

NOTES ON MAMMALS COLLECTED AND OBSERVED IN
THE NORTHERN MACKENZIE RIVER DISTRICT, NORTH-
WEST TERRITORIES OF CANADA, WITH REMARKS ON
EXPLORERS AND EXPLORATIONS OF THE FAR NORTH.

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Among the reasons which led me to prepare this list and relative notes, together with the paper on the birds and eggs collected by me and under my direction in Arctic America, recently published by the Historical and Scientific Society of Manitoba, and by the U. S. National Museum at Washington,^a the following may be mentioned: First, I desired thus to set an example to the fur-trade officers of the Hudson's Bay Company, which some of them could well follow, to furnish similar experiences of their own. Secondly, I further desired to incite the ambition of others, especially the younger men of the service, stationed at posts on the Gulf of St. Lawrence, on the sea-coasts of Labrador, Hudson Bay, and the North Pacific, amid the fertile prairies and great forests, and on the banks of numerous rivers and lakes of the vast interior of Old and New Canada, to resume and continue making important additions to the company's officers' well-known interesting contributions to the natural history of their former chartered, licensed, and still occupied trade territories. Thirdly, I wished that the Smithsonian Institution might appoint an agent for the purpose of personally reviving the grand work begun by Robert Kennicott in 1859, and afterwards followed by others, under the auspices of the lamented Spencer Fullerton Baird. Lastly, but not least, I trust that both papers may eventually aid in arousing the naturalists of Canada to exert themselves more fully than ever, not only in the way of ascertaining the existence of new species and the geographical distribution of others, but also in obtaining specimens to fill up the many gaps in the catalogues of well-known animals which are still unrepresented in their national museums.

^a Proc. U. S. Nat. Mus., XIV, 1892, pp. 413-446.

In its immense northwest territories, situated on both sides of the Rocky Mountains, and in the wilds of Quebec, Ontario, Labrador, and Hudson Bay, but especially in the "Great Mackenzie Basin," the Dominion of Canada presents an indubitably rich and varied field for scientific investigation. For many years to come there should be ample room within its continental boundaries (without reference to the important outlying arctic islands and lands which extend almost to the North Pole) not only for her own and other British explorers, but also for like-minded brother-workers from the great neighboring Republic, to make large and valuable acquisitions in all branches of natural history; and if the former would only take hold of this interesting and fascinating subject with characteristic zeal, energy, and perseverance there can be little doubt that before the close of the second

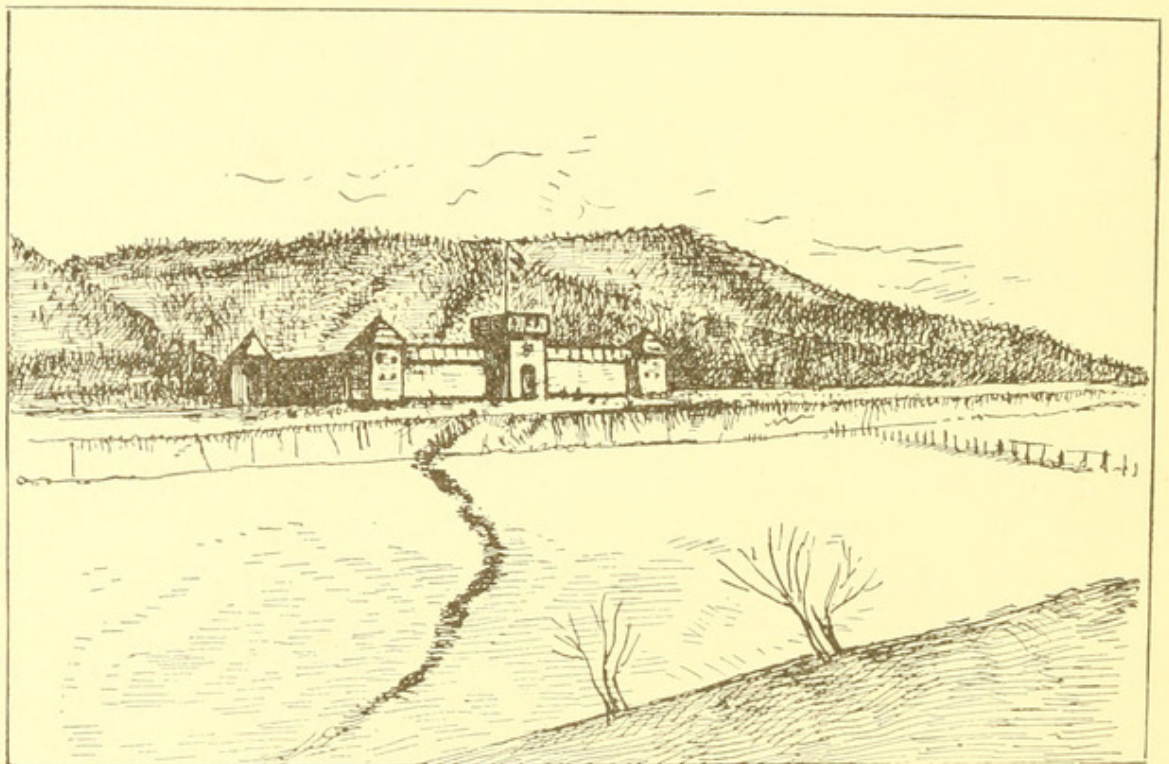


FIG. 1.—SKETCH OF FORT ANDERSON.^a

decade of the century our great Dominion would find itself in possession of a collection of Canadian objects and species worthy of the country, and in some at least, if not in most, departments of science, second to none in either hemisphere.

^aIn the month of March, 1865, the Reverend Émile Petitot, at that time Père of the Order of the Maurice Institution of the Good Hope, Mackenzie River Roman Catholic Mission, paid a visit to Fort Anderson, and while there made an excellent winter sketch (subsequently painted in water colors) of the establishment. I forwarded the latter to the Smithsonian Institution at Washington and Professor Baird had it reproduced in, I think, Frank Leslie's Weekly (1865 or 1867), with some relative information. It was on a much larger scale than this sketch copied from Abbé Petitot's *Les Grands Esquimaux*.

The spruce poles, seen in the sketch, with their attached branches and sunk to the bottom of the river through holes made in the ice soon after it set fast, formed a

The scope of country embraced by the following notes is, in the main, the same northern section of the Mackenzie River District referred to in the aforesaid paper on arctic birds and eggs. It is bounded on the north by the Polar Sea, to the outlet of the Mackenzie River; on the east, by the coast of Franklin Bay, from Cape Bathurst to its depth in Langton Harbor; on the west, by the lower Mackenzie River; and, on the south, by the sixty-seventh parallel of north latitude to its intersection with longitude 124° west. The period during which the collections herein mentioned were made extended from the beginning of the year 1861 to the end of July, 1866. Fort Anderson (about

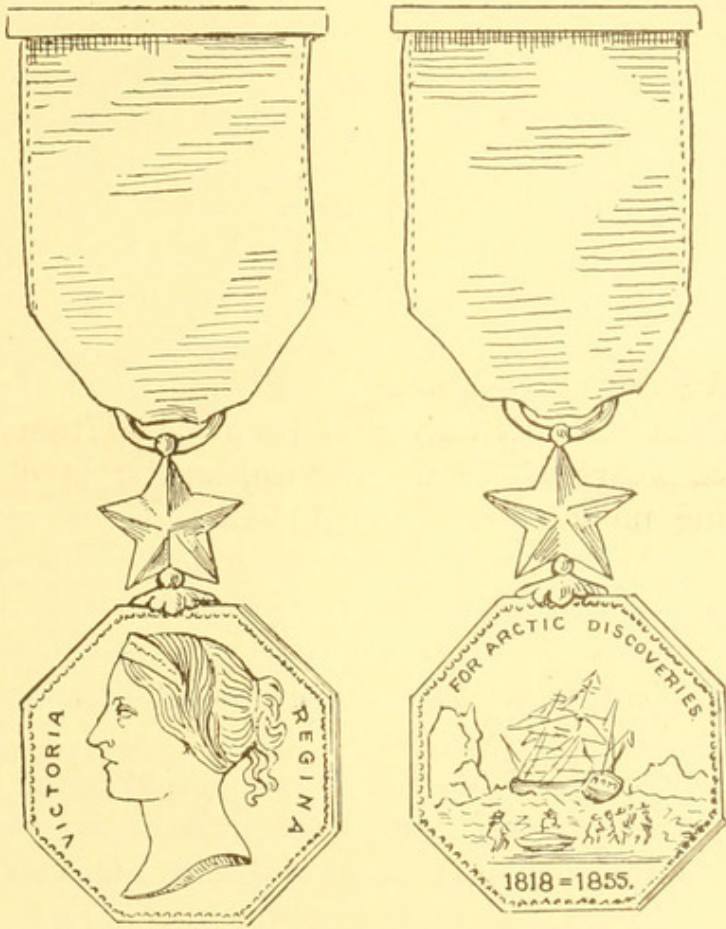


FIG. 2.—THE QUEEN'S ARCTIC MEDAL.

latitude $68^{\circ} 30'$ north, and longitude 128° west) was the principal point of investigation. It was situated on the right bank of the Anderson River, first visited by me in 1857. The Anderson River, which disembogues itself into Liverpool Bay, latitude 70° north, has its sources in the Reverend Abbé Petitot's "Ti-Degale" (Frost-hardened Mountain), lying at some "little distance" to the north of Great Bear Lake. For this exploration and the recovery in June, 1862, of the

barrier from bank to bank, with an open space near the center, in which a net was placed, and by means of which quite a large number of white fish and other fish were annually secured in course of the two or three weeks "run." The other marking on the ice is that of a dog meat-hauling and Indian winter track to the country lying across the Anderson River to the west of the fort.

dispatches delivered to the Eskimo by Capt. Robert McClure of Her Majesty's arctic search expedition ship *Investigator*, when off Cape Bathurst in the month of August, 1850, for transmission to England by way of Fort Good Hope and other Hudson's Bay posts, the British Admiralty (through the good offices of Lord Strathcona and Mount Royal, G. C. M. G.) were recently pleased to award me the Queen's arctic medal. When Sir Leopold McClintock returned to England from his expedition of 1857-1859, which ascertained the fate of Sir John Franklin and his companions, an octagonal form of the medal was struck for presentation to several of his officers and crew who had not received the round service medal of 1818-1855 previous to the latter date.

Although these notes chiefly relate to the collections made by the writer within the above-defined region, and at two or three other points, yet many incidental references were deemed necessary in respect to northern mammals obtained and observed by officers of the Hudson's Bay Company and others in the Mackenzie River District and elsewhere. It was also considered advisable to refer to similar work performed by officers of some of the British Government's arctic exploring and search expeditions which wintered in Dominion Polar Sea lands. Brief extracts have also been made from Gen. A. W. Greely's *Three Years of Arctic Service*, and from other land and water exploring publications, while the explanatory remarks, called for under each species of animal entered in the company's catalogues of their annual London fur sales, practically include every noticeable vantage point of observation throughout the vast domain in which their trade and commercial business has been conducted, particularly during the last eighty-two years.

With such a magnificent field for investigation as the "Anderson," as well as other interesting points throughout the vast regions in which he was stationed as a post and district manager for a period exceeding forty years (1852-1894), the writer of these notes has since deeply felt and regretted that, despite the many advantages pertaining to his position as a company's officer, he has not (except at Fort Anderson) done a quarter as much as a collector and observer as he might and ought to have accomplished in ascertaining and making known to naturalists the copious wealth of the animal kingdom in the northern lands of his adopted country.

It may be here premised that this paper was largely prepared for publication at Cumberland House, the headquarters of Cumberland District, early in the winter of 1890-91, but for various reasons it was not completed at that time, while, unfortunately, several sheets thereof, together with some relative memoranda, have since disappeared, and this will explain the paucity of the remarks appearing under certain species headings. Quite a large number of the speci-

mens of mammals which had been collected were lost or much injured by neglect on the part of their Indian and Eskimo collectors, or from various causes beyond careful control. The nomenclature of the following list has been carefully revised by the naturalists of the U. S. National Museum.

UNGULATA.

MOOSE.

Alces americanus (Clinton).

This valuable food animal used to be very numerous on the Peace River, and, indeed, throughout the forest region of the northern portion of the "Great Mackenzie Basin;" but for the last twenty years it has been much less abundant, and, indeed, remarkably scarce in many parts, especially along the Athabasca, Peace, Liard, and other rivers, and the larger lakes of the North. As moose have since been found more or less plentiful in the eastern, western, and southern sections of territory where for many years previously they were rather rare, or conspicuous by their absence, it is now supposed by some observing natives and others that considerable numbers of them must have migrated southward, particularly during the remarkably mild winter of 1877-78. Be that as it may, it has been noticed that at intervals, and for several years at a time, this animal has been rather scarce in various sections where it had formerly been fairly abundant. It is easily scared, and no doubt much hunting ultimately succeeds in driving it away to distant and less accessible retreats. Previous to the establishment of Fort Anderson, in 1861, moose were frequently seen by us on our annual winter trade trips from Fort Good Hope to (the Eskimos of) Liverpool Bay, feeding along the high sloping banks of the Anderson River, but they soon after diminished in numbers, and had already become somewhat difficult to discover when the post was abandoned, in 1866. They are, however, to be found sparsely there to the very edge of the wooded country, especially in sheltered river valleys. Traces were observed by us near the Wilmot Horton River in the Barren Grounds, in about latitude 69° north and longitude $126^{\circ} 30'$ west. I may also mention that on my way back from a visit made to Anderson River in July, 1860, I came across and traveled through a veritable moose preserve of some extent, which lay between the usual hunting grounds of the Loucheux of Peel River and the Hare Indians of Fort Good Hope. Several moose were seen and one shot, while traces of them were very numerous. It was also the resort of many black bears and woodland caribou. Again, for nearly a decade subsequent to 1865 (in that year Fort Nelson, which with all its inmates had been utterly destroyed by the Indians in 1813, was reestablished near its former site on the eastern branch of the Liard

River), moose were much more abundant in the adjacent country than they have ever been since. In the vicinity of farming and ranching settlements, however, they would seem to have become somewhat accustomed to the not distant presence of man, as is surely evidenced by their comparative abundance still in the eastern sections of the province of Manitoba (and elsewhere), although they have been much hunted there of late years. No doubt the close season and the due enforcement of the relatively restrictive killing law have been important accounting factors for this state of affairs, which is so satisfactory not only to naturalists and sportsmen but also to other interested residents.

During summer, when the weather is warm and mosquitoes very troublesome, moose resort for protection to the shores of lakes and streams, and while standing in the water they sometimes seem quite indifferent to the near presence of man, and will then retire only after being repeatedly fired at. I myself had proof of this on one occasion when ascending the Anderson River in the end of June, 1866. There were five or six in the party when we observed three full-grown moose in the water. As they were not in good condition, we did not care to kill them, but, in order to test the truth of this peculiarity, I made the Indians fire a number of shots very close to them, but to no purpose. In fact, we had to scream and yell at them before they got out and stalked away at a very leisurely pace. According to a consensus of Indian reports from various quarters, the moose copulate annually during the months, or moons, of September and October, and the offspring appear some nine months later. The female generally selects a dense thicket on a lake island or islet, or in a clump of trees on a dry spot in the midst of a marshy swamp or other submerged tract of forest, for the purpose of bringing forth her young, which are usually one or two, and occasionally, it is said, as many as three, in number. At birth, the hair-covering is very short and of a dirty-yellowish color, the eyes are open, and the newcomer is rather weak and helpless; but, after a comparatively short time, it is able to move about and soon becomes quite active. Suckling is supposed to continue for two or three months. When in good condition and stalked, the flesh of the moose is excellent eating and, on the whole, more tender and luscious than the venison of the red deer or either species of caribou; but animals killed after a long chase on snow, or during, or after the rutting season are far from palatable, owing to a strong and very rank flavor then acquired. The skins are dressed by native women and the resulting smoked leather is made into tents or lodges, moccasins, tunics, shirts, and trousers for winter and summer use by the resident population of the interior. Some skins are also cut up for pack cords and others turned into parchment for the requirements of the Hudson's Bay Company and others. Hunters assert that hermaphrodites and barren females are sometimes met with, and that these imperfect exam-

ples almost invariably attain a larger size and heavier weight than their fertile kindred. Chief Trader H. I. Moberly, an experienced officer, hunter, and woodsman, confirms the truth of this statement from his own personal observation. In his North West Passage, Doctor Armstrong mentions that Capt. Sir Robert McClure, one of a small party of explorers sent out in the spring of 1851 from Her Majesty's Franklin search-expedition ship *Investigator*, then wintering in Prince of Wales Strait, said that he saw three animals which he firmly believed to be moose in about latitude 71° north and longitude 114° west. I think this is the first and only record of this animal having been met with on the lands lying to the north of the American Continent.

Chief Trader James Lockhart has recorded that "the moose down at Peel River and Fort Yukon are much larger than up this way [Great Slave Lake and Fort Simpson]. There, I have known two cases of extraordinary moose having been killed [probably one or both were obtained at Peel River], the meat alone of each of them weighing over 1,000 pounds. The Loucheux have a superstition that the Indian who meets with one of these extraordinarily large moose is sure to die within the year, or else meet with some grievous misfortune".^a

The above may belong to the gigantic species recently discovered on the western coast of Alaska, or they may be representatives of those referred to by Mr. Moberly. I have never met any of these monster moose, although of course I have seen examples weighing considerably over the general average.

WOODLAND CARIBOU.

Rangifer caribou (Gmelin).

I do not think this species extends much beyond latitude $67^{\circ} 30'$ north, except perhaps in spurs of the Rocky Mountains to the west. It is a larger animal than the Barren Ground reindeer, and is not met with in the "barrens" proper, nor on the shores of the Polar Sea. Like the latter, the females produce one or two fawns in spring. The rutting season, as well as the period of gestation and time of birth, are said to be much the same as in the case of moose. The eyes of the young are open when born, the skin is light brown, and they soon become quite lively and strong. They are suckled for several months. The skin of the woodland caribou is dressed by the native women and afterwards made into necessary moccasins, gloves, tunics, and trousers, and sometimes women's dresses. Those cut by the gadfly are converted into "babiche" for lacing snow-shoes, and occasionally into thongs of various thickness, which were formerly, if not now, twisted into snares for capturing deer. Herds of the

^a Proc. U. S. National Museum, XIII, 1890, p. 307.

woodland species seldom exceed thirty or forty individuals, except in the autumn, when sometimes quite a large number congregate together. They do not associate with the Barren Ground reindeer, and seldom quit the forest country. Although known to exist at no great distance to the south, we never, to my knowledge, received at Fort Anderson an example in the flesh, except the ribs of a few in a dried state; but in course of my six years' charge of Fort Good Hope (latitude $66^{\circ} 16'$ north), the Hare and Nahanni Indians frequently supplied the establishment with a number of dressed skins and a considerable quantity of the venison of this animal. A similar remark would apply to my five years' residence at Fort Simpson (latitude 62° north, longitude 122° west); but although the species is fairly distributed throughout New Caledonia district, British Columbia, we seldom obtained any of its meat or preserved skins during my two years' charge. It is not uncommon in the Athabasca and Peace River districts, nor at Cumberland House, Saskatchewan, where we occasionally received some venison and skins, while I was stationed there in 1889 to 1894. It is not improbable, however, that the variety of woodland caribou found in the Rocky Mountains of northern Canada may belong to the mountain caribou discovered in the Selkirk Range of British Columbia and made known to science by Mr. Thompson Seton in 1899. It is said to be darker in color than Maine and other eastern specimens.

BARREN GROUND REINDEER.

Rangifer arcticus (Richardson).

Although this interesting animal has of late years been very irregular in frequenting ancient passes and haunts in the forest country, and in numbers very considerably less than formerly, yet it is believed to be still very numerous in the "Mackenzie Basin." The northern Indians were accustomed, in the face of repeated remonstrances on the part of the company's officers and resident missionaries, to slaughter thousands of reindeer annually, chiefly for the skins and tongues, and too often from the sheer love of killing. But as they have latterly experienced protracted spells of food scarcity and even actual starvation, I believe it has taught them to be more careful and provident. Since the introduction of steam also into the districts of Athabasca (1883), and the Mackenzie River (1886), the provision posts of both have not been called upon to furnish more than a bare quota of the quantities of dried meat and pemmican absolutely required under the old inland York boat system of transportation. The hunting of reindeer has, therefore, largely declined, no doubt to their increase in numbers, and the Indians are able to devote more of their attention to the trapping of fur-bearing animals. The Eskimos of Anderson and Mackenzie rivers, however, were never guilty of waste of food in the

same inexcusable manner. They are a more provident race, and seldom suffer privation for want of food. In course of the company's five years' occupation of Fort Anderson, we received considerable quantities of venison and many skins of the Barren Ground reindeer from the Eskimos and Indians who resorted thereto for purposes of trade.

During the comparatively short season of open water, the Anderson and Liverpool Bay Eskimos were engaged in fishing and hunting reindeer along the river, as well as walrus, seals, and sometimes whales in the contiguous polar seas. In spring, when the reindeer were on their annual migration to the coast, but especially on their fall return to the woods, the Eskimos shot and speared a great number; in the former season while browsing on the slopes and summits of the Anderson River banks, and in the latter, when in the water making for their customary crossing points or passes. In both cases, the successful hunter inserted an arrow in the carcass, so that on its floating by the lodges lower down the river it might be taken ashore for the benefit of the party by whom it had been killed. Early in December, the Eskimos usually retired to their driftwood-constructed huts, or winter houses, at various points along the coast, but before doing so they always made more or less provision for their return to the Anderson River in the beginning of the succeeding month of April, by placing in one or more caches (built on and formed of large blocks of thick ice, well protected from wolves and wolverines, the chief robbers to be feared) some 30 or 40 miles from its outlet in Liverpool Bay, a considerable quantity of fresh venison. Early in March, the female seals begin to bring forth their young, and the seal then became the chief object of chase by the Eskimos, who, as the days lengthened, moved out seaward on the ice from their winter residences on the coast to engage in the interesting task of hunting seals. After reaching the aforesaid caches, the bulk of the Eskimos would remain in the neighborhood, using the meat, trapping foxes, and killing a few reindeer and making the usual preparations for the summer season, until the disruption of the ice, when many of them would ascend the river, visit the post, and spend some days in its immediate vicinity, and in due time proceed to the seashore.

When I first reached the mouth of the Anderson River, early in February, 1859, instead of a village, as I was led to expect, there was but one large house inhabited by fifteen men, women, and children, while the nearest group of huts was, as they informed us, at too great a distance for us to visit in the very cold and stormy weather which usually occurs at that season, and which, indeed, prevailed during our two days' stay there. Our party comprised one Scotchman, one Swede, one French half-breed, and one Loucheux Indian, with two trains or teams of three dogs each. We found our quarters very warm and comfortable. Fort Anderson was established in 1861, after we had

made several more winter trips to the same house, as well as to the spring provision rendezvous on the ice, already mentioned. By the autumn of 1865, however, several new huts were built at intervening distances from there to within some 60 miles from the post. This was done at my request, and their occupants met with some success in trapping foxes and minks, with a few martens, in the wooded ravines farther south. On this and subsequent winter trips to the coast, we observed fresh traces of reindeer, while the Eskimos informed us that some animals were occasionally seen, and a few shot, most every winter, very close to the ice-covered sea. The Fort Indians usually snared a number of reindeer in spring and summer, but their big annual hunt was made in the fall, when they frequently shot and speared them by the hundred. During the winter season they always succeeded in killing a few individuals now and then, but more, of course, when the snow happened to be deeper than usual.

When the fall of snow is light and the weather severely cold, the reindeer are almost constantly on the move, and are then very difficult of approach. At such times, especially when rabbits are scarce, the "caribou-eating" Indians frequently suffer much privation for want of food while following them for a living in their winter peregrinations. The skin of the reindeer furnishes the Eskimos with nearly all of their summer and winter clothing. The hair or fur is never removed in this connection; the made-up skin of the fawn forms the inner shirt, with the fur side next the body. (The skin of the musquash is sometimes used in a similar manner.) The outer tunic, shirt, or capote, with hood attached, is made from selected portions of adult late summer or early fall skins, with the hair outside and having the borders trimmed with a thin strip of the fur of the wolf or wolverine. A sufficient number of similarly scraped but undressed skins are sewed together and mounted on poles to form a summer tent or lodge, and also for sleeping robes or blankets for personal and family use. These robes are as flexibly prepared as the tunics, and are very comfortable on a cold, windy night. The Indians are also generally indebted to the reindeer for winter robes and capotes, and likewise for tents and dressed leather for making moccasins, gloves, tunics or shirts, trousers, game bags, and women's and children's clothing. Certain inferior and many fly-cut skins are converted into "babiche" for lacing snowshoes, and other suitable skins are made into deer snares and parchment for windows, while the tendons of all are split and twisted into fine and excellent thread for general use.

The remarks made under *R. caribou* in respect to the number and appearance of the young at birth, etc., are equally applicable to this species. I may here remark that albinos are very rare among the northern deer. In 1886 I obtained a fine example, which was forwarded to the Smithsonian Institution at Washington. It had been

killed the previous winter by an Indian near Fort Chipewyan, Lake Athabasca, but, although I heard of a few instances elsewhere, I think this was the only one I ever saw in the interior. The company generally exports a number of reindeer in a parchmentary and Indian-dressed state, which seldom realize more than their actual cost. In the years 1902 and 1903, respectively, they sold in London 321 and 267 reindeer skins.

