Article IV.— REPORT ON THE MAMMALS COLLECTED IN NORTHEASTERN SIBERIA BY THE JESUP NORTH PACIFIC EXPEDITION, WITH ITINERARY AND FIELD NOTES, BY N. G. BUXTON.

By J. A. Allen.

CONTENTS.

Introduction.

This is the first of a series of papers on the zoölogical results of the Siberian Division of the Jesup North Pacific Expedition. Other reports will follow on the birds and fishes.

The natural history collections were made principally by Mr. N. G. Buxton, of Johnstown, Ohio, whose experience in arctic collecting at Point Barrow, Alaska, on the McIlhenny Expedition, in 1897–98, had especially fitted him for his work in Siberia. His 'Itinerary,' given below, fully describes the nature of the country visited, including its climatic and topographic features, while his field notes, given in connection with the species to which they relate, add greatly to the value of the present paper. Mr. Buxton collected mainly in the neighborhood of Gichiga, on the west coast of the Okhotsk Sea, but also at Marcova, on the middle Anadyr River, 600 miles north of Gichiga, and at some other points. Mr. Buxton's zeal and industry are attested by the large number of specimens he obtained in a country where the fauna is meager and the season for field work is limited to a comparatively small portion of the year. The fine condition of the specimens is evidence of his skill and care as a collector.

The present paper includes not only the mammals collected by Mr. Buxton, but also those obtained by other members of the Siberian Expedition. These comprise a few collected on the lower Amoor River by Dr. Berthold Laufer, a few taken

at Vladivostok, many collected at Marcova by Messrs. Buxton, Bogoras, and Axelrod, a considerable number from near the mouth of the Anadyr River and at Indian Point, on the extreme northeastern coast of Siberia, collected by Mr. Bogoras, and a small but very interesting collection made near Verkhne Kolimsk, on the middle Kolyma River, by Mr. Jochelson.

This report is restricted to the material collected by the Jesup Siberian Expedition, and is in no sense intended as an exposition of the mammalian fauna of eastern Siberia.

In this connection I wish especially to acknowledge my indebtedness to Mr. Gerrit S. Miller, Jr., Curator of Mammals at the National Museum, not only in securing for me the loan of valuable material for comparison, but also for kind assistance and advice.

The species treated in the present paper number 35, of which 29 are represented by specimens, and 6 are presented simply on the basis of Mr. Buxton's field notes. The number of specimens of mammals in the collection is about 500. Several of the species here recorded appear to have hitherto escaped recognition. These, including two seals described in a previous paper [1] based primarily on the Buxton material, are the following:

Ochotona kalymensis.
Lepus gichiganus.
Citellus buxtoni.
" stejnegeri.
Evotomys jochelsoni.
" latastei, nom. nov.
Lemmus obensis chrysogaster.
Phoca hispida gichigensis.
Vulpes anadyrensis.
Putorius pygmæus.
Erinaceus orientalis.
Sorex buxtoni.

As would be naturally expected, the present investigation brings to light several new illustrations of the intimate relationship of the mammalian fauna of Siberia with that of Alaska. A small shrew (*Sorex buxtoni*, sp. nov.) finds its nearest relative in *Sorex pribilofensis* Merriam of the Pribilof Islands; the large spermophile of eastern Siberia finds its nearest ally in the *Citellus parryi* group of arctic and subarctic America, and not in *C. eversmanni* of the interior of Siberia. The small weasel of eastern Siberia proves not to

[1] This Bulletin, Vol. XVI, 1902, pp. 459–499, figs. 1–10; Dec. 12, 1902

be a member of the *Putorius nivalis* group, but a near relative of *P. rixosus* Bangs of arctic America. It is not surprising that some of the seals of the genus *Phoca* should be found to range along the coast of Siberia from Okhotsk Sea to Point Barrow, but it is interesting to note that these do not include the Pacific Coast Harbor Seal (*Phoca richardii*), and also that the Harp Seal (*Phoca grœnlandica*) does not pass through Bering Strait into Bering Sea, as formerly believed, its supposed records of occurrence here apparently resting on the misidentification of young males and females of *Histriophoca fasciata* for this species.[1]

It may be further noted that the skins of many fur-bearing animals are imported from Alaska into northeastern Siberia. Thus among a lot of peltries purchased at Indian Point (Chaplin Point of most maps), on the Chukchee Peninsula, by Mr. Bogoras and brought to the American Museum, are skins of the Lynx, Otter, Beaver, Red Fox (in its various phases), Arctic Fox, Blue Fox, and Sable, which are readily recognized by expert furriers as of Alaskan origin. Of course, none of these are formally included in the present report. Respecting the Beaver, I find the following in Mr. Buxton's notes. Mr. Buxton says: "I was assured by Mr. Sokolnikoff, as well as by many others, that there are no Beavers in northeastern Siberia, and that all the skins that one sees there are obtained from the American whaling fleet by the Chukchees, who in turn trade them to the Russians at Marcova and the settlements along the Kolyma River. They bring from ten to fifteen roubles each."

The external measurements given in this paper were taken from the fresh specimens by the collector, unless otherwise stated, and are expressed in millimeters. Mr. Buxton's field notes follow the technical matter under each species, and are placed in marks of quotation and followed by the initials, 'N. G. B.' In several instances some of his unpublished notes on mammals met with by him at Point Barrow are here inedited, on account of their special interest in the present connection.

[1] See this Bulletin, Vol. XVI, 1902, pp. 475-477.

Itinerary and General Description of the Country.

By N. G. Buxton.

On March 16, 1900, I received instructions at New York to proceed immediately to San Francisco, purchase my outfit, and be in readiness to sail with the Jesup North Pacific Expedition for northeastern Siberia on April 10, which had already been organized and equipped for an ethnological survey of that country.

Accordingly I left New York March 24, going by way of New Orleans and thence over the line of the Southern Pacific Railway Company, whose officials had kindly furnished me with transportation, and arrived at San Francisco April 1. Mr. W. Jochelson, leader of the expedition, and Mr. Bogoras came on the 9th, when it was decided that it would be impossible to get away on the 10th as we had expected. However, by the end of the following week we had so far completed our outfits and arranged the details necessarily incident to such an undertaking, that we engaged passage on the Oriental and Occidental Steamship Company's vessel 'Doric,' which sailed on the 17th. After an uneventful voyage of six days we sighted the Sandwich Islands, and that afternoon, April 23, rounded Diamond Head and docked at Honolulu. One day was spent here, when we resumed our journey, and on the 4th of May reached Yokohama, where we remained four days; we made Kobi on the 9th and Nagasaki on the morning of the 11th. We left the same day at midnight, on the Chinese Eastern Railway Company's steamer 'Mukden.' Fusan, on the Korean coast, was reached May 12, Gensan the 14th, and on the 16th we anchored in the harbor off Vladivostok.

According to our plans, Mr. Bogoras was to proceed north to the Gulf of Anadyr while Mr. Jochelson, Mr. Axelrod, whom we found here awaiting us, and myself were to go to Gichiga at the head of Okhotsk Sea. We found that the next vessel for the latter place would sail in about ten days, which was too soon for us, as we still had to get our official papers, buy our staple provisions and trading goods, complete our outfits, and

divide and repack the goods that had already been purchased in Europe. Mr. Bogoras was more fortunate, as the one vessel which visits the Anadyr country annually did not sail until June 14.

As the next vessel for Gichiga was not to sail until July 24, I had considerable time at my disposal, which I employed in making a collection of the fishes found in the harbor at Vladivostok and the Gulf of Peter the Great. There are no streams in the vicinity of Vladivostok where fresh-water fish could be taken, so on May 27 I went by train to Nikolsk and posted from there by telegas to Lake Khanka, a distance of ninety miles, arriving on the 29th. Governor Chichigoff had kindly wired the officials along the way of my coming, provided me with letters of introduction, and an official request for post-horses, so that notwithstanding my inability to speak the language I got along very well. At the lake I was entertained by Mr. Shubenko, who had two or three cabins there and employed twenty Korean fishermen during the summer and supplied the Nikolsk market with fresh fish. This lake is a shallow, gradually shoaling body of water, lying between 44° 30′ and 45° 30′ N. and 132° and 133° E. It is about 50 miles long, 40 miles wide, and 225 feet above sea-level, and is surrounded by extensive marshes which drain into the Sungari River, a tributary of the Amoor. Through the interest my host and his men took in my collection I was able to fill my tanks in one week and secure specimens of all the food fishes that occurred there at that season of the year, although the smaller and probably more interesting ones I did not get on account of the lack of necessary means. Early on the morning of June 5 the telega which I had ordered from Kamenribiloff, a post station one mile distant, called for me and after a wild, rough ride of six relays I reached Nikolsk at midnight and returned to Vladivostok the next day.

On June 18 the steamship company told us that a vessel would be despatched for Gichiga between the 20th and 28th of June, so we renewed our efforts to get everything in readiness, and felt hopeful of getting in the field before the short, northern summer had passed, when, on the 21st, rumors of the

Chinese trouble reached us. This caused the company to declare the sailing of this vessel off, and made them undecided about sending the one scheduled for July 24, as all ships were being pressed into the government transport service. Then followed for us an anxious and exciting month, as inhabitants of a Russian fortified port in active war times. Thousands of soldiers arrived daily from the interior and departed in transports for the front; missionaries and merchants came from Manchurian points up the Amoor River; the Chinese stopped work and fled the city; martial law was proclaimed, and commerce came almost to a standstill. Finally we were assured that the 'Khabarovsk' would leave July 23, and on that date our party took passage on it. Our course lay north along the coast between the mainland and Saghalin Island, and our voyage was without incident until the 28th, when we went aground in the shallow, tortuous channel off the mouth of the Amoor River. After waiting three days for an abatement of the wind and a high tide, the water-ballast tanks were pumped out and we floated again. August 2 we came to anchor in Udskoi Bay, back of Great Shantai Island, discharged a small amount of cargo for the little settlement there, and were soon under way again for Ayan.

The small number of sea-birds observed along the Siberian coast, as compared with the large number one encounters on the Alaska side in the same latitude, is very striking.

August 3.—Anchored in the beautiful little harbor of Ayan this evening. This place, possessing the only harbor on the Okhotsk Sea, is nicely situated at the toe of a small horseshoe-shaped indentation in the rugged coast-line. The settlement consists of a few large log storehouses and small dwellings and the inevitable blue-domed church. During the palmy days of the whaling industry it was used by the Americans as a recruiting place, and as a landing place for vast quantities of birch tea, which was sent from there inland to the settlements along the Kolyma River by reindeer during the winter months. Now, since the whalers no longer visit these waters, and the shorter and better route from Ola was discovered, it has lost its importance and the few inhabitants are mostly

employees of the Russian Sealskin Company which owns the magazine and most of the buildings. After spending a couple of hours ashore in collecting flowers which grow abundantly here, climbing the larch- and fir-covered hills, and taking photographs, we left again the same evening.

August 4.—To-night anchored in the open roadstead three miles off Okhotsk. The village, consisting of about a hundred weather-beaten log houses, is situated on a tongue-shaped sand-spit that separates the sea from the lagoon which forms the mouth of the Okhotsk River. The coast, from about four miles above to fifteen miles below the town, is low and extends inland as a wide flat valley through which winds the river. Besides being one of the largest settlements in the marine province of Northeast Siberia, and an important trading centre, Okhotsk is known as the best place on the Okhotsk Sea for salmon. Two species, and perhaps more, are taken here in large numbers, and many of them are smoked and salted and sent to Vladivostok. Fish taken further north in the sea are poor and pale in color. Hundreds of seals were congregated at the mouth of the lagoon catching the fish as they entered the river. Salmon could undoubtedly be taken here in sufficient numbers to supply a cannery, and of very good quality. We remained here five days discharging cargo and left on the 9th and reached Ola the next afternoon. This little collection of Russian and Tungus huts was brought about by the recent discovery of a short and practicable route from here to the headwaters of the Kolyma River. It is located similarly to Okhotsk, on a lagoon formed by the mouth of the Ola River, which has thrown down a large deposit of gravel in the valley between the mountains which end on the sea in high bluffs. Larch and fir trees crowd the river-bottom down quite to its mouth.

August 13.—Resumed voyage to Gichiga, and on the 16th came to anchor in the Gichiginski Gulf and went ashore.

Three miles above the mouth of the Gichiga, on its left bank, is a collection of blockhouses called Kooshka where the commanding officer, or nechalnik, and his assistants live. Here we took up quarters in a cabin which had been occupied

by the government storekeeper and his family, all of whom had died the previous winter from an epidemic of measles and pneumonia, which took off nearly 150 of the inhabitants of the Gichiginski settlement. We were occupied for the next ten days in landing, storing, and dividing our freight.

Mr. Jochelson had expected to find the Koryaks here in their summer camps along the coast, but as they had already abandoned them and returned to their herds and permanent sites he prepared to go to the settled Koryak villages along the head of the Penginski Gulf, and he and the rest of the party left for Parane with a pack-train on September 10.

A large party of Russian workmen, in charge of four American mining engineers, and employed by an English exploration company, arrived from up the river on the 13th, where they had been prospecting for gold. I purchased from them some much-needed provisions, the obtaining of which had been neglected in Vladivostok. On September 24 they sailed on their ship 'Progress,' in company with the 'Mukden,' which had arrived that day, thus breaking the last link that bound me to civilization.

The migration of the birds was already advanced when we arrived, so I immediately set to work to get as many as possible before the long winter closed down, but was unable to accomplish much on account of our cramped quarters and other work until after the departure of Mr. Jochelson.

The coast-line of the Gichiginski Gulf, formed by the mainland and the Taiganose Peninsula, rises boldly from the water to a height of two to three hundred feet, except at its head, where it is low and marshy and entered by the Gichiga and Ovecho Rivers. These two rivers, with their tributaries, drain the triangular valley between the Stanovoi Mountains on the west and a spur which extends south from them and forms the backbone of the Taiganose Peninsula. This valley is a high, rolling tundra, dotted with numerous lakes and pools, and destitute of trees except on some of the dry, elevated places where there is a scant growth of recumbent stone pine, and along the river-bottoms. The mountains to the eastward attain at one point, Babooska, 18 miles from the mouth of the

Gichiga, a height of 1500 to 1800 feet, while those 40 miles distant to the southeastward rise to 3500 feet or more. No timber is found on them. The smaller valleys which the Gichiga and Ovecho have cut out are separated by a high, triangular section of country, which begins at the head of Gichiginski Gulf as a high cliff of recent sandstone, half a mile wide and called Maiak Point, and which separates their mouths. The Gichiga is a rapid, shallow stream about 70 miles long, and flows in a generally north and south direction. At Kooshka, three miles above its mouth, it is 175 yards wide; below this point it rapidly broadens and is filled with bars and flats. The Ovecho is somewhat smaller and flows in a southwesterly direction from the Taiganose Mountains. The river-bottoms near the sea are destitute of trees, but further up they are filled with small willows and alders, and at a distance of 25 or 30 miles contain a thick growth of larch large enough for building material. Still further up there are also birch and poplars.

Formerly the mouth of the Gichiga River was four miles above its present location, where the river is hemmed in by hills on either side, but the gradual rising of the whole valley, shown by the deep deposit of waterworn material all over it, and the deposition of silt at the head of the Gulf, have moved it down to its present position at Maiak Point. At low tide the bottom of the Gichiginski Gulf is exposed for a distance two miles out from Maiak Point as a great mud-flat, extending clear across the head of the Gulf, a distance of eight miles. On this account the vessels anchor about 20 miles out from Maiak, opposite the rocky inlet, Matuga, on the Taiganose side, in 12 fathoms of water. The tides are high and irregular. The difference between high and low water is perhaps nearly 20 feet, and at high tide the water is backed up in the rivers for nearly four miles. It is only at this time that one can row a boat up-stream: above slack water it must be towed.

The town of Gichiga is situated on the east bank of the Gichiga River, 15 miles above its mouth, and is one of the oldest settlements in Siberia, having been located by a party

of Cossacks about the middle of the 18th century. Most of the people now living in this section of Siberia are descendants of these early settlers and the native women, principally Chukchees, whom they took for wives. The population of Gichiga, Christova, Kooshka, and the few isolated fishing stations along the river, numbers about 375. Nearly all of the able-bodied men are enlisted as Cossacks and provided with rations by the government. The affairs of the colony are administered by the local governor, or nechalnik, and his two assistants.

The salmon, which ascend the rivers in immense numbers during July and August, when they are caught and dried, constitute the people's chief supply of food. These, together with the reindeer they obtain from the Tunguses and Koryaks, the wild fowl which they shoot in the summer, and the plain birch tea and sugar which they get from the traders in exchange for work and furs, complete their bill of fare. Owing to the limited resources of the country very few of the inhabitants are able to obtain anything more than a poor existence from it. While many valuable skins and furs are received yearly by the traders at the few scattered settlements in Northeast Siberia, still the territory that they represent is so vast and so thoroughly travelled by the numerous wandering natives and hardy Russians that one finds an amazingly small number of fur-bearing mammals, or indeed of any kind of animal life that will serve for food, in any limited area. Northeastern Asia has undoubtedly for centuries had a vastly larger native population than northeastern America, and the natives there have been in contact with Russians, and acquainted with the use of firearms, for nearly 250 years, so that to-day the animal life of northern Siberia, outside of the timbered portion, is less than that of the barren portion of Alaska.

Snow begins to fall in the valleys the first week in October, and the rivers and lakes freeze over a few days later. The snow falls at intervals from this time on until the middle of May, but probably does not exceed a depth of eighteen inches on the level. However, this is a hard matter to determine, as

strong winds blow almost continually from the northeast and the southwest and pile the snow in huge drifts wherever there is any obstruction. Further inland, away from the seacoast, the winds are not so frequent and the winter weather is pleasanter. There is much overcast and foggy weather, yet the annual precipitation probably does not exceed eighteen or twenty inches, which is quite equally distributed throughout the year, July and August being the dryest months. The temperature at Gichiga ranges from 80° F. to — 40° F. or more, the warmest weather occurring in August and the coldest in January. As soon as winter sets in the people tie up their dogs, repair their sledges, and make everything ready for the long cold season, which is really their most active one, and from this time on until the snow disappears in the latter part of May, they travel almost continually, going in all directions, visiting the Tungus and Koryak lagers and Russian settlements, engaging in trade for themselves or the merchants. The abundance of fish enables every man to keep from ten to sixty dogs. Ten to sixteen constitute a team, although twelve is the usual number. They are hitched in pairs to a long line attached to the sledge, and are trained to drive by word. All of the native Russians are very expert in handling these teams and are the most accomplished travellers on the road that I have ever met in the 'high north.' A good team, with a moderate load, will cover from six to ten miles per hour and is capable of travelling continuously, when necessary, forty-eight hours without food. Satisfactory travelling in the north is limited to the winter months, as the country in the summer, owing to the vast extent of boggy tundra and numerous lakes and rivers, is almost impassable for horses. Mr. Jochelson was seventeen days in September in going with horses from Gichiga to Parane, and later I made the same trip with dogs in thirty hours of continuous travel.

From the time the migratory birds left in the fall until their return there was comparatively little to be accomplished, especially in such a long-settled, thoroughly travelled, and barren country as that section of Siberia, where there are no large wild mammals and few active small ones, and only a

small number of resident birds. Although I secured series of all these winter forms, and of some of them large series, still the work was insufficient to occupy my time, and as I had nothing to read and was unable to carry on any extended conversation with the few people who found their way to my cabin, I passed a very monotonous winter. Many days I was unable to leave the house on account of the severe windstorms which filled the air with snow so that one could not see twenty yards away.

In the latter part of November I took three sledges and visited a large herd of Koryak reindeer which were at that time herded at the base of the mountains fifty miles to the eastward, and selected specimens suitable for a group.

