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PART II, SECTION I

THE EXPLORATION OF SOUTHAMPTON ISLAND, HUDSON BAY

BY GEORGE MIKSCH SUTTON

PART II, ZOÖLOGY

SECTION 1.—THE MAMMALS OF SOUTHAMPTON ISLAND¹

BY GEORGE MIKSCH SUTTON² AND WILLIAM J. HAMILTON, JR.

(Plates VI-X)

MAMMALOGICAL STUDIES ON SOUTHAMPTON ISLAND PREVIOUS TO 1929

Most of the earlier explorers who landed upon Southampton Island, or voyaged in the surrounding waters here and there, mention mammals in their journals, and the reports upon some of the expeditions include *Appendices*, listing the mammals encountered or collected, sometimes accompanied by extensive annotations. Among the writings of the earliest explorers such conspicuous animals as whales, walruses, and Polar Bears receive considerable comment; the smaller mammals are not often mentioned, save in lists, which are intended to include all the forms known to occur within a given region. Very few really complete lists of the mammals of this region have appeared, and to the best of our knowledge no complete list of the mammals of Southampton Island has been prepared prior to the preparation of the present paper.

1610. The writings of Captain Henry Hudson and Abacuk Prickett pertaining to Hudson's last voyage contain a few references to "stores of Seales," "Beares," and "Deere" [caribou] seen or shot in the northern part of Hudson Bay. These mammals are, on the whole, mentioned oftener than the birds.

¹The authors are indebted to several persons and institutions for assistance in the preparation of this part of the work. Among those who have helped us in one way or another are: Dr. Albert Hazen Wright of Cornell University, Dr. R. M. Anderson of the Canadian National Museum, and Mr. Kenneth Doult of the Carnegie Museum. The Division of Mammals in the American Museum of Natural History, N. Y., the United States National Museum at Washington, D. C., and the Carnegie Museum have loaned us material for comparison. Captain George Comer, of East Haddam, Connecticut, has given us a briefly annotated list of the mammals he encountered on Southampton.

²The portion of this monograph prepared by the senior author has been presented to the Graduate School of Cornell University in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

1612. Comparatively little has been written about the voyage of Sir Thomas Button, and, so far as we know, no personal narrative was ever published. Captain Luke Foxe, however, has given us a most entertaining account of the voyage in his "The North-West Fox," and here we find numerous references to mammals, such as those to "3 Deare," "divers Beares," and "Wolves" seen in the winter, and to "5 white Beares" seen at Mansel Island. These references we find in Miller Christy's reprint (1894) of Foxe's account in his *Voyages of Foxe and James, etc.* Just where Foxe got the material, upon which he based his account of Button's voyage is not altogether known, but the account is most readable, and is, we believe, usually considered fairly accurate.

1615. William Baffin (mate and associate of Robert Bylot) gives us several interesting notes upon the marine mammals found in the waters to the east of Southampton. These mainly concern Atlantic Walruses seen in the region of Seahorse Point during the summer. On July 16, 1615, when Bylot's ship was just south of Cape Comfort, the crew must have seen many of these creatures, which Baffin calls "Morses." Baffin tells us (see Markham, 1881, p. 133): "Among this ice we saw som store of *Morse*, som uppon the ice and other in the water, but all so fearfull that I think little good would be expected in hope of killing som. They are so beaten with the *Saluages* that they will not suffer nether ship nor bote to com neare them."

1620. According to Lauridsen, Jens Munk's writings include a few references to game-mammals and birds, which were used as food, especially to bears and such species as were found along the west coast of Hudson Bay to the southwest of Southampton at "Munk's Winter Harbor" [the mouth of the Churchill River].

1631. In the colorful writings of Captain Luke Foxe, who is thought by some to have given the name Southampton to the Island, we find many references to the mammals of northern Hudson Bay. Foxe speaks of seeing many "sea-mors" [walruses] near Mansel Island, "white Beare" at "Carie Swan's Nest" [Coats Island], and mentions "Seales," whale, and "Reine Deere" here and there throughout the narrative.

1742. Christopher Middleton must have seen some interesting mammals during the course of his voyage through Sir Thomas Roe's Welcome and at the time of his naming of Repulse Bay and Frozen Strait, but he tells us little about them. A few observations upon change of pelage in the fox, hare, and weasel are made in one of his published writings (1852, p. 128).

1743-1751. The earliest important work dealing with the mammals of the Hudson Bay region in general is George Edwards' *A Natural History of Uncommon Birds and Some Other Rare and Undescribed Animals*. The work was published in four volumes. In it were figured a few mammals from Hudson Bay, some of which were thus for the first time really made known to the scientific world. The colored illustrations of various species were accompanied by good descriptions, but the names given were English names, so it became the task of Linnæus to give binomials to most of these. Linnæus in some cases exclusively referred to Edwards' figures; in other cases he cited other authors in addition. According to Richardson (1831, II, p. ix) the material, upon which Edwards based his illustrations and descriptions, was received from a Mr. Alexander Light and a Mr. Isham, "who, during a long residence, as Governor of various forts and trading-posts, employed his leisure hours in preparing the skins of beasts, birds, and fishes."

1746-1747. During these years, Captains William Moore and Francis Smith voyaged in search of the coveted North-West Passage in the ships *Dobb's Galley* and *California*, passing northward along the west coast of Hudson Bay to about the latitude of Southampton

Island. In the following year appeared two reports upon the expedition, one by a man known as "Drage" or "Charles Swaine," apparently the Clerk of the *California*; the other by Henry Ellis. Swaine's account (in two volumes) contains much information on the mammals, chiefly on pages 174-178 of Volume I. Ellis's account (also in two volumes) includes not only some illuminating paragraphs upon various mammals and birds, but also some very interesting illustrations of such species as the Wolverine and Canada Porcupine. Ellis's account of the "white bear" (p. 41) is so entertaining that it is quoted in its entirety here: "The White Bear is a Creature very different from the common Bear; having a long Head, and a Neck much thinner than other Creatures of that Kind; It is said to make a Noise, not unlike the barking of a Dog that is hoarse: There are different Sizes, great and small; their Hair is long and soft as Wool; and their Noses and Mouths are black, and so are their Claws, they swim from one Field of Ice to another, and dive under Water for a long Time. Near the Sea Coast they feed chiefly upon dead Whales; but on Shore, on anything they can get."

1769-1772. During these years, Samuel Hearne made three overland journeys to the northwest of the mouth of the Churchill River, in search of minerals and for purposes of exploration. The report upon these trips, which appeared in 1795, does not give us definite data upon the Southampton region proper, but the final chapter gives us a detailed account of the animals, with which Hearne had become acquainted on his journeyings, and some of his remarks are upon species found also about Southampton and are therefore of interest.

1771. Thomas Pennant's *Synopsis of Quadrupeds* contains much information upon mammals found in the region of Hudson Bay.

1819. Following the report upon Sir John Ross' first *Voyage of Discovery, etc.*, is an *Appendix II*, (author not stated) containing an article on birds and mammals observed about Baffin's Bay.

1820. W. Scoresby's *An Account of the Arctic Regions with a History and Description of the Northern Whale Fishery* does not primarily deal with the whale-fisheries of Hudson Bay, but the account is interesting, because it includes dissertations upon several well known Arctic mammals, such as the Polar Bear, Caribou, Greenland Whale, Walrus, and so on.

1821. On Captain W. E. Parry's second voyage, he visited the eastern and northern parts of Southampton Island, and Melville Peninsula to the north. The general account of the journey includes a few notes on the natural history, especially of Melville Peninsula. An *Appendix* to the published journal of this voyage, which appeared in 1825, and which was written by John Richardson, contains "An Account of the Quadrupeds and Birds" found on Melville Peninsula, especially at Winter Island and Igloolik. In George Francis Lyon's *Private Journal, etc.*, published in 1824, are also to be found several references to the mammals and birds seen on this expedition. Parry, Lyon, and Richardson, then, all give us statements as to the mammals encountered during this one voyage.

Among the most interesting of these notes are those given by Lyon, who tells us of a bear seen on the ice in Frozen Strait on August 13 (p. 44); of Narwhals and White Whales seen on the same date, the latter at the "Narrows"; of several "rein-deer" and a fox "killed by one of the *Fury's* dogs" (p. 46); and of whales [probably Greenland Whales] seen in the comparatively shallow waters of Duke of York Bay on August 17 (p. 48).

1823. The report upon the voyage of Sir John Franklin (1819-22) added much to our knowledge of the mammalian life of the Arctic. The narrative itself contains a few notes upon the natural history of the Barren Grounds, and an *Appendix*, by Joseph Sabine, is written "on various subjects relating to Science and Natural History."

1824. During this year, George Francis Lyon (who had also been on Parry's Second Voyage) made a vain attempt to reach Repulse Bay. In the very interesting account (1825) of this expedition we are given many notes upon mammals seen on Southampton Island and in the surrounding waters. Notable among these references are those to "five deer" seen south of Cape Comfort on August 24 (p. 50); to walruses seen near Seahorse Point (p. 52); and to White Whales noted apparently somewhere in Evans Inlet on August 26 (p. 54). One of the illustrations (facing p. 29) depicts a Polar Bear on the ice, a ship in the distance. The title of this picture is: "View of Terra Nivea in Hudson's Strait."

1829. The first volume of *Fauna Boreali-Americana*, treating of the Quadrupeds, was written by John Richardson. The data gathered on Parry's several voyages, on Ross's first voyage, and on the voyages of Sir John Franklin were incorporated in this work and much original matter appeared concerning the mammals of the Arctic regions of America.

1835. The narrative of Sir John Ross's "Second Voyage" in search of a North-West Passage (1829-33) contains many notes on the mammals of the region north of Hudson Bay, especially about Felix Harbor, Boothia Peninsula. The *Appendix* to this narrative, written by James Clark Ross, contains a systematic account of the collections and observations made on the voyage.

1833-1836. In 1836 appeared Richard King's narrative of the expedition (1833-35) headed by Captain Sir George Back to the Mouth of the Great Fish River. In this narrative King gives us much information on the mammals encountered on the Barren Grounds on the mainland to the west of Southampton Island. Captain Back's own narrative of the same expedition appeared during the same year, but Back's references to the mammals are as a rule indefinite, and the list of species, written by John Richardson, which accompanies the account, unfortunately is often without annotations.

During the course of Captain Back's journey (1836) toward Repulse Bay in the *Terror*, many mammals, especially seals, walruses, and whales must have been seen, and reference to these may have been made in the narrative, published in 1838, which we have not seen. Barrow's review of the journey, with several excerpts from the diary, gives us no notes upon any of the mammals of the region.

1846-1847. During these years, Dr. John Rae made an expedition to the shores of the Arctic Ocean. He sailed along the western coast of Hudson Bay from York Factory to the Arctic coast. He wintered at Repulse Bay, not far to the northwest of Southampton. His narrative (1850) includes many notes upon the mammals seen in the region, and the *Appendix* includes an annotated list by John Edward Gray of the mammals collected. Some of the birds taken on this expedition are still preserved in the British Museum. A number of these, labelled *Repulse Bay*, were almost certainly actually taken farther south in wooded country; so also some of the notes upon the mammals may possibly apply to regions south of Repulse Bay.

1865. J. E. Nourse's *Narrative of the Second Arctic Expedition made by Charles F. Hall*, etc., (1879) contains many notes upon the game-mammals of the region about and to the south of Repulse Bay. Hall visited Southampton once, in June, 1865.

1881. William H. Gilder's story of Lieutenant Frederick Schwatka's overland journey (1878-80) from Chesterfield Inlet to King William Land and return contains many notes upon the game-mammals of the region.

1885. Dr. Robert Bell's Appendix II to the Report of the Canadian Geological Survey upon the Geology, Mineralogy, Zoölogy, and Botany of the Labrador coast, Hudson's Strait and Bay, gives us a list of the mammals of the vicinity of Hudson Bay and Labrador.

1888. In this year appeared Dr. John Rae's paper, "Notes on Some of the Birds and Mammals of the Hudson's Bay Company's Territories and the Arctic Coast" published in the Canadian Record of Science. Here we are given notes upon a few species of mammals in the region of Melville Peninsula. The same paper, with a few changes and omissions, was published again in 1890, in the Journal of the Linnæan Society of London.

1900. The appearance of Edward A. Preble's *A Biological Investigation of the Hudson Bay Region* (1902) gave us at last a complete report on the mammals of this part of North America. Preble together with his brother, Alfred E. Preble, made a personal trip to Hudson Bay during the summer of 1900, preparatory to the publication of this paper. These two men studied the west coast of the Bay, the former as far north as the vicinity of Cape Eskimo, taking copious notes and making extensive collections. Preble did not reach the latitude of Southampton, but he entered the Barren Grounds just north of Churchill. Preble's paper is of great value to us, not alone because of the large amount of information it gives us about the mammals themselves, but because it presents such a careful study of the Life-Zones of the region, such a well prepared résumé of the biological work that had been done, and such a thorough bibliography. Preble's work may be called a classic of its kind.

1904. It is regrettable that in his report (1906) on the cruise of the *Neptune*, Alexander P. Low has not given us a list of mammals, similar to the list of birds offered in Appendix II. In the chapter on *Whaling*, brief paragraphs are given concerning the various kinds of whales, seals, and walruses found about Hudson Bay and the Arctic Archipelago, but these remarks are tantalizingly sketchy. There are very few comments upon the mammalian life anywhere in the narrative, though seals, whales, walruses, and Barren Ground Caribou are mentioned in connection with the excursion to Southampton Island (pp. 32-33), and Polar Bears are spoken of at several points (pp. 16, 58, 65, and 128).

1909. Ernest Thompson Seton's *Life Histories of Northern Animals* contains much of interest to the student of the life of Arctic mammals. This work is not only a compilation of notes from many sources, but it includes also a vast amount of original material. There are no direct references to Southampton. Seton's *Lives of Game Animals*, which appeared in four volumes from 1925 to 1929, also presents a great deal of interesting material. We have consulted Seton's works constantly in working up the present paper.

1910. Captain George Comer made several whaling-trips to the Southampton region from the year 1893 to 1920. In 1910, he gave us a "Geographical Description" of Southampton Island, wherein were incorporated a few remarks upon Barren Ground Caribou. Captain Comer has been good enough to let us go through all of his personal diaries and he has written down for us some of his recollections of the mammals he encountered in the region.

1916. During Captain Henry Toke Munn's sojourn on Southampton Island, he collected many specimens. We do not, however, know where these specimens are at present. Munn tells us (1919) a good deal about the mammals he saw, heard of, or collected at Southampton, but presents no complete list.

