

XX NOTES ON VIVERRIDAE.

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The Director of the Zoological Survey of India has submitted to us a series of this family, mainly from the immediate vicinity of Calcutta, and we have therefore examined the whole of the material in our collection. The Indian and Indo-Malayan forms we are able to recognize are:—

Genus *Viverra* Linn.

<i>Viverra zibetha zibetha</i> , Linn.	North Peninsular India, Himalayas.
<i>Viverra zibetha pruinosa</i> , Wroughton.	Burma, Tenasserim, S.W and S. E. Siam.
<i>Viverra zibetha sigillata</i> , subsp. nov.	South Malay Peninsula.
<i>Viverra megaspila megaspila</i> , Blyth.	Burma, Siam, Malay Peninsula.
<i>Viverra megaspila civettina</i> , Blyth.	South India.
<i>Viverra tangalunga tangalunga</i> , Gray.	Malay Peninsula, Borneo, Sumatra.
<i>Viverra tangalunga lancavensis</i> , subsp. nov.	Langkawi Id., Straits of Malacca.

The races may be recognised by the following key:—

1.	<ul style="list-style-type: none"> { White tail rings unbroken above 2 { White tail rings interrupted above 4 		
2.	<ul style="list-style-type: none"> { Pattern distinct <i>V. z. sigillata</i>. { Pattern indistinct 3 		
3.	<ul style="list-style-type: none"> { General colour greyer <i>V. z. zibetha</i>. { General colour yellower <i>V. z. pruinosa</i>. 		
4.	<ul style="list-style-type: none"> { Dark bars on tail less than ten 5 { Dark bars on tail more than ten 6 		
5.	<ul style="list-style-type: none"> { Markings on flanks and haunches confluent; black on tail less extensive <i>V. m. megaspila</i>. { Markings on flanks and haunches discrete; black on tail more extensive <i>V. m. civettina</i>. 		
6.	<ul style="list-style-type: none"> { Spots on body and rings on tail more conspicuous; general colour darker <i>V. t. tangalunga</i>. { Spots on body and rings on tail less conspicuous; general colour paler <i>V. t. lancavensis</i>. 		

Viverra zibetha zibetha, Linn.

There are three recent specimens from Calcutta which are typical of the form inhabiting the plains of Northern India.

Another from Darjiling has the pelage softer and more woolly as might be expected from the climatological conditions: it represents *V undulata*, Gray (*Spic. Zool.* pl. 8, p. 9) which, however, we are not at present prepared to recognize. The same type of animal is found in the Abor Hills. Another specimen without locality (Zool. Survey India No. 10,391) is indeterminable sub-specifically: the flanks are distinctly marked, but there is a tendency to interruption of the white tail bands.

V z. picta described by Wroughton on the same page, but before *V z. pruinosa (postea)*, and based on animals from Khamti, Upper Chindwin, Burma, has since been withdrawn by that author (*op. cit.*, XXVI, 1918, p. 46). It must, presumably, be regarded as synonymous with *V z. zibetha*.

***Viverra zibetha pruinosa*, Wroughton.**

Fourn. Bombay, Nat. Hist. Soc. XXIV, 1915, p. 64 (Tenasserim).

Mr. Wroughton appears to have inadvertently reversed the characters of this subspecies. So far from being greyer and less yellowish than the typical race, specimens from Tenasserim and neighbouring districts are invariably more yellow and less grey. We are in possession of two paratypes; also an example from Koh Lak, S.W. Siam, in the same latitude, and another from Sriracha, S.E. Siam, a little to the north on the opposite side of the Gulf of Siam.

***Viverra zibetha sigillata* subsp. nov.**

Viverra zibetha pruinosa, Kloss (*nec* Wroughton), *Fourn. Nat. Hist. Soc. Siam*, II, 1917, p. 292

Type. Adult male (skin and skull): Bang Nara, Patani, Peninsular Siam, collected by Messrs. W J F. Williamson and M. A. Smith's native collector. 16th July, 1916. No. 2477/C.B.K.

