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ON THE TYPE MATERIAL OF *MUS ARGENTEUS* TEMMINCK, 1844

by

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With 3 plates

ABSTRACT

The taxonomic history of the Japanese Wood Mouse ("Himenezumi" in Japanese) is reviewed. Two scientific names have been widely used: *Apodemus argenteus* (Temminck, 1844) and *Apodemus geisha* (Thomas, 1905). To solve this controversy, the type material of *Mus argenteus* Temminck, 1844 in the Leiden museum is re-examined. The type series is composite; a lectotype is chosen. The lectotype corresponds in skull characters with the holotype of *Micromys geisha* Thomas, 1905; the latter name therefore is a junior synonym of *Mus argenteus*. The two paralectotypes are juvenile specimens of *Apodemus speciosus* (Temminck, 1844).

TAXONOMIC HISTORY

The mouse called "Himenezumi" in Japanese¹⁾ was first made known to science by C. J. Temminck in 1844²⁾ under the name *Mus argenteus*. The Japanese names mentioned by Temminck (1844: 51) are "Jama-nezumi" and "No-nezumi", meaning, according to Temminck: "rat de montagne" and "rat de champs", respectively. The next author to refer to this species was Barrett-Hamilton (1900: 420-421, 428), who studied two specimens in the British Museum (Natural History), London, collected by H. Pryer in Japan (BM

¹⁾ As English names of this species have been used: Japanese long-tailed field-mouse (Aoki, 1915: 26), geisha mouse (Kishida, 1925: 120), Japanese wood mouse (Jones & Imaizumi, 1956: 273) and small Japanese field mouse (Corbet, 1978: 136).

²⁾ Temminck's description of *Mus argenteus* almost certainly appeared in December 1844 (see Holthuis & Sakai, 1970: 72-73, 263-264).

88.9.25.6 and 88.9.25.7). He wrote: "Although Temminck gives no particulars as to the skull of his *M. argenteus*, and although his figure of that species is a miserable caricature of a dark brown *M. musculus*-like Mouse, with dark feet, long tail, and light underside, his description, which, it will be noted, contradicts his figure in several important respects, fits this Mouse so closely that I feel bound to identify it as *Mus argenteus*". Barrett-Hamilton recognized the close relationship between *Mus argenteus* and the Eurasian *Mus* (now *Apodemus*) *sylvaticus*, calling it "a local development from a *sylvaticus*-like stock".

In 1905 Thomas (1905: 491-493) described *Micromys geisha* (type specimen BM 5.3.3.37) from Kobe, Hondo (now Honshu), presented to him by R. G. Smith. He commented: "*Mus argenteus*, Temm., whose description might have been thought to apply to it, is a larger animal, with a hind foot of 22 mm, and many differences in the detailed measurements of the skull, e.g. interorbital constriction 4.9 mm, palatal foramen 5.8". Later (Thomas, 1906: 349) he added: "It appears probable that Temminck's *Mus argenteus*, also described in the 'Fauna Japonica', was based on small spineless specimens of *M. speciosus*". In 1908 Thomas (1908: 54) placed his *geisha* in the genus *Apodemus*. Barrett-Hamilton & Hinton (1915: 505) also used the name *Apodemus geisha*.

Namie (1909: 122-123) was the first Japanese author to use the names *Apodemus geisha* and *Mus argenteus*; he followed the suggestion by Thomas (1906) on the identity of the latter. Aoki (1913: 306-308) also used *A. geisha*, tentatively listing *Mus argenteus* as a synonym of *A. speciosus*. Later, however, Aoki (1915: 26-29) referred to Temminck's description of *Mus argenteus* and criticized Thomas's comment (1906) that *argenteus* probably represented young specimens of *speciosus*, since the pelage of the type specimens as described by Temminck appeared more reddish and the ratio of tail length to head and body length in Temminck's description was greater than in young *speciosus*. He therefore left the identity of *Mus argenteus* open to question. Kishida (1925: 120, 127-128) also used *A. geisha*, but drew attention to the comments made by Aoki (1915) and added a Japanese translation of Temminck's description of *Mus argenteus*. Kuroda (1927: 16) used the name *A. geisha* without comment, but later (Kuroda, 1934: 9; 1938: 61; 1940: 120), referring to Aoki (1915) and Kishida (1925), treated *A. argenteus* as a questionable species resembling *A. geisha*. Tokuda (1934: 2003, 2008; 1939: 313; 1941a: 297), Watanabe (1937: 34-39) and also Kuroda (1947: 21) used the name *A. geisha* without comment. Later, however, Tokuda (1941b: 91-93) wrote under *A. geisha*: "*Mus argenteus* is known as a doubtful species being uncertain if it is identical to the present species or to *A. speciosus*" and repeated the statements made by Thomas (1905, 1906) and Aoki (1915). He further added: "So far as can be judged from Temminck and Schlegel's illustration, *argenteus* is apparently *geisha* rather than *speciosus*. But I shall refrain from forming any definite opinion on this subject until the precise status of the original specimens is known". In 1954, however, Tokuda (1954: 26) used the name *A. geisha* again without comment. Imaizumi (1949: 260-263) used *A. geisha*, but noted that the description of *Mus argenteus* by Temminck did agree with this species; he doubted whether

