

Small mammals from the Koren Arctic Expedition to the Kolyma River, northeast Siberia 1914–1918

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A small mammal collection from the Kolyma region in northeastern Siberia collected by the Norwegian trapper and naturalist Johan Koren between 1915 and 1917 comprises 152 specimens of 17 species. The collection was brought to Norway with Roald Amundsen's "Maud" expedition through the Northeast Passage and has been held by the Zoological Museum, University of Oslo.

When comparing the collection with the current distribution of small mammals in the region, it is not possible to detect changes in the small mammal fauna. As several species which are common today are missing in the collection, the collection apparently does not give a complete account of the small mammal fauna in the Kolyma region from 1915 to 1917. This discrepancy can largely be explained by the fact that Koren caught small mammals only in parts of the Kolyma region and not in those areas where the missing species are found in abundance.

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Introduction

The Norwegian field naturalist and trapper Johan Koren made five expeditions to northeastern Siberia during the period 1908–1918. He made two expeditions to the Lower Kolyma region. After the first of these, with his own schooner "Kittiwake" (1911–1912) he returned with an impressive collection of bird and mammal specimens from an area which had been visited by very few zoologists. The bird collection was treated by the sponsor of the expedition J. E. Thayer (Thayer & Bangs 1914), and the mammal collection was processed by Allen (1914). Allen described eight new species and subspecies of mammals, and the entire collection (including the types) was donated to the Museum of Comparative Zoology, Cambridge, Massachusetts.

The area of the Kolyma Lowlands made such a deep impression on Koren that he returned and settled there in 1914. On his journey to the Lower Kolyma in 1914 he was accompanied by seven other participants, among whom were zoologist Copley Amory, Jr., geologist Benns Alexander, and John Wyckoff, who made motion pictures during his stay (Schaanning 1920; Evjenth 1938).

The schooner "Eagle", which carried the expedition, was drawn up on land, and the participants moved into two log cabins hired in Nižnekolymsk. From here they made several excursions to the surrounding areas.

During his residential period from 1914 to 1918 in Nižnekolymsk (near the recent Kolymskoe settlement), Koren collected a large number of birds and mammals. After the outbreak of World War I, all the participants except Koren returned to the United States in July 1915. Copley Amory, Jr., had made a bird collection which was eventually examined by Riley (1918). Koren stayed in the area until summer 1917, at which time he made plans to travel to the United States to sell furs. He left his collections of birds and small mammals in Nižnekolymsk, and sailed with the steamer "Kolyma" to Vladivostok. However, because of the export prohibition on furs, he had to drop his plan to travel to the United States and instead chose to sell his furs in Vladivostok (Evjenth 1938). He was hired by the fur company "Youroveta" and stayed in Vladivostok until the spring of 1918 when he returned to the Kolyma area to join a trapping expedition organised by the fur company. Koren stayed in Kolyma until the following autumn when he returned to Vladivostok via Irkutsk. During the winter, after having probably caught the Spanish flu, he died in Vladivostok on 3 March 1919 (Schaanning 1920).

For Russian names and literature references in Norsk Polar-institutt's publications, the international bibliographic transcription "Scando-Slavica" is used which corresponds with the ISO (International Standard Organization) transcription.

During the expedition with the vessel "Maud" through the Northeast Passage (1918–1920), the Norwegian polar explorer Roald Amundsen spent the winter 1919–1920 near the Kolyma Delta. Here he received information about Koren's collections and sent his men to the residence of Koren's widow in Nižnekolymsk in May 1920 (Amundsen 1921). Later the material was brought back to Norway and donated to the University of Oslo.

The present collection contains skins and skulls of small mammals collected by Koren in the Lower Kolyma region in 1914–1918. Koren's collection of skins and birds' eggs was examined by Schaanning (1954), but the mammals collection has been unexamined until now. The collection is kept at the Zoological Museum, University of Oslo.

The aim of this paper is to draw attention to a valuable collection which has never been studied by zoologists. Koren left no notebooks on the collection, and none of the specimens were identified. Fortunately, the skins and skulls were labelled with information on locality, date, sex, body length, tail length and hind foot length. Small mammals in the Lower Kolyma were also studied by one of the present authors (E. P.) in 1982–1992. This then allowed us to compare the mammals collected by Koren with the current distribution of the animals. The information on the localities where the specimens were taken includes few details. However, a survey of the current distribution of mammals in the region would give an indication of the localities where the mammals were collected.

Geographical description

The river Kolyma crosses the northern part of the Magadan District and the northeastern part of the Jakut (Sacha) Republic (Fig. 1). It is 2,600 km long and flows from the Kolyma Mountains into the East Siberian Sea. The upstream part of the river is locked in the mountains. The water here is clean and the flow is very forceful and rapid. In the lower part of the river the water flow is slow: the river carries a lot of silt which is deposited in islands and along the river banks. The town of Nižnekolymsk was located on one of the islands not far from the river delta. The town, which had previously accommodated both Russian trappers and Cukča herdsmen, prospered

until the late 1940s, when most of the settlers moved to Čerskij. Today Nižnekolymsk is almost deserted with only a few inhabitants remaining.

The Kolyma water masses carry a great amount of heat from the South. This, and isolation from the North by the Anjuj Mountain Ridge, makes the local climate in the Lowlands milder and the vegetation richer in contrast to the surrounding tundras. Continental climate dominates in the areas. The mid-January temperature at the timberline is -34°C , and -32°C at the coast. The July temperatures are $+12$ and $+6^{\circ}\text{C}$ at timberline and the coast, respectively (Northern Jakutija 1969). At the Konkovaja River the temperatures in mid-July are $+7^{\circ}\text{C}$ (Potapov 1993).

The timberline extends along the Kolyma River up to the former village "Kraj Lesa" (Edge of the forest), approximately 100 km from Nižnekolymsk. Larch trees *Larix daurica* grow along the river. The river banks are flanked with the Kolyma willow *Salix kolymensis* and alder *Alnus fructosa*. The northernmost islands of the delta are bordered by grey willow *S. glauca* and covered by tundra vegetation. Tundra vegetation is also predominant on the so-called Chalarča Tundra, northwest of Nižnekolymsk. The entire terrain in Lower Kolyma is underlaid by permafrost.

The collection

Species identification has been made according to Allen (1914), Ognev (1926, 1931, 1935, 1940, 1947, 1948, 1950) and Corbet (1978). All measurements taken by Koren were in inches and have been transformed into mm. Calculations of means and SD were made in inches and then transformed into mm. The nomenclature follows Corbet (1978, 1984), but additional comments to the taxonomy of the different species are also given. Complete lists of all data available for each specimen in the collection are given in Appendices 1–3.