1922. Dr. Therkel Mathiassen was not interested primarily in natural history during his stay of six months on Southampton. He has given us (1931) an interesting résumé of the mammal-life of the Island, however, which comes as close, perhaps, to being a complete list as any that has been prepared. Listed here (p. 27), some with brief annotations, are the "caribou, bear, wolf, ermine, and lemming"—all terrestrial forms, and whales, walruses, White Whales, narwhals, and seals among the marine forms. He calls attention to the ab-

sence of the Musk-ox, Wolverine, and "marmot" [spermophile], all three of which species are to be found on the mainland west of Southampton.

1928. In John Dewey Soper's *Faunal Investigation of Southern Baffin Island*, not many direct references are made to the mammals of Southampton Island, but there are excellent discourses upon the life-histories of several species found also at Southampton and in the waters adjoining both Baffin Island and Southampton. Soper's work is the result of a long experience in Baffin Island, and the wealth of data presented in this paper have furnished us much interesting comparative material, as well as inspiration to write accounts which may prove to be equally readable and informative.

1929. The senior author's chief interest, during his sojourn on Southampton Island from August, 1929, to August, 1930, was in birds. He was able, however, to devote a great deal of time to the mammals during the winter, when bird-life was scarce, and he made a fair-sized collection of specimens.

When the senior author considered the matter of working up these collections, he decided it would be wise to collaborate with someone, who was interested in the taxonomy as well as the life-history of the animals. He therefore asked Dr. William J. Hamilton, Jr., an Instructor at Cornell University, to assist him. Dr. Hamilton's contributions to the following paper have been so extensive, that it seemed only fair that he be named as co-author.

In the following List of Species, it will be noted that the pronoun *I* rather than *we* appears in many places, especially under the heading of *Records*. This, it will be readily understood, is because the field-notes were made only by the senior author and use of the pronoun *we* might be misleading under the circumstances. Dr. Hamilton, however, is almost entirely responsible for the taxonomic remarks offered in the following pages.

THE MAMMALS OF SOUTHAMPTON ISLAND

LIST OF SPECIES³

BY GEORGE MIKSCH SUTTON AND WILLIAM J. HAMILTON, JR.

Class MAMMALIA.

Order INSECTIVORA.

Family SORICIDÆ.

Genus SOREX Linnæus.

*Sorex*⁴ sp.? LONG-TAILED SHREW.

Eskimo Name: The Eskimos with whom I came in contact had never seen any sort of shrew on Southampton Island, but most of the Aivilikmiut, who had lived in the Repulse Bay country, were familiar with the small, soft-furred creature they called the *Oogjewnuk*, the color, size, and quick movements of which they were able to describe in minute detail. *Oogjewnuk* is probably a modified form of the word *Oogjuk*, the name of the Bearded Seal or Square Flipper. It is difficult to believe that the Eskimos can see any resemblance between these very different mammals, yet the similarity of the two words may indicate that the Eskimos know of some physical resemblance or of some quality which the two creatures have in common.

Status: Some species of shrew apparently is a fairly common mammal in the Repulse Bay region. While it may also occur rarely on Southampton Island, I am certain it did not live anywhere about South Bay during my stay there, for I set lines of traps in all sorts of places expressly to capture one of the creatures, and failed even to see a track in the mud or snow. The Eskimos, too, assured me that the *Oogjewnuk* was not to be found on Southampton.

An old man, Angoti-Marik, gave me the best description of the creature. In telling of its strength and vigor he cupped his hands one over the other and, simulating an effort to keep his fingers tightly shut, showed how the little animal would nose about and finally pry its way to freedom. He told me that it was much smaller than a lemming, that it had a snout, that it could not see, and that it was dark in color.

Mr. Ford called these animals *Shoe Crops*. The significance of this rather funny name I do not know.

Other Records: No writer mentions seeing or taking a shrew on Southampton Island. According to the distributional maps given us by Jackson (1928, pp. 39 and 67) the shrew found at Repulse Bay is likely to be either *Sorex cinereus cinereus* Kerr or *Sorex arcticus arcticus* Kerr, both of which species apparently have been taken as far north along the west coast of Hudson Bay as York Factory. Since *cinereus* is known to range northward to the coast of the Arctic Ocean not far west of the Repulse Bay region, it may be that it occurs also to the eastward throughout Boothia-Felix and Melville Peninsula.

Richard King (1836, II, p. 17) tells us of a shrew taken at the mouth of the Great Fish

³The order and nomenclature of the present list follows that of Gerrit S. Miller's *North American Recent Mammals* (1924).

⁴Species given in Italics are such as were not collected by the senior author, nor thought by him to have been taken on Southampton, but which may occasionally occur on the Island, or in the general region of the Island.

River (the Back's River of most modern maps) not far to the west of Repulse Bay. He says: "A specimen of Forster's shrew-mouse, *Sorex Forsteri*,⁵ the smallest quadruped the Indians are acquainted with, was found here, the skins of which animal they carefully preserve in their conjuring bags."

Order **CARNIVORA.**

Family **URSIDÆ.**

Genus **THALARCTOS** Gray.

1. **Thalarctos maritimus maritimus** (Phipps). POLAR BEAR.

Eskimo Name: The Eskimo name of this, one of the best known animals of the Arctic, has been in wide use for so many years that it is heard today almost as commonly as the English name, at least among trappers and voyagers in the North Country. The customary spelling of the word is, I believe, *Nanook*. Soper (1928, p. 29), however, spells it *Nannok*, and tells us that Hantzsch spelled it *Nennok*. The etymology of the word I do not know.

Status: In many parts of Southampton Island, chiefly perhaps in the north and in the region of Seahorse Point the Polar Bear is today really an abundant animal. It is to be found along the coast or on the offshore islands, or swimming about in the water, sometimes some distance from land. It probably was much commoner formerly in some sections of the Island. There has been a good deal of hunting in the region of South Bay of late years, and so many bears have been taken here, that they have been somewhat thinned out. One of the little islands in South Bay has long been known as Bear Island, doubtless because bears were once seen there frequently; but bears are rarely seen there today. The bear's skin is a valuable article of trade, and is used by the Eskimos in a great many ways, so bear-hunting is a common pursuit among the natives.

Bears are not often seen inland during the summer. They stay close to or in the salt-water at this season. They may wander more widely in the fall, in search of food or of a sheltered place, where they may sleep during the coldest part of the winter. Along the eastern side of the Island, among the ice which is carried southward in the current of Fox Channel, the appearance and disappearance of the bears with the ice may assume somewhat the aspect of a migration; and it is said that in particular the male bears at some seasons wander away from their customary range, perhaps in search of food.

Some writers aver that only the female bears hibernate. We are not convinced that this is always, or even usually, the case on Southampton Island.

Records: As the *Nascopie* made her way into the harbor at Coral Inlet on August 16, 1929, she passed the big mass of rock known as Walrus Island, which lies at the mouth of South Bay. On one of the upper ledges of this forlorn spot a Polar Bear was reclining. He was massive in build, and he looked down at us with an expression of haughty indifference as he turned his long neck about. Flocks of gulls and terns were gyrating about him. He did not even rise in alarm as we steamed by. Nanook of the North Wind!

I had my first personal contact with a live Polar Bear on the very day of my arrival. In a heavy, strong crate near the shore, surrounded by an admiring but somewhat timorous group of Eskimo children, was an unspeakably dirty, foul-smelling, half-grown *Nanook*, ready for a trip to some zoölogical garden. The animal swung back and forth ceaselessly, mouth languidly open, eyes directed balefully this way and that, big paws treading heavily on the planks. I noticed that the children did not get very close to the crate, for the beast

⁵According to Jackson (1928, p. 40), *forsteri* is a synonym of *cinereus*.

had a way of raking his feet suddenly under the lowest opening and sometimes he growled savagely. Whenever he growled, the dogs went half-wild with excitement. The Eskimos carried the big crate down to the water's edge, whence on a raft, it was towed out to the *Nascopie*, and the crate and bear were given a thorough dipping in the sea, before they were hoisted to their place on the after-deck.

During the few remaining weeks of summer I learned a good deal about bears from the Eskimos. I did not, however, actually encounter the species again, until early in September on our trip to Cape Low.

On September 2 at Cape Low I examined fresh bear-dung not far from the high-tide mark along the shore. On September 5 at Four Rivers Tommy Bruce and his companions killed a female bear and her two yearling cubs along the shore about three miles northeast of our camp. The animals, when first seen, were ambling along, evidently searching for food. When they saw that they were being pursued they moved rapidly away, but they were too late.

On September 11 one of the Eskimos brought to the Post a bear, which had been killed inland at the headwaters of the Koodlootok River or at Mathiassen's Darkness Lake.

On September 20 at a sandy point near the mouth of the Anderson River we had a most interesting experience with a bear. We had just located the huge, foul-smelling carcass of a Greenland Whale, which had been killed the preceding July. The Eskimos had jumped about on the partly floating putrid mass and one of them, Amaulik Audlanat, had set to work to saw off the jaws, so as to get to the *shookak* or baleen. Jack Ford and I finally set out for a distant cliff of whitish, crumbling limestone, and had gone perhaps a mile, when with our binoculars we spied what appeared to be a bear, swimming toward the whale. By this time all the Eskimos but Amaulik Audlanat were out in the motor-boat's little tender, hunting seals. Jack and I reasoned that we could not run back in time to shoot the bear ourselves, and since the animal appeared to be swimming steadily toward the shore we simply watched from a good vantage point the exciting drama that was taking place. Evidently the bear scented no danger. All at once, Amaulik Audlanat dropped his saw, sank to his knees and scuttled to the farthest point of the sandy bar nearby, motioning wildly to his companions. Evidently he had seen the bear. Then he returned to the whale, snatched up what appeared to be the boat-hook, and started fastening something to the end of it. He did not even have a rifle. He was improvising a harpoon from that boat-hook and a big snow-knife in preparation for a hand-to-hand encounter with the bear.

Both Jack and I wondered how the affair would turn out. To run to Audlanat's assistance was out of the question. Suddenly a shot rang out, and we perceived to our surprise that the little boat-load of hunters had come up. The bear's head disappeared, and did not again show for perhaps three minutes. Then there was another shot, and another. Amaulik put down his harpoon. We finally saw them towing the bear to shore. Amaulik told us afterward that *he* would have got that bear with his harpoon, if someone else had not made so much noise with the guns.

The animal was a small male, the pelt was not very good. It evidently had been for some days coming to the carcass of the whale to feed, for its coat was not clean. There was a great hole in the side of the whale, where the bear probably had been gouging out the flesh. The lining of the bear's mouth, the lips at least, were black. As we skinned the animal, a flock of ravens, which had come to feed on the whale, circled about the carcass of the animal, probably attracted by the appearance, or smell, of the fresh meat and blood.

On the following day, at a place not far from Leyson Point, the Eskimo, Kyakjuak, killed a large and very handsome male bear on a cliff about a mile and a half inland from the salt-

water. We sighted this bear from a considerable distance, and made a special anchorage in order to get it. Once on land, most of the hunters went round a low knob of rock, in order to steal up on the unsuspecting animal. Others of us went directly, but slowly, across the open, so as to keep the bear's attention focused upon us. The plan was successful. There were only three shots. We had a very hard time pulling the great brute, which may have weighed half a ton, out of a crevice into which it had fallen. Its jowls and chest were stained a rich orange-color, perhaps from eating berries. The hair was in beautiful condition. The animal was very fat. In the stomach were quantities of berries, mushrooms, and some mosses or lichens, but not a particle of meat of any sort.

On September 22 Jack Ford and the Eskimos shot four bears at Seahorse Point. That morning, when we mounted a prominent ridge, whence we could survey the surrounding region, we sighted eleven bears at one time—single bears, bears going about in couples, and one group evidently composed of a mother and two of last year's young. I witnessed the stalking of one bear at close range, and was amazed at the quiet, unsuspicious behavior of the great brute. It was making its way slowly up the rocks. Amaulik Audlanat hoped he might get a photograph of it, and actually whistled to it once to make it turn its head. The stomach of this animal was filled principally with moss and lichens.

On the following day, three bears, a very large one and two smaller ones, were killed at Seahorse Point. And we must have seen a dozen more animals. It was on this date that I had a memorable encounter with *Nanook* myself. I had just collected a pair of ravens and a Duck Hawk, and was making my way round the edge of a small, partly frozen lake. A light snow was falling. All at once, I spied a bear, pawing in the turf. He turned to look at me, made an odd grimace by sticking his upper lip forward, and loped off up the slope, bound for a rounded rocky hill about half-a-mile away. I was a little excited by this close encounter, but it did not occur to me that I would see the bear again.

Within half an hour, I noticed a flock of ravens and gulls circling low over the crest of the rounded hill. Since there were among these birds some adult Glaucous Gulls which I very much wanted, I started across the tundra. After I had got to the crest of the hill I looked out over a long, narrow, ice-filled fjord. The birds were annoyed or frightened at my coming, and set up a loud calling. Then I perceived that what had attracted them was the partly eaten carcass of a large Harp Seal, lying on the rocks about one hundred yards from the edge of the water. Even then it did not occur to me that the bear had killed this seal.

Then I saw *Nanook*. Bottle-green in the clear water, swimming lazily about, he looked up toward me. But I think he did not see me. I was fascinated. Finally he lifted himself out of the water, shook himself like a great dog, sniffed the air, then, in the most deliberate manner, began making his way up the rocks to the seal. So very measured were his steps that he sometimes actually put one foot down on the other, and blinked his eyes as if half asleep. When I noted how near I was to the carcass of the seal, I marvelled that the bear could actually be coming back to feed.

As the bear moved slowly toward the seal, I made my way by short stages down the cliff, moving when the bear's head was turned the other way. I could foresee that I would be very near the animal by the time he had returned to his prey; near enough, perhaps, for a shot. The ravens, by this time, had circled away. The gulls, however, continued to dip down toward the seal and toward the bear's head, as if begging him for food. Annoyed at these importunities, the bear looked at the gulls with narrowed eyes, and once or twice actually stood up to take a pass at them with his broad front feet.

At length the bear was once more at the carcass of the seal, and I, after a series of hitch-

ings down the rocks, found myself at the edge of a fifteen foot precipice, just across a little gully from the bear. It gave me a queer feeling, whenever the bear looked directly at me, evidently wondering whether I could be animate or not, then turned away, nose lifted to the wind, which was blowing from across the fjord and therefore giving him no sign of my whereabouts.