Doctor Armstrong, of the *Investigator*, writes that besides several white bears, musk oxen, and other polar animals herein referred to, the hunters of that ship, while wintering in Prince of Wales Strait, saw a number of reindeer, though they failed to secure even one. In Mercy Bay, latitude $76^{\circ} 6'$ north and longitude $117^{\circ} 55'$ west, however, where it was finally abandoned on June 3, 1853, the total number of reindeer killed between October, 1851, and April, 1853, was 112. After reaching Melville Island, about latitude 75° north and longitude 109° west, the doctor, with several officers and men of Her Majesty's arctic ships *Resolute* (Captain Kellett) and *Intrepid* (Captain McClintock), shot a large number of reindeer and several musk oxen, the meat of which weighed over 10,000 pounds. After four seasons' experience, Doctor Armstrong came to the conclusion that the reindeer inhabiting Baring Island do not migrate to the southward thereof. In Mercy Bay and Prince of Wales Strait, many individuals and small herds were seen and a number shot during the severest months of the winter. "In May and June the females calved in the ravines and valleys bordering on the coast where the sandy soil mixed with the alluvium forms a rich loam which highly favors vegetation and affords good pasturage for the hungry denizens of its wilds." As reindeer are present all winter on Melville, Baring, and other large islands of the polar regions, I think it may be confidently assumed that there is no migration from them to the continent. On the latter, however, from Port Kennedy (latitude 72° north and longitude 94° west), Bellot Strait, its northeastern extremity, there is apparently a regularly recurring season of migration south and north. There may be a similar annual movement of reindeer between the northern coast and Wollaston Land by way of the Union and Dolphin Strait, and also from Victoria Land to Kent Peninsula by way of Dease Strait. Lieutenant Schwatka and Colonel Gilder observed considerable numbers of them passing over the ice on Simpson Strait late in the spring and early in the winter of 1879 between Adelaide Peninsula and King William Land (Island). General Greely gives latitude $82^{\circ} 45'$ north as the probable highest polar range of the reindeer. An antler and old traces were found on Grinnell Land. Sir J. C. Ross writes that the does arrived at Boothia in April and the bucks a month later, while herds of several hundred were seen in May. He also mentions that "the paunch of the deer is esteemed a great delicacy, and its contents is the only

vegetable food which the Eskimos of that country ever taste." While stationed at Mercy Bay, Doctor Armstrong made "various sectional preparations of the antlers of the reindeer in different stages of growth, as illustrative of its rapidity, in the hope of elucidating one of the most surprising processes of animal growth which bounteous nature enables us to contemplate as evidencing her wonderful reproductive powers." Unfortunately for science, however, these specimens, together with a fine collection of birds, mammals, and other objects of natural history, were left behind along with the abandoned ship *Investigator*. As already mentioned, a number of hardy reindeer bucks remain all winter near the arctic coast of the lower Anderson in Liverpool Bay.

Statement showing the yearly migration of the Barren Ground reindeer from the north, and their spring return thereto, as observed at the Hudson's Bay Company's post of Lac du Brochet, Reindeer Lake, 1873 to 1890.

Season.

1873.

None were observed passing the neighborhood of the post.

1874.

May 9. First deer seen on their spring migration to the north.

Nov. 14. First deer seen on their yearly return from the north.

1875.

Apr. 26. First deer seen on their spring return to the north.

Oct. 27. First deer seen on their autumn return from the north

1876.

May 17. First deer seen on their spring return to the north.

Oct. 29. First deer seen on their autumn return from the north

1877.

Apr. 21. First deer seen on their spring return to the north.

Dec. 28. First deer seen on their autumn return from the north.

1878.

Apr. 27. First deer seen on their spring return to the north.

Nov. 12. First deer seen on their autumn return from the north.

1879.

Apr. 24. First deer seen on their spring return to the north.

Nov. 18. First deer seen on their autumn return from the north.

1880.

May 12. First deer seen on their spring return to the north.

Nov. 26. First deer seen on their autumn return from the north.

1881.

Apr. 22. First deer seen on their spring return to the north.

Oct. 24. First deer seen on their autumn return from the north.

1882.

Apr. 26. First deer seen on their spring return to the north.

Dec. 15. First deer seen on their autumn return from the north.

1883.

Apr. 26. First deer seen on their spring return to the north.

Nov. 6. First deer seen on their autumn return from the north.

1884.

May 1. First deer seen on their spring return to the north.

Season.

1885. None were observed within many miles of the establishments.
 1886. None were observed in the spring or autumn of this season.
 1887. None were observed in the spring or autumn of this season.
 1888. None were observed in the spring or autumn of this season.
 1889. None were observed in the spring of this year.
 Dec. 21. First deer seen on their autumn migration from the north.
 1890.
 Apr. 16. First deer seen on their spring migration to the north.

ROCKY MOUNTAIN GOAT.

Oreamnos montanus (Ord).

The Nahanni tribe of Chipewyan, or Athabasca, Indians of the Mackenzie River District kill a number of these goats annually in the northern ranges of the Rocky Mountains; but it is perhaps remarkable that no wild sheep or goats are met with in even the most extensive spurs thereof, situated on or to the eastward of that great river. They extend, however, north to the Arctic Circle, if not beyond. At Forts Norman and Good Hope the company frequently receives small quantities of the dried meat of this animal from their Indian hunters on the west side of the river and in the mountains.

DALL'S MOUNTAIN SHEEP.

Ovis dalli (Nelson).

It is probably this recently-determined variety, or species, of wild sheep which inhabits the Rocky Mountains of the lower Mackenzie River to the arctic coast, while the true Bighorn, *Ovis canadensis* Shaw, exists in the ranges to the south. Some of the western Eskimos, who occasionally resorted to Fort Anderson, wore outer coats or capotes made from the skin of this animal, with the hair attached. The Nahanni tribe of Indians belonging to the company's northern posts of Nelson, Liard, Simpson, Norman, Good Hope, Peel River, and La Pierre House usually brought in for trade, small supplies of the meat of the goat and sheep of the Rockies in a partly smoked or sun-dried state. We always considered it, when in prime condition, second to no other variety of flesh food to be had in that extensive territory.

MUSK OX.

Oribos moschatus (Zimmermann).

This interesting member of the family Bovidae has not, so far as I am aware, been discovered in the flesh to the westward of the Mackenzie River, nor, as a rule, are many met with in the tract of country lying to the eastward between that stream and the Anderson. Mr. P. Deschambeault distinctly remembers having, upward of fifty years

ago, seen his first musk-ox skin at Fort McPherson, Peel River, then in charge of his father, Chief Trader George Deschambeault. It had probably been taken from a straggler by an Indian on the east side of the Mackenzie River. In the "Barrens" proper, however, as well as along the arctic American coast, and on the borders of, and for a short distance within the northern forest region to the southeastward, in winter, musk oxen are fairly, though in no one place or section very numerous. In fact, very few were ever observed by us on any of our several specimen-collecting tours from Fort Anderson to Franklin Bay, or on any other of our many summer and winter journeys within the Arctic Circle.

On one occasion, however (July 4, 1864), on our way back from that bay, we saw a herd of twenty-five animals of various ages reposing on the side (and just below the summit) of a gentle eminence in the Barren Grounds. A patriarchal-looking bull on the top of the eminence evidently kept guard, while the others appeared to sleep. I had been for some time endeavoring to obtain a pair of live calves for shipment to London and as this seemed a good opportunity for making an attempt in that direction we rapidly advanced to about 300 yards from their position, when we halted and unloaded our twelve Eskimo pack-carrying dogs and sent them at the herd, while several of the fastest sprinters in our party of twenty followed as closely as they could. As soon as the dogs were perceived, the sentinel gave the alarm and the musk oxen immediately set off in different directions, apparently very much startled, but when the dogs began to bark the musk oxen rallied instantly, came together, and presented a rather formidable front to their assailants. This military-square-like formation on the part of the musk oxen seemed to have a rather terrifying effect on our dogs, as they almost ceased to bark, though now within a few yards of the herd. In the meantime we were all rapidly nearing the herd, and I was in hopes that with our dogs we might be able to surround or run down and capture one or more of the several spring calves observed. When they became aware of our near presence—the close proximity of the dogs (who resumed their barking) having taken up their attention—by the premature firing of a shot which fatally wounded one of the larger animals they all scampered away at such a sweeping canter that we soon gave up the chase as hopeless, although our dogs continued to follow them for some time, but later returned to partake of the spoil of the killed animal. After skinning the three-year-old male, we noticed a moving object at some distance, which we supposed to be one of the dogs, but it turned out to be a spring calf which had evidently swerved from the main body and was doubtless searching for its mother. Several of the party thereupon started out with the dogs in full pursuit, and we all had to show our best paces for several hundred yards before we could

reach the spot where he was brought to bay. We at once secured him by means of a looped line, but not before he was wounded by the dogs. We had much trouble in getting the calf to accompany us—in fact, we first let him rather exhaust himself in bucking and kicking like a goat, while he stubbornly refused to be led by a line. After a time, when prodded from behind, he would make a rush at his leader, but he eventually quieted down and followed the Indian to the camp. Next day he seemed rather subdued and gave no trouble, not even when being carried across the Wilmot Horton River, but to my deep regret he died at sunrise the following morning, having no doubt bled to death internally. On reaching Rendezvous Lake, near the end of the eastern limit of the woods, my disappointment was great when I learned that a female spring musk-ox calf, which had shortly before been secured for me by an Anderson River Indian, had been killed by dogs during the previous night. Subsequent attempts in the same desirable direction unfortunately failed, and the field is therefore still open for the successful efforts of some favorably circumstanced and luckier party.

On another occasion (June 29, 1865), near the Wilmot Horton River, we shot a large bull which was grazing on a flat plain bordering on a small stream named Eagle. After approaching him we unloaded our dogs and they soon surrounded and began barking at him, a course which he resented by endeavoring to impale one of them on his sharply curved horns, but just as we were coming within gun range he noticed us and at once made off at full speed. It was surprising to witness the seemingly easy, but really swift, gait at which this rather short-legged and clumsy-looking beast ascended a somewhat steep hill in front of him. A long and well-directed shot, however, suddenly ended his career. The beef proved acceptable to the men and dogs, and it neither smelled nor tasted of musk, as it often does later in the year, but especially during the rutting season when it is scarcely eatable except by natives and a few of the company's servants blessed with strong appetites and good digestive powers. The hide was secured, but the skin was so dilapidated, owing to the thick inner coating being still unshed except in large ugly patches, that it was useless as a specimen.

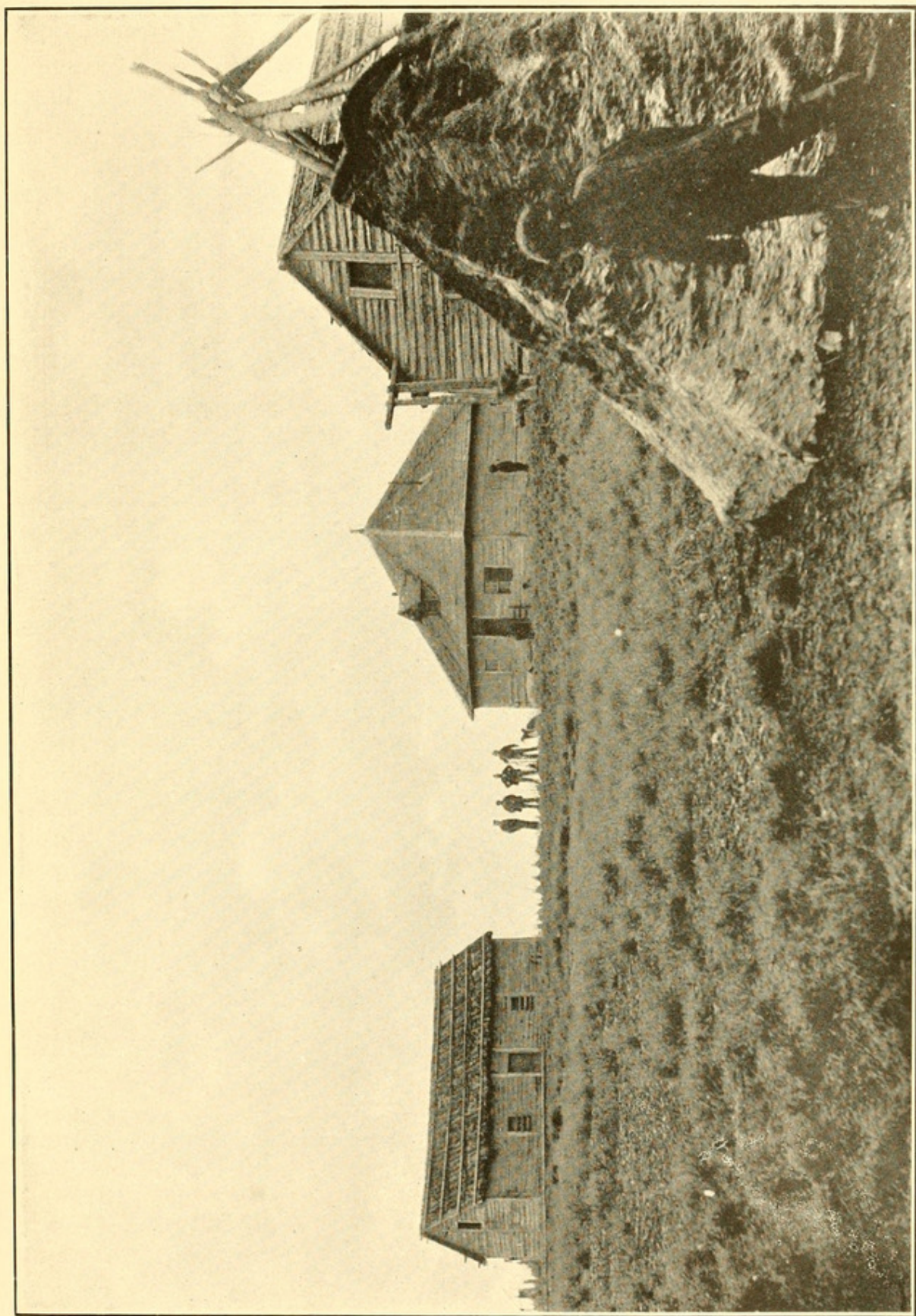
During the severe cold of winter, the musk ox enters the outer sections of the forest and is frequently found therein to a distance of 40 or 50 miles, while we have heard of more than one instance where a stray animal had been killed at fully 100 miles from the nearest "Barrens." The most southerly wandering of the species beyond the limits of its normal range is that recorded by Mr. Preble in *North American Fauna*, No. 22 (1902). A pair was seen on the "Barrens" between York factory and Fort Churchill in about latitude 57° north, and the male was shot. This authentic information was obtained by

Mr. Preble from Dr. Alexander Milne, factor, Hudson's Bay Company, Winnipeg.

The northern range of the musk ox is truly polar. Nearly every wintering arctic expedition has met with them singly or in small (never in large) herds. Former traces have also been observed at many northern points, while on one occasion a traveling party on Melville Land (Island) saw a pure white individual among a comparatively large herd—probably the only instance of the kind on record. Between September 3, 1852, and September 9, 1853, the hunters of Her Majesty's arctic ship *Resolute* shot 114 musk oxen on Melville Island, a clear proof of itself that they are fairly abundant in that locality. Doctor Armstrong, of the *Investigator*, says that in Prince of Wales Strait five, and during his stay in Mercy Bay, Banks Land, two full-grown animals were killed. Several were also shot by himself and Lieutenant Pim on Melville Island. In 1875-76 Sir George Nares, of Her Majesty's exploring ship *Alert*, who wintered in latitude $82^{\circ} 27'$ north, longitude $61^{\circ} 22'$ west, secured quite a number of animals. The first herd seen consisted of a veteran and two young bulls and four old and two young cows. They were all surrounded and, with the exception of the first-mentioned, which required several bullets to finish him, were easily killed. Nares refers to the fact that in 1872 the crew of the American expedition ship *Polaris* shot twenty-six animals on the opposite side of Kennedy Channel during the twelve months passed by them in that latitude.

Markham remarks that "musk oxen ascend hills and climb over rocks and rough surfaces with great ease." He further adds that "they are very irascible when wounded, and will sometimes attack a hunter and seriously endanger his life." Doctor Armstrong has also recorded an interesting experience in Prince of Wales Strait in which the dam and sire of a small herd brought to bay bravely stood in front protecting the others in the rear, an action which surely afforded strong proof of their affectionate instinct. On this occasion three males, the mother, and a young female calf were all shot. Sir Leopold McClintock, who had been engaged in several Franklin search expeditions, writes:

The white cow (the albino observed on Melville Island) was accompanied by a black calf. The musk ox clammers up the steepest rocks like a goat, and, when running, his long black hair heaves up and down, streaming in the breeze, and gives him a peculiarly savage appearance. It is so long that he occasionally treads thereon, and one finds hairs almost 2 feet in length stamped into the snow. There is an undergrowth of very thick wool so soft and silky that the warmest gloves have been made of it. The musk ox is not absolutely deficient of a tail, but it never exceeds $1\frac{1}{2}$ inches in length. They do not seem to cross from one island to another, as the reindeer do, but usually roam about in small herds. Unaccustomed to man, they seldom deigned to notice us until we came tolerably near; then they would gen-



FORT McPHERSON ON PEEL RIVER.
The most northerly post of the Hudson's Bay Company

erally close together in an attitude of defense. While facing you their massive horns so effectually shield every vital part that it is useless to fire, and therefore a single sportsman must wait until their patience is exhausted and they alter their position; but it is desirable to get behind a block of glassy ice, a rock, or some rough ground, where they can not charge straight at you, which we have known them to do before, as well as after being fired at. I once came across a solitary old bull which instantly faced me, spent a few seconds rubbing his horns against his fore legs (a sure sign that mischief is brewing) and rushed on me at full speed; but I had taken the precaution so to approach him that I was able to shoot him when he halted on the brink of the ravine down which I had retreated.

McClintock further says that three or four sportsmen may station themselves about a herd at a distance of 70 or 80 yards, and then pick off the restless ones first, which so greatly bewilders the remainder that they are easily secured. He was himself one of three who thus shot down a herd of ten in three or four minutes. No wonder, therefore, that he ardently longed for a similar experience at Fort Kennedy, as it would have furnished the crew of his vessel with fresh meat every day for three months, but unfortunately not an animal could be seen. In the vicinity of Fort Conger, Lady Franklin Bay, Grinnell Land, in latitude $81^{\circ} 44'$ north and longitude $64^{\circ} 45'$ west, General Greely, U. S. Army, commander of the American expedition, secured 103 examples of the musk ox. He gives latitude $83^{\circ} 3'$ north as the highest point where traces of this animal were observed by Lieutenant (Captain) Lockwood.

One or two writers have said that lichens form an important item in the diet of the musk ox, but Greely is positive (and I agree with him) that none of his party ever observed them eating any, while the stomachs of a large number examined by him did not contain a trace thereof. The contents clearly demonstrated that they fed on dwarf willow, saxifrages, and grasses. They use their hoofs in digging for these when the ground is covered with snow. There must, however, be fairly good pasturage in certain fertile spots amid the generally desolate and sterile lands situated in high latitudes, similar to that described by Doctor Armstrong as occurring on Baring Island, or it would be utterly impossible for reindeer and musk oxen to subsist there, as many do all the year round. Of course, no such food scarcity exists on continental America, even in the so-called "Barren Grounds." Like all wild animals, the musk ox in winter quenches its thirst by eating snow.

As spring advanced, the musk oxen of the Anderson country migrated northward. The females are said to produce one, and sometimes two, at a birth. The company's posts at which skins are usually traded are Fort McPherson (from the eastern coast Eskimos), Forts Good Hope and Norman (from the Anderson Eskimos and from post Indians who specially hunt them), Rae and Resolution on Great Slave Lake (from Indian hunters), Lac du Brochet, Reindeer Lake (from the

inland Eskimos), and Fort Churchill (from the Hudson Bay Eskimos). It is only in recent years, however, that the company has strongly encouraged the hunting of musk oxen, and although there is no record of the sale of any in the London Statement, 1853 and 1877, yet we now know that a number of pelts were occasionally, if not annually, traded at Forts Churchill and Anderson, at least subsequent to 1860, and that they must have sold there or in Montreal (the British company's market for buffalo robes), as the statement of the northern department fur-returns for outfit 1865, printed herewith (p. 756), shows that the districts of Mackenzie River and York, Hudson Bay, collected 25 and 66 musk-ox skins, respectively, in that year. During the last thirty years, the Indians and Eskimos have devoted more attention than before to the hunting of this valuable animal. In 1902, 271 skins and in 1903, 246 skins were exposed for sale, and the average for the past twenty years probably ranged between 200 and 250 pelts. The greater portion of those secured by the company are purchased in London and reshipped to, and used in Canada and the United States, chiefly as sleigh and cutter winter robes. In his Explorations in the Far North, Dr. Frank Russell, of the Iowa State University, has given a very interesting account of his successful efforts in hunting the musk ox in the Fort Rae Indian country. His other experiences in the territories of Canada are well worthy of perusal, while his services to science reflect much credit on himself and his alma mater. Mr. Caspar Whitney's achievements in the pursuit of the musk ox, under the unfavorable conditions as narrated in his published volume, also deserve commendation.

WOODLAND BUFFALO.

Bison bison athabascæ Rhoads.

This variety of the American bison was fairly numerous when I first went north to Mackenzie River in 1853, but it has since gradually diminished in numbers in the Athabasca district, and its utter extermination is now only a question of time, unless restrictive hunting rules are adopted without delay. When Thomas Simpson, the celebrated arctic explorer, traveled down the valley of the Clearwater River in January, 1837, traces of buffalo were quite abundant, but for the last forty years they have practically forsaken that quarter and have dwindled so greatly in number that only a few individuals are now to be met with in open spaces and patches of prairie in sections on the west side of the Athabasca River, between Fort McMurray and the Birch Mountain, as well as in similar tracts of country from Pointe a la Paix on the lower Peace to the plains of Salt River in latitude 60° north, which had from time immemorial been regularly frequented and occupied by hordes of bison. At the end of the eighteenth and in the earlier part of the nineteenth century, buffalo were abundant on the upper

Peace River, and many also roamed to the northwest as far as the Liard River. Even as late as 1864 a straggler was killed within 40 miles of the company's post of that name and another in 1866 about 25 miles from the same. Sir J. Richardson states that there were some bison in the Horn Mountain, southeast of Fort Simpson, in the beginning of the last century (1800), while some were also met with on the east side of the Athabasca, below and above Fort McMurray. During a residence of fifteen years (1870 to 1885) at Fort Chipewyan, Lake Athabasca, our native fort hunters never failed in winter to kill one or more bison for the use of the establishment, the meat of which was hauled thereto by the company's dogs and servants. Nearly all of them were shot on the north side of the lower Peace River. At that time, the Indians of Forts McMurray and Smith always secured a number in autumn and winter. Having seen the skins of numerous prairie buffalo many years ago, and those of several of the woodland variety, I think the only marked difference I noticed was that the outer hair of the latter is darker in color, and the inner is of a finer, thicker, and probably warmer texture than that of the former, while it is doubtful if the average "dressed beef" of either animal of the same age would materially differ in weight. In the winter of 1871-72, an Indian shot an albino example of the bison some 35 miles northwest of Fort McMurray. This skin was throughout of a faint yellowish white color. I have been repeatedly assured by Indians that the female very rarely has more than one calf at a birth. They have also said that, in winters of deep snow, wolves succeed in destroying some animals. They themselves have too often been guilty of unnecessary slaughter of bison under similar conditions, especially in former years. In the month of March, 1879, a small band of Chipewyan Indians discovered traces of a herd, consisting of twenty animals of various ages, near the Birch Mountain, and the snow being deep they did not suffer even one to escape. None of the flesh, however, was wasted; all of it was consumed by the party. The company never exported any Woodland bison skins for sale in London or Canada. Mr. P. Deschambeault remembers seeing in the early fifties of the last century two fine albino examples of the prairie buffalo in possession of Chief Factors John Rowand and James G. Stewart, both of which had been secured on the plains of the upper Saskatchewan River.

CARNIVORA

CANADA LYNX.

Lynx canadensis Kerr.

This is one of the principal periodic fur-bearing animals which regularly increase and decrease in numbers about every decade. The experience of observers, largely corroborated by the company's London

sales, is pretty much as follows: The catch of lynxes for each of (say) three seasons when they are least numerous, or rather comparatively scarce, fell sometimes as low as 4,000 or 5,000 skins as the entire output for the immense extent of territory covered by the Hudson's Bay Company's business operations. The fourth year would double these quantities, the fifth often more than doubled the fourth, the sixth doubled the fifth, while the seventh almost invariably witnessed the maximum trade of skins. The eighth would still be good, while the ninth and tenth would each exhibit a startling decline in the returns, which in quantity would closely correspond with the sixth and fifth years, respectively, in each decade. Indeed, the regularity of these peculiar results in seasons of scarcity and plenty is remarkably interesting.

The Canada lynx is very widely distributed over the "Great Mackenzie Basin." It feeds on eggs, ducks, partridges, mice, stranded fish, and occasionally on a land-captured beaver, young deer, or sheep, while rabbits, of course, form their staple article of diet. It is chiefly taken in snares; some are trapped, and others are followed up with dogs, treed, and shot. The flesh is white and tender, and is an important and much-relished native country product. The female is said to bring forth from two to five, and not unfrequently as many as six, at a birth annually in June and July, the period of gestation being about three months. The young are about the size of a puppy, with the eyes partly open, but are very helpless for several days. They are suckled for about two months.

For the twenty-five years from 1853 to 1877, inclusive, the company sold in London a total of 507,450 skins of the Canada lynx, or an average of 20,298 a year. During that period, the minimum sale was 4,448 in 1863, and the maximum year was 1868, with 76,556 skins. The number entered in their catalogue in 1902 is 5,701, and in 1903, 9,031.

WHITE WOLF.

Canis albus (Sabine).

GRAY AND BLACK WOLF.

Canis griseus (Sabine).

The white is the most abundant variety of wolf in the far north; next comes the gray, and the black is the rarest. These wolves yearly succeed in killing as prey quite a large number of reindeer and not a few moose. On one occasion, while traveling upon the ice between Forts Liard and Nelson, in the Mackenzie River District, we came across a big patch of hard-packed snow on the Liard River where a large buck moose had evidently been surrounded and no doubt overpowered, after a most gallant fight for life, by perhaps a score of fero-

cious and cowardly wolves. A few well-picked bones and the skull were the only relics left. At a short distance, however, we perceived a full-grown gray wolf, which was at once shot. It had one of its hind legs shattered by a kick from the moose, which so disabled it that it could scarcely crawl. Had its companions not been fully gorged they would doubtless have fallen upon and eaten it too.

Although the old saying "mad as a March wolf" may not apply generally, yet there are seasons when many of them undoubtedly suffer from distemper similar to that which some years attacks Indian and Eskimo dogs, and are then more or less dangerous. In the month of March, 1868, large numbers of northern wolves were thus affected, and several Indians and one or two servants of the company were attacked and narrowly escaped being bitten, while it was currently reported that an elderly native woman had been killed about that time in the forest at a distance of several miles from Fort Rae, Great Slave Lake. Instances have also occurred where they have carried off dogs from the vicinity of the posts, and also from the winter night encampments of northern travelers.

In some seasons, the woodland wolf is more abundant than usual at certain points throughout the north. It is naturally more numerous in sections where reindeer abound. It breeds once a year—the female has from three to five, and occasionally as many as six at a birth. The eyes of the young are closed, and they are as helpless as dog pups for some days after they are born. The male is believed to assist his mate in rearing the offspring. Copulation of the sexes takes place during the months of February and March.