INSECTIVORA

Soricidae

The taxonomy of the Palearctic shrews has been unclear for some time. Recent Russian studies (Dolgov 1967; Judin 1971; Ochotina 1983;

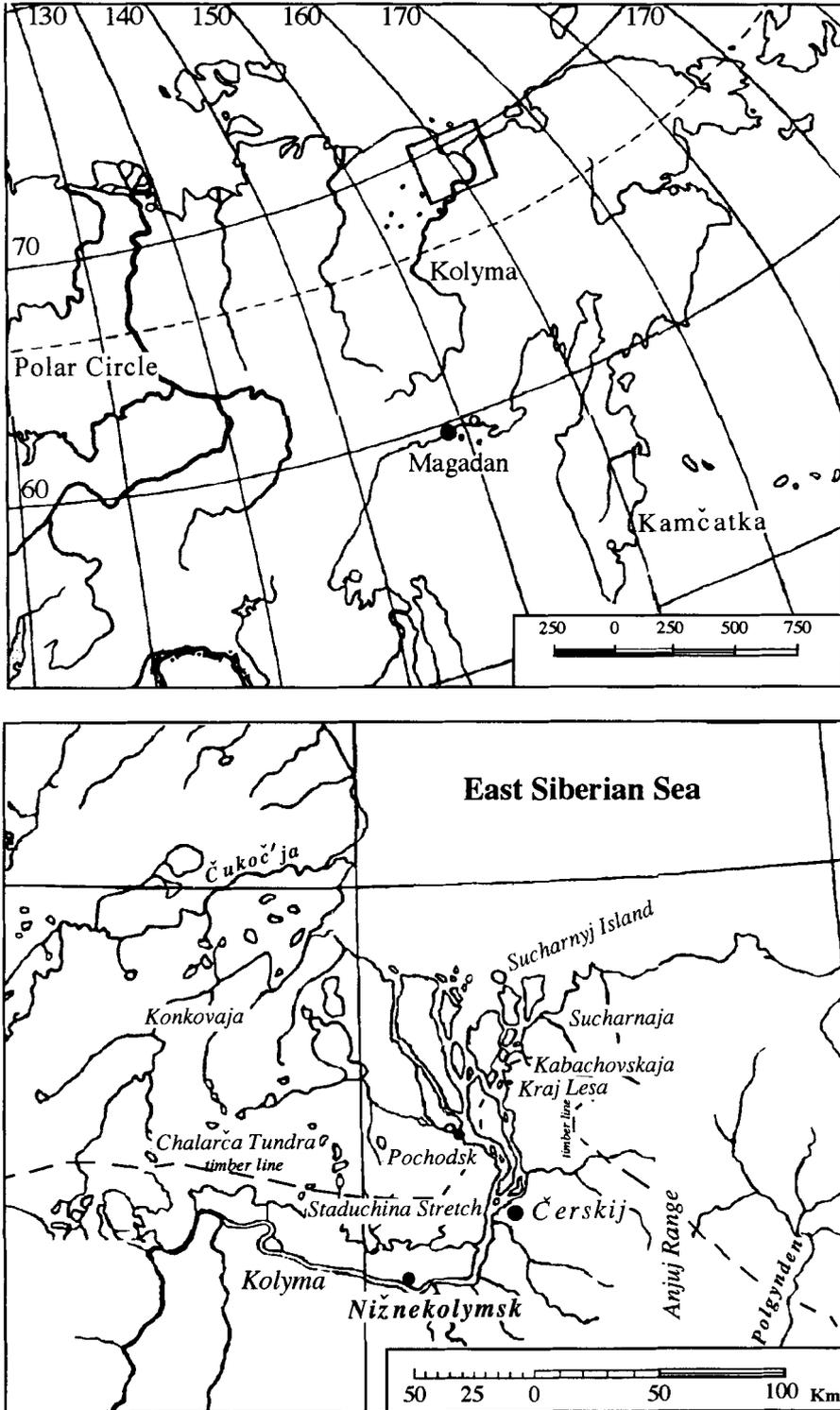


Fig. 1. Location map of the Lower Kolyma region in northeastern Siberia.

Černjavskij 1984; Krivošeev 1984; Dolgov 1985; Pavlinov & Rossolimo 1987; Dokučaev 1990) on systematics, morphology (reproductive organs and karyotypes), ecology, and distribution have provided new information on the taxonomical status of Siberian shrews.

Sorex roboratus Hollister, 1913. Flat-sculled Shrew

This shrew from Kolyma was described by Allen (1914) as a new species *Sorex vir*. It was regarded by Ellerman & Morrison-Scott (1966) as conspecific to *S. araneus* L., 1758, but later Russian authors (Judin 1971; Černjavskij 1984) treated it as a *S. vir*. The current point of view is that this species is conspecific to *S. roboratus* Hollister, 1913 (Krivošeev 1984; Hoffman 1985; Pavlinov & Rossolimo 1987; Dokučaev 1990).

The collection contains 29 specimens of this species (Table 1). This large shrew was thought to be the most common in the Nižnekolym'sk area (Allen 1914). It is widely distributed in the taiga zone of the Kolyma Lowlands and can be found in the cotton-grass tussock tundra habitat as well as in meadows along river stretches and lakes (Tavrovskij et al. 1971).

Table 1. Summary table of measurements (in mm) of *Sorex roboratus* for males and females collected in the Kolyma region

Sex	Measurement	n	x	sd	range
Males	Total length	18	106.5	6.9	97–117
	Tail length	18	36.3	2.5	31–41
	Hind foot	18	15.0	0.5	14–16
Females	Total length	9	108.3	5.6	102–117
	Tail length	9	36.8	1.0	36–39
	Hind foot	9	15.1	0.5	14–16

Sorex tundrensis Merriam, 1900. Arctic Shrew

Allen (1914) described the specimens collected by Koren on his previous expedition to Kolyma as a new subspecies of *S. araneus* L., 1758, which he named *S. araneus ultimus*. This shrew was treated by Corbet (1978) as the subspecies *S. arcticus borealis*. Neither Ellerman & Morrison-Scott (1966) nor Kuzyakin (1965) regarded *S. arcticus* Kerr, 1792 as a separate species, as did later Russian authors (Stroganov 1957; Corbet 1978). The current point of view is that this shrew belongs to the species *S. tundrensis* Merriam, 1900

(Ochotina 1983; Černjavskij 1984; Corbet 1984; Krivošeev 1984; Pavlinov & Rossolimo 1987; Dokučaev 1990).

There are two specimens of this shrew present in the collection.

Sorex daphaenodon sanguinidens (Allen, 1914). Large-toothed Shrew

A new species *S. sanguinidens* was described by Allen (1914) from the Kolyma region. Most specialists (Ellerman & Morrison-Scott 1966; Černjavskij 1984; Pavlinov & Rossolimo 1987) treated this species as conspecific to *S. daphaenodon* Thomas, 1907. Corbet (1978) and Krivošeev (1984) treated this shrew as a subspecies *S. d. sanguinidens*. The same point of view was expressed by Tavrovskij et al. (1971) who pointed out that specimens of *S. d. sanguinidens* from the Lower Kolyma are smaller than those from central Jakutija.

This species is represented by ten specimens in the present collection. Currently this shrew is abundant in the meadows along rivers and lakes. It also inhabits larch forests in the river valley (Tavrovskij et al. 1971).

LAGOMORPHA

Ochotonidae

Ochotona hyperborea (Pallas, 1811). Northern Pika

Allen (1903) described a new species *Ochotona kolymensis* from the Kolyma Region. Later it was treated as a subspecies of the widely distributed *O. alpina* (Pallas, 1773) (Corbet 1978; Tavrovskij et al. 1971; Krivošeev 1984), but after closer studies it was regarded as a separate species *O. hyperborea* (Černjavskij 1984; Corbet 1984; Pavlinov & Rossolimo 1987).