The bear did not feed. Evidently he was agitated, probably because the gulls gave warning cries. I could write a long dissertation on my thoughts and reasonings during the following fifteen minutes. Briefly, I finally decided to try to shoot the bear with No. 4 shot, the largest shot I had. The discharge merely infuriated the creature. He rose to his hind legs with a terrific roar, swung about twice, striking the air viciously, then sank once more to his fore feet and made his way up the rocks. The leaden pellets had little more than torn the skin here and there. I was considerably frightened for a time, and was relieved to see the bear making his way off toward the outer shore. A quarter of an hour later, when I had regained composure and straightened out my stiff legs, I followed the animal; got to the top of the promontory in time to see him swimming strongly out to one of the distant islands; and at the last drop of blood of the trail saw a particolored weasel, which had also evidently been following the wounded *Nanook* to the sea.

The Eskimos told that Seahorse Point was a favorite rendezvous for Polar Bears, especially in the fall. Here they were known to gather to feed upon seals and other food, before seeking out some sheltered place, in which to sleep away the coldest days of winter. Many of the bears seen at Seahorse Point probably drift southward on the ice of Fox Channel.

On October 9 I saw a bear-track at the head of South Bay. On the same day one of the Eskimos killed a large bear nearby. On October 17 at Seal Point I followed the trail of two bears, which had swum across from Munnimunek Point, or from the Tern Islands. In the snow I could see how they had emerged from the sea, shaken off the water, and wandered about the cliffs. On leaving the Point they had gone out to its farthest promontory, then entered the water once more, perhaps heading for Prairie Point, seven miles away. On October 18 Amaulik Audlanat and Muckik each got two bears along the Fox Channel shore about forty miles east of the Post. On October 25 Sheeloo and his party saw four bears not far inland from the Post. They got two of these, one rather a small and decidedly white one, the other much larger and more creamy in color. On October 28 Keetlapik got a large one (stomach empty) at Seal Point. I might have shot this animal myself, had I not had the misfortune to break through the ice. I think I might have kept on hunting for some time without becoming disagreeably cold, for wet outer clothing freezes and forms a good windbreak, but seal-skin boots become wretchedly soggy and floppy when wet, and it is almost impossible to walk in them.

On October 30 two Eskimos brought in six bear-skins from the region of Cape Low. On the following day Kungualook saw the tracks of two large animals, which had been making their way toward Itiujuak on the harbor-ice. They had passed not far from the Post probably at night.

On November 1 Shookalook shot a large male. On November 3 Amaulik Audlanat reported that many had been seen near Native Point; and Keetlapik and Noah saw three, an adult (probably a female) and two young, making their way inland, not far from the Post. These animals were, perhaps, on their way to hibernate in dens.

On November 15 two of the Eskimo hunters drifted off on the ice east of Cape Low while after Polar Bears. They never returned. One of the men had been far out on the ice

when a change of wind started to carry the whole mass of ice out to sea. One of the men ashore pulled a canoe to the water's edge quickly, and paddled out before putting additional winter-clothing on. The Eskimos on shore eventually saw the canoe smashed in the ice and watched the forms of the men as they disappeared in the distance. To go after them in canoes in the rising wind would have been folly. Hunting *Nanook* is not always a pleasant experience.

On November 16 Father Thibert reported to me an interesting encounter with a bear at the southernmost of the Noovoodlik or "peculiar shed-like hills." He and some Eskimos were passing the base of the hill, when they spied a bear. On giving chase they found that the animal had been making what appeared to be a den in the snow. They chased it for about two miles before shooting it. It was so tired that it panted furiously by this time. Its stomach was packed with the flesh, skin, and blubber of seals. It proved to be a male.

On November 18 Sam Ford saw the tracks of a very large bear at Seal Point. On November 27 we saw tracks that may have been a week old at Tooktootok Island, just north of East Bay. On December 12 the tracks of a small bear were seen at the head of South Bay. The Eskimos told me that by this time most of the bears were "holed up" for the winter.

We heard no more of bears for some time. On February 8, however, tracks were seen by the Eskimos near Munnimunnek Point. Sam Ford told me that this was an early record, and that the animal was probably a hungry male. Tracks were next seen at Native Point on March 2.

On March 4 Eskimos, who had just come in by dog-sled from the Cape Low region, reported seeing tracks of a mother bear and a tiny cub in the region of the southernmost Noovoodlik. The tracks were leading toward the nearest open water. I was told that in the southwestern part of the Island these gravel-hills are a favorite place for the female bears to make their dens. On March 12 Evaloo reported the tracks of a mother and *three* small cubs somewhere between the Post and Darkness Lake. On the following day Amaulik Audlanat saw the tracks of a very large animal (probably a male) in the same region. On March 16 Kyakjuak saw the trail of another large male not far from Cape Low.

On March 21 Muckik regaled us with an amusing tale of his finding that a bear had been sleeping actually under one of their igloos during the winter. The igloo is a temporary camping-quarter. While coming in to the Post, he found that a bear had just emerged from its winter-den under one of their old igloos. He told us, with smiles on his broad face, that the dogs had lain on the snow only a few feet above the bear, and had not been able to smell it.

On March 23 Jack Ford saw the trails of two mother bears, one with two and one with three small young, at the head of South Bay. The trail of a solitary animal was seen on the harbor-ice not far from the Post on March 26.

On March 27 Tapitai and Sheeloo brought in a tiny live cub from the Salmon Pond at the headwaters of the Koodloutok River. Unfortunately they did not tell us about this animal immediately upon arriving at the Post; by the time we had been told about it the dogs had utterly annihilated it, skin, flesh, and even bones.

On March 30 the trails of a female and one small cub were seen at the head of South Bay. On April 4 Eskimos, who had just come in from Seahorse Point, said they had seen several winter-dens along the deep drifts about Mount Minto. Sam Ford told me this was a favorite denning-ground of the animals, and that a great many young were to be found there at this season.

On April 16 Amaulik Audlanat and Pialak saw the fresh tracks of a bear between the Post

and Bear Island. On April 28 Kyakjuak and Pumyook told us of following many bear-trails along the shore of Fox Channel northeast of the Post; and of seeing a trough in the snow where a large bear had slid down a long embankment directly into the water.

On July 24 Amaulik Audlanat and his party returned with four bears they had killed on and about the ice, which extended in a somewhat broken sheet from Walrus Island to Cape Low. Here at this season many bears customarily are seen. They spend all their time, it appears, searching for seals, or basking in the sun, couched on the ice. From July 25 to 28 Amaulik and his party were again in the region of Walrus Island, hunting walrus. They got three bears on this trip. On July 30 Jack Ford and his party returned from a hunt, with five bears they had shot about the floe of Walrus Island. On August 2 Amaulik Audlanat and three other hunters shot three bears on the ice south of Bear Island.

From the foregoing account it will be seen that the Polar Bear is really a rather common animal on Southampton Island.

Annual Cycle of Activities: The Eskimos of Southampton, as well as Mr. Sam Ford, who is well acquainted with this part of the North Country, believe that all Polar Bears, males as well as females, hibernate as a rule. This statement is at variance with that of Soper (1928, p. 29) who says: "According to the Eskimo, polar bears are rarely present in winter along the east coast [of Baffin Island] and occur in largest numbers in April, when the males after spending the winter hunting seals on the ice of Baffin Bay and Davis Strait, approach the shores and the females with their cubs leave their hibernating quarters." I wish I could offer more positive proof for my belief; but we never saw any bear actually in its den, and there is no way of proving, so far as I can see, that a male bear taken near what appeared to be a hibernating den was actually in the process of entering upon a period of hibernation. Of one thing we are certain: that very few bears of either sex are to be seen during a period of the winter from about the first of December to early March. It may be that the male bears at this period go to some far hunting-grounds, to Coats Island, or to the masses of floating ice in the middle of Hudson Bay.

Assuredly the condition and behavior of the bears at Seahorse Point led me to think they were all preparing to go to dens. They were feeding constantly; they had a somewhat drowsy manner of going about (which may be characteristic of the brutes at any season for all I personally know); and that the whole region was admirably equipped with gulleys and fissures wherein bears could "hole up."

According to the Eskimos, the young are born in January. They are exceedingly small at birth, naked, blind, and helpless. I never saw a new-born young, to be sure, but was told that they are as small as, or smaller than, the spermophile of the Repulse Bay country. I learned that the young usually number two, but that three and four young have been known. They are led forth from the winter dens by their mothers in early or middle March. At about this time the males also appear, either emerging from their hibernation dens, or returning from their pelagic hunting-grounds. At this time bears are to be seen almost anywhere, either far inland, or at the edge of the floe; the males are usually ravenously hungry and make their way to the places where seals are most numerous.

It is the belief of the Eskimos that female bears give birth to young not every year, but every other year or even less frequently. Females accompanied with half-grown young were seen several times in the fall. Whether these females customarily hibernate *with* their young is more than I can say, but the young apparently accompany her up to the very eve of the hibernation period.

Throughout spring and summer bears are usually to be found in sections where seals,

especially *Netchek*, are common. In late summer, however, they consume a good deal of vegetable matter, and (as some authors have stated) probably eat lemmings, the eggs of sea-birds, and offal by way of variation.

The principal enemy of the Polar Bear is the Eskimo. Not only is bear-skin an important article of trade, but it is used by the Eskimos as a robe, rug, or mattress, and as a bottom, or cover, for the *komatik*-load; trousers, boot-soles, and other articles of clothing are made from it; the flesh and fat of the animal are prized as food, and the bones and teeth are put to many uses. I was told several times that the bear's liver is poisonous, so the Eskimos take care that their dogs are not permitted to eat it.

Other Records: Practically all the journals having to do with expeditions to this part of Hudson Bay mention Polar Bears here and there. Thus Abacuk Prickett tells us of "Beares" seen on Hudson's voyage in 1610; Foxe tells us of "5 white Beares" seen by Button on Mansel Island in 1612, and of "a white Beare" seen by his own party at "Carie Swan's Nest" in 1635. Scoresby (1820, I, pp. 517-526) gives us rather a lengthy discussion of the animal. Lyon (1824, p. 44) tells us of seeing a bear in the ice of Frozen Strait on August 13, and (1825, facing p. 29) gives us an illustration of a bear standing on the floating ice in his picture entitled "View of Terra Nivea."

Preble (1902, pp. 64 and 65) gives us an account of the species in the Hudson Bay region and says: "The female dens up in a snowdrift in the winter, brings forth her young about March, and soon afterwards leads them to the sea. The male is said to pass the winter at sea."

Low (1906, pp. 16, 58, 65, and 128) tells us a little about bears and bear-hunting among the Eskimos of the Arctic Islands.

Munn (1919, p. 54) took "over one hundred [bears] in the winter of 1917-18," at Southampton.

Soper (1928, pp. 29-31) gives us a good account of the species on Baffin Island, where it occurs "in largest numbers on the east, north, and northwest coasts," and tells us that the Eskimos believe the males do not hibernate, but spend their winters "on the ice of Baffin bay and Davis strait . . ." hunting seals.

Binney (1929, p. 19) says: "From the mouth of James Bay northwards, the Polar Bear is hunted and is the source of the greatest excitement among the Eskimos and their dogs. While the husky-dogs are frightened of wolves and will not eat their flesh, if they get the wind of a bear (*nanook*) they are after him like greased lightning and impede his escape until the arrival of the hunter."

Mathiassen (1931, p. 27) lists the "bear" among the terrestrial mammals of Southampton, but says nothing further about the animal.

Captain Murray told me that he once found a Polar Bear dead from an unknown cause at Cape Frigid. Mr. Ford told me that he had seen numerous bears both on Southampton and Coats Islands since his coming to this region.

Family MUSTELIDÆ.

Genus MUSTELA Linnæus.

2. *Mustela arctica semplei* Sutton and Hamilton.* SOUTHAMPTON ISLAND WEASEL.

(Plate VIII, fig. 3, dorsal and lateral views of skull)

Eskimo Name: Soper (1928, p. 31) tells us that the name *Terreak* is applied to the Arctic Weasel, *Mustela arctica arctica* (Merriam), in Baffin Island. This same word is in

*Sutton & Hamilton: Annals Carnegie Museum, XXI, pt. 2, pp. 79-81, March, 1932.

use among the Southampton Eskimos, but I spelled it *Teggeuk* or *Tuggeuk*. Its etymology is unknown to me. Since the name of the Arctic Fox, *Teregeneuk*, is so similar, it seems reasonable that the two words are derived from similar or identical roots.

Status: The weasel is widely distributed over Southampton, according to the reports of the Eskimos. It is perhaps commoner, as a rule, in the rocky districts of the high, eastern part, than in the flat country of Cape Low. Its abundance usually parallels that of the lemmings so definitely, that it is difficult to make a statement that applies equally to seasons of all sorts. I recorded it personally only in the vicinity of the head of South Bay and at Seahorse Point, but specimens were brought in from several other localities, and I was told that it had been seen or caught in traps, or its readily recognizable trails observed in practically all parts of the Island. It had also been seen on Tooktootok Island near East Bay, several miles offshore, and on other small islands. It had never, however, been noted at Walrus Island.

Weasels are usually common during "good fox years." The reason for this is apparent. Since an abundance of foxes usually signifies an abundance of lemmings, by the same token it signifies an abundance of other predatory forms (birds as well as mammals) which depend upon these rodents for their food. During the winter of 1929-30, lemmings were more than usually common all over the Island, and there was, therefore, a notable abundance of foxes, weasels, and owls. During some seasons (I was told), when lemmings are scarce, weasels are nowhere to be seen.

The Eskimos were surprised at my interest in these little mammals. For a long time the fox has been so valuable by comparison as a fur-bearer, that the Eskimos now make no attempt to capture *Teggeuk* as a rule. They do not use its skin in decoration of their *kooletahs*,⁶ nor do they often use the teeth, claws, or any other part in their amulets. According to the records of the Hudson's Bay Company very few raw weasel-pelts have come from Southampton Island since the establishment there of the Post in 1924.

Records: Prior to the heavy snows of mid-September, 1929, I did not see any signs of weasels about the Post; nor did I record the animal at all during the course of our journey to Cape Low. When there came a heavy fall of snow, however, signs of weasels were to be noted here and there all about the head of South Bay. On September 12 I noted several trails (perhaps all of the same individual) leading to a burrow in the rocks about two miles east of the Post.

On September 22 at Seahorse Point I saw a parti-colored⁷ individual which apparently had been following the trail and licking up the fresh drops of blood of a Polar Bear, which I had slightly wounded with a shot-gun.

On October 4 I noted two trails in the snow. These were of different individuals, I am sure, for the tracks were of different sizes.

