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*** START OF THE PROJECT GUTENBERG EBOOK COMMENTS ON THE TAXONOMIC STATUS OF APODEMUS PENINSULAE, WITH DESCRIPTION OF A NEW SUBSPECIES FROM NORTH CHINA ***

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Comments on the Taxonomic Status of *Apodemus peninsulæ*, with Description of a New Subspecies from North China

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In the past several years the United States National Museum has received a large number of mammals from central and southern Korea through the auspices of the Commission on Hemorrhagic Fever of the Armed Forces Epidemiological Board. Among these Korean collections are more than a hundred specimens of a murine rodent originally described as "*Micromys speciosus peninsulæ*" by Oldfield Thomas but currently placed in the genus *Apodemus*. In attempting to ascertain the specific relationships of this mouse I have examined, through the generosity of Dr. David H. Johnson, Acting Curator of Mammals, most of the other Oriental specimens of the subgenus *Sylvaemus* in the U. S. National Museum and it is on this combined material that the following comments and description are based.

Three general groups of the genus *Apodemus* are presently known to occur on the mainland of northeast Asia. One is the distinctive *Apodemus agrarius*, lone representative of the subgenus *Apodemus*. The others, both in the subgenus *Sylvaemus* and closely resembling each other, are represented by a small animal that is currently regarded as conspecific with *Apodemus sylvaticus* and a larger animal of which the Korean mouse, *peninsulæ*, is representative. The oldest trivial name applied to the large *Sylvaemus* is *major* of Radde, 1862, in the combination [*Mus sylvaticus*] vrt. *major*. This is, however, twice preoccupied (see Ellerman and Morrison-Scott, 1951:566). The next available name is *peninsulæ* of Thomas, 1907, which was applied to mice from central and southern Korea (type from Mun'gyong, 110 mi. SE Seoul, Korea), and was originally proposed as a subspecies of the insular Japanese species, *Apodemus speciosus*. G. M. Allen (1940:949), who recognized *peninsulæ* as a monotypic species, was the first investigator to make the important distinction that it was not conspecific with the Japanese *speciosus*, although Hollister (1913:1-2) and Miller (1914:89) had previously used the combination *Apodemus peninsulæ*, evidently with the same thought in mind.

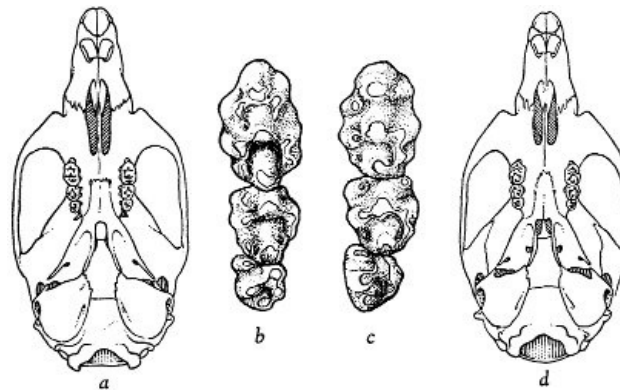


Fig. 1. Ventral views of skulls and left maxillary tooth-rows of two species of the genus *Apodemus*.

a. *Apodemus flavicollis flavicollis* (Melchior),
Lolland, Denmark, adult ♂, No. 141691 USNM,
×2.

b. *Apodemus flavicollis flavicollis* (Melchior),
Mauseklippe, Germany, young ♂, No. 112895
USNM, ×10.

c. *Apodemus peninsulæ peninsulæ* (Thomas),
Central Nat'l Forest, near Pup'yong-ni, 200 m.,
Korea, subadult ♀, No. 300650 USNM, ×10.

d. *Apodemus peninsulæ peninsulæ* (Thomas), 6
mi. S Yongdongp'o, Korea, adult ♂, No. 299554
USNM, ×2.

In comparing the ventral views of skulls note especially the size and location of incisive foramina and posterior palatine foramina as well as the breadth of mesopterygoid fossae. In comparing the left maxillary tooth-rows note especially the size of M3 and the reduced posterointernal cusp on M1 in *A. peninsulæ*.]