Wolves of this kind have been observed and some captured on many of the large islands to the north of the American arctic coast. Doctor Armstrong noticed a number on Baring Island and elsewhere, while Sir James Clark Ross states that considerable numbers of them collected on the narrow portion of the Isthmus of Boothia Felix in order to intercept the reindeer on their annual spring migrations. He also mentions that a single wolf will go among any number of Eskimo dogs and carry off one from among them without the others attempting an attack. General Greely's party obtained six examples at or near their winter quarters at Fort Conger, in Lady Franklin Bay, and he gives latitude $82^{\circ} 50'$ as the northern limit of this animal which is there indigenous. Sir Edward Parry records its presence on Melville and the other North Georgian Islands.

In the sketch of North Western America (1868), Archbishop Taché, of St. Boniface, Manitoba, recounts a remarkable instance of persevering fortitude exhibited by a large dark wolf caught in a steel trap at Isle à la Crosse many years ago. A month afterwards, it was killed near Green Lake, 90 miles distant, with the trap and connecting wood block still attached to one of its hind legs. It had evidently dragged

both around in the snow for many a mile, during a period of intense cold, and it was therefore not surprising that he was a "walking skeleton" when finally secured.

From the statement 1853-1877, inclusive, the company sold in London as many as 171,770 wolf skins, or an average of nearly 6,871 a year. I think more than half of them must have belonged to the smaller variety (*Canis latrans*) of the prairies and British Columbia. The three best sales were in 1855, with 15,419 (the maximum), 12,659 in 1859, and 12,616 in 1866; the three lowest, 2,802 in 1872, 2,083 in 1876, and 1,865 (the minimum) in 1877. In 1902, they sold 1,340, and in 1903, 1,790 skins. From 1858 to 1884, Athabasca District contributed 2,119 skins of the woodland (black, grey, and white) wolf to the London sales. For the outfits 1885 to 1889, it made a further addition of 339 skins. Between 1863 and 1884, inclusive, the district of Mackenzie River supplied a total of 1,880 skins of this animal. Its quota in 1889 was only 49 skins. From 1862 to 1887, Fort Resolution, Great Slave Lake, gave 193, and in 1884, 10 skins. The posts of the upper Peace River, with its lake stations transferred from Edmonton, sent in 48 woodland wolves in 1889.

The Eskimos use the fur of the different varieties of wolves for trimming the hood and other portions of their deerskin capotes or tunics.

COYOTE.

Canis latrans Say.

This smaller prairie wolf is not found much to the north of the northern branch of the Saskatchewan River; but on the west side of the Rocky Mountains it is, in some seasons, fairly numerous as far as latitude 55° north. Mr. Moberly, an intelligent and experienced observer, writes:

The prairie wolf seldom attacks any large animal except when led on by a woodland example. After a time, however, he will learn to kill domestic sheep without any assistance. They generally live on mice, gophers, musquash, berries, and carrion. I think the wood wolf inhabiting the plains country is much smaller than the kind found farther north, and also lighter in color, and may possibly be a cross between both species. It is more cowardly than the true woodland wolf.

He further states that the male renders no assistance whatever to the female in providing food for the young, which number from three to five, and occasionally six. Indians have known of instances where both kinds of wolves and some of their dogs have mated, and they have always found that the resulting offspring were not only prolific, but also better and stronger as beasts of burden. Parry records an instance—the first authentic one known to him—where a setter dog had intercourse with a female wolf (*Canis griseus*). It was soon afterwards killed by a male of the same species.

New Caledonia District, British Columbia, usually sends in from 40 to 120 wolf skins annually, fully three-fourths of which belong to *Canis latrans*.

ESKIMO DOG.

Canis familiaris borealis (Desmarest).

The Eskimos make use of this indispensable animal for traveling during the winter season, and in summer it renders much assistance in tracking their boats (umiaks) upstream, on the Mackenzie, Peel, Anderson, and other arctic rivers. These boats are manned by women, and are always steered by an elderly man. When tracking on the beach, the woman is attached to the cord hauling line next to the bow of the umiak, then follow at intervals, similarly harnessed thereto, from four to six dogs, who with their leader go forward or halt at the call of their driver mistress. Nearly all of the hauling dogs used by the company at Fort Anderson were obtained from the Eskimos.

Early in the month of February, 1864, a very virulent and fatal form of distemper broke out among the post and native dogs, and, in a short time, it carried off about three-fourths of their number; but as there was still much work to be done in the way of transport of outfit and returns between the Anderson and Fort Good Hope, besides the hauling of fresh venison from the camp of the fort hunter for the spring and summer use of the establishment, we had to be constantly on the lookout to purchase as many dogs as could be spared by visiting Indians and Eskimos, to replace our heavy weekly losses. The distemper did not much abate until May, when it ceased almost as suddenly as it had appeared; but during the three and one-half months of its prevalence, the company lost no less than sixty-five sleigh dogs at Fort Anderson, while the total native losses must have been very considerable. It was remarked at the time that bloodless fights between healthy and affected animals resulted in no injury to the former, but when the fight was hard and bloody the disease was thereby communicated and the bitten dog soon fell a victim to it. Comparatively few ever recovered. Most of the attacked animals became very quarrelsome and some quite ferocious, while a few fled and died quietly in the neighboring woods, or after traveling a distance of from 5 to 15 miles. In course of a residence of over thirty years in the districts of Mackenzie River and Athabasca, I have known distemper to occur on different occasions at several trading posts in both, and always with fatal results to the dogs, but this Anderson epidemic was, I think, one of the very worst ever experienced in the far north. I find that Sir George Nares, when on his polar expedition of 1875-76, long after the foregoing was written, lost quite a number of his Eskimo dogs by distemper in his winter quarters in latitude 82° north. He writes that the "first observed symptoms thereof in an animal

was his falling to the ground in a fit, soon followed by a rushing about in a frantic manner as if wholly deprived of all sense of feeling. On some occasions one would rush into the water and get drowned. At other times a few would wander away from the ship and be seen no more. Sometimes their sufferings would terminate in death. Several appeared to suffer so very much that they were shot to relieve the poor things from their pain." Markham also remarks "that nearly all arctic expeditions have experienced the same kind of disease and mortality among their dogs, and for which there has hitherto been no remedy. Hydrophobia is unknown among the Eskimo or Indian dogs, as no one bitten by a diseased animal has ever suffered permanent injury therefrom."

Most of the true breed of Eskimo dog are more or less wolfish in appearance, while others facially resemble the common fox. Many of them are very playful and affectionate, but some others are bad tempered, sulky, and vicious in disposition. McClintock mentions one or two notable characteristics. "Chummie," the favorite dog in Commander Hobson's Eskimo team, while on the *Fox* in her celebrated pack-ice drift, disappeared and was supposed to be lost; but "after an absence of six days he returned decidedly hungry, although he could not have been without food all the time, and evinced great delight at getting back. He devoted his first attention to a hearty meal, then rubbed himself up against his own particular associates, after which he sought out and attacked the weakest of his enemies, and, soothed by their angry howlings, lay down and coiled himself up for a long sleep."

Like domestic and Indian dogs, the female of the species under review reproduces at various seasons, but as a rule most frequently during the warmer months of the year. The litter of pups seldom exceeds five in number, sometimes less and occasionally more, and there is no apparent difference in other relative dog characteristics. The full-grown female, however, is generally smaller in size than the male.

Arctic explorers and other voyagers of experience have written much and spoken highly of the capacity, the fortitude, and the endurance of the North American hauling dog. After half a century's residence in northwestern Canada the writer of these notes would be able to fill many pages with dog lore, but he has no desire to thus tax the patience of those who may peruse them. At the same time he thinks that a few readers might possibly take a little interest in certain traits, as well as in the performances of a small and rather short-legged dog of Eskimo breed, born tailless, which formed one of the train or team of a Hudson Bay sled of dogs conducted by himself on a winter journey of fully 2,000 miles, from Fort Simpson on the Mackenzie to Oak Point near the southern end of Lake Manitoba. We left the former point on November 30, 1869, and reached the latter place on Febru-

ary 22, 1870. We accompanied the old Hudson Bay winter packet, due to leave Fort Simpson annually on December 1, Fort Chipewyan January 2, Isle à la Crosse January 20, and Carlton House, Saskatchewan, early in February; but by rapid traveling the party managed to arrive at Chipewyan nine or ten days ahead of time. After a rest of several days we started with my own and another team of fresh dogs carrying our baggage and provisions. No time was lost on the march; in fact, we got over the ground between the different company's posts at a very rapid gait, and always had fresh baggage, men, and dogs, while the packet was dispatched independently on the usual dates from Fort Chipewyan, post to post, to Carlton. By this means I was enabled to give frequent rests, exclusive of Sundays, to my own team and personal servant, and also spend about a month in the aggregate with friends and acquaintances on the way. We never delayed the packet; on the contrary, when we finally overtook its bearers, our fourth and their seventh day out from Carlton, the united party made better progress, and but for the first Red River rebellion of Louis Riel it would have arrived at Fort Garry, if not earlier, certainly not later, than the usual date. When we reached the company's post at Touchwood Hills, there were orders for the packet to report at Fort Pelly instead of proceeding by the direct route by way of Fort Ellice. This necessitated the adoption of a much longer and more tedious course by way of Forts Qu'appelle and Pelly, Shoal Lake, Waterhen River, Manitoba House, Oak Point, and White Horse Plains to Fort Garry, which was reached on February 25, 1870. Having long lost the brief itinerary of this journey I can not at this late date give details, but I firmly believe that the time actually consumed in traveling was less than seven out of the twelve weeks spent thereon (except at the last we always rested on Sundays), and for that time we averaged more than 40 miles a day, a record probably never before or since attained by the same dogs on a trip of equal extent. Four of the five haulers were of Eskimo breed, and they were engaged thereon from start to finish. A spare dog who lingered behind our second day out from Fort Simpson was killed by a band of wolves not far from our night encampment. Another of the team, which suffered severely from sore paws, was replaced at Chipewyan. With the exception of one or two of the last of the many trade posts between Fort Simpson and Oak Point, the team invariably arrived at a rattling fast pace. It was the custom in those days, as it still is in some parts of the great interior, for winter voyagers to stop for a short time within a few miles of a post in order to make themselves presentable to the inmates. The dogs were also dressed with worsted or silk-fringed tapis of fine cloth, richly beaded or embroidered, and banded with brass or silver-plated round bells. Ribbon-adorned iron branched stands of small open bells screwed on top of their harness collars,

having three or four of a larger size stitched to the lower part thereof, made a fine display, while the jingling of the bells emitted sounds of a musical and agreeable nature. From previous experience, the dogs knew that they were approaching a haven of food, plenty, and temporary rest, and once started, they lost no time in cantering over the intervening distance. In course of upward of forty years' personal knowledge and experience of hauling dogs of various breeds in arctic America, British Columbia, and the Northwest Territories, the already-alluded-to smallest dog in my own team, *Keskayoo* (Cree for tailless dog), was, *for his size*, the very best all-round hauler I ever met, drove, or heard of in the country. The very nearest approach to him in endurance and other good qualities was *Cerf-volant*, so highly and justly commended by Colonel (now General) Sir William F. Butler, K. C. B., in his *Wild North Land*. During the winter of 1872-73, we traveled together from Cariton House to Fort Chipewyan, and I had, therefore, ample opportunities of witnessing the admirable qualities of that fine animal.

The mother of *Keskayoo* was barely a month old when I bought her from an elderly Eskimo woman at Fort Anderson, where she eventually developed into a small, but compactly built, creature. Her first litter of pups consisted of three males (one died of distemper months afterwards) and one female, who subsequently became the mother of the unfortunate dog eaten up by wolyes on December 1, 1869. (The two survivors made the long winter journey.) On this occasion the mother appeared to suffer agonizing pain in endeavoring to bring forth her first-born pup, but the administration of a dessert-spoon full of tincture of lavender acted like a charm. The relief given was immediate, and all four pups were born without delay.^a Her next confinement, seven months later, was apparently easy. There was but one male (*Keskayoo*) and two females.

A more devoted and affectionate family of dogs I never knew. In corroboration of this view I would mention a few traits: The last litter was brought forth in a wooden kennel within the fort stockades, during the season when Indians and Eskimos were frequent visitors, and some of their hungry dogs would have no hesitation in devouring any stray puppies; but for months after their birth one or more of the first litter kept guard with the mother in protecting the young puppies from this or any other danger. In fact, they were never left alone during a period of several weeks, but were always carefully watched. I can not remember any instances of quarreling among themselves. On the contrary, they never failed to stand by each other when attacked by strange dogs or when they themselves became aggressive.

^a I may here remark that I have personally known several cases in which this medical preparation greatly aided both human and canine mothers under similar circumstances.

At times, long after he became a hauler, *Keskayoo* seemed to delight in beginning a fight with other dogs. He was himself a living embodiment of daring, energy, and pluck, quite capable of coping successfully with many of a much larger size, knowing, as he did, that his brothers would rally to his assistance in the event of his tackling a more powerful antagonist, or in a general scrimmage. It was sometimes amusing to watch *Keskayoo* while being fed, both at Fort Simpson and at the various posts on the above-described journey. A big "bully" among visiting teams at the former (the fort dogs let him severely alone) or the "cock of the walk" at some one of the latter, judging him by his small size, would brazenly come along and attempt to rob him of his fish or meat, but almost in a twinkling of the eye the assailant would be sprawling on his back, severely bitten, retiring afterwards quite crestfallen, with his tail between his legs. The unexpected suddenness and strength of the attack seemed to completely disconcert the would-be robber. It was seldom, indeed, that a second attempt of this kind was made at the same place.

Previous to the abandonment of Fort Anderson, early in July, 1866, it frequently surprised me to witness the joyful greeting which took place between the mother and surviving offspring of both litters when they met after days or weeks of necessary separation. Indeed, they were constantly together whenever possible. Two of the later litter died of distemper and the old mother herself perished a couple of months after giving birth to four beautiful pups in her third and final confinement. Unfortunately, they were accidentally frozen to death in December, 1865.

Keskayoo was exceedingly quick and active in moments of attack or defense, while the protection afforded by his own remarkably long-haired and densely thick fur skin-covering rendered it almost impossible for any dog's teeth to meet in any vulnerable portion of his body. Poor *Keskayoo* died during my first brief visit to the old land in 1870. He was a wonderful little animal; he never seemed tired or weary; he was always ready and willing to follow the track beater, or the sled ahead of him; for three-fourths of the entire journey he acted as foregoer or leader of his own team. Years of association with these dogs naturally brings about an almost human regard or affection for them, and their death frequently seems a personal loss.

Although much more of an interesting nature might be related of this and other northern hauling dogs, the writer will conclude with a few remarks regarding the appearance of what, from the perceptible symptoms, must have been English dog distemper. In summer it was usual to send the Fort Simpson dogs to Big Island at the west end of Great Slave Lake, where fish are more or less abundant all the year round, to be well fed until the autumn. Early in October, 1869, my team of dogs arrived with the first fish boat from that point; but, to my deep

regret, I found that two of the best had been ill for over a week and utterly unable to walk or even stand up, and they had to be carried from the river to a picketed yard adjoining the officers' residence. Their hinder parts seemed to be entirely paralyzed. As they were strong and tried animals, I naturally desired to have them with me on my then contemplated trip to Fort Garry (now Winnipeg City). Knowing that there were several boxes of Holloway's celebrated pills among the post's store of medicines, I determined to test their vaunted virtues by ascertaining if they were equally efficient in canine, as they claimed to be in human ills. I began by giving them each a dose of five pills, night and morning. After one week's course I reduced the number to three, and at the end of the fortnight there was a perceptible improvement, which became more marked and assuring as the weeks went by. About the middle of November I began to harness and drive them slowly around. The two convalescents staggered a great deal, and this continued for some days; but a short time prior to our departure, on November 30, 1869, they had nearly recovered and were able, with the others, to make daily runs of several miles at a very good pace. The improvement continued, and I think they became almost as strong and untiring as ever. Some of the fort residents all along asserted that they could not recover fully or stand the long journey; but I, who had much previous knowledge of their staying powers, was of a different opinion, and the result proved that I was right.

HARE INDIAN DOG.

Canis lagopus (Richardson).

This animal is more or less typical of the indigenous Indian dog of the far north of Canada. It is not so stout or strong as the Eskimo dog, but many individuals can endure a vast amount of hardship in the shape of heavy sleigh and packing work with but little to eat. It is even more necessary for the Indians, especially the so-called "caribou eaters" (as the latter move and travel about in winter following the reindeer) than is the case with their brethren who subsist chiefly on fish, rabbits, beaver, and moose. The Eskimos, with the exception of roving traders from the west and Alaskan coast of North America, do not make any very extensive excursions during the winter season. In birth, traits, habits, and liability to epidemics there are no material differences between it and *Canis familiaris borealis*, nor, for that matter, with the rather mongrel breed or introduced varieties of hauling dogs used by the company, missionaries, and the "freemen" of the interior. I might also mention that I have heard of one or two instances of English distemper having appeared among inland dogs.

RED FOX—CROSS FOX—SILVER FOX—BLACK FOX.

Vulpes sps.

The natives consider the foregoing as belonging to one and the same species (the common red fox), an opinion generally, but not universally, accepted by naturalists and collectors; and while it is just probable that the different varieties have occasionally been found among the litter of a red fox mother, yet I have for a long time been of the opinion that there must have been originally two distinct and well-defined species of North American fox—the pure red and the pure black (*Vulpes fulva* et *V. nigra*)—and, as a matter of fact, there still exist many of the former and some of the latter throughout the entire region under review. I also firmly believe that sexual intercourse between a male and female red fox invariably results in the production of only red foxes. I am equally satisfied that similar results always follow cohabitation between a male and female black fox. In course of many years' trading of fox skins, I have observed perhaps every possible degree of variation between the practically perfect, typical red fox and the same description of the black form. These varieties between the two are easily accounted for, as a consequence of the natural commerce which exists among the sexes during the annual seasons of copulation.

Since writing the above, I have come across Chief Trader Bernard R. Ross's Popular Treatise on the Fur-Bearing Animals of the Mackenzie River District.^a I will now quote from page 16 thereof the views held by him and therein stated, and with which I fully agree, in this connection:

In treating on the different varieties of foxes I have spoken of, it is extremely difficult to mark the line where one ends and the other commences. During my residence in these regions I have seen every shade of colour among them, from a bright flame tint to a perfectly black pelt, always excepting the tip of the tail, which in all cases is white. Even the judgment of an experienced fur trader is sometimes at fault to decide, in bartering, to which of the three varieties a skin should belong, as they bear different prices. Still, notwithstanding this, I consider these colours to have been produced by intermixture of breed. The different varieties, being in my opinion, quite as distinct as those of the human race. And I do not think that any of the progeny of two pairs of red foxes would be either black or cross. In cohabiting the male foxes accompany the females in bands of from 3 to 10, much in the manner of domestic dogs. At Dunvegan on Peace River, I have repeatedly observed this. The males fight violently for the possession of the females, many are maimed and some killed. A number of males thus in all likelihood cohabit with the same female, which gives rise to the varieties of colour in a litter.

Instances are reported as having occurred in which all the varieties were taken in one den, but of this I am rather doubtful. It is very difficult to tell the future colour of cub foxes, the red appear to be cross, and the cross to be silver, which may have caused an error, though I write under correction. I have seen many Indians even

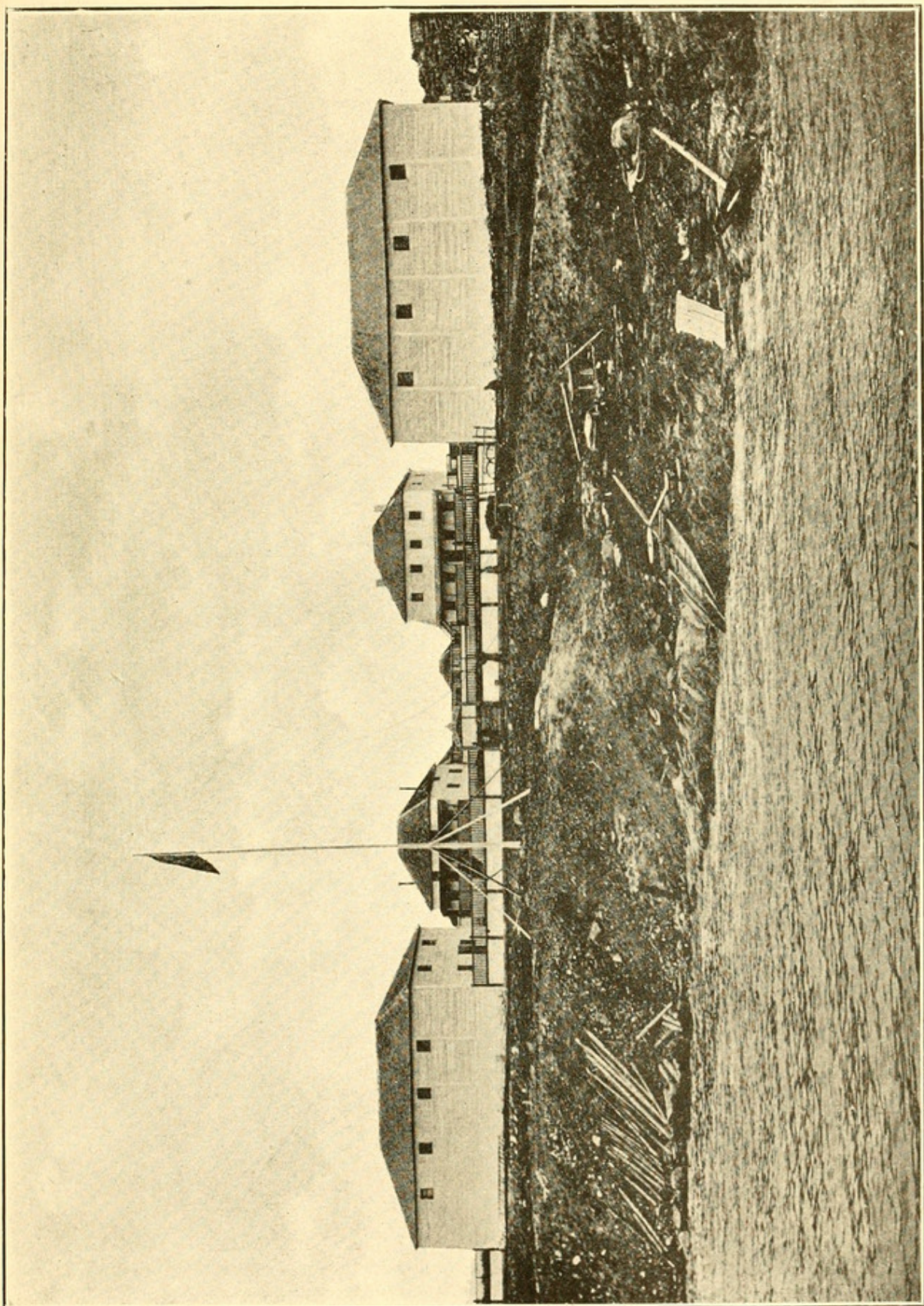
^a Canadian Naturalist and Geologist, VI, 1861.

mistaken in this. They have brought me live cub foxes for silver, which on growing up proved to be cross. My own theory is that the silver fox is the offspring of two silver parents, the cross, of a silver and red, the red, of *two* reds, and the different shades being caused by fresh inter-breeds. Thus two negroes will have neither white nor mulatto children, nor will two whites have black or mulatto offspring. I do not know whether I have explained my ideas on the subject clearly or not. They are the result of my experience on a subject to which I have given no small attention. I have often robbed fox dens, and have also bred the animals, and the summing up of this part of my subject may be thus made—like colours reproduce like, black and red being origins, the cross is the fruit of intermixture between these shades. I kept a pair of cross foxes in confinement at Slave Lake; their offspring were *all cross*. I had only one litter when the bitch died. Foxes are very shy animals, and difficult to tame, indeed when old they appear to pine away in confinement, when young they are playful, but at all times rather snappish. They are far from sociable and generally burrow alone, although it is not uncommon for the members of one family to live together.

The above views, I deferentially opine, are perhaps as reasonably probable as that of the eminent Prof. Spencer F. Baird in respect to the origin of the American red fox, which he and others thought might be the lineal descendant of individuals of the European red fox introduced many years ago. The fact of their present abundance and extent of distribution being no barrier to the reception of the idea. It is rather remarkable, however, that the supposed varieties—cross, red, silver, and black—should, in Europe as well as in America, be confined to the northern portions of both continents. Neither can the gray fox of the United States, entirely unknown in northwestern Canada, be considered as their progenitor, as these varieties are conspicuous by their absence wherever that species of fox predominates. I now regret that during my long residence in the Indian country I neglected to have the theory of fox origin practically tested, but I hope the matter will eventually receive due attention.

Doctor Armstrong mentions that one of the crew of the *Investigator* saw a "black fox" on the shores of Baring Land (island), near Cape Colquhon, early in September, 1851. Again on November 11 of the same year, one of the men observed another black fox on the ice, about a mile from the ship, then wintering in Mercy Bay, latitude 76° north. He further says that there was no previous record of the appearance of this animal so far north, but that its existence there could not be questioned. It may be asked in vain, Were these foxes but one and the same individual twice seen, or were they indigenous, or a pair of recent stragglers from the continent? With the exception of the blue and white foxes (*Vulpes lagopus* and *Vulpes fuliginosa*), of which all arctic explorers make frequent mention, I believe these are the only recorded instances of any species of fox having been observed on the lands situated to the north of the American Continent.

In course of fifteen years' residence at Fort Chipewyan, Lake Athabasca, the Indians brought me five litters of young foxes. Until they



FORT CHIPEWYAN, ATHABASCA LAKE.

were several months old, it was very difficult to determine the variety to which they belonged. The red first declared itself. Two of the litters (five and seven cubs, respectively) were all red, as was their mother; two were all cross (mothers were cross), five cubs each; and the fifth consisted of one red, one very fine, and three fair cross foxes, from a red female. I would remark that they were successively kept within a small, closely stockaded yard adjoining the office building at Fort Chipewyan. At first, each litter was placed in a small wooden kennel, and they were very lively and frolicsome. They soon came to know those who fed and visited them, but they were timid, snappy, and retiring with strangers. As they grew up and the season advanced, they took to burrowing in the ground under the office, but they never tried to get away. So soon, however, as winter approached and snow began to fall, they became very restive and made frequent attempts to escape by tunneling under the building and the outer stockades. In time, one or more of each litter were successful in their efforts, and soon after fell victims to outside trappers at no great distance from the establishment. This, of course, led us to dispatch the others for the benefit of their attendant. Dogs also managed to kill two or three of the total number.

