

32. The Duke of Bedford's Zoological Exploration of Eastern Asia.—XIV. On Mammals from Southern Shen-si, Central China. By OLDFIELD THOMAS, F.R.S., F.Z.S.\*

[Received and Read April 25, 1911.]

(Plate XXIX. †)

As already indicated in paper No. XIII. of the present series ‡, Mr. Malcolm Anderson and his party, working on behalf of the Duke of Bedford, obtained a considerable number of mammals in Southern Shen-si before going on to Kan-su and Sze-chwan, whence the series described in that paper was collected. Owing to delay in transport, however, a large part of the Shen-si collection has only recently arrived, and the diagnoses of *Myotis myosotis ancilla*, *Microtus nux* and *M. johannes* § are all that have been published upon it.

The present paper gives a list of all the specimens obtained in S. Shen-si by Mr. Anderson between his second landing in China in the autumn of 1909 and his move on into Kansu in 1910.

The regions explored were, firstly, the district round Shang-chou, S.E. Shen-si (about 33° 40' N., 110° 20' E.), and, secondly, the important mountain Tai-pei-san (about 34° N., 107° 30' E.), one of the sacred Chinese mountains, another being Omi-san, Sze-chwan, where at a later period Mr. Anderson obtained the many new species described in my Sze-chwan paper.

Of the majority of the Shen-si specimens there is little new to record, as Mr. Anderson had obtained the same species on his previous visit to the more northern part of the province. But in any case their interest is dwarfed by the discovery on Tai-pei-san of a magnificent species of Takin, quite different from the known W. Chinese species *Budorcas tibetanus*, and both in interest and beauty one of the most striking mammals that it has ever been my good fortune to describe.

Besides this fine animal, of which a coloured figure is given (Pl. XXIX.), Mr. Anderson obtained a new Badger, a new Pika, and a new Vole ||.

1. RHINOLOPHUS FERRUM-EQUINUM Schreb.

♀. 2079, 2080, 2081. Shang-chou District, S.E. Shen-si.

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† For explanation of the Plate see p. 695.

‡ P. Z. S. 1911, p. 158.

§ P. Z. S. 1910, p. 635.

|| The complete account of these new forms appears here, but the names and preliminary diagnoses of the species underlined were published in the 'Abstract, No. 95, 1911.—EDITOR.

## 2. MYOTIS MYOSOTIS ANCILLA Thos.

♂. 2082, 2083, 2084. ♀. 2085. Shang-chou Dist., S.E. Shen-si.

The typical series (*cf.* P.Z.S. 1910, p. 636), no. 2082 (B.M. No. 10.5.2.4.) the type.

## 3. CROCIDURA ATTENUATA M.-Edw.

♂. 2009. King-tze-Kwan, S.W. Honan. 850'.

## 4. CROCIDURA COREÆ Thos.

♂. 2185. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 7000'.

## 5. FELIS FONTANIERI M.-Edw.

♀. 2038. Shang-chou District, S.E. Shen-si. 3000'.

This fine Leopard is a valuable accession to the Museum collections.

## 6. FELIS MICROTIS M.-Edw.

♂. 2176. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 3600'.

## 7. VIVERRA ZIBETHA, subsp. ?

2192. Native skin. 40 miles N. of Han-chung-fu, Shen-si.

This specimen does not agree with the description of the Civet called *V. filchneri* by Matschie, but how far the colour-characters used by him are likely to be diagnostic in so variable a group I am not at present prepared to say.

## 8. PAGUMA LARVATA Gray.

♂. 2053. Shang-chou Dist., S.E. Shen-si. 2300'.

## 9. VULPES sp.

♂. 2178. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 3600'.

## 10. LUTREOLA SIBIRICA Pall.

♂. 2070. Shang-chou Dist., S.E. Shen-si.

♀. 2118. Si-ngan-fu, Shen-si. 1200'.

## 11. ARCTONYX LEUCOLÆMUS ORESTES.

Thos. Abstr. P. Z. S. 1911, p. 27 (May 2).