On October 8 at the cemetery near the Post I shot a male among the rocks. This animal, which was not at all fat, was parti-colored, though largely white. When first noted it was darting among the rocks. When it heard me, it stood upright at the entrance to a burrow under a flat rock, and looked at me, nose quivering and eyes twinkling. As it ran it held its arched tail high, though the plumed tip or brush apparently touched the snow or rock lightly with every leap.

⁶These *kooletahs*, which are a sort of shirt or blouse with hood attached, are usually made of caribou skin, or a cloth called duffle. Formerly the *kooletahs* were considerably decorated with designs of one sort or another; this custom of adding designs is, like that of wearing the amulet, disappearing among the Southampton Eskimos.

⁷This animal was about half brown and half white.

On October 18 and 21 several trails were noted. On October 30 two trails were followed for some distance at Seal Point. One of these led virtually all round a small, partly frozen pond, down to the water's edge, out on the thin ice for a short way, then into a burrow toward which a lemming-trail also led. On October 31 Jack Ford saw many tracks at Prairie Point.

During the second week of November there apparently was an immigration of weasels in the vicinity of the Post. On November 9 one or two trails were seen. By the 13th, however, trails were to be seen everywhere, dozens of them wherever we went, most of them following the ridges or leading from one high place to another. Trails that led about the flat prairie-country were the exception, not the rule. And trails were sure to be found at and about all the beacons⁸ and high boulders anywhere in the region. They were especially numerous at the cemetery, where there were several piles of stones as well as some rather high, wooden crosses. I noted that the animals rarely climbed up a beacon. The footprints clearly indicated that in reaching the top the animals leaped lightly from rock to rock rather than crawling up over the edges of the stones. On November 13 and 14 many trails led especially to the beacons, on which I had set traps for owls; but no weasels were caught in these traps.

On November 16 a fully white female specimen was caught in a fox-trap at Native Point by the Eskimo known as Billy Boy. I was told that weasels were more than usually common in that section of the Island at that time.

During early December I continued to see tracks every day. On December 16 what I believe to have been separate trails were observed on at least twenty ridges. The trails wound about a great deal, often to no apparent purpose, as if the lithe hunters were merely listening for sounds of lemmings under the snow. Now and then, however, the trails led to a burrow in the snow and once I noted tiny bits of frozen blood, or the signs of a brief scuffle, where a capture had been made. The trails in one or two instances followed ptarmigan- or hare-trails for a short way, but I think this was largely a matter of coincidence, for there was little evidence that the weasels had been giving the hares or partridges a long chase.

On December 17 I caught a large, fat,⁹ bob-tailed male in a trap that had been set at the base of a perpendicular five-foot rock-face, just under a dangling chunk of rotten fish. This was the only bob-tailed individual I saw during my stay on the Island. Its tail probably had been cut off in a trap.

During January, weasel-trails were abundant most of the time. I was amused by the statements of my Eskimo friends that all these trails were made by only one, or maybe two animals. I had measured the tracks, of course, so was certain that different individuals were responsible for them; yet the natives continued to assure me that *Teggeuk* wandered very widely while hunting, and that he sometimes had to go ten or twelve miles before he could catch a mouse. I found it useless to argue about the matter, for the Eskimos rightly felt that I did not know much about their country; yet I had some satisfaction in bringing in specimens day after day which I had caught along the very ridges, which were the hunting-ground of that "one" far-ranging *Teggeuk*.

On January 8 I spent a good deal of time following trails. They led along the ridges, as a rule, and the deeper snow-drifts. They zigzagged, looped, and figure-eighted about,

⁸These beacons, which are built up at the entrances of harbors, as a rule, are constructed of small stones to a height of five to eight feet and are frequently called "American Men" in the North Country.

⁹According to Sutton's recollections, this fat was found principally, if not exclusively, in the region of the belly, or in a strip along each side of the belly. According to my experience, the fatty areas in *Mustela cicognani* and *M. noveboracensis* from New York are located in the same region of the body.—W. J. Hamilton, Jr.

leading to a lemming-burrow here, to a crevice in the rocks there, or to an open, wind-swept area of gravel or moss. On the southern slope of one of the biggest drifts I found what appeared to be the den of one of the weasels. There was but one entrance. It was about two and one-half inches broad at the mouth, and led almost straight downward for about three feet to the rocks. When I first noticed this burrow I kept quiet for an instant, then began squeaking. Soon I saw down in the blue darkness the pale purple glowing of two eyes. But the weasel could not be lured out. I set three traps here, two at the very entrance of the burrow, and one on a high rock nearby.

On this same date, Jack Ford had to liberate from a fox-trap one of his dogs. Jack told me that about the unfortunate dog, which had, of course, struggled to free itself, was a heavily beaten down ring of weasel-tracks just far enough away from the outermost ring of dog-tracks to be safe. No wonder the tale is sometimes told in the North Country that the weasel will kill a full grown caribou.

On January 9 I caught a female in a trap set below a dangling lemming at the foot of a steep rock. The stomach was empty. The animal was rather fat. I noted that while many weasel-trails led to my fox-traps, the animals were rarely caught in these traps, for the weight of their bodies was not sufficient to break the thin shell of snow that I always placed over the trap.

On January 12 I found another weasel-burrow. It led straight down for about eighteen inches, then shot off abruptly to one side. On the following day I saw the weasel itself near this burrow. It was astonishingly quick in all its movements, and, as it ran, held its tail almost straight up. It flicked its tail jauntily, just as it popped into its den.

On January 15 I revisited the weasel-den found on January 8, and discovered to my surprise that no animal had been caught in any of the traps, but that a new opening to the den had been made about twenty feet from the one previously used. I set more traps at the new entrance and the following day caught a nice male, which was still alive when I found it. This was the only live weasel I saw in a trap. As a rule, I believe, they tire easily, or chill rapidly, and die soon after being caught.

On January 17 I caught a male at the entrance to its burrow among a large pile of rocks not far from a large frozen lake. The stomach of this animal contained no hair; only a thick, blackish substance, perhaps the blood of its prey.

On January 19 I caught another male in a trap set below bait placed in an inaccessible niche above it. I noticed that fresh trails frequently led directly to the traps, where animals had recently been caught, as if the weasels had been attracted by the odor, or by the sounds made by the captured animal.

During January we noted many trails about the buildings at the Post. The animals evidently ranged widely; and they were attracted by the strange odors of the store and of the shed where seal-oil and dog-food were kept.

On January 25 I caught a rather small individual in a trap set several days before at a burrow. About the animal and the trap were innumerable tracks, probably of animals, which had come up to sniff the carcass. All these new tracks were in fresh snow, which had fallen after the weasel had been caught.

On January 26 I noted a round opening into a drift, about which there were a few weasel-tracks. Evidently the animal had been chasing a lemming, had come out of the burrow for a short time, and then had returned to continue the chase. I searched diligently for other signs of this weasel's trail and found none within one hundred yards. This made it evident to me that much of the weasel's winter-hunting is done under-ground in the lemming-burrows.

On January 30 I caught a very large male in a trap which had been set, without bait or covering, simply on the top of the highest pinnacle of one of the rocky ridges, which paralleled the shore of South Bay east of the Post. On the same date I found a den toward which dozens of trails led, and near which there were several urine spots and slender, dark-colored faeces in the snow. I am sure that at least two animals were living at this den. It was not difficult, as a rule, to distinguish the male from the female tracks, for those of the males were much larger.

On February 3 I caught a female in a trap, which had had a lemming suspended above it by a string.

On February 9 I saw innumerable trails, and found myself agreeing with the Eskimos that the little animals are most active when the moon is brightest. On February 13 I followed one trail fully a mile out into the rough ice of the harbor. I did not come to the end of the trail, nor was there much zigzagging about. I think the animal was going to a new hunting-ground across the harbor, seven miles away.

On February 20 several "double" trails were noted, apparently where male and female animals had travelled about together. Whether these trails can be considered as evidence of mating we cannot say. We can affirm, however, that as a rule, weasels do not hunt together.

On February 22 two males were taken from traps not far apart, and no small, supposedly female tracks, were seen anywhere nearby.

On March 1 a male was caught in a trap, which had been set without bait or lure of any sort on a small rock set upon a high boulder. I am sure that traps set in this way would catch a great many weasels on the tundra, for the animals seek out these highest places every night, either to satisfy their curiosity, or to survey their hunting-ground from a vantage point.¹⁰

I was much interested in noting that weasel-trails frequently led up to and about trapped foxes and owls. I am not sure that the fox ever eats the weasel, but I think it very likely that the Snowy Owl does so upon occasion, perhaps frequently. The weasel is resolute, however, and does not hesitate to come up to sniff at his larger foes, when they are caught in a trap. The Husky dogs apparently do not touch the weasel, as a rule, probably because they find the odor of the musk highly offensive. When I threw the skinned bodies of weasels to the hungry dogs they rushed up to get them, but did not eat them with relish and sometimes dropped them or left them for the half-starved, quivering puppies to bolt.

On March 10 the Eskimo, Angoti-Marik, caught a male for me in one of his far inland fox-traps. He told me that in that district he had not seen many weasel-tracks. On March 12 a rather large female was caught in a trap set on the top of a high boulder.

From April 26 to 30 no weasel-tracks were noted on the ice at the edge of the floe near Native Point. Both fox- and lemming-tracks were noted, however, so it is logical to infer that the weasel does not range quite so widely as do these other animals at this time of the year.

No female specimen taken up to this time contained embryos, so it is questionable whether mating had taken place. I did not succeed in capturing a single specimen during May, so am not able to offer any remarks concerning the change of pelage in spring, other than that animals seen during this period of melting snow are parti-colored, as are those of late summer and early fall.

On June 23 I shot a male in full summer-coat. When first seen it was leaping about

¹⁰It is my belief that the eye-sight of the weasel is not very good. When animals look about their hunting-grounds from these high places they probably learn as much from what they smell as from what they see.

on the tundra, looking this way and that, as if searching for a bird's nest. My attention was directed to it, in fact, by the agitated cries of buntings and longspurs. As the weasel jumped about, it wasted a good deal of energy, it appeared to me, for its springings were fully two or three times as high as they needed to be in such more or less aimless wanderings, as those in which the animal was indulging. The gonads of this specimen were much swollen.

On June 27 a small animal, probably a female, and in full summer-pelage, was seen running about among the rocks near the buildings of the Post.

On July 5 the Okomiut boy, Noah, brought me a handsome female specimen, which he had killed with a stone. There were no embryos in this specimen, but the mammae were swollen, so I am certain she was suckling young. On the same date in passing a pile of stones at the base of a ridge, while catching butterflies, I chanced to hear the strange chuckling sounds of a mother weasel at the entrance to her den. When I first saw the little beast, she was peering at me from under a rock not more than three feet away. She was fearless and very curious, and showed her anger by hissing, making cries which might be written "*Chuh, chuh,*" and glaring at me with open mouth. She was so excited that she ran out and touched my foot two or three times. I could hear her young ones calling to her from under the rock, but I could not get to them, so do not know how well developed they were, nor how many there were in the brood.

On this same date Father Thibert saw a family of four young weasels with their mother not far from Seal Point. They all spent most of their time under the rocks, but came out to chuckle at the strange, big animal, which lingered so near, running over his feet and sniffing at his clothing. Father Thibert put a loon's egg down near the entrance to their den, in such a position as would command their attention. All the weasels came out at once to inspect, sniff at, and paw over this new object in their world. They would all dart back in a twinkling, if Father Thibert made the slightest movement.

On July 6 I saw an adult weasel swimming across a small stream. The animal progressed rapidly, in a leaping manner, much as it progressed over ground. Evidently it did not swim "dog-fashion" at all, but by stroking with both front or both hind feet at once.

On July 7 I secured a female from a pile of stones near the Post. I could not, however, find a nest.

On July 10 one of the Eskimos at Munnimunnek Point caught a mother and four well developed young and brought them in stuffed with grass. The tails of the young were short and thinly haired.

On July 14 I saw a large animal, probably a male, among the rocks at the head of South Bay. On the same date Father Thibert presented me with a large male, which had been killed with bow and arrow by one of the Eskimo lads not far from the Mission building; and with fourteen lemmings and four young Snow Buntings which had been found heaped in that one weasel's den. All these creatures bore neat tooth-marks on their necks, or skulls, as evidence of the manner of their slaughter.

On July 27 I watched a family of five young weasels with their mother for some time. They were very pretty and graceful in their movements. So quick were they, that the rocks seemed to be alive with them. A bright-eyed face would peek out here; a winnowing would sound there; a brown, white-fronted form would dart across a little opening; the grasses would quiver and the flowers tremble on their stalks, as a lithe form would creep among them; weasels were everywhere. They hissed, blew, and chuckled at me, yawned in my face, ran after each other with pretty musical cries, and rolled down the rocks in somersaults, biting at dry lichens on the way. Occasionally they would pull themselves through the grass,

as if they enjoyed the sensation of having their bellies scratched, or would lie limp on the rocks peering at me with heads turned to one side, puppy-like.

On August 1 an Eskimo child brought me a large male, which had been killed some time previously in the vicinity of the Ranger River at Cape Low.

On August 5 I saw a small individual, probably a female, not far from the Post.

Annual Cycle of Activities: The change from summer- to winter-pelage accompanies the period of early autumn snow-fall. According to the few specimens collected at this time of the year, the change begins, or at least is first completed, in the region of the body, and is consummated with the head and feet. The tip of the tail, of course, is always black.

By mid-October most of the Southampton Island Weasels are as white as they ever become during the course of the winter. Whether they change their burrows or dens at this time, I cannot say. Probably some animals continue to use the nests they occupied during the summer; other individuals, notably those which migrate into a new region for the winter-hunting, adopt new dens. These are practically always among the rocks along the ridges, and the entrances are usually in the snow, sometimes in deep drifts, through which long entrances have to be dug. These entrance-tunnels, which nearly always reach straight downward to the very place where they lead under, or between the rocks, are about two inches in diameter and are almost round. The animals pop into these burrows with amazing agility. I have never examined the actual winter nest of a weasel, for these were always placed under such large rocks, or in such an inaccessible place, that I could not reach them without blasting, or some other measure, which would unduly have consumed time and labor.

The winter-food of the weasel is almost exclusively lemmings. Since both species of lemmings inhabit the same burrows, as is pointed out in another part of this paper, the weasel probably preys upon both species equally, catching most of them in their burrows under the snow. I have seen signs, which led me to believe that lemmings are sometimes pursued and captured on the snow; but most of the hunting by the weasels is carried on in that endless labyrinth of tunnels deep in the drifts. Weasel-tracks are to be seen everywhere on the snow, to be sure; but these animals are probably seeking a new section of burrows in which to work; they are hardly on the lookout for the chance lemming that wanders from burrow to burrow. Hunting under the snow must indeed be agreeable to the slender weasel, for, while he is thus engaged, he is altogether invisible to all his enemies. Neither the Snowy Owl nor the Arctic Fox can see him. And if he wishes to sleep, he has but to curl up in the warm dry nest of the lemming, the rightful inmates of which he has just slain.

