

**Article XXIV.—MAMMALS COLLECTED IN KOREA.**

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Until the year 1911, the greater portion of northeastern Korea, lying between the Tumen and Yalu Rivers, had remained unvisited by white men. In the spring of 1912, the junior author led an expedition into this section for geographical and zoölogical exploration. The expedition travelled by ship from Fusan to Chon Chin (Seshin) on the northeast coast; disembarking there it continued by push-rail 40 miles to Muryantani, a village consisting of three or four Korean huts, thence by bull-carts up the Tumen River valley to Musan, the largest city in northeastern Korea. From Musan the route was southwestward to Nonsatong (Nojido), the last village on the edge of the larch forests which stretch away toward the "Long White Mountain" (Paik-tu-san), along the Korean-Manchurian boundary in a vast unbroken wilderness of larch trees. The expedition penetrated the forests to the base of the Paik-tu-san, thence struck southwestward across the water-shed which divides the country drained by the Tumen River from that drained by the Yalu River and its tributaries. Reaching the Yalu at Shinkarbarchin, the expedition proceeded by boat and raft down the Yalu to its mouth.

Collecting was carried on at various points between Muryantani and Musan, in the Tumen River valley. This valley is broad, rather sandy, sparsely inhabited, and bordered on either side by hills from 500 to 1500 feet in height. The hills near the Tumen valley are thinly forested. At some distance away from the river on either side the country consists of mountains heavily forested with oak and a few larch trees. Nonsatong, which lies just at the edge of the primeval forest, proved to be the best locality for mammals, both large and small. The larch wilderness was a great disappointment from the standpoint of zoölogy. During the month of May when the expedition travelled through it, it was almost completely deserted; birds were very few and no mammals could be seen or trapped. For the first eighteen or twenty miles a red-backed mouse, *Craseomys regulus*, was caught in some numbers, but as the forests became more dense toward the Paik-tu-san, even these disappeared and the eighty traps which were set almost every night yielded nothing. The Koreans stated that later in the summer when the vegetation was well under way a large stag, deer and bears were found here. My observations are in accord with those of Mr. Frank N. Meyer of the Bureau of Plant Industry, Washington, D. C.,

who travelled through a portion of the heavy forests to the south of where my expedition entered. He passed through a portion of the wilderness during August and said that he was impressed by the total lack of fauna of any kind. When crossing the watershed which divides the country drained by the Tumen and Yalu Rivers, diligent trapping showed that it offers no barrier to the small mammals, such as *Craseomys* and *Apodemus*, which are found there.

The entire peninsula of Korea is a mass of intersecting mountain chains which seldom reach a greater height than 4000 feet and do not offer any effectual barrier to the distribution of even the smallest forms of mammal life, such species as *Apodemus manchuricus* covering practically the entire peninsula with no perceptible change. Specimens of this animal taken at Ulsan on the southeast coast of Korea and at various points in the north-eastern portion along the Tumen and Yalu Rivers show practically no differentiation, although they are separated by several hundred miles and almost innumerable low mountain ranges.

The portion of the country visited by this expedition is of especial interest since it connects the southern Manchurian and southern Korean faunas and demonstrates that most of the species have a continuous distribution between these widely separated localities. Only two mammals are plentiful in northern Korea, these are the roebuck (*Capreolus* sp.) and the chipmunk (*Eutamias orientalis*). All other animals, even the smallest forms, are not abundant, and not only are their numbers few, but the number of species is decidedly limited. It is true as well of southern Korea as of the northern portion of the country, as has been demonstrated by Mr. M. P. Anderson during his collecting on the Duke of Bedford expedition for the British Museum of Natural History. Not less than eighty traps were continually in use on this expedition, but never were more than eight specimens taken in one night, the usual number being one or two, and sometimes none.—R. C. A.

The mammals collected on this expedition were determined by the senior author, who compared representative series of specimens of each species with the types of the species in the British Museum, with the kind assistance of Mr. Oldfield Thomas, Curator of Mammals, to whom he is greatly indebted for unrestricted access to the research collection of mammals, and for other aid most cordially rendered.