♀. 2191 (young adult). Tsin-ling Mts., 34° N., 107° 45' E., S.W. Shen-si. Alt. 12,000'. 25 January, 1910. B.M. No. 11.6.1.6. *Type.*

Distinguished from the true *leucolæmus* of Peking by the following characters:—

Dark mark enclosing eye not broadly projected forwards and downwards to the upper lip, but practically confined to a strong spectacle-mark, barely half an inch broad, surrounding the eye; a narrow and indistinct line only running forwards to the base of the whiskers, the upper lips quite white. Dark patch behind mouth much reduced, a trace only of it running forward to the

angle of the mouth, separated from its fellow of the opposite side by a white interramial space over an inch broad. Light throat-patch not really white, but brownish white, figured in *leucolæmus* as snowy white. Light patch in front of ear less prominent, continuous with but darker than that under the eye. White ear-rim much broader and more prominent. Back more broadly washed with whitish than appears to be the case in *leucolæmus*, the dorsal hairs white for their terminal 15–20 mm., while only their points are said to be white in *leucolæmus*. Tail wholly white.

Dimensions of the type, measured in the flesh :—

Head and body 570 mm.; tail 195; hind foot 94; ear 45.

Skull: condylo-basal length 132 mm.; basal length 123; greatest breadth 72; interorbital breadth 29; palatal length 86; greatest diameter of  $m^1$  16.

*Hab.* and *type* as above.

The British Museum had previously possessed no examples of the N. Chinese *Arctonyx*, so that this fine specimen is a valuable accession. On account of the differences above detailed I cannot refer it to the true *leucolæmus*, but think it represents a special subspecies, as is the case with so many other Shen-si mammals.

12. *PETAURISTA ALBORUFUS* \* M.-Edw.

2194. Native skin. Near Pao-Ning-Fu, N. Sze-chwan.

13. *TROGOPTERUS XANTHIPES* M.-Edw.

2055. Shang-chou Dist., S.E. Shen-si.

14. *SCIUROTAMIAS DAVIDIANUS* M.-Edw.

♂. 2022, 2037, 2052, 2065, 2066, 2067, 2069, 2087, 2095, 2104. ♀. 2054, 2059, 2096, 2105. Shang-chou Dist., S.E. Shen-si.

♂. 2106, 2115. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

♀. 2107. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

15. *EPIMYS CONFUCIANUS*, subsp.

♂. 2034, 2063, 2064. ♀. 2024, 2033, 2035, 2036, 2039. Shang-chou Dist., S.E. Shen-si.

♂. 2114. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

♀. 2010. King-tze-Kwan, S.W. Honan.

♂. 2012, 2014. ♀. 2015, 2016. Shan-nan-hsien, S.E. Shen-si.

♂. 2122, 2123, 2137, 2140, 2143, 2144, 2152, 2161. ♀. 2162. 30 miles S. of Feng-hsiang-fu. 3600'.

In my previous paper the Kan-su specimens of this group were assigned to *E. confucianus luticolor*, though tending to intergrade with the typical *E. confucianus* of Sze-chwan. But now, on laying out the whole of the N. China representatives of the group,

\* *Petaurista* is masculine, this being one of the numerous names which by their deceptive form render desirable the suggested convention that all generic names in zoology should be treated as masculine. See Stebbing, 'Knowledge,' xxxiii. p. 259, 1910.

I find that the true *E. c. luticolor* is a pale desert form peculiar to the region towards the Ordos desert, that the present S. Shen-si specimens are, as is geographically correct, intermediates between the *E. c. sacer* of Shantung on the east and the Kan-su form on the west, and that the latter is sufficiently differentiated to have a special subspecific name of its own. It may be called

*EPIMYS CONFUCIANUS CANORUS*, subsp. n.

General colour approximating to "clay-colour," slightly darker and more tawny than in *sacer*, much darker than in *luticolor*, lighter than in *confucianus*. Median darker dorsal line averaging more distinct than in *confucianus*, less than in *sacer*. White of under surface more markedly tinged with buffy or cream-colour than in the other subspecies (but there is a doubt as to how much this fades after death). Metatarsals without, or with but slightly marked, darker patches. Tail with the dark colour of its upper surface passing nearly or quite continuously to the end; its tip hardly so heavily tufted as in *sacer*.