Differs from the two other races in having the pattern above clearly defined; the forelimbs with a distinct tendency to bars and the under surface with dark blotches and markings more defined on the flanks. External measurements (taken in the flesh):—Head and body, 818; tail, 435; hindfoot (without claw) 121; ear, 51mm. Skull measurements:—greatest length, 142; basal length, 130; zygomatic breadth, 67.5; breadth of brain case, 39; maxillary tooth row exclusive of incisors (alveoli) 53; greatest length of upper sectorial, 14.7 mm.

Specimens examined. The type; one from Pelarit, Perlis; two from Perak (Temangoh and Taiping) and two from Selangor (Kuala Lumpur).

***Viverra megaspila megaspila*, Blyth.**

Two adults from Taiping and Kuala Lumpur. The black spots on the sides and haunches stand out with great distinction

on a deep buff ground. The type, which is no longer in existence, came from near Prome, North Pegu, Burma.

Viverra megaspila civettina, Blyth.

We have examined the skull of the type and a flat skin with no exact provenance (Zool. Survey India. No. 10,394). The latter differs from *M. megaspila* only in having the marks on the haunches more confluent, the spots on the sides smaller, the erectile mane carried further up the neck and the tail rings much larger.

In the type skull the posterior upper premolar is larger than in either *V. zibetha* or *V. m. megaspila* and the anterior upper molar is also larger and more quadrate in outline than in other species: the bullae are highly compressed. All these characters, however, may be purely individual and series of the south Indian animal are highly desirable.

Viverra tangalunga lancavensis subsp. nov.

Type. Adult female (skin and skull) from Batu Puteh, Langkawi Id., Straits of Malacca, 8th December, 1912. Collected by H.C. Robinson and C. Boden Kloss. F.M.S. No. 542/12.

Differs from Peninsular Malayan and Bornean animals in having the ground colour distinctly paler and less buffy and in having the spots on the body and rings on the tail reduced in size and less conspicuous. External measurements taken in the flesh:—Head and body, 650; tail, 342; hindfoot, 103; ear, 30;

Skull measurements:—greatest length, 130; basal length, 111; zygomatic breadth, 61; maxillary tooth-row exclusive of incisors (alveoli), 47; greatest length of upper sectorial, 12.5mm. Specimens examined: One, the type.

Genus *Viverricula* Hodgson.

The series of this genus available to us shows that the original genotype founded on specimens and figures of animals obtained by Sonnerat in Malacca is easily separable from Peninsular Indian races by several characters of the tail, which in *Viverricula malaccensis malaccensis* (Gm.) is much paler towards the tip and has only seven dark rings against the eight of the Indian animals.

Specimens from Calcutta sufficiently agree with Gray's figure of *Viverra bengalensis* inhabiting "most part of Bengal" (*Ill. Ind. Zool.* I, 1830-2, pl. 4) and must be known as *Viverricula malaccensis bengalensis* (Gray and Hardw.). The Calcutta specimens are greyish buff, quite without any rufous tinge, and have the stripes and spots clear black and sharply defined.

Specimens from the neighbourhood of the Chilka Lake, on the borders of Orissa and Madras, are more reddish; but one from

Dharwar, South Mahratta country, resembles in colour one from Calcutta. All the skulls, however, differ from the Calcutta examples in their small size and much smaller bullae which are both shorter, lower and more compressed than in the northern form: greatest lengths:—Chilka, 94–95; Dharwar, 95 mm. against Calcutta, 104–105 mm. (one subadult example 103 mm.).

For the present we regard Chilka and Dharwar animals as representative of *Viverricula malaccensis indica* (Desmarest, *Nouv. Dict. d'Hist. Nat.*, VII, 1817, p. 170).

We have not seen *Viverricula malaccensis deserti*, Bonhote (*Ann. and Mag. Nat. Hist.* (7), I, 1898, p. 120) from Rajputana which is probably well entitled to subspecific rank.