Mr. Jochelson returned to the Kooshka on January 29 from his wandering among the Koryak lagers. I learned from him that there was a number of specimens at Marcova which Mr. Bogoras had sent and which needed my attention. I had originally intended to remain in the vicinity of Gichiga only until March and then go to Marcova and to the mouth of the Anadyr River and await the one steamer which comes there every summer, and return by it to Vladivostok. But on account of my late arrival at Gichiga, the early departure of the vessel from Anadyr the following summer, and consequent shorter time in the field, and other reasons, I decided to alter my plans and put in all my time in the Gichiga territory. However, after consulting Mr. Jochelson, and knowing that there was nothing to be gained by remaining at Kooshka, I decided to go to Marcova, prepare whatever material had accumulated, collect anything else possible, and return to Gichiga in the spring before the snow left and the birds arrived.

I engaged two Cossacks and two sledges with fourteen dogs to each, and on February 21 left Kooshka for Marcova. Marcova is situated on the middle Anadyr River, 500 miles from its mouth and 600 miles from Gichiga. The route over which I was to go was the same as that travelled by the Russo-American Telegraph Company's party of Americans in 1866–67, and so thrillingly described by George Kennan in his

'Tent Life in Siberia.' Since their time I was the first American to make the trip. I left Kooshka at noon February 21, and although the road was heavy from the recent severe snowstorm, we covered the twelve miles to Gichiga in an hour and a half, where we stopped over night. Next day we went as far as Christova, a little settlement of five houses, twenty miles further up the river, and stopped for the night.

February 23.—Fair, calm. Got away at daybreak and followed up the valley of the Chooma River until noon, where we stopped half an hour for tea. Here we left the river and our way for the rest of the day lay across the vast rolling tundra which stretched away in billows of spotless white to the distant mountains whose outlines could be traced on the pale blue sky. At dusk we found a place on the crest of a hill, where we could obtain enough creeping-pine to make a fire, and stopped for the night. After tea and a cup of soup I turned into my 'pavoska,' or covered sledge, and my Cossacks lay down on the snow beside it and slept soundly until morning. Weather too cold for my thermometer, which registers only $-24°$ F.

February 24.—Strong northeast wind blew all forenoon, which filled the air with snow, and later in the day much snow fell, which made travelling slow and laborious. Met two men from Anadyr at noon, and late in the afternoon met six traders. Camped at dusk and made a fire of green stone-pine which we dug from under the snow. The ease with which the Cossacks start a fire, even with a fierce wind blowing, and the celerity with which they prepare tea is wonderful and never ceases to excite my admiration. Twenty minutes after stopping they have a kettle of snow melted, the water boiling, and the tea ready to serve.

February 25.—Strong north wind and overcast. Broke camp at daylight and reached Parane River at noon, where we stopped for tea. Some of the cottonwoods along this river were 40 feet high, and 18 inches in diameter. Just at dusk we reached Quail, a Koryak settlement of ten yomtas, and stopped for the night.

February 26.—Crossed the head of the bay upon which the

settlement was situated and then followed the general direction of the coast-line, cutting off the headlands and approaching the sea in the lower places. Mountains visible in all directions. Crossed long stretches of barren tundra, followed three small rivers for short distances, and finally reached Mickina, where we remained in a Koryak yomta for the night.

February 27.—Reached Shestacova at noon and decided to lie over here until next day, as the next settlement is two to three days' journey. Occupied the day in repairing our freight sledge, buying fish for our dogs, and repacking our sledges. This was formerly a large settlement, but various diseases and epidemics have reduced it to two yomtas. It is situated on a little bay at the mouth of a small river. This and the last place are on the direct line of flight of ducks and geese on their migrations, and they are known as the best places along the head of Okhotsk Sea for shooting them.

February 28.—Turned out at 4.30 and were off at 5 A.M. Our way led up the Shestacova River. Five miles above its mouth its shallow valley suddenly narrows where it cuts through a ledge of basalt, and from that point up it is shut in by mountains on either side. Three miles further we struck into a cañon on the right and began to climb the mountains. Reached the summit, 380 meters elevation, at noon, and after a short stop for tea began the descent. Far below us lay the broad valley of the Ocklan River, whose winding course was marked by the thick growth of trees along its bottom which showed black against the snow. Reached the river late in the afternoon and made camp. Snow so soft we had to break track with snow-shoes.

March 1.—Reached Ooskou Pass, out of the valley (elevation 360 meters), at 3 P.M. The descent was so steep that my sledge capsized and the dogs threatened to run off with us until the driver stopped them and quickly slipped one hind leg of each dog through the harness, this making them three-legged, when we made the rest of the descent in safety. Reached Ooskou at night and camped. Next day, the 2d, reached Pengina, a Russian settlement of fifty-seven people, on the Pengina River. Remained here next day to repair sledges

and rest the dogs for the last stage of our trip. The starosta, or head man of the village, in whose house I stopped, assured me that there was neither flour nor sugar in the settlement, and that all they had to live on was fish, reindeer, and tea. Between here and Marcova there are four small log houses at convenient intervals for the accommodation of travellers when caught in one of the numerous protracted storms which occur.

March 4. — Got away at daybreak and reached the first station on the Chorna River at 3 P.M., when we stopped for tea and then pushed on, the moon being full, until midnight, when we reached the next station. My sledge was ahead and we had arrived, started a fire, unpacked our sledge, and fed our dogs before the other Cossack arrived. His sledge, which was heavily loaded with our outfit and provision, had broken through the ice in crossing a small river and it was with difficulty that he escaped drowning and saved the sledge. Our small supply of sugar and hardtack was soaked, but the canvas in which the main part of the load was lashed somewhat protected the rest of the outfit. After a few cups of boiling tea, some boiled dried salmon, and a kettle of soup, we turned in and slept until 5 A.M., and then resumed our journey. We soon crossed to the headwaters of the Orlofky River and reached the last station at 3 P.M. Encountered a howling blizzard in the Roosky Pass, which separates the Orlofky from the Anadyr valley, and lost our way, but finally got over the pass and reached Marcova at 9 o'clock, where our arrival was heralded by a chorus of the entire dog population. I found Mr. Axelrod and Mr. Bogoras, and the next morning called on the nechalnik, Mr. Sokolnikoff, and the priest who has been here since 1862 and of whom Mr. Kennan speaks in his book. I found people in Gichiga, Pengina, and Marcova who still remembered the members of the telegraph exploration party, and fondly recalled how the 'Americanskis' skated, danced, snowballed, and played ball, and not a few of them still retained a few words of English that they had learned at that time. During the winter of 1899–1900 a Chukchee brought to the nechalnik at Marcova a letter written by Lieutenant Macrae, dated September 25, 1865, which stated that he and

four comrades had been landed at the mouth of the Anadyr River and had been kindly received by the native Chukchees. This letter was written with a pencil on a leaf torn from a notebook and was tied up between two pieces of thin board, after the custom of the country. It was as clean and legible as the day it was written, notwithstanding that it had been carried thirty-five years by the wandering Chukchees before being delivered.

Marcova is a little collection of rough log cabins clustered about the conventional blue-domed Greek Russian church and has, with the outlying fishing stations along the river, a population of about 400. It is situated one half-mile from the Anadyr River, on one of its small tributaries. It requires nine days to go by boat from Marcova to the river's mouth, and fourteen days to return, during the summer. The same journey is made with dogs in the winter in five days. The river is navigable for boats, with a draught of two and a half to three feet, from its mouth to a point fifteen miles below Marcova. Its bottom is thickly lined with a growth of cottonwoods, alders, birches, and willows.

Salmon and herring ascend it during the summer, and several species of *Coregonus* are caught from it in large numbers, especially during the winter.

Mr. Axelrod had prepared most of the few specimens that had been sent, so that after preparing the balance I had but little to do and turned my attention to making a collection of the fish found in the rivers there. In company with Dr. Calleenen we made daily trips to the streams, set nets under the ice, and explored the surrounding country on snow-shoes. Mr. Sokolnikoff gave me a collection of birds that he had made, and I secured much valuable information from him concerning the country between Marcova and the Gulf of Anadyr. The winter weather is very superior to that at Gichiga, and every day I was there it was cold, clear, and calm.

Late on the night of March 21 word was received from Mr. Bogoras, at Baronesskorf Gulf, that he was in poor health and was returning from Kamchatka to the mouth of the Anadyr River, whence he would depart for the north as soon as Mrs.

Bogoras, Mr. Axelrod, and Mr. Sokolnikoff could join him there; consequently I gave orders to my Cossacks to prepare to leave on the 23d. At one o'clock that day, after bidding good-bye to Mrs. Bogoras, Mr. Sokolnikoff, and his secretary, Mr. Dedenko, Dr. Calleenen, Mr. Axelrod, and the host of kind people who had gathered to see me depart, I was lifted into my pavoska by my faithful Cossacks, who released their frantic dogs and we went dashing out of the village in a cloud of snow which glittered like diamond dust in the bright sunlight. Our return journey was uneventful except for being lost in a blizzard one day between Mickina and Quail, when our sledges became separated and again met, each going in opposite directions, after several hours' wandering. The distance from Quail to Christova we accomplished in thirty-six hours of continuous travelling, where we arrived April 1, and on the following day we reached Kooska.

The tide-water broke through the ice on the river April 21, but it was not until May 26 that the ice moved out of the river. The snow began to disappear from the tundra about the middle of May, but was not entirely gone before the first week in June. Where it was heavily drifted, in ravines and along the coast, some remained all summer. In the middle of May I went with sledges to the rocky islets lying along the Taiganose Peninsula, travelling over the ice across the head of the Gichiginski River. Later in the season I again visited these places several times, and also made one trip down the mainland coast as far as Varkhalam Bay.

The first birds arrived about the 20th of April, but no species became common before the end of the first week in May, and the height of the migration was not reached until the last week of May. None of the sea-birds, except the gulls, come up the bay further than Chaibuga Point, some six or seven miles south of my station, and all the other birds stop but a few days at the mouth of the river before continuing their journey inland, where they breed.

The long, vigorous winter suddenly jumps into the short arctic summer, and the grass and flowers spring up before the land is entirely free from snow. The vegetation is abundant,

and the beauty of the flowers is very striking. The grasses, of which there are a number of species, grow very rank in favored places. The summer season of eight weeks, when there are no frosts, together with the moist atmosphere, makes it possible for the people to grow turnips, beets, and carrots in their small, carefully prepared gardens. The mosquitoes, which are the worst feature of life in Northeast Siberia, arrive the first week in July and simply dominate the country for one month. It is impossible to obtain a minute's rest from their attacks during that time.

On the morning of June 16 the first ship of the season arrived, which brought me the first letters and news from the outside world that I had received for ten months. The summer passed quickly, and on August 26 the SS. 'Girin,' from Anadyr, arrived with Mr. Bogoras's collection aboard, he having left the ship at Petropavlovsk, and was detained fifteen days at Gichiga, owing to inclement weather, in discharging her freight. As this was the vessel that was expected to make the next and last trip of the season to Gichiga, and was then more than one month overdue, the captain assured me that it was improbable that there would be another vessel that season, and as the migration was nearly over I decided on September 7 to ship on the 'Girin,' and packed up my collection and closed out my outfit on the 8th and left for the ship that night, arriving there early next morning. Sailed at noon on September 9, stopping at Ola, Okhotsk, and Ayan, and reached Vladivostok on September 28. Found Mr. Bogoras there, and we spent the next two weeks in repacking and arranging our collection for shipment. After several days' delay we finally succeeded in securing a permit from the Governor-General of Eastern Siberia and the constructing engineer to go over the then uncompleted railway, and on October 14 Mr. Bogoras and myself left Vladivostok for Russia. I was the first foreigner that had been favored with a pass over this route, and I was fully repaid for the time I had spent in Vladivostok in obtaining it by the time we gained in crossing Siberia by this route. Our papers were honored at every place along the line, and we were hurried

along on construction trains and special trains, and furnished with government post-horses over the uncompleted section of more than one hundred miles through the Khingan Mountains, so that we reached Irkutsk thirteen days later, and Moscow on November 5; was in St. Petersburg on the 10th, Berlin on the 15th, Paris on the 17th, and sailed from Cherbourg on the 'Kron Prinz Wilhelm' for New York on the 20th, where I arrived November 26, 1902.

During my stay in Siberia I was placed under many obligations to many of the Russian government officials and private citizens, to whom my cordial thanks are hereby extended. I am especially indebted to Governor Chichigoff of the Premorski Province for official letters to the various officers of the posts under his jurisdiction and for an excellent botanical collection from Eastern Siberia; to S. I. Ankoodenoff, Commandant at Gichiga; S. I. Pahderin, Captain of Cossacks at Gichiga; and to N. P. Sokolnikoff, Commandant at Marcova, who gave me much valuable information concerning the Anadyrski country, and also a small collection of birds and mammals. To all the people of the settlements of Ayan, Ola, Okhotsk, Gichiga, and Marcova, and in fact to all the Russians with whom I came in contact, I am deeply indebted for their unlimited hospitality and uniform good-will.

Annotated List of Mammals.

1. **Delphinapterus leucas** (*Pallas*).

White Whale.

Represented by a fœtal specimen. Most of the field notes and the measurements relating to this species were made by Mr. Buxton at Point Barrow, Alaska, in 1898.

"Abundant, probably remaining in the Okhotsk Sea the entire year. During July and August, when the salmon are running, they are especially abundant in the Gichiginski Gulf. At that time, when the tide is high, they come in to the head of the Gulf just off the mouth of the Gichiga and Ovecho Rivers

in hundreds and go out again with the tide. In the summer of 1899 a party of Koryaks who were encamped just below the mouth of the Ovecho River surrounded a school, which had ventured in nearer to the mouth of the river than usual, with their bidarkas, and succeeded in keeping sixteen from returning to the sea until the tide went out and left them stranded on the great mud-flat thus left exposed.

"On October 16, 1900, a fœtus (No. 301 in collection) was brought to me which had been taken from a female killed off the mouth of the Gichiga River a few days previously.

"A Finn now living at Gichiga was formerly employed there by the American Trading Company in catching 'white fish' for their oil. The Russian name of the white whale is *Bi-loo-hah*, and not *Bi-loo-gah*, as the American whalers call them, which is the Russian name for a large species of sturgeon.

"The following unpublished notes were taken at Point Barrow, Alaska, in 1898. — On the morning of May 3, Mr. Chas. Brower of the Cape Smythe Whaling and Trading Company sent word to Mr. McIlhenny that a native had just arrived from one of his floe whaling camps with word that they had found a school of white fish in a 'hole' and had already killed 70. Mr. McIlhenny and his Japanese cook, together with two Eskimos and dog team, set out immediately for the scene. That night the cook returned with a note to me asking for a dog team and natives. Next morning I started with four Eskimos and a sledge. After a rapid journey of five hours over the sea ice we reached the 'hole.' On the way we met more than twenty different gangs of natives with sledges loaded with 'white fish' skins and meat.

"On May 2 the wind blew lightly from the northeast until 3 P.M., when it hauled to the southwest and drove the ice-pack in and closed up the series of holes between the pack-ice and the land-floe, or 'ice-foot,' attached to the shore, except one which the whales had found.

"At 10 o'clock that night some of the Eskimo from the whaling camp who had gone out after seals discovered the fish imprisoned in this hole. The hole when first discovered was about 150 yards long and 50 yards wide, but when I

reached there the young ice had formed around the edges until it was only 60 by 20 yards. The water was about 30 fathoms deep. At the time of my arrival, there were 150 carcasses, some with the skin, meat, head, flukes, and flippers removed and others untouched, lying on the ice, while nearly one half that number were tied up to the edge of the ice in the water. Over 100 more were still alive in the water. These rose to 'blow' every twelve to eighteen minutes and then made from ten to fifteen blows, sometimes making two in swimming the length of the hole, and then, turning back, repeating the operation several times before again descending. The inspiration and expiration required not more than one or two seconds and sounded like an exaggeration of the noise produced by a person rounding the lips and blowing. Over one hundred Eskimos were there, and new parties were continually arriving and others departing as they got their sledges filled. All of the new arrivals immediately tried their skill at shooting, although there were many more killed than would supply their wants.

"The whales in rising came up with the forward part of the body elevated, pushed the top of their head out of the water, and 'blowed,' and then, with tail depressed, back elevated, and head pointed downward, disappeared again, seldom showing the fluke. This gave the appearance of a circular disc revolving in the water with only about one fourth of its diameter exposed. The head was seldom raised enough to show any part of it below the eye. Some rose and swam for some distance parallel with the surface of the water, but most of them described sharp curves. Although all did not rise at the same time, yet the majority rose together, and smaller numbers came up between the main risings, so that there was no period of more than six minutes when some were not visible. When the main rising occurred the hole was almost filled and they were so thick that occasionally one would be pushed high in the air with its tail up and body two thirds out of the water and held that way for a second before disappearing again. At no time were there less than five natives shooting, and sometimes as many as twenty. Probably not

more than one in five of those killed were secured, as many mortally wounded went off under the ice, and all those not instantly killed immediately sank. A bullet placed just back of the base of the skull, dislocating or breaking the spinal column, gave the best results, and nearly all killed in that way floated. Nearly every one of those still alive had at least one bullet-hole in it and I saw one that had eight.

"At the time I visited them the greater part were the dark colored or younger individuals, although those first on the scene said that the dark and light colored ones were about equally represented. Every one in shooting would pick a large white one as long as they lasted. The colors represented all the shades of slate and hair brown, gradually fading into pure white. The majority of the adult females were pregnant, the fœtuses measuring from 1450 to 1700 mm. in length. The fœtuses were uniform dark slate color with lighter rings around the eyes. Three calves, about eight feet in length, following their mothers, were darker than the fœtal ones and mottled with chocolate brown. These had not yet cut their teeth. From this size up the color gradually became lighter, some being light slate, others smoke gray and hair brown, until on those from 11 feet 9 inches to 12 feet the color entirely disappeared, leaving them milk or ivory white, except a dark purplish brown stripe about an inch wide on the posterior edge of the fluke, on the dorsal and ventral edge of the 'small' or just anterior to the fluke, on the free edge of flippers, and a sooty ring around the eyes. In still older ones the sooty ring around the eyes was wanting, and the dark markings on fluke, small, and flippers was more subdued. Some of the large white ones had a distinct chlorine green tinge. The fœtuses are lighter than the calves and darker than the medium-sized ones; after birth they assume a darker color and become mottled with chocolate; then they soon begin to fade until the color has entirely disappeared, except as previously stated, leaving them pure glossy ivory or milk-white. When the larger dark colored individuals are examined closely they present a uniform hair brown color punctated with small darker ovoid spots. A transverse sec-

tion through the skin of one of these shows the dermis pure white and the base of the epidermis black, gradually fading towards the surface. Small black pigment lines run from this black base to the surface, giving it the spotted appearance. On the white ones the epidermis is entirely white with no black at the base nor pigment lines running through it.

"In an adult white specimen the epidermis was 9, dermis 4, and blubber 53 mm. thick, and in a large hair-brown specimen the epidermis was 9, dermis 7.4, and blubber 43 mm. thick. The blubber is clean and vinaceous cinnamon in color. The eyeball of an adult male was 30.5 and the iris 16.8 mm. in diameter; iris hazel brown. In no specimen did the bulge of the forehead extend beyond the lips.

"The teeth, which are irregular and peglike in form, are loosely set with wide spaces between them in the rubber-like gum. The normal formula is $\frac{10-10}{9-9}$, but this is seldom found, owing to loss or suppression. In one large male it was $\frac{10-10}{8-9}$; those above all inclined forward, and the first four on each side below inclined forward and the others backward. The two posterior teeth were curved and horn-shaped, and lay forward flat on the gums. The first four on either side below were worn down until they resembled short posts; the second four above had half of the crown worn away, leaving them tusk-shaped. In younger specimens the teeth are more regular.

"The internal ear cavity of nearly every specimen examined contained small, filiform worms, about 19 mm. long and .25 mm. in diameter. In some the cavity, which is quite large, was almost entirely filled with them.