Skull about as in *confucianus* and *luticolor*, smaller than in *sacer*.

Dimensions of the type, measured in the flesh:—

Head and body 120 mm.; tail 180; hind foot 27; ear 21.5.

Skull: greatest length 34.5 mm.; condylo-incisive length 30.5; upper molar series 6.

*Hab.* Southern Kan-su, grading eastwards into *sacer* and southwards into true *confucianus*. Type from Wen-hsien Country, S. Kan-su.

*Type.* Adult female. B.M. No. 11.2.1.110. Original number 2282. Collected 6 May, 1910.

16. *MUS WAGNERI* Eversm.

♂. 2094. Shang-chou Dist., S.E. Shen-si.

17. *APODEMUS SPECIOSUS PENINSULÆ* Thos.

♂. 2046, 2076, 2077. ♀. 2045, 2047, 2092, 2093, 2103. Shang-chou Dist., S.E. Shen-si.

♂. 2113. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

♀. 2126, 2132, 2136. 30 miles S. of Feng-hsiang-fu, S. Shen-si.

♂. 2167, 2169, 2172. ♀. 2166, 2168, 2174. Tai-pei-san. 10,600'.

18. *APODEMUS AGRARIUS PALLIDIOR* Thos.

♂. 2030. ♀. 2031, 2040, 2057, 2058, 2061. Shang-chou Dist., S.E. Shen-si.

♂. 2019. ♀. 2020. Shan-nan-hsien, S.E. Shen-si.

♀. 2108, 2109, 2112. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

9 ♂, 9 ♀. 30 miles S. of Feng-siang-fu, S. Shen-si. 3600'.

19. *MICROMYS MINUTUS* M.-Edw.

♂. 2056. Shang-chou Dist., S.E. Shen-si.

20. *CRICETULUS TRITON* Thos.

♀. 2011. King-tze-Kwan, S.W. Honan.

♂. 2013, 2018. Shan-nan-hsien, S.E. Shen-si.

♀. 2028, 2029, 2062. Shang-chou Dist., S.E. Shen-si.

21. *CRICETULUS ANDERSONI* Thos.

♂. 2116, 2117. Si-ngan-fu, S. Shen-si. 1200'.

22. *MICROTUS CALAMORUM SUPERUS*.

Thos. Abstr. P. Z. S. 1911, p. 27 (May 2).

♂. 2121, 2127, 2128, 2129, 2138, 2139, 2147, 2154, 2163, 2181, 2182, 2183.

♀. 2119, 2120, 2130, 2146, 2155, 2164, 2179, 2180. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 3600'.

A larger longer-tailed race of the Nanking Vole.

Fur longer and finer than in true *calamorum*, the hairs of the back about 16 instead of 10 mm. in length. Colour quite as in *calamorum*, except that all the specimens have a dull buffy suffusion in the surface-colour of the abdomen, this being only the case in certain of the younger examples of *calamorum*, the older ones having the belly clear greyish white. Tail longer than in *calamorum*, the usual length in adult specimens 60–63 mm., as against 52–53 in that animal, its coloration more prominently bicolor.

Skull like that of *calamorum*, but slightly longer than in specimens of similar age. Nasals longer. Bullæ generally larger.

Dimensions of the type, measured in the flesh:—

Head and body 130 mm.; tail 63; hind foot 24; ear 13.

Skull: condylo-basal length 33 mm.; condylo-incisive length 33.2; zygomatic breadth 17.8; nasals  $8.5 \times 3.6$ .

Type. Adult male. B.M. No. 11.6.1.45. Original number 2163. Collected 7 January, 1910.

This Shen-si representative of the Lower Yang-tze Reed-Vole is distinguishable by its longer tail and longer fur, the latter in obvious correlation with the greater altitude at which it is found.

23. *MICROTUS MANDARINUS* M.-Edw.

♀. 2032. Shang-chou Dist., S.E. Shen-si.

Skull. S.E. Shen-si.