The female brings forth annually in spring from three to as many as six and seven at a birth. They are born blind, and are very helpless for some days. Gestation occupies about two months, and the young are said to leave their natal home when several months old. They are generally most numerous around the shores of lakes and among marshy tracts in the vicinity of the larger rivers.

It is a well-known fact that foxes greatly fluctuate in numbers—for some years in succession they are very abundant, and then for a longer or shorter period they become comparatively scarce. Chief Trader Bernard R. Ross (1848 and 1862) estimated that the proportion of the various colored foxes traded by the company in the Mackenzie River District for ten years of his time would be about six-fifteenths red, seven-fifteenths cross, and two-fifteenths silver and black. From 1853 to 1877, inclusive, the Hudson Bay sales in London totalled 59,650 cross, 260,775 red, and 20,100 silver and black. For thirteen of the twenty-five years, the cross-fox sales fell below the average of 2,386 a year, say from 1853 to 1856, 1862 to 1866, and 1872 to 1875, and these minus quantities ranged from 1,172 in 1854 to 2,315 in 1873. The other twelve years varied between the lowest, 2,455 for 1876, and the highest, 5,174 skins in 1869. If we observe the same rule in dealing with red foxes, we have only eight years which exceeded the average of 10,431 skins. These are 1857 with 10,526, 1859 with 11,488, 1860 with 11,031, 1867 with 20,824, 1868 with 26,822, 1869 with 20,267, 1870 with 13,058, and 1877 with 11,233. Four more years were not far under the mark: 1858 with 9,707, 1861 with 8,897, 1875, with

8,973, and 1876 with 9,838. The remaining sales of the period ranged between the lowest, 3,175, in 1854, and 8,760 in 1865. The average number of silver and black foxes for the twenty-five years was 804. Eleven of these years exceeded the average, namely: 1853 with 847; 1857, 1,072; 1858, 1,060; 1859, 1,164; 1860, 1,177; 1861, 1,066; 1868, 1,253; 1869, 1,490 (the maximum); 1870, 914, and 1877 with 971 skins. The year 1875 fell short by 9 skins. From the minimum sale of 390 in 1854, we have had a series of four years between that figure and 696 in 1871. In 1902 the company sold 1,447 cross, 5,912 red, and 280 silver foxes; and in March, 1903, 1,970 cross, 6,200 red, and 491 silver and black foxes. It may also be of interest to mention that for fifteen (1863-1877) of the often-referred-to twenty-five-year London sales statement, Mackenzie River District supplied 6,072 cross, 8,034 red, and 1,699 silver and black foxes. For twenty years thereof (1858-1877), Athabasca District contributed 4,652 cross, 6,582 red, and 1,450 black and silver foxes. All these facts go to establish the claim that these foxes should be classified among the "periodical" fur-bearing animals of North America. In the Indian country tributary to Fort Anderson, the several varieties of foxes were fairly abundant in good years, and this was more so on the lower portion of the river and along the arctic coast between Herschel Island and Cape Bathurst.

KIT FOX.

Vulpes velox hebes Merriam.

This fox does not inhabit the territories to the north of the upper Saskatchewan River, nor is it found in New Caledonia, British Columbia. I never obtained an example during two years' residence at Fort St. James, Stuart Lake. I was equally unsuccessful at Cumberland House, lower Saskatchewan, where I was stationed from 1889 to 1894. It used to be abundant in the great prairies of the West from that river to the international boundary. Naturalists may be interested in the fact that the total number of skins of this animal sold by the Hudson's Bay Company in London from 1853 to 1877, inclusive, was 117,025. The best year was 1858, with 10,004, and the poorest, 1864, with 2,410. There are no foxes of this kind entered in their fur catalogues for 1902 and 1903.

WHITE FOX.

Vulpes lagopus innuitus Merriam.

The white fox is numerous most winter seasons on the arctic coast inhabited by the Eskimos of the Anderson and Mackenzie rivers, and no doubt more or less so on other American polar shores, and, when this is the case, numbers are also met with in the timbered regions to the south and on the larger ice-covered lakes and rivers.

Even northern sections of the country hunted by Indians belonging to some of the company's trade posts of Cumberland and English River districts have, at times, succeeded in trapping a few examples. In 1876, Cumberland House had 5; in 1873, Moose Lake secured 3; in 1885, the Pas had 2 and Pelican Narrows 16; in 1886, Rapid River caught 2, and Lac du Brochêt post traded 785 skins, nearly all from its northern inland Eskimos; in the winter of 1890, Portage La Loche secured an example. A few white foxes have also been trapped on the south shore of Great Slave Lake, but at Fort Resolution the natives of Fond du Lac and the northeastern tract, who resort thereto, seldom fail to bring in some skins every season. The catch there from 1862 to and including outfit 1877 averaged 42 a year. Fort Rae, at the northern end of the same great inland sea, also turns out a few skins most years. In 1877, it had only two examples, but the average for 1880 to 1882 was 23 for the three outfits. Many years ago an individual of the species was shot a considerable distance up the Peace River. Sir John Richardson states that early in the nineteenth century two white foxes were seen near Carlton House, on the Saskatchewan River.

We hardly ever saw a live white fox on our many summer and winter trips in the arctic regions of Canada. Neither have I observed among several thousand prime winter skins of this animal one that was not almost if not wholly pure white, while the blue variety always appeared distinct in color. McClintock, who had many opportunities for observation, writes that both white and blue foxes are found in all arctic lands, and that they are beautiful animals, full of tricks and impudence. In September, 1853, he "captured a litter of three cubs of a dark grayish color—fierce little fellows with most restless eyes and pliant weasel-shaped bodies. Not unfrequently foxes would venture on board the arctic ships in winter and be caught even in traps set for them on deck. When irritated they gave a short, suppressed bark, and they sometimes uttered a strange cry resembling that of a hawk, goose, or gull." At Port Kennedy, where he passed the winter of 1858-59, McClintock secured two polar bears, nineteen white foxes, nine hares, eight reindeer, and eighteen seals; several ermines and lemmings were also caught. Sir J. Clark Ross, who passed several years in Victoria Harbor, Boothia, latitude 70° north and longitude 91° west, states that the foxes breed there early in June, and have from six to eight young at a birth. On one occasion, several weeks later in the season, he captured six little ones in a sand burrow close to the ship's wintering position. White foxes were numerous in that quarter, and upward of fifty were trapped. Sir George Nares observed a "mottled" fox in latitude 82° north. Doctor Armstrong also refers to the presence of *V. lagopus* at Mercy Bay and Prince of

Wales Strait, where some fifty specimens were taken during their long stay.

Other expeditions in the polar regions have met with many white and a few blue foxes. General Greely obtained but twelve of the former, and he gives latitude $83^{\circ} 24'$ north as the most northerly range of this animal, which is there indigenous. He says that the white fox of the Grinnell Land section is much more wary than that of a few degrees of latitude farther south, and therefore very difficult to approach for a shot, while all but one example rejected many poisoned baits set for them. Mr. Peterson, the well known Eskimo interpreter of several expeditions, asserted that this species made caches of food for winter consumption. Captain Lockwood found several fox lairs. In one hidden rock nook he found fifty dead lemmings, in others (sand and earth covered) there were from twenty to thirty lemmings, while in a hollow he discovered a cache containing part of a polar hare and the wings of a young brent goose and the usual lemming. Some lairs appeared to be occupied from year to year. McClintock writes that in March, 1859, at Port Kennedy, he shot a couple of white foxes that came playing around the dogs, and, conscious of their superior speed, were very impudent, snapping at the dogs' tails, and passing almost under their noses. The captain intended both foxes for the mess table, but the dogs anticipated him in respect to one. The flesh of the other proved insipid, but decidedly better to the taste than the tinned meat.

When comparatively scarce, or rather less numerous than usual, as sometimes happens in their native habitat, it is a rare thing to meet with any foxes in the interior. It is said that a litter consists generally of three and four, seldom five, and when born the young are blind and helpless, but they soon acquire sight and gradually increasing strength, and they also become active and very playful. The adult fox is seemingly stupid and is easily captured by both Indians and Eskimos. It lives on mice, lemmings, birds, and carrion.

During the period of twenty-five years, 1853 to 1877, the company sold in London a total of 124,100 skins, or an average of 4,964 a year. The three best sales were in 1856, 1864, and 1869, which amounted to 10,311, 12,242, and 12,088, respectively, and the three lowest were in 1855, with 1,897, 1859, with 1,577, and 1871, with 1,805 skins. In 1902, 8,487 skins, and in 1903, 10,717 skins were sold at the same place.

If the Hudson Bay and Canadian arctic blue fox be a variety of *Vulpes lagopus*, which I certainly doubt, the stone-blue fox of the Pribilof Islands and other Alaskan islands, even in originally introduced cases, is surely entitled to specific rank. Blue foxes occur very sparingly on the northern, Hudson Bay, and Labrador coasts. We secured very few skins thereof at Fort Anderson. It is, indeed, a very rare inland visitor. Mr. Bernard R. Ross writes that up to the

close of outfit 1861 he had known of only two instances, and in both the examples were secured on the verge of the "Barren Grounds," situated near the eastern end of Great Slave Lake. The very next season, however, after his departure from Fort Resolution in 1862, the same Indian tribe killed one summer and three prime winter skins thereof. Outfit 1872 also records another winter example. From 1853 to 1877 the company had in all but 1,100 blue foxes for sale in London, an average of only 44 a year. The three best year's sales were in 1864, with 82 skins, 1869, with 124 skins, and 1873 with 90 skins. The smallest sales were 3 skins in 1860, and 13 skins in 1868, while the years 1857, 1859, and 1871 yielded but 15 skins each. Chief Factor Robert Campbell, one of my predecessors in charge of Athabasca District, received three skins in 1859 and two more in 1862 from the most northerly Indians who resort to Fond du Lac, Athabasca. During my fourteen years' management, we obtained 15 skins from the same "Barren Ground" quarter. It may also be mentioned that between 1862 and 1883 the district of Mackenzie River traded 140 skins, nearly all from the Eskimos resorting to Fort McPherson. Fort Good Hope gave an occasional skin as the result of Indian trade with the Eskimos of the Anderson after the Fort was abandoned in 1866. In 1886 Fort McPherson turned out three and Good Hope three also. In 1887 the former gave eleven skins and the latter one. In 1889 Fort McPherson had one, Rampart House one, and Lac du Brochêt, Reindeer Lake, traded seven skins from its northern inland Eskimos. Sir James C. Ross obtained three examples of this fox on the shores of Boothia. Parry secured several, and although Armstrong and Kellett of the *Resolute*, each have about fifty foxes in their game lists, which have been considered as white, one or more of them may have been blue. Nares, as above stated, observed a "mottled" specimen, while Greely writes that eighteen of the twenty secured by him on Grinnell Land were free from any sign or mark of white, red, or yellow, and that all of them were smaller in size and lighter in weight than the twelve of his captured dozen of *V. lagopus*. McClintock, however, shot a prime blue fox while drifting in the *Fox* with the pack ice in the winter of 1857-58, although 130 geographical miles from the nearest land. It was very fat, having probably lived on dovekies. McClintock often observed tracks of the arctic fox following the polar bear for discarded seal scraps.

WOLVERINE—CARCAJOU.

Gulo luscus (Linnaeus).

This comparatively powerful and very destructive animal is to be met with all over the northern continent to and along the shores of the Polar Ocean. Although Doctor Armstrong does not have the wolverine

in his list of observed mammals, yet several arctic explorers have either seen the animal or traces thereof in very high latitudes. A skull, minus the lower jaw, was picked up on Melville Island, latitude 75° north. Sir James Ross found it abundant on Boothia Felix. He received skins of two adult and two young wolverines from the Eskimos. Another was captured in winter on shipboard, having fearlessly climbed over the banked snow in search of food which from his thin condition he much needed.

When in prime condition, the fur of the wolverine is highly prized by the Eskimos, more so than that of the wolf, for the purpose of trimming the hood and other portions of their outer reindeer-skin clothing. Several skulls of adults and two skins and skulls of young animals were secured at Fort Anderson and duly forwarded to the Smithsonian Institution at Washington.

The Company of Adventurers of England trading in Hudson's Bay, received and sold in London 32,975 skins of this species from 1853 to 1877. The returns were lowest in the years 1857 (923), 1866 (909), and 1867 (768). The three best sales of skins in the statement were in 1871 (1,848), 1873 (2,095), and 1874 (1,763). The sales for 1902 and 1903 amounted to only 635 and 695 skins, respectively. It is estimated that the old northern districts of Athabasca and Mackenzie River furnished fully two-fifths of the foregoing quantities.

As the habits and depredations of this "uncivilized robber" have already been fully and frequently recounted by naturalists, I need not add to its well-known record. I may, however, say that copulation of the sexes takes place in the months of March and April, and that the female brings forth the offspring about sixty days later. They are from one to three, four, and occasionally as many as five in number. They are said to be born blind, and are very frail for some time, but soon acquire more strength. Suckling is supposed to last for two or three months. A discarded beaver-lodge, a vacant bear-hole, or any other suitable depression in the ground serves as a nest. The male is supposed to render some assistance in rearing the young.

Fortunately for the natives, who suffer so much from his depredations, the carcajou is not very abundant anywhere, although doubtless too much so everywhere, for the reason that even one will, in course of a single season, do an incredible amount of damage. They are first-class experts in persistently demolishing very extensive lines of deadfall, marten, and other traps, as well as in hiding, eating, or otherwise injuring the animals found in them. They treat rabbits and lynx caught in snares in a similar manner. They will further break up well-built caches of meat, fish, and sundries. The wolverine is undoubtedly entitled to first place among the destructive animals of North America, and is also the most detested of them all.

FISHER.

Mustela pennanti Erxleben.

It is very seldom, indeed, that an example of this species is found beyond latitude 62° north in the Mackenzie River region, or any other part of America. I never knew of any being taken at Fort Simpson, while the very few skins received there were trapped by Indians in the forest country some distance to the south; but on the upper Peace River, and in the country farther south, east, and west, on both sides of the Rocky Mountains, the fisher is fairly numerous.

The male and female are said to come together annually in the months of February, March, or April, according to locality, and the offspring vary between one and five in number. They are born blind and helpless, but soon acquire sight and strength. They nest in a hole in the ground. Some say the male assists in rearing the young, but others deny the truth of this assertion. They subsist on rabbits, fish, and mice. Mr. Colin Thomson states that for winter consumption they provide quantities of "hips" in advance.

It may be mentioned that from 1863 to 1883 Mackenzie River district traded the skins of 331 fishers. More than three-fourths were obtained from Indians resorting to Fort Resolution, who hunt to the south of Great Slave Lake, as well as along the Slave River, the balance coming from natives belonging to Forts Simpson, Providence, Liard, Halkett (abandoned), and Nelson. The last post (latitude 59° north) had one skin for each of the outfits 1886, 1887, and 1889. Fort Providence had one and Fort Simpson six examples in 1889. For the period 1858 to 1884, Athabasca district turned out 5,138 fishers. The average trade for the five succeeding outfits (1885 to 1889) would be about 100 skins less a year, after making due allowance for the gain by the Resolution transfer and the loss of the four upper Peace River posts (constituted a new district in 1878). The contribution of the latter for 1889 was 122. That of the stations added thereto (taken from Edmonton) was as follows: White Fish Lake gave 33, Sturgeon Lake 20, Trout Lake 20, and Lesser Slave Lake 61 skins for the same year. English River district, by its posts at Isle à la Crosse, Portage La Loche, and Green Lake supplied 63, 18, and 48 skins, respectively, for 1889, and 22, 19, and 31 skins, respectively, in 1890. The district of New Caledonia, British Columbia, gave an average of about 300 skins a year for the years 1885 to 1889, while Fort St. James, Stuart Lake, and Frazer Lake always headed the list in nearly equal quantities; the other posts, except Babine, made up the balance with much smaller quotas. Then we have Cumberland district, with a total of 195 skins for 1888 and 216 in 1889; but with the exception that Cumberland House had 51 and 42 skins for the two years, respectively, I can not give details as to where the rest of the lots came from. Mr. P.

Deschambeault never saw a single fisher during his fifteen years in charge of Lac du Brochêt, Reindeer Lake.

While the annual London sales for the first twenty years, 1853 to 1872, ranged between the minimum, 4,605 for 1866, and the maximum, 7,959 in 1870, the sales of the last five, 1873 to 1877, only amounted to 3,639, 3,539, 3,558, 3,263, and 3,338 skins, respectively. The three best sales of the series were 7,197 for 1860, 7,477 in 1869, and 7,959 in 1870; and the three lowest were 1875 with 3,558, 1876 with 3,263, and 1877 with 3,338, as above mentioned. In 1902, the company sold 3,679, and in 1903, 3,223 skins, making a grand total of 144,107 for the twenty-seven years in question. Judging from the northern department returns for outfit 1865 (sold in London in 1867) I think that about two-fifths or more of the fishers appearing in the company's annual fur catalogue must be obtained from the western, southern, and Montreal departments of the Hudson Bay service.

MARTEN.

Mustela americana abieticola Preble.

This is probably the most constant of the "periodic" fur-bearing animals, whose presence in considerable numbers is very largely dependent upon a greater abundance of hares or rabbits, though mice also form an important item of marten diet. The remarks made under *Lynx* in this regard have a similar, but somewhat modified, application to this American representative of the Russian sable. In years of plenty the marten is very numerous throughout the entire northern forest region; but it is not uniformly so at the same time in every section of country all over the immense territories covered by the Hudson's Bay Company's trading operations. When it is abundant or scarce, say in the northern and western departments, it will generally be found that there is an important and corresponding increase or decrease in the southern and Montreal departments. The natives maintain that lynxes and martens migrate from the north and west to the east and south, and that when they have attained their height in numbers for several seasons, the great bulk (no section is ever totally devoid of martens) of those who escape capture resume the return march until the next period of protracted migration. It must be admitted that many old fur traders have come to entertain similar views from their own personal experience and observation. Of course there are post, district, and departmental fluctuations in annual results, caused by local epidemics among the hunters and other relative reasons, but, on the whole, I think the aforesaid twenty-five years' London sales statement adds strength to the migration theory, and is otherwise of some interest. If it were possible, however, to obtain from the London executive a complete abstract of all the furs and peltries annually disposed of by the Hudson's Bay Company, since the union with

the Northwest Company of Montreal in 1821, to 1903, a period of eighty-two years, this opinion would probably receive further confirmation.

In this connection, native allegation in respect to a corresponding increase and decrease in the birth rate of the marten and other "periodic" and migratory species may be worthy of a little attention from interested naturalists. The following comparison of the yearly London sales of this pelt may help any such in enabling them to arrive at a better understanding of the subject, and for this purpose, sales exceeding 100,000 will be classified as "good" and under that figure as "lean" years. To begin with, we have two of the latter—1853 with a sale of 73,050 skins, and 1854 with 91,882. I have reason to believe that the three preceding years (1852, 1851, and 1850) would come under the same grouping, while the five previous (1849, 1848, 1847, 1846, and 1845) should be considered as "good" years. Then we have six of the same description, two of which, 1856 with 179,736, and 1857 with 171,022 skins, were probably the best ever realized by the Hudson's Bay Company from incorporation in 1670 to the present time. The other four "good" years' sales were 137,009 skins in 1855, 138,535 in 1858, 139,124 in 1859, and 102,235 in 1860. These six years were succeeded by only three "lean" years (1861 with 74,738, 1862 with 80,484, and 1863 with 79,979), which were immediately followed by five "good" years—1864 with 112,396, 1865 with 124,830, 1866 with 142,970, 1867 with 126,616, and 1868 with 106,784 skins. Then came no less than eight successive "lean" years' sales (1869 to 1877), having but one bright break, in 1875, when the sale amounted to 131,170 skins. I think the best since the transfer of the country to Canada was in 1870. The total for each of the eight years last mentioned was 81,706, 52,308, 55,453, 60,455, 66,841, 66,750, 83,439, and 81,174, respectively. The aggregate total sales of martens for the twenty-five years amounted to no less than 2,590,691 skins. In 1902, the company sold 56,491, and in 1903, 78,629 marten skins in London.

The two best and most successful months for the trapping of this valuable animal are November and March, while comparatively few are taken during December, January, February, and April. Severely cold weather is not a favorable factor in hunting, for the reason that at such times martens do not roam as much as on other occasions. The sexes begin to copulate in February, and the process is continued to the end of March, according to situation or other circumstances. For some time afterwards, martens are more easily captured than at almost any other period of the season. The young are blind and helpless when born, but shortly acquire sight and strength. They make their nests in hollow trees, or under fallen timber, and in holes in the ground.

Comparatively few skins were obtained from the country north of

Fort Anderson, but in the forest region to the south martens were fairly abundant in some years. The writer has seen several albino examples, and also a considerable number of bright yellow and dark orange colored martens in his time, particularly while stationed in the districts of Mackenzie River and Athabasca. In the month of February, 1890, Albert Flett, then chief of the Cumberland House band of free Indians, brought me a large male marten somewhat different from any that I had previously met with or specially noticed. After it was properly skinned and prepared, it was forwarded to the Smithsonian Institution at Washington. I think the chief told me that he had trapped it in the Pas Mountain, some 60 or 70 miles to the southward of Cumberland House. He also informed me that he had seen several similar animals captured in the same quarter. It is now described under *Mustela americana albiaticola*, subsp. nov., Hudson Bay Marten, in *North American Fauna*, No. 22, 1902, by that zealous naturalist, Mr. Edward A. Preble of the U. S. Biological Survey.

WEASEL—ERMINE.

Putorius arcticus Merriam, *P. cicognanii* (Bonaparte), and *P. cicognanii richardsonii* (Bonaparte).

I believe the weasel extends to the north of Fort Anderson, where several specimens were obtained from the natives in course of our five years' residence from 1861 to 1866. The Eskimos of the lower Mackenzie and Anderson rivers use the skin of the weasel very largely in their conjuring and other religious exercises. It may be here mentioned that ermines are not particularly abundant within the Arctic Circle, although there, as elsewhere throughout the wooded country, they are more numerous some seasons than others. Doctor Armstrong refers to the presence of one of these species on Baring Land. Sir James Ross says they are fairly abundant at Boothia Felix, where they feed mainly on lemmings. Sir George Nares observed many ermines where he wintered in 1875-76. General Greely also secured eight examples on Grinnell Land, and gives latitude $82^{\circ} 36'$ north as about their highest range in that polar quarter.

Quite a large number of specimens of these animals were obtained at Fort Anderson from the Eskimos, as well as from the Indians, and a few were captured in the stores and in the vicinity of the place. They range to the shores of the American coast. Ross, Nares, Greely, and Doctor Armstrong refer to these species in their respective arctic exploring volumes. The female gives birth to her young, from four to eight, and sometimes as many as nine and ten, in May and June, annually. They are said to be blind and very helpless when born, and so continue for some time afterwards. Although ermines no doubt destroy some food themselves, yet when one manages to get inside a Hudson Bay inland store, it soon makes a clean sweep of field or other

mice, which frequently do a considerable amount of damage by devouring and concealing meat and other eatables, and in cutting up cloth and goods. A domestic cat seldom evades death from native dogs. In May, 1885, a skin of this species was forwarded from Fort Chipewyan, Athabasca, to Dr. Robert Bell, of Ottawa; and in July, 1889, three trade specimens from Babine Lake, British Columbia, were sent to Washington. It is fairly abundant in New Caledonia District. The Hudson's Bay Company now annually trades and exports to England many thousand ermine skins; but for several decades previous to 1887 the prices obtained for them were not remunerative, and their hunting was not therefore encouraged. Jubilee and coronation functions have, however, brought them once more to the front, to the advantage of the hunter, the trader, and the seller. From 1853 to 1877, inclusive, the company's average London sales of ermines amounted to 2,476 skins a year. The five best years were 1873 with 4,012, 1874 with 4,447, 1875 with 4,732, 1876 with 6,360, and 1877 with 5,338; and the five lowest, 1858 with 1,034, 1859 with 809, 1862 with 912, 1863 with 1,178, and 1864 with 899. As against all this, the sale of 1902 reached 16,374, and that of 1903, 33,883 skins.

MINK.

Lutreola vison lacustris Preble.

The mink is one of the company's staple pelts, and although it is but very slightly dependent on the American hare for food, yet it somehow seems to periodically augment and decrease in numbers much in the same way, not perhaps in as precise, but still in a remarkably interesting manner. If we adopt a minimum of 50,000 and under as a "lean" unit, and sales above that figure as "good," as was done in the case of the marten sales, we may better understand this. The sales of the years 1853 and 1854 were 25,152 and 42,375 skins, respectively. There is reason to believe that the sales of the three previous years were below the average. Then came five "good" years in succession, 1855 with 50,839, 1856 with 61,581, 1857 with 61,951, 1858 with 76,231, and 1859 with 62,264 skins. Next we have four "lean" sales, 1860 with 44,730, 1861 with 31,094, 1862 with 49,452, and 1863 with 43,961 skins. These were followed by six "good" years—1864 to 1869—with 61,727, 60,334, 51,404, 58,451, 73,575, and 74,343 skins, respectively. Once more we have four "lean" sales, 1870 with 27,708, 1871 with 31,985, 1872 with 39,266, and 1873 with 44,740 skins. The year 1858, already mentioned, with 76,231, 1876 with 79,214 (maximum), and 1877 with 79,060 skins were the three largest years' sales for the period under review. The total output of minks, exclusive of some 15,000 skins sold in Montreal and St. Paul, was 1,365,360.

This animal is to be found along the Anderson and other arctic rivers to the coast, and also throughout the Dominion of Canada from the Atlantic to the Pacific. The sexes come together in March and April, and the female brings forth in due time five or six blind and helpless little ones. I have also been assured that where the food conditions are very good, instances of as many as eight, ten, and even twelve have been observed. In this connection I would remark that Indians in different parts of this vast country have asserted that when the several periodical fur-bearing animals are at a minimum stage the births are few, but that these augment annually in number during the seasons of increase. This rather remarkable, but probable circumstance, applies particularly to musquash, martens, minks, ermines, foxes, and skunks. A number of hunters have also said to me that they have sometimes noticed this peculiarity in the case of beaver. Albinos are rare, but the writer has seen a few in the course of his forty years' service.

SKUNK.

Mephitis hudsonica (Richardson).