"I again visited the place on May 7 and counted 164 carcasses on the ice, and Mr. Hobson, whose whaling camp found the school, told me that his natives had thrown 70 more back into the hole. About 20 were still alive in it, but these were killed later, and 20 dead ones were in the water frozen in by the ice. Nearly 300 of the school were thus accounted for, and estimating that only one in three was secured after being killed, although I think that one in five wounded would be nearer the truth, it is seen that it originally contained not less than 900 individuals, not one of which escaped."—N. G. B.

MEASUREMENTS OF *Delphinapterus leucas*, TAKEN[1] AT POINT BARROW, ALASKA, MAY 2–7, 1898.

No.	Sex.	Length.	Girth behind Flippers.	Length of Right Flipper.	Width of Right Flipper.	Length of Gape.	Girth of Head at Spout-hole.	Spout-hole to Front of Mouth.	Width of Spout-hole.	Width of Flukes.	Length of Flukes.	Girth of Small.	Diameter of Eye.	Base of Flippers to end of Nose.	End of Fluke to Mammæ.	Distance between Mammæ.
1	♂	4473	2402	508	485	280	1296	585	76	991	508	502	25	940	—	—
2	♀	3965	2211	494	280	241	1207	457	76	813	432	483	25	782	1067	915
3	♀	4194	2465	457	369	267	1245	546	76	940	483	496	25	864	118	928
4	♂	4956	2656	559	330	305	1423	610	76	1080	572	534	25	953	—	—
5	♂	4982	2796	534	457	343	1500	661	76	1093	610	559	31	966	—	—
6	♂	4778	2618	547	483	305	1398	610	76	1042	521	521	25	953	—	—
7	♂	4905	2821	559	457	318	1525	623	79	1118	585	572	25	966	—	—
8	♀	3914	2135	330	312	229	2169	445	76	826	432	457	25	637	991	—
9	♀	4092	2370	429	330	260	1220	546	76	330	445	483	25	839	1106	—
10[2]	♂	4804	2643	584	508	343	—	572	76	330	—	635	—	—	—	—
11[2]	♀	4041	2313	369	318	241	—	470	76	292	457	470	—	—	—	—

[1] By Mr. Buxton, in feet and inches, and here reduced to millimeters.—J. A. A.

[2] To angle of flukes; in all other cases, to end of flukes.

Nos. 2, 3, 8 and 9 were pregnant females; their fœtuses measured, respectively, 1601, 1716, 1550, 1589 mm.

Mr. Buxton's notes contain references to several other species of Cetacea observed by him, but no specimens were collected. These include the Killer (probably *Orca rectipinna* Cope), of which one was seen at Ayan, August 3, 1900, and two others in the bay at Okhotsk, September 18, 1901. Porpoises were seen off the coast of Korea in May, 1900, and at Okhotsk in September, 1901. Also Humpbacks and Finbacks off the coast of Saghalin Island in September, 1901, where many are taken by the Kaiserling Company "for their oil and flesh, which is sold principally to the Japanese for food."

Respecting the 'Right' Whale, probably *Balæna sieboldii* Gray, he says: "Saw two Right Whales between Ayan and Okhotsk on August 4, 1900"; and adds:

"The hunting of this species was formerly prosecuted with great energy by the Americans in Okhotsk Sea and adjacent waters, but is now almost totally abandoned, only one or two filibustering schooners visiting these waters each year. One American schooner visited Penginski and Gichiginski Gulfs in the spring of 1900 and secured several whales. The same one returned in April and May, 1901, but got none. I saw some 'three-foot' bone in a Koryak yomta at Shestacova on Penginski Gulf. An occasional one is seen off the mouth of Gichiga River by the people living there and the coast Koryaks now sometimes catch one along the Taiganose Peninsula. Slabs of bone sawed from the whale's lower jawbone are used by the Russians and natives to shoe their sledges with late in the spring."

2. **Rangifer tarandus** (*Linn.*).

REINDEER.

Reindeer are represented by specimens of both wild and domesticated animals, from several quite widely separated localities, including two races of the domesticated Reindeer. These specimens were collected partly by Mr. Buxton and partly by Mr. Bogoras, as follows: A series of 5 specimens, skins and skulls, collected for mounting by Mr. Buxton,

Nov. 6, 1900, from a large herd about 50 miles east of Gichiga, on the Taiganose Peninsula, consisting of a large 7-year-old male, a younger adult male, a yearling male, a 4-year-old female, and a 2-year-old female; also two fawns three days old, taken April 30, and 2 fawns four weeks old, taken June 14; also two flat skins, to show the variations of color, and a skin of a female taken by Mr. Axelrod at Marcova, Nov. 15, 1900. These all belong to the Lamut race of Reindeer.

Mr. Buxton also obtained the skins, without skulls or measurements, of two wild Reindeer at Marcova, a female and a young male, killed and brought in by hunters.

Mr. Bogoras's series includes 4 skins and skulls of wild Reindeer collected at Mariinski Post, mouth of the Anadyr, at different dates, and several additional skulls; also 6 young fawns of different ages and two skins and skulls of females of the Chukchee domesticated race, and one skin and skull of a female of the Lamut domesticated race.

Although this material seems considerable it is insufficient, both in quantity and character, to enable one to make satisfactory comparisons between the wild and domesticated animals, or between the two commonly recognized domestic races, the Lamut and Chukchee. Also material is lacking in sufficient quantity to give much new information in respect to the supposed differences between the Reindeer of Siberia and of Scandinavia. Most of the adult males were killed when the antlers were in the velvet, and the pelage had not acquired its full winter development. The color of these skins is much like that of our Eastern Woodland Caribou, at least in general effect; the antlers, however, are longer and slenderer, and partake more of the Greenland type.

Mr. Buxton's measurements of the Taiganose Peninsula specimens are as follows:

No. 18179, a 7-year-old male, is unfortunately without measurements. No. 18180, an adult male: "Length, 1750 mm.; tail, 125; hind foot, 510; girth, 1190; height, 970. A fine, large individual."

No. 18178, a 4-year-old female: "Length, 1630 mm.; tail, 125; hind foot, 480; height at shoulders, 940; girth behind fore legs, 1030; girth of neck, 530; head of humerus to head of femur, 860. A perfect

specimen of a 4-year-old female of average color and size and with perfect, average-sized antlers, selected from a herd of more than 2000 which varied in color from pure white to a dark seal brown."

No. 18182, young female, "A fine average individual. Length, 1405 mm.; tail, 120; hind foot, 450; height, 785; girth, 910."

No. 18181, yearling male. "A very fine specimen, of average size and color, in good pelage, and with as good antlers as it was possible to find in a herd of more than 2000. Length, 1375 mm.; tail, 119; hind foot, 440; height at shoulders, 760; girth, 860."

A detailed report on this material is necessarily deferred till a later occasion, when a more general study of both the Old World and American forms of *Rangifer* can be undertaken.

The following notes by Mr. Buxton supply much interesting information:

"Wild Reindeer. Russian name, *Déeka Ō-láin*, meaning wild reindeer. Undomesticated reindeer are still quite common in the country about Marcova. Every few weeks during the winter travellers in that territory report seeing small herds of them and a few are killed and brought to Marcova every winter. There are some in the Gichiga territory. The specimens in the collection were taken in February, 1901, near Marcova. The skin of the wild reindeer is much thinner than that of the domesticated form and the hair is much lighter in texture. They are smaller also than the domesticated ones.

"Domesticated Reindeer. Russian name, *Ō-láin*. Representatives of nearly all the different tribes of native people inhabiting that vast section of northern Eurasia lying between the Arctic Ocean on the west and Bering Sea on the east have from the remotest times maintained herds of reindeer. As these animals are so constituted by nature than they can be utilized for food, clothing and transportation, they form a very important factor in the existence of these high north people. The Chukchees who inhabit the extreme northeastern corner of Siberia, between the Arctic Ocean and Bering Sea, possess the largest herds of any of the Siberian natives, some of them containing as many as 20,000. The Koryaks living to the south of those along Bering Sea and around the head of Okhotsk Sea also have large herds, and the Tunguses,

further inland and along the shore of Okhotsk Sea, also possess considerable numbers of them, The Lamuts, along the lower Kolyma, are also reindeer people.

"The Lamut are the largest of all the domesticated deer in Northeastern Siberia, and the Tungus are larger than those of the Chukchees or the Koryaks. This difference in size is probably accounted for by the fact that the Chukchees and Koryaks inhabit a treeless country, while the Tunguses and Lamuts live in the timbered section further inland. I had the opportunity of observing but one large herd, which was kept on the Taiganose Peninsula, and contained four or five thousand. In the latter part of November I visited it in order to obtain some for food and specimens. At that time they were in full, unworn pelage. The older ones had shed the velvet from their horns, but the young ones still retained it. In color they ranged from pure white to dark seal brown, although the general color of the adults is a brownish gray. The younger ones are darker. The antlers are generally smaller and more terete than those of the North American Barren Ground Caribou, while the animal itself is larger. During the latter part of January the oldest animals begin to shed their antlers, but all do not complete the process before the latter part of May. The young are dropped from the middle of April to the first of June. In May they begin to change pelage and complete it in August and the early part of September. The antlers are full grown from August to October.

"This herd was owned by one Koryak, the head man among the Koryaks in that region, who kept twelve men and their families to look after the deer. The camp, consisting of three very large deerskin tents, is moved quite often in order to afford them good feed. One or two men are in constant attendance day and night, summer and winter. Many of the reindeer are broken to ride and drive; and nearly two hundred sledges are used in moving the camp. The animals are very tame and are easily caught with the long sealskin lariats, which the men handle very dexterously.

"Reindeer in Siberia generally give birth to young when

they are two years old, and it is exceptional for them to have young when one year old; but those that have been imported to Alaska foal at one year old, and it is exceptional for them to go until they are two. Also in Alaska a large percent has twins.

"They are inferior to dogs for travelling, being able to make only about one half the distance of a dog team in a day, and they are unable to endure the continuous work of dogs." —N. G. B.

3. **Paralces alces** (*Linn.*).

ELK.

The Elk has apparently disappeared from the region bordering the Okhotsk Sea, but still exists further inland. No specimens are included in the collection.

"Russian name, *Lōs*. The Russians at Gichiga say that Elk were formerly found at Parane on the head of Penginski Gulf, and that a few are still taken near Yamsk. Mr. Jochelson says that they are abundant in the valley of the Kolyma River."—N. G. B.

4. **Moschus moschiferus** *Linn.*

MUSK DEER.

The collection contains a single specimen of Musk Deer, a young male, collected by Mr. Jochelson in the Verkhoyansk Mountains, near the junction of the Yana and Dulgulach Rivers, Yakutsk, Siberia. The general color above is blackish brown, strongly varied with yellowish gray; ears blackish, fringed internally with white; throat and breast dusky strongly varied with white. The collector's measurements are: Head and body, 780 mm.; tail, 30; hind leg, 468; girth, 490.

It is hardly probable that the north Siberian form, represented by the present specimen, can be subspecifically the same as true *moschiferus* of the Himalayas, but lack of material prevents a critical consideration of the subject. Pallas's name *Moschus sibiricus* is apparently available for the northern form, should it prove separable.

5. **Ovis nivicola** *Eschscholtz.*

KAMCHATKA BIGHORN.

Represented by 3 skins with skulls, and one skin with skeleton, collected by Mr. Buxton on Taiganose Peninsula, April 4, 1901, and by one skin and skull and four pelts purchased by Mr. Bogoras at Baronesskorf Gulf.

Mr. Buxton's measurements of three specimens in the flesh are as follows:

No. 18211, ♂. Total length, 1350 mm.; tail, 102; hind foot, 395; height, 840; head of humerus to head of femur, 760; girth, 1000; girth of neck, 510.

No. 18213, ♀. Total length, 1380 mm.; tail, 90; hind foot, 373.

No. 18210, ♂. juv. (quite young). Total length, 1070; tail, 86; hind foot, 325; height, 665; head of humerus to head of femur, 665; girth, 690; girth of neck, 330.

The skull of No. 18211, adult male, measures: Basal length, 223 mm.; least interorbital breadth, 111; greatest orbital breadth, 156; mastoid breadth, 95; length of nasals, 68; breadth of nasals at middle, 38.5; palatal length, 131; length of upper toothrow, 72; length of horns along outer edge, following the curvature, 588; spread at tips, 470; circumference at base, 255.

The skull of No. 18212, an older and much larger male from Baronesskorf Gulf, measures: Basal length, 252 mm.; least interorbital breadth, 125; greatest orbital breadth, 168; mastoid breadth, 95; length of nasals, 83; breadth of nasals at middle, 43; palatal length, 137; length of upper toothrow, 65; length of horns along outer edge, following the curvature, 730; spread at tips, 453; circumference at base, 295.

The skull of the adult female, No. 18213, measures: Basal length, 240 mm.; least interorbital breadth, 104; greatest orbital breadth, 144; mastoid breadth, 80; length of nasals, 78; breadth of nasals at middle, 26; palatal length, 129; length of upper toothrow, 70; length of horns along curvature, 167; spread at tips, 116.

As the description and figure of this sheep given in 'Wild Oxen, Sheep, and Goats of All Lands' (pp. 221–226, pl. xviiiA) are quite misleading as to the color of the animal the following description, based on a good series of specimens, is here presented. Eschscholtz's figure is also incorrect as to color and does not agree well with the same author's good description.

Male, winter pelage.—General color yellowish gray brown, lighter on the flanks and over the middle region of the body, darker on the shoulders, top of neck, and hinder part of back. Ears short, heavily clothed, brown like the surrounding parts except the apical fourth which is whitish. Forehead and face yellowish white, with a broad zone of brown across the nose, but end and sides of nose whitish; chin, throat, breast, and most of ventral surface dark brown; inguinal region, inside of thighs, and buttocks clear white, the caudal disk divided by a dark band from the back continuous with the dark brown tail, which is darker than the general tone of the back. Fore and hind limbs dark ruddy brown, with a narrow band of dull white on the posterior surface. Horns yellowish brown, or brownish wax-yellow.

The four pelts, in full winter pelage, vary little in coloration except that some are a little darker or a little lighter than others. The four April skins, complete, with leg bones and feet, have the coat somewhat worn and are a little lighter from bleaching. Otherwise the two adult males are as above described; an adult female is lighter colored throughout than the males, and a yearling male lamb is still lighter than the female, the general coloration being light brownish with a yellowish cast, the front of the legs darker. The tips of the hairs are whitish with the under pelage brownish, showing slightly through the surface.

In none of the 7 adult skins, all in winter pelage, is there any indication of a white winter coat, which Dr. Lydekker appears (*l. c.*) to have unjustifiably assumed, in view of what other observers have stated, may characterize the Kamchatka Bighorn. In all of the four skins that have the head skin complete, the nose and face are white, but the brown area across the upper part of the nose varies in extent, being very broad in one, much narrower in another, and practically absent in a third.

In color, size, slenderness, and curvature, the horns closely resemble those of the *Ovis dalli-stonei* group, but the general coloration of the animal is much different from either, closely resembling that of typical *O. canadensis*.

It is surprising, however, in view of the material now available for comparison, that the Kamchatka Bighorn should have ever been considered specifically identical with the

American forms, although these are, of course, its nearest affines.

"Russian name, *Dee-ke Bar-an*, meaning wild sheep. Mountain Sheep probably occur all over Northeastern Siberia wherever the mountains are rugged enough to attract them, although I have only a few reliable records of their presence at widely separated places in that vast territory. They are found in the Stanovoi Mountains, at Ayan, Okhotsk, Ola, Yamsk, Mickina or Niakinsk, and on as far north at least as the Arctic Circle, and perhaps further, although the range becomes much less rugged towards the north. They are also found along the Kolyma River to the westward of that range. A few are taken in the mountains in the Anadyr Territory about Marcova. They are common on the Taiganose Peninsula, and are said to be abundant all over Kamchatka from Petropavlovsk northward. Kamchatka, from the nature of its mountains and vegetation, offers the most suitable place for them. The wandering reindeer Koryaks inhabiting the Taiganose Peninsula kill a few every winter. Three of those in the collection are from that locality, while the fourth is from Baronesskorf Gulf." — N. G. B.

6. **Sciuropterus russicus** (*Tiedemann*).

SIBERIAN FLYING SQUIRREL.

Mus volans LINNÆUS, Syst. Nat. ed. 10, I, 1758, 64 (in part; based primarily on *Sciurus volans* Seba, exclusively American).

Sciurus volans LINNÆUS, Syst. Nat. ed. 12, I, 1766, 88 (in part).

"*Pteromys russicus* TIEDEMANN, Zool. I, 1808, 451."

Pteromys sibiricus DESMAREST, Mamm. II, 1822, 342 (= *Sciurus volans* Pallas, non Linnæus).

This species is represented by four hunters' skins, without skulls or feet, obtained by Mr. Buxton at Marcova, obviously winter skins. Three of them have the upper parts nearly uniform pale whitish gray, while the fourth has a barely perceptible tinge of pale buff; the lower parts are white with a very faint buffy tinge, and a slight mixture of black-tipped hairs overtopping the general pelage. The tail is grayish

white above, strongly varied with long black-tipped hairs, and with a tinge of buffy brown; below similar but more strongly washed with buffy brown. Eyelids black; a broad superciliary stripe and cheeks white; an indistinct blackish lateral line of short hair along the sides of the neck; fore feet (present in only one specimen) gray blotched with blackish; hind feet above gray like the back, and pale buffy white below.

Fourteen specimens in alcohol, collected by Mr. W. Jochelson at Verkhne Kolimsk, on the Kolyma River, in December, 1901, are similar in coloration, except that some of the specimens are more tinged with buffy, especially on the tail and feet. These specimens afford the following measurements:

MEASUREMENTS OF *Sciuropterus russicus*.

Mus. No.	Locality.	Date.	Sex.	Total Length.	Head and Body.	Tail Vertebræ.	Hind Foot.
19522	Verkhne Kolimsk, Kolyma River	Dec. 1901	♂	247	150	97	38
19526	" " " "	"	♂	270	170	100	34
19528	" " " "	"	♂	275	175	100	35
19529	" " " "	"	♂	273	170	103	35
19531	" " " "	"	♂	259	174	85	36
19532	" " " "	"	♂	280	174	106	36
19521	" " " "	"	♀	271	170	101	37
19523	" " " "	"	♀	268	168	100	36
19524	" " " "	"	♀	281	175	106	37
19525	" " " "	"	♀	253	150	103	35
19527	" " " "	"	♀	274	172	102	33
19530	" " " "	"	♀	279	173	106	33
19533	" " " "	"	♀	283	170	113	35
19534	" " " "	"	♀	285	173	112	37
	Average, 6 males and 8 females	—	—	272	169	104	35.5

An adult male skull has a total length of 42 mm. and a zygomatic breadth of 25 mm.

Without other material it is impossible to compare the present series with the Flying Squirrel of northern Europe, commonly known as *Sciuropterus volans* (Linn.). As, however, the *Mus volans* Linn. 1758 (and earlier in Syst. Nat. and Faun. Suecica) was based primarily on the *Sciurus volans* of Seba and other references to the American animal, the name

volans has of late been properly restricted by American writers to the Virginia form of the group. The first name available for the northern Europeo-Asiatic animal is apparently *Pteromys russicus* of Tiedemann. (I have not Tiedemann's work at hand, but find this name repeatedly cited for the north European animal.)

"Russian local name, *Lee-tyá-gah.* Flying Squirrels are common in the wooded section inland from Ayan, Okhotsk, and Ola, and all over the wooded section westward from Gichiga and in the Kolyma River district. A very few are still found near Yamsk and along the immediate headwaters of the Gichiga River. No. 472 and 486 (pelts) were taken at Yeropole, 100 miles northeast of Marcova, where there is pine timber. Mr. Jochelson says that they are abundant along the Kolyma River as far north as timber line." — N. G. B.