The mammal fauna of Korea has until recently been very little studied. Mr. M. P. Anderson, while engaged on the Duke of Bedford's Zoölogical Exploration in Eastern Asia, visited southern Korea during the autumn and early winter of 1905, where he collected 130 skins, representing nine species, mostly mice and shrews, four of the nine species being new. This

collection was soon after reported upon by Mr. Thomas.<sup>1</sup> In 1907 Mr. Anderson made a second visit to Korea, when he collected mammals in the central part, "in two districts respectively about 50 miles northeast of Seoul and the same distance south of it." His collection of 70 specimens, representing 13 species and including four new forms, was the basis of a second report on Korean mammals by Mr. Thomas.<sup>2</sup>

The present collection made, as noted above, in northern Korea, throws important light on the general character of the mammal fauna of a hitherto little known region, and indicates that many of the Korean forms of mammals range from southern Korea northward into Manchuria without appreciable modification. Many of the species collected are represented by large series of specimens, the 162 specimens obtained representing only 10 species, two of which, a badger and a pika, appear to be new. This list adds three to the 16 previously recorded from Korea by Mr. Thomas. All are accompanied by field notes and measurements from the fresh specimens. A supplemental list includes 9 species observed but not collected.—J. A. A.

### *Species Collected.*

#### 1. *Lepus coreanus* Thomas.

Seven specimens: Ulsan, 3 adults, Jan. 30, Feb. 12 and 25; Potaidon, 1, a young one a few days old; Chunkang-chin, a hunter's skin without skull; Musan, 2 hunter's skins without skulls.

The three adults from Ulsan measure: total length, 485 (470–495); tail, 70; ear, 127 (125–130); hind foot, 93 (90–95).

At Ulsan, in southeastern Korea, rabbits are not uncommon. Three were taken at this place, all of them being killed near the summits of the hills where a few trees had been left standing about the Korean graves. In northern Korea they are apparently much less plentiful as only three specimens were secured, two adults and one young.

#### 2. *Ochotona* (*Pika*) *coreanus* sp. nov.

Type, No. 34050, ad. ♀, Pochong, Korea, June 2, 1912; coll. Roy C. Andrews.

The type is in winter pelage, with no evidence of molting. Pelage very soft and full. Upper parts from crown to rump tawny olive (Ridgway) finely grizzled with

<sup>1</sup> The Duke of Bedford's Zoological Exploration in Eastern Asia.—II. List of Small Mammals from Korea and Quelpart. By Oldfield Thomas, F. R. S. Proc. Zool. Soc. London, 1906, pp. 858–865.

<sup>2</sup> The Duke of Bedford's Zoological Exploration in Eastern Asia.—V. Second List of Mammals from Korea. By Oldfield Thomas, F. R. S., F. Z. S. Proc. Zool. Soc. London, 1907, pp. 462–466.

black; nose and sides of head nearly to the anterior base of ears gray strongly varied with black-tipped hairs; sides of neck clear tawny olive; ventral surface whitish washed with pale clay-color, strongest over the pectoral region and paler laterally and posteriorly; ears blackish externally with a whitish border, paler internally with a fringe of long whitish hairs at base; fore feet above grayish white, hind feet gray with a pale fulvous wash; soles of all the feet blackish.

A male topotype is similarly colored but the pelage is more worn. A young female in first pelage is similar in color to the adults but paler and the coat more woolly.

*Measurements.* Type (♀), head and body, 204; hind foot, 30. Topotype (♂), head and body 195; hind foot, 33. Skull of type, greatest length, 43; condylo-basal length, 40; zygomatic breadth, 22; interorbital breadth, 5; mastoid breadth, 15; length of nasals, 14; diastema, 10; palatal foramina,  $6.7 \times 4$ ; diagonal length of bulla, 12; length of upper toothrow at alveoli, 8.3. The male skull lacks the rostral portion; zygomatic breadth, 21.5; interorbital breadth, 4.5; mastoid breadth, 20.5; diagonal length of bulla, 12.

This form is probably a subspecies of the *O. hyperborea* group. It differs much in coloration from *O. h. mantchurica* Thomas, from the Khingan Mountains, being larger and quite different in coloration when corresponding pelages are compared. It is similar in size to *Ochotona nitida* Hollister, from the Altai Mountains, but is much duller in coloration and differs from it in various important details of cranial structure.

This species lives at a low altitude (about 3000 feet) for a pika, and not in rock piles as is so frequently the case. It was seen only at Pochong, where the three specimens were taken.