The collection contains eleven specimens of this pika (Table 2). According to Koren (Allen 1914) it is found in rocky areas in the region. Recent observations show that it inhabits both the mountain tundras east of the Kolyma and the plain tundras west and northwest of the Kolyma. It does not occupy bush and forested habitats between the high terraces on each side of the Kolyma River valley but prefers the stony habitat of the mountain areas west of the Kolyma and

Table 2. Summary table of measurements (in mm) of *Ochotona hyperborea* for males and females collected in the Kolyma region

Sex	Measurement	n	x	sd	range
Males	Total length	6	157.7	10.6	142-166
	Tail length	4	11.4	3.7	8-15
	Hind foot	6	27.1	0.8	26-28
Females	Total length	5	153.5	9.0	143-173
	Tail length	4	11.7	3.6	6-14
	Hind foot	5	25.7	1.7	24-28

dry polygons with deep, dry, frost-trenches in the tundras east of the Kolyma and north of Nižnekolymsk. Tavrovskij et al. (1971) considers this species to be very common between the Staduchina stretch and the Konkovaja River. It was mentioned by Buturlin (1913) as a common species in the delta.

RODENTIA

Sciuridae

Sciurus vulgaris vulgaris L., 1758. Red Squirrel

Ellerman & Morrison-Scott (1966) classified populations from this region as belonging to the subspecies *S. v. jacutensis* Ognev, 1929, while Corbet (1978) included it in the nominative subspecies. The latest revisions (Černjavskij 1984; Krivošeev 1984) treated the populations from the Lower Kolyma as *S. v. jakutensis* Ognev, 1929).

A total of five specimens are present in the collection. According to Koren (Allen 1914), it is found in the larch forests along the Kolyma River. The red squirrel is common in all types of forests and spreads up to the northern limits of the timberline. Krivošeev (pers. comm.) found the squirrel even in tundra habitats. Along the east bank of the Kolyma it is found up to the northernmost limits of the forest (E. Potapov unpubl.; Tavrovskij et al. 1971).

Marmota camtschatica (Pallas, 1811). Black-capped (Kamčatka) Marmot

This marmot was treated by Ellerman & Morrison-Scott (1966) as a subspecies *M. marmota camtschatica*, but was later given species rank

(Corbet 1978), which has not been disputed by recent studies (Černjavskij 1984; Krivošeev 1984; Pavlov & Rossolimo 1987).

This species is represented in the collection only by a lower jaw (No. 177). According to Koren (Allen 1914), it can be found in wooded highlands. This record is of great importance as even now the distribution of this species in the region remains unclear. Until the re-discovery of the Koren's collection there was no evidence of presence of the species in the Lower Kolyma. Buturlin (1913) noted an isolated population of this species at "65 km from Sukharnyj". He probably meant either the Sukharnaja River (the northeast tributary of the Kolyma) or the Sukharnyj Island in the delta. Later Černjavskij (1984) referred to personal communications from various sources which suggested that isolated colonies of this species could be found at the sources of the Pogynen River (which flows from the same area as the Krestovaja River, but which was a tributary of the Malyj Anjuj River). None of the mentioned observations were supported by specimens, and thus it was concluded that there was no evidence of this species in the Anjuj Range region (Gromov & Poljakov 1977). The jaw from Koren's collection provided such evidence. There is no indication that Koren consulted the sources of the Pogynen or Sucharnaja rivers, but it is possible that he acquired the jaw from local nomadic herdsmen.

Since Buturlin's expedition to the Lower Kolyma nobody has checked the information of marmot colonies in the Sucharnaja River, but even now local trappers and fishermen state that the species occurs in the area. The nearest known colonies of the Kamčatka marmot are at the Koryak Mountains (800 km SE) or in the Jakutija (upper Indigirka, 500 km or the Lower Lena River, 500 km). Small scattered colonies of the Kamčatka marmot were recorded at the Pyrgenau Ridge, south of the Cape Let'jatkin, 65 km east of the Kolyma Delta (Vovčenko et al. 1987; Bibikov 1989). To support the latter finding, one skin has been kept in the Zoological Museum of the Moscow State University (Krivošeev, pers. comm.). There is an indication that in 1920s some colonies of the Kamčatka marmot were present in the Lower Indigirka (Tavrovskij et al. 1971). During the most recent expeditions to the region no marmots were found (Solomonov 1987). As there is no evidence, that Koren visited coastal areas east of the Kolyma, the marmot's jaw in his

collection possibly comes from the northernmost point of the range, either from a population not yet discovered or from an already extinct population.

The "wooded highlands" mentioned by Koren (Allen 1914) is the most unusual type of habitat for marmots. The typical habitat of the Kamčatka marmot includes gentle, steppe-like vegetation slopes in high mountain areas, or places of similar character near the sea coast. The marmot avoids stony, steep slopes and forested areas (Tavrovskij et al. 1971; Černjavskij 1984). The nearest isolated population in the North Anjuj Range (Vovčenko et al. 1987) lives in stony mountain tundra at least 90 km from the current timberline.

Spermophilus parryi leucosticus Brandt, 1844.
Arctic Souslik

Allen (1903) described a new species *Citellus baxtoni* from eastern Siberia. Later, Ognev (1947) suggested that the North American species *S. parryi* (Richardson, 1825) is close to the East Siberian souslik *C. undulatus* (Pallas, 1778). The latter opinion was supported by a detailed study of Gromov et al. (1965) who treated the north-eastern populations of *S. undulatus* as conspecific to *S. parryi* and separated them from the southern populations of *S. undulatus*. The study of Gromov et al. (1965) was based on the morphological analysis and supported by chromosome analysis by Ljapunova (1969). This opinion was widely accepted (Černjavskij 1984; Krivošeev 1984; Pavlonov & Rossolimo 1987).

The present collection includes two specimens of this souslik. It was not included in the collection studied by Allen (1914). According to Allen (1914) Koren reported that this souslik was common in the tundra around the mouth of the Kolyma River. Today the arctic souslik occurs only along the eastern side of the delta and is not found on the western banks of the Kolyma or on the islands of the Kolyma delta. It also occurs in all high terraces on the eastern side of the Kolyma River and both Malyj and Bol'šoj Anjuj and Omolon Rivers. It is common in most of the places and on the right bank of the Lower Kolyma its population density was described as the high. (Tavrovskij et al. 1971). In order to obtain a specimen Koren had only to cross the Kolyma River near Nižnekolymsk and go to the high terrace across the boggy part of the valley.

Pteromys volans L., 1758. Flying Squirrel

This species is represented in the collection with only one specimen. According to Koren (Allen 1914), it is found in wooded areas in the Kolyma. This species is very difficult to detect in summer, and there are no winter observations from this region. It is highly possible that the flying squirrel could still be found in the larch forests of the Lower Kolyma River. The nearest known location is the mid-Omolon River, mid and lower Anjuj River (Černjavskij 1984; Krivošeev 1984). According to Tavrovskij et al. (1971) the northern limit of the range of the flying squirrel in the Kolyma is the Srednekolymsk settlement at the mouth of the Osetrovka River, i.e. ca. 200 km south of Nižnekolymsk.