More recently, Ellerman (1949:32) and Ellerman and Morrison-Scott (1951:566) have arranged *peninsulæ* as a subspecies of *Apodemus flavicollis* under the assumption that all the members of the subgenus *Sylvaemus* on the eastern Asiatic mainland are subspecies of one or another of the

species of western Europe, *A. flavicollis* or *A. sylvaticus*. Ellerman (in Ellerman and Morrison-Scott, 1951:564) states: "The majority of the forms I distribute in a somewhat arbitrary manner between *sylvaticus*, average smaller skull, and *flavicollis*, average larger skull; occurring together nearly throughout the Palaearctic. I feel fairly sure that there are some errors of judgment in my arrangement, and equally sure that there is no other way to define species in this very large and difficult group." I have compared the specimens of *peninsulae* available to me from central and southern Korea with specimens of *A. f. flavicollis* from Denmark, Germany and Sweden and find, although the two are similar in many ways, that *peninsulae* differs from *flavicollis* in several important characters: Mammae 1-2=6 in *flavicollis*, and 2-2=8 in *peninsulae*; incisive foramina reaching level of alveoli of M1, or nearly so, in *flavicollis*, but ending conspicuously short of that level in *peninsulae*; posterior palatine foramina large in *flavicollis* and opposite a point where M1 and M2 meet, but small in *peninsulae* and situated farther back on the palate, opposite M2. Moreover, *peninsulae* lacks the characteristic buffy throat patch of *flavicollis*, has a much reduced posterointernal cusp on the M1, a relatively (frequently actually) larger M3 and, on the average, a broader mesopterygoid fossa. In view of these differences, all of which appear to be constant, I consider *peninsulae* specifically distinct from *flavicollis*. Throughout its known geographic range (see below) *peninsulae* is evidently confined to wooded terrain, either scrub or brush types or forested areas, and the vernacular name wood mouse, therefore, seems appropriate for this species.

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The type specimens of *Apodemus praetor* Miller (type from Sungari River, 60 mi. SW Kirin, Manchuria) and *Apodemus nigritalus* Hollister (type from Tapucha, Altai Mountains, Siberia) agree with *peninsulae* as concerns the above characters and differ from it only in minor external and cranial features. They are, therefore, here considered as subspecies of the latter.

Ellerman (1949:32) and Ellerman and Morrison-Scott (1951:567) regarded *nigritalus*, like *peninsulae*, as a subspecies of *flavicollis*. The subspecies *praetor*, on the other hand, has generally been regarded as a synonym of *peninsulae* by recent authors. Howell (1929:58) noted that the holotype was, "... a phenomenally large specimen such as is encountered occasionally in almost all groups of rodents." He ascribed the color differences noted by Miller to "seasonal" variation. The holotype of *praetor* is undeniably larger than the other adult specimens listed in the original description. These paratypes and other specimens of *praetor* available to me are approximately the same size externally and average only slightly larger cranially than specimens of *peninsulae* from central and southern Korea. However, the dorsal coloration of *praetor* is somewhat darker and duller than that of *peninsulae*, especially in summer pelage when *praetor* lacks the conspicuous bright ochraceous tinge of the Korean specimens. In addition, *praetor* has broader zygomatic plates with correspondingly deeper zygomatic notches and the color on the face of the upper incisors averages much more orange than in *peninsulae*.

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In the north then, wood mice range from Korea and Manchuria westward at least as far as the Altai Mountains. For mice from the intervening Siberian areas Russian workers have used the name *major* which, as noted above, is unavailable. The exact relationships of the mice of these areas to previously named subspecies is unknown to me and I have not seen specimens of "*Mus (Alsomys) major rufulus*" of Dukelsky, 1928, the type locality of which is 75 versts (approximately 50 miles) SE Vladivostok, Siberia. It appears to be of the same species as *peninsulae* and judging from the original description it closely resembles *praetor*. Neither have I seen specimens of the Sakhalin Island mouse, *giliacus*, which Ellerman (1949:32) regards as a subspecies of *Apodemus sylvaticus*. I feel reasonably sure, however, that it will prove to be a subspecies of *peninsulae*. In the original description *giliacus* was referred to as, "Most closely allied to the Korean subspecies..." (Thomas, 1907:411).

In China the extent of the distribution of *Apodemus peninsulae* is also uncertain. Allen (1940:949-50) reported its occurrence from Jehol and Hopeh in the northeast, southwestward through Shansi, Shensi and eastern Kansu to Szechuan and northwestern Yunnan. Throughout most of this region it occurs with another mouse, currently regarded as conspecific with *Apodemus sylvaticus*, and the two kinds have been confused by some previous authors. Howell (1929:58), for instance, reported twelve specimens of *peninsulae* from 65-75 mi. NE Peking but my examination of these mice indicates that only four are *peninsulae* while the others are referable to what is currently regarded as *Apodemus sylvaticus draco*. Another subspecies of *sylvaticus*, *A. s. orestes*, occurs in Szechuan and Yunnan and it is certain that some records of distribution ascribed to *peninsulae* from those provinces actually represent *orestes* (see Allen, 1940:949-50). *A. sylvaticus* is distinguishable from *peninsulae* by darker ears, blackish preauricular patches, dark eye rings, a noticeably smaller skull, incisive foramina that reach the level of M1 (or nearly so), much larger auditory bullae, and a more fully developed posterointernal cusp on M1. Too, *sylvaticus* typically has 1-2=6 mammae although Allen reports finding a 2-2=8 formula in some specimens. *Apodemus latronum*, regarded as a full species by Osgood (1932:318) and G. M. Allen (1940:950) but as a subspecies of *flavicollis* by Ellerman (1949:32) and Ellerman and Morrison-Scott (1951:567), also occurs in Szechuan and Yunnan. Its relatively dark color, large feet and large ears, *flavicollis*-like skull and large molar teeth immediately separate it from *peninsulae* although the two possibly have been confused in the earlier literature. Until a complete revisionary study of the Asiatic members of the subgenus *Sylvaemus* can be undertaken the presence of *peninsulae* in southwestern China must remain in question.