The specimens referred to in the description of *Microtus johannes* (P. Z. S. 1910, p. 637).

24. *MICROTUS (CARYOMYS) NUX* Thos.

♂. 2041, 2042, 2043, 2072, 2073, 2088, 2089, 2090, 2097, 2098. ♀. 2044, 2050, 2091, 2100. Shang-chou Dist., S.E. Shen-si.

♂. 2110, 2111. Ching-ling Mts., Lo-nan-hsien, S. Shen-si.

Described from these specimens, P. Z. S. 1910, p. 636. No. 2089 (B.M. No. 10.5.2.79) the type.

25. *MICROTUS* (*CARYOMYS*) *EVA* Thos.

♂. 2173. Tai-pei-san, Tsin-ling Mts., S.W. Shen-si. 10,600'.

The typical series was obtained near Tai-chow, Kan-su, at a similar elevation.

26. *LEPUS* *SWINHOEI* Thos.

♂. 2145. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 3600'.

Represents *L. filchneri* Matsch., and also the Tai-pei-san subspecies "suppressed" by Dr. Allen\*, to which he, nevertheless, attaches the name *L. swinhoei brevinasus*.

Of all the many examples of *L. swinhoei* obtained by Mr. Anderson, whether topotypes from Shantung or from other localities, this specimen is one of those that agree most closely with the type collected by Swinhoe, owing to its being a dark-coloured individual, with its general buffy coloration more or less suffused with pinkish.

27. *OCHOTONA* *SYRINX*.

Thos. Abstr. P. Z. S. 1911, p. 27 (May 2).

♂. 2170. ♀. 2171. Tai-pei-san. 10,600'.

(?) ♂. 2071 (young). Shang-chou Dist., S.E. Shen-si. 3300'.

Related to *O. cansa*, but larger. Bullæ smaller.

Size distinctly larger than in *O. cansa* and *O. sorella*. Fur (in winter pelage) long and soft, not very thick; hairs of back about 16-17 mm. in length. General colour more blue-grey throughout than in *cansa*; head grey tinged with clay-colour; nape "smoke-grey"; dorsal area darker grey tinged with brown; rump nearly "mouse-grey." Flanks near "broccoli-brown." Under surface greyish, the bases of the hairs slaty, their tips greyish white. Ears greyish brown, their proectote blackish, their rims white; the tuft of long hairs at their inner base nearly "cinnamon." Hands and feet white above, the thickly haired palms and soles "smoke-grey."

Skull of the same general type as in *O. cansa*, of similar flattened form, the palatal foramina not subdivided. Size distinctly greater throughout; nasals of about the same shape, not narrowed as in *O. sorella*. Interorbital space and brain-case broader. Bullæ conspicuously smaller or at least lower, those of *O. cansa* being very large for so small a species.

Dimensions of the type, measured in the flesh:—

Head and body 142 mm.; hind foot 28.5; ear 16.

Skull: greatest length 36.5 mm.; condylo-incisive length 33.5; zygomatic breadth 18.5; nasals 11.8 × 5.4; interorbital breadth 4.3; breadth of brain-case 15.7; palatilar length 12; palatal foramina 9.2 × 3.7; upper cheek-tooth series (alveoli) 7.1.

*Hab.* Tai-pei-san.

\* Bull. Am. Mus. N. H. xxvi. p. 427, 1909.

*Type.* Adult male. B.M. No. 11.6.1.59. Original number 2170. Collected 9 January, 1910.

This is probably the species recorded as *O. cansa* by Dr. Allen \*, who had, however, only "skins with fragmentary skulls" for comparison with the single type of Dr. Lyon's species. The present perfect specimens, compared with the topotypical series of *O. cansa* obtained in Kan-su by Mr. Anderson, show that the species is readily distinguishable, both by its greater general size and its much less swollen bullæ.

No. 2071 is too young for certain determination, but it is interesting as still retaining in place the minute milk-predecessors of the small posterior incisors. The milk-teeth are pressed close against the front face of the permanent teeth, between these and the large incisors in front of them.