Cricetidae

Dicrostonyx torquatus (Pallas, 1778). Collared Lemming

Allen (1914) described a new species *D. chionopaes* from Kolyma. Later this lemming was given status as a subspecies *D. torquatus chionopaes* or included in *D. t. lenae* Kerr, 1792 (Corbet 1978).

The collection contains only one specimen of this lemming, a skin in winter fur. The only data available consists of "skin prepared by a native, no measurements". Today the collared lemming can be found on the large islands of the Kolyma Delta and in the tundras approximately 35 km north of the Nižnekolymsk. This specimen could in no way have been obtained in the forested habitats along the river valley, an area never used by this species even during peak years. The specimen probably originates from the Chalarča tundra (which is the location of the nearest known populations), the avan-delta of the Kolyma, or from the mountain tundras of the eastern side of the Kolyma.

Myopus schisticolor thayeri (Allen, 1914). Wood Lemming

Based on two specimens found dead in the snow during Koren's expedition to the Kolyma in 1911–12, Allen (1914) described a new species *M. thayeri*. Later it was treated as a subspecies of *M. schisticolor* (Liljeborg, 1844) (Ognev 1948; Černjavskij 1984).

The present collection contains only one specimen. Recent studies mentioned this species as a

fairly common animal in the larch forests in valleys of the Omolon and Anjuj rivers (Černjavskij 1984; Krivošeev 1984), as well as in the forests and bushes along the western side of the Kolyma up to the Pochodsk settlement (Tavrovskij et al. 1971). The habitat of this species includes green mosses which are very common in Koren's study area.

Lemmus sibiricus chrysogaster (Allen, 1903).
Siberian Lemming

Allen (1903) described a new subspecies *L. obensis chrysogaster* based on specimen from the river Gyžiga, north of the Ochotsk Sea. The Siberian Lemming population there is small and isolated. Later Allen (1914) treated the latter as a separate species *L. chrysogaster*. The Siberian lemming from the Kolyma Delta (locality Kalashevo) was described as a new species *L. paulus* Allen, 1914. Later these two lemmings were treated as conspecifics. Although at present lemmings from the Chukotka peninsula and plain tundras east of the Enisej River are treated as *L. s. chrysogaster*, the status of the isolated population from the Gyžiga River remains unclear. Sidorowicz (1964) made a revision of the genus *Lemmus* and treated all three species (*L. sibiricus*, *L. trimucronatus*, *L. lemmus*) as conspecifics. This was criticised by various authors (see e.g. Gromov & Poljakov 1977). Krivošeev & Rossolimo (1966) treated *L. sibiricus* as conspecific with *L. trimucronatus*, whereas this question was left unanswered by Rausch & Rausch (1975). The latter authors treated *L. chrysogaster* as a subspecies of *L. sibiricus*. This point of view was later supported by Černjavskij (1984).

Three specimens are present in the collection. According to Koren (Allen 1914), it was common in the Kolyma region even if he only was able to obtain one specimen during his first Kolyma expedition. The nearest sites Koren might have collected the animal from are the same as described for the collared lemming. Another possibility is that the specimens come from a forest-tundra population which is known in near Srednekolymsk area (Krivošeev & Rossolimo 1966; Tavrovskij et al. 1971). The animals from the latter population are known to be smaller than the ones from the tundra zone. Krivšeev (pers. comm.) caught one Siberian lemming at the Staduchina stretch, approximately 20 km from Nižnekolymsk.

Clethrionomys rutilus jochelsoni (Allen, 1903).
Red-backed Vole

Allen (1903) described this vole as a new species *Evtomys jochelsoni* based on two alcohol-preserved specimens from Verkhnekolymsk (now Zyrjanka). Among the character distinctions separating the new species, Allen (1903) mentioned bright-red spots on the back and bright yellow spots on the sides. Čerjavskij (1984) noted that this might be a result of the method used for preserving the skin. Gromov and Poljakov (1977) treated this vole as *C. r. jakutensis*; however this point of view was not supported later (Černjavskij 1984; Krivošeev 1984).

The collection contains 26 specimens of this vole (Table 3). According to Koren (Allen 1914) the red-backed vole is abundant around Nižnekolymsk. Most of Koren's specimens were collected in houses, under loose sticks and planks. This species is very common in the forests on both sides of the river valley. During peak years it is recorded north to the typical tundra sub-zone (Potapov 1993). Along the Kolyma River it normally spreads up to the Pochodsk settlement on the left bank and up to the place Kabachovskaja on the right bank. Koren's "study area" is located in the region of "absolute dominance" of the species (Tavrovskij et al. 1971). Its density in the Lower Kolyma reaches twelve individuals per 100 trap-nights (Krivošeev 1981).

Microtus oeconomus koreni (Allen, 1914). Root Vole

The specimens collected during Koren's first expedition to the Kolyma were described as a new species *Microtus koreni* (Allen 1914). Ellerman & Morrison-Scott (1966) treated this vole as a subspecies of *M. oeconomus* (Pallas, 1776). This

Table 3. Summary table of measurements (in mm) of *Clethrionomys rutilus jochelsoni* for males and females collected in the Kolyma region

Sex	Measurement	n	x	sd	range
Males	Total length	25	112.3	8.1	102-140
	Tail length	25	26.9	3.1	19-32
	Hind foot	25	18.9	0.5	18-19
Females	Total length	1	135		
	Tail length	1	35		
	Hind foot	1	19		

Table 4. Summary table of measurements (in mm) of *Microtus oeconomus koreni* for males and females collected in the Kolyma region

Sex	Measurement	n	x	sd	range
Males	Total length	42	133.9	14.2	102-173
	Tail length	42	34.8	5.1	24-49
	Hind foot	42	20.8	1.3	16-23
Females	Total length	3	146.0		100-184
	Tail length	3	33.5		19-51
	Hind foot	3	19.3		17-22

opinion was supported by Tavrovskij et al. (1971), Černjavskij (1984), and Krivišeev (1984).

The collection contains 48 specimens of this vole (Table 4). It is very common along the Kolyma River and on the islands in the river (Tavrovskij et al. 1971; Krivošeev 1981). Its numbers there reaches 16.3 individuals per 100 trap nights (Krivošeev 1981). The root vole also lives in the tundra north of the Nižnekolymsk (Potapov 1993) and in the delta.

CARNIVORA

Canidae

Canis lupus L., 1798. Wolf

The collection contains only one specimen of the species (Female, No. 151b). The wolf is said to be common in the area (Allen 1914). Buturlin (1913) mentioned that wolves increased their numbers in the Lower Kolyma. From the 1960s to 1990 the population of wolves in the tundra region was controlled and their numbers were reduced. Today the number of wolves in the region increases (Potapov unpubl.) It breeds both in the tundra and in forested areas.

Mustelidae

Mustela erminea erminea L., 1758. Stoat

Allen (1914) mentioned two specimens collected by Koren and identified them to *Mustela kaneii* Baird, 1857, a weasel described from the Arakchechen Island, Čukotskij Peninsula. Ognev (1931) considered the name *kaneii* inappropriate as the description of this species was based on specimens from different parts of the Palearctic.