A specimen from Cachar is impossible to identify subspecifically: it is boldly marked but the number of rings on the tail ally it to eastern rather than to Indian forms.

Kloss has recently described from South Central Siam as *Viverricula malaccensis thai* (*Journ. Nat. Hist. Soc. Siam* III, 1919, p. 352) a subspecies rather paler and duller than *V. m. malaccensis* and with skull characters approximating towards *V. m. rasse* (Horsfield) of Java. This probably extends into Southern Burma.

Genus *Paradoxurus* F. Cuv.

Dr. Annandale has submitted to us photographs of Buchanan-Hamilton's original paintings of *Ichneumen prehensilis* and *Ichneumen bondar* which formed the basis for the descriptions of Desmarest's *Viverra prehensilis* and *Viverra bondar* (*Mammalogie*, 1820, pp. 207, 210).

We have received specimens from the vicinity of Calcutta which quite agree with Buchanan-Hamilton's figures and with the descriptions based on them by Desmarest.

Viverra prehensilis is the first name applied to any Indian *Paradoxurus* and the Bengal form would bear the name *P. hermaphroditus prehensilis* were it not that Desmarest's name is preoccupied by *Viverra prehensilis*, Kerr (*Animal Kingdom*, 1792, p. 169 = *Cercoleptes caudivolvulus*, the Kinkajou, fide Blanford, *P.Z.S.* 1885, p. 784). The name, therefore, of the Bengal subspecies must be *Paradoxurus hermaphroditus bondar* (Desm.) to the figure of which many Calcutta specimens closely approximate. So, indeed, do others to the figure of *Viverra prehensilis*: but all races of *Paradoxurus* show a good deal of variation within themselves due principally to age and we are not prepared to admit, on the existing material, the occurrence of two forms or species in Bengal.

In addition we have a specimen from Dharwar obtained by the Mammal Survey of the Bombay Natural History Society which has been listed by Wroughton as *Paradoxurus niger* (*Viverra nigra* Desmarest, *op. cit.* p. 208, Pondicherry) and which, allowing for certain individual abnormalities, agrees with Desmarest's description.

On the other hand the specimen will not fit in with Wroughton's synopsis of the genus as given later (*Journ. Bombay Nat. Hist. Soc.* XXV, 1917, pp. 48-51; XXVI, 1918, p. 49) and we cannot but think that some topographical confusion has taken place.

The Zoological Survey also possesses a specimen from the Dafla Hills which agrees, so far as its condition permits to say, with the form described as *Paradoxurus vicinus* Schwarz (*Ann. and Mag. Nat. Hist.* (8) VI, 1910, p. 230) from Assam which Wroughton has identified with *Paradoxurus hermaphroditus strictus*, Horsfield (*Ann. and Mag. Nat. Hist.* (2) XVI, 1837, p. 105. Nepal plains).

It appears that *Paradoxurus birmanicus*, Wroughton (*op. cit.* XXIV, 20th March 1917, p. 51), from Sagaing, Upper Burma, is antedated by *Paradoxurus hermaphroditus laotum* Gyldenstolpe (*Kunigl. Sv. Vet. Akad. Handl.*, 57, No. 2, 2nd Feb. 1917, p. 26, pl. iv, figs. 2, 4) from Chiengmai, North Siam, since Wroughton himself says that this race extends throughout Burma eastwards into Siam and south to meet in Tenasserim *P. h. rarus* Miller, which is the North Malayan form. More recently Gyldenstolpe, who has presumably examined Burmese material, states (*Journ. Nat. Hist. Soc. Siam*, III, 1919, p. 147, note) that *P. birmanicus* is absolutely identical with *P. h. laotum*.

A specimen in the Zoological Survey recorded as from Rangoon but obtained from a Menagerie is not this race but belongs to the *bondar* section and can be matched by examples from Calcutta. Its locality is probably wrong.

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