## 28. *Sus* sp.

♀. 2186. 30 miles S. of Feng-hsiang-fu, S. Shen-si.

In the state of confusion to which the late Père Heude reduced the systematic arrangement of the Chinese members of *Sus*, as with every other genus with which he dealt at any length, it is impossible to give a satisfactory determination of this Wild Boar at present. It probably represents the *Sus oxyodontus* of Heude, from the Upper Han, but whether that is or is not a valid species I am unable to express an opinion.

## 29. *BUDORCAS BEDFORDI*. (Plate XXIX.)

Thos. Abstr. P. Z. S. 1911, p. 27 (May 2).

♂. 2175. ♀. 2189, 2190. Tai-pei-san. 10,000'.

A wholly pale buffy species, practically without darker markings.

Fur longer and richer than in the available specimens of *B. tibetanus*, but the dates of these are not known, while the examples of *B. bedfordi* were killed in mid-winter; hairs of sides of neck attaining 7-8 inches, and those of back 3-4. General colour a beautiful glossy golden-buffy, more cream-buff in the females, more tending towards ochraceous in the male; at least at the ends of the hairs, their bases being still creamy or whitish. Darker markings on muzzle, ears, hinder back, and limbs, characteristic of *B. tibetanus*, practically absent. No. 2190 (♀) entirely without darker hairs on the muzzle, 2175 (♂) with a few, and 2189 (♀) with more, but the inconspicuous darker patch so formed very different from the large and prominent black mask characteristic of *B. tibetanus*. Dorsal line not darkened at all, its hairs elongated and more strongly buffy in the male, not differentiated at all in the females. Limbs not obviously darkened terminally, though a few isolated darker hairs are present on the carpus and tarsus.

\* Bull. Am. Mus. N. H. xxvi. p. 427, 1909.

Tail bushy, a few darker hairs on it in No. 2189, soiled ochraceous buffy in the others.

Skull apparently rather smaller, and its nasal region less vaulted than in either *taxicolor* or *tibetanus*, but, owing to differences in the ages of the specimens available, a satisfactory comparison is not at present possible.

Dimensions of the male, measured by Mr. Anderson in the flesh :—

Head and body 1925 mm. ; tail 23 ; hind foot 340 ; ear 127.

Skulls :—

	♂ (young adult).	♀ (adult).
Condyllo-basal length .....	389 mm.	381 mm.
Zygomatic breadth .....	176	164
Height of nasal convexity above middle of palate.....	118	113
Length of muzzle, to front of p <sup>2</sup> .....	113	115
Palatal length .....	245	241
Greatest spread of horns, on outer edge...	401	308

*Type.* Adult female. B.M. No. 11.6.1.64. Original number 2190. Killed 15 January, 1910.

The discovery of this splendid animal, whose golden-buffy colour renders it by far the most beautiful of its genus, is of the highest interest, and it is with great pleasure that I name the species in honour of the Society's President, during whose exploration of Eastern Asia it has been obtained. Mr. Anderson himself seems to have thought the occurrence of Takin on Tai-pei-san of special interest, and believed that they would probably prove to be new. He says : " The herds on Tai-pei-san are isolated by some hundreds of miles from the nearest others we could hear of, and as I could not learn that any other foreigner has hunted them on Tai-pei, I believe the chance for a new species is good."

As a matter of fact, however, specimens had previously been obtained and had passed into the possession of the American Museum of Natural History at New York. But these were quite young, and showed, as it was not unnatural that the young should show, more or less of the normal coloration of the group, with blackish muzzle and extremities, and therefore in recording them Dr. Allen\* saw no reason to suppose them different from *B. tibetanus*. The practically unicolor condition of *B. bedfordi* proves therefore to be a characteristic of the adult, a fact which, in view of the peculiar specialization of such a colour, is not at all surprising.

Even in *B. tibetanus*, as shown by Milne-Edwards's figure †, the young is very materially darker than the adult.

That the Takin of Tai-pei-san and other parts of the Pe-ling range should be different from that of the mountains of Sze-chwan

\* Bull. Am. Mus. N. H. xxvi. p. 425, 1909.