Thomas had indeed compared his *geisha* with Temminck's type material. Later, Imaizumi (1950: 127) again used *A. geisha* without comment.

Ellerman (1941: 100-101) used the name *Apodemus geisha* and synonymized *Mus argenteus* with *A. speciosus*. Ten years later, however, Ellerman & Morrison-Scott (1951: 570) introduced the combination *Apodemus sylvaticus argenteus*, tentatively synonymizing *geisha* with *argenteus*. They added the following comment: "It seems fairly certain that Temminck would be acquainted with such a common form as that later described as *geisha* by Thomas. There is reason to believe that the cranial measurements given for *argenteus* in the original description of *geisha* are erroneous. B.M. No. 88.9.25.7, which Barrett-Hamilton identified as *argenteus*, seems to be an ordinary specimen of *geisha* in such skull measurements as are obtainable, and the description of *argenteus* seems to fit *geisha* equally well". Following this opinion, Kuroda (1953: 82; 1957: 14) also used the name *A. sylvaticus argenteus*. Jones & Imaizumi (1956: 273) agreed with Ellerman & Morrison-Scott in that *geisha* was "almost certainly" a synonym of *argenteus*, but restored *argenteus* to specific rank. Imaizumi (1960: 145) did so too, and definitely synonymized *geisha* with *argenteus*, stating that Temminck's description agreed with this species. Despite this, Watanabe (1962: 16-17), Zimmermann (1962: 202) and Misonne (1969: 88, quoting Zimmermann) continued to use *A. geisha*. Kuroda (1965: 682), Fujimaki (1970: 2), Kobayashi & Hayata (1971: 236-237) and Corbet (1978: 136) all used the name *A. argenteus*, regarding *geisha* as a junior synonym.

Aimi & Kaneko (1971: 24-28) reviewed the taxonomic history of *Apodemus argenteus* and showed that the measurements given by Temminck fall within the range of that species. They urged a re-examination of Temminck's type material, since none of the authors quoted above had studied the original specimens. Even Kuroda (1975: 130), in his commentary on the facsimile edition of the Fauna Japonica, still wrote "*Mus argenteus* = ?*Apodemus argenteus argenteus* (Temminck & Schlegel)" with a question mark.

From the taxonomic history as reviewed above, it is clear that re-examination of the type material of *Mus argenteus* Temminck, 1844 is long overdue and necessary to solve the present uncertainty on its identity, particularly in the light of the comments made by Thomas (1905, 1906), Aoki (1915), Tokuda (1941b) and Ellerman & Morrison-Scott (1951).

THE LEIDEN TYPE MATERIAL

The type specimens of *Mus argenteus* Temminck in the Leiden museum have been catalogued by Jentink (1887: 210; 1888: 63). The osteological material was listed as follows:

- a. Crâne d'un individu adulte monté, un des types de l'espèce. Japon. De M. Bürger. Très incomplet.
 - b. Crâne d'un jeune individu monté, un des types de l'espèce. Très incomplet.
- In his later catalogue, Jentink (1888) listed the skins as follows:

- a.* Individu adulte monté, un des types de l'espèce et figuré dans la Fauna Japonica, Tab. 15, fig. 1. Japon. Des collections de M. Bürger. Queue incomplète. (Cr. *a* du Cat. Ost.).
- b, c.* Jeunes individus montés, types de l'espèce. Japon. de M. Bürger. (Cr. *b* du Cat. Ost.).