7. **Sciurus vulgaris calotus** (*Hodgson*).

SIBERIAN SQUIRREL.

Mustela ? calotus HODGSON, Calcutta Journ. Nat. Hist. 1841, 221–223, pl. ix. Himalaya and Thibet. Type from Thibet, *apud* Gray, Ann. and Mag. Nat. Hist. (3) XX, Oct. 1867, 272.

Sciurus calotus GRAY, Ann. and Mag. Nat. Hist. (3) XX, Oct. 1867, 272. "Hab. North China, Thibet (Mr. Hodgson's type), Siberia, B. M."

Sciurus vulgaris calotus BARRETT-HAMILTON, P. Z. S. 1899, 6. "Hab. Eastern Siberia, the exact limits uncertain; . . ."

? *Sciurus vulgaris argenteus* KERR, Ann. King. 1792, 256. River Obi. (*Cf.* Barrett-Hamilton, *l. c.*, p. 6.)

Ten specimens, collected by Mr. Buxton in February, 1901, "on the Yeropole River, 100 miles northeast from Marcova," are in full winter pelage, with black ear-tufts, black tails, and blackish brown feet. These specimens agree quite well with Mr. Hodgson's description (*l. c.*), from imperfect skins, of his "*Mustela ? calotus*," which, he says, is "clear slaty blue freckled vaguely with hoary; the amply tufted ears, the spreading tail, and the limbs blackish"; "and the middle of the belly and the neck in the same line, together with the insides of the limbs close to the belly are pure white."

These specimens are exceedingly uniform in color, the upper parts being dark gray, with a barely perceptible wash of brownish over the median area from the middle of the back posteriorly. The soles of the feet are clothed with very long, thick, closely matted woolly fur, of a grayish brown color.

Measurements.—Ten specimens (6 males and 4 females) measure as follows: Total length, 395 (372–420) mm.: tail vertebræ, 171.4 (154–192); hind foot, 63.6 (57–69). An average adult skull has a total length of 52 and a zygomatic breadth of 31 mm.

In addition to the above described series of ten specimens from Marcova, Mr. Buxton obtained at Gichiga and at Marcova, a series of 20 hunters' skins to illustrate the color variation to which this species is subject. The exact locality of these specimens is unknown, but they must have come from the general region tributary in trade relations to these points. These are complete skins except that they generally lack the feet. There are also 6 hunters' skins obtained by Mr. Bogoras at Marcova, which lack tail and feet. These six agree in coloration with the above-described Marcova skins collected and made up as specimens by Mr. Buxton.

The Buxton series of 20 hunters' skins is deserving of special mention on account of the wide color variations they present. Eleven of them are like the 16 dark gray specimens already enumerated and call for no special remark. Of the other 9, three are albinistic, — pure white below as in normal specimens, with the rest of the pelage dull light creamy brown, with the tail and ear-tufts somewhat darker than the general coloration. The remaining six have the general coloration of the body (the median ventral surface excepted) light ashy gray, many shades lighter than the dark gray series; three of them have the tail and ear-tufts bright red. They thus agree with the winter pelage of *Sciurus vulgaris varius* (Kerr), of Scandinavia and eastward to northern and central European Russia, as defined by Barrett-Hamilton (*l. c.*, p. 6). The other three have dusky brown ear-tufts with a faint reddish tone, and dusky reddish brown tails, with more or less reddish on the crown and at the base of the ears,

and a reddish brown shade over the lower back. They are thus more or less intermediate between the three last described and the ordinary dark gray phase, as regards the ear-tufts and tail, but more reddish on the lower back and head. It might be inferred that the six light gray specimens with more or less reddish ear-tufts and tails came from some point far to the westward, and thus represent the north European form, were it not that Mr. Bogoras assures me that all of these phases of coloration occur in the region immediately about Marcova. The albinistic phase and the specimens with red ear-tufts and red tails, he informs me, are very rare, and are looked upon by the hunters as 'curiosities.'

"Russian name, *Bél-kah.* Although an enormous number of pelts of this handsome little mammal are annually brought to the settlements along the Okhotsk Sea and to Marcova very few are now found in the vicinity of any of these places. Inland, in that vast section of Northeastern Siberia which is covered with coniferous trees, they are still abundant and their skins are the chief source of revenue to the natives inhabiting that territory. A few are still found near the western shore of Okhotsk Sea, along the upper Gichiga and Pengina Rivers and along the tributaries of the Anadyr system. From two to five thousand are yearly brought to Marcova; from seventy-five to one hundred thousand to Gichiga; from one hundred to one hundred and twenty-five thousand to Okhotsk, and about five thousand to Ayan and Ola. Formerly many more than this were brought out at Ayan, the receipts having dropped off four fifths in the past twenty years. They are killed principally by the Tunguses during the winter with old-fashioned small-bore flint-lock rifles. The skins are removed, turned inside out, dried and tied up in bundles of ten, in which shape they are brought to the coast during the summer — July — and traded to the merchants or at the government magazines for powder, lead, iron, tea, and rye flour. The price varies from eighteen to twenty kopechs each, although the government allows them but fifteen. Nearly all of them are used in Russia for lining fur garments." — N. G. B.

8. **Eutamias asiaticus** (GMELIN).

PALLAS GROUND SQUIRREL.

Sciurus striatus SCHREBER, A. Das asiatische, Säug. IV, 1785, 790.

Sciurus striatus, α. asiaticus GMELIN, Syst. Nat. I, 1788, 150. Based on *Sciurus striatus* Pallas, Nov. Spec. Quad. Glir. Ord. 1778, pp. 378–384, ex Siberia.

Type of present description, No. 18474, ♂ ad., Gichiga, Northeast Siberia, August 12, 1900; N. G. Buxton, Jesup North Pacific Expedition.

Post-breeding Pelage.— Front half of dorsal surface, from nape posteriorily, and sides of shoulders, light gray faintly tinged with yellowish; rest of dorsal surface, including top of head, rump and thighs, yellowish brown; five black dorsal stripes, the median one extending from crown to base of tail, the inner pair from sides of nape to rump, the outer pair from shoulder to hip, all equally distinct and about equal in width; the four light dorsal stripes are whitish gray anteriorly and yellowish rufous posteriorly, the outer pair less strongly yellowish than the inner pair; supraocular stripe, from nose to posterior border of eye, pale buffy white, from eye to ear rusty brown; subocular stripe, from front border of eye to posterior base of ear, pale buffy white, confluent with the small white postauricular patch; below this a broad maxillary streak, rusty brown mixed with black-tipped hairs; fore and hind feet pale dingy buffy gray; whole ventral surface with a barely appreciable tinge of buff; ears like the top of the head, with narrow whitish tip and edging; tail with the hairs broadly tipped with white, giving a general whitish gray effect, the hairs individually being pale rufous at base, forming, when seen from below, a broad central area of pale yellowish rufous, about one third the total width of the tail; this area is bordered with a band of black, and a broad outer edging of white.

Measurements.— Type, total length, 259 mm.; tail vertebræ, 113; hind foot, 37. Four adult males and eight adult females measure as follows: Males, total length, 258 (250–265); tail vertebræ, 118 (112–129); hind foot, 38.5 (37–40). Females, total length, 261 (253–280); tail vertebræ, 116 (108–120); hind foot, 37.5 (35–39).

Skull.— Type, total length, 37 mm.; zygomatic breadth, 21; length of nasals, 13; posterior breadth of nasals, 3.4.

This species is represented by 12 specimens collected at Gichiga, 11 of which were taken July 6–10, 1901, and one September 27, 1900; and one from Ola, about sixty miles south of Gichiga, taken September 12, 1900; also one from Marcova, without date. A single specimen from Saghalin

Island, collected by Dr. Berthold Laufer, in August, 1898, is not appreciably different from the Gichiga series. This series of 15 specimens is quite uniform in coloration, varying only in the color of the lower back, which is a little deeper fulvous in some of the specimens than in the type. The series differs strikingly, through very much paler coloration, from a series of 10 specimens in the U. S. National Museum from the upper Amoor River, representing Bonhote's *Tamias orientalis* (Ann. and Mag. Nat. Hist. (7), IV, Nov. 1899, p. 385). It has only a remote relationship, as would be expected, with *Eutamias senescens* Miller (Proc. Acad. Nat. Sci. Phila. 1898, p. 349), from Pekin, China, the type of which is before me.

With proper material for comparison, the Siberian *Eutamias* proves to be not closely related to the most northern form of the genus in North America, namely, *E. quadrivittatus borealis*, of which I have for comparison a series of nearly 100 specimens collected at various points in northern British Columbia. The American form is fully one half less in size (as regards bulk of body), and very much darker and otherwise strikingly different in coloration.

Sciurus striatus Pallas (Nov. Spec. Quad. Glir. Ord. 1778, pp. 378–384), which later became the basis of Gmelin's *Sciurus striatus*, *α. asiaticus* (Syst. Nat. I, 1788, p. 150), included all the then known striped Ground Squirrels of Europe, Asia, and America. His description was based on a Siberian specimen, but, as usual, he failed to state the locality whence his material came. He speaks of the Siberian form as frequenting all of the wooded parts of Siberia, from the Kama and Dvina Rivers eastward to Kamchatka. His description indicates an animal with five black dorsal stripes, and with the general coloration above pale lutescent. As he fails to mention the conspicuous reddish color of the head and lower back which especially distinguishes the Amoor River form (*Tamias orientalis* Bonhote), and as his description satisfactorily characterizes the animal of the Gichiga region, there seems to be no alternative but to restrict the name *asiaticus* to the Gichiga animal.

Schreber, with his usual astuteness, properly discriminated the Asiatic animal as different from the American, as "A. Das asiatische," but failed to give it a technical name, which was first supplied later by Gmelin, as above cited.

"Russian name, *Bŭr-ŭn-dóok*. Abundant at Ayan, Okhotsk, and Ola, common at Gichiga and Pengina, and present at Marcova. At Gichiga they are confined to the upper stretches of the rivers where the larch (*Larus sibirica*) grows, and to the patches of recumbent stone-pine (*Cembra pumila*) along the seacoast. I spent the second week in July, just at the height of the mosquito season, encamped at the junction of the Gichiga and Chooma rivers. The country between these streams is a park-like expanse of dry, level country, covered with an open growth of Siberian larch, and with tangled masses of willows close to the river-banks. Under the trees is a thick growth of grass and flowers. I am certain that the chipmunks were very common, although I secured only ten, nine males and one female, during five days of almost continuous tramping through these woods, and heard but two more. Eight of the ten were feeding on the green cones in the tops of the larch trees, where they would remain motionless and allow me to approach to the foot of the trees. The other two were startled from the grass and immediately ran up trees. Most of the females taken had been nursing young. They retire to their winter quarters the last week in October and do not come out again until the first week of the following June. At Ayan I saw several of them during the first week of August feeding on the green cones of *Larus ayensis*, which there crowd the little valley quite down to the beach. Mr. Sokolnikoff says that they occur along the Yeropole and Main rivers, tributaries of the Anadyr, northeast of Marcova. Several of the chipmunks killed at Christova had their cheek pouches filled with the green seeds of the larch and larvæ of a large ant abundant there in the woods." — N. G. B.

9. **Citellus**[1] **buxtoni,** sp. nov.

EAST SIBERIAN SPERMOPHILE.

Type, No. 18403, ♂ ad., Gichiga, west coast of Okhotsk Sea, Siberia, August 19, 1901; N. G. Buxton, Jesup North Pacific Expedition.

[1] *Cf.* Allen, this Bulletin, XVI, 1902, p. 375.

Post-breeding pelage. Type.— Front and top of head deep rufous, varied minutely on the crown with black-tipped hairs; rest of the dorsal area yellowish brown, thickly covered with small squarish spots of white, narrowly edged posteriorly with black; sides and ventral surface ochraceous, wholly concealing the plumbeous underfur; back and sides with many long, stiff, wholly black hairs; front and sides of the nose, chin, and upper throat deep buff; upper surface of both fore and hind feet rusty buff; upper surface of tail blackish, especially towards the tip, conspicuously fringed with deep fulvous, the hairs individually being grayish fulvous, then narrowly ringed with black, then with a broader ring of deep fulvous, followed by a broad band of black and a broad fulvous tip; lower surface of tail deep orange rufous, with a subapical black band, reaching nearly to the base of the hairs, and edged and tipped with fulvous.

In breeding dress (left-over winter coat) the pelage is thin and worn, and the general coloration is much paler, through fading and wear, so that in many specimens the sides of the neck and shoulders are gray, almost without trace of fulvous; the sides are pale fulvous gray, the deep orange or ochraceous tint of the ventral surface is much paler, and the fulvous fringe of the tail has bleached to yellowish white.

Young of the year, one eighth to one half or two thirds grown, resemble in a general way the faded breeding adults, but the pelage is softer and more woolly, and the markings and tints are less developed; the crown patch is paler and mixed more or less with gray, the scapular region is pale, and the dorsal region grayish brown varied with black, with the spotting poorly defined.

Ten adult males and ten adult females measure as follows: *Males*, total length, 356.8 (340–380) mm.; tail vertebræ, 90.9 (80–104); hind foot 59.2(57–62); *Females*, total length, 358.7 (345–374); tail vertebræ, 90.3 (80–101); hind foot, 58.5 (56–60).

This species is represented by 48 skins and skulls, 3 specimens in alcohol, and 10 additional skulls, taken at Gichiga by Mr. Buxton at various dates from May 21 to October 5, and 7 specimens obtained at Indian Point (Chaplin Point of most maps), by Mr. Bogoras, in June, including two pure white albinos, purchased of the natives.

In post-breeding pelage the coloration varies considerably in different specimens. The description given above of the type indicates about the average condition, from which the coloration varies chiefly in the depth of the ochraceous color of the sides and ventral surface, which ranges in different specimens from orange to pale ochraceous, with a corresponding variation in the amount of fulvous suffusing the dorsal

area and the border of the tail. The amount of fading shown by May, June, and early July specimens, which still retain the left-over winter pelage, also varies, some specimens having the shoulders and sides of the neck whitish gray, with scarcely a trace of fulvous, while in others a distinctly fulvous tone infuses the gray.

Citellus buxtoni finds its nearest relative in *Citellus barrowensis* (Merriam) from Point Barrow, Alaska, from which, however, it differs in smaller size and relatively as well as absolutely shorter tail, the average measurements of 7 adults from Point Barrow, collected on the McIlhenny Expedition, being as follows: Total length, 421 (382–470); tail vertebræ, 145 (130–178); hind foot, 60.4 (57–65). The general style of coloration is the same, but the Point Barrow animal has the dorsal area a darker brown, and the fulvous suffusion of the sides and underparts is very much paler. The difference in size is especially striking on comparison of the skulls, an average adult skull of *barrowensis* giving a total length of 61 mm. as against 58 in *buxtoni*, while the dentition in the former is much heavier, the length of the upper toothrow being 15 mm. as against 12 in *buxtoni*. Among other cranial differences may be noted the form of the posterior narial opening, which is not only narrower in *buxtoni*, but the pterygoid processes curve more strongly inward.

The other American forms of the *parryi* [1] group differ, as

[1] In adopting, some years since, the name *empetra* (*Mus empetra* Pallas) for the group of Parry Spermophiles (see N. Am. Rodentia, 1877, pp. 842–844, and Bull. Am. Mus. Nat. Hist., X, 1898, p. 454) I was influenced largely by Schreber's plate of *Arctomys empetra* (Säuget., pl. ccx), which Schreber says (*op. cit.*, IV, 1785, p. 744) was transmitted to him by Pallas. This plate clearly does not represent any known species of *Arctomys*, while it does fairly well represent the large rufous-headed spermophile of northern North America, later known as *Spermophilus parryi*. Pallas's brief description, paraphrased by Schreber, is unsatisfactory, corresponding better perhaps with a half-grown specimen of the northern form of the common woodchuck (*Arctomys monax* auct.) than with the Parry Spermophile, the top of the head and feet being described as brownish black instead of rufous; but the ventral surface is said to be "rufo-ferruginea," and the size is given as between that of a marmot and the small spotted spermophile of Europe (*Mus citellus* Linn.).

Pallas cites (Nov. Spec. Quad. Glir. Ord., 1778, p. 75) both Pennant's and Forster's 'Quebec Marmot,' the latter being the Parry Marmot and the former, in all probability, a young woodchuck, so that Pallas's *Mus empetra* was in any case composite. Sabine, in 1822 (Trans. Linn. Soc. London, XIII, 1822, p. 584), used Pallas's name *empetra* for the northern form of the woodchuck, describing under this name specimens received from the Hudson Bay Company. This may be taken as definitely fixing the name *empetra* upon the northern woodchuck, leaving the name *parryi* Richardson as available for the spermophile (*Citellus parryi* ex Richardson), with Lyon Inlet, Melville Peninsula, as its type locality. Thus, in order to clear up a vexatious case of nomenclature (see Osgood, N. Am. Fauna, No. 22, Oct. 1902, p. 47), it seems best to ignore the alleged figure of Pallas's *Mus empetra*, since it was not published by Pallas, and clearly disagrees with his previously published description.

would be expected, still more widely from *buxtoni* than does its nearest geographical neighbor, *barrowensis*.

C. buxtoni has only a remote relationship to *C. eversmannii* (Brandt) from the Altai Mountains, the latter being very much smaller, with relatively longer tail, and very different coloration, wholly lacking the rufous head-patch so characteristic of *C. buxtoni* and the whole *parryi* group.

"Russian local name, *Ōv-rȧhs-ka*. Abundant in suitable places at the mouth of the Anadyr River, Marcova, Pengina, Gichiga, Ola, Okhotsk, and Ayan. Mr. Jochelson says that it is also abundant in the Kolyma country, where they are sometimes eaten by the natives when other food is scarce. At Gichiga larger or smaller colonies of them are scattered all along the river banks and along the high bluffs which overlook the sea. On the right bank of the Gichiga River, about five miles above its mouth, is a wide sandy bottom, a few feet above the river, which in the summer is covered with a thick growth of grass and flowers. This bottom for nearly a mile along the river and two hundred yards inland is covered with spermophiles' burrows, and the colony contains three or four hundred individuals. During summer their runways radiate from these burrows in all directions and cross one another in the tall grass. At this time one can see them sitting erect at their holes and running through the grass, and hear them utter their sharp *shick-shick* of alarm. They begin to come out of their winter quarters as soon as the snow begins to leave, about the second week in May, and return during the last week in September. The young are born about the time they emerge from hibernation. Their food consists of green grass and plants and their seeds, which they store, at least in limited quantities." — N. G. B.

10. **Citellus stejnegeri,** sp. nov.

KAMCHATKA SPERMOPHILE.

Spermophilus brunniceps KITTLITZ, Denkwürdigkeiten einr Reise, etc., II, 1858, 337. Nomen nudum. Southern Kamchatka.

Spermophilus parryi BRANDT (nec Richardson), Bull. phys. math. Cl. Acad. Sci. St. Pétersb., II, 1844, 373, part; only the reference to the Kittlitz specimen, as above.

Type, No. 63226, U. S. Nat. Mus., ♂ ? juv., near Petropaulski, southeastern Kamchatka; Dr. L. Stejneger.

Allied to *C. buxtoni* from Gichiga, but very different in coloration, and rather larger, with heavier dentition.

General coloration above gray shaded with blackish, and varied with small squarish white spots; sides gray with a faint tinge of pale fulvous; ventral surface dingy gray; sides of shoulders, fore arms and feet, and the whole pectoral region strong fulvous, palest on the breast and brightest on the fore arm; thighs and hind feet fulvous gray; chin, throat, and sides of the nose pale buffy white; top of the nose as far as the eyes chestnut rufous; top of head from middle of eyes posteriorly blackish tinged with dark rufous; tail above basally mixed blackish and gray, the apical third of the vertebral portion and the tip black, the tips of the hairs pure white, forming a white fringe; tail beneath fulvous gray centrally for the basal two thirds, the central area bordered with black, the apical third all black fringed with white.