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The western limits of the geographic range of *Apodemus peninsulae* are unknown. *Apodemus gurkha* Thomas, 1924, from Nepal is said to have 2-2=8 mammae but the description is not otherwise suggestive of close relationship to *peninsulae*. Farther to the west, *Apodemus*

flavicollis rusiges Miller, 1913, from Kashmir seems to have been properly assigned as a subspecies of *flavicollis* (cotypes and large series in USNM).

Wood mice almost certainly do not occur in the Gobi Desert. They are known as far west as the Altai Mountains to the north of the Gobi and at least as far west as Kansu (see below) to the south of it. Whether the geographic range of the species skirts the western edge of the arid regions of northern China is at present unknown; perhaps it does not. At any rate, mice available to me from the North Chinese provinces of Jehol, Shansi, Shensi and Kansu are notably different in certain external and cranial features from other known races of *Apodemus peninsulae* and are here given subspecific recognition. All measurements are in millimeters. Capitalized color terms are from Ridgway (1912).

Apodemus peninsulae sowerbyi, new subspecies

Type.—Adult female molting from winter to summer pelage, skin and skull, U. S. National Museum no. 175523, from 30 miles west of Kuei-hua-cheng, 7000 ft., northern Shansi, China; obtained on 23 May 1912 by Arthur de Carle Sowerby, original no. 456.

Distribution.—Known presently from eastern Kansu eastward through Shensi, Shansi and Hopeh to southern Jehol, probably also in northeastern Szechuan, exact limits of range unknown.

Diagnosis.—Size small for species (see measurements). Color: Upper parts (fresh summer pelage) averaging near (15'a) Ochraceous-Buff, suffused with blackish (especially mid-dorsally); winter pelage much paler; underparts grayish-white, individual hairs plumbeous at base, tipped with white; ears pale brownish; feet whitish above, darker below; tail bicolor, pale brownish above, whitish below. Skull: Small (see measurements); rostrum somewhat shortened and conspicuously down-curved; zygomatic notches relatively shallow; zygomatic plates narrow; braincase proportionally more inflated than in other subspecies of the species; auditory bullae moderately inflated; upper incisors slender, their faces averaging bright yellowish-orange.

Measurements.—External measurements of the holotype, followed by those of an adult male and female from the type locality, are, respectively: Length of head and body, 101, 102, 100; length of tail, 93, —, 102; length of hind foot (*su*), 21, 21.5, 23; length of ear from notch, 14, 16, 15.5. Corresponding measurements for an adult female from 20 mi. E Taiyuan, Shansi, are: 91, 99, 23, 16. For cranial measurements see Table 1.

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Table Key:

- A: Occipitonasal length
- B: Zygomatic breadth
- C: Mastoid breadth
- D: Interorbital length
- E: Frontonasal length
- F: Nasal length
- G: Depth of skull
- H: Alveolar length of maxillary tooth-row

TABLE 1.—CRANIAL MEASUREMENTS OF ADULTS OF SEVERAL SUBSPECIES OF *APODEMUS PENINSULAE*

Sex and catalogue number or number of individuals averaged	A	B	C	D	E	F	G	H
<i>Apodemus peninsulae peninsulae</i> , various localities in central Korea								
Average 10 (4♂, 6♀)	29.2	14.2	11.8	4.7	20.1	11.4	10.2	4.3
Minimum	28.3	13.8	11.5	4.6	19.2	10.8	9.9	4.1
Maximum	29.8	14.6	12.2	5.1	20.7	12.0	10.5	4.4
<i>Apodemus peninsulae nigritalus</i> , Tapucha, Altai Mts., Siberia								
USNM 175164, ♂ (type)	28.8	14.8	12.4	4.5	20.8	11.7	11.0	4.4
USNM 175171, ♀	28.2	13.7	11.8	4.5	19.8	11.2	10.3	4.5
<i>Apodemus peninsulae praetor</i> , Sungari River, 60 mi. SW Kirin, Manchuria								
USNM 197792, ♂ (type)	30.5	....	12.5	4.7	21.5	12.5	10.3	4.6
USNM 197798, ♀	30.2	14.4	11.8	4.6	21.6	12.7	10.6	4.6
Mukden, Manchuria								
USNM 197782, ♂	29.5	14.8	12.4	4.8	20.6	12.2	10.5	4.2
<i>Apodemus peninsulae sowerbyi</i> , Kuei-hau-cheng, Shansi								
USNM 175523, ♀ (type)	27.9	13.3	11.7	4.5	19.6	11.4	9.9	4.0
USNM 175521, ♂	27.6	....	11.5	4.6	18.9	11.4	9.7	4.1
USNM 175522, ♀	27.9	....	11.8	4.6	19.4	11.3	9.8	4.2
20 mi. E Taiyuan, Shansi								
USNM 172558, ♀	27.4	13.8	11.5	4.6	19.4	11.6	10.1	4.4
12 mi. S Yen-an, Shensi								
USNM 155072, ♂	27.8	14.1	....	4.4	19.5	11.0	....	4.3