According to Jentink, the mounted skin *a* has been figured in Temminck's Fauna Japonica, pl. 15 fig. 1. However, it is the pedestal of specimen *b* that bears an inscription in Temminck's handwriting, reading: "Mus argenteus Tem. Fau. Jap. tab 15 f 1 Jamanezumi Japon"; it is the only of the specimens bearing such an inscription. This strongly indicates that it was in fact specimen *b* that has been figured in the Fauna Japonica. Comparison of the three mounted skins with fig. 1 on pl. 15 confirms this, as Cat. *b* is at once recognizable as the specimen depicted here, in reverse (pl. 1). Of the other two skins (in much poorer condition), Cat. *a*, in a later handwriting, bears the inscription: "Mus akanezumi Burger Japon"; Cat. *c*, in the same hand: "Mus Jamanezumi Bürger Japon". Apart from these annotations on the pedestals, none of the skins bears an original label. H. Bürger, who was Von Siebold's assistant in Japan and who continued to send zoological specimens to Leiden after Von Siebold's departure from Japan in 1829, always carefully specified his shipments, listing the various species by the scientific genus name followed by a Japanese vernacular. The names written on the socles of the specimens probably derive from Bürger's cargo lists, in which the names "jamanezumi" and "akanezumi" occur (pl. 4).

On nearly all plates of the mammalogical part of the Fauna Japonica, Temminck (1842-1844) had the skull of the animal figured in addition to the mounted specimen. On fig. 1 of pl. 15, however, he only depicted the skin of *Mus argenteus*, in contrast with the other murids featuring on this and the following plate. This almost certainly means that Temminck had not extracted the skulls from his *argenteus* specimens, possibly because of the fragile state of the material. Since Jentink (1887, 1888) does mention the presence of two separate skulls, that of Cat. *a* (skull *a*) and of Cat. *b* or *c* (skull *b*), these must have been extracted later, perhaps on the request of O. Thomas, who compared the skull of his *Micromys geisha* with Temminck's *Mus argenteus* (Thomas, 1905), though he gives some measurements of one *argenteus* skull only. The second skull listed by Jentink is that of Cat. *b*; the skull of Cat. *c* was extracted in 1974 and consists of not more than a few incomplete fragments.

The three type specimens with their skulls have now been given new registration numbers. Cat. *a* (with skull *a*) is registered as RMNH 24211; Cat. *b* (with skull *b*) as RMNH 19688; and Cat. *c* (skull not listed by Jentink) as RMNH 24212.

As mentioned by Groves & Smeenk (1978: 18), the practice in Temminck's days was to exchange large numbers of "duplicates" with other museums in Europe. As a result, the rich collections from Japan acquired by Von Siebold and Bürger are now scattered over many different countries and only a fraction

of the series originally received by Temminck is still housed at Leiden. This also applies to the material of *Mus argenteus* and other rodents. The detailed cargo lists compiled by Bürger and preserved in the archives of the Leiden museum bear witness of this. We find the following specifications: on 20 December 1830 a.o. 1 "Mus Hakkanezumi"; on 31 December 1832 a.o. 14 "Mus Akanezumi", 4 "Mus Jamanezumi"; on 22 November 1934 a.o. 2 "Mus akanezumi" and 2 "Mus jamanezumi" (pl. 4). Unfortunately, we cannot trace the exact origin of the specimens any longer, nor which skins arrived with which shipment.

IDENTITY OF THE TYPE SPECIMENS

We have seen that RMNH 19688 (Cat. *b*) must have served as the example for the mouse depicted on pl. 15 fig. 1 of the *Fauna Japonica*. Nevertheless, we agree with Barrett-Hamilton (1900) that the figure is not very accurate; its colour is dark brown and does not resemble the warm golden brown pelage of RMNH 19688 and the other two type specimens. The skin itself is still in fairly good condition and agrees well with Temminck's description on p. 51 of the *Fauna Japonica*. Its measurements cannot now be taken accurately, since it has been mounted with its back arched, more so than shown on Temminck's plate (pl. 1). The length of head and body is about 80 mm, the tail about 85 mm (the tip is missing) and the hind foot (c.u.) about 18.3 mm. The zygomatic plate of the skull (though damaged) is straight-edged and does not protrude forward of the zygomatic process of the maxilla (pl. 2 fig. b). The first loop of M² has a small outer tubercle (pl. 3 fig. a); the overall tooth surface gives a worn impression and the animal certainly is fully adult (not "jeune" as stated by Jentink, 1888). External and skull measurements are given in table I.