Measurements.— There are no measurements, taken from the fresh specimens, available. Approximate measurements from the skin are as follows: Total length, 306 mm.; tail vertebræ, 75; tail to end of hairs, 110; hind foot, 55. Skull, total length, 53 mm.; zygomatic breadth, 31; nasals, 20; upper toothrow, 13.

A second specimen (U. S. Nat. Mus. No. 14136), also from near Petropaulski, and collected by Dr. Stejneger, for whom the species is named, — a flat skin, lacking feet, tail, and skull, — is exactly similar to the one already described, so far as the body is concerned. The type specimen is nearly full grown, as shown by the skull, in which the permanent premolars are just coming into place, their crowns being visible beneath the milk teeth, three of the four milk premolars being still retained.

Compared with *C. buxtoni* of exactly corresponding age, *C. stejnegeri* is characterized by the absence of any fulvous suffusion of the back, and of the strong ochraceous tint of the sides, limbs, and ventral surface. The tail has a very much larger area of black, and is fringed with white instead of fulvous. As regards the skull, the dentition is heavier, and the palatal floor much less curved downward posteriorly, it being in *C. stejnegeri* nearly flat throughout and in *C. buxtoni* strongly arched for the posterior third.

Dr. Stejneger has kindly called my attention to the following passage in Kittlitz's 'Denkwürdigkeiten einr Reise,' etc.

(Vol. II, 1858, p. 337) as possibly furnishing a name for this species. Kittlitz says: "Hier [in the mountains near Ganal] ward zwischen Alpenpflanzen plötzlich eine weibliche Jewraschka gefangen, ein kleines Murmelthier, das dem *Arctomys citillus* nahe steht. Die Art unterscheidet sich von ähnlichen bei Pallas beschriebenen hauptsächlich durch die geringere Zahl der Mammellen, deren nur acht sind. Das Exemplar ward in Petersburg unter dem Namen *Spermophilus brunniceps*, Brandt, aufgestellt und von mir im Jahr 1835 beschrieben und abgebildet." I am unable, however, to find that Kittlitz ever published a description or figure of the animal, or that the name *Spermophilus brunniceps* has ever appeared elsewhere. Brandt appears not to have published it, as in 1844 (Bull. Acad. Sci. St. Pétersb., phys.-math. Cl., Vol. II, 1844, p. 373) he identifies this same specimen with *Spermophilus parryi*. The name *Spermophilus brunniceps* as used by Kittlitz is practically a *nomen nudum*, since the only feature mentioned, the number of mammæ, cannot be considered as sufficiently distinctive.

11. **Arctomys,** sp.?

SIBERIAN MARMOT.

The genus *Arctomys* is not represented in the collection. Mr. Buxton refers to a species of this genus in his notes as follows:

"*Arctomys* sp.? Marmot. Russian local name, *Tār-bahgàn*. The people living at Gichiga say that a species of marmot is found at Baronesskorf Gulf where they are abundant. Mr. W. H. Shockley, an American mining engineer, who was in charge of an English expedition which prospected the coast of Siberia for gold from East Cape to Petropavlovsk in the summer of 1900, said that they were abundant at Olutorski Gulf where they lived in the rocks along the coast. In the summer of 1901 I saw a Yakutsk native from the Kolyma River district with a cap made from their skins, and he explained to me that it was a mark of wealth to possess such a cap, although at Baronesskorf Gulf the skins are worth but sixty kopecks each."— N. G. B.

12. **Evotomys (Craseomys) latastei,** nom. nov.

KAMCHATKA RED-BACKED MOUSE.

Arvicola rufocanus varieté *kamtschaticus* LATASTE, Ann. Mus. Civ. di Stor. Nat. di Genova, XX., 1884, 284 (in text). The range here given as "dans le Kamtschatka, sur les bords de l'Armour, auprès du lac Baïkal, sur l'Altaï, et généralement, dans tout le nord de la Sibérie." Not *Arvicola kamtschaticus* Polyakoff, 1881.

E. latastei differs from *E. rufocanus* in its much smaller size, less angular teeth, rounder bullæ, less fulvous underparts, and darker gray sides.

A series of 18 specimens (including two in alcohol) collected at Gichiga, is provisionally referred to this species, the type region of which is northern Kamchatka. In the absence of typical representatives of *E. kamtschaticus* any other course seems inexpedient.

The Gichiga series was taken as follows: Jan. 12, 1; May 12, 1; June 25, 1; Aug. 27, 1; Sept. 11–24, 14. The January specimen is in very long, soft pelage, clear grayish white below, the sides rather light clear gray, and the back yellowish rufous, with numerous long black-tipped hairs. The May specimen is in shorter, less full pelage, with the color much as in the January specimen, except that the rufous of the back is more dilute, through the less developed fur, but of the same tint. The adult September specimens are darker, the sides being of a darker gray, the ventral surface deep pure gray with a whitish wash, and the back dark rufous or chestnut. Young specimens about two thirds grown, partly in the soft woolly pelage of the young, have the sides and lower surface practically as in September adults, but the back in one specimen (the youngest) is only slightly suffused with rufous, restricted to the median region; in others, somewhat older, the rufous is stronger and suffuses a broader area.

The external measurements of 10 adults are as follows: Total length, 128 (120–140) mm.; tail, 29 (24–33); hind foot, 19 (18–20). Six adult skulls measure as follows: Total length, 23.6 (22.5–25) mm.; basal length, 20.5 (19–22); zygomatic breadth, 13 (12–13.8); nasals, 6.2 (5.7–6.5).

[The name *kamtschaticus* (*Arvicola rufocanus* var. *kamtschaticus* Lataste, 1884) cannot be used in this connection, owing to the previous *Arvicola kamtschaticus* of Polyakoff (1881). It may therefore be called *Evotomys latastei*, after the author who first recognized the form.

13. **Evotomys wosnessenskii** (*Polyakoff*).

WOSNESSENSKI RED-BACKED MOUSE.

Arvicola wosnessenskii POLYAKOFF, Zapiski Imp. Acad. Sci. St. Pétersb. XXXIX., No. 2, 1881, 56.

Evotomys wosnessenskii MILLER, Proc. Acad. Nat. Sci. Phila. 1898, 361. Description, synonymy, etc.; Bering Island and Petropaulski, Kam.

This species is represented by 83 specimens (including six in alcohol), all taken at Gichiga, as follows: April 10–13, 2; June 29, 1 (juv.); July 26–29, 4 (2 juv.); Sept. 24 and 30, 2; Oct. 2–27, 49; Nov. 1–11, 15; Dec. 15 and 20, 2. All but twelve are adult and are exceedingly uniform in coloration. The two April specimens and the two December specimens have the red of the back a little lighter or paler than the September-October series, with the pelage longer and fuller, and the tail more heavily clothed. The young specimens (half to three fourths grown) are duller colored, with the soft woolly pelage of immaturity, and the red of the back not fully developed. Two nursing young, in very short close pelage, have the dorsal area orange rufous, the sides orange, and the ventral surface yellow in one specimen and white in the other, in which latter also the sides are somewhat paler. This coloration cannot be considered as due to the effect of formalin or alcohol, as the adults preserved with them, when removed from the preserving fluid and dried, do not differ from the skins.

In adult autumn specimens the back is rich chestnut rufous varied with black-tipped hairs; sides yellowish buff; ventral surface clear dull white, the plumbeous underfur imparting a grayish cast. About one specimen in ten has the ventral surface faintly washed with buff, strongest posteriorly.

This series does not differ appreciably in coloration or cranial characters from specimens in the U. S. National

Museum from Bering Island and Petropaulski, Kamchatka. The latter measure slightly larger in total length (collector's measurements from the fresh specimens), with shorter tail and slightly smaller hind foot, but the discrepancy may be due to different methods of measuring.

Measurements.— Ten adult males and ten adult females measure as follows: *Males:* Total length, 128.8 (121–137) mm.; tail vertebræ, 29.6 (26–34); hind foot, 18.8 (17–22). *Females:* Total length, 130.4 (120–136); tail vertebræ, 30.1 (26–32); hind foot, 18.3 (18–19). Eight adult Bering Island and Petropaulski specimens (collected and measured by Dr. L. Stejneger) measure: Total length, 137 (134–143); tail vertebræ, 27.5 (23–35); hind foot, 17 (16–17.5).

The hairiness of the tail varies greatly with the season and individually, in some specimens the tail being thinly haired and lightly pencilled; in others, taken at nearly the same time, the tail is very thickly haired and has a heavy pencil.

Mr. Buxton apparently did not recognize that there were two species of Red-backed Mice in his collection. His field notes, covering both *E. wosnessenskii* and *E. latastei*, are as follows:

"Russian name, *Mysh.* This is undoubtedly the most abundant mammal found in the territory I visited, although the series in the collection is the result of one year's continuous trapping for them. At Gichiga they are found everywhere on the tundra except in the more barren places where nothing but moss and lichens grow. In places where there is a growth of grass and flowers or low shrubs, and along streams and in timbered places, they are most abundant. They are also common about houses. When I took up quarters in my cabin many were living there, which I soon caught; and at that time there were a great many open containers of hardbread, peas, beans, and cracked buckwheat. Later in the year I found a number of collections of these things about the house which they had made. In one old boot was more than one quart of hardtack crumbs, buckwheat, rice, and peas. At Kooshka there are three government storehouses standing in a row. The two end ones are 100 yards apart. In one end house are kept rice, flour, and buckwheat, and in the other

metal goods and manufactured wares. In this latter house the storekeeper often finds large accumulations of rice and buckwheat which have been brought by the mice from the other magazine more than three hundred feet away. In the houses they are active during the entire year, and I think young are born in every month, but on the tundra they are inactive during the winter; I caught the most there during August and September, and very few during the summer. In the moist places where the fine grass grows, grass cuttings and droppings are plentiful, but baited traps set there caught very few of them. I caught several in my cabin with their cheeks filled with rice." — N. G. B.

14. **Evotomys jochelsoni,** sp. nov.

KOLYMA RED-BACKED MOUSE.

Type, No. 19538, ♀ ad., Verkhne Kolimsk, Kolyma River, February, 1902; W. Jochelson, Jesup North Pacific Expedition.

Based on two adult specimens preserved in spirits, collected by Mr. Jochelson as above. Dorsal area, from front of crown to tail, bright rufous, with a slight intermixture of black-tipped hairs, the pelage being dark plumbeous for the basal two thirds, then banded with ochraceous and broadly tipped with rufous; sides ochraceous, including the front and sides of the head; ventral surface bright buff; tail above dusky, sides and below bright buff, heavily clothed; ears tipped with rusty internally.

Measurements.— Type: Total length, 107 mm.; head and body, 85; tail vertebræ, 22; hind foot, 17. The other specimen has a defective tail (probably due to injury in life), measuring as follows: Head and body, 80; tail, 13; hind foot, 17. *Skull*, total length, 22; mastoid breadth, 11; length of nasals, 6.3.

This species differs from *Evotomys wosnessenskii* and *E. rutilus* through the much lighter red of the dorsal area, the strongly ochraceous sides, and the buffy underparts. It is also smaller. It differs so radically in coloration from the *Craseomys* group (*E. rufocanus* and *E. latastei*) that no comparison with these forms is necessary.

15. **Microtus kamtschaticus** (*Polyakoff*).[1]

KAMCHATKA VOLE.

Arvicola kamtschaticus POLYAKOFF, Zapiski Imp. Acad. Sci. St. Pétersb. XXXIX., No. 2, 1881, 43, fig. 4, dentition. Kamchatka.

Microtus kamtschaticus MILLER, Proc. Biol. Soc. Wash. XIII., 1899, 11 (in text).

Represented by 33 specimens, of which 12 were collected at Marcova, March 7–20, and 21 at Gichiga, the latter as follows: Jan. 12, 1; July 28, 1; Aug. 1–3 and 29–31, 5; Sept. 1 and 24, 2; Oct. 1–4, 12. One of the specimens is very old, 9 are fully adult, and 8 are young adults, the rest being immature, of various ages, from nurslings to specimens one half to two thirds grown. The January specimen is only about half grown, the March series contains two less than half grown, some of the July specimens are quite young, and the October series includes nursing young, half grown, and adults; hence, apparently, young are reared at all seasons of the year.

The March series of adults are in full soft winter pelage, with heavily furred tails, and the dorsal pelage about 20 mm. long. They differ greatly in respect to pelage from the July, September, and October adults, in which the coat is quite short and the tail thinly haired. They are also darker and browner. There is, however, much individual variation in color, and in the length of the tail, in specimens taken practically at the same date, there being a tendency to a yellowish brown phase and to a reddish brown phase, with many intermediates. The March adults are strong buffy brown above varied strongly with black-tipped hairs, the general color ranging in tone from yellowish brown to slightly rufescent brown; lower parts clear grayish white, the plumbeous underfur tinging the otherwise nearly clear white superficial tint. The tail is sharply bicolor, the lower surface being white and the upper surface blackish mixed slightly with gray-tipped hairs; feet dull grayish white.

In September specimens the dorsal pelage is only about

[1] Poliakoff appears to attribute the name *kamtschatica* to Pallas, citing a "*Mus œconomicus*, var. *kamtschatica* Pallas, Novæ spec. Quadrp. e Gliri Ord. p. 233." But Pallas did not use the name in a nomenclatorial sense, but in a descriptive or geographical sense. He says: "Varietas Kamtschatica muris œconomi, cujus exuvias habeo," etc. The name should therefore date from Polyakoff, 1881.

12–15 mm. long, and of a deeper, more reddish brown, varied with black, giving a much darker general effect. The ventral surface is whitish gray with a very slight wash of buff. The color of the young in the woolly immature coat is in general similar to that of fall adults, but of a duller tint above and more plumbeous below.

Three additional specimens, taken at Indian Point, Siberia, by Mr. Bogoras, seem not in any way distinguishable from the Gichiga and Marcova specimens collected by Mr. Buxton.

The following table gives the external measurements of 18 specimens, taken by Mr. Buxton from the fresh specimens, arranged in the order of size, with which are included the two principal measurements of the skull, when the skull is not too much broken to be available. The specimens range in age from young adults to very old, some of the last six being still partly in immature pelage.

MEASUREMENTS OF *Microtus kamtschaticus.*

Mus. No.	Locality.	Date.	Sex.	Total Length.	Tail Vertebræ.	Hind Foot.	Total Length of Skull.	Zygomatic Breadth.
18580	Marcova	March 20, 1901	♀	190	48	20	28.5	—
18594	Gichiga	Sept. 1, 1900	♀	185	50	21	—	—
18610	"	Aug. 16, 1901	♀	180	46	22	28	15
18581	Marcova	March 20, 1901	♂	175	45	23	29	—
18588	Gichiga	Aug. 3, 1901	♂	175	44	19	27	15.4
18586	"	" 2, "	♀	172	46	20	25	16
18578	"	Oct. 3, 1900	♂	170	45	22	—	15
18600	"	" 4, "	♂	166	50	21	—	—
18585	"	July 28, 1901	♂	166	41	21	27	15
16001	"	Oct. 4, 1900	♂	160	44	21	—	—
16587	"	Aug. 1, 1901	♀	156	41	19	—	14
16576	"	Sept. 2, 1900	♂	146	36	21	25.3	14
16577	"	Oct. 3, "	♀	144	36	22	25.5	14
16582	Marcova	March 20, 1901	♂	144	33	21	25.6	14.6
16583	"	" " "	♂	138	36	21	—	—
16579	"	" 7, "	♂	137	29	22	26.5	14.5
16593	Gichiga	Aug. 31, 1900	♂	136	35	22	25	14
16584	Marcova	March 20, 1901	♂	134	32	21	24	13

The above-described specimens of *Microtus* from Gichiga and Marcova have been compared with a series from Kamchatka identified by Mr. Gerrit S. Miller as *M. kamtschaticus*, and do not appear to either Mr. Miller or myself to differ from them.

"Russian local name, *Mysh.* This species is not as common as the Red-backed Mouse and is more partial to the houses. The majority of the specimens in the collection were taken about cabins. The others were taken in the same place as the Red-backed Mice. It is also active about the houses during the winter, but continuous trapping on the tundra during the winter revealed none there. It is possible that the grass cuttings and droppings in grassy places are done by this species. They also accumulate large stores of provision, and their habits and distribution, so far as I observed, are practically the same as those of the Red-backed."—N. G. B.

16. **Dicrostonyx torquatus** (*Pallas*).

PIED LEMMING.

A single specimen of *Dicrostonyx* was collected by Mr. Buxton near Gichiga, June 23, 1901. It closely resembles in coloration June specimens of *D. nelsoni* Merriam from Point Barrow, Alaska. The skull is broken, only the lower jaw and rostral portion being present. In the absence of specimens of *D. torquatus* for comparison, it is provisionally referred to that species. Mr. Buxton refers to this specimen in his field notes which here follow, and to which he has added some very interesting and hitherto unpublished notes on the two species of Lemming observed by him at Point Barrow, Alaska.

"No. 840, male, 6-23-'01. This specimen was brought to me by a Tungus who caught it near their summer encampment at Chevitka, 10 miles down the mainland coast from Kooshka. He said that this was the only one that he had ever seen there, but far inland they were common. I showed it to the captain of the Cossacks, S. I. Pahderin, a man 54 years of age who had lived here all his life, and he said that during April and May, 1900, there were hundreds of them on the tundra about Gichiga. The dogs hunted them day and night at that time and required no other food. The people here had never seen one previous to that time and were greatly puzzled to know from where they had come and whither they had gone. They have no distinct name for it

and simply call it 'mysh' or mouse. The commanding officer, Ankoodeenoff, also said that he caught two of them in his house in the spring of 1900. I saw the track of one on the snow in February, 1901. Their tracks are very easily distinguished from those of the mice, or even from those of *Lemmus*, as the long, stiff hairs protruding beyond the toes of *Dicrostonyx* drag on the snow and make a very characteristic track.

"Concerning specimens of *Lemmus trimucronatus* and *Dicrostonyx hudsonius alascensis* Stone [= *D. nelsoni* Merriam, of 10 days' earlier date], taken by the McIlhenny Expedition to Point Barrow, Alaska, 1897–98: As far as I observed, the habits of these two species of lemmings are the same. During the summer they are seldom seen, and then only while running from one burrow to another, as at that time their runways are under the moss which covers the tundra everywhere. In winter, when the moss freezes, they run tunnels in all directions on the tundra just under the snow and up to the surface of the snow. After a high wind many may be seen running about on top of the snow, apparently lost or unable to regain their burrows. This gives rise to the superstition, which is current among the coast Eskimos from the mouth of the Mackenzie River to the Yukon, that the white ones are sent whirling down with the snow from the sky by Puk-ai-mu-ña as his messengers, and that when they have accomplished their mission they disappear. They call them Kĭl-ĭ-mai-u-tah, and are adverse to killing them. The Norwegians also have a similar superstition concerning this species in winter dress.

"In summer their nests, runways, and droppings are encountered everywhere on the tundra, especially on the higher, black hummocks and along low banks which border the lagoons. In winter and spring they are often found far out on the sea ice, sometimes two or three miles from shore. The statements made by other writers concerning their comparative scarcity and abundance in different years is verified by the natives and whites here. The young, at least of *Lemmus hudsonius alascensis*, are born every month in the year. Six is the usual number brought forth at a time. Their food consists of grass and weed seeds and bulbous roots.

"Mr. Brower, who had been at Point Barrow 10 years as a trader, had never seen a *Dicrostonyx* until we showed him one, although he had observed many *Lemmus* and one large migration in 1888. Our series of the former contained 48 specimens, all that we could obtain, while that of the latter contained 606, and we could have taken many times that number had we cared to do so.