I believe that a few straggling individuals have been met with as far north as the Upper Peace, the lower Athabasca, and the Upper Slave rivers, but I never heard of any having been discovered in the Mackenzie River District, or beyond Great Slave Lake. Chief Trader B. R. Ross, however, found the bones and part of the skin of a skunk at a short distance from the south shore of that great inland sea. As already indicated, this is one of the herein-designated "periodic" species. The statement of sales in London rather corroborates this view, although perhaps not in as exact a manner as under martens and minks. First, we have 1,619 skins for 1853, then seven successive "good" years, ranging from the lowest (4,474 in 1854) to the highest (11,320 in 1856) for the entire period of twenty-five years. These were followed by seven "lean" years (1861 to 1867) with from 1,617 for 1865 to 3,758 in 1861. After that three more "good" years, 6,208 in 1868, 6,679 in 1869, and 9,606 in 1870. Then we finish the list with seven poor seasons from 1871 to 1877, varying between 1,322 in 1874 and 3,928 in 1877. I regret that I am unable to furnish details of the later sales, except for the years 1888, 1902, and 1903, and they consisted of 16,322, 5,682 and 5,206 skins, respectively. There is no record of the trade of even one example of this fur-bearing animal in the Athabasca or Peace River Districts for over thirty years subsequent to 1858, nor, I believe, previously; but from its former Edmonton posts to the south some skins have since been obtained. In 1889, Lesser Slave Lake gave 62, Sturgeon Lake 3, Trout Lake 2, and Whitefish Lake 20 skins; English River District, to the southeast of Athabasca, turned out 461 skins in 1889 and 207 in 1890, most of which

were purchased from Indians resorting to Isle à la Crosse and Green Lake. Portage La Loche had but 11 and 14 skins, respectively, for those outfits. At Fort St. James, Stuart Lake, British Columbia, the company traded 6 skunks in 1887, 23 in 1888, and 61 in 1889. Frazer Lake post contributed about one-half of the number. It is said that the sexes come together in the months of February and March, and that the female produces from four to seven young, which for a time are blind and rather weak and helpless. In May, 1885, I sent the skins of two young skunks, secured shortly before by an Indian near Fort Chipewyan, Lake Athabasca, and captured south of the place, to Dr. Robert Bell, of the Canada geological survey at Ottawa.

BADGER.

Taxidea taxus (Schreber).

Sir John Richardson gives latitude 55° north as the limit of this animal's northern range. It used to be fairly abundant in the prairie regions, but as these are settled, it is gradually diminishing in numbers. If it ever extended as far as the Peace River it must have been many years ago, as not a single example has been traded by the company in that quarter since 1858 (I have no earlier data), but elsewhere to the south, they collected a total of 39,579 skins between 1853 and 1877. The best three years were 1870 with 2,445, 1873 with 2,705, and 1876 with 2,274 skins, and the three lowest, 1854 with 886, 1857 with 871, and 1867 with only 597 skins. In 1902 and 1903, respectively, the London sales amounted to 1,141 and 824 skins.

The female badger has from three to five at a birth, and they are said to be like most mammals, born blind and helpless. Mr. Donald Gunn of the Red River Settlement, Manitoba, was misinformed when he wrote that the Indian name for badger was *Weenusk*. This, I believe, is the native (Cree) name for *Arctomys monax* and *Mistunusk* for the badger. In 1889, Isle à la Crosse and Green Lake each traded one badger skin, and the latter one also in 1890.

RACCOON.

Procyon lotor (Linnaeus).

According to the company's twenty-five years' statement (1853-1877), they sold a total of 99,179 raccoon skins in the London market. During that period, there were only six years when the annual sales exceeded the average (3,967), and they varied between 4,011 in 1872 and 11,678 in 1867, with 21,321 for 1868 as the maximum. The remaining nineteen years ranged from the minimum (1,042) in 1877 to 3,883 in 1863, the maximum. Strange to say, there is not one raccoon entered in the Dominion senatorial report of the Lampson's and Hudson's Bay Company's fur catalogues for the year 1887. In the latter's catalogue for 1902, however, we have 1,967 and in that for 1903, 1,024 skins. I understand

that this species is, now at least, very rare in the northwest of Canada, while it is probable that most of the foregoing returns were obtained in other sections of the country, to the west, south, and eastward. In the second volume of Audubon and Bachman's Quadrupeds of North America, Audubon has given us a full and interesting account of the habits of this species. As to its northern and western distribution, he quotes from Sir John Richardson and others. The former supposed that the raccoon extended farther north on the shores of the Pacific than it does on the eastern side of the Rocky Mountains. Dixon and Pastlock confirm this, as they obtained skins from the natives of Cook River in latitude 60° north. Richardson further states that the company procured about 100 skins from the southern parts of the fur districts, as far north as the Red River in latitude 50° north. It is said to hibernate for a portion if not most of the winter. The young, usually from four to six in number, are quite small at their birth, which generally takes place in May, though varying with the range.

LAND OTTER.

Lutra canadensis (Schreber).

The Canada otter is but very sparingly present on the lower Anderson, nor could it be truthfully stated that it was very abundant in the far north; still, it is generally met with in every locality adapted to its requirements. There are seasons also when, for natural reasons beyond our knowledge, it is more markedly numerous in certain sections of the country than is usually the case; but the very extraordinary statements made by Bell^a that there were imported into England 713,115 skins of the American otter in 1830, 494,067 in 1831, and 222,493 in 1832, must be enormously exaggerated. As only 23,889 is the total given for 1833, the other figures must surely be grossly incorrect. The company's aggregate sales for the twenty-five years previous to 1878 only amount to 318,140, or an average of about 12,723 skins a year. In March, 1888, they sold 11,588; in the same month of 1902, 8,675, and 10,273 in 1903. The three best years of said period were 1864 with 15,443, 1866 with 18,380, and 1867 with 15,271, and the three lowest 1853 with 8,991, 1874 with 9,010, and 1877 with 9,926 skins. In fifteen years (1863-1877) of the aforesaid twenty-five, Mackenzie River district supplied 1,984, and the Athabasca district in twenty years (1858-1877) supplied 4,861 skins toward the above grand total. The Mackenzie River contribution by Fort Resolution, Great Slave Lake, was 427 for the same period.

By widely separated hunters, this animal is said to mate during the months of March, April, and May. The offspring are from three to

^a British Quadrupeds, 1837, p. 136.

five in number. One informant says they are born with their eyes wide open, but all of the others assert the contrary. Richardson mentions that the female has one litter of from one to three annually in April; but Indians in the far north (in New Caledonia, British Columbia, on the Peace and Saskatchewan Rivers) vary in their several accounts. Traces of its "sliding," or travels from one stream to another over the winter snow, have been frequently observed, and as a result some—not all—of those seen are shot or run down and bludgeoned. I never, however, heard of any instance in keeping with Godman's "otter-sport" sliding amusement.

GRAY SEA-OTTER.

Lutra lutris (Linnæus).

During the oft-mentioned twenty-five years, the Hudson's Bay Company obtained from the natives of Alaska and northern British Columbia, a total of 4,100 skins of this formerly abundant but now rare and very valuable sea-otter. The three best years were 1855, which produced 338 skins; 1856, 319 skins, and 1858, 343 skins, and the three poor seasons were 1862 with 84, 1870 with 90, and 1872 with only 66 pelts. Their London catalogue sales for 1902 and 1903 seen by me do not contain a single entry of this animal.

GRIZZLY BEAR.

Ursus horribilis Ord.

There are no bears of this species in the Anderson River country, nor on the adjoining arctic coast, but I believe they are sometimes encountered, and their skins secured, in other parts of the northern districts on the west side of the valley of the Mackenzie to the Rocky Mountains. The female, it is said, brings forth one or two, and occasionally as many as three at a birth, every third year. The first few years are always spent by them in their mother's company, after which they are expected to provide food, a mate, and hibernating quarters for themselves. Comparatively few skins of this bear are received from the Indians, and they, together with most of those of *U. richardsoni*, figure under *gray* in the company's accounts. As all of the four kinds—black, brown, gray, and white—are grouped together in the fur sales statement, it is impossible to give the quantities of each for the period in question; but the catalogues for 1902 and 1903 furnish details, while their totals are only 143 skins below the average collections for the twenty-five years. The year 1902 yielded 161, and 1903, 246 skins of the "gray" bear. For fifteen of the twenty-five years (1863 to 1877) Mackenzie River District furnished 665 "gray" bears. There are no available data for a similar period for Athabasca; but in 1886, 1887, and 1889, 68 more skins were obtained from that district, while the

posts on Upper Peace River gave 35 skins of the bears designated above. The adjoining district of New Caledonia, on the west side of the Rockies, also contributed a certain number of skins of this species to each year's London sales. Mr. Moberly, who spent several years in British Columbia, says that he was credibly informed that many years ago grizzly bears were occasionally met with in the Pas Mountain of Cumberland District and amid the Touchwood Hills of Manitoba; but such is not the case now. He further says:

There seems to me to be a different species in the Rocky Mountains. They are much larger than any other grizzly bears seen on either side. Their color is lighter and they have a whitish mane, and are much more ferocious, but not so numerous as the others. Indian hunters readily attack the latter; few, however, will willingly venture on a contest with the Mountain King unless the chances are very favorable.

It is also on record that the grizzly bear, as well as the black bear, were not uncommon to the eastward and in certain other wooded sections of the Red River Valley at the end of the eighteenth and beginning of the nineteenth century.

RICHARDSON'S BARREN GROUND BEAR.

Ursus richardsoni Swainson.

This bear is not uncommon in the Barren Grounds of the Anderson region nor on the polar shores of Franklin Bay, where, apart from a few exported skins, we annually secured during our five years' sojourn at Fort Anderson one or two examples, with the skulls and skeletons suitable for museum purposes. The characteristic disposition of this rather formidable animal may be fairly judged from the following experience: In the end of July, 1862, an Indian brought in the skin, skull, and leg-bones of a medium-sized male, which he shot in the Barren Grounds northeast of the post. He informed us that as soon as the bear perceived him, it at once advanced toward him, and when at a few yards distance, he fired at and killed it. On the 8th of the same month an Eskimo secured a large male on the east side of the lower Anderson, about 50 miles north of the fort. The first shot struck and broke one of its hind legs, which greatly angered the bear, which fiercely pursued its assailant, but a second ball fortunately laid it low in rather close proximity to his person. Again, on June 30, 1863, a member of our Indian collecting party succeeded in killing a very large male on the shores of Franklin Bay. From a high and narrow shelving ridge near the head of a deep ravine, he observed the bear at some distance below, and in order to attract its attention he began to whistle and throw stones at it, much to master bruin's disgust, and it immediately started to ascend to where the Indian from his chosen vantage ground stood prepared to receive it. After permitting it to approach within 10 or 12 feet he fired at and mortally

wounded it, but to make his work sure he at once rushed out and drove his knife to the hilt in the bear's heart. The skin and complete skeleton of this animal were secured and forwarded the following summer to the Smithsonian Institution at Washington. About three weeks previous to our arrival at Franklin Bay, in the end of June, 1864, two Eskimo hunters observed a brown bear at some distance, and being, for them, well armed, they went forward to meet it and did their best to annoy it by uttering very loud and shrill cries. They made a stop, however, at a driftwood stand, shortly before constructed by them for the purpose of shooting therefrom at passing ducks, geese, and swans, and there prepared for action. One of them carried a Hudson Bay single-barreled flintlock gun, and the other had a spear formed by firmly attaching a long knife of Eskimo make to the end of a somewhat slender pole about 6 feet in length. When the bear had closely approached them, it was shot and severely wounded, which, of course, made it perfectly furious, and it came on so very quickly that there was no time to reload the gun; but, just as it was about to spring at and close with the man who had fired the gun at it, the other man struck fiercely at it with his spear, and both soon dispatched it with their knives. This animal will not only hug, and if possible crush, any unfortunate falling into its clutches, but will also bite with its sharp teeth and scratch viciously with its powerful claws, as Indians and Eskimos have occasionally experienced to their cost. In the spring of 1864, one of the leading men of the Mackenzie River Eskimos, while hauling with a comrade on the slopes of a high sea-bank, was suddenly attacked, knocked over, and severely bitten by a large male, which would doubtless have speedily finished him had not his companion, who happened to be near by, killed the bear by a quick and well-directed knife thrust. Another instance of biting occurred in the Anderson Barren Grounds in the month of August in the same year. An Indian on a hauling tour observed an animal of this species, which he determined to shoot, reposing on the top of a knoll, but to make sure of his quarry he crawled quite close to it, and on pulling the trigger of his gun it unfortunately snapped; but the sound awoke the bear, and before the Indian could draw his knife he was thrown down, and the bear at once began to bite him in the shoulders, arms, and legs; but for some unknown reason it soon desisted and disappeared, leaving the poor fellow in a badly mutilated and helpless condition. Luckily for him, his friends missed him and a search was made which resulted in his discovery; he was then taken on to his own lodge, not far away, where he was carefully attended to, but, some three or four months elapsed before he recovered sufficiently to be able to hunt again, and he will no doubt carry the scars of the wounds of his very narrow escape from death, to his grave. The wonder is that he was not killed outright.

Early in the morning of July 15, 1865, as I was in my tent, emptying some birds' eggs gathered the previous day a few miles east of the Wilmot Horton River, I noticed the countenance of an Indian assistant who was at the door suddenly change color and exhibit much fear. I asked him what ailed him, and he muttered "*sass*," which is the Chipewyan general term for bear. I got up immediately, looked out, and with much delight saw what under the peculiarly hazy mirage of the hour, when objects not far away appear comparatively gigantic, one enormous and two young Barren Ground bears coming direct for our camp. I at once roused up our best shots and made ready to accord them a very warm reception; but just as they were about arriving within range of our muzzle-loaders (there were no breech-loading rifles in those days) the mother bear perceived the tent, as well as our crouched party, which, under the stated atmospheric conditions must have struck her with fearful astonishment, as she instantly got up on her haunches, a proceeding followed by her offspring (over two years old). After having a fairly good look at us, they all bolted, while apparently not one of the dozen balls fired at them went home, as they scampered away at a rapid pace, and so escaped. On the succeeding evening, another large animal was seen, and he appeared to be making right for our encampment; but, although he was allowed to approach quite close, we failed to secure him. On another occasion, several of our Indian hunters observed a bear busily engaged in feeding on the carcass of a reindeer, which had probably died from the effects of a bullet-wound received a short time previously on the arctic coast, near Langton Harbor, Franklin Bay. As soon as they were noticed, he got up on his hind legs and after a square look at them decided to retire, and succeeded in doing so scathless. From all that has been narrated herein, I think it will be readily admitted that the male, at least, of *Ursus richardsoni* is a bold and courageous animal, and when wounded is quite as brave and formidable an antagonist on his own grounds as his cousin, the true mountain grizzly, is in his territory. The female is doubtless less aggressive, except when defending her young. Nearly all these referred to were males. The Indians say that the females give birth to one or two cubs every third year, and that they keep company and hibernate for two seasons in the same shelter-hole or cave with their mother. The paunches of the bears secured by us were mostly full of various edible roots, and one or two contained some partially-digested venison. Exclusive of a comparatively small number of skins shipped as trade returns of the post, I may mention that the Smithsonian Institution received several examples of the full-grown and some spring cubs of the male and female of the Barren Ground bear. A. G. Dallas, esq., then resident governor-in-chief of the Hudson's Bay Company, had a fine large mountable specimen sent to him by request. A similar sample was also forwarded

to Prince Jerome Napoleon, of France. The former was secured in 1863 and the latter in 1864. I have not noticed any reference to the presence of this or the other species of bear on the lands to the north of the American coast visited by the different arctic expeditions.

BLACK BEAR.

Ursus americanus Pallas.

The black bear is not at all common within the arctic portion of the Anderson River, but in the forest country to the south on both sides of the valley it is fairly abundant. It subsists chiefly on roots, edible grasses, berries, and green leaves, and on stranded fish and dead animals when procurable. The Indians occasionally kill a male or female bear which has neglected to hibernate, or for some unknown reason has left its winter shelter, and such examples are generally in a more or less impoverished condition, while many of the "winterers" are still quite fat as late as March and April when shot or speared in their holes or caves. In the far north, one and two, but rarely three, young are produced at a birth; but the Indians of New Caledonia district, British Columbia, have assured me that two, three, and four at a time are events there of rather frequent occurrence, and that even as many as five have been occasionally observed. This difference in prolificness may be owing to the fact that while roots and berries may be equally abundant in both sections of country, salmon are very abundant in their season and easily accessible in the western spawning rivers and streams, and there form the chief item of diet of the bears. The young usually hibernate two seasons with their mother, after which they are rather harshly repulsed by her and thereby made to understand that they must set up house and provide for themselves. This course would indicate that they breed only every third year, while some Athabaskan Indians thought they did so each alternate spring. In this connection I would mention that the Carrier Indians of Stuart Lake, British Columbia, have told me that it was an event of the utmost rarity (one such occurred in the spring of 1889) to kill a hibernating bear with unborn young. Even when attacked in their winter shelters, they will almost invariably manage to abort the young, if not already in existence, immediately on becoming aware of the near presence of men with deadly intentions. During the rutting season, the males of all bears are always more ferocious than on other ordinary occasions. They frequently fight together until one submits, nor will they hesitate to attack any man they may meet at such times. When bears quit their winter-quarters, they usually resort, morning and evening, to the nearest small stream and feed on the small fish. They also eat roots, etc., as already mentioned. When wounded, they are said to utter a cry and moan in pain much as most

men would do under similar circumstances. This is particularly the case with the black bear. They are taken in snares, shot, and captured in deadfall and powerful steel traps. The Indians themselves can not account satisfactorily for the recurring seasons of exceptional scarcity of bears in certain regularly-occupied tracts. If the bears perished by disease, or even starved to death—a very unusual occurrence—they think that they should sometimes come across their remains in their many hunting peregrinations, if only for the reason that relics of a badly wounded animal are almost invariably discovered sooner or later in the vicinity of the locality where it was shot. Migration, therefore, seems the most reasonable solution of the difficulty. Remarks as to food, habits, and distribution, but not numbers, made under this heading are equally applicable to *U. cinnamomeus*, the skins of which are usually described as *brown* in the company's lists.

For the reasons already given under *U. horribilis*, I am unable to show the quantities of each color sold in London for the period from 1853 to 1877, but with the aid of the following data a fairly correct estimate of the proportion of black and brown bears collected in the northern district, at least, may be formed, namely: From 1863 to 1883, Mackenzie River District furnished a total of 906 black and 571 brown, and for 1836, 1887, and 1889, 1,678 black and 183 brown skins. The posts of old Athabasca produced 712 black and 70 brown in outfit 1889. Then came the London catalogues for 1902, with 7,087 black and 161 brown, and 1903, with 6,444 black and 246 brown bears. In the twenty-five years' statement, all the bears are grouped together under one heading, and they aggregate a total of 200,042, or an average of nearly 8,002 a year. The bear returns for the two years 1902 and 1903 are only 143 skins below this average, while the competition in the fur trade during the last three decades has been far and away the greatest in its history since the coalition with the Northwest Company in 1821. For twenty-seven years, from 1858 to 1884, inclusive, Athabasca District's quota to the London sales was 13,997 assorted bears. This total would have been upward of 2,000 larger but for the transfer in 1878 of the posts of Battle River, Dunvegan, Hudson's Hope, and St. John, with other Edmonton fur-trade stations, to constitute the company's new district of Peace River, which, for outfit 1889, turned out 500 black, 67 brown, and 38 gray bears. For the five years 1885 to 1889, New Caledonia district, British Columbia, supplied 1,602 assorted bears, and in 1889, 333 black, 11 brown, and 21 gray, as against 412 black, 22 brown, and 20 gray shipped the year previous. I may mention in conclusion that the English River District, next on the southeast of Athabasca, traded 283 black and 64 brown in outfit 1889, and in 1890, 399 black, 120 brown, and 1 gray bear skins.

POLAR BEAR.

Thalartos maritimus (Phipps).

With the exception of a few trade skins annually received from the Eskimos during our five years' residence at Fort Anderson, we secured but three assorted examples of this bear, which were forwarded to Washington. One of them, the best, was shot in Liverpool Bay, and the other two, I think, were killed near the outlet of the Wilmot Horton River in the Franklin Bay. The Eskimo who brought us the latter stated that he and a companion were watching for passing ducks and geese in a small sheltered, but open, stand, which they had built with blocks or slabs of hard frozen snow close to the shore, when they saw a large white bear coming from the sea in their direction. They permitted it to almost reach them before one of them fired at and wounded it very severely, while the other soon finished it with his spear. The second animal was killed later in the same spring (1865) in a similar manner.

The writer of these notes entered the service of the Hudson's Bay Company on June 25, 1852. We embarked in the company's sailing ship *Prince of Wales* (Capt. Daniel Herd) at Stromness, Orkney, on the 3d of July and reached York Factory, Hudson Bay, on the 15th day of August following. While retarded in the navigation of Hudson Strait by large fields of drifting ice, a full-grown polar bear was observed from the ship, and as the captain was desirous of procuring a suitable specimen, he ordered his chief mate, John Hackland, to lower and man one of the boats for this purpose. The company's surgeon (H. S. Reddome) with several of the cabin passengers, myself included, obtained permission to accompany him. As soon as bruin perceived the boat proceeding in his direction, instead of being scared, he boldly advanced to meet us, and we were therefore not long in coming to close quarters. A couple of shots were fired at him, one of which evidently struck home, as he immediately turned tail and set off at a rapid and much blood-marked pace over the ice. After a hot pursuit we gave up the chase, as it was impossible to follow him with the boat or on the moving masses of floating ice. We then returned to the ship greatly disappointed at the loss of such a fine animal. Next morning another bear was seen, but at a considerable distance; but we were more fortunate on a subsequent occasion, while we were similarly delayed by ice near the center of Hudson Bay. This attempt by the same boat party was crowned by the capture of a much larger polar bear than Captain Herd had ever observed in the course of the twenty voyages then made by him between London and York Factory. It was an old veteran, and had evidently participated in many a hard-fought battle for food and love, the proof marks of which were deep and many in number. The last great

fight for life was the culminating point of a career which surely entitled him to hold the position of the unquestioned championship of the white bears of Hudson Bay. The sailor in the crow's-nest was the first to perceive the bear at less than a mile's distance. He appeared to be engaged in a fierce combat with some large animal, which turned out to be the case. When we came up to him he only had had time to partake of a few mouthfuls of the warm flesh of an enormous seal (*Erignathus barbatus*) which had been killed by him after a terrible struggle, evidences of this being plainly visible. He looked as if he was very angry indeed at our unseasonable interruption of his well-earned dinner, and at the same time determined to stand by his hard-won prize. At first Mr. Hackland thought we might be able to secure him alive, by noosing him with a stout rope while in the water, but soon gave up the idea as too dangerous, and we then, some six or seven men with guns, fired repeatedly at the bear while on the ice and swimming in the sea, at very close quarters; but although many of the bullets went wide of the mark, the shooters being mostly youngsters of little experience, we afterwards ascertained that it had taken a number of penetrating ones to oblige him to crouch down and appear to die. After most of our party had landed on the same large block of ice, in order to take possession of their prey, one of them, with gun still loaded, noticed in time a rather sudden movement of the bear, which might have resulted disastrously had he not been promptly finished by a ball through his head. He had been mortally wounded, but he no doubt feigned death in order to avenge himself, and would probably have succeeded had he not been killed outright as stated. We towed his carcass to the ship, and it was at once hoisted on board and well skinned by expert Greenland whale-fishery men among the crew. He was very fat and heavy. Very soon after our return, a severe gale sprung up, which enabled us to leave the ice fields for good.

Except for 1902 and 1903, when 170 and 96 skins, respectively, were sold in London, I have no idea of the company's annual sales of this species. All the skins are obtained from natives of the arctic coast, Hudson Bay, Ungava, and Labrador. When the North Pole is discovered, as I expect it will be some day, I believe the white bear will be one of the very few mammals found there. I think every arctic exploring and Franklin search expedition refers to the presence of this animal in the polar seas of Greenland and the Dominion. The *Investigator* secured four large specimens in Prince of Wales Strait, and Doctor Armstrong calls Baring Island "the land of the Polar Bear." Sir Leopold McClintock observed several individuals when drifting with the *Fox* in the pack ice in 1858, at least 110 geographical miles from the nearest land. On the other hand, Doctor Armstrong thought the meeting of an example over one mile inland on Baring Island

an interesting and most unusual occurrence. Sir George Nares's party secured several specimens in 1875-76. General Greely obtained several. He writes that they were very rare in Smith Sound, north of Cape Sabine. Lieutenant Lockwood, however, saw a polar bear at Cape Benet on the Greenland coast in latitude $82^{\circ} 24'$ north, which is the most northerly American record. Sir Edward Parry, in 1827, observed one on the ice also in latitude $82^{\circ} 24'$ north, to the north of Spitzbergen Island. "On August 18, 1859, while almost becalmed off Cape Burney, a mother polar bear, with two interesting cubs about the size of very large dogs, swam off to the *Fox* and were all shot." McClintock says that the "veal" of the young appeared among the delicacies of their table, and that Christian had asked him for a portion of the old bear to carry home to his mother in Greenland, where the flesh is considered a real delicacy. He further says that he acquired the arctic acquisition of eating frozen bear's blubber in very thin slices on biscuit, and vastly preferred it to frozen pork. At the time of writing, however, he thought he could not even taste it, but the same privation and sense of starvation from *cold*, rather than *hunger*, which induced him to eat it *then*, would doubtless enable him again to partake thereof *very kindly*, if similarly "cooked by frost."

PINNIPEDIA.

WALRUS.

Odobæenus rosmarus (Linnæus) and *O. obesus* (Illiger).

Fifty years ago, the walrus was numerous in the northern seas between Point Barrow and Cape Bathurst and to the eastward. On several of our overland bird and egg collecting expeditions from 1862 to 1865 we observed a few individuals basking in the sun on the pack, as well as on large blocks of tide-swayed ice at the southern end of Franklin Bay. The Anderson Eskimos frequently brought into the post for trade various articles made from the ivory tusks of the walrus. Their umiaks, or women's boats, are usually made by sewing the requisite number of hides together and placing them over a framework composed of drift timber. The skins are also cut up into stout thongs, which are highly valued, and the best procurable for dog-sled line lashings. Its flesh and oil are greatly prized by the Eskimos. After passing to the east of Point Barrow, Doctor Armstrong was "surprised by seeing numerous herds of walruses (*Trichechus rosmarus*) grouped together on the large detached masses of ice, drifted off from the main pack, apparently asleep or basking in the sunshine. The novelty of a sight so unexpected was gladly welcomed, and various and amusing were the opinions given by the men who had never seen them before as to what they could possibly be, while they gazed in mute wonder and amazement at the strange sight before them. They

did not exhibit any feeling of alarm as we approached; one or two could be seen dropping into the water, but it was not until we had got within a few yards of them that, as if by a preconcerted signal, they rolled or tumbled into the sea, and for a time became invisible. They appeared to live in perfect harmony, a lazy, listless air characterized the whole. I could not but admire the affection displayed by the dam for her young which were crawling on the maternal back as we approached; but the moment the mothers perceived the danger, they seized them under their arms and disappeared; nor did we see them again at the surface until there existed no cause for alarm. Greenland Arctic seamen consider the 'marine beef' of this animal excellent eating, an opinion concurred in by all medical men who have been engaged in polar explorations."