### 3. *Craseomys regulus* Thomas.

Thirty-seven specimens: Nonsatong, 24, May 9-27; Potaidon, 9, May 27-29; Pochong, 4, June 3. The sexes are about equally represented, and all the specimens are adult, although the skulls show some to be much older than others. There is, however, a wide range of color variation, the red of the dorsal surface ranging from cinnamon to dark intense rufous, while the ventral surface varies from grayish white without a trace of fulvous to a strong wash of buff. The specimens that are palest above have the strongest wash of fulvous below, and, conversely, those that are brightest rufous above are grayest below. The skulls show that the latter are the older, and that the difference is mainly due to age.

The difference in the average measurements shown by the series from the different localities is apparently due mainly also to age.

*Measurements.*

Locality	No. of spec.	Total length.	Head and body.	Tail.	Hind foot.
Nonsatong	23	143.3 (132-155)	111 ( 98-119)	33.8 (26-39)	19.3 (18-20)
Potaidon	9	132.3 (125-139)	99 ( 92-110)	33.3 (28-39)	19 (18-20)
Pochong	4	155 (146-170)	118 (112-130)	35.5 (34-40)	20 (19-21)

This mouse was the only mammal which was at all plentiful in the dense larch forests. A large series was taken at Nonsatong, all trapped some little distance within the edge of the forest. They were frequently taken in the same places with *Micromys speciosus peninsulæ*, but were also found far in the heavy forests where the *Micromys* was not abundant. They were caught about old logs and tree stumps and often near the banks of small streams. Bread was the bait which appeared to be most attractive.

#### 4. *Apodemus mantchuricus* (Thomas).

Twenty-five specimens: Ulsan, 3, Feb. 3-16; Hozando, 10, April 15-22; Daichi-bei, 1, April 24; Musan, 7, April 27-30; Potaidon, 1, May 31; Pochong, 1, June 2; Chunkang-chin, 1 (juv.), June 12.

Six adults from Hozando measure: total length, 173 (164-181); head and body, 103.5 (99-105); tail, 69 (60-78); hind foot, 21 (20-23).

Six adults from Musan measure: total length, 176 (165-188); head and body, 106.7 (98-117); tail, 71 (61-77); hind foot, 20 (20-21).

This is a widely distributed and fairly abundant species. A few specimens were taken at the whaling station at Ulsan on the southeastern coast of Korea which apparently do not differ from those of the Tumen and Yalu River valleys near the extreme northern part of Korea. The specimens were most frequently trapped about stone piles in the valleys and seemed to like fairly open ground. None were taken in the heavy forests.

#### 5. *Micromys speciosus peninsulæ* Thomas.

Twenty-two specimens: Hozando, 5, April 16-19; Musan, 2, April 30. and May 1; Nonsatong, 11, May 15-27; Potaidon, 3, May 29 and 30; Pochong, 1, June 2.

Ten adults from Nonsatong measure: total length, 200.4 (183-215); head and body, 106.6 (99-117); tail, 91 (80-97); hind foot, 25 (24-27).

The measurements of the 10 adults from the other localities all come within the dimension given above for the Nonsatong series.

This mouse is fairly abundant in northern Korea, and was found most frequently at the edge of the larch forests and near clearings. At Nonsatong the greatest number were collected, and were taken about tree stumps, old logs and large rocks. Bits of bread seemed to be the most attractive bait, although particles of meat were sometimes of use.

6. **Micromys minutus ussuricus** (*Barrett-Hamilton*).

Six specimens, Nonsatong, May 19-21. Measurements of 5 adults: total length, 113.6 (109-128); head and body, 70.6 (64-78); tail, 45 (40-50); hind foot, 14 (12-16).

One specimen was caught by a native in an old log pig-pen not far from a house in Nonsatong. The others were brought to me by a Korean, who had dug them out from a burrow. I caught none in traps.

7. **Epimys norvegicus** (*Erxleben*).

Three specimens, Nonsatong, May 17-21.

Two specimens were caught near Nonsatong, one under a rock on the hill side, and the other near a small stream not less than a mile from a Korean hut; a third was brought by a native from several miles distant.

8. **Cricetulus nestor** *Thomas*.

Six specimens, 3 adult and 3 young, Nonsatong, May 15-22.

The 3 adults, 1 male and 2 females, measure: total length, 243 (218-261); head and body, 168 (143-184); tail, 72.3 (65-85); hind foot, 27 (27-27).