TABLE I

Measurements of Temminck's type series of *Mus argenteus* (in mm)

	RMNH 19688	RMNH 24211	RMNH 24212
Length of head and body ¹⁾	ca. 80	—	—
Tail length ¹⁾	85	—	—
Hind foot length c.u. ¹⁾	18.3	22.1	22.8
Ear length ¹⁾	12.3	13.6	—
Nasal length	9.0	10.4	—
Interorbital width	3.7	4.6	4.6
Length of diastema	6.1	8.0	7.1
Palatilar length	—	12.4	—
Length of incisive foramen	4.3	6.0	—
Length of upper molars	3.1	4.2	3.8
Width of M ¹	1.0	1.3	1.3

¹⁾ External measurements approximate, taken from dry specimens mounted with their back very much arched.

Superficially, the skins of RMNH 24211 (Cat. *a*) and 24212 (Cat. *c*) show a strong resemblance to RMNH 19688. The dorsal fur is very slightly darker than that of RMNH 19688 and, like in the latter, is soft, without stiff bristly hairs. The body measurements cannot be taken any more, since both skins have been mounted with their backs very much arched, even more so than RMNH 19688. The hind foot of RMNH 24211 is approximately 22 mm, that of RMNH 24212 about 22.8 mm. The skulls do not show the characters of RMNH 19688, however: the zygomatic plate clearly protrudes forward of the zygomatic process of the maxilla (pl. 2 fig. *a*) and there is no outer tubercle on the first loop of M^2 (pl. 3 fig. *b*, *c*). Although both specimens are larger than RMNH 19688, with more robust teeth, their tooth surface shows no sign of wear and they probably are young animals. External and skull measurements appear in table I.

Thomas (1905), describing the skull of *Micromys geisha*, says: "Anteorbital plate straight-edged in front, scarcely projected forwards in advance of the upper bridge... Molars small, of normal structure, a well-marked antero-external secondary cusp on m^2 , as well as the usual large antero-internal". In both these characters Thomas's *geisha* agrees with RMNH 19688, but not with RMNH 24211 and 24212. In the latter two specimens, the zygomatic plate protrudes clearly forwards (pl. 2 fig. *a*). In this respect, these specimens correspond with the two syntypes of *Mus speciosus* Temminck, 1844 in the Leiden museum (RMNH 19686 and 19687); this feature is faintly visible on pl. 16 fig. 3 of the Fauna Japonica, where the skull of *Mus speciosus* is figured. Imaizumi (1949: 256; 1960: 141, pls. 38-41) used the shape of the zygomatic plate as a character to distinguish *Apodemus argenteus* from *A. speciosus*.

The presence or absence of an outer tubercle on the first loop of M^2 is not always a reliable guide to distinguish both Japanese *Apodemus* species. The antero-external cusp of M^2 is always present in *A. argenteus*, as in RMNH 19688, but absent or very small in *A. speciosus* (Tokuda, 1941b: 88; Kuroda, 1953: 141; Imaizumi, 1949: 256; 1960: 142, 145). In both type specimens of *Mus speciosus* this cusp is absent, and also in RMNH 24211 and 24212 (pl. 3 fig. *b*, *c*).

It is obvious that the type material of *Mus argenteus* in the Leiden museum is composite. RMNH 19688 agrees with *Micromys geisha* Thomas, 1905 in skull characters and is doubtless conspecific with that form. RMNH 24211 and 24212 agree with the two syntypes of *Mus speciosus* Temminck, 1844 in the shape of the zygomatic plate and the structure of M^2 , characters generally regarded as diagnostic for *Apodemus speciosus*. They clearly represent young specimens of *speciosus*, in which the tooth surface shows no sign of wear and in which the characteristic stiff, bristly hairs of the dorsal fur have not yet developed.

We therefore formally designate RMNH 19688 (Cat. *b*) as the lectotype of *Mus argenteus* Temminck, 1844. The holotype of *Micromys geisha* Thomas, 1905 is conspecific with the lectotype of *Mus argenteus* and the name *Micromys geisha* is a junior synonym of that species.