USNM 155073, ♀	27.7	13.3	11.5	4.5	19.4	11.0	10.0	4.2
USNM 155075, ♂	27.9	13.5	11.4	4.5	19.2	11.0	10.0	4.3
Hsin-lung-shan, 65 mi. NE Peking, Jehol								
USNM 219229, ♂	27.7	13.8	11.4	4.5	19.0	10.9	10.4	4.4
15 mi. S Lanchow, Kansu								
USNM 155171, ♂	27.7	13.6	11.7	4.6	19.0	11.3	9.9	4.5

Comparisons.—From *Apodemus peninsulae peninsulae* (specimens from various localities in central Korea), *A. p. sowerbyi* differs in: External size smaller throughout, especially hind foot; upper parts, especially in summer pelage, and dorsal aspect of tail paler; skull smaller and less massive; braincase proportionally more inflated; rostrum shorter and noticeably down-curved. From *Apodemus peninsulae praetor* of Manchuria (holotype and paratypes), *A. p. sowerbyi* differs in most of the same ways in which it does from *peninsulae* as well as in having more shallow zygomatic notches, narrower zygomatic plates and smaller, more slender, upper incisors. From *Apodemus peninsulae nigritalus* of the Altai Mountains of Siberia (holotype and paratypes), *A. p. sowerbyi* differs in: Smaller size, both external and cranial; paler dorsal coloration; less convex cranial outline in lateral view; smaller auditory bullae.

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Remarks.—*Apodemus peninsulae sowerbyi* is named in honor of the late Arthur de Carle Sowerby whose collections of mammals from North China and Manchuria have added so much to our meager knowledge of that part of the world.

Four specimens from Hsin-lung-shan, 65 mi. NE Peking, here assigned to *sowerbyi*, are darker dorsally than mice from farther to the west and in this respect may show approach to *A. p. praetor*. In all other features, however, they closely resemble the new subspecies.

All of the specimens of *sowerbyi* available to me are from altitudes of 3000 feet or higher. At lower elevations in North China, destruction of wooded habitats owing to intense land-use practices has probably restricted the distribution of *sowerbyi* primarily to hilly and mountainous areas where brushy, scrub and forest habitats still prevail.

Specimens examined.—Thirty-three, all from North China, as follows: JEHOL: Hsin-lung-shan, 65 mi. NE Peking, 3000 ft., 4. KANSU: 15 mi. S Lanchow, 7400 ft., 1. SHANSI: Chiao-cheng-shan, 90 mi. W Taiyuan, 7000-8000 ft., 4; 30 mi. W Kuei-hau-cheng, 7000 ft., 5; Lung-wang-shan, 20 mi. E Taiyuan, 4000 ft., 10; 18 mi. W Taiyuan, 5000 ft., 1; 50 mi. NW Taiyuan, 5500 ft., 4. SHENSI: 12 mi. S Yanan, 4000 ft., 4.

Apodemus peninsulae, then, is known or suspected to occur over much of southeastern Siberia, Manchuria, Korea and North China. The western limits of its geographic range are unknown. Over this vast area only four subspecies, one newly named, can be ascribed with certainty to *peninsulae* whereas only two other kinds, *giliacus* of Thomas from Sakhalin and *rufulus* of Dukelsky from extreme southeastern Siberia are probably conspecific with it, the latter possibly a synonym of *praetor*. These considerations underscore the preliminary nature of the present paper. The mammalian fauna of northeastern Asia is scarcely better known today than was that of North America in 1885 when Dr. C. Hart Merriam organized what was later to become the U. S. Biological Survey.

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It seems to me that the correct names of four kinds of wood mice discussed above are as follows:

Apodemus peninsulae peninsulae (Thomas, 1907)
Apodemus peninsulae nigritalus Hollister, 1913
Apodemus peninsulae praetor Miller, 1914
Apodemus peninsulae sowerbyi Jones, 1956

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