"During May when the snow was melting, leaving only patches scattered over the tundra, one could see hundreds of them in a day's walk on the tundra. At that time the moss is still frozen so they cannot burrow in it. On one day at this time our Japanese cook killed 105 in one day. On June 21, 1898, I counted over 100 in a fox burrow. On June 7, 1898, found five *Lemmus* and two *Dicrostonyx* in a nest of the Snowy Owl, both of the latter still white enough to be very conspicuous against the black tundra.

"Considering that these two lemmings have about the same habits and the same environment it would be interesting to know why the one that changes to white during the winter and has horny pads on his fore feet, and is apparently better fitted in every way to elude his enemies and obtain food, is so much rarer than the other form which is not so well equipped." — N. G. B.

17. **Lemmus obensis chrysogaster,** subsp. nov.

GOLDEN LEMMING.

Myodes schisticolor MIDDENDORFF (not of Liljeborg), Sibirische Reise, Säugethiere, 1853, 108. "Westküste des Ochotskischen Meeres (Ajan)."

Type, No. 18762, juv., Gichiga, west coast of Okhotsk Sea, July, 1901; N. G. Buxton, Jesup North Pacific Expedition.

Two specimens, a skin and skull, and a specimen in spirits, taken by Mr. Buxton at Gichiga, July 26, 1901.

The spirit specimen (type), dried out to show its coloration, is yellowish brown above varied with black, more grayish brown and less yellowish on the head and neck, the fulvous tint gradually increasing in brightness and amount from the shoulders posteriorly, becoming strong yellowish rufous on the lower back and rump; sides and ventral surface orange ochraceous, paler on the throat and at the base of the tail; chin and sides of mouth soiled buffy white; top of nose pale

dusky brown, passing posteriorly into the dull yellowish gray-brown of the upper surface of the head; feet dusky grayish brown; claws dusky horn color; ears very small, orbicular, wholly concealed in the fur; tail very short, the upper surface dusky, the lower surface and a long pencil grayish white. Incisors pale yellow.

Measurements.— Total length, 97 mm.; head and body, 78; tail vertebræ, 10; tail to end of pencil, 20; ear from crown, 4; hind foot without claws, 14; with claws, 17; claws of fore foot, 6.

Skull.— Total length, 25; basal length, 22; length of nasals, 6; length of palate, 13.5; zygomatic breadth, 16.5; mastoid breadth, 13; interorbital constriction, 4; upper toothrow, 7.

The skin belongs to a young adult, which differs from the spirit specimen in being much darker and less ochraceous; dorsal surface dusky brown, almost blackish over the whole middle region of the back, with a very short tipping of pale rusty on some of the hairs, imparting a faint rusty general tint; sides ochraceous; ventral surface rusty buff, palest on the throat.

This species differs from *Lemmus obensis* (Pallas), as described in great detail by Middendorff (Sibir. Reise, Säuget., pp. 99–108, pll. VIII–X) from a large series collected on the Taimyr River, in the much richer, brighter orange color of the sides and upper parts, and the orange ochraceous instead of whitish ventral surface. It agrees more closely in coloration with Point Barrow specimens of *Lemmus alascensis* Merriam, but the under parts are brighter, and it is very much smaller. The two skulls, both quite young, show no distinctive cranial differences.

This is doubtless the *Myodes schisticolor* Middendorff, but not the *M. schisticolor* of Liljeborg. Middendorff's specimen was a skin and skull brought by Wosnessenski from Ajan (or Ayan), on the west coast of Okhotsk Sea, about 600 miles south of Gichiga.

18. **Ochotona kolymensis,** sp. nov.

KOLYMA PIKA.

Type, No. 19535, ♂ ad., Verkhne Kolimsk, Kolyma River, Yakutsk, Siberia, December, 1901; Waldemar Jochelson, Jesup North Pacific Expedition.

Based on two specimens in alcohol, collected as above. Pelage very soft and thick. Above pale yellowish brown, strongly varied with black over the median area, less black and more strongly yellowish on

the sides; the hairs individually plumbeous for their basal three fourths, then abruptly pale fulvous and tipped with black; head less fulvous and more grayish; ventral surface soiled yellowish white, strongest over the pectoral region, the plumbeous underfur well concealed by the light tipping of the hairs; feet soiled grayish white with a faint buffy tinge above, dull brownish gray beneath; ears with a narrow pale rim, the long hairs within pale buffy gray, the short hairs clothing the outer surface dusky plumbeous; nose and upper lip dusky brownish, sides of nose lighter, buffy gray.

Measurements. — Head, 43 mm.; body, 110; total length (approximate), 153; hind foot, 24; ear from crown, 12. (Correct measurement of the length in a straight line is difficult owing to the rigidity of the specimens and their bent positions.)

Skull.— Total length, 37 mm.; basal length, 29; zygomatic breadth, 14; mastoid breadth, 19; length of palatal floor, 3; length of nasals, 10.8; upper toothrow, 7.

This species appears to differ strongly from *O. littoralis* (Peters), from the eastern end of the Chukche Peninsula, in general coloration, and especially in the absence of all trace of ferrugineous on the sides of the neck and throat, and it is also larger. It differs from *O. hyperboreus* (Pallas), also from the Chukche Peninsula, in its somewhat larger size and in having the upper parts pale yellowish brown instead of ferrugineous. It appears to have no very close relationship with *O. alpinus* (Pallas), from the Altai Mountains, differing from it in coloration and smaller size.

19. **Lepus gichiganus,** sp. nov.

GICHIGA HARE.

Type, No. 18286, ♂ ad., Gichiga, west coast of Okhotsk Sea, Jan. 11, 1901; N. G. Buxton, Jesup North Pacific Expedition.

Winter pelage, pure white, generally to the extreme base of the underfur; in some specimens the extreme base is pale gray. Ears narrowly tipped with black.

Summer pelage, head and back gray-brown tinged with yellowish brown; sides, lower back, rump, and thighs clear dark gray; ears tipped with dark yellowish brown.

Measurements.— Total length (type), 584 mm.; tail vertebræ, 75; hind foot, 173; ear from notch (in dry skin), 78. *Skull*, total length, 93; basal length (Hensel), 74; postpalatal length, 55; greatest zygomatic breadth, 49; mastoid breadth, 33; postorbital constriction, 19; length of nasals, 38; breadth of nasals at base, 21; length of upper

toothrow (on alveolar line), 17; length of lower jaw, 67; height of lower jaw, 46.

Young female, about one third grown.— General color above grayish brown with a faint fulvous tinge; the abundant woolly underfur is pale plumbeous at base, with the apical third pale rusty fulvous; the longer overhair is dusky, broadly ringed subapically with white, and ending in a fine blackish tip; ventral surface clothed, from the upper breast posteriorly, with very soft, thick, fine woolly fur, which over the whole pectoral region is pure white to the base, but along the sides and posteriorly is at the base pale plumbeous; a broad prepectoral band dusky grayish brown; chin and throat plumbeous with the fur broadly tipped with white, giving a grayish white superficial tint; sides of the nose and edge of upper lip pale rusty buff; tip of nose dusky, followed as far back as the eyes by a broad facial band of gray; top of head like the back but rather darker; sides of head from nose to base of ears pale grayish rusty buff; ears internally blackish brown washed with pale rust, becoming more fulvous at the tips, which are edged with black; outer border of ears edged with white for the basal three fourths, the white diminishing in amount from the base apically; posterior surface of ears broadly whitish on the outer half, passing into buffy gray on the inner half with the dusky base of the hairs showing more or less at the surface; tail above gray mixed with blackish, under surface of tail light gray; upper surface of fore feet pale yellowish brown, the under surface whitish, adventitiously stained yellowish; hind feet white externally, yellowish brown on the inner edge and on the toes; soles clothed with dusky hairs, the toes yellowish.

An adult female, taken May 28, is still partly in winter dress, but on the head and back the summer pelage is well developed, though thinly veiled in places by the left-over white hairs of the winter coat, while the nape, shoulders, sides, and whole ventral surface are still heavily covered with the winter coat. The general color of the new, short, summer coat is dark grayish brown suffused rather strongly with buffy yellow. The sparse underfur is pale buffy gray; the longer hairs are broadly banded near the tip with dark brown and tipped with yellowish. The upper surface of the head is rather more yellowish than the back, and the sides are darker, more grayish brown and less yellowish than the back, while the lower back and rump are dark gray. The ears are still mostly white, but the tips have changed from black to dull yellowish brown. The tail is still wholly white, and the feet have undergone little change from the winter dress.

A male taken October 1 has nearly completed the change to winter dress. The top of the head and the back show traces of the summer coat, there being a strong mixture of yellowish brown and black-tipped hairs on the crown, and a slight sprinkling of similar hairs over the middle region of the back.

In full winter dress the pelage is very thick and soft and, including the underfur, pure white to the base, except the ears, which are very narrowly tipped with black.

This southern form of the Siberian Arctic Hare is represented by 24 skins and skulls, 2 additional skins, 2 skeletons, and 14 additional skulls, taken in the vicinity of Gichiga by Mr. Buxton. They are all in white winter pelage except three, and were collected as follows: Oct. 1, 1; Nov. 5 and 6, 2; Jan. 11, 7; Feb. 1, 12; Feb. 15, 12 (skulls only); July 27, 1 (young).

The weight of three specimens, as recorded by Mr. Buxton, is, respectively, 7½, 8, and 8¼ pounds. Whether these were of average size or exceptionally large is not stated.

The table on page 158 gives the external measurements of 20 adult males and 17 adult females, taken by Mr. Buxton from the fresh specimens, and also the two principal measurements of the skull. The range of variation is not very large, and is due in part to immaturity, the smaller specimens being shown by the skull to be the younger members of the series. The females average slightly smaller than the males, except in respect to the length of the tail which, as often happens in other species, is longer in the females than in the males.

It is probable that the Arctic Hares of Europe and Asia are all referable as subspecies to *Lepus timidus* Linn., but in the absence of material for their investigation the Siberian forms are treated under binomial names. *Lepus canescens* of Nillson, from southern Scandinavia, is said to have a similar representative in the Stanovoi Mountains of southeastern Siberia, and indeed by some writers, as Middendorff and Radde, they have been considered as indistinguishable. It seems, however, probable that very appreciable differences would be found on comparison of adequate material from the two reigons. Nordquist has considered the Northeast Siberian form as a variety of *L. timidus*, for which he has proposed the name *Lepus timidus* var. *tschuktschorum* (Vega-Exped. Vetensk. Iakt., II, 1883, pp. 84–90). The form here described differs from the latter in considerably smaller size, less massive skull, much lighter dentition, and apparently a more

tawny summer pelage. The cranial differences and the difference in size are shown by the single specimen from Chaplin Point, extreme northeastern Siberia, described below.

MEASUREMENTS OF *Lepus gichiganus.*

Mus. No.	Sex.	External Measurements.			Skull.	
		Total Length.	Tail Vertebræ.	Hind Foot.	Total Length.	Greatest Zygomatic Breadth.
18279	♂	595	54	170	—	—
18280	♂	600	86	159	42.5	49
18282	♂	570	61	156	94	48
18285	♂	555	50	166	91	47.5
18286	♂	584	75	173	93	49
18289	♂	582	60	159	91	49
18290	♂	593	76	166	95	49
18291	♂	624	77	167	—	—
18292	♂	597	80	162	93	48
18293	♂	565	75	170	93	48.3
18294	♂	583	74	162	95	50
18296	♂	594	79	165	99	42
18298	♂	562	76	163	95	50
18299	♂	565	81	164	97	50
18303	♂	552	74	159	—	—
18307	♂	576	81	159	90	46
18308	♂	580	70	163	93	48
18309	♂	620	76	167	98.5	48
18312	♂	590	74	173	92	48
18314	♂	558	74	160	92	48.3
18281	♂	585	76	167	91	47
18283	♀	563	61	156	91	45.3
18284	♀	562	61	146	88	45
18287	♀	552	73	160	91	48
18288	♀	558	69	155	90	47
18295	♀	588	85	165	94	49.7
18297	♀	562	76	159	91	47
18300	♀	563	82	168	90	49
18301	♀	590	80	167	92	49
18304	♀	560	80	169	—	—
18305	♀	575	71	160	90	47
18306	♀	573	79	164	—	—
18310	♀	570	68	160	88.5	47.5
18311	♀	568	81	162	95	48
18313	♀	550	69	156	—	—
18315	♀	555	75	166	91	46.5
18316	♀	575	77	168	92	47
Average of 20 adult males		582	66.6	164	94	48.7
Average of 17 adult females		577	74	162	91	46

"Russian name, *Zaisch;* Siberian name, *Oo-skon.* An abundant resident in suitable localities at all places that I visited in Northeast Siberia. I saw it at Okhotsk, Ola, Gichiga, and Marcova. Mr. Jochelson says that it is abundant along the Kolyma River and its tributaries, and that a few [*Lepus tschuktschorum*] were found near the New Marine Post at the mouth of the Anadyr. Along all the streams, and wherever there was a growth of trees or bushes between Gichiga and Marcova, I saw evidences of them. In many of these places the snow was simply packed down by their feet and littered with their droppings. They are especially fond of the bark of the young willows, and I have seen sprouts entirely stripped of the bark for a distance of three feet above the snow, and others over two inches in diameter entirely gnawed in two. They are never seen during the day unless startled from their burrows in the snow-drifts or under fallen trees, but they are very active at night, especially clear ones. They seldom stray far from their feeding-grounds and are never seen on the open tundra. The Russians catch them during the winter in deadfalls and use the meat for food and the skins for bedclothing. Every family has a number of bed blankets made from their skins, and they are very warm and serviceable. A skin has a local value of about 5 cents." — N. G. B.

20. **Lepus tschuktschorum** (*Nordquist*).

CHUKCHE HARE.

One specimen, in full winter pelage, obtained at Chaplin Point (Indian Point of Americans), extreme northeastern Siberia, by Mr. W. Bogoras, the date being "Fall, 1901." No measurements were taken from the fresh specimen, but such measurements as can be obtained from the skin show it to be larger than the average size of *L. gichiganus*, slightly exceeding even the largest specimens of that form. Thus, the ear from the crown measures 13 mm. longer than the average length in *gichiganus* and 8 mm. more than the largest; while the hind foot (measured in the dry skin in each case) is 10 mm.

longer than the average in *gichiganus* and slightly exceeds the largest. The skull is much more massive, though only slightly exceeding in dimensions the largest skulls of *gichiganus;* the incisors are broader and thicker and the molars broader and heavier, as are also the zygomatic arches. The lower jaw is also broader and heavier.

21. **Erignathus barbatus** (*Fabricius*).

BEARDED SEAL.

This species is represented by four adult specimens (skins with skulls) collected by Mr. Buxton at Gichiga, Sept. 4, 1901, and two young adults collected by Mr. Bogoras at the mouth of the Anadyr. They do not differ appreciably from Greenland specimens, either in size or other features. Three of the four specimens are females and the other is a male. The male skull has a basal length of 213 mm. and a zygomatic breadth of 122; two of the female skulls (one is much broken) measure, respectively, 205 x 125 and 220 x 137 mm.

The external measurements of three of the specimens, taken in the flesh by Mr. Buxton, are as follows:

	No. 18166 ♂	No. 18164 ♀	No. 18165 ♀
Length	2300	2095	2600
Girth	1375	1410	1655
" of head	600	605	620
Distance between the eyes.	90	75	90
Tail	215	215	275
Hind foot	350	390	420

"Local name, *Nerpah;* also sometimes called *Locktock,* which is the name generally applied to it in Kamchatka. Also usually called Locktock at Marcova. A common winter resident in Okhotsk Sea and along the eastern coast of Siberia from Petropavlovsk to East Cape, and probably along the whole northern coast. Mr. Jochelson has seen it at the mouth of Kolyma River in summer. At Gichiga it is quite common, especially during July, August, and September, but does not ascend the rivers until after the 1st of August, and then only in small numbers. Mr. Sokolnikoff has observed it

during August in the Anadyr River, more than 400 versts above its mouth. All the specimens that I saw at Gichiga were much lighter in color than Point Barrow, Alaska, specimens, and not so uniformly colored. At Gichiga a skin is valued at five roubles." — N. G. B.

22. **Histriophoca fasciata** (*Zimmermann*).

RIBBON SEAL.

Represented by a flat skin obtained by Dr. Berthold Laufer on the Lower Amoor River.

"Local name, *Kre-lat-ah* and *Mandar-ka*. Although this seal does not occur at Gichiga, the people there are well acquainted with it and many possess travelling bags made from their skins, which have been obtained from Oliutorski and Baronesskorf Gulfs, where they are common. Mr. Jochelson said that the Koryaks living along Penginski Gulf have taken an occasional one there, but I consider it very doubtful. Mr. Sokolnikoff says that they are common far out in Anadyr Gulf, but never come close in to shore or ascend the Anadyr River." — N. G. B.

23. **Phoca (Pusa) hispida gichigensis** Allen.

OKHOTSK RINGED SEAL.

Two skins and skulls of young females (see this Bulletin, XVI, 1903, pp. 478–480). Mr. Buxton's notes respecting this species are as follows:

"Local name, *Ak'-ee-pah*. A small seal, of which I saw very few. After the ice began to form in the river about the first of October, and was daily crushed up by the tide, I saw a few of this species swimming in the ice-gorged river opposite my station, and during the summer I saw a few off Matuga Island. The people say they do not come into the rivers until the ice begins to form. In February, 1901, I saw one in a Koryak lager at Shestacova, that had just been killed.

"Mr. Sokolnikoff has seen this species in the Anadyr River, 25 versts below Marcova, in summer. Their skins are in but little demand, as those of the other two species are much better and larger." — N. G. B.

24. **Phoca ochotensis** *Pallas.*

OKHOTSK SEAL.

Five specimens (skins and skulls), collected by Mr. Buxton on the Taiganose Peninsula, 20 miles south of the mouth of the Gichiga River. These are therefore topotypes of Pallas's *Phoca ochotensis*, his description of which is sufficiently explicit to render its application to the present species satisfactorily evident, as elsewhere explained (*cf.* this Bulletin, XVI, 1902, pp. 480–482). A skeleton collected by Dr. Laufer at the mouth of the Amoor River is also referred to the present species.

"Local name at Gichiga, *Ola;* at Okhotsk, Ayan, Pengina, and Marcova, *Largha.* This is by far the most abundant species of the hair seals found in the Okhotsk Sea. I saw them at Udskoi Bay, about the Shantar Islands, at Ayan, Okhotsk, Ola, Gichiga, and at Shestacova on Penginski Gulf. It, together with the other two species occurring at Gichiga, is a resident in the Gichiginski Gulf. As soon as the rivers flowing into the head of this gulf free themselves from ice, about the first of June, the Larghas ascend them at high tide as far as slack water, some four or five miles above their mouths, and again go out with the tide. They do not become common in the rivers until the first of July, when the salmon begin to run in considerable numbers, and do not reach their maximum of abundance until two or three weeks later, when the salmon have become abundant. At this time hundreds of them come in with the tide, especially when there is one per day and that occurring after midnight. At that time many go far up the river, while hundreds of them remain near its mouth, where they catch fish and 'haul out' on the low banks and islands at that point, when their snorting and growling can be heard far up the river. It is possible to shoot many of them in the river, but very few can be secured there, as they sink immediately and the strong current carries them out to sea. At high tide off the river's mouth one can see vast numbers of them catching fish. Dozens of them stick their heads out of the water, some with fish in their

mouths, within a stone's throw of your boat, and gaze in mild-eyed astonishment at you for a few seconds, give a snort, and disappear. Salmon can be seen jumping clear out of the water in all directions in their efforts to escape the seals. The Koryaks and Tunguses pitch their tents during July and August along the head of the Gichiginski Gulf at places where streams flow in and get many of these and of the Bearded Seal by shooting them from bidarkas and spearing them with retrieving harpoons along the rocky headlands.