The three young ones, about one-fourth grown, are very unlike the adults, being blackish above, particularly on the middle of the back, the hairs with light tips, giving a dark gray general effect; below very thinly haired, the hairs ashy at base with whitish tips. The pectoral white spot is indicated by the hairs of a small irregularly shaped area being white to the base.

Two adults were caught on the side of a hill near a large rick in a cultivated field. The other was taken from a burrow with three young ones. The young were about one-quarter grown and were nursing. I saw no indication of these animals except at Nonsatong.

9. **Eutamias orientalis** (*Bonhote*).

Forty-three specimens: Hozando, 2, April 13; Musan, 1, April 28; Nonsatong, 38, May 16-31; Pochong, 1, June 3.

There is a wide range of color variation, some being much paler than others, but the difference is obviously partly seasonal but mainly individual.

Thirty adults from Nonsatong measure: total length, 256.7 (243-271); head and body, 155 (140-170); tail, 101.4 (87-114, mostly between 95 and 110); hind foot, 38 (35-40).

This is by far the most abundant of all the small mammals of northern Korea. Most of the specimens were secured at Nonsatong, which lies just at the edge of the larch forest; here they were very abundant and during one afternoon the Koreans snared 19.

In the thick woods chipmunks were rarely seen and only a few were taken but they were fairly abundant in the Tumen River valley, near Musan, where the forests were very thin. I kept one of these animals alive for about two weeks; in a few days it became very tame and was carried in my pocket while on the march, it making no attempt to bite or get away.

#### 10. *Meles melanogenys* sp. nov.

Type, No. 33951, a flat skin, Musan, Jan. 27, 1912; coll. Roy C. Andrews.

General color of body white grizzled with black, the basal three fifths of the hair and the rather abundant underfur pale yellowish white, the hairs with a broad sub-apical band of black and long white tips, through which the black of the subapical band shows more or less at the surface; ventral surface and legs black with blackish underfur; head, including sides of head, throat and chin, black, the hairs broadly tipped with black with the extreme base pale fulvous; ears edged with yellowish white; top of nose yellowish brown, forming a nearly rectangular area about 30 mm. long by about 15 mm. wide, terminating posteriorly opposite front border of the eyes. No white band over the front of the head, nor any white on the sides of the head or throat, present in all of the other known species of the genus. Tail above like the back; below white at base, with the anal region bright orange rufous, as in other species of *Meles*.

Length of head and body, 715 mm.; tail imperfect.

Represented by two flat skins, which lack the feet and the apical portion of the tail, and also the skull. The topotype exactly resembles the type in coloration, but is rather smaller and apparently somewhat younger.

The wholly black head, including not only the frontal aspect but the sides, chin and entire throat, sufficiently distinguish this species from any of the hitherto described forms of either *Meles* or *Arctonyx*. The small yellowish brown nose patch and the yellowish white edging on the ears are the only parts of the head that are not deep brownish black.

Two skins of this animal were secured from natives, one at Musan, the other on the Yalu River. Badgers are not rare in northern Korea, according to the statements of the natives, but are certainly not abundant. Both animals were taken in open fields some distance from any trees.

*Species Observed but not Collected.*1. **Capreolus** sp. ROEBUCK.

This may be either *Capreolus pygargus* (Pallas) which has once been recorded from Korea (Lydekker, *Deer of All Lands*, 1898, p. 230), or *Capreolus pygargus mantschuricus* (Noack), common in the mountains of Mantchuria, but, according to Thomas (P. Z. S., 1908, II, p. 645), described under a preoccupied name and probably identical with his *Capreolus bedfordi*, based on skulls from Shan-si.