General Greely gives latitude $79^{\circ} 40'$ north as the highest probable range of the walrus. It is indigenous in Hudson Bay and strait and also in many other portions of the northern ocean.

HARBOR SEAL.

Phoca vitulina Linnæus.

This is probably the most generally distributed and abundant of all the northern species of hair seals. I believe it is also the most numerous in the coast seas of arctic America. The Anderson and Mackenzie River Eskimos kill a great many annually. It is a very valuable and useful animal for them; its skin is necessary for making boots and hunting canoes and other purposes. Its dark and rather unsightly flesh and extracted oil are among the chief and most esteemed articles in their yearly diet; the latter is also used in their stone lamps for light, heat, and cooking their food. We noticed some seals on the ice, basking in the sun, on each one of our four summer trips (1862 to 1865) to Franklin Bay. The Eskimos with us killed a few with the bows and arrows. Our Indian assistants did not seem to relish the rather disagreeable-looking flesh, but the Eskimos partook thereof with avidity. Doctor Armstrong, of the *Investigator*, observed many and secured several examples of this species in the waters of Baring Land. It has also been met with by other arctic explorers. Sir Leopold McClintock's party secured 17 examples of the smaller seals at Port Kennedy. During their eight months' drift in the pack ice, they killed 73 seals, 2 polar bears, 38 dovebies, and the blue fox already referred to. On March 2, 1858, they shot 4 fat seals and several dovebies; the largest seal weighed 170 pounds and the smallest 150 pounds. They were males of the species *P. hispida*. The flesh of this species was very disagreeable, a garlic-like taint so strongly permeating the whole animal that even Eskimos are nearly overpowered thereby, but the females are at all times free from fetor. A week later two more seals were captured. The flesh being free

from taint the Eskimos had fried liver and steaks for breakfast, the latter preferred. They had been washed in two or three waters to get rid of the blubber. The flesh was very dark and very tender.

McClintock doubts if seals breed in the drifting pack, as they never saw any cubs during their stay in that risky position. *P. hispida* may also be known to the Eskimos of the northern coast of America. General Greely writes that it is indigenous at Grinnell Land, and that it was met with as high as latitude $82^{\circ} 58'$ north. *P. grænländica* is also present as far as latitude $81^{\circ} 30'$ north, but he considers it migratory. They secured a number of the several resident species, including 27 examples of *P. hispida*. Sir Edward Parry's highest latitude (attained in 1827) was $82^{\circ} 56'$ north. In a lane of open water in the ice he observed one of the last-mentioned species. This was until recently thought to be the most northerly position ever reached by seals. Mr. Preble noticed a number of skins of this species in the company's stores at Fort Churchill, Hudson Bay.

From Hudson Bay, Ungava, and Labrador, the company receive and sell in London annually thousands of hair-seal skins. From 1853 to 1877 the sales aggregated a total of 259,600. The three best years in the series were 1867 with 21,458, 1861 with 18,104, and 1863 with 16,933; and the three lowest, 1853 with 1,425, 1854 with 2,021, and 1855 with 2,842. After a long period of good results, the returns have fallen to only 3,061 skins for 1902, and 2,509 for 1903. There is reason to believe that other species of seals besides the harbor seal are embraced in the foregoing sales statement.

(Some reference to Fort Churchill may not prove out of place among these mammalian notes. Comparatively few of the Canadians of to-day are aware that "upon a rocky spit forming one side, and commanding a splendid harbor, stand the still well-preserved remains of a massive fortification, the most northerly one of British America, scarcely inferior as such even to old Louisburg and early Quebec, its site admirably chosen, its design and armament once perfect, and interesting still as a relic of a by-gone strife, and now only useful as a beacon for the harbor it had failed to protect." Some day again, however, in the not distant future, when the Hudson Bay route, now so much decried by many eastern and by a few western "unbelievers," shall have become an accomplished and successful navigable ocean waterway between Canada and Europe, the Imperial Government may consider it advisable to rebuild upon the ruins of the old, a new and impregnable "Fort Prince of Wales.")

BEARDED SEAL.

Erignathus barbatus (Erxleben).

Although we received no whole skins of this species at Fort Anderson, we had every reason to believe that it is an inhabitant of the northern ocean. It is common in Hudson Bay and Strait and along the Alaskan coast from Bristol Bay northward. Ross observed it in Boothia, and it has also been met with by other arctic explorers, including Nares, and Greely obtained several specimens. The latter gives latitude $81^{\circ} 46'$ north as the highest point where an example (8 feet $2\frac{1}{2}$ inches in length and weighing 640 pounds, gross) was secured. He considers it a summer visitor so far north. McClintock mentions that the Dane, Peterson, shot an example in Bellot Strait which weighed 500 pounds, and that its flesh was preferable to that of the smaller seals. The Eskimos who resorted to Fort Anderson made use of the parchment-dressed skins of this species for the canoes, and occasionally also for their women's boats, instead of that of the walrus. They heartily enjoy partaking of its flesh and oil, no matter how rank it may become by keeping. They can and do eat raw meat and fish; but during the summer season, as well as when living in their winter huts on the coast, they cook the former, and the latter also when fresh, much in the same way as do Indians and others. During our five years' sojourn at Fort Anderson we received large quantities of sun-dried reindeer tongues and venison, in excellent shape for consumption, from the river Eskimos.

FUR SEAL.

Callorhinus alascana Jordan and Clark.

This valuable marine fur-bearing animal is introduced here, like *Phocæna phocæna*, merely in connection with the company's receipts of the skins and sale of same in London. There may have been previous collections, but the first record in the "statement" is for 1854, with only 13 pelts; 1855 is but 2 better; then we have 38 for 1856, and 79 for 1857. Next follow 1858 with 116, 1859 with 196, 1860 with 186, 1861 with 176, 1862 with 403, 1863 with 655, and 1864 with 977 pelts. Afterwards the trade has been good, with 2,086 for 1865, and only three years under that figure, while the sales vary between 2,151 and the maximum, 13,620, in 1871, subsequent to which they irregularly decline to 1,588 for 1877. The total for the twenty years is 44,322, or an average of nearly 1,846 skins a year. There is no entry of fur seals in the Hudson Bay catalogues for 1902 and 1903. In recent years, however, the company's trade of this pelt has practically ceased on the western Pacific coast, but I understand that they now sell on commission the bulk of the yearly catch of the Victoria, British Columbia, sealing fleet.

CETACEA.

WHITE WHALE.

Delphinapterus leucas (Pallas).

Common in the Arctic Sea and in the estuary of the Mackenzie River, where the Eskimos capture a number every season. Many years ago, it is said, several individuals ascended that river as far as Fort Good Hope. They are abundant in Hudson Bay, where a large number are annually captured at Fort Churchill by servants of the company; the oil is extracted, duly shipped, and sold in London. The various boat and ship discovery and Franklin arctic search expeditions have all noticed the presence of white whales in the northern sea under review. Greely gives latitude $81^{\circ} 35'$ north as its most northerly migratory observed range.

On the question of the "Northwest Passage" Admiral Sir Edward Belcher, in volume 2 page 258 of his *Last of the Arctic Voyages*, writes: "The original act was to reward any persons who, by sailing from sea to sea, proved America to be an island, and at the period the reward was offered, it was considered (I speak subject to correction), by the wording of applications to the Treasury, with the assertion 'that great benefit would arise to *commerce*.' Now, when Sir Edward Parry made good his claim, it was for the completion of *a portion* between the meridians undiscovered. The act then, . . . divided the undiscovered spaces into divisional rewards. But inasmuch as Sir John Franklin, Sir John Richardson, Dease and Simpson did not *sail through*, the rewards to which they were *most justly entitled* were *denied*. But to my mind, and to those who are deemed to possess the clearest views in such matters, it has been deemed that the solution of the question (or really that America is sea-washed on its Arctic bounds) would have been incontestably proved had any person passed down Peel's Strait *in open water* and arrived at the positions visited either by Captain Back in former times, or by Doctor Rae on his late journey (1853-54).

It has therefore been assumed by the friends of Sir John Franklin, that his ship did so pass down Peel's Strait, and was wrecked in a position which would entitle him, if living, to contest this matter. And my own opinion goes to favor those who have, by much more hazardous voyages than those made by Parry or his successors determined the *commercial interests* which may, in consequence of their discoveries, and probably will, be pursued at some future period along that *sea-washed* shore."

In this connection I would point out that the time has surely arrived for action in respect to these remote and distant shores, as well as to our immense possessions situated to the north of the American Continent. We already know that there are copper deposits of much value up there. Coal has been met with and no doubt iron and other minerals are also present in some sections. The reindeer and musk ox have numerous representatives. Wolves, foxes, and polar bears are not scarce, while many of the rivers abound in salmon and other fish. In the straits, inlets, and larger bays whales, seals, and walrus are still in abundance, and call for some attention from Canadian fishermen. Nor should it be forgotten that there are many portions of the Canada of to-day fertile and of great metallic wealth, which, but a few decades ago, were considered almost worthless; it would therefore be very unwise to assume and continue to hold similar opinions regarding the resources of many tracts of vast extent and importance, now virtually despised, which may yet prove of great worth to the Dominion.

GREENLAND WHALE—ARCTIC RIGHT WHALE.

Balæna mysticetus Linnæus.

It was probably an individual of this large and widely distributed species which Sir Alexander Mackenzie observed when he discovered the great Mackenzie River in 1789. On that occasion he landed on an island at its mouth, which he named "Whale Island." Although old and recent traces of them were many, yet he did not meet with any Eskimos. The Eskimos who frequented Fort Anderson succeeded most seasons in killing one large whale, but seldom as many as two. Plenty reigned for many months as a result. Quite a large number of hunters were necessary for the successful pursuit of a whale. The implements formerly used were an ivory barb, with an iron or flint point, attached to a strong walrus line having an inflated bladder at the other end. A long haft of wood was used to propel the barb, which detached itself when the object was hit. This course was followed until as many as a dozen or more floats were dragged by the whale; he soon became exhausted by the persistent attack of his enemies, and when that happened they approached and by repeated thrusts lanced him to death. The fresh blubber resembles pork in color and taste. Our servants preferred to eat it raw with their dry venison. When fried, it was very rich and oily. Needless to state that the Eskimos of the arctic region are exceedingly fond of fat and oil, and that during the long winter season they consume far more of these necessary and cold-protecting foods than any other race on earth. On June 25, 1862, the tenth anniversary of his departure from Stornoway, Lewis, Scotland, the writer had his first near view of the ice-covered polar sea and of the bay named by Sir John Richardson, in 1826, after England's celebrated but hapless explorer, Admiral Sir John Franklin.^a We then and there distinctly heard one or two large whales spouting at a great rate in a narrow lane of water, which was clearly visible at some distance amid the immense field of unbroken ice. In the end of June, 1864, he had a similar experience in the same quarter. Since the advent of American whalers, however, into these narrow seas, about twenty years ago, whales are now said to be rapidly diminishing in numbers to the westward of the Mackenzie, and this will soon be the case in the narrow seas of the land-locked portions of the Canadian polar ocean. In several suitable spots on the south shores of Franklin Bay and Langton Harbor we saw some ribs, crown, and other large bones of the whale, and certain other remains, including a human skull, ancient Eskimo huts or winter houses. With the exception of two families, with one large boat, or umiak, and three kayaks, or

^a He had previously—in June, 1857—obtained a distant view, and but for a prevailing blizzard would have had an equally close view of Liverpool Bay in January, 1859.

canoes, who had been directed to come there from Liverpool Bay to meet and assist us collecting birds, eggs, etc., and one or two young men who accompanied us from Fort Anderson, we never saw any other representatives of this intelligent and interesting race in that quarter.

I think the Greenland whale has been observed by all of the arctic expeditions. Markham relates that the Nares ships of 1875-76 witnessed numerous examples of the bottlenosed species near Davis Strait, but as they do not yield much oil they are not in much request; also one dead floating Greenland whale, worth £1,000. One of Greely's party found a rib of the latter as far north as latitude $82^{\circ} 33'$. Upon the east side of Port Kennedy the bones of whales were found in two places, a mile apart; the lowest was 180 feet and the highest 300 feet above the sea. They were more or less buried upon a flat patch of rather rich earth and nearly a mile inland. McClintock asks: "When did the skeletons of these whales drift to their present position? When did the forest trees grow in Baring's and Prince Patrick's Land, many of which are still fit for firewood? And when were the lofty table-lands of North Devon and North Somerset scored by the immense ravines, broad and deep, with sides almost perpendicular, and rocky beds, sometimes 100 yards wide, where no rivers now exist, nor even streamlets, except during the few weeks of summer's thaw? Will geology ever solve these enigmas?"

NARWHAL.

Monodon monoceros Linnæus.

From Eskimo reports, as well as from the published accounts of various exploratory expeditions, there can be no doubt that this marine animal is at least sparingly present in almost every section of the Alaskan and Canadian seas of Arctic America. Doctor Armstrong, of the *Investigator*, has noted some among the mammals observed by him; Sir John Ross, Sir George Nares, and other explorers refer thereto, while General Greely gives latitude $81^{\circ} 35'$ north as its highest migratory range. Several skeletons and one tusk weighing about $14\frac{1}{2}$ pounds and 7 feet $9\frac{1}{2}$ inches in length were found on Boothia Felix during the stay of Admiral Sir John Ross's party there from 1829 to 1833, when they abandoned their ship and retreated by boat to Barrow Strait, where they were rescued by a whaler, at one time commanded by Ross himself. Doctor Armstrong, the accomplished surgeon and naturalist of the *Investigator*, has written that in the large western islands (Baring and Melville), "where the soil is arenaceous, animal life is more abundant than elsewhere; this gradually decreased as we proceeded to the eastward, where the limestone formation generally prevailed. But the greater number of bears, seals, walruses, and sea fowl met with, although these are more difficult to procure than

musk oxen or reindeer, by their great size afford sufficient compensation; the carbonaceous element of the food (fat), the great supporter of respiration and life, being so largely supplied."

HARBOR PORPOISE.

Phocæna phocæna (Linnæus).

In the oft-referred-to statement of London fur sales, half skins of the porpoise appear without a break from 1856 to 1869, inclusive (I can not say if any were previously secured for export); then we have the columns for 1870 and 1873 blank, while the catch varied between 4 (the lowest) in 1862, 5 in 1863, 6 in 1864, and the highest (2,278) in 1865. The total sales for the twenty years amount to 14,048 half skins—equal to, I presume, 7,024 killed porpoises. As neither Dr. Robert Bell nor Mr. Preble mention this animal, it is probably not an inhabitant of the waters of Hudson Bay, and must, therefore, be considered as a product of Labrador seas.

The discoverer of the great Mackenzie River, which figures so frequently in these notes, and from which a large amount of material was forwarded to the Smithsonian Institution, and which has also for a long time been, and still is a valuable and rich fur preserve, surely deserves some notice, especially by a later fellow-townsmen. The celebrated fur trader and explorer, Sir Alexander Mackenzie, was a native of Stornoway, Lewis, Scotland, who emigrated to Canada in 1779, and soon after engaged in the fur trade, and in time became a partner and leader in the Northwest Company. In 1789 he discovered and descended the Mackenzie River to its outlet in the Arctic Ocean. In 1793, by way of Peace River, he was the first white man, with matchless prudence and fortitude, to force his way across the Northern American continent, and there, in latitude 52° 20' north, left his mark on a rock by the seaside bearing the inscription: "Alexander Mackenzie from Canada by land the twenty-second of July, one thousand seven hundred and ninety-three." Mackenzie's discoveries added new regions to the realms of British Empire and commerce, and in doing so extended the boundaries of geographical science. He did much more, and but for his labors it is doubtful if any part of that country would to-day be a portion of the Canadian Dominion. Mackenzie is described as "possessed of a vigorous intellect and a fine physique, of medium stature, square, muscular build, very strong, lithe, and capable of enduring great fatigue. He was a remarkably fine-looking man, firm and dignified, refined and noble in thought, with a mind and energy bent on enterprise, and filled with zeal for the benefit of his partners in trade, and with a desire for the well-being of mankind in general." He died in Scotland on the 12th of March, 1820.

Another great explorer and trader of the Hudson's Bay Company, the notable Chief Trader Thomas Simpson, likewise calls for some proper reference herein. He was a native of Dingwall, in the county of Ross, North Britain, and entered the service of the company as secretary to his relative, the resident "emperor-governor," Sir George Simpson. He left Fort Garry, Red River, on December 1, 1836, for Fort Chipewyan, whence he was to set out in company with the prudent, capable, and experienced Chief Factor Peter Warren Dease (the builder and provider of Fort Franklin, on Great Bear Lake, where Sir John Franklin passed the winter after his return from his second overland expedition to the northern coast in 1826), in order to complete the exploratory work of that party west and east of the mouth of the Mackenzie River. All know how well these officers performed the duties intrusted to them. A perusal of Simpson's narrative of their explorations should prove inter-

esting to Canadians. General Sabine, who revised the same, wrote as follows: "I found the work in a state of such complete preparation that the alterations which I saw any occasion to make were very few indeed, and these chiefly of a verbal nature. It impressed me with an additionally high respect for your brother's memory, that he should have drawn up the narrative of the expedition on the spot in such a complete manner that it might quite well have been printed verbatim." On the 6th of June, 1840, Simpson, who had returned to Fort Garry on the preceding 2d of February, after an absence of three years and two months, marked by toils, perils, and privations such as have seldom been endured, set out for England by crossing the prairies to St. Peter's (St. Paul and Minneapolis were not in existence then), and thence to New York. He pursued his journey with much rapidity, left the main body of buffalo hunters with whom he started, and in company with four men went on ahead. On a chart which was found among his other papers after his death his last recorded day's march (June 11) was 47 miles in a direct line. After that date every circumstance is involved in mystery. He had evidently turned back, and all that can be ascertained with certainty is that on the afternoon of the 13th or 14th of June he shot two of his men, and that the other two mounted their horses and rejoined the large brigade of hunters. A party of them went to the scene of the shooting next morning, where his death took place. Whether he shot the two men in self-defense, and was subsequently killed by their companions, or whether the severe stretch to which his mental faculties had been subjected for several years brought on a temporary aberration of mind, under which the melancholy tragedy took place, is known only to God and the surviving actors therein.

"Man is a harp, whose chords elude the sight,
Each yielding harmony disposed aright;
The screws reversed (a task which, if he please,
God in a moment executes with ease),
Ten thousand thousand strings at once go loose,
Lost, till he tune them, all their power and use."

Thus perished, before he had completed his thirty-second year, Thomas Simpson, a man of great ardor, resolution, and perseverance, one who had already achieved much, and has left a name which will be classed by posterity with that of Cook, Parry, Lander, Franklin, Rae, Ross, McClintock, and others of a later date. The Royal Geographical Society presented to him in 1839 their founder's gold medal, which, however, never reached him. It was not until October, 1841, that the remains of Simpson were sent for from where he fell and brought to Fort Garry for interment.

RODENTIA.

BUSHY-TAILED WOOD RAT.

Neotoma drummondi (Richardson).

Chief Trader W. J. McLean informs me that Fort Liard, Mackenzie River District, where he was post manager from 1863 to 1872, is the only place in the northern department of the company where he has seen a few examples of this rat. This post is situated in latitude (about) 60° north and longitude 124° west. In New Caledonia District, British Columbia, however, it is quite common, and individuals are sometimes secured in native and other buildings. At present, Fort Liard may be considered the eastern range limit and the northern as well; but it is probably a more northerly resident on the west side of the Rocky

Mountains. Mr. Moberly states that a wood mouse or rat, color light brown inclined to gray, and about 5 inches long, was repeatedly seen by him at Fort McMurray, but nowhere else on this side, although not uncommon in New Caledonia, British Columbia, where the people speak of it as the "small wood rat."

WHITE-FOOTED OR DEER MOUSE.

Peromyscus arcticus (Mearns).

Although we failed to secure any specimens of this mouse at Fort Anderson, it may still be discovered in the country to the northward of Forts Liard, Simpson, Resolution, Rae, and Big Island, from which points numerous examples were obtained by Messrs. Ross and Kennicott, and forwarded to the Smithsonian Institution in the years 1860 to 1862. Mr. Moberly mentions the existence in the region of Athabasca and Peace rivers of a brown wood mouse, which destroys martens and other fur animals caught in dead-fall traps.

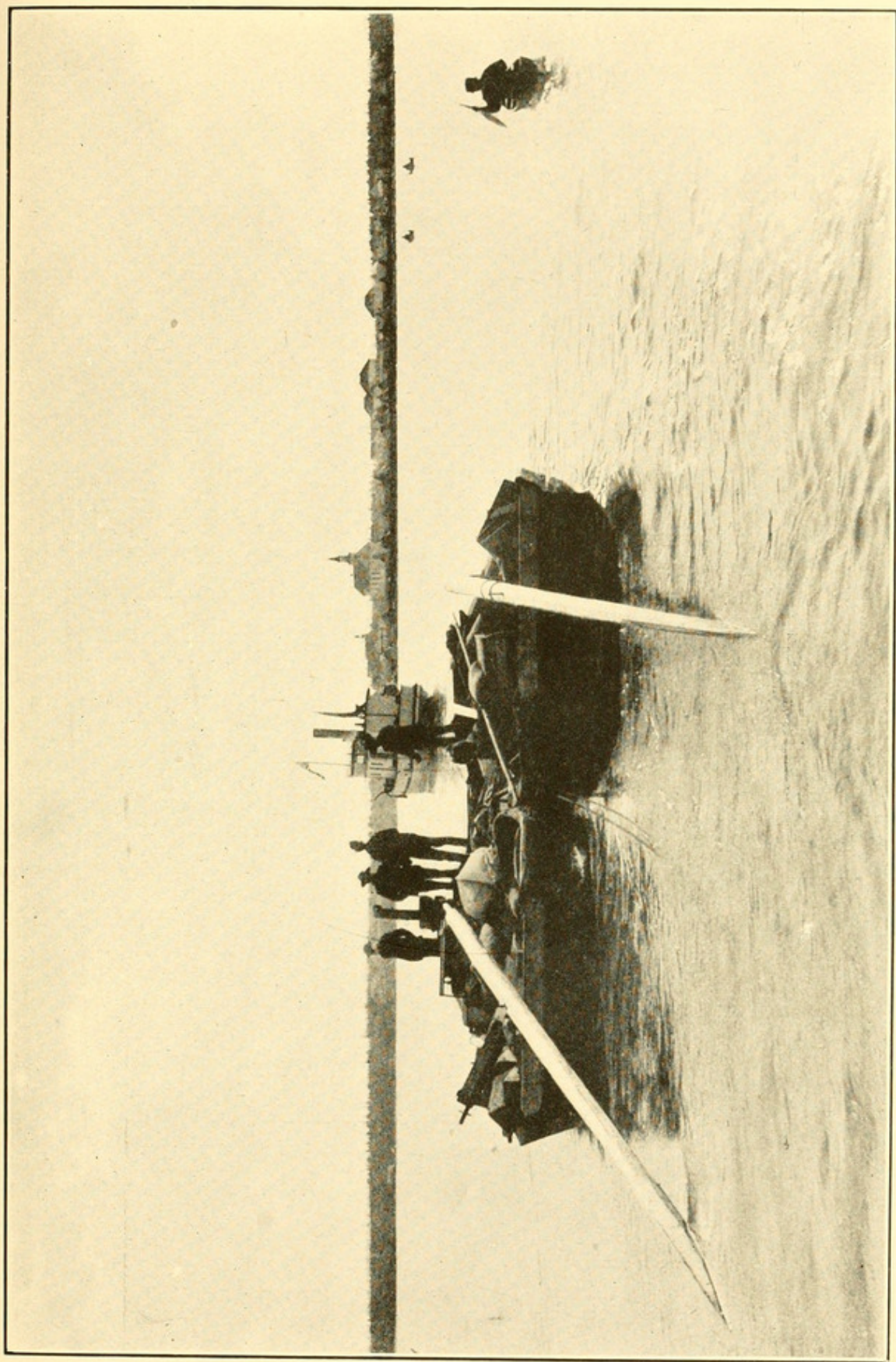
I incline to think that this mouse ranges farther north than the several Mackenzie River District posts (Forts Simpson, Liard, Big Island, Rae, and Resolution), from which specimens were forwarded to Washington by Messrs. Kennicott, Ross, Kirkby, Clarke, Reid, Brass, and Mackenzie in the early sixties of the last century. From the description given, I think Mr. P. Deschambault met with this species, both at Isle à la Crosse and at Lac du Brochêt post, situated at the northeastern end of Reindeer Lake.

RED-BACKED MOUSE.

Evotomys sp.

A fairly large number of examples of this species was collected by the Eskimos on the polar shores of Liverpool and Franklin bays, and in the adjacent country of the lower Anderson and Mackenzie rivers. Some were also taken in the vicinity of Fort Anderson and from the eastern Barren Lands. At nearly all of the company's posts in the Mackenzie River District likewise a number of skins were obtained for the Smithsonian Institution, and the gentlemen of the service above named were the contributors, together with Messrs. Hardisty, Wilson, Lockhart, A. Flett, J. Flett, W. Thomson, Smith, Gaudet, Taylor, Sibbiston, McDougall, Camsell, and MacFarlane.

Among the many northern Mackenzie River collectors of those distant days, to whom reference was made in my paper on birds breeding in Arctic America, as well as those specially referred to in these notes, but few besides the writer are now living. I think they are Chief Factors James McDougall and J. S. Camsell, Chief Traders C. P. Gaudet, W. J. McLean, and William C. King, and Messrs. Murdo McLeod and John Edward Harriott. Archdeacon W. W. Kirkby, D. D., now of Rye, N. Y., and Archdeacon Robert McDonald, D. D., of Peel River, also ranked among the number of successful Smithsonian collectors of the early sixties of the last



FORT RESOLUTION, GREAT SLAVE LAKE.

century. Among those who have passed away are the lamented naturalist, Robert Kennicott; Chief Factors William L. Hardisty and Lawrence Clarke; Chief Traders Bernard R. Ross, James Lockhart, John Wilson, and John Reid, and Messrs. Strachan Jones, A. Mackenzie, Andrew Flett, James Flett, J. Sibbiston, and William Brass; also the recently deceased Bishop Grandin, D. D., of St. Albert, Alberta, who contributed more than one interesting specimen during his former mission sojourn in the Mackenzie District. Neither has death spared the Smithsonian Institution. The eminent Professors Henry and Baird, together with the able Assistant Secretary, Dr. G. Brown Goode, the genial and experienced zoologist, Maj. C. E. Bendire and others, have been called away.