"Catherine Gulf, 40 miles southwest from Gichiga on the mainland coast, is a long tongue-like indentation in the precipitous coast-line, 200 yards wide and a mile long. At low tide the water in it is quite shallow, and many rocks on its bottom and along its side are exposed. On the morning of August 11, 1901, I came suddenly on this little gulf while down the coast goose shooting, and every one of the hundreds of available rocks in it was occupied by seals — mostly this species and a few Bearded Seals — basking in the bright sunlight. At the report of my gun they all slid into the water and started for the open sea.

"Hair seals are much more abundant in the Okhotsk Sea than they are at any point along the Alaskan coast. They form a considerable part of the food of all the people, natives and Russians, living near the Okhotsk Sea, as they do of all the people inhabiting the high north. The skins of this species have a commercial value of one rouble each at Gichiga, and are used for boots, lines, and dog harness.

"Mr. Sokolnikoff assured me that in summer it ascended the Anadyr River nearly to Marcova."[1] — N. G. B.

25. **Ursus beringianus** (*Middendorff*).

KAMCHATKA BEAR.

The collection contains five more or less imperfect flat skins of bears, only one of which has a skull. They probably all belong to one species, the variation in size and color being

[1] This statement refers to the subspecies *Phoca ochotensis macrodens* Allen. See this Bulletin, XVI, 1902, pp. 483–485.

probably due to sex and age, three of the specimens being young.

The best specimen is No. 18275, male, represented by a nearly perfect skin and skull. It was killed on Baronesskorf Gulf (Olutorski Bay of some maps), and purchased of the natives by Mr. Bogoras. This specimen is referred to Middendorff's *Ursus arctus* var. *beringiana*. The specimen he describes and figures under this name, he informs us, came from Great Schantar Island, which is situated in the western arm of the Okhotsk Sea (Uda or Udski Bay), so that this island may be taken as the type locality of the species. Another specimen is figured and described from "Uda-Bucht," at the mouth of which is situated Great Schantar Island. The locality of the present specimen is on the east coast of Siberia, nearly opposite the head of Okhotsk Sea.

The specimen is obviously in full winter pelage and is a beautiful skin. The general color is very dark reddish brown, darker, or blackish brown, on the limbs. The hairs on the back are tipped with lighter, the light tipping increasing rapidly in length from the middle of the back anteriorly, and becoming lighter in color, so that over the shoulders the prevailing color is yellowish brown, passing on the nape and crown into pale golden fulvous. The front of the head, from the forehead anteriorly, is dark brown with a tinge of fulvous, particularly on the sides of the nose anterior to the eyes. The claws are strong and curved, those on the hind feet much worn. The longest front claws have a length of 70 mm. along the convexity, and 45 along the arc; the longest hind claw measures 40 mm. over the convexity and 17 along the arc. The length of the flat skin is 1975 mm.; the expanse from tip to tip of the extended fore limbs, 2271 mm.

The skull indicates a middle-aged animal, the sutures being still quite distinct and the teeth almost wholly unworn. Its striking features are the great breadth of the frontal region, the swollen postorbital processes, and the deep median hollow between them. Compared with skulls of *Ursus middendorffi* Merriam, from Kadiak Island, of corresponding age and sex, the breadth of the skull is much greater in proportion to its

length, the anterior narial opening is much shorter, and the molars differ in relative size and form. It much more resembles in general contour and proportions the skull of the Barren Ground Bear (*Ursus richardsoni*), as perhaps should be expected. The present skull measures: Total length, 390 mm.; basal length, 355; zygomatic breadth, 235; interorbital breadth, 105; breadth at postorbital processes, 141. These measurements are much less than those given by Middendorff of a very old skull from Great Schantar Island, and slightly less than those of his 'middle-aged' skull from Uda-Bucht.

A second flat skin, No. 18176, without skull or data, is similar to No. 18175, except that it is rather smaller and less dark, with a distinct shade of gray over the posterior half of the back, and the shoulders, nape, and top of the head are paler fulvous. Two much smaller skins, evidently of quite young animals, are very dark brown, like the adult male first described, with the light tips of the hairs of the posterior back gray, and of the front part of the dorsal region and head yellowish gray, but very much less fulvous than in the adult. One of these specimens (obtained by Mr. Bogoras at Marcova) has a broad transverse band of white across the hind neck, and a small white spot on the middle of the belly, due apparently to albinism.

A third small flat skin, probably young of the year, labelled as from Marcova, without a skull, is widely different in coloration from any of those above described. The ears, limbs, sides, and ventral surface are dark brown, tinged slightly with gray; the dorsal region is gray, becoming brighter anteriorly, the nape being pale fulvous, and the crown and cheeks pale golden fulvous. This could well be called a 'yellow' bear. Mr. A. J. Stone suggests to me that its light color indicates that it is a female, as he has found that the female of the great Alaska Bear differs from the male, just as this specimen differs from the other specimens of this series.

"Russian name, *Měd-véhd*. Bears are undoubtedly very common in the country around the head of Okhotsk Sea, as well as in the Anadyr and Kolyma River territories, along

the western seacoasts, and in Kamchatka, for all of the people in these districts tell of their great number, although one sees comparatively few skins. Notwithstanding the high prices that I offered for specimens in the flesh, or with skull and leg-bones attached, I received none, although during the summer of 1901 I heard reports every few days of the Russians seeing bears along the upper waters of the Gichiga and Ovecho Rivers. In September, 1900, I saw tracks along the Ovecho. At Gichiga they come out of hibernation about the first week in April, and at Marcova about two weeks later, and again retire the first of October. The Russians claim to be afraid of them on account of the poor firearms that they possess, and seldom attack them. The natives — Tunguses and Koryaks — locate them in winter by the vapor arising from their dens and dig them out. The Parane River, which flows into Penginski Gulf, is said to abound in small black bears. All the pelts I saw in Northeast Siberia are those in the collection. A good dark pelt brings from 10 to 15 roubles in trade or cash. Their food consists of fish and berries, both of which are abundant and easily obtained." — N. G. B.

26. **Canis lupus** *Linn.*

GRAY WOLF.

Represented by 5 skins, with their skulls, collected on the River Main, 60 miles from Marcova, by Mr. Axelrod, and by 3 skins without skulls, obtained by Mr. Bogoras near the mouth of the Anadyr River. No measurements were taken of any of the animals before skinning. They are all winter specimens, those taken near Marcova having been killed in December and February. They vary somewhat in color, particularly in the amount of black, due to the black tips of the hairs of the back, and the amount of subapical yellowish suffusion on the median area of the back. In one or two of the specimens the amount of black is very small, and in others black is the prevailing tint. In the lightest colored specimens the subapical zone of the fur is nearly or quite without any fulvous tint; in other specimens the hair of the mid-dorsal region is subapically strongly suffused with fulvous, varying

in different specimens to pale ochraceous, and in the extent of the area thus suffused, which is broadest in those with the deepest suffusion. The ears are more or less yellowish brown, most strongly so toward the base, the depth of the yellowish brown tint correlating with the intensity of the yellow suffusion of the dorsal region.

The skulls show the specimens to be young adults, with the teeth unworn and the sagittal and occipital crests only slightly developed. They range in basal length from 203 to 221 mm., and in greatest zygomatic breadth from 108 to 126 mm., both extremes being females. Compared with the northern forms of American wolves, their small size and the narrowness of the postpalatal fossa attract attention.

Lack of material prevents comparison of the series of East Siberian wolves with those of other parts of the Palæarctic region.

"Russian name, *Volk*. Wolves are extremely rare if present at all in the Gichiga country. In the Anadyr territory and along the west coast of Okhotsk Sea and inland they are common. The supply of skins received at Gichiga does not equal the local demand for them for making clothing, but at Marcova a few can always be purchased. The people of Gichiga and Marcova recognize but one species, although a priest at Ola assured me that two species were found inland from that place. All of the skins in the collection are from Anadyr." — N. G. B.

27. **Vulpes anadyrensis,** sp. nov.

SIBERIAN RED FOX.

Type, No. 18239, ♂ ad., Marcova, Anadyr Province, Siberia, Dec. 10, 1900; N. G. Buxton, Jesup North Pacific Expedition.

Similar in size and coloration to *Vulpes alascensis;* much larger than *V. vulpes* of the British Islands and western Europe, and very differently colored, with a relatively much longer and heavier tail, and much heavier dentition.

General color above bright orange rufous, darkest along median line, lighter on the sides of the shoulders, sides of the neck and cheeks, and sides of the rump, and slightly varied with gray on the head and hips; nose in front of the eyes rufous, sides of nose blackish, upper lip broadly edged with white; top of head lighter than shoulders and back,

very slightly varied with fulvous gray; apical external half of ears black, basal half and inner surface pale orange; posterior third of dorsal surface rufous varied with fulvous gray, much lighter than the anterior half of the body, and with a pale orange disk in front of the base of the tail, divided by a median band of the color of the back; ventral surface from chin to lower part of breast white, with the underfur blackish or slaty gray; rest of ventral surface rufous, lighter posteriorly, with the underfur along the median line dusky, showing strongly at the surface on the middle of the belly; tail dark rufous orange, the long hairs tipped with black, so that the sides of the tail when seen from above are strongly fringed with black; end of the tail broadly tipped with pure white; fore and hind limbs deep rufous, with the front surface of the fore feet black to the carpal joint, and of the hind feet black nearly to the tarsal joint, the black area narrowing proximally on the latter from the middle of the foot; base of the toes deep orange rufous; soles of both fore and hind feet brownish gray with a slight rufous tinge.

For external measurements see below, and for cranial measurements see page 170.

Vulpes anadyrensis is so strikingly different in coloration and size and in its heavy dentition from *Vulpes vulpes* of western Europe and England that no further comparison is necessary. In size and general external features, and in its heavy dentition, it bears a striking resemblance to some of the brighter colored phases of the Red Fox group of Alaska, but it is very much more deeply colored, being orange rufous above instead of fulvous or golden fulvous, with the nose, feet, and other lighter parts proportionately deeper colored.

The skull is less massive and narrower interorbitally, but the dentition is quite as heavy as in the largest Alaskan skulls.

This species is represented by 9 skins with skulls, taken in the vicinity of Marcova by Axelrod and Buxton, and by 17 hunters' skins purchased by Mr. Bogoras of the natives at Indian Point. Five of the Marcova specimens measured in the flesh as follows:

18239,[1]	♂,	Dec. 10.	Total length,	1120;	tail vertebræ,	425;	hind foot,	166.
18240,	♀,	" "	"	"	1065;	"	"	374;	"	"	168.
18244,	♂,	Apr. 7.	"	"	1078;	"	"	430;	"	"	157.
18241,	♀,	Feb. —.	"	"	1005;	"	"	362;	"	"	170.
18245,	♀,	Apr. 24.	"	"	1030;	"	"	410;	"	"	165.

[1] Type.

Eight of the Marcova skins represent the usual red phase, while the other is a 'cross' fox. In the red phase the general color above varies from light to dark red, lighter and brighter anteriorly, with a slight mixture of gray on the top of the head and lower back; the apical half of the ears is deep black; the anterior surface of the feet and apical half of the fore leg is black or blackish, mixed more or less with rufous, as is the upper surface of the hind feet, where the black extends up from one third to two thirds the length of the tarsus, narrowing proximally; the upper surface, and sometimes the lateral surface of the tail is conspicuously washed with black, with the extreme tip white. The ventral surface is quite variable in respect to the amount of white present, which covers the sides of the upper lip, the chin, throat, and breast, with the underfur of the throat and breast more or less slaty black; there is often a less well-defined whitish area over the extreme posterior ventral surface, and sometimes an irregular whitish median band connects the broad white area of the throat and breast with the smaller white anal area.

In the 'cross' specimen the whole ventral surface is black, — deep black on the chin, throat, and breast, and brownish black over the rest of the ventral surface; edges of the upper lip, and the sides of the face in front of the eyes also black, and the feet and limbs are more extensively brownish black than in the red phase. The dorsal surface is dark reddish brown varied posteriorly with gray, — not yellow as in the Alaskan 'cross' fox. The tail is also more heavily washed with black, with, however, the usual white tip. The sides of the shoulders and chest, the sides of the neck, and the area at the anterior base of the ears, and at the sides of the base of the tail, is much lighter than the general coloration, being in this example bright yellowish rufous, becoming rich orange rufous at the anterior base of the ears, but lightening to pale yellow at the sides of the base of the tail.

The following are the measurements of the series of skulls from Marcova.:

MEASUREMENTS OF SKULLS.

Cat. No.	Sex.	Date.	Basal Length.	Palatal Length.	Postpal. Length.	Nasals.	Zygom. Breadth.	Interorb. Breadth.	Breadth of Rostrum.	Pm. 4, along Outer Border.
18239[1]	♂	Dec. 10	142	72	70	59	80	26	23	15
18240	♂	" "	138	68	67	55	74	28	24	14.3
18242	♂	" "	136	69	66	55	72	27	24	14
18244	♂	Apr. 7	140	71	70	52.5	79.5	29.5	24	13.6
18246	♂	Dec. —	135	—	—	—	74	28	22	13.6
18245	♀	Apr. 24	141	71	68	54	75	25.5	22	14
18243	?	Dec. —	132	—	—	—	73	—	23	13.5

[1] Type.

"Red Fox. Russian name, *Lee-see-sha.* None of the foxes are abundant or even common in the Gichiga valley although, comparatively speaking, the red form is the commonest there, as it is in the Anadyr Province. The traders at Gichiga and Marcova receive each year a large number of pelts from the inland natives and from the Koryaks inhabiting the country lying between these two places and the Chukchees, to the north and west of Marcova. Many are also received at Gichiga from the country lying along the west coast of Okhotsk Sea. The people employ native traps to catch them, and also resort to the illegal use of strychnine when they can obtain it.

"I saw no foxes nor any signs of them at Gichiga although I saw many tracks along the Pengina, Ocklon, and Orlofki Rivers during February and March, 1901. Pelts bring from 4 to 5 roubles each.

"Cross Fox. Russian local name, *See-woy-dóos-ka.* Cross foxes are rather common all over that portion of Northeast Siberia where the red fox occurs, and a considerable number of pelts are annually received by the traders at the different settlements. The average price is 15 roubles each.

"Black or Silver Gray Fox. One poor, mutilated pelt was received by a trader at Gichiga from Yamsk in the spring of

1901, which was valued at 40 roubles. One taken at Ayan in the winter of 1899–1900 sold in the market for 1500 roubles." — N. G. B.

28. **Vulpes lagopus** (*Linn.*).

ARCTIC FOX.

Represented by one specimen, in 'blue' coat, taken April 1, 1901, at Kamenskoi, on Penginski Gulf; by 4 specimens taken at Marcova, in December, by Mr. Axelrod; by 12 winter specimens collected by Mr. Bogoras at the mouth of the Anadyr River, and by 18 hunters' pelts bought by Mr. Bogoras of the natives at Indian Point. Of these 35 skins 12 only have skulls, and one only has measurements or indication of sex. This specimen, a male, taken at Marcova, March 10, 1901, measures: Total length, 940; tail vertebræ, 345; hind foot, 150. No. 18248, from the mouth of the Anadyr, without date, is apparently in summer coat, the pelage being ragged and more or less worn. The general color above is soiled yellowish white, with the underfur dingy gray or grayish brown. The ears, and the fur surrounding them, are dull chestnut brown; the nose as far back as the eyes, a broad space enclosing the eyes, and the chin, are dusky brown. The ventral surface is dusky grayish brown, darker and more rusty on the anterior half. The feet and legs are dull rusty brown, the apical portion of the hairs lighter and more yellowish.

The winter specimens are superficially white, or slightly yellowish white, with the thick woolly underfur more or less tinged with gray at base, the amount of gray varying in different specimens, from nearly none to a strong infusion. Some of the specimens show a slight mixture of blackish hairs overtopping the general surface.

The April specimen in 'blue' coat from Penginski Gulf is dull dark brown all over, with a slight reddish tinge, with the underfur light gray, and the soles of the feet whitish. This is the 'blue' fox pelt referred to by Mr. Buxton in his notes. It apparently is not a seasonal condition, as the pelage is long

and full and in excellent condition, and apparently the winter coat. This phase is probably a melanism, comparable to the 'black' or 'silver gray' phase of the red fox.

The ten skulls available for measurement range in total length from 114 to 126 mm., averaging 120, and in zygomatic breadth from 64 to 70, averaging 68.

"Arctic Fox. Russian local name, *Pee-seetz-(a)*. This is the next common of the foxes in the Gichiga and Anadyr regions. The bulk of the skins come from the country north of Marcova where it is abundant and the commonest form. It prefers the barren tundra to the wooded portions of the country and therefore ranges further northward. More of this species are received at Marcova than at Gichiga and other settlements further south. Pelts are valued at from three to four roubles each.

"Blue Fox. Russian local name, *Gol-o-bah pee-seez-(a)*. An occasional pelt is received at Marcova and Gichiga. The one in the collection was caught on a small river flowing into Penginski Gulf. I saw another pelt at Marcova taken at a place 100 miles northeast of that place. They are valued at 15 to 25 roubles each." — N. G. B.

29. **Gulo gulo** (*Linn.*).

WOLVERENE.

This species is represented by a skin, without skull, obtained by Mr. Axelrod, at Marcova, in the Anadyr Province, and by two young cubs obtained by Mr. Buxton near Kamenskoi, on Penginski Gulf. The cubs have a total length of about 400 mm. and could have been but a few weeks old. As shown by the skulls, the teeth had not yet pierced the gums. They are, of course, in the soft woolly pelage characteristic of extreme youthfulness, and while very different in coloration from the adults, they have the same color pattern. The light areas are pale yellowish white, more strongly yellowish on the rump and ventral surface than elsewhere; the dark areas are ashy brown, in strong contrast with the light areas.

The skin from Marcova, taken in December, has the dark areas nearly black, and the light markings white tinged with rusty; the specimen is thus darker than in average North American skins, but not darker than some of the darkest specimens now before me.

"Russian local name, *Rŭs-so-mā̆kāh*. This mammal is now not found, or at least very rarely, in the vicinity of Gichiga. In Anadyr Province it is tolerably common. One was obtained by Mr. Axelrod from hunters there which is in the collection, and I saw one that had been taken in March, 1901, near Marcova. The two young in the collection were caught near Kamenskoi, on Penginski Gulf, but I could obtain no particulars concerning their capture. They are reported plentiful in Kamchatka, and pelts bring but 5 roubles in Petropaulsk, while at Marcova and Gichiga they are worth from 10 to 20 roubles each. They are used by the Russians and natives for trimming fur garments." — N. G. B.

30. **Mustela zibellina** *Linn.*

SABLE.

This species is unrepresented by specimens. As shown by Mr. Buxton's notes, here subjoined, it has been exterminated in the region about Gichiga.

"Russian name, *Só-bel*. No Sables are found in the immediate vicinity of Gichiga, although from thirty to fifty pelts are received there annually, principally from the Pengina River region and northern Kamchatka. Mr. George H. Storck, a furrier of New York City who visited Gichiga in June, 1901, purchased thirty-five skins from a local trader for 35 roubles each, and the commanding officer at Gichiga had six. Mr. Storch said that these skins were of better quality and darker than skins from southern Kamchatka, of which he had examined several hundred for sale at Petropauvolsk. Mr. Sokolinkoff, the commanding officer at Marcova, had ten pelts from the Pengina district when I visited him in March, 1901. The average price is from 30 to 40 roubles each." — N. G. B.

31. **Putorius (Arctogale) ermineus** (*Linn.*)

ERMINE.

Represented by 20 adult males and 1 adult female (skins and skulls) collected by Mr. Buxton in the vicinity of Gichiga, all in the white winter pelage except one. One was taken in January, 6 in April, 2 in October, 5 in November, 6 in December, and 1 (in summer dress) in August. Besides these there are 10 skins with skulls, brought by Mr. Bogoras from the mouth of the Anadyr River, and 9 specimens in alcohol collected by Mr. Jochelson near Verkhene Kolimsk, on the Kolyma River.