That weasels wander widely in search of a good feeding-ground was evident to me many times during the winter. Not only do individual trails cover much ground, but there are times when notable influxes of weasels occur; an immigration of individuals from farther north, perhaps; or from a section where lemmings are not common. Whether the local population of Southampton weasels is ever augmented by a migration of individuals from Melville Peninsula is unknown to me; I think it hardly likely, unless the weasels definitely follow a migrating lemming horde across the ice-bound stretches of Frozen Strait.

I am of the opinion that weasels practically always eat the flesh of the lemming or other prey that they have caught, and that they do not merely suck the blood. Once or twice I found dead lemmings on the snow which may have been killed and left by weasels; but the lemming remains found in burrows showed that almost the entire carcass had been consumed.¹¹

¹¹It is possible that such "lemming remains" were left, not by a weasel, but by other lemmings, for lemmings are at times cannibalistic.

Mating may continue more or less all through the winter. But it is probably at its height in April and early May. The young probably are not born until the winter-snows have melted away, and the summer-pelage once more resumed. The nest is under a heavy rock, usually in an inaccessible place. The young are fed upon young lemmings, and young birds, especially of those species which nest under rocks, such as the Snow Bunting.

Taxonomic Remarks: *Mustela arctica semplei* differs noticeably in size from *Mustela arctica arctica* of Alaska, the latter animal being nearly a third larger. In coloration, however, the two races differ but little.

The closest affinities of *semplei* appear to be with those of the Greenland form, *Mustela arctica polaris*, rather than with those of the Alaskan animal. Both the Southampton and the Greenland weasels have white upper lips in summer pelage, and if we can judge from the meagre information given us in the original description of *polaris*, there is little difference in size between the two forms, *polaris* being apparently somewhat larger. The description of *polaris* was based upon an unsexed, dried skin (without skull) in summer-pelage. The length of the hind foot of *polaris*, as given in this description, is 38 mm. It is a well-known fact that British mammalogists customarily take this hind-foot measurement to the end of the longest toe and do not include the nail. Allowing for this method of measuring and for the shrinkage that is to be expected in a dried skin, we may properly suppose that the hind foot of *polaris* actually measures about 43 mm. (nail included) in the flesh. In *semplei*, average males (adult) have a hind foot measuring only 39.6 mm.

Other Records: It is a little surprising that so few of the earlier writers mention the weasel among the mammals encountered in this region.

The author of *Appendix II* of Sir John Ross's *Voyage of Discovery* records the weasel from the west side of Baffin's Bay (1819, p. xliii). Lyon (1824, p. 54 and elsewhere) states that weasels were found on the east side of Melville Peninsula during the course of Parry's Second Voyage. James Clark Ross (1835, p. x) mentions the occurrence of the weasel on the shores of Boothia Felix. All of these references are doubtless to *Mustela arctica*, though it is not certain what subspecies is to be found in these places.

Kumlien (1879, p. 53) considered the weasel (supposedly *M. arctica arctica*) rare in the region of Cumberland Sound, saying that it was "even unknown to some of the Eskimos."

Preble (1902, p. 67) lists *Putorius arcticus* Merriam, and gives us several references, but apparently did not actually encounter the species during the course of his expedition.

Low (1906) does not even mention the species.

Hantzsch (1913, pp. 154-155), calling the animal *Putorius cicognanii*, apparently found the weasel very rare in the vicinity of Blacklead Island near Baffin Island. Soper (1928, pp. 31-32) tells us that *Mustela arctica arctica* is "comparatively scarce on Baffin Island."

Mathiassen (1931, p. 27) mentions "ermine" among the terrestrial mammals known to occur on Southampton Island. He says: "Foxes, ermines and lemmings are numerous."

Mr. Ford told me that he had seen many weasels since coming to Southampton Island in 1924, and that he had noted them also on Coats Island.

Genus GULO Starr.

Gulo luscus (Linnæus). WOLVERENE.

Eskimo Name: *Kubbing*, according to Soper (1928, p. 32).

Status: The Wolverine is known to occur, sometimes rather commonly, in the region of Repulse Bay to the northwest of Southampton. Captain John Murray, who caught two Wolverenes in a sort of snow-den at Repulse Bay in about the year 1902, and who is

also well acquainted with Southampton Island, assured me that, though the animal is well known about Repulse Bay it is not found on Southampton, and with this belief Mr. Ford entirely concurred.

Captain Comer, on the other hand, has expressed the belief in a personal letter that Wolverenes do occasionally wander across to Southampton. I am not sure upon what he bases this belief. Judging from what I heard of the animal, while I was on the Island, I am inclined to think that it has never actually been taken, or seen here.

This, then, evidently is a species, which invaded the mainland along the northwest corner of Hudson Bay *after* the insularity of Southampton was established. In this respect it is like the shrew, the *Oogjewnuk* of the Eskimos. Neither of these animals can be very venturesome, else they should have wandered to the Island on the ice of Frozen Strait or have been carried across on some of the floating cakes long ago. Both these species probably are to be found in the northernmost part of Melville Peninsula, so latitude and consequent temperature have had very little to do with their distribution hereabouts; and they would surely find Southampton a suitable habitat could they once establish themselves here.

Family CANIDÆ.

Genus VULPES Oken.

Vulpes fulva (Desmarest). RED FOX.

Eskimo Name: Unknown to me.

Status: Soper (1928, p. 33) says: "It is evident that the accidental occurrence of the red fox on Baffin Island is a comparatively common incident." He suggests that a certain fox captured by an Eskimo at Cape Dorset "a few years ago" might have reached Baffin "by way of Southampton island from Keewatin."

While I was at Southampton I heard a good deal of discussion about two foxes, alleged to be "cross" foxes, which had been caught by the Eskimos. I never saw these animals, but Mr. Ford considered them examples of this form, and it may be that they were, indeed, stragglers from the mainland, which had come over on the ice. One of these was caught by an Eskimo (name lost) at Native Point, on January 29, 1928; the other was taken at Duke of York Bay, by Amaulik Audlanat, on February 2, 1928.

Captain Murray told me that during the winter of 1902, the Eskimos reported to him that they had seen a red fox somewhere inland from Cape Low.

Genus ALOPEX Kaup.

3. *Alopex lagopus innuitus* (Merriam). ARCTIC FOX; BLUE FOX.

(Plate IX, fig. 3)

Eskimo Name: The name of the Arctic Fox, as I wrote it down, is *Teregeneuk*. Soper (1928, p. 33) tells us that the name in Baffin Island is "*Terriginiak*; *Terrienniak*, according to Hantzsch." The similarity of these words to that for the weasel, *Teggeuk*, is marked. The etymology of the words is not known to me.

Status: The Arctic Fox is found all over Southampton Island. It is, apparently, equally common in the high eastern part and in the flat country about Capes Low and Kendall. It is not always common, to be sure, for it is subject to cycles of abundance and rarity. Since the establishment of the Hudson's Bay Company Post at Coral Harbor, in 1924, foxes have been fairly numerous every year, and decidedly abundant during some years, so

that Southampton may fairly be regarded as a region in which conditions on the whole are favorable to the maintenance of a large population of foxes. The abundance of foxes is probably in large measure dependent upon the supply of lemmings. Since lemmings are widely distributed over the Island and are usually found in considerable numbers, foxes also are usually found.

The Blue Fox, a color-phase of the present species, is found regularly, though never abundantly, on Southampton Island. According to the records of the Hudson's Bay Company and in the opinion of Mr. Sam G. Ford, about one out of every one hundred foxes taken on Southampton is blue. Apparently the blue phase is found somewhat more commonly on Baffin Island, where, at Pangnirutung fiord, according to Soper (*ref. cit.*) "the blue variety was said to constitute about five per cent of the total catch." This writer also maintains (*Ibid.*, p. 36) that "the proportion of blue foxes increases northward and, it is said, in northern Ellesmere land and Greenland the blue variety predominates."

Records: During the late summer of 1929, I did not see any foxes about the Post at the head of South Bay. The animals were common thereabouts, however, and I sometimes saw tracks, or noted the feathers of ducks which evidently had been caught and eaten. On August 27 we saw one in brown pelage, which evidently had not yet begun to lose its summer coat to any great extent. It was running along the beach at Four Rivers. I was impressed, as I watched the animal, with the straightness and stiffness of the tail. Its attitude in running was not particularly graceful.

On the following day we had one of the most harrowing experiences of my sojourn on the Island. In making our way in to a harboring-place for the night our propeller was damaged so badly that it was useless. My companions, who somehow managed to keep from getting seasick, succeeded in dragging our motor-boat into calm water by use of the anchor. When I was finally able to stand upright and to help to some extent with the boat-hook, one of the first sounds I heard from the shore nearby was the somewhat derisive barking of a fox. It was a strange sound, small, thin, rather doglike, and somewhat peevish. When we finally reached a place where it was safe to spend the night we roused the curiosity of the foxes of the neighborhood by lighting our lanterns and we heard the whining and barking of several animals, perhaps a family of young, all along the shore.

On September 2 at Cape Low, Mr. Ford found the tail of a fox along the shore. The animal had been in summer pelage when killed; we could not determine the cause of its death. Possibly it had somehow lost its tail and had not been killed. On September 3 Mr. Ford saw one in very ragged summer pelage at Cape Low. The animal was unsuspicious and curious.

We continued to see tracks of foxes in the sand or mud everywhere along the southern shore of the Island. The animals must have been especially common at Four Rivers and at Leyson Point. On September 26 I saw the tracks of a large and a very small fox running parallel to each other along the beach, near the mouth of the Anderson River. On October 2 the remains of a parti-colored Rock Ptarmigan were found by me. I feel sure it had been killed by a fox.

With the coming of the snow, and the consequent appearance of fox-trails everywhere, foxes suddenly seemed to become abundant about the head of South Bay. On October 4 I noted the trails of at least six, some of which I followed for a considerable distance. One of these led finally to a sheltered spot near a partly frozen lake where the body of an Oldsquaw duck evidently had been cached weeks before. Another led through swampy country out to a sort of burrow, about which were scattered egg-shells; probably another cache. I

noted that certain of the pale yellow urine-spots, which were to be seen here and there, especially on the high places along the trails, were tinged with reddish blood-stains. At one place I noted that two animals had been frisking in the snow. On the same date Keetlapik saw the trail of a fox, which evidently was dragging a trap about with it.

During early October, hundreds of fox-trails were to be seen. On October 9 I found the remains of an eider-egg, which had been dug up from the snow and eaten. On October 17 I followed several trails, noted places where the animals had dug in the drifts for lemmings, and observed that at any such place where considerable digging had been carried on, there were also many signs of urine. I spent a good deal of time trying to find a burrow or sleeping quarters, but had no success. On October 30 I observed an interesting series of marks in the snow, where a fox had evidently tried to catch a lemming by pouncing upon it through the thin snow above its burrow. The fox had apparently been unsuccessful for a time; but after one attempt it had listened carefully; then made another attempt; and finally had pinned the mouse down; bitten it, and pulled it out from the snow with its paws. In making the attack the fox had made high, clean leaps, and had not run helter-skelter along the burrow.

On October 31 Jack Ford told me that on their *komatik*-trip to Prairie Point they had seen many fox-tracks; had heard one barking at night; had watched one, while they were building their igloo; and had had an exciting time with the dogs, while they were chasing one on the harbor-ice. The dogs might have caught up with the fox, had it not suddenly changed its course and run down wind. Jack said that neither of the animals he had seen were yet in full winter-pelage, but that they were both predominantly white.

On November 1 Eskimos from the region of Cape Low brought two fox-skins in to the Post to trade. Neither of these animals was in full winter-pelage, and the spotting and blotching of gray-brown made the skins practically worthless. The gray summer-fur was to be seen principally in the region of the neck, shoulders, and back.

On November 13 three skins were brought in for trade, and all of these were perfectly white. Mr. Ford told me that he regarded this as a sign of early cold weather, for he had many times seen fox-skins taken as late as December, which were not in complete winter-pelage. On November 14, three more skins, all in complete winter-pelage, were brought in. On November 15 Jack Ford caught one not far from the Post, a young male, in pure white pelage. It weighed seven and one-half pounds. The eyes were greenish or grayish yellow, not of a particularly handsome shade in the dead animal. On November 18 Jack caught an adult female, a pure white individual, quite fat, weighing five and one-half pounds. At about this time we saw a great many trails all about the head of South Bay.

On November 19 I found many diggings in deep drifts. Here the foxes had tunnelled their way directly to lemming-nests in the heart of the drifts. After examining a number of these diggings I decided that the foxes must listen for some time to the comings and goings of the mice; decide upon the precise location of the nest before even beginning their digging; then make their way rapidly downward at an angle of about forty-five degrees. I take it that foxes, in cases of this sort, catch principally the young in the nest. I never witnessed such captures, so do not know whether the mother lemmings permit themselves to be caught while guarding their young, or not. Evidently they do not carry their young away as some mammals are known to do. Many of the diggings I examined were four or five feet long, and they were as a rule just large enough for the body of the fox. The grass of the lemming-nests was usually left more or less in place; sometimes it was strewn roughly about. Spots of urine were usually to be seen nearby and often a single small, black scat was to be found

on the top of the drift to one side of the burrow. Occasionally there were shallow diggings here and there, where the fox had begun to sink a shaft to the nest, but had abandoned the effort.

A male fox caught in one of Amaulik Audlanat's traps on November 22 was in perfect winter-pelage; a female caught by Jack Ford on November 27, however, had small tufts of gray fur yet remaining in the region of the rump. On the following day, Jack Ford caught another female, a very small, light one, weighing only a little more than three pounds.

On December 2 I tried to photograph a fox, which had been caught in one of Amaulik's traps at the head of South Bay. The eyes were clear golden-brown, and the facial expression was that of a creature somewhat dazed by the light. When we came up, it growled in a high, thin voice, and gave several strange, almost bird-like, chirps and musical sounds. One specimen, caught by Amaulik Audlanat on December 2, had small tufts of summer-fur remaining on the flanks. By December 3, about a hundred pelts had been brought in to the Post for trade and Mr. Ford told me that the overwhelming majority of these were in prime condition.