† Rech. Mamm. Atl. pl. 74.

is only in accordance with the indications furnished by the remainder of Mr. Anderson's collections, as brought out in the paper No. XIII. of the present series\*.

With regard to other names that have been given in the genus *Budorcas*, Mr. Lydekker† has shown that both *sinensis* and *mitchelli* are synonymous with *tibetanus*, so that there appears to be no existing name which comes into question in now describing this beautiful species.

It may be noted that on each side of the withers of the two females there is a large patch of grey hairs, these hairs being horny whitish, curiously ringed or beaded with black. Similar hairs have been found on a specimen of *B. tibetanus*, and so would appear to be natural and not discoloured artificially as I at first supposed. No such patch is present on the male.

Mr. Anderson has sent me the following further notes on this animal:—

"Takin.—Found in large herds on Tai-pei-san, where it lives in precipitous places at from 9,000 to 11,000 ft. altitude. Its food is bamboo grass; a small bamboo very common at these altitudes. Although apparently clumsy, I found these animals very alert, and capable of picking their way very deftly and rapidly down steep mountain sides. A herd my companions and I saw seemed to contain about 40 individuals; Chinese hunters reported another herd of 80. These herds seem quite isolated on the peaks of Tai-pei-san. Travelling westward we did not hear of any Takins again till we reached Pie-kou in Southern Kansu, and I am in doubt whether this was the same animal or not.

Chinese name:—Pan-yang; at Tai-pei. The species in Szechwan is called Yei-nu=Wild Cow. The name Pan-yang is also applied to a mountain sheep or goat."

30. NEMORHÆDUS sp.

♀. 2188. 30 miles S. of Feng-hsiang-fu, S. Shen-si. 10,000'.  
Near the Long-tailed Goral (*N. caudatus* M.-Edw.).

31. CAPREOLUS BEDFORDI Thos.

♂. 2153 (young). ♀. 2177, 2187. 30 miles S. of Feng-hsiang-fu. 3600'.

EXPLANATION OF PLATE XXIX.

The Chinese Takin (*Budorcas bedfordi*). Male.

\* P. Z. S. 1911, p. 158.

† P. Z. S. 1908, p. 795.

## EXHIBITIONS AND NOTICES.

May 9, 1911.

E. G. B. MEADE-WALDO, Esq., Vice-President,  
in the Chair.

Mr. R. I. Pocock, F.R.S., F.L.S., Superintendent of the Gardens, exhibited some of the hair of the "puppy coat" of a Grey Seal (*Halichoerus grypus*), which was caught at Barmouth, in Merionethshire, at the end of April. When received at the Gardens at the beginning of May this Seal was covered, with exception of the head and flippers, with longish woolly white hair, the last of which was moulted on May 7th. Most authorities state that Grey Seals are born in the autumn, not later than about the middle of October, and that the puppy coat is shed from a month to six weeks later. Allowing six weeks for the retention of its puppy coat, this Welsh Grey Seal must have been born near the middle of March, a date in tolerably close agreement with the date, namely the end of February, given by Cneiff for the birth of these Seals in the Gulf of Bothnia. It is, therefore, quite clear that these Seals breed both in the early spring and the autumn.

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Mr. E. G. BOULENGER exhibited some living male specimens of the Midwife Toad (*Alytes obstetricans*) carrying the eggs. He also exhibited a number of the detached eggs to show the manner in which they were strung together.

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Mr. A. E. ANDERSON exhibited a large number of photographs of the more important fossil mammals in the Department of Vertebrate Palæontology of the American Museum of Natural History, New York, showing the methods of mounting fossil skeletons. For comparison, a set of photographs was exhibited with the skeleton supports eliminated from view, thus adding to the pictorial value of pose in the specimens.

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## PAPERS.

33. An Investigation into the Validity of Müllerian and other forms of Mimicry, with special reference to the Islands of Bourbon, Mauritius, and Ceylon. By NEVILLE MANDERS, Lieut.-Colonel, R.A.M.C., F.Z.S., F.E.S.

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Naturalists generally and the majority of entomologists are disposed to accept a broad view that mimicry is caused by



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