The length of the black tip to the tail is variable, ranging from 65 mm. to 95, and averaging about 75, or from considerably less than half to considerably more than half of the whole length of the tail. The same range of variation is shown by a large series of *P. richardsonii* from Repulse Bay, Arctic America. These two large series show that the relative length of the black tip to the whole length of the tail is too variable a feature to have much importance in the consideration of single specimens from different localities. There is also a wide range of variation in the amount and depth of the yellow suffusing the pelage of the ventral surface, the limbs, and the basal portion of the tail. Some specimens show none, and others merely the slightest tinge, restricted to the limbs and edges of the ventral surface, while in still others the tone of yellow approaches deep chrome and covers the whole ventral surface, from the posterior border of the pectoral region to the black portion of the tail, including both fore and hind limbs, the rump, and the basal half of the tail. Several of Mr. Buxton's specimens show no tinge of yellow; nearly all of Mr. Bogoras's are either wholly without yellow or show only the slightest trace, while some of Mr. Jochelson's are without and some have a very deep shade of yellow. The single specimen in summer pelage has the whole ventral surface strongly yellow, including the breast and throat. A series of 14 specimens of *P. richardsonii* in winter pelage show little or no yellow, while 22 in summer pelage all show more

or less yellow, varying in different specimens from a faint tinge to deep yellow.

I add herewith the external measurements of 21 specimens taken by Mr. Buxton from the fresh specimen, and include therewith the three principal skull measurements, so far as the skulls are available for this purpose, a few of them being too imperfect for measurement.

MEASUREMENTS OF *Putorius ermineus*.

Cat. No.	Date.	Sex.	External Measurements			Skull Measurements.		
			Total Length.	Tail Vertebræ.	Hind Foot.	Total Length.	Zygom. Breadth.	Mastoid Breadth.
18324	Aug. 6	♂	315	88	43	—	—	—
18325	Oct. 23	♂	333	100	48	—	—	—
18326	" 30	♂	357	102	50	47.3	27.3	23.3
18327	Nov. 4	♂	333	97	51	47	27	23
18328	" "	♂	313	83	50	45.5	25.6	22.7
18329	" 15	♂	317	85	47	45.3	24	21.5
18330	" 23	♂	305	82	44	—	—	—
18331	" 24	♂	316	90	44	44	23	20.2
18332	Dec. 13	♂	365	102	54	48	27.6	23.5
18334	" 2	♂	347	102	51	45	25	23
18335	" "	♂	350	99	48	47	27	23
18336	" "	♂	345	95	48	46.5	26.3	23.8
18337	" 20	♂	335	92	45	44	24	22.5
18338	" "	♂	340	91	47	—	—	—
18339	April 5	♂	325	88	45	—	—	—
18340	" "	♂	312	74	43	—	—	—
18341	" "	♂	312	79	42	—	—	—
18342	" "	♂	318	93	49	44	24	22
18343	" 13	♂	328	93	49	45.5	25.6	22.3
18344	" 24	♂	328	83	45	—	25.3	22
18333	Jan. 12	♀	278	73	38	39.8	21	19.6
20 males average			325	90.5	47.4	46	26.5	22.6

Material from northern Europe available for comparison with the Siberian series is too scanty — four specimens only — to be of any importance, but so far as it goes the specimens from northern Europe do not differ appreciably from those from northeastern Siberia.

Externally the Siberian animal does not differ noticably from *P. richardsonii* from eastern Arctic America, of which I have some 30 skulls and nearly 40 skins, collected in the vicinity of Repulse Bay (a northwestern arm of Hudson Bay).

The Repulse Bay specimens, however, are without measurements taken from the fresh specimen, and are thus in respect to size and proportions not satisfactorily comparable with the Siberian specimens. The Repulse Bay specimens in summer coat are extremely variable in coloration, ranging from light yellowish brown to dark brown. There are, however, very marked differences in the skulls of the two forms, in *P. ermineus* the skull being long and narrow, with a low, elongate, narrow braincase, in comparison with the much broader skull of *P. richardsonii*, and relatively much deeper and much broader braincase. The skull in *P. richardsonii* averages considerably smaller than that of *P. ermineus* and has shorter, less flattened, and more widely separated bullæ.

It is interesting to note that in the Buxton series of 21 specimens only one is a female, and that there is also only one female in a series of 38 specimens from Repulse Bay. It would thus seem that the females are better able than the males to escape the wiles of the trapper.

"Ermine. Russian name, *Gór-no-stai-e*. Quite common at all the places that I visited in Northeast Siberia, although by no means abundant. They are most common in winter about the Russian and native settlements, where they are attracted by the fish and meat stored at such places. In a small outbuilding near my cabin I had a number of gulls and deer carcasses stored, and during the winter I caught ten ermines in one trap that was set there, while from a line of baited traps maintained on the tundra and under other buildings in the settlement all the time (thirteen months) that I was at Kooshka I took only one. The distinct sulphur color of many of the winter skins was more or less present in the fresh specimens, but has increased in intensity since being prepared. The pelts are valued at from 20 to 30 kopecks each." — N. G. B.

32. **Putorius (Arctogale) pygmæus,** sp. nov.

PIGMY WEASEL.

Type, No. 18322, ♀ ad., skin and skull, Gichiga, west coast of Okhotsk Sea, Siberia, Oct. 2, 1900; N. G. Buxton, Jesup North Pacific Expedition.

Summer pelage.— Above dark reddish brown, including the anterior surface of the fore limbs to the carpus, and the outer surface of the hind limbs to the base of the toes; ventral surface, inside of the limbs, fore feet, and apical half of hind feet white, the ventral surface unmixed with any brown mottling; edge of upper lip and lower half of cheeks white, like the ventral surface; ears very small, brown like the dorsal surface; tail very short, much shorter than the hind foot, wholly brown, uniform with the color of the back, the tip not dusky.

Winter pelage.— Wholly pure white, including the tip of the tail.

Measurements.— Type: Total length, 158 mm.; tail vertebræ, 16; hind foot, 21. *Skull*, total length, 28.5; zygomatic breadth, 13.3; mastoid breadth, 12.5.

A second specimen in summer pelage from Marcova, without measurements and skull imperfect (see Mr. Buxton's notes below), is similar in coloration to the type, but slightly larger and evidently a male.

Besides the two specimens in summer pelage — one from Gichiga and one from Marcova, as already noted — there are two in winter pelage, in alcohol, collected by Mr. Jochelson at Verkhene Kolimsk, on the Kolyma River, in January, 1902. These are male and female, and measure as follows: Male: Total length, 184 mm.; tail vertebræ, 19; hind foot, 23. Female: Total length, 166; tail vertebræ, 13; hind foot, 19.

The measurements given by Mr. Stone for *Putorius rixosus eskimo* (Proc. Acad. Nat. Sci. Phila., 1900, p. 44) considerably exceed those of *P. pygmæus*, being for two males, respectively, total length, 204 and 230; tail vertebræ, 28 and 31; hind foot, 20; while three females range from 178 to 184 in total length, tail 22–25, and hind foot 16–23.

The much smaller size, the very short tail, and greatly reduced ears distinguish this species at a glance from true *P. nivalis*, as shown by a Swedish specimen now before me. Its nearest ally and the only species with which it needs comparison is *Putorius rixosus* Bangs, from Arctic America (type locality, Osler, Saskatchewan), from which it differs in being much smaller, with the tail only half as long as in that species. Mr. Stone's *P. rixosus eskimo*, from Point Barrow, Alaska, is nearer the Siberian form, but differs from it in larger size and in having the tail vertebræ longer than the hind foot instead

of about one third shorter. It is, however, an interesting fact that the present form finds its closest relationship with the *rixosus* group of Arctic America rather than with the Old World *nivalis* group.[1]

"The one specimen from Gichiga was taken in a mouse trap on the tundra near my station at Kooshka. During the year while I was at this station I had from 25 to 100 baited and unbaited traps set continuously, but caught only this one. Some of the residents at Gichiga said that they had never seen the animal before while others maintained that it was a young ermine, so that I consider it rare, at least in the vicinity of Gichiga. The pelt from Marcova was given me by Mr. Sokolnikoff, the commanding officer there, who caught it swimming in the Anadyr River and who said it was the only one that he had seen during his three years there.

"The specimen of *Putorius rixosus eskimo* described by Stone in the McIlhenny Collection from Point Barrow (No. 848), was a nursing female with 10 mammæ developed; another in the same series taken in the middle of June had 12 mammæ developed, and 12 fœtal young in the oviducts." — N. G. B.

33. **Lutra lutra** (*Linn.*).

OTTER.

This species is not represented in the present collection. Mr. Buxton's notes respecting it are as follows:

"Russian name, *Vee-drăh*. No otters are now found in the Gichiga country although they undoubtedly occurred there formerly. They are still taken along the smaller tributaries of Pengina and Anadyr Rivers, further inland, and in Kamchatka. I was unable to secure any specimens in the flesh or skulls, but pelts were plentiful at Marcova at from six to ten roubles each. A few pelts are shipped out by the traders each year, but the bulk of them are used by the Russian inhabitants." — N. G. B.

[1] On the Weasels of the *P. nivalis* group, see Barrett-Hamilton, Ann. and Mag. Nat. Hist. (7), V, Jan. 1900, pp. 41–50.

34. **Erinaceus orientalis,** sp. nov.

SIBERIAN HEDGEHOG.

Type, No. 18355, ♀ ad., Vladivostok, Siberia, July 18, 1900; N. G. Buxton, Jesup North Pacific Expedition.

Similar in external characters to *Erinaceus europæus*, but paler and rather larger, with quite different cranial characters. General color of the spiny dorsal area pale yellowish, the spines similar in character to those of *E. europæus*, the individual spines whitish basally with a broad median band of pale brown and a whitish tip. Head, shoulders, and sides pale grayish sandy brown; ventral surface very pale yellowish, thinly haired; head pale brown with a tinge of yellow, and an indistinct whitish spot in front of the eye, enclosed in a slightly dusky area which extends to and covers the sides and front of the nose and most of the head anterior to the eyes; feet dull pale brown, passing into a grayish yellow brown on the limbs; ears small, dusky, about as in *E. europæus;* tail short, dull brown, very thinly haired. Mammæ 6, well developed.

Measurements.— Total length, 312 mm.; tail, 42; hind foot, 50; ear (in dry skin) from notch, 27. *Skull*, total length, 61; zygomatic breadth, 39; postpalatal length, 26.5; length of nasals, 19; length of entire upper toothrow, 30.

This species is based on a single old female (teeth quite worn) bought alive by Mr. Buxton at Vladivostok of a Chinaman, who told him it was caught in Vladivostok. It differs from *E. europæus* in its much lighter coloration, and somewhat larger size, but especially in various features of the skull and teeth. The skull, in comparison with a nearly equally adult skull of *Erinaceus* from Kingsbridge, Devonshire, England, is of nearly the same length as the latter, but much broader and more massive, with the zygomatic arches much more convex outwardly, the two skulls measuring, respectively, 59 and 61 mm. in total length and 34 and 39 mm. in greatest zygomatic breadth. The rostral portion of the skull in *E. orientalis* is much broader, less sloping and less pointed than in *E. europæus*, and the premaxillæ are much broader and heavier, but much less extended and more abruptly truncated posteriorly, their line of junction with the nasals being nearly 3 mm. shorter than in skulls of *E. europæus* of less size, making the relative difference very great. The chief

difference in dentition is the very much larger size of pm^2 in *E. orientalis* and the nearly transverse position of m^3. The palatal vacuities are much broader in *E. orientalis*, and the posterior border of the palate is developed into a broad shelf behind the transverse ridge, thus differing very widely from the same part in *E. europæus*, which extends but little beyond the ridge and terminates in a central sharp spine, which is absent in *E. orientalis*. The lower jaw has about the same general form in the two species, except that the coronoid process is much broader and higher in *E. orientalis*. The lower dentition, however, is quite different in the two, through the very small size of the incisors, canines, and premolars in *E. orientalis* as compared with *E. europæus*.

There appear to be very few references to the occurrence of any species of *Erinaceus* in southeastern Siberia, and in these cases the species is referred to *E. europæus*. Von Schrenck found it near Aigun, on the Amoor River, and Radde refers to specimens collected by Maack and Maximowicz on the Ussuri River, but both Schrenck and Radde considered their specimens specifically identical with *E. europæus*.

There being apparently no available name for the East Siberian animal, I have conferred upon it the name *orientalis*, in allusion to its extreme eastern distribution. Erxleben's *Erinaceus sibiricus* (Syst. Reg. Anim., 1777, p. 172) was based on Seba's figures and brief description of his "Erinaceus Sibiricus" (Thes. I, p. 79, pl. 49, figs. 4 and 5). Seba's figures are unidentifiable, and the only hint as to the locality of his specimen is the name, which he renders in French as "Herisson de Siberie." The diagnosis, "Coloris est obscure russi; . . ."; or, "Il est d'un roux foncé, . . ." obviously does not apply to the pale East Siberian species. The only other name to be considered is *amurensis* Radde, used in his description of Plate V (Reisen im Süden von Ost-Siberien, I, 1862, p. 325), where he says: "Fig. 1. *Erinaceus europæus L.* (*amurensis*) a. c. d." But nowhere in the text does he state the locality of the specimen figured, and throughout his text and tables of measurements mentions only skulls from Dauria, Sarepta, and St. Petersburg. In any case his

figures clearly relate to an animal very different from the Vladivostok form here named *E. orientalis*.

35. **Sorex buxtoni**, sp. nov.

BUXTON SHREW.

Type, No. 18655, ♀ ad., July 27, 1901, Gichiga, west coast of Okhotsk Sea, Siberia; N. G. Buxton, Jesup North Pacific Expedition.

Summer pelage.— Above, including sides, dull pale reddish brown; below pale fulvous gray; tail thinly haired, bicolor, dark brown above, below dull gray with a fulvous tinge; ears small, nearly concealed by the fur.

Winter pelage (May specimen).— Above dark reddish brown; sides and underparts silvery whitish gray; tail well clothed, with a distinct pencil at the tip, brown above, clear gray below, darker at the tip, both above and below.

Fall pelage (September and October specimens).— Above dark brown, much darker than in summer pelage; sides and ventral surface gray, more or less tinged on the sides with fulvous,—not pure silvery gray as in spring specimens.

Measurements.— Type: Total length, 106; tail vertebræ, 34; hind foot, 14 mm. Twenty adult males measure as follows: Total length, 100.3 (93–111); tail vertebræ, 34 (31–37); hind foot, 13.8 (12–15). Twenty adult females measure: Total length, 95.6 (90–111); tail vertebræ, 34 (30–38); hind foot, 13.9 (12–15). The average total length of 40 specimens is thus slightly less than 100 mm. Of the 40 specimens, only 8 exceed 100 mm. in total length, and only 8 fall below 95 mm. The skull of the type measures 17 mm. in total length and 8 mm. in greatest width.

This species is represented by 42 skins and skulls and 4 specimens in alcohol, all taken by Mr. Buxton in the vicinity of Gichiga. Both sexes are about equally represented, and also several seasonal phases of pelage. One specimen was taken in January, 1 in April, 7 in July, and the others, except 6 taken Sept. 24–Oct. 6, at intervals between August 25 and September 11. They are thus mostly in summer pelage, with the sides brown like the back. The single May specimen has the sides and underparts clear silvery white, in strong contrast with the dark brown back. In a few specimens taken in September and October the dorsal area is dark brown and the sides gray like the ventral surface, but the gray is dull

and slightly brownish and is confined in most specimens to the lower border of the sides. The greater part of the series is in summer pelage, in which the color of the dorsal area is pale brown, the sides are like the back, and the gray of the ventral surface is dull with a slight tinge of yellowish.

Sorex buxtoni belongs to the *S. araneus* group, but differs from the true *S. araneus* of Sweden and other parts of northern Europe in its much paler colors at all seasons, and smaller size. It more nearly resembles *Sorex pribilofensis* Merriam, from the Pribilof Islands, from which it is almost indistinguishable in coloration in some of its phases.

"Russian local name, *Mysh*, meaning mouse, as the people do not distinguish between the mice, voles, and shrews.

"Abundant in suitable localities all over the Gichiga and Anadyr sections of Siberia, and probably the rest of Northeast Siberia. At Gichiga they prefer the higher places on the tundra where it is moist, and where there is a growth of low hawthorn bushes, or other places where there are shrubs or an undergrowth, as along the banks of streams or of tundra pools. They are active during the entire year and often come into the houses during the winter. They gave me much annoyance during the summer by devouring the mice and voles that had been caught in my traps, and by springing my larger baited traps and escaping unharmed. They were easily caught in traps baited with fresh fish or meat. They are most active during August and September." — N. G. B.

American Affinities of Certain East Siberian Mammals.

The mammal fauna of East Siberia, so far as genera are concerned, consists of exclusively Holarctic types, represented, with one exception (*Moschus*), in both Arctic America and Arctic Eurasia, but by more or less differentiated forms on the two continental areas. Whether some of the more slightly differentiated forms are to be regarded as species or subspecies depends upon the point of view. The results of modern research, however, when based on ample material, demonstrate that what in earlier days were looked upon as

circumpolar species are resolvable into a number of well-marked forms, which occupy definite geographic areas, and are characterized by easily recognized differences. That there is, nevertheless, a close interrelationship between the forms of boreal mammals inhabiting the two continents is beyond question, — a relationship so intimate that it could only have been brought about by a former land bridge connecting the two areas, the existence of which in comparatively recent time, geologically speaking, is generally conceded, if not practically demonstrated.

It is thus probable that most of the more northern types of mammal life on the two continents are the slightly modified descendants of types which formerly had a continuous circumarctic distribution, which have become slowly differentiated, probably mainly since the disruption of the former land connection at Bering Straits. To this category belong the whole of the ursid, canid, felid, and mustelid series (excepting, of course, the mephitine phylum), and such genera as *Cervus*, *Rangifer*, *Paralces*, *Ovis*, and *Ovibos*, and possibly *Bison* among Ruminants, and *Sorex*, *Evotomys*, *Microtus*, *Dicrostonyx*, *Lemmus*, *Sciuropterus*, *Sciurus*, *Eutamias*, *Citellus*, *Arctomys*, *Lepus*, and *Ochotona* among the Insectivores and Rodents. These types are so wide-spread and so diversified on both continents that it is hard to suppose that any of them owe their presence in America to any very recent immigration from Asia, or the reverse. Possibly, however, *Cervus*, *Bison*, and *Eutamias* may have been direct contributions from one continent to the other, the former from Eurasia to America, and the two latter from America to Eurasia, judging by their present relative representation in the two areas.

But the cases especially in point in the present connection are the occurrence along the Siberian and Kamchatkan coasts of types distinctively American. These are a species of weasel (*Putorius pygmœus*) closely related to *Putorius rixosus* of arctic and subarctic America, and only remotely related to any Eurasiatic species; a spermophile (*Citellus buxtoni*) closely related to the *Citellus* (=*Spermophilus* auct.) *parryi* group of boreal America, but only remotely related to any

known Old World type; a shrew (*Sorex buxtoni*) much more nearly related to certain Alaskan forms than to any other; the Kamchatkan Bighorn (*Ovis nivicola*), which is so much more nearly related to the American type of *Ovis* than to any Asiatic species that it was formerly referred to it. The Kamchatkan-Siberian *Evotomys wosnessenskii* is also more nearly related to some of the Alaskan members of the genus than to any of its Old World congeners. *Microtus*, *Arctomys*, *Vulpes*, and apparently *Ursus*, afford nearly parallel cases.

There is thus evidence that eastern Siberia has derived some of its present mammalian life from boreal America, and doubtless within a comparatively recent period. The American origin of various early types that eventually attained circumpolar distribution, as the horse, camel, and rhinoceros phyla, etc., is now well established by palæontological evidence, but that the same is true of some forms of the existing mammalian fauna does not appear to have been heretofore recognized.