Early in the winter I began a study of trapping methods, and with one or two lessons learned to set a fox-trap. It is my opinion that the Arctic Fox is not a difficult animal to trap. The Eskimos probably could procure many more than they do, if they kept more traps out, and if they visited the trap-line more regularly and more frequently.

I remember distinctly my first lesson in fox-trapping. Sam Ford and I were out, not far from Seal Point. We watched the general trends of the various trails and finally decided that a certain low ridge near a lake would be a good place for a trap. Sam took his *pana* or snow-knife out of his trapping-bag, and cut from a drift a chunk of snow about two feet square and eight or ten inches thick. He then brought out a steel trap, through the ring of the chain of which he stuck a piece of wood about two feet long. He stamped the snow down firmly over this piece of wood, then placed a medium-sized, round stone over it. This, I could see, would hold the trap and keep the animal from escaping, for the snow would freeze very hard in a short time. Next he placed the block of snow close against the stone, with the chain of the trap between the stone and the snow-block. Then he hollowed out an area in the top of the snow-block into which the set trap would fit, set and placed the trap, scattered a few shavings of rotten fish about, then placed *over the trap* a very thin slice of firm snow, which he scraped delicately down until it was possible actually almost to see the trap through it. As I watched the setting of this trap I could see that it would be an easy matter indeed for a very hungry or curious fox to put his foot into the trap through that paper-thin shell of snow.

Nevertheless it was some time before I caught a fox. Sometimes the wind was so savage that the plate of thin snow was soon worn away and the trap drifted under completely. Sometimes the fox sprang the trap or clawed away the bait without being caught. Sometimes hares or lemmings blundered into them in the course of their wanderings about the tundra.

Eventually I found that, when foxes are really common, traps may be set almost anywhere; but that, if they are scarce, it is sometimes almost impossible to lure them into danger.

The Eskimos catch foxes in many ways. Formerly they made big traps by piling stones up in the shape of a big, inverted cone. The fox, lured by bait placed on the floor, would jump into such an enclosure and then be unable to jump out. Barrels with the lid swung on a pivot are frequently used with great success. Snares are sometimes employed. The Eskimos even catch the animals out in the open, surprising them as they dig for lemmings in the deep drifts.

On December 12 I dissolved a few fox-droppings found near one of my traps and found among the lemming-remains the summer feathers of a Red-backed Sandpiper. This bird doubtless had been cached sometime during the nesting-season.

On December 16 I caught a handsome male fox weighing almost eight pounds, which had a little gray summer-hair in the region of the ears and on the flanks. On December 20 Jack Ford caught a very large, very fat male weighing nine pounds and nine ounces. The stomach was empty. By the end of December many fox-skins were being brought in for trade almost every day, and I was kept busy cleaning skulls. By December 31 over two hundred skins had been brought in for trade; and most of these were, of course, prime skins.

On about January 2, 1930, John Bull found hairs of a Blue Fox in a trap at Leyson Point.

On January 13 I noted that a fox had come up to one of my traps, evidently sniffed about, and then, utterly disregarding the bait, had clawed at a patch of frozen urine on the snow. During January I saw many digging all about the Post. Most of the trails indicated that the animals usually hunted singly; but now and then two parallel trails were observed.

On January 20 one of the Eskimos at Native Point saw a Blue Fox running along the edge of the salt-water ice.

During January and February there were not many foxes about the head of South Bay. Thereafter they seemed to become abundant again.

The Eskimos constantly complained of the damage done by wolves to the foxes especially in the Cape Low region. Muckik reported once that almost half of the foxes he had trapped were destroyed by wolves. On February 8 Jack Ford had the interesting experience of seeing a Snowy Owl attacking a trapped fox. The great bird swooped about, buffeted the fox, slashing its face and head with its claws. By the time Jack got to the fox it was all but dead. A great many owls are caught each season in the fox-traps; not so much, I believe, because the owls attempt to steal the bait, as because they like to perch on the blocks of snow whence they can look out over their hunting grounds.

In mid-February I noted several fox-trails, which appeared to me to be of animals going about in pairs or following each other. At this time I found that cheese was quite as good bait as rotten fish. On February 21 I was surprised to note that there was a touch of gray-brown summer-fur on each flank of a female specimen caught at the head of the Bay. The under hair of the tail, also, was definitely dusky. It has occurred to me that this animal might have been partly of the "blue" phase. The animal weighed five pounds.

On February 28 a handsome Blue Fox was caught at Darkness Lake. I examined this animal carefully. The general color was smoky gray of a very handsome shade, but the feet pads were white and there was a sprinkling of white on the head and tail. Mr. Ford told me, as we examined this beautiful pelt, that prime Blue Foxes were taken usually only at this time of the year; for later in the spring the smoky color was usually so badly faded by the glare of the sun that the pelts were all but valueless.

I was surprised on March 1 to learn that one of the best of the Eskimo trappers, Muckik, was using perfume as bait. A new use for *Florida Water*.

I caught two specimens on March 6, a large male and a slender female, the former with a large patch on the flank stained a dull yellow which I could not remove with water, carbon-tetrachloride, gasoline, or Plaster of Paris. The "vellum," or inside of the skin of this same specimen was turning blackish in the region of the nose and the feet. At about this time most of the trails were to be seen in the flat meadow-country, and not so frequently along the ridges.

On March 13 a female in changing pelage was captured. The inside of the skin of the

ears, nose, face, and legs was very dark; the external appearance of the animal was yet that of the winter, but the under fur of the legs was decidedly gray. Two animals caught by Scotch Tom at Prairie Point on March 15, were also changing color.

On March 16 Jack Ford saw many trails at the head of South Bay, found a fox in one of his traps, saw three running about over the drifts, heard one in a burrow *under* the snow, and had the decidedly interesting experience of startling one from a nap. The fox had lain down in the warm sun, and the fur of its side had frozen so fast to the snow that at first it could not rise. Eventually it had been able to get away with chunks of snow clinging to its back and sides. On the same date, Pialak caught one rather faded blue, and three prime white foxes.

On March 20 I caught a female weighing about six pounds. Spots on her flanks and the backs of her ears were decidedly grayish in color. I think this animal had not mated; I could find no embryos in the uterus.

On March 21 Muckik and one of his fellow hunters brought in forty-seven foxes, one of which was a miserably faded blue. Included in the lot was one peculiarly *maned* specimen, with a ruff of unusually long hair about the neck and in the region of the shoulders. Mr. Ford told me that he had seen a few such individuals before, and that he did not know how to account for such an aberration.

During latter March there must have been a sort of invasion of foxes all through the region of the head of South Bay, for we actually saw hundreds of trails wherever we went, many of them along the edge of the salt-water ice. On March 26 Amaulik Audlanat saw a fox running across the tundra with a trap hanging to its right front foot.

On March 29 Sheeloo and Tapatai found the remains of a blue fox in one of their traps. The carcass had been torn to pieces by the wolves.

On April 1 I caught a small, rather mangy female. There was an old scar on the neck. The face and the top of the head had started to change color and the hair, especially that about the mouth and ears was alive with small black mites, some of which I preserved. On the same date, Amaulik Audlanat caught a male, the nose and face of which was decidedly dark in color. Mr. Ford told me that he expected all the animals to be in spotted pelage from that date on.

On April 4 Jack Ford made a special trip to some burrows he knew to be inhabited by foxes along the Ford's Rivers. Here, on relatively high ground along the edge of the shut-in stream, he found nine entrances to long burrows all in one comparatively restricted area. He told me there were probably a good many more such burrows sealed shut with the snow.

On April 8 I caught a large and handsome male animal in perfect winter-pelage. This and several other individuals I liberated in the hope of getting specimens which would show more of the change of pelage in the spring. The foot had scarcely been injured by the trap. As the animal loped away I noted again that the tail was held very stiffly, straight out, almost as if it were incapable of being bent.

On April 12 I found one large drift, into which at least ten full burrows had been dug after lemmings. On April 16 Pialak caught a blue fox along the edge of the salt-water ice at Munnimunnek Point.

By May most of the Eskimos had taken up their fox-traps. At about this time I was told that a good many of the female animals were gravid, but in spite of my oft repeated requests for specimens, I did not get any for preservation. I was told that as a rule there were many young in a brood. Some females had had as few as seven or eight embryos, but

most of them had from eleven to thirteen, and Mr. Ford told me that he had counted sixteen young in one female taken in late May.

From May 7 to 15 I noted many fox-trails at the edge of the floe many miles from land, in the region of Native Point and Bear Island, and decided that the animals must be wandering, either in search for new hunting-grounds for the lemmings, which occasionally run about on the surface of the snow, or for sea-weed that had been caught in the ice. These trails frequently led along the very edge of the ice.

On May 19 Tommy Bruce and I had a most interesting experience with a fox. We were crossing a wide plain just west of the cliff at Itiujuaq when the dogs scented a fox. We saw the dainty animal in the far distance, but it did not occur to me that we could possibly overtake it. After the dogs had run for about fifteen minutes at a considerable speed they suddenly stopped, and strained their heads forward in an attitude that told us at once they had scented something. We got off the *komatik*, ran forward, and there in a burrow, scarcely more than three feet under the snow, its golden eyes glowing, was a fox. We caught it without difficulty and Tommy saved its skin. There was a good deal of dark fur all about the face and on the feet. The animal had probably been digging for lemmings. The inside of the skin was darkly shaded all over in bilaterally symmetrical blotches, cloudings, and spots. On May 22 Tommy and I saw another one running in a zigzag course more or less up-wind, over the open meadow.

From May 27 to 29 the tracks of a few animals were seen in the region of the Bear Island floe.

On June 5 many tracks were seen in the snow in all the region northwest of the Post. By this time the snow was disappearing rapidly. It was surprising to me that in spite of all the trapping that had been carried on during the winter months, the animals should continue to be so common all about the head of South Bay.

I found on June 11 a fox-den about five miles northwest of the Post in a sort of grassy upland meadow between two low ridges. One of the foxes, probably the male, attracted me to this den with its barking. The cry made by the animal was not a *yip* nor yet a bark; it was more nearly a *squawk*, a loud, harsh, rather drawled cry, very noticeable at close range and with a wild, defiant effect. The fox was not very afraid of me. It sat among the high grass and squawked at me until I was very close to it. The face and neck, as well as spots all over its body, were brownish, but on the whole it was white. When I pressed it too closely it ran into one of its burrows. I could hear it continuing its squawking from inside. All about the burrows (there were many entrances) were the wing-feathers of ptarmigans, the feathers of small birds, and some bones of what I took to be an Arctic Hare. These burrows had been dug in rather a turfy place. Much tall grass grew all about.

On June 13 Muckik found a burrow with many young, which made a considerable outcry as he came up. He did not see the young, but thought there must have been eight or ten in the burrow. On this date Jack Ford and Santiana saw several at the head of South Bay, all of them parti-colored, some more brown than white.

I saw on July 1 the first entirely brown animal of the season. It was carrying prey of some sort in its mouth. I again on July 14 saw a brown animal, which was, I think, hunting. It was vociferously pursued by a pair of Long-tailed Jaegers.

On July 27 I noted extensive diggings in the moss and turf, where foxes apparently had been hunting for lemmings.

From the above data it appears that while most foxes have become largely white by mid-

October, many of them yet retain traces of the summer-pelage even as late as January, and that the summer-pelage is again attained during the following June, or July.

In all the many hundreds of foxes taken on Southampton, which I personally examined, I saw not one with more than a slight wisp of black or brownish on the end of the tail; and as a rule this dark area was reduced to a few blackish hairs.

Annual Cycle of Activities: The winter-food of the Arctic Fox is, as a rule, lemmings. A few ptarmigans doubtless are caught, and an occasional hare. If lemmings are not to be found, however, the foxes usually move out of the country and continue their roving until they find a supply large enough to subsist upon.

Mating probably begins in March or April and is consummated before summer. The young number from six to sixteen. The young are born frequently before the summer-pelage of the parents is complete.

During summer the foxes have little trouble in capturing lemmings, and they doubtless occasionally capture small birds, especially young shore-birds and ducks, which they encounter in the course of their wanderings. They are especially fond of eggs, of course, and are among the principal natural enemies of the ground-nesting birds. Some of the food they catch at this season they cache for future consumption.

Foxes are scavengers. The Eskimos told me that foxes often followed the *komatiks* of the caribou-hunters and hung about like jackals until the "deer" had been killed and skinned, waiting for a chance to rush in to lick up the remains. Sometimes they join the Polar Bears in gorging upon whale or walrus carcasses, which have been cast up along the shore, and they may become very foul and greasy from their gluttonous feeding at such times. They are very curious, as are other members of this family, and frequently are attracted to the Post by the odors which issue from the oil-shed, the store, or the Chief Trader's dwelling.

The Eskimos generally do not use the pelt of the fox to any great extent, though they recognize it as a most important item of trade. They tell stories about the wiles and cleverness of *Terregeneuk*, sometimes imputing the same keen wit and resourcefulness as we have to our Reynard; even though the Arctic Fox appears on the whole to be rather a stupid animal in comparison with the Red Fox.

Taxonomic Remarks: A series of eight skins with skulls and a great many separate skulls were obtained and have been critically examined.

Measurements. The average measurements of three adult males (measured to the end of the hair on the tail) are as follows: total length, 893; tail, 371; and hind foot, 148. The average measurements for four adult females, measured as above, are: total length, 835.5; tail, 328; hind foot, 134. These averages are found to be somewhat smaller than Stone (1900, p. 46) gives for Point Barrow specimens, from the type-locality. Three of his adult males, ostensibly measured only to the tip of the tail vertebrae, are: total length, 965; tail, 377; hind foot, 155. The averages for two Point Barrow females, both adult, are: total length, 925; tail, 369; hind foot, 150.5. The difference in size would be even more marked (15-20 per cent more) if it could be ascertained that the collector took measurements only to the end of the tail vertebrae.

Neither series is large enough to determine satisfactorily whether this apparent difference in size is constant. A great many more specimens must be procured and assembled before the Genus *Alopex* can be seriously studied with the intention of settling the taxonomic status of this polar form.

The average weight of three adult males from Southampton is 8 lbs. 15 oz., while two apparently normal adult females weigh 5 lbs. 14 oz. and 5 lbs. 15 oz. respectively.

The usual sexual differences (principally that of size) that are characteristic of foxes in general, are not very well pronounced in *Alopex*. In adult animals, the skull of the male has a tendency to have a more pronounced occipital ridge than females of the same age, but there appears to be but slight difference in the size of the upper first molar or of the carnassial teeth of either jaw. In one large male, the upper carnassial on the cingulum measures 13 mm.; in a small female the same tooth, measured similarly is 12.5 mm. The transverse diameter from the notch on the outer side of the first molar in a large male measures 10 mm.; in a small female it is slightly smaller: 9.7 mm.