The Roedeer is by all means the most abundant large mammal of northern Korea. In the Tumen River valley in the vicinity of Musan they were very abundant and especially so at Nonsatong. They were hunted in the early morning and late afternoon during the hours of feeding. The method was to climb to the top of a range of hills and walk along the summit watching the edges of the cultivated patches of ground where the deer came to feed, and it was almost always possible to see three or four in as many hours. The feeding period was from daylight until about 9 o'clock A. M. and in the afternoon from 4 o'clock until dark. At Nonsatong they were found along the edges of the forest feeding on the young vegetation which had sprung up after the old grass had been burned off by the Koreans. After feeding, the deer would often lie down in the open at the edge of the fields and were not difficult to approach. When suddenly startled they would sometimes give a sharp bark, repeated two or three times, which sounded very much like the bark of a dog, except that it was a little hoarser and more round and full in tone. Near Musan, the bucks which were taken after the middle of April still had the antlers in the velvet and were in the midst of shedding their winter coat. At Nonsatong, just a month later, the deer were only beginning to shed their winter coat, but the antlers were stripped almost entirely of velvet. When the antlers are half-grown they are highly prized by the natives for their supposed medicinal qualities, and a preparation is made from them which is supposed to give great strength and vitality to those who are fortunate enough to obtain it.

A female was shot near Musan on April 24, which contained two fetuses. The Koreans of the north call the Roebuck *Noro*.

2. **Cervus** sp. RED DEER.

This is probably *Cervus xanthopygus* Milne-Edwards, found in Mantchuria, or a closely related form as yet undescribed.

A large stag is found in northern Korea, but so far as I have been able



to learn no white man other than myself ever saw this animal alive. It is called by the Koreans of the north *Sasami*. It lives in the dense larch forests and comes down to the edge of the marshes to feed early in the morning and late in the afternoon. It is exceedingly shy and although I hunted it persistently near Nonsatong and other places, I saw it only twice, both times being near Nonsatong. Three of them had been feeding on the side of a hill before the sun was up and a few minutes after sunrise lay down to sleep. When I started them they ran down the side of the hill across a marsh giving me a short but excellent view of them. They appear slightly smaller than the American wapiti, but carry large antlers. In the afternoon another single specimen was seen, but on neither occasion was I able to get a shot. I heard them bark once, the noise being similar to that of the roedeer, except that it was very much louder, deeper and hoarser. The Koreans sometimes take them by digging pits in their trails, but catch very few. Judging from the tracks and other signs which I saw in the forests, the animals must be fairly numerous, but are so exceedingly shy that it is very difficult indeed to kill one. The natives said that at Nonsatong the *Sasami* remained near the edge of the forest until the vegetation was well started and then retired deeper into the wilderness toward the Paik-tu-san. The lower jaw and a hunter's bag made from the skin of the legs of the *Sasami* were presented to me by the natives.

### 3. *Nemorhædus* sp. GORAL.

One goral was seen at a considerable distance on a very rough mountain side, about 15 miles from Musan.

### 4. *Sus* sp. WILD BOAR.

Wild boars are fairly plentiful in northern Korea, but are not easily killed. They are most often found about the swamps where they come to root and feed. In almost every marsh patches of sod will be turned up during their feeding operations. One boar was killed near Nonsatong, but the skin was stolen by a native and was not recovered.

### 5. *Ursus* sp. BEAR.

Black bears are fairly abundant during the summer in the heavy forests near the Paik-tu-san. One specimen was killed in May not far from the

Samcheyong. The skin and forequarters of this specimen were carried off from the tree in which it had been hung over night by some large animal, presumably a leopard.

6. **Canis lupus** subsp.?

Wolves were said by the Koreans to be fairly abundant during the winter, but I heard only one of them and saw but very few tracks. While hunting stag at Nonsatong, shortly after I had started three animals, I heard the bark of a wolf repeated two or three times in quick succession.

7. **Felis uncia** Schreber. SNOW LEOPARD.

So far as I am aware, a snow leopard has never been shot by a white man in Korea. They are frequently reported by the natives as having killed horses, dogs, and sometimes oxen, and are occasionally trapped. The natives confuse the tiger and leopard in their statements to such an extent that it is very difficult to determine which animal is being described.

8. **Felis tigris** Linn. TIGER.

Tigers are reported to be plentiful in northern Korea, but I think their numbers are greatly exaggerated. They are very infrequently trapped by the natives and were sometimes killed by them before the firearms were taken from them by the Japanese three or four years ago. The natives so greatly exaggerated the accounts as to the numbers and ferocity of these animals that it is difficult to get any exact information concerning them. I spent three weeks hunting two tigers near Musan, but was not able to get a shot. It is almost impossible to kill them except in winter when they can be tracked in the snow.

9. **Bat.**

A bat was seen in April near Musan. This is the only bat observed upon the entire expedition, although a sharp watch for them was kept almost every evening.