Based on specimens obtained by S. A. Buturlin from the Pochodsk village in the Lower Kolyma, he treated this stoat as *M. e. orientalis* (Ognev, 1931). Geptner et al. (1967) used the subspecies name *M. e. kaneii*, which was later supported by Krivošeev (1984). Tavrovskij et al. (1971) and Černjavskij (1984) regarded the stoats from the region as *M. e. arctica*, while Corbet (1978) treated it as belonging to the nominate subspecies *M. e. erminea*.

Six specimens are present in the collection. The stoat is quite common in the area and occupies both the taiga and the tundra zones (Krivošeev 1984, Potapov 1993).

Mustela nivalis pygmaea (Allen, 1903). Least Weasel

Allen (1903) treated this weasel from the Lower Kolyma as conspecific with *Putorius pygmaeus*, a new species he described from the Gyžiga River. Later it was treated as conspecific with *Mustela nivalis* L., 1766. (Ellerman & Morrison-Scott 1966). Recent authors treated weasels from the Lower Kolyma as *M. n. pygmaea* (Geptner et al. 1967; Tavrovskij et al. 1971; Černjavskij 1984; Krivošeev 1984).

The collection contains seven specimens of this weasel. This species is not mentioned in the paper describing the material from the first Koren's expedition to the Kolyma (Allen 1914). Recently this species was observed at a number of locations in the Lower Kolyma including forested areas and the tundra (Potapov 1993).

Felidae

Lynx lynx L., 1758. North-Siberian Lynx

The lynx from Yukutia is treated by Tavrovskij et al. (1971) as the North-Siberian Lynx *lynx lynx wrangeli* Ognev, 1928.

The collection contains only one skull of this species (no. 181, collected at Nižnekolymsk, other script unreadable). The species is said to inhabit the Upper Kolyma Highlands (Allen 1914). The occurrence of this species in the Lower Kolyma and the Lower Anjuy River was mentioned by Iochel'son (1898).

Černjavskij (1984) states that this species occurs everywhere in the forested part of the region, but very rare. In the Kolyma Lowlands this species is very rare (Tavrovskij et al. 1971).

General discussion

Studies of the local fauna in the Lower Kolyma region began in the 19th century when the area was visited by Matjuškin and Vrangel' (Vrangel' 1841), and later by Maidell (1894) and Iochel'son (1898), all of whom made observations and collected animals. In 1892 the Kolyma River was visited by I. Čerskij (Revzin 1952), who collected birds and mammals. This collection, lodged at the Zoological Institute, St. Petersburg, covers specimens from the taiga of the Kolyma River, but includes few tundra specimens due to the untimely death of I. Čerskij which brought the expedition to an end. In 1905 the Kolyma Lowlands were visited by Buturlin (1913), who also collected birds and animals. Later the region was visited by Gribanovskij (1915).

The material collected during Koren's first expedition to Lower Kolyma added valuable information to the knowledge of the fauna of small mammals of the region. (Allen 1914). More recently the mammals of the region were studied by Krivošeev, who stayed in the Pochodsk settlement from 1960 to 1963 and intensively travelled within the region. The results of his research were summarised later by Tavrovskij et al. (1971) and Krivošeev (1964, 1981) and they were included in a comprehensive study by Černavskij (1984). Potapov (1993, 1994) stayed in the proximity of the Pochodsk settlement in 1985 and made occasional visits to the Kolyma Delta and the mountains east of the river. In 1982–1983 and in 1986–1992 he studied small mammals in the tundras north of Koren's study area.

The present collection is not representative for the whole fauna of the terrestrial mammals in the Kolyma River region in the period 1915–1917; it indicates, however, the geographical range of Koren's activity in the region. Lack of species such as the arctic fox *Alopex lagopus* (L., 1758), red fox *Vulpes vulpes* (L., 1758), wolverine *Gulo gulo* (L., 1758), sable *Martes zibellina* (L., 1758), arctic hare *Lepus timidus* L., 1758, elk *Alces alces* (L., 1758), reindeer *Rangifer tarandus* (L., 1758) and brown bear *Ursus arctos* L., 1758, is undoubtedly a result of Koren's commercial activity. However, it is still not clear why Koren left squirrels in the collection. The squirrel is a very valuable fur animal in the region (Iochel'son 1898; Maidell 1894; Tavrovskij et al. 1971). The same applies to the weasel. Although the total number of specimens in the collection is 152, the specimens were

given numbers up to 181 and thus several specimens are missing. The missing numbers might have belonged to fur specimens sold by Koren in Vladivostok. Schaanning (1954) claims that the collection had suffered during its transportation from Kolyma, as a large number of the bird eggs were broken and several bird skins were missing. Perhaps some mammal skins might have disappeared during the transportation.

The presence of the Kamčatka Marmot and lack of the bighorn snow sheep *Ovis nivicola* Eschscholtz, 1829, implies that either the marmot's jaw could have been obtained from local hunters or Koren may have indeed encountered a unique colony living in "forested highlands". The collection also lacks the masked shrew *Sorex caecutiens* Laxmann, 1788, which is quite common in the region (Tavrovskij et al. 1971; Černjavskij 1984). This could be explained by the fact that Koren probably did not have any sophisticated traps, or did not catch the shrews deliberately.

The lack of Middendorff's vole *Microtus middendorffi* (Poliakov, 1881) and especially narrow-sculled vole *M. gregalis* (Pallas, 1779) suggests that Koren never visited the tundra areas to the north of Nižnekolym'sk and in the western part of the Kolyma Delta. These parts of the region have very high numbers of the narrow-sculled vole which cannot be missed. The narrow-sculled vole occurs in many parts of the Lower Kolyma and can be found even in Verkhne-Kolym'sk (Tavrovskij et al. 1971). This is indirectly supported by the small numbers of Siberian and collared lemmings represented in the collection. These species dominate in the tundras in the Kolyma Delta and in the plain tundras north of the Nižnekolym'sk. Both lemmings are detectable even during low periods of the cycles as their remains could be found everywhere in the tundra in owl's pellets and old nests. It appears that Koren only visited the right bank of the Kolyma Delta, and possibly the Kabachovskaja River at timberline. There he might have collected Siberian lemming, marmot, and souslik. This is the only place where Koren could have collected whimbrel *Numenius phaeopus*, great knot *Calidris tenuirostris* and Naumann's thrush *Turdus naumanni* included in his bird collection (Schaanning 1954).

The species of the taiga fauna are well represented in the collection, except for grey-sided vole *Clethrionomys rufocanus* (Sundevall, 1846) which lives in all forests in the river valley together with

the red-backed vole and also in the forested slopes of the mountain. In the Omolon River the density of grey-sided vole was found to be much lower numbers than red-backed vole (Černjavskij 1984). This probably explains lack of this vole in the collection of Koren. However, Krivošeev (1981) has found grey-sided vole in the Kolyma Lowlands in quite high numbers (up to ten individuals per 100 trap nights).

Small mammals inhabiting mountain regions are also lacking in the collection. The lack of the Siberian mountain vole *Articola macrotis* Radde, 1862 and sub-arctic vole *Microtus hyperboreus* Vinogradov, 1934, which could be found in the mountain tundra together with the northern pika (Černjavskij 1984), probably means that the pikas from the collection were obtained from the plain tundras on the left bank of the Kolyma, or in the stony forested slopes of the right bank.