All the specimens of the series are in the winter-pelage. This pelage is white throughout, with the exception of the black nose pad and a few black hairs at the end of the tail; but the color produced by these hairs is not pronounced enough, even where they number fifty or more, to be obvious on a live animal. While we find no reference in literature to these scattered black hairs in the tail, the character is probably not pronounced enough to be of any great taxonomic value, for it varies considerably in different individuals.

Cranial Measurements of adult *Alopex lagopus innuitus* from Southampton Island.

MALES

Carnegie Museum No.	Greatest Length	Basal Length	Palatal Length	Zygom. Brdth.	Interorb. Breadth	Brdth. across Postor. Process	Last Molar to For. Magn.
6610	129	115.5	61	68.5	28	32.5	51.5
6698	124	109	59	66	26	32.5	50
6700	129.5	116	61	66	27.5	33.5	54.5
6707	123.5	112	59.5	63.5	28	32.5	51
6716	123	111.5	57	65	26.5	31.5	51.5
6719	124	109.5	58	66.5	27.5	33.5	51
6704	127	114	62.5	67	29	34.5	52
6721	124	110	58	64	27	31.5	49
6742	123	108	58	63	25.5	31.5	51.5
6746	128	113	60	66.5	27.5	33.5	52
6749	133	116	63	69	27.5	33	53
6771	126	112	59	66.5	27	33	52
6785	122	109.5	57.5	67	27	32	50
6792	129	115	60	69	29	35	54
Average	125.3	112.2	59.7	66.6	27.8	32.8	51.6

FEMALES

6652	123.5	109	58.5	63	26	32	50
6706	119	106	58	62	26	29	49
6709	117.5	104	56	64	26.5	32.5	48
6713subadult.	113	99	54	63	24.5	29.5	44.5
6714	113	101	55	59.5	25	31	45
6736	125	110	59	67	26.5	32.5	51
6750	118	103.5	58	62	25	30	47
6752	120	106	56	64.5	26	31	49
6759	120	107.5	57	65	25	31	50.5
6767	119.5	108	58	62	26	30	48.5
6769	120	106	56.5	61.5	24.5	29.5	48.5
6772	122.5	110	59.5	64	25	29.5	50.5
6773	122	110	59	62.5	27.5	35.5	51
6776	121	108.5	58	62.5	26	31.5	50.5
6779	112	98.5	54.5	62	23.5	30	46
6783	119	104	57.5	62.5	26	33.5	48
Average	119	105.3	57.1	63	25	31.1	48.4

Other Records: According to Sabine (1823, *Appendix*, p. 658) this fox is to be found principally along the seacoast and breeds on the west coast of Hudson Bay as far south as the vicinity of York Factory.

Lyon (1824, p. 46) records the species from Duke of York Bay.

Richardson (1829, p. 89) describes what must have been a blue fox, which was killed December 16, on Winter Island, near Melville Peninsula.

Preble (1902, pp. 62 and 63) says: "The Continental Arctic Fox occurs throughout northern Keewatin and the adjacent islands of the Arctic Sea." He gives us an extended discussion of the species, as he found it along the west coast of Hudson Bay.

Low (1906, pp. 151-152) gives us a brief discussion of fox-hunting and trapping among the Eskimos.

Comer (1910, p. 86) says: "Wolves are not numerous [on Southampton Island], and, of late, the same is true of the arctic fox."

Munn (1919, p. 54) tells us that foxes were scarce in 1917 on Southampton, but "plentiful in 1918."

Allen and Copeland (1924, p. 7) state that forty skulls were collected by the MacMillan expedition in 1921-22 at Cape Dorset and Bowdoin Harbor, Baffin Island, and elsewhere.

Soper (1928, pp. 33-36) gives us an extended discussion of the Arctic Fox. He says that "periodically [it] is comparatively abundant on Baffin Island."

Mathiassen (1931, p. 27) lists the "fox" among the "terrestrial mammals" of Southampton, stating further that "foxes, ermines and lemmings are numerous."

Genus CANIS Linnæus.

4. *Canis tundra* Miller. BARREN GROUNDS WOLF.

Eskimo Name: The name given this animal by the Baffin Island Eskimos according to Soper (1928, p. 37) is *Amarok*. The Southampton Eskimos use a word differing from this, being closer to *Amahghuk*. I do not know the etymology of the words.

Status: In most parts of Southampton Island the Barren Grounds Wolf was formerly a rather common animal. Of late years, however, it has become rare, especially in the southern part, along the shores of South Bay. Its present range is apparently more or less determined by the range of the caribou, and these large animals are to be found principally in the wild, little known parts of the Island east of Duke of York Bay, along the shore of Fox Channel, and along the northwestern coast north of Cape Kendall.

There is a current belief among the Eskimos that some of the wolves of Southampton are merely Husky dogs gone wild. I recall a story which lends color to this belief. One of the Eskimos once caught a young wolf in a trap somewhere in the Cape Low region. The animal was so tractable that the Eskimo decided to put harness on it and let it help pull the *komatik*. The wolf did not greatly object to the harness, and after running with the dogs for a few miles began to understand what was expected of it, and assumed its part of the duties of drawing the sledge.¹²

As has been stated above, the range of the wolf is more or less determined by that of the caribou. The reason for this, of course, is that the wolf preys almost altogether on the caribou. The wolf apparently finds it difficult to subsist on a fare of smaller animals such

¹²Many of the stories of the Eskimos are, of course, only fables. When I questioned Sam Ford about the above story, however, he told me that one of the Eskimos had once actually made a wolf a member of his dog-team and that the animal was one of the most trusted of the team. Mr. Ford himself believes that some of the Southampton wolves may be feral Husky dogs.

as hares, and since there are no musk-oxen anywhere about the Island, the caribou are practically the sole item of food.

Records: During the late summer and early fall of 1929 we heard occasional reports of wolves from the Eskimos, especially from the region northeast of Native Point. The animals were nowhere common, however. My first experience with the species was on the trip to Cape Low, when, in late August, I saw tracks of the animals on the sand and mud along the margins of some small rivers. The tracks were large and broad, larger it seems to me than most dog-tracks.

On November 15 word came to us that Kaligalik, one of the Eskimos who had been trapping somewhere between the Post and Cape Low, had caught a young wolf in one of his fox-traps. Mr. Ford saw the animal and described it to me as "almost white." He went on to explain to me that no full-grown wolf would ever have been caught in that manner in a fox-trap, for the old animals are too wary. On November 30 two more wolves were brought in from the region of Cape Low, where the animals were a considerable nuisance, because of their following the trap-lines and eating the captured foxes. I saw the skins of both these animals. They were big and shaggy and were indeed, very white in their general color-tones. It struck me, as I examined the feet of the animals, that they must be larger than any Husky dog on the Island. The Eskimos saved the skull of one of these animals for me, but the dogs got it and chewed it up so badly that it had been thrown away.

On December 1 we saw a wolf-track in the flat country just west of East Bay. The animal was apparently ranging over the country by itself. It apparently was not following any herd of caribou. On the following day far in the distance, we actually saw a wolf. I shall never forget the majestic creature's behavior. The whole scene was so wild—the rough horizon-line, the steaming open waters of East Bay, the low-hanging sun, the desolateness of willow-twigs, protruding bit of rock, wind-swept patch of gravel—and the hoary wolf, turning to look at us, judging his distance from us, then loping away, off into country the white man knows but vaguely, and perchance will never know but vaguely.

Mr. Ford told me that the wolves were as a rule rare in the southern part of the Island until the fall fox-trapping began. As soon as a few trap-lines have been established, however, a few wolves wander in from the north and more or less establish themselves for the winter, getting their living by making the rounds of the traps, stealing the bait in the cleverest manner, and destroying the foxes or the owls which have been caught. During December, hardly an Eskimo came in, who did not bring with him tales of the wolves, which had been eating his foxes; and these tales were full of comments upon the remarkable cunning of the wolf. Traps set in the most ingenious way failed to catch them. One man had set many traps about a well baited fox-trap and the wolf had stolen the bait, making his way off from the trap by putting his feet in the prints he had made coming in. In this part of the North Country it is the wolf, not the fox, apparently, that is the symbol of cunning.¹³

On December 12 I saw a wolf-track about three miles from the Post. The trail led directly across the open country, to one or two of my fox-traps, and finally off toward the distant Itiujuaq. During the following few days I saw the trail of the same animal several times. The wolf sprung several of my traps, but apparently did so deliberately, and in the traps I found not a single hair of the clever beast.

¹³In many of the Eskimo tales, however, the fox gets the better of the clever wolf, reminding us thus of the qualities attributed to the famous Reynard of English literature. One such tale has to do with a fox who told the wolf to catch himself a fish by hanging his tail over the edge of the ice in the water. The wolf lost his tail in trying to catch fish in this way, then upon finding the fox who had caused him this loss, was further led astray by the lying of the fox.

On December 17 Muckik caught a large adult wolf in a single-spring trap near East Bay, but the animal gnawed at the spring, got a good grip with his molars apparently, and freed himself without leaving part of his foot. Muckik told us the story of this wolf with a very dramatic expression on his face. The Eskimos have come to expect such behavior by the wolves, and actually seem to be a little disappointed when a wolf fails to live up to its reputation.

On January 11 the Eskimo, Kaliquilik, surprised us all by reporting that he had found a *dead* wolf along the shore not far from Munnimunnek Point. He told us that there was no evidence that the animal had been trapped or shot, or that it had starved; nor was it a very old animal. None of us could explain the death of an animal apparently in such good condition. It may have been poisoned. Mr. Ford told me that other wolves had been found dead, and that no one had been able to explain the matter satisfactorily. The foxes had torn the carcass of the animal up so badly that it had not been brought in for me.

On January 18 Muckik and Kooshook told us of the trouble they had been having in the region of Seahorse Point because of the wolves. Fox after fox had been destroyed and eaten, and they had not been able to catch or even to see any of the vandals.

On February 24 Sam Ford followed a wolf-trail which he encountered at Seal Point. The trail led up to one of his fox-traps. There the animal had pawed about carefully, taken the bait, and left without even springing the trap. Sam told us that the animal's footprints were broader than his hand. On the following day, Tapatai told us of a wolf that had dug a tunnel under the snow and come up under one of his traps to steal the bait.

On March 25 I found at one of my traps evidence of irregular happening of some sort. A hare evidently had been caught in the trap, then, while still alive, had been attacked by some large animal, dragged off for some distance while still kicking (there was blood scattered all about on the snow) and eaten, and the spring of the trap had actually been broken. Sam Ford told me immediately the animal could have been none other than a wolf.

During latter March Amaulik Audlanat made a trip through the region of Koodlootok River and Salmon Pond (Darkness Lake) and reported to me that he saw very few wolf-tracks anywhere. Shookalook, however, saw many tracks in the region north of Cape Kendall, while he was there hunting caribou.

During latter March the Eskimo, Kavavou (a man I do not seem to remember) got a wolf with what was known as a *gun-set*. The Eskimo made several false, dummy traps along a ridge. He then placed the meat bait at another place and set a loaded, cocked rifle with string attached to the trigger in such a way that when the wolf came to the meat it was shot in the head. Sam Ford told me that the Eskimos had found this the most successful method, on the whole, of catching wolves.

In late April Tommy Bruce killed a female wolf with three large embryos *in utero* almost ready to be born. When we learned of this, Amaulik Audlanat told me he had found one wolf-den since his coming to Southampton, a large fissure under the rocks at the high mountain northwest of the Post named Mt. Angoti-Marik¹⁴ by Mathiassen.

The Eskimos told me that wolves sometimes have as many as four young in a litter; that they usually hunt caribou in packs, but that in visiting fox-traps they often roam about singly; and that during recent years they have become decidedly less common than formerly.

¹⁴Mathiassen named this mountain, which did not have a very noticeable peak, after the Eskimo, Angoti-Marik, whose better known name was "Scotch Tom." I was not able to make a trip to this mountain, but I made one trip toward its base and found the interior country to be very wild.

Annual Cycle of Activities: I am not in a position to say whether the Southampton Island wolf varies in color with the seasons. The only specimens I saw were of a creamy or pale buffy white color generally speaking; some of the longer hairs tipped with grayish and whitish, giving some areas of the body a frosted appearance. I never saw nor heard of a black animal, such as is sometimes mentioned in stories of the North Country, and to which Soper (1928, p. 38) alludes.

Wolves usually hunt in packs, when they are chasing caribou, their principal food, but they go about singly when they are robbing the Eskimos' fox-traps. They never have been known to attack the Eskimos, so far as I was able to learn. Their craftiness and cunning have made them famous.

They give birth to their young probably in late April or in May. From three to five¹⁵ young compose a brood. The den is situated in a sheltered place, usually along a ridge, among huge boulders, and often a considerable way inland.

Other Records: Not many references to the wolf are to be found among the writings of the earlier explorers in this region. Neither Hudson nor Prickett mentions the species. In Foxe's account of Button's voyage (1894, p. 189) in 1612, brief mention of "Wolves" is made. The animals must have been seen on Mansel Island. Preble (1902, p. 62) says: "The Barren Ground wolf has been recorded by the different Arctic expeditions from various points in northern Keewatin." This statement is doubtless correct; it is therefore the more surprising, perhaps, that such a careful observer as Lyon (1824, 1825) apparently did not encounter the species on or near Southampton.

Kumlien (1879, p. 52) tells us that wolves were seen, especially during winter, about Cumberland Sound, Baffin Island.

Preble (1902, pp. 61-62) saw several wolves in the vicinity of his camp twenty-five miles south of Cape Eskimo. Low (1906) does not mention the species. Soper (1928, pp. 37-39) says: "The Barren-ground wolf occurs more or less commonly throughout Baffin Island, but according to the writer's experience is not, as has been stated, abundant."

Mathiassen (1931, p. 27) says: "There are extremely large numbers of wolves in the caribou district, where they roam about, singly or in packs of ten to twenty and are a source of great embarrassment to the Eskimos; it not infrequently happened that the younger men returned from caribou hunting, as they dared not proceed on account of the boldness of the wolves."

Captain Murray told me that there were many wolves in the region of Cape Low during the winter of 1902. Mr. Ford told me that wolves had been more or less abundant on both Southampton and Coats Islands since his coming to this region.

Family FELIDÆ.

Genus LYNX Kerr.

Lynx canadensis canadensis (Kerr). CANADA LYNX.

Eskimo Name: Unknown to me.

Status: If the Canada Lynx ever occurs on Southampton, it is only as a straggler from more southern regions.

