rat)

Material.—1♂: Susuna, Ha Road, *c* 2350 m., W. Bhutan; 11 Feb. 1969.

Measurements:

External.— H. & B. 139; Tl. 182; H.F. 25; e. 26.
Cranial.— on. 37; pal. 17.6; apf. 6; nas. 13.8; TR. 6.1; bul. 5; dia. 9.

Colour of the back cold gray with a certain admixture of brown, and not black as mentioned by Ellerman (1963). The specimen is somewhat large for this subspecies, and in both external and cranial measurements appears closer to *R. n. mentosus* Thomas. However, it has provisionally been placed under *niviventer* on geographical consideration.

The present specimen constitutes the first record of *R. niviventer* from Bhutan.

Rattus nitidus nitidus (Hodgson)
(The Himalayan Rat)

1845. *Mus nitidus* Hodgson, *Ann. Mag. nat. Hist.*, **15** : 267.
1845. *Mus pyctoris* Hodgson, *Ann. Mag. nat. Hist.*, **15** : 267.
1845. *Mus horeites* Hodgson, *Ann. Mag. nat. Hist.*, **15** : 268.
1849. *Mus aequicaudalus* Hodgson, *Ann. Mag. nat. Hist.*, **3** : 203.
1947. *Rattus nitidus nitidus:* Ellerman, *J. Mammal.*, **28** : 378.

Material.—1 subad. ♂, 1♀: Mithangar, *c* 1525 m., E. Bhutan, 3 May 1966.

Measurements:

External.— 1♀: H. & B. 175; Tl. —, H.F. 33; E. 22.
Cranial.— 1♀: on. 44; pal. 24; apf. 7.5; nas. 17; TR. 6.2.
Weights.— 1♂: 55 g. 1♀: 148 g.
Mammae: 1—2—1—2 = 12.

The subadult specimen is darker than the adult and the coloration of its sides are not well marked from the ventral surface.

This is the first record of *R. nitidus* from Bhutan.

Mus pahari jacksoniae (Thomas)
(The Sikkim Mouse)

1921. *Leggada jacksoniae* Thomas, *J. Bombay nat. Hist. Soc.*, **27** : 596.
1947. *Mus pahari jacksoniae:* Ellerman, *J. Mammal.*, **28** : 382.

Material.—1♂: Putlibir, *c* 2103 m., W. Bhutan; 9 Mar. 1969.

Measurements:

External.— H. & B. 83; Tl. 82; H.F. 19; E. 16.5.
Cranial.— on. 23.6; pal. 11.6; apf. 4; nas. 8.5; TR. 3.5; bul. 3.4; dia. 6.1.

Ellerman (1963) stated that the fur in this species is bristly and spiny, but in the present specimen the fur is long and soft.

Diastema long, more than one-fourth of the occipitonasal length.

This is the first record of this species from Bhutan.

Observations on other species

The Assamese Macaque (*Macaca assamensis* McClelland): A troop comprising of about 20 adults with a few young ones clinging to their mothers was noticed in the forest near Shamgong.

The Asiatic Black Bear (*Selanarctos thibetanus* (G. Cuvier)): Footprints and faecal matters were seen at Shamgong. Its call was heard in the evening at Shamgong, Panjurmane and Ganglakha.

The Leopard (*Panthera pardus* (Linnaeus)): Its pug-marks were noticed in the dry bed of Ai river at Gaylegphug.

The Yellow-throated Marten (*Martes flavigula* (Boddaert)): A pair was seen at the base of an Oak tree near Susuna. At the sight of the party they jumped away inside the thick forest.

The Sambar (*Cervus unicolor* Kerr): Footprints were seen almost everywhere.

The Bharal (*Pseudois nayaur* (Hodgson)): A single animal was seen at dusk in a hill slope near Shamgong.

The Indian Elephant (*Elephas maximus* Linnaeus): Footprints and faecal matters were seen in the forests in Gaylegphug and Ganglakha.

Summary

An account of the mammalian fauna of Bhutan based mainly on the collections from western, central and eastern Bhutan made by the Zoological Survey of India parties during 1966, 1967, 1969 is given. The present account includes report on 104 specimens comprising of 20 species and subspecies, together with those seen in the field but not collected.

Taxonomic status of three species and subspecies, *Petaurista magnificus* (Hodgson), *Callosciurus erythraeus bhutanensis* (Bonhote), *Dremomys lokriah bhotia* Wroughton, and of the genus *Tamiops* Allen have been discussed.

A new subspecies of *Rattus rattus* (Linnaeus) has been described, which can be differentiated from all its nearest allies by its tail being always shorter than head and body, and by several other features.

Intergradation between *Rattus rattus tistae* Hinton and *Rattus rattus brunneusculus* (Hodgson) has been reported.

Structure of bacula of *Callosciurus erythraeus bhutanensis* (Bonhote) and *Tamiops macclellandi macclellandi* (Horsfield) have been described. Variations in coloration, size, etc., have been reported in a number of forms.

Field observations on several species of mammals have been included.

Altogether 11 species are recorded for the first time from Bhutan.

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