MEADOW MOUSE.

Microtus drummondi (Audubon and Bachman).

Quite a large number of skins were forwarded from Fort Anderson to Washington. They were obtained from the Eskimos of the Mackenzie and Anderson rivers, while a few were secured in the neighborhood of the fort. In severely cold winters individual mice are often found dead in stores and outhouses, and also on the snow in sparsely wooded tracts of country. Disease may, however, be sometimes the real cause of death. Some Indians assert that some species of mice breed oftener than once annually.

LITTLE MEADOW MOUSE.

Microtus macfarlani Merriam.

The Indians, and especially the Eskimos, who resorted to Fort Anderson, supplied a large proportion of the specimens received by the Smithsonian Institution from the Mackenzie River region, in course of the years from 1861 to 1866, inclusive. There are seasons during which mice are exceptionally abundant in different parts of the great Canadian northwest.

CHESTNUT-CHEEKED MOUSE.

Microtus xanthognathus (Leach).

This comparatively large mouse is very abundant most seasons in the far north, as well as along the arctic coast of Canada. Numerous skins thereof were secured at Fort Yukon (Alaska), Forts McPherson, Anderson, Good Hope, Norman, Simpson, Big Island, Rae, and Resolution, Great Slave Lake.

TAWNY LEMMING.

Lemmus trimucronatus (Richardson).

From the polar shores of Liverpool Bay and Cape Bathurst, from the lower Anderson River, from the neighborhood of Fort Anderson, from Fort McPherson on Peel River, and from Fort Yukon in eastern Alaska, many examples were obtained of this small animal, which

were forwarded to the Smithsonian Institution at Washington some forty years ago. From the published records of arctic exploration, there can be little doubt that at least two species of lemmings are comparatively abundant, even at the highest attained latitude, at many points of the northern polar lands of the Dominion of Canada visited by the various ship expeditions.

On Baring Island, Doctor Armstrong found them numerous in many localities, at most periods of each season, and also in large numbers on the ice during the spring thaws. He also knew them to prey on each other, has himself partaken of their flesh, and thought it delicately nice and tender. He writes that the female lemming produces from two to six at a birth. Sir Edward Parry found two species of lemming equally abundant on Melville Island; he gives the number of young as varying between four and eight. A female captured in 1820 had four *in utero*. On July 12, he discovered a nest containing six blind, naked, and helpless little ones, which grew so rapidly that they were able to quit it ten days later. Lemmings subsist on the products of the soil, such as dry dwarf willow, grasses, etc. Sir James Clark Ross states that lemmings were very abundant in Boothia, and he also confirms the above birth references from his observation. Captain Markham, of Sir George Nares' expedition, met with lemmings on his North Pole expedition of 1875-76, while General Greely found them in large numbers on Grinnell Land, as far north as latitude 83° 24' north. Eight examples were secured by his party during their stay in that quarter. They live in comfortable nests, composed of dry grasses, in holes in the ground, with two entrances to each. Sir John Ross found the skeleton of a lemming on an ice floe 60 miles north of Spitzbergen, in 1827.

HUDSON BAY LEMMING.

Dicrostonyx richardsoni Merriam.

This species is decidedly more abundant than *Lemmus trimucronatus* in Arctic America. A considerable number of skins was collected in various conditions of pelage from midsummer to midwinter, not only in the vicinity of Fort Anderson, but also from the lower Anderson River, the Barren Grounds, and on the coast shores of Liverpool and Franklin bays. Two females secured in the "Barrens" on June 26, 1865, each contained five embryos, while a few days later (June 30) a dead male example, perfectly white, was discovered in the nest of a golden eagle, 2 or 3 miles to the west of our usual summer crossing of the Wilmot Horton River.

MUSKRAT OR MUSQUASH.

Fiber zibethicus hudsonius Preble.

Like most of the important fur-bearing animals, the musquash greatly fluctuates in number. We have usually several seasons in succession when they are very abundant, followed by quite as many when they are comparatively scarce, and then between these periodic fluctuations we have a year or two when the returns are either above or below the average trade, as will now be demonstrated. From 1853 to 1877, the company sold in London 10,600,056 musquash, or an average of about 424,000 skins a year. Outfits 1853 and 1854 exceeded this result. They yielded, respectively, 493,952 and 512,291; but the following nine sales (1855 to 1863) were all below the average, and ranged between the period minimum (177,291 skins) in 1860 and 357,060 in 1863. There was a material increase in 1864 (509,769 skins), then three years of decline (418,370, 320,824, and 412,164 skins). However, 1868 gave as many as 618,081 skins, after which the two succeeding seasons fell below the average (404,173 and 232,251 skins), and the statement of sales winds up with seven good years, varying between 437,121 skins in 1877 and 768,896 skins in 1873, which was the best of the series.

The musquash abounds in all suitable localities throughout the entire Northwest Territories of Canada. It is abundant in marshy tracts on both sides of the mountains. It is also very common on the lower Mackenzie River, and less so on the same portion of the Anderson River, to their outlets in the polar sea. Albino examples are occasionally met with, but in all sections of the country formerly ruled by the Hudson's Bay Company a few skins of a fine dark variety of this species are annually secured by the native and other hunters. Seasons of high water, however, are a necessary factor in the propagation of the muskrat, while summers of drought and continued low water curtail expansion and also cause many deaths during the succeeding winters. In corroboration of this view I would offer a few remarks. The outfit 1889 was my first of five years' charge of the Cumberland District, lower Saskatchewan. The stage of water that autumn was fairly good in the many marshy streams, small lakes, and ponds in this musquash country (probably the best in western Canada), and the returns therefore quadrupled those of the preceding season. The following year was dry, and both water and the musquash catch shrunk considerably, while many thousands of the animals perished miserably under the ice and in their frozen up "washes," or winter houses. This unfortunate occurrence adversely affected results for two or three years, but in the meantime water conditions improved and have been very favorable for the last decade, so much so, indeed, that the annual

catch of musquash therefor has more than doubled that of any of the previous ten years in the district's history. In fact, I believe it turned out about 450,000 skins for outfit 1900. When very numerous, epidemic liver disease appears and carries off many thousands of musquash. Last year's Cumberland returns declined nearly two-thirds, and they may go still lower for this season, after which they will, as usual, rapidly increase again in numbers. More attention than before is now given to the hunting of the musquash in this and other districts, and as a result the company's sales are very considerably above the average of former years. In January, 1897, they sold 492,244 skins; in January, 1900, 756,910 skins; in January, 1901, I am told that the sales bordered on 2,000,000 skins; in January, 1902, 1,650,214 skins, and in January, 1903, 1,482,670 skins. This last showing is only 53,122 skins less than double the figures for the best sale (1873) entered in the London sales statement. The aggregate total for the period was 10,600,056 skins.

Leading hunters at the Pas, Cumberland, state that when about a year old the musquash begins to breed. The female has but two litters the first and three each succeeding season for a time. The number of young brought forth at a birth varies between 8 and 20. When born, they are weak and blind for some days, but they soon acquire sight and strength and learn to swim about and aid in providing for their own gradually increasing wants. Their food consists of esculent grasses and aquatic roots of various kinds. As already mentioned, many thousands of musquash die of disease, and many other thousands perish in seasons of low water. Mr. Colin Thomson, an intelligent observer, remarks:

They have an instinctive habit which those who hunt them would do well to learn. They have a general residence in which they live and exercise their natural instincts; to this residence a storehouse is attached at a little distance, in which they put up many dainty and succulent roots against the "rainy day" and a long winter; and when misfortune drives them from their homes, they are not without a refuge, although it be but a small one. The material used in the construction of their houses is such as they find in the marshy swamps where they live, and it is not uncommon to find the entire family of a season living in one house, sometimes as many as sixty in all.

Another informant, speaking of his own experience at Frazer Lake, British Columbia, and of his residence at posts on the Saskatchewan, Athabasca, and Peace rivers, writes that "the musquash copulates in the months of May, June, and July; that the females have three litters each season—the first being the most numerous, the second less, and the third, the least fertile in the series—that they are born sightless, and that the male assists in the rearing of the young."

JUMPING MOUSE.

Zapus hudsonius (Zimmermann).

In the early sixties of the nineteenth century the Smithsonian Institution at Washington received from Liard River, Fort Resolution, Great Slave Lake, and from the Peace River several examples of this mouse, but from report I do not think it is very common in these localities. Mr. B. R. Ross states that it is numerous in the Portage La Loche country, but rather rare in the district of Mackenzie River, but I do not remember having seen any at Good Hope or the Anderson. They may, however, be sparingly represented by examples at Liard and other points in the distant north. Mr. P. Deschambeault informs me that he has seen some jumping mice both at Isle à la Crosse and Lac du Brochêt. Mr. Moberly has also met with them on the Athabasca and Peace rivers.

POLAR HARE.

Lepus arcticus Ross and *L. grœlandicus* Rhoads.

I doubt if this hare is "abundant" in the Barren Grounds, or on the coast shores of arctic Canada, with the exception of the isthmus of Boothia Felix. We hardly ever observed an individual on our many summer and winter journeys in the far Northland, while I think we secured but three specimens during our five years' residence at Fort Anderson. Two or three skins were also obtained by Chief Factor Lawrence Clarke from the Barrens northeast of Fort Rae, Great Slave Lake. They are said to be fairly numerous among the tundras of northern Alaska, while arctic explorers have found the polar hare "very abundant" on the large islands lying to the north of the American Continent. On Baring Island they were in considerable numbers and many were shot. The *Resolute* obtained 146 on Melville Island and Ross secured some in Boothia. Nares met with them on his polar expedition, and Greely's men captured 57 examples. He gives latitude $83^{\circ} 24'$ north as its highest northern range. Lieutenant Lockwood killed 1 at Cape Benêt on the coast of northwestern Greenland. Captain Markham of the *Alert* observed traces on the polar frozen sea, 10 miles from the nearest land, in latitude $83^{\circ} 10'$ north. Doctor Armstrong also mentions that individuals were occasionally seen on the ice at a distance of 2 or 3 miles from the shore. He asserts that they breed three or four times in the course of an arctic season, and that the females have as many as eight and ten at a birth. This seems both extraordinary and improbable, but the doctor was a close observer and had had three years' experience of Baring Island and its fauna. Sir James Clark Ross, on the other hand, writes that a female shot at Sheriff harbor, Boothia, on June 7, 1832, had four

young *in utero* nearly mature, each $5\frac{1}{2}$ inches long, and of a dark gray color. In the uterus of one killed at Igloodik on June 2, six young were found, not quite so far advanced. One taken by Ross himself on June 28, a few days after birth, became sufficiently tame to eat from the hand but it died fifteen months later. He remarks that the polar hare exists even in the most desolate sections of the arctic regions, and that, too, throughout the long winter; nor does it seek shelter by burrowing in the snow, but is often met with sitting under the lee of a large stone where drifting snow has accumulated and seems to afford some protection from the biting blast. Doctor Armstrong, however, holds that this hare, as well as white foxes, lemmings, and the very few native birds all burrow in the snow at times during the winter for the sake of warmth.

NORTHERN VARYING HARE.

Lepus americanus macfarlandi Merriam.

Australians used to complain bitterly of the great havoc committed by the introduced English hare, or rabbit, and at one time the government offered as much as £20,000 for the discovery of a remedy which would have the effect of extirpating the nuisance, or at least considerably reducing the rabbits in number. We of the north then thought that if the latter could be inoculated with the virus of the disease which periodically affects the head and throat, and carries off many thousands of the American hares, when they are most abundant, in each decade, it would doubtless be highly appreciated in Australia, while, on the other hand, the natives and others resident in the eastern, western, and northern territories of Canada, would be greatly pleased if the referred-to epidemic would recur in a less fatal form and thereby prevent the years of scarcity frequently experienced. As already stated in this paper, there are several fur-bearing animals, notably the lynx and marten, whose numbers would seem to be chiefly dependent upon the abundance or scarcity of this species. The yearly catch of lynxes rapidly diminishes in volume as soon as the rabbits become scarce, and when the latter are comparatively rare a large proportion of the great, but now dwindling crowd of lynxes suffer privation, and some actually starve to death. Indians occasionally find examples of such victims. Nearly every post in the Mackenzie River District sent one or more specimens of the American hare to the Smithsonian Institution. It is said that it breeds two and three times each season; that the sexes copulate in the end of March, May, and August; that the period of gestation lasts about three weeks, and that the female seldom becomes a mother before she is a year old. A litter usually consists of three or four; but when on the "periodic" increase, females are known to have as many as six, eight, and even ten at a time, and then gradually return to three and four. The young are not born blind, nor, so far

as known, does the male render any assistance in rearing them. I am not able to substantiate this statement by my own experience.

The Hudson's Bay Company does not trade rabbit skins in the interior, but from the posts situated on the shores of Hudson Bay they annually export to England many thousands. From 1853 to 1877 the total amounted to 1,418,361 skins. Twelve of these years had sales varying between a minimum of 1,036 in 1871 to 45,917 in 1869, and then from 50,948 in 1876 to the maximum sale of 174,715 in 1855. The three next years of the series turned out 141,403 in 1865, 143,930 in 1867, and 106,320 in 1868. Subsequent to 1877 I have no data, except for January, 1897, when 81,759 skins were sold; January, 1900, with 18,372, January, 1902, with 5,857, and January, 1903, with 16,873 skins. The pelt of this valuable food animal is of great service to northern Indians, who cut up the fur skins into narrow strips and therewith make them into robes for their women and children and tunics or shirts for the men for winter use, and these garments certainly prove warm and comfortable for them. The American hare does not inhabit any of the large islands situated to the north of the continent. It is there replaced by *L. arcticus*. Neither did McClintock at its extremity (Bellot Strait) nor Ross at near its center on Boothia Felix meet with any examples or traces thereof on that far extending northeastern portion of Canada's continental territory.

LITTLE-CHIEF-HARE.

Ochotona princeps (Richardson).

Although I have never made the acquaintance of this hare-like mammal, yet from what Mr. Moberly states I incline to think that it is to be found sparingly on both sides of the Rocky Mountains as far north as latitude 60°—Richardson's northern limit. Moberly also refers to a rabbit about the size of *Lepus americanus*, of a grayish color, which does not change to white in winter, while its movements are very swift. Indians informed Mr. Ross that little-chief-hares were common in the mountains of the Liard River, while Jack McQuesten obtained some specimens on the upper Yukon, about 200 miles south of the old fort and in about latitude 63° north.

CANADA PORCUPINE.

Erethizon dorsatus (Linnaeus).

Porcupines are but rarely met with in the wooded country of the northern Anderson River, but in the region to the south they are somewhat more numerous, though nowhere in the far north very abundant. It is said that they copulate in September, and that the young are not brought forth until the following April. They are usually one or two in number, and, like most mammals, are born blind and

helpless. They nest in rock-sheltered holes. The male renders no assistance in rearing his offspring. They spend much time among the trees, on which they subsist. Indians consider them the most insolent and the clumsiest of animals. Neither Doctor Russell nor the Messrs. Preble met with this species on their recent arctic and Hudson Bay expeditions. Mr. George Deschambeault says that the period of gestation lasts about twelve months.

YELLOW-HAIRED PORCUPINE.

Erethizon epixanthus Brandt.

The northern Indians concede that there are two kinds of porcupines in the Canadian territories. This species, however, is more numerous toward the Rocky Mountains, where it probably replaces *E. dorsatus*. The flesh of the porcupine is considered excellent eating, not only by the natives but by all who have partaken thereof. Some hunters state that the females bring forth two and three at a birth. The Slave tribe of Indians inhabiting the Liard and Mackenzie rivers dye the quills of various colors and weave them into belts, garters, bands, bracelets, and rings for table napkins. They also ornament bark rogons and other birch articles, women and children's dresses, and the front uppers of leather moccasins therewith. Mr. P. Deschambeault says that he believes both species exist in the hunting grounds of the Isle à la Crosse (English River district) and Lac du Brochêt (Cumberland district).

BEAVER.

Castor canadensis Kuhl.

This well-known and valuable fur animal has been so fully described by travelers, as well as naturalists, that it is by no means easy to add matter of interest to its history. I shall, however, venture to submit a few items bearing thereon. From a consensus of statements and opinions elicited by me from the examination of aged Chipewyans, of Athabasca, and Carrier Indians of North Caledonia, British Columbia, I believe that the sexes copulate in the months of January and February, and that the young are brought forth in April and May following. The period of gestation is about three months. The young are born blind and are very helpless, but both sight and strength are duly acquired, and they soon display much activity. They are suckled for some weeks, but early learn to feed on succulent stems and the tender roots of aquatic and other plants. The most prolific females are those of middle age, and they annually produce from four to five and six at a birth, while instances of as many as seven and even eight are not infrequent on Peace River. Chief Trader Moberly has known of two cases, in one of which the female had eight and in the other nine little

ones. A Chipewyan hunter also assured me that he once found as many as nine well-formed embryos in the uterus of a female killed by him on the lower Peace River. Both tribes state that the female beaver seldom or never has young before the third year and that there are only one or two cubs at first, but more the following seasons. After attaining a certain stage in life the birth rate begins to decline. The adult beaver subsists on various roots, poplar bark, green willows, birch, and other deciduous leaves. The male assists in providing food for the young in the earlier stage of their existence. When necessary, this intelligent animal erects new, and always renovates old, lodges and dams in the autumn. One or two kindred families frequently live together, and their progeny continue for upward of two years with their parents, after which they are usually expected to mate and provide for themselves. The males often fight fiercely during the rutting season. It is not an uncommon experience for hunters to find one or more beavers dead of disease in their houses or "washes." Such animals are seldom other than in good condition, but the Indians will not eat the meat except they be verging on starvation. In this connection, Mr. G. Deschambeault writes that "when beaver are found dead in their 'wash' they are generally (mouth and nostrils) infested by numerous small white worms. Low water also causes the death of beaver some winters in their lodges." Some old veteran males become very large and heavy. The flesh of the beaver, except when very lean, is very palatable and easy of digestion, and is much relished by the natives and northern resident whites who have partaken thereof.

If let alone, or not much disturbed by hunting, the beaver will rapidly increase in numbers. In proof of this statement, I would mention that many extensive tracts of country in which they had become scarce or had wholly or almost entirely disappeared (as a result of the keen and very costly rivalry in trade which had for many years existed between the Northwest Company of Montreal and the Hudson's Bay Company of England previous to their coalition in 1821, it was uncertain for some time "which of them lost most money—neither of them gained money," while the general demoralization of Indians and whites was very lamentable) they afterwards recovered under the fostering policy of protection promptly inaugurated and intelligently pursued by the now united Fur Trading and Governing Corporation. For more than a decade subsequent to 1821, each beaver district in the chartered and licensed territories of the Hudson's Bay Company was annually restricted to the collection of a certain fixed number of beaver, which course eventually proved of much benefit to all concerned. By this means the perpetuation of the beaver was insured in sections where reckless slaughter had almost exterminated it, while the resulting expansion in more forward localities naturally followed. With

the view, however, of reconciling them to this enforced mode of preservation, the natives were strongly urged and encouraged to devote their best energies to the trapping of martens and other fur-bearing animals. After the beaver were known to have largely increased in numbers, and still sold well, the above rule was gradually relaxed; and as the wants of the Indians in those days were comparatively few, they never experienced any particular hardship from the limit thus imposed upon them in the general interest. It may be here mentioned that the company never encouraged the hunting of beaver or any other pelt *out of season*. On the contrary they strictly prohibited the killing of beaver in summer, and would only reluctantly accept the skins of such animals as they were assured had been absolutely necessary for food purposes.

The introduction of nutria and silk in the manufacture of hats in the early forties of the last century struck a deadly blow at the value of beaver, the chief staple fur of Canada and the northwest for two centuries, from which it has not yet quite recovered. For nearly half a century thereafter, the prices annually obtained for pelts were some 60 and 70 per cent below the average which had previously ruled. Since the Alaska fur seal, however, has come into "fashion," very much better rates have been realized by the smaller quantities of beaver sold in recent years. With the view of obtaining better prices in England, as well as for its future increase in numbers, the company naturally favored a continuation of its beneficial policy of restriction; but owing to the then general abundance of beaver, and the advent of competition in the trade, this much desired course had to be gradually abandoned. For the twenty-five years, from 1853 to 1877, the Hudson's Bay Company sold a total of nearly three million skins (2,965,389) of this important animal in the world's fur mart, London. The yearly catch from 1853 with 55,456 pelts to 87,013 in 1858 exhibited a steady increase. The year 1859, with 107,196 pelts, was, I believe, the first to reach and exceed the century mark since the union in 1821, but 1860 dropped to 91,459. While 1861 was only 926 skins below 1859, 1862 produced 115,580 pelts, 1863 produced 114,149, and 1864 produced 142,998, yet the last-mentioned year's sale was immediately followed by a decline of 24,750 pelts. The balance of the series from 1866 to 1877 varies between the minimum, 115,646 in 1877, and the maximum, 172,042 in 1867, certainly the highest and best since 1821, and probably one of, if not, the most productive in the history of the Hudson's Bay Company. An old writer of repute, however, writes that 175,000 beaver skins were collected by the "ancient concern" in one year about the middle of the eighteenth century. It is possible that this large number may have comprised the country trade of two seasons. European wars were rather frequent and somewhat protracted in those days, while it is on record

that one or two of the company's ships failed in making the annual round voyage between London and Hudson Bay. I think it is a matter of regret that neither of the two recent historians of the Hudson's Bay Company, while throwing much light on the earlier and some of their later trade operations, have not also given us some definite statements of their yearly fur shipments and sales, which would have been generally appreciated. Mr. Beckles Willson has, however, given an interesting account of the company's first London public sale, which took place on January 24, 1672. On this occasion the 3,000 weight of beaver were put up in thirty lots, and fetched from 36 to 55 shillings (a pound probably). The other furs and peltries, bear, marten, and otter, etc., were reserved for a separate and subsequent auction, while previous receipts from the bay had been disposed of by private treaty.

This first official sale, as it subsequently proved, of a series of great transactions which for upward of two centuries have made London the center of the world's fur trade, excited the greatest interest, and both the Prince of Wales and the Duke of York, besides Dryden, the poet, were among the many spectators. Previous to the advent of Canadian traders from the east, the Indians of the surrounding country were wont to assemble in the spring at Lake Winnipeg to the number of perhaps 1,500, where also birch-bark canoes were built. Six hundred of these containing a thousand hunters, exclusive of women, came down annually to York factory with furs to trade. Beaver were very numerous in those days, and a great many were wasted in various ways, often as clothing and bedding. Not a few were hung on trees as native offerings upon the death of a child or near relation; occasionally the fur was burned off, and the beaver roasted whole for food banquets among the Indians.

He further states that in 1742, two large expeditions of natives from the interior came down to York and Churchill (Fort Prince of Wales). One of them had 200 packs of 100 skins each (20,000 beaver, probably from Lake Winnipeg country), and the other 300 packs of 100 each (30,000 beaver and 9,000 martens). This made a total of 50,000 beaver received from both "expeditions." I take it that these came from the Chipewyan Indians of the distant Athabasca and intervening country, reaching Churchill by way of the English and Churchill rivers.

Doctor Bryce, in his concise history, writes that so effective and successful were the operations of the great Northwest Company of Montreal, that toward the end of the eighteenth century, a single year's trade produce was enormous, and comprised 106,000 beaver, 32,000 martens, 11,800 minks, 17,000 musquash, and 17,000 skins of other animals. Still, if we knew the total Hudson's Bay Company's catch for that year, I doubt if both returns of beaver would much exceed the total of 172,042 skins, given in the London fur sale statement for 1867. From 1858 to 1884, the district of Athabasca contributed 445,014, or an average of 17,116 a year to the company's London sales. The average for the selfsame posts for the five outfits

(1885 to 1889) is about 8,000; and with the "opposition" trade added from 1890 to the spring of 1903, both will undoubtedly exhibit a further decline. From 1863 to 1883, Mackenzie River District exported a total of 183,216 beaver, giving an average of 11,822 a year. For the three years (1886, 1887, 1889) of which I hold data, it had fallen to 6,852, and is, I fear, very much lower at the present time. These are but samples of the general decrease in beaver receipts experienced at every trade competing point from Quebec to the North Pacific and from the international boundary to Hudson's Bay and the northwestern limit of its range in arctic America.

It is now well known that for some years prior to the coalition in 1821, the annual catch of beaver was rapidly dwindling, and that in several sections it had been exterminated by reckless slaughter; another decade or two of similar trade competition, would doubtless have led to its extinction, except for a time in retreats remote and difficult of access. We have had ample proof, however, by obtained results, of the beneficial operation of the wise and far-reaching policy adopted by Governor Sir George Simpson and the able and experienced fur-trade counselors of the then united companies, for the due preservation of this valuable animal. For some years before and after the transfer of the country to Canada in 1870, the entire Peace River, together with many other streams and small ponds, throughout the Territories, British Columbia, the Yukon, and the east were swarming with beaver; but this, unfortunately, is not the case to-day. From 1853 to 1877, inclusive, the average number of skins sold by the Hudson's Bay Company in London, was 118,615, as against their total catalogue sales of about 50,000 for 1897, 43,000 in 1900, 46,000 in 1902, and 49,190 for 1903. This is without doubt a bad showing for some of the later of the twenty-six years which have succeeded that statement. Even with the addition thereto of the "opposition" trade, in the very same locality, it is doubtful if the aggregate of both would greatly exceed one-half of this average. It is generally assumed that "opposition" or competition is the "life of trade" in all branches of business; but, in the opinion of many competent judges, the fur trade, from its very nature and the scope of its operations, is, or should be, one of the few essential exceptions to the rule. It is a matter of fact that the advent and continued presence of "free traders" at a company's inland post has always had a more or less stimulating effect on the natives by inducing them to exert themselves to a larger degree than usual in the hunting of beaver and all other fur-bearing animals; but although at first and for some time, all concerned appear to benefit by increased returns, yet the inevitable accompaniment of reckless and indiscriminate slaughter, sooner or later, adversely manifests itself. This has hitherto been the invariable experience at every assailed post or district in North America.