Mr. Ford told me that in a former year a Canada Lynx was caught on Coats Island.

¹⁵The Southampton Eskimos told me that they had never seen more than four young in a brood. Hantzsch (1913, pp. 151-153), however, states that in Baffin Island, in July, 1910, he saw a female with five young at a place called Tikeradjuak.

This is probably the individual referred to by Soper (1928, p. 39) who tells us that about the year 1918 "a lynx was caught on Coats Island, by Stephen J. Stewart."

One of the Aivilik hunters told me that he had once seen a lynx (the name he gave the animal I did not record) somewhere in the region of Repulse Bay.

Order **PINNIPEDIA.**

Family **PHOCIDÆ.**

Genus **PHOCA** Linnæus.

5. **Phoca vitulina concolor** (De Kay). HARBOR, or RANGER SEAL.

Eskimo Name: The only name for this species I heard on Southampton was *Kashigiak*, the etymology of which is unknown to me. The same name apparently is in use on Baffin Island, though Soper (1928, p. 39) spells it *Kassigiak*. The Eskimo name for the body of water on which the Hudson's Bay Company's Post is located, Coral Inlet, is *Kashigialik*, meaning "a place where *Kashigiak* are found."

Status: According to the Eskimos, this seal is to be found in the waters all about Southampton, especially near the mouths of the larger streams, and in the fresh-water lakes, which are connected with the ocean by fair-sized rivers, but that it is on the whole an uncommon animal. They were formerly seen with some regularity throughout most of South Bay, especially in Coral Inlet, and they bred on the little offshore islands throughout this district. Today they are very rare in much of this region, and are scarcely ever seen near the Post. This may be because they have been hunted too assiduously, or because they have become frightened by the sounds of the comings and goings of motor-boats about Coral Inlet. They still are to be found in some numbers about the mouth of *Kashigiaksoak*, or the Ranger River, near Cape Low. Whether the *Kashiagiak* remains in the waters about Southampton the year round is more than I can say. Assuredly we did not see nor take any specimens during the winter of 1929-1930.

Records: During the late summer and fall of 1929 I heard a good deal about Ranger Seals, and was shown several garments and sleeping-bags made from its handsomely marked skin. But I did not actually see one, so far as I know, until we reached the region of Cape Low. There, at the mouth of the Ranger River on September 1 we saw perhaps a dozen of them sleeping or resting on one of the sand-bars not far from the outward rushing current of the stream. At a distance they all appeared to be very dark. We could see that the animals varied considerably in size, some of them being quite small.

As we approached these animals, they took alarm and made off gracefully. After we had made our way a short distance up stream, had anchored, and started taking our camp-equipment out of the motor-boat, we heard a sound not far away and turned round in time to gaze straight into the large, dark eyes of a *Kashigiak* which was making its way deliberately up the stream, apparently headed for a large lake not far inland. It dabbled its head this way and that, blew air through its nose or mouth, producing a strange sound, and then swam along in a leisurely fashion, evidently somewhat curious as to our behavior and sudden appearance, perhaps on one of its favorite sunning-spots.

Amaulik Audlanat, who was ever on the alert for game, made a quick movement, as he grasped his rifle. But the seal evidently sensed that all was not well and turned quickly to drift out with the current. Amaulik took one long shot, then another. The terrified animal shot out of the water, splashed back, and dived into deep water.

Amaulik now forgot all about helping us with the setting up of camp, and made off to

the bar, where we had seen the seals as we came in. We watched him as he crept nearer and nearer the bar. Finally he took a definite position and waited. It was not long until the seals began to return. Finally there were several shots, and we saw Amaulik splashing through the mud and water. We went to help him drag the animal back. It was a rather young individual, about five feet long, and its coat was handsomely marked in such a manner as to remind me of an ocelot. We ate this seal during the following day or two and found it very tasty indeed.

On October 10 Keetlapik killed a Ranger Seal in South Bay not far from the Post. Everyone commented on this capture, for Ranger Seals were not often seen or shot in this section.

On December 6 one of the hunters shot a large male on the ice about a mile south of Bear Island. Mr. Ford told me that he had never before known a seal to be taken at this place at this time of the year.

Mr. Ford told me that the young *Kashigiak* are usually born during the first or second week in July; that they are not born on the ice, as a rule, but on flat rocks or sandy beaches; and that they are dark in color, almost black, marked more or less like the adults, but with finer or smaller spots and blotches. He informed me that during the summer of 1924 mother seals and their young, belonging to this species, were to be seen on all the small islands of South Bay, the islands at Seal Point, and the Tern Islands. At the present time, however, they are only to be found with regularity in the region of Cape Low, though many Ranger Seals were noted near Walrus Island on July 24, 1930.

Annual Cycle of Activities: My impression is that the Harbor Seal is somewhat migratory. It certainly does not live the year round in the region where the young are born; and it is not frequently, if ever, taken along the *sheenah* during the dead of winter, when the common *Netchek*, or Ringed Seal, is so frequently taken by the natives.

It comes to its favorite breeding-grounds with the disappearance of the ice. The young are born in late June or July, on the small flat, rocky islands, or on the sand-bars, principally at the mouths of the larger streams. The food of this species is probably almost altogether fish, though I did not examine any specimens, and am making this statement only upon the reports of the Eskimos. The principal enemies of the Harbor Seal are first the Eskimo, who highly values the beautiful skin, and who uses the blubber and flesh either for himself or for his dogs; the Polar Bear, which doubtless captures a good many; and perhaps the shark, which is decidedly rare in these waters.

6. *Phoca hispida* Schreber. RINGED SEAL.

(Plate VI, figs. 1, 2; Plate IX, fig. 4.)

Eskimo Name: Throughout most of the North Country this common marine mammal is known by Eskimos and traders alike as the *Netchek* or *Netsek* (Soper, 1928, p. 40). The word is in use almost as widely as is *Nanook*, the Eskimo name for the Polar Bear. On Southampton Island young *Netchek* were called *Netchiatsuk*. Soper (see above) tells us that in Baffin Island the old males are called *Tigak*, and the "young after shedding and until one year old," *Netsiavik*. The precise etymology of these words I do not know, save that *atsuk* in the word *Netchiatsuk* is a familiar diminutive suffix among the Southampton Aivilikmiut.

Status: The *Netchek* is by far the commonest seal to be found in the waters about Southampton Island. It is occasionally and locally uncommon; but it is to be found the year

round in all the arms of the sea, and is therefore one of the most important of all mammals from the standpoint of the Eskimo. It is my belief that the *Netchek*, in this region, at least, performs no seasonal migrations of any extent. It is likely, however, that it wanders somewhat in locating good feeding-grounds.

Mr. Ford and others, who have known this section of the North Country well, assure me that the *Netchek* is holding its own very well in spite of the fact that a great many are killed by the Eskimos every year. This is interesting indeed, especially in view of the fact that the *Kashigiak*, or Harbor Seal has been becoming steadily rarer of late years.

Soper (see above) says concerning this mammal: "The ringed seal is abundant in the Baffin Island seas and to the Eskimos is more important than any other form of life. When all else fails, the ringed seal is usually procurable."

Records: When I landed on Southampton Island in mid-August, 1929, abundant evidence of the presence of Ringed Seals was to be seen on every hand. Carcasses of recently killed animals were being skinned by the Eskimos; the dogs were chewing at the offal from these; in the oil-shed were barrels of reeking flesh and fat already stored as dog-food for the coming winter; and out in the harbor, bobbing about in the water, were the dark, rounded heads of the animals themselves, as they played about or came up to investigate the great steamer at anchor in their home-waters. The Eskimos were out hunting the animals almost every day. Sometimes they went after them in the big motor-boats, sometimes only in the little canoes which have supplanted the famous *kayak*. At this time all the animals were fairly well grown; all had shed their light-colored baby-coats, and had much the color and general appearance of the adults. Many of them were, however, quite small.

At this time of the year the Eskimos hunted the *Netchek* almost altogether with the rifle; and, because the seals were well provided with a layer of fat they usually had no difficulty in reaching the carcasses before they sank. In this respect, the *Netchek* was decidedly different from the *Oogjook* which was so thin at this season, that, unless shot *on the ice*, it was almost certain to sink before it could be retrieved by the hunters.

Hunting seals was interesting sport. As we drifted about on the waves, there was no telling when a solemn, big-eyed face would suddenly rise from the waves, the sleek black head turn mournfully this way and that, and the dog-like muzzle sniff the air apparently in suspicion. Most of the animals would make off hurriedly upon being shot at, but some of them would dive for only a moment, then come up to see what all the noise was about.

On September 28 Amaulik Audlanat got a small one as we were returning from Cape Low, not far from Munnimunek. Many *Netchek* had been seen that day, as well as a few *Oogjook*, a band of Harp Seals, and one or two Rangers.

On October 22 (the harbor at the head of South Bay was now all but frozen over), Amaulik Audlanat and I took the dog-team and *komatik* out onto the ice for a *Netchek* hunt. I was much interested in Amaulik's tactics. First, after we had fastened the team so that they could not follow in a burst of enthusiasm, we surveyed the ice with our binoculars. Far out at the edge of the black "leads" which had not yet frozen over, numerous *Netchek* were to be seen. Amaulik, without saying anything to me about the matter, evidently decided upon what he thought to be the best course; then told me he would go after some of the animals. He started deliberately, making his way about the chunks of ice, taking care to test the leathery new ice, which sometimes actually appeared to give under his weight, keeping himself as well as he could back of chunks of ice so as not to frighten the seals by his appearance. Finally I saw him drop to hands and knees and make his way up to a seal. The animal raised its head frequently and looked about, but evidently it did not see the Eskimo, for it never

tried to leave. After Amaulik had shot this seal, he simply sat on the ice, waited for all the other seals to dive into the water and to return to their sunning-spots. Then he went after the next one. In the course of two hours, he had three fine large *Netchek*. Shooting seals is not always as easy as this; sometimes they are unreasonably wary; and if the wind is changeable, it may carry scent of the hunter all about over the ice and make all the animals timorous.

On the following day we got another *Netchek*, and Jack Ford shot two not far from the Post. On October 24 Keetlapik got two not far from Bear Island. On the following day Scotch Tom (Angoti-Marik) and others shot several *Netchek*, but most of them could not be secured because of the thin ice. The ice was so weak it would not hold the hunters; on the other hand it was so thick that it was impossible to go through it with the frail canoes.

On October 26 Jack Ford and I spent a good deal of time studying the behavior of *Netchek* and trying to get a specimen. The ice was very thin over much of the Bay. More than once I saw a *Netchek* trying to find a solid place, where it might come out and bask; but the ice would not hold. As a rule, such animals came up under the ice, broke through with a cracking, slushy sound, and shot up easily, only to break through and try again. We tried crawling up on some of the animals that had found themselves a solid place on which to bask. I learned that scraping on the ice with the feet will sometimes rouse their curiosity and keep them from taking fright. They must hear well, for, when we whistled, they would sometimes put up their heads and listen intently for an instant.

On October 28 I saw my first "seal holes" in the ice formed above deep water. These holes were about eighteen inches in diameter and the edges of the holes were roughish and piled up somewhat in the manner of the mud about the hole of a crayfish. By waiting patiently at one of these holes, I finally had the pleasure of seeing one of the seals come up to breathe. When it first appeared, it made a peculiar sort of sucking sound, perhaps because it had had a long swim between breathing-holes. I never measured the distances between these holes, but I do know that many of them were a considerable distance apart, surely several hundred yards. Many of the holes were to be found along long cracks in the ice. The animals in coming out of these holes must sometimes have some difficulty, for the ice is smooth, the surface of the ice may be as much as two feet or more above the surface of the water, and it would seem to me under the circumstances that the seal would have to shoot out, if it were to get out at all; it could hardly crawl out. Getting back in, is not, however, a very difficult matter. At least all the seals I saw going back into the water did so in a great hurry and apparently without any trouble whatever.

On October 30 in the bay west of Seal Point, in the region of the little Tern Islands, I saw a great many seals, most of them undoubtedly *Netchek*, basking at their breathing-holes, and lined up along the edge of the open water. There must have been one hundred animals in sight at one time in mid-afternoon. Across the ice drifted strange whining and moaning cries, which I think must have come from the seals, for there were no birds about, and no other mammals of any sort, so far as I could see. On the following day, I saw almost as many seals again in the same place; thereafter I never saw so many, for the Eskimo learned of their abundance there and began hunting them assiduously.

During November, at least on the pleasant days, we frequently saw *Netchek* on the ice of South Bay not far from the Post. Some of their breathing-holes were not more than a mile from the shore, and here we could plainly see the animals, when they came up to bask.

On November 25 at East Bay I had my first experience in hunting the animals with Husky dogs. In this sort of hunting the Eskimos merely drive the team out upon the ice, then let them go where they will. Sooner or later one of the dogs, usually the leader, will

give a low, joyful bark, or a wistful whine, and in response every dog will leap to attention, as it were, and make off at a terrific gait for the seal-hole. Sometimes they have to dodge this way and that a little, but it is not long before they have ferreted out the hole and then they all stand about, excited as fox-terriers. The holes are not always to be seen easily. The first one I saw which had been found in this manner was actually covered over almost completely with a thin crust of ice and snow; but the dogs continued to show interest in the place, and with a little digging it is possible to expose the hole. The Eskimos told me that these holes usually had a strong odor of *Netchek* about them. This, I can affirm, is often the case. The odor, when I first detected it, made me think of the musk of a weasel. It is not to be wondered at that the keen-nosed dogs can smell such a strong odor some distance away.

On December 1 at East Bay Muckik spent a great deal of time (more than an hour) stalking a *Netchek* and failed to get it.

During January, 1930, *Netchek* were killed by many of the Eskimos from time to time, at Cape Low, Munnimunnep Point, Bear Island, Native Point, and elsewhere. Females killed at this period carried embryos, but I did not procure any of these embryonic specimens during January.

On February 3 one of the Eskimos brought me a good-sized, creamy-white embryonic specimen, which was, I should say, almost ready to be born. It was well covered with woolly hair or fur, its eyes were open, its flippers and claws well formed, but it had no visible teeth. The end of the tongue was slightly double-rounded or furcate. It was not easy to prepare the skin for there was a layer of very tough, somewhat fatty tissue just under the skin which was very difficult to remove.

At about this time (the exact date was never ascertained) a yellow-white, adult *Netchek* was killed by one of the Eskimos at Native Point. The coloration of this individual was about that of the newly born young, but it was full-grown and the hair covering the body was that of the adult, not that of the young. Unfortunately I never saw this specimen, but Mr. Ford thought it was