There are no indications from the collections made by Koren or the knowledge of the present status of small animals in the Lower Kolyma region that any small mammal species have suffered any significant decline in distribution or abundance since the beginning of this century.

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References

- Allen, J. A. 1903: Report on the mammals collected in north-eastern Siberia by the Jesup North Pacific Expedition, with itinerary and field notes by N. G. Buxton. *Bull. Am. Mus. Nat. History* 19. 101–184.
- Allen, G. M. 1914: Notes on the birds and mammals of the Arctic coast of Siberia. *Proc. New England Zool. Club* 5. Pp. 49–66.
- Amundsen, R. 1921: *Nordostpassagen. Maudfærden langs Asiens kyst*. Gyldendal, Kristiania.
- Bibikov, D. I. 1989: *Surki* (Marmots). Agropromizdat, Moscow. 255 pp.
- Buturlin, S. A. 1913: Nabljudenija nad mlekopitajuščimi, sdelannye vo vremja Kolymskoj ekspedicii 1905 g. [Observations of mammals made during the Kolyma Expedition 1905]. *Dnevnik Zool. otd. Ob-va ljubi. estestvoznau., antropol. i etnografii. Nov. ser. T. 1(5)*. [Notes Zool. Dept. Nat. Hist. Anthro. Ethnogr. Soc., n.s.1(5)]. Pp. 225–266.
- Černjavskij, F. B. 1984: *Mlekopitajuščie krajnego Severo-Vostoka Sibiri* (Mammals of the extreme north-eastern Siberia). Nauka, Moscow. 389 pp.
- Corbet, G. B. 1978. *Mammals of the Palearctic Region: a taxonomic review*. Cornell Univ. Press. British Museum of Natural History.
- Corbet, G. B. 1984. *Mammals of the Palearctic region: a taxonomic review. Supplement*. Cornell Univ. Press. British Museum of Natural History.
- Dokučae, N. E. 1990. *Ekologija burozubok Severo-Vostočnoj Azii*. 160 c. [Ecology of shrews of northeast Asia]. Nauka, Moscow. 160 pp.
- Dolgov, V. A. 1967 *Raspređenje i čislennost' paleartičeskich burozubok* [Distribution and numbers of shrews in the Palearctic]. *Zool. žurn.* 46(11), 1701–1712.
- Dolgov, V. A. 1985: *Burozubki Starogo Sveta*. [Shrews of the Old World]. Iz-vo MGU. 221 pp.
- Ellerman, J. R. & Morrison-Scott, T. C. S. 1966: *Checklist of Palearctic and Indian Mammals 1758–1946, 2nd edition*. London.
- Evjenth, H. 1938: *Gutten som Norge glemte*. Gyldendal, Oslo.
- Geptner, V. G., Naumov, N. P., Jurgenson, P. B. Sludskij, A. A., Čirkova, A. F., Bannikov, A. G. 1967: *Mlekopitajuščie Sovetskogo Sojuza*. T. 2, V. 2. [Mammals of the Soviet Union. Vol. 2. Part 2]. 1004 pp.
- Gribanovskij, N. N. 1915: *Nazetki o poljarnoj ekspedicii na Kolymu* [Notes on the Polar Expedition to the Kolyma region]. *Trudy Jakutskogo otdelenija Rossijskogo Imperatorskogo Geografičeskogo Obsčestva*. T. 1. [Proceedings of the Jakut Branch of the Russian Imperial Geographical Society. Vol. 1].
- Gromov, I. M., Bibikov, D. I., Kalbuchov, N. I. & Mejer, M. N. 1965: *Nazemnye beliči*. [Ground squirrels (Marmotinae)]. *Fauna SSSR. Mlekopitajuščie*. 3(2). [In: Fauna of the USSR. Mammals. Vol. 3 (2)]. Nauka, Moscow-Leningrad. 466 pp.]
- Gromov, I. M. & Poljakov, I. Ja. 1977: Polevki (Microtinae) fauny SSSR. *Mlekopitajuščie*. [Voles (Microtinae) of the fauna of the USSR]. *Fauna SSSR. Mlekopitajuščie*. T. 3(10). [Fauna of the USSR, Mammals, Vol. 3 (10)]. Nauka, Moscow-Leningrad. 275 pp.
- Hoffmann 1985: The correct name for the Palearctic Brown, or Flat-Sculled Shrew is *Sorex roboratus*. *Proc. Biol. Soc. Wash.* 98 (1).
- lochel'son, V. I. 1898: Očerok zveropromyšlennosti i trgovli mechami v Kolymskom okruge [Notes on trapping and fur trade in the Kolyma district]. *Trudy Jakutskoj Ekspedicii. otd. 3, T. 10 (3)* [Proc. of the Jakutian Expedition. St. Petersburg. Vol. 3(3)]. Pp. 1–167].
- Judin, B. S. 1971: *Nasekomojadnye mlekopitajuščie Sibiri*. [Insectivorous mammals of Siberia (Key)]. Nauka, Novosibirsk. 170 pp.
- Krivošeev, V. G. & Rossolimo, O. L. 1966: Vnutrividovaja izmenčivost' i sistematika sibirskogo lemninga *Lemmus sibiricus* Kerr. (1792) [Intraspecific variation and systematics of the Siberian Lemming (*Lemmus sibiricus* Kerr, 1792) in the Palearctic]. *MOIP, Bjull. Otd. Biol.* 71, 5–17.
- Krivošeev, V. G. 1981: Faktory reguljacii čislennosti myševidnyh gryzunov i čiščnyh mlekopitajuščich tajgi Kolymskoj Nizmennosti. *Ekologija mlekopitajuščich severoostočnoj Sibiri*. C. 61–82 [Factors of small and predatory mammal numbers regulation in the taiga of the Kolyma Lowlands. In: Ecology of mammals of NE Siberia]. Nauka, Moscow. Pp. 61–82.]
- Krivošeev, V. G. (ed.) 1984: *Nazemnye mlekopitajuščie Dal'nego Vostoka SSSR. Opredelitel'*. [Terrestrial mammals of the Far East of the USSR. Identification keys. Nauka, Moscow]. 356 pp.
- Kuzyakin, A. P. 1965: Insectivora and Chiroptera. In Bobrin-