SUBSPECIFIC IDENTITY OF THE LECTOTYPE

The question remains which population of *Apodemus argenteus* is represented by the lectotype and thus is to be regarded as the nominate form. Thomas (1906: 350-351, 359, 362; 1908: 54) and Kuroda (1924: 9) distinguished the following subspecies:

Micromys geisha geisha Thomas, 1905: Honshu, Kyushu, Shikoku.

Micromys geisha hokkaidi Thomas, 1906: Hokkaido.

Micromys geisha celatus Thomas, 1906: Oki Islands.

Micromys geisha yakui Thomas, 1906: Yakushima Island.

Apodemus geisha sagax Thomas, 1908: Tsu-shima Islands.

Apodemus geisha tanei Kuroda, 1924: Tanegashima Island.

These subspecies are mainly characterized by slight differences in their average external measurements and coat colour; moreover, Miyao & Mōri (1968), Miyao et al. (1966, 1967) and Imaizumi (1972) have been unable to distinguish the populations of Honshu, Kyushu, Shikoku, Hokkaido and the Oki and Tsu-shima Islands with regard to tail and hind foot length. Corbet (1978: 136) states that these subspecies "seem very doubtfully distinct although *celatus* is rather short-tailed". It is obvious that the lectotype of *Apodemus argenteus* cannot be referred to any of the above populations on the basis of its external measurements. The coat colour in this species varies according to season and age, so probably cannot serve as a reliable guide either. It therefore appears that the provenance of the specimens may be the only safe criterion for identifying the putative subspecies of *A. argenteus*. As mentioned above, the place of origin of the lectotype cannot be traced any longer, but most mammalogical specimens acquired by Von Siebold and Bürger almost certainly came from the surroundings of Nagasaki (but see Groves & Smeenk, 1978: 25, 28). It is reasonable to assume that, unless proved otherwise, the nominate form, as in *Micromys geisha*, is the one occurring on Honshu, Kyushu and Shikoku.

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Fig. a. RMNH 19688 (Cat. b), lectotype of *Mus argenteus* Temminck, 1844.
Fig. b. Fauna Japonica, pl. 15 fig. 1, showing RMNH 19688.



Fig. a. Skull of RMNH 24211 (Cat. a), *Apodemus speciosus* (Temminck, 1844), paralectotype of *Mus argentatus* Temminck, 1844.
Fig. b. RMNH 19688 (Cat. b), lectotype of *Mus argentatus*.