We all know how the bison or buffalo of the prairies of Canada and the United States has practically disappeared, although half a century ago it was reckoned by millions. The beaver has been Canada's staple fur for centuries, and but for the Hudson's Bay Company and its officers it would long ago have ceased to exist as a commercial asset. Unless further action speedily intervene in the premises, however, the ultimate extermination of the Canadian beaver is merely a question of time. It has already disappeared for good from many sections in which it was formerly present. It is becoming very scarce in certain localities where it should receive immediate protection in the way of several legally-assured years of rest and full exemption from disturbance by hunters. In other districts, where it is gradually but surely diminishing in numbers, its killing should be restricted on lines similar to those pursued by the company for many years subsequent to 1821. Greater latitude might be accorded to hunting in now unknown and not easily accessible parts where it probably abounds; but except for food absolutely required no one should be permitted to trap or shoot beaver *out of season*. It is useless making rules and regulations, however, unless they be strictly enforced. The woodland buffalo is now receiving some well-deserved attention in this regard, and it is about time that the musk ox should be protected from indiscriminate slaughter solely for the sake of his head or hide; there should be a seasonable limit imposed upon hunters thereof. Neither should the mountain goat and sheep, the elk, and the valuable food animals—the moose and woodland caribou—be neglected in this connection. And although the Barren Ground reindeer is still abundant, yet the northern Indians should not be permitted to continue or resume their ancient vicious course of reckless and indiscriminate slaughter of them whenever the opportunity appeared.

From Fort Anderson and nearly every other post, including Fort Yukon, skulls and other parts of the beaver were obtained for transmission to the Smithsonian Institution at Washington. While stationed at Fort St. James, British Columbia, in 1887 and 1889, I sent to the same Institution two embryo skins taken from the uterus of a female killed in the vicinity early in May (there were five in all), together with that of a 2-weeks-old example captured in the latter end of the same month. As to albinos, they are very rare, but I have seen perhaps as many as ten skins in course of my long residence in the Northwest Territories. I have also observed quite a number of fine dark skins of the beaver in various parts of the country. I think those taken by the natives of Quebec who resort to Bessimis post in the Gulf of St. Lawrence are among the very finest. Labrador, East Main, and other Hudson Bay posts also furnish a small number of similar pelts. As a rule, those which frequent clear-water streams have a better color than is the case with the summer inhabitants of very

muddy rivers having their source in or beyond the Rocky Mountains and flowing through a sandy clay soil. The skins of such beaver are usually of a dirty rusty brown color, with the inner fur of a lighter hue, and are certainly in appearance inferior to those of their cleaner-furred brethren, and must therefore realize lower prices in London.

The substance contained in two pyriform sacs situated near the organs of reproduction in the beaver, and commercially well known as "castoreum," has always been traded from the natives; and although it is not entered in the aforesaid statement of sales or in the fur catalogues for 1887, 1902, and 1903, yet the company's officers annually shipped to London considerable quantities of this valuable commodity. "At one time it was largely employed as a medicine for derangement of the nervous system, but now little used." This, of course, adversely affected prices, and for a number of years castoreum did not sell well. Latterly, however, owing to its scarcity and its reported use as a base in the manufacture of perfumery, its value has been greatly enhanced. During my long stay at Fort Chipewyan, Lake Athabasca, upward of twenty abnormally large examples of castoreum sacs, or "pods," as designated in trade, containing from three to nearly five times as much of the substance as is usually found within averaged-sized specimens, were obtained, for the most part, from animals killed on the Peace River. I also noticed and heard of a few similar "pods" elsewhere in the interior; but in those days Athabasca produced the very largest I ever saw.

From certain documents in my possession I believe we can form some idea of the extent of the castoreum trade of the last century. As a rule the receipt of this article naturally corresponds with the annual catch of Beaver. Mackenzie River District from 1863 to 1881 contributed a total of 6,251 pounds weight. From 1858 to 1884, old Athabasca was premier, with 18,904 pounds, but in consequence of increasing competition in the north the average of the former for 1886, 1887, and 1889, is only 54 pounds, as against 32,918 for the period ending in 1884. The trade of the latter for the five years (1885 to 1889) gives an average of but 211 pounds as against 700 pounds for 1858 to 1884. Its former posts on Upper Peace River had not one-fourth as much castoreum in 1889 as in other years. English River district gave 40 pounds for each of the outfits, 1889 and 1890; Cumberland district only 26 pounds in 1888, and 56 pounds in 1889; and then we have New Caledonia, British Columbia, with 113 pounds for each of 1885 and 1886, and 390 pounds in 1887, 390 pounds in 1888, 402 pounds in 1889, and 231 pounds in 1890; all of these results are very much below those realized previous to the advent of (the frequently vaunted) "free trade."

NORTHERN POCKET-GOPHER.

Thomomys talpoides (Richardson).

Never having seen an example of this species I know nothing about it; but from what Mr. Moberly states it probably inhabits the banks of the North Saskatchewan in the immediate vicinity of the Rocky Mountains. He further adds that there is an allied but somewhat larger gopher on the west side, from the Kootenay to the Frazer River. It is about 2 inches longer than *T. talpoides* and has very short ears, with more brown about the body. Both kinds are good eating, and they also form an important item in the diet of the grizzly bear.

NORTHERN FLYING-SQUIRREL.

Sciuropterus sabrinus (Shaw).

Having lost some of my original field notes and several Smithsonian receipt lists, I can not feel quite sure of a few stated entries and references in this paper. I have, however, an impression that I saw a flying-squirrel north of Fort Simpson and several elsewhere in other southern tracts of territory. Some specimens were collected at Fort Liard by Mr. Hardisty, at Big Island by Messrs. Ross and Reid, at Resolution by Mr. Lockhart, and one also labeled "Arctic America" by Mr. Kennicott many years ago. In 1893, Dr. Frank Russell, of the Iowa State University, secured one specimen at Grand Rapids, where he says they are very rare. The brothers Preble, of the U. S. Department of Agriculture, have also recently obtained some skins at Oxford House and Norway House, Keewatin. Mr. Moberly writes that the flying-squirrel of the Rockies must be *S. alpinus*, as it is not found in the country to the east. Mr. Pierre Deschambeault writes that the flying-squirrel is not uncommon at Isle à la Crosse and Lac du Brochêt.

RED SQUIRREL.

Sciurus hudsonicus (Erxleben).

This species is undoubtedly the most generally distributed of the squirrel family, and it is more or less common throughout the entire timbered region of northern continental Canada. It is also numerous in Alaska, while specimens have been sent to Washington from nearly every Hudson Bay post in the Mackenzie River district. It makes its nest in a tree and has usually, once a year, from four to six, and occasionally as many as seven young. I obtained an albino example which must have been forwarded to the Smithsonian Institution. Mr. Moberly writes:

This squirrel is common at every place I have been since I came to the company's service in 1854—on the North Saskatchewan, Peace, and Athabasca rivers, and at Frazer Lake, British Columbia.

There is another ground squirrel, smaller than the red, and more brownish in color, and lives high up on the mountains, chiefly beyond the tree limit. It has a peculiar call, more like a whistle than a chatter. In British Columbia there are three kinds of squirrels not found east of the Rockies. One has the head broader than the red squirrel with ears very round and with tufts on them; the color brownish, the whiskers quite black, as well as the tips of the tail. The other is smaller and has the tip of the tail black. I have only seen it close to the mountains. A third is a large ground squirrel, with a tail somewhat resembling that of a flying-squirrel, which may be a spermophile.

NORTHERN CHIPMUNK.

Eutamias quadrivittatus borealis (Allen).

Specimens of this chipmunk were collected at Salt River (an affluent of the Slave River below Fort Smith, Athabasca District), Forts Resolution and Rae, Great Slave Lake, Fort Liard, and one also by the writer, labelled "Mackenzie River," which was probably secured between Fort Good Hope and Fort Simpson. I never saw any in the Anderson region. Mr. Ross^a gives its range as extending to Fort Good Hope; and that these animals were very destructive to such garden produce as was raised at Fort Resolution. Dr. Frank Russell secured two examples at Grand Rapids near the outlet of the Saskatchewan River into Lake Winnipeg.

CHIPMUNK.

Callospermophilus sp.

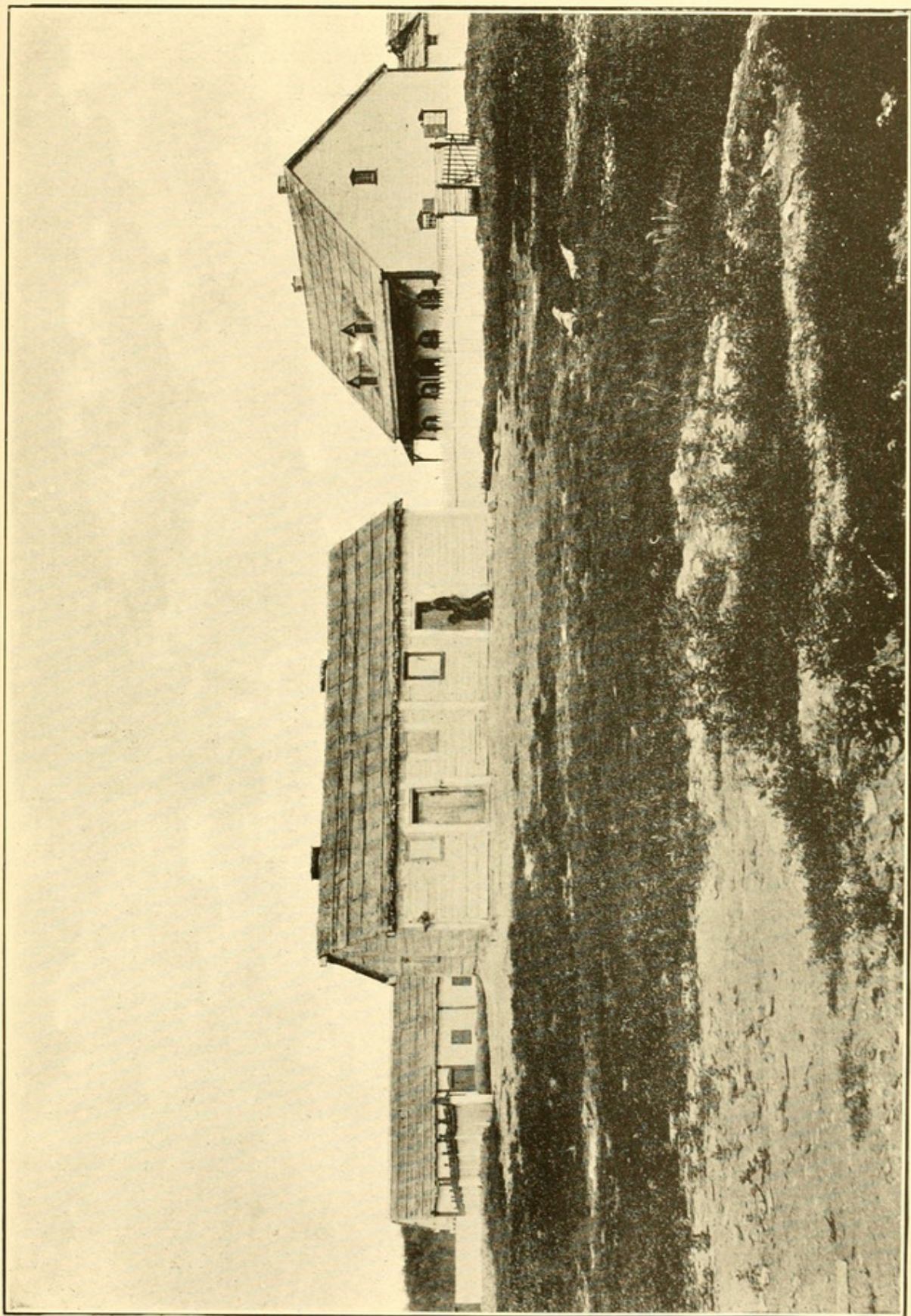
Mr. Drummond obtained examples of this species in the Rocky Mountains some seventy or more years ago, in about latitude 57° north. I can not say that I ever saw a specimen, neither did Mr. Preble on his recent collecting expeditions to Hudson Bay meet with or hear aught of this chipmunk.

PARRY'S SPERMOPHILE.

Citellus parryi (Richardson).

Abundant in the Barren Grounds, on the Arctic coast, and in the vicinity of many of the rivers and lakes of the North Country. In the early sixties of the last century, numerous specimens were obtained from Fort Anderson, the Barren Grounds, Liverpool and Franklin bays, from the Yukon, and from the Mackenzie River. They breed once a year and have several young at a birth. They live in burrows, as described by Mr. Preble, who secured specimens from a point 150 miles north of Fort Churchill. Doctor Russell also obtained three examples at Herschel Island, situated to the west of the outlet of the Mackenzie River.

^a Manuscript notes in the Smithsonian Institution.



FORT GOOD HOPE.

RICHARDSON'S SPERMOPHILE.

Citellus richardsoni (Sabine).

Richardson gives its range as not extending beyond latitude 55° north, and in the neighborhood of the north branch of the Saskatchewan River, but I do not think I ever met this animal anywhere in the country.

STRIPED SPERMOPHILE.

Citellus tridecemlineatus (Mitchill).

Richardson found this species quite common at Carlton House, Saskatchewan. It is also said to have been abundant in all favorable localities between the international boundary and the North Saskatchewan River. I do not think it is an inhabitant of the regions beyond that stream.

WOODCHUCK—GROUND HOG.

Marmota monax canadensis (Erxleben).

Mr. B. R. Ross gives latitude 62° north as the northern limit of this animal. In 1889, three trade skins were obtained at Fort Simpson. I do not remember if I ever saw any examples at Fort Anderson or elsewhere in the Mackenzie River District, but at Fort Chipewyan, Athabasca, several were observed, and in May, 1885, I sent five skins to Dr. R. Bell, of the Geological Survey, Ottawa. At Cumberland House, Saskatchewan, however, the company annually trade and export a few skins, which bring only a few cents in the London market. They are not common at any of the posts of the Pas, Moose Lake, and Grand Rapids. In 1888, one specimen was obtained at Pelican Narrows. The adjoining district of English River, to the north, traded 3 skins in 1889 and 127 in 1890. Of the last, 11 came from Isle à la Crosse, 2 from Portage La Loche, and 114 from Green Lake. It has also been met with on the Nelson, Liard, and Peace rivers, while Chief Trader Traill secured two examples at Fort St. James, Stuart Lake, British Columbia, which he duly forwarded to the Smithsonian Institution at Washington. The Cree Indian name of this animal is "*weenusk*."

HOARY MARMOT.

Marmota caligata (Eschscholtz).

This species is decidedly more abundant than *A. monax canadensis* in portions of the north country, especially in the neighborhood of the Rocky Mountains and spurs thereof on or near the Mackenzie River. Specimens have been collected on the Peace River, and at Forts Liard, Simpson, Norman, and Good Hope, Mackenzie River District, as well

as Fort Yukon and other points in Alaska; said to be common there beyond the Arctic Circle. In his list Mr. Ross writes: "North to Arctic Circle, abundant in the mountain ranges." For some unknown reason the company never export this fairly good fur pelt. The natives make excellent robes with the skins. I have seen several on the Mackenzie River. Mr. Turner states that the Indians of Kotzebue Sound, North Pacific, use many skins of these for clothing. In July, 1889, I obtained from a Connolly Lake (British Columbia) Indian a fine robe, which was forwarded to Washington.

INSECTIVORA.

SHREW.

Sorex sp.

Mr. Ross writes: "This genus (*Sorex*) is abundant throughout the district (Mackenzie River) as far north as the Arctic coast. I can not speak confidently of either the names or the number of the species." I have a strong impression that I have seen more than one kind of shrew at Fort Anderson, Mackenzie River, in Athabasca, at Stuart Lake, and at Cumberland House. A specimen in alcohol was forwarded from Fort St. James, Stuart Lake, British Columbia, which is entered under *Sorex* (*Microsorex*) *hoylei* Baird, in *North American Fauna*, No. 10, 1895, p. 90. Dr. Richard King has recorded a specimen of *S. forsteri*, which he found near the mouth of the Great Fish River.

COUES'S SHREW.

Sorex sphagnicola Coues.

The type-locality of this species is given in the above publication as Fort Liard, Mackenzie River District, and it probably extends much farther north. This shrew may be indigenous in other sections of the Canadian Northwest Territories. Mr. Moberly also refers to a small short-tailed mole or shrew with a sharp longish nose found only in beaver lodges.

CHIROPTERA.

SILVERY-HAIRED BAT.

Lasionycteris noctivagans (Le Conte).

Mr. Moberly states that he has seen examples of bats on the Peace, Saskatchewan, and Athabasca rivers. Mr. P. Deschambeault writes that he has met with this species, both at Isle à la Crosse and Lac du Brochêt, but I do not remember seeing any north of Cumberland House.

BLUNT-NOSED BAT.

Myotis lucifugus (Le Conte).

Mr. B. R. Ross, in his oft-referred-to list, mentions that this bat is very rare, but that it extends northward to Salt River. This species is entered among the specimens collected by Sir George Back on Great Slave Lake, probably near Fort Reliance, about seventy years ago. Mr. P. Deschambeault is also confident that it is sparingly present at Isle à la Crosse and Lac du Brochêt. Mr. Preble, however, did not come across any examples in his trip to the shores of Hudson Bay, while Dr. Robert Bell's list contains both species.

ADDENDA.

1.

In the third report of the select committee of the senate of the Dominion of Canada, appointed in 1888 to inquire into the resources of the "Great Mackenzie Basin," we find the following classified summary of one year's catch of furs offered for sale in London by C. M. Lampson & Co. and by the Hudson's Bay Company, namely:

Badgers.....	3,739	Martens.....	98,342
Bears of all kinds.....	15,942	Minks.....	376,223
Beaver.....	104,279	Musk ox.....	198
Ermines.....	4,116	Musquash.....	2,485,368
Fishers.....	7,192	Extra black.....	13,944
Foxes:		Otters, land.....	14,439
Blue.....	1,440	Rabbits.....	114,824
Cross.....	6,785	Sables.....	3,517
Gray.....	31,597	Seals, hair-dry.....	13,478
Kitt.....	290	Skunks.....	682,794
Red.....	85,022	Swans.....	57
Silver.....	1,967	Wolves.....	7,156
White.....	10,257	Wolverines.....	1,581
Lynxes.....	14,520		

It is to be regretted that the exact quantities of the foregoing furs and peltries pertaining to each of the companies were not given in separate columns, so that a naturalist, as well as the general public, might not form erroneous opinions in respect to the fur resources of the "Great Basin" in question. The annual fur sales of the Hudson's Bay Company in January and March comprise all of the pelts collected by their officers and agents throughout their former chartered and licensed territories and from parts of New Ontario, Quebec, and Labrador. On the other hand, while the Lampson incorporation undoubtedly received considerable quantities of the furs and peltries sold by them from the same hunting grounds, yet it is believed that the bulk of their entire yearly collection is obtained from Alaska and

other suitable sections of the United States of America. The Lampson's share of the foregoing summary statement would therefore be subject to the following estimated *outside of Canada* reductions: Many of the badgers, bears, beavers, ermines, fishers, blue and cross foxes, and all of the 31,597 gray, a large proportion of the silver and white, with upward of three-fifths of the red foxes, and many also of the white foxes, lynxes, and martens; fully three-fifths of the minks; more than two-thirds of the musquash; an important quota of the otters and rabbits; all of the 3,517 sables; some of the dry hair-seals; fourteen-fifteenths of the skunks, and a fair share of the wolves and wolverines.

We find 57 swan skins in the above summary, and they no doubt belonged to the Hudson's Bay Company. Although no skins of *Olor columbianus* or *O. buccinator* appear in their fur catalogues for 1897, 1900, 1902, or 1903, yet for many years they never failed in having quite a number of swan skins for sale in London. From 1853 to 1877 they sold a total of 17,671, or an average of nearly 707 skins a year. There were seven good years (1853 to 1856, 1861, 1862, and 1867), with sales ranging between 985 and 1,312 in 1854 (maximum), and seven poor years (1870 to 1877), with returns varying between 338 and the minimum (122) in 1877. From 1858 to 1884, inclusive, Athabasca District turned out 2,705 swan skins, nearly all of them from Fort Chipewyan. Mackenzie River District, according to a statement in my possession, supplied 2,500 skins from 1863 to 1883. From 1862 to 1877 Fort Resolution, Great Slave Lake, contributed 798 thereof. For 1889 Athabasca traded but 33, as against 251 skins in 1853. In 1889 and 1890 Isle à la Crosse, headquarters of English River District, sent out two skins for each outfit.

2.

The wording of a corporation's commission is almost unknown outside of the service, and the copying herein of the author's own last parchment may not therefore be considered out of place. His first as chief trader was dated 1868, under the deed poll of 1834; the next as factor under the deed poll of 1871 was granted in 1872, and the following in 1875. I may premise that the former recognized but two ranks, those of chief traders and chief factors, while the latter was four grades, namely, junior chief traders, chief traders, factors, and chief factors. Except in the title conferred, all of the commissions are exactly similar. The chief factor commission is as follows:

RODERICK MACFARLANE, Esquire:

By virtue of the charter granted by King Charles the Second by his letters patent under the great seal of England bearing date the second day of May in the twenty-second year of his reign to the governor and company of adventurers trading into Hudson's Bay. We do hereby appoint you a chief factor of the said company in all places where trade is carried on by the said company. You are therefore, in virtue of this commission, to exercise all the powers and to perform all the duties which now

are or hereafter may be exercised and performed by a chief factor, and particularly to observe all the provisions of the deed of regulations, under the common seal of the company, which bears date the nineteenth day of December, one thousand eight hundred and seventy-one, and we do hereby order and direct all our clerks and other servants strictly to obey such orders as you may think proper to give them in the execution of the duties of your office. And you are to observe and follow such orders, from time to time, as you shall receive from us, the governor, deputy governor, and committee of the company, or our successors for the time being, and all orders issued by our chief commissioner or resident governor.

Given under our common seal at our house in London, this first day of June, one thousand eight hundred and seventy-five.

By order of the governor, deputy governor, and committee.

[SEAL.^a]

W. ARMIT, *Secretary.*

3.

Since the preamble to the foregoing notes was originally drafted, the writer has observed with great pleasure that Canada, by means of her capable and experienced officials, like the veteran Prof. John Macoun and son, Mr. William Ogilvie, the brothers Tyrrell, and others of the Dominion geological survey; by zealous missionaries like the Rev. Father Morice, O. M. I., of Stuart Lake, British Columbia, and the Rev. Mr. Stringer, C. M. S., formerly of Herschel Island, and now of White Horse, Yukon; and by other naturalists like the accomplished Mr. Ernest Thompson Seton, and Mr. Raine of Toronto, has already accomplished a good deal in the very desirable direction therein indicated. The lamented death of Dr. George Mercer Dawson, director-general of the Geological Survey, however, was a distinct loss to science and his country; but he has been fortunately succeeded by the clever and well informed Dr. Robert Bell, who will probably spare no possible efforts in continuing the good work performed by his able predecessors in office, Sir William Logan, Doctor Selwyn, and Doctor Dawson. I am also glad to see that American naturalists have again come forward to do their good share in the premises. Prof. C. C. Nutting, Doctor Smith and Dr. Frank Russell (especially the latter, who spent one winter at Grand Rapids, Saskatchewan, and another in the Mackenzie River District) have done much in furthering the interests of science and the State University of Iowa; while the brothers Preble of the U. S. Biological Survey at Washington have made an interesting summer journey to the shores of Hudson Bay; and they have also, in the spring of 1903, proceeded to Mackenzie River, where I think one or both of them should remain for two or three seasons (Kennicott was there from 1859 to 1862), and thereby render invaluable service in the elucidation of obscure points, as well as in collecting new material toward the ultimate completion of the natural history of con-

^a The seal consists of a coat of arms, with motto *Pro pelle cutem*, around which are the words "Hudson's Bay Company. Incorporated, 1670."

The original seal is entirely of a blue color and omits the words "Hudson's Bay Company. Incorporated, 1670."—R. McF.

tinental Arctic America. As to certain brief references herein to the great fur traders of the Northwest and Hudson's Bay Company of former days, as well as to some of the Arctic explorers, especially to those who have been engaged in the Franklin search, in which he has always felt a deep and abiding interest, the compiler believes that these digressions will be condoned by his readers, not only by the older for reminding them of the almost forgotten past, but by the younger, for calling their attention to the noble work accomplished by those who have gone before; and also for the reason that the successful collector and naturalist must necessarily be, more or less, imbued with an ambitious, enterprising, and persevering spirit, similar to that which, without doubt, actuated those men in their respectively able and heroic labors for science, Crown, and country.

For items of new or corroborative information used in the preparation of these notes, the undersigned feels much indebted and obliged to Chief Traders Henry J. Moberly, Pierre Deschambeault, William J. McLean; to Factor Alexander Milne, M. D.; to Chief Factor Archibald McDonald; and to Messrs. Colin Thomson, George Deschambeault, Murdo MacLeod, Henry MacKay, and Angus McLean of the Hudson's Bay Company.

Should this brief and far from perfect record of past achievements by those mentioned therein, have the effect of somewhat stimulating the innate ardor of some of the younger men of the company's service, *and others*, to make renewed and more systematic efforts than their predecessors, in the already referred to and much desired direction of obtaining and contributing material toward the completion of the natural history of the great Dominion of Canada, he will consider himself well repaid for the time, labor, and attention which he has here and formerly given to the interesting and important subject in question.

4.

Statement of fur returns for the Northern Department for outfit 1865.

District.	Badgers.	Bears.				Beavers.	Ermines.	Fishers.
		Black.	Brown.	Gray.	White.			
Mackenzie River.....		462	27	19	6	8,490		9
Athabasca.....		306	39	10		12,595		46
English River.....	5	376	77	6		3,669		61
Cumberland.....	28	88	22	5		3,244		83
Saskatchewan.....	133	515	86	42		11,954		113
Swan River.....	165	120	87	20		3,308		46
Red River.....	310	333	107	11		1,851	188	217
Lac La Pluie.....		179	9			985		322
Norway House.....	1	120	7			9,727		393
York.....		144	4		3	12,551	55	106
Total.....	642	2,643	465	113	9	68,374	243	1,396



MacFarlane, R. 1905. "Notes on mammals collected and observed in the northern Mackenzie River District, Northwest Territories of Canada, with remarks on explorers and explorations of the Far North." *Proceedings of the United States National Museum* 28(1405), 673–764.
<https://doi.org/10.5479/si.00963801.28-1405.673>.

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