- skii, N. A., Kuznetsov, B. A. & Kuzyakin, A. P. (eds): *Opredelitel' mlekopitajuščich SSSR* [Classification of the mammals of the USSR]. Moscow.
- Ljapunova, E. A. 1969: Opisanie chromosomnogo nabora i potvrzdenie vidovoj samostojatel'nosti *Citellus parryi* (Marmotinae, Sciuridae, Rodentia). [Description of the chromosome set and confirmation of the species status of *Citellus parryi* (Marmotinae, Sciuridae, Rodentia)]. Mlekopitajuščie (évoljucija, kariologija, sistematika, faunistika). [In: Mammals (evolution, karyology, systematics, fauna)]. *Novosibirsk*, 53-54.
- Maidell, G. 1894: Journey to the northeast Yakutia region in 1868-1870. Appendix to Vol. 74. *Proc. Russ. Imp. Acad. Sci. (St. Petersburg)* 74 (3) suppl. (In Russian).
- Ochotina, M. V. 1983: Taksonomičeskaja revizija *Sorex arcticus*, Kerr, 1792 (Soricidae, Insectivora) [Taxonomical revision of *Sorex arcticus*, Kerr, 1792 (Soricidae, Insectivora)] *Zool. žurn.* 62(3), 409-417.
- Ognev, S. I. 1926: *Zveri Vostočnoj Evropy i Severnoj Azii. Čast' 1. Nasekomojadnye i leučie myši. T. 1.* [Mammals of Eastern Europe and Northern Asia. Vol. 1: Insectivora and Chiroptera. Vol. 1] Iz-vo AN SSSR. Moscow-Leningrad. 631 pp.
- Ognev, S. I. 1931: *Mlekopitajuščie Vostočnoj Evropy i Severnoj Azii. Čast' 2. Chiščnye mlekopitajuščie. T. 2.* [Mammals of Eastern Europe and Northern Asia. Vol. 2: Carnivora.]. Iz-vo AN ISSR. Moscow-Leningrad.
- Ognev, S. I. 1935: *Zveri SSSR i prilježščich stran. T. 3: Chiščnye i lastonogie.* [Mammals the USSR and adjacent countries. Vol. 3: Carnivora and Odobenidae]. Iz-vo AN USSR. Moscow-Leningrad. 752 pp.
- Ognev, S. I. 1940: *Zveri SSSR i prilježščich stran. T. 4: Gryzuny.* [Mammals of the USSR and adjacent countries. Vol. 4: Rodents]. Iz-vo AN SSSR. Moscow-Leningrad. 615 pp.
- Ognev, S. I. 1947: *Zveri SSSR i prilježščich stran. T. 5: Gryzuny.* [Mammals of the USSR and adjacent countries. Vol. 5: Rodents]. Iz-vo AN SSSR. Moscow-Leningrad. 809 pp.
- Ognev, S. I. 1948: *Zveri SSSR i prilježščich stran. T. 6: Gryzuny.* [Mammals of the USSR and adjacent countries. Vol. 6: Rodents]. Iz-vo AN ISSR. Moscow-Leningrad. 559 pp.
- Ognev, S. I. 1950: *Zveri SSSR i prilježščich stran. T. 7: Gryzuny* [Mammals of the USSR and adjacent countries. Vol. 7: Rodents]. Iz-vo AN ISSR. Moscow-Leningrad. 706 pp.
- Pavlinov, I. Ja. & Rossolimo, O. L. 1987: *Sistematika mlekopitajuščich SSSR.* [Systematics of the mammals of the USSR]. Nauka, Moscow. 282 pp.
- Potapov, E. R. 1993: *Ecology and energetics of Rough-legged Buzzard in the Lower Kolyma River.* Doctorate Thesis, University of Oxford.
- Potapov, E. R. 1994: Checklist of birds of the Lower Kolyma (NE Siberia). *Bull. Brit. Ornithol. Club* 114(2), 66-73.
- Raush, R. L. & Raush, V. R. 1975: Taxonomy and zoogeography of Lemmus spp. (Rodentia, Arvicolinae) with notes on laboratory-reared lemmings. *Ztschr. Säugetierk* 40 (1), 8-34.
- Revzin, G. I. 1952: *Zizn' i podvig Ivana Čerskogo* [The life and heroism of Ivan Čerskij]. Moscow.
- Riley, J. H. 1918: Annotated catalogue of a collection of birds made by Mr. Copley Amory, Jr., in northeastern Siberia. *Proc. US Nat. Mus.* 54, 607-626.
- Schaanning, H. T. L. 1920: *Johan Koren 1879-1919.* Norsk jeger-og fiskerforenings tidsskr.
- Schaanning, H. T. L. 1954: A contribution to the ornithology of Eastern Siberia. *Nytt Magazin for Zoologi* 2, 91-115.
- Sidorowicz, J. 1964: Comparison of the morphology of representatives of the *Lemmus* from Alaska and Palearctic. *Acta Teriol.* 8(14), 217-226.
- Solomonov, N. G. (ed.) 1987: *Krasnaja Kniga Jakutskoj ASSR* [Red Data Book of the Yakut ASSR]. Nauka, Siberian Department. Novosibirsk. 99 pp.
- Stroganov, S. U. 1957: *Zveri Sibiri (Nasekomojadnye)* [Mammals of Siberia (Insectivora)]. Iz-vo AN SSSR. Moscow. 267 pp.
- Tavrovskij, V. A. (ed.-in-chief). Egorov, O. V., Krivošeev, V. G., Popov, M. V. & Labutin, Ju. V. 1971. *Mlekopitajuščie Jakutii* [Mammals of Jakutija]. Nauka, Moscow. 670 pp.
- Thayer, J. E. & Bangs, O. 1914: Notes on the birds and mammals of the Arctic coast of Siberia. *Proc. New England Zool. Club, Cambridge, Massachusetts, Vol. 5*, 1-48.
- Vrangel', F. P. 1841: *Putešestvie po severnym beregam Sibiri i po Ledovitomu morju. Č. 1.* 385 pp., č. 2, 365 pp. [Journey along the northern coasts of Siberia and the Northern Sea made in 1820-1824. Part 1, 385 pp. Part 2, 365 pp.]. St. Petersburg.
- Vovčenko, V. E., Gončarov, O. N. & Krivošeev, V. G. 1987: Geografičeskij izoljat čerpnšapočnogo surka (*Marmota camtschatica*) v Anjujskom chrebtie [A geographically isolated population of the Kamčatka marmot (*Marmota camtschatica*) in the Anjuj Mountains]. *Zool. žurn.* 66, 954-956.

Appendix 1. Sex, locality, date, and measurements (in mm) of shrews (Soricidae) collected in the Kolyma region. (F = female, M = male, R.K. = River Kolyma)

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
<i>Sorex roboratus</i>						
20	F	R.K.	05.11.1915	109	36	14
27	M	R.K.	14.11.1915	111	41	14
28	F	R.K.	"	102	37	15
37	M	R.K.	19.11.1915	112	38	15
38	M	R.K.	"	112	37	15
39	M	R.K.	"	112	39	15
41	M	R.K.	20.11.1915	116	37	15
42	M	R.K.	"	114	39	16
44	F	R.K.	"	108	36	15
45	M	R.K.	"	109	37	16

Appendix 1. Continued.