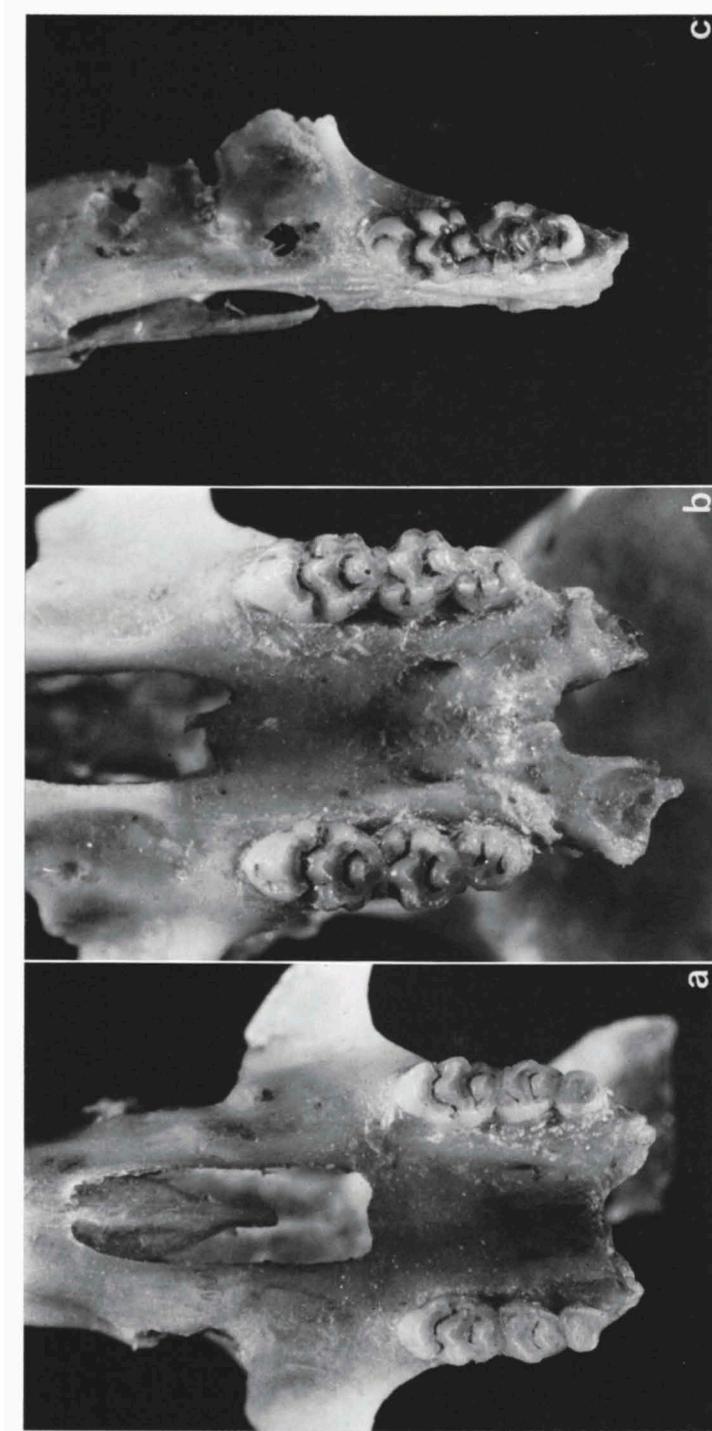


Fig. a. Upper tooth rows of RMNH 10688 (Cat. b), lectotype of *Mus argentus* Temminck, 1844.
Fig. b, c. RMNH 24211 (Cat. a) and 24212 (Cat. c), *Apodemus spicciocis* (Temminck, 1844), paralectotypes of *Mus argentus*.

Bürger Dez. 31.

Systematische Lijst van Opgesette Japanische
Zoogdieren en Skelette, welke door den Ondergetee-
kende met de Schepen van dit Jaar naar Batavia
worden verzonden.

サル	猿	N ^o 1 <u>Genus Sylvanus, var.</u> <u>Suru Japon. Genus speciosus.</u>	10 Skelette
ゴキウ	之嶋類鼠	N ^o 2 <u>Myoxis Gogonezumi, Japon.</u> <u>Myoxis Wachmanni elegans</u>	1 10
モガク	鼯鼠	N ^o 3 <u>Peromys Momoga! Japon.</u> <u>Peromys momoga</u>	5 "
リス	野食栗鼠	N ^o 4 <u>Peromys Nobutoma! Japon.</u> <u>Peromys nobutoma</u>	2 "
子ウ	鼠	N ^o 5 <u>Sciurus Les Japon. Sciurus les.</u> <u>Sciurus les Japon. Sciurus polit-aria</u>	5 skel
子ウ	赤鼠	N ^o 6 <u>Mus Nerezumi, Japon.</u> <u>Mus decumanus, Linn. Mus japonicus</u>	2 10
子ウ	野鼠	N ^o 7 <u>Mus Akanezumi Japon. tout rouge</u> <u>Mus leucopus Linn. Mus bipus</u> <u>Mus speciosus.</u>	14 "
子ウ	野鼠	N ^o 8 <u>Mus Indicus, Linn. Mus indicus</u> <u>Mus Indicus Japon. Mus indicus</u>	1 "
子ウ	鼯鼠	N ^o 9 <u>Mus Hatakanezumi, Tap.</u>	3 "
子ウ	鼠	N ^o 10 <u>Mus Jamanezumi, Tap.</u> <u>Mus argenteus</u>	4 "

List of mammals (in part) shipped from Japan to Batavia (now Jakarta) and from there to Leiden; compiled by H. Bürger and signed "Dezima 31 December 1832". The page shown mentions 14 mounted skins of "Mus Akanezumi" and 4 of "Mus Jamanezumi". The notes, in Temminck's handwriting, read as follows: (under *Mus Akanezumi*) "tout rouge ventre blanc ?C'est Esp N. *Mus speciosus*." (under *Mus Jamanezumi*) "souris de montagne, Esp: N. *fauve* *Ventre blanc* *La queue courte*. *Mus argenteus*".