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
46	M	R.K.	23.11.1915	116	40	16
47	M	R.K.	"	117	39	15
48	M	R.K.	"	114	36	16
54	M	R.K.	24.11.1915	104	31	15
55	F	R.K.	"	104	36	15
56	F	R.K.	"	114	37	16
60	F	R.K.	27.11.1915	103	36	15
65	F	R.K.	"	114	37	15
66	F	R.K.	28.11.1915	117	36	15
105	M	R.K.	09.01.1916	104	36	16
115	M	R.K.	27.01.1916	98	32	15
116	M	R.K.	"	97	34	14
117	M	R.K.	"	99	36	15
118	M	R.K.	"	104	38	15
119	M	R.K.	01.02.1916	99	37	15
120	M	R.K.	"	100	35	15
135	M	R.K.	10.03.1916	99	34	15
136	F	R.K.	"	105	39	16
144	M	R.K.	20.03.1916	109	37	15
<i>Sorex tundrensis</i>						
61	F	R.K.	27.11.1915	95	32	13
93	F	R.K.	01.01.1916	84	33	13
<i>Sorex daphaenodon sanguinidens</i>						
20	M	R.K.	16.11.1915	78	28	13
43	M	R.K.	20.11.1915	81	31	14
52	M	R.K.	24.11.1915	81	29	13
62	M	R.K.	27.11.1915	78	31	13
63	F	R.K.	27.11.1915	85	33	13

Appendix 2. Sex, locality, date, and measurements (in mm) of lagomorphs (Lagomorpha) and rodents (Rodentia) collected in the Kolyma region. (F = female, M = male, R.K. = River Kolyma, N.K. = Nižnekolym'sk)

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
<i>Ochotona hyperborea</i>						
32	F	R.K.	15.11.1915	166	6	28
36	M	R.K.	18.11.1915	157	9	27
82	F	R.K.	08.12.1915	144	14	24
83	F	R.K.	08.12.1915	157	14	24
92	F	R.K.	02.01.1916	142	-	25
97	F	R.K.	06.01.1916	153	-	26
122	F	R.K.	15.02.1916	158	13	27
125	M	R.K.	26.02.1916	143	-	28
128	F	R.K.	03.03.1916	173	15	28
147	F	R.K.	22.03.1916	158	8	26
171	F	N.K.	05.04.1917	159	14	26
<i>Sciurus vulgaris vulgaris</i>						
14	M	N.K.	21.09.1915	404	169	66
15	F	N.K.	"	401	174	66
19	M	R.K.	21.10.1915	384	154	64
26	F	R.K.	10.11.1915	413	154	66
163	M	R.K.	25.06.1916	373	174	66
<i>Spermophilus parryi leucosticus</i>						
175	M	Mouth of R.K.	09.07.1917	325	103	69
176	F	Mouth of R.K.	"	305	90	69
<i>Pteromys volans</i>						
152	M	R.K.	12.03.1916	264	100	37

Appendix 2. Continued.

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
<i>Myopus schisticolor thayeri</i>						
102	M	R. K.	12.07.1916	119	20	18
<i>Lemmus sibiricus chrysogaster</i>						
123	M	R. K.	17.02.1916	111	18	18
124	M	R. K.	"	104	18	19
172	M	N. K.	10.06.1917	-	-	-
<i>Clethrionomys rutilus jochelsoni</i>						
21	M	R. K.	05.11.1915	116	28	19
22	M	R. K.	"	129	32	19
23	M	R. K.	07.11.1915	109	27	19
24	M	R. K.	07.11.1915	105	19	19
29	M	R. K.	14.11.1915	105	23	18
30	M	R. K.	"	109	26	19
98	M	R. K.	07.01.1916	112	25	18
99	M	R. K.	"	105	28	18
100	M	R. K.	"	102	24	18
101	M	R. K.	"	106	21	18
102	M	R. K.	"	118	28	19
103	M	R. K.	"	105	26	18
109	M	R. K.	16.01.1916	106	25	18
121	M	R. K.	08.02.1916	121	32	18
127	M	R. K.	28.02.1916	109	26	18
129	M	R. K.	05.03.1916	113	27	18
130	M	R. K.	"	112	27	18
131	M	R. K.	"	109	27	18
132	M	R. K.	"	110	27	18
153	M	R. K.	09.04.1916	108	30	18
154	M	R. K.	"	116	29	19
155	M	R. K.	"	116	31	18
156	M	R. K.	"	112	27	18
157	M	R. K.	14.04.1916	113	27	18
160	M	R. K.	23.05.1916	140	32	19
161	F	R. K.	27.05.1916	135	35	19
<i>Microtus oeconomus koreni</i>						
25	M	R. K.	07.11.1915	140	37	22
34	M	R. K.	17.11.1915	123	31	21
35	M	R. K.	"	141	34	22
40	M	R. K.	19.11.1915	129	33	21
49	M	R. K.	23.11.1915	119	30	21
51	M	R. K.	"	136	32	20
57	M	R. K.	24.11.1915	146	38	21
58	M	R. K.	"	130	33	16
59	M	R. K.	27.11.1915	132	32	21
67	M	R. K.	28.11.1915	127	32	22
68	M	R. K.	"	132	46	21
69	M	R. K.	01.12.1915	137	38	20
70	M	R. K.	"	129	38	20
71	M	R. K.	06.12.1915	126	29	20
72	M	R. K.	"	138	39	22
73	M	R. K.	"	130	34	20
74	M	R. K.	"	135	36	20
75	M	R. K.	07.12.1915	135	39	20
77	M	R. K.	"	138	36	22
78	M	R. K.	"	116	31	21
79	M	R. K.	"	126	32	21
80	M	R. K.	"	134	33	21
81	M	R. K.	"	135	34	22
87	M	R. K.	22.12.1915	133	37	22
88	M	R. K.	"	118	29	21

Appendix 2. Continued.

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
89	M	R.K.	"	117	31	20
96	M	R.K.	02.01.1916	127	33	21
110	M	R.K.	17.01.1916	139	36	22
111	M	R.K.	"	131	35	21
112	M	R.K.	"	119	33	20
113	M	R.K.	"	111	31	21
114	M	R.K.	"	134	38	22
133	M	R.K.	09.03.1916	166	45	23
134	M	R.K.	"	151	41	23
139	M	R.K.	15.03.1916	173	49	22
140	M	R.K.	"	102	29	19
143	M	R.K.	18.03.1916	-	-	-
145	M	R.K.	20.03.1916	147	39	22
146	M	R.K.	"	158	41	21
148	M	R.K.	26.03.1916	132	37	22
149	M	R.K.	"	136	37	21
151	M	R.K.	04.04.1916	143	36	22
164	M	Delta of R.K.	11.07.1916	156	31	19
165	M	Delta of R.K.	21.07.1916	121	25	19
166	F	Delta of R.K.	"	100	19	17
168	F	N.K.	28.07.1916	184	51	22
173	M	Delta of R.K.	02.07.1917	147	24	19
174	F	Delta of R.K.	05.07.1917	153	31	19

Appendix 3. Sex, locality, date, and measurements (in mm) of mustelids (Mustelidae) collected in the Kolyma region. (F = female, M = male, R.K. = River Kolyma, N.K. = Nižnekolymsk)

No.	Sex	Locality	Date	Total length	Tail length	Hind foot
<i>Mustela erminea erminea</i>						
113	M	N.K.	29.08.1915	276	67	36
16	F	N.K.	27.09.1915	285	72	37
90	M	R.K.	25.09.1915	342	99	46
91	M	R.K.	01.10.1915	340	92	46
138	M	R.K.	02.10.1915	310	80	43
147b	no data	skull only				
<i>Mustela nivalis pygmaea</i>						
76	F	R.K.	07.12.1915	175	12	21
84	M	R.K.	09.12.1915	170	18	23
85	M	R.K.	14.12.1915	183	33	25
137	F	R.K.	14.03.1916	141	-	20
141	M	R.K.	16.03.1916	198	19	25
150	M	R.K.	31.03.1916	179	18	25
170	M	N.K.	09.10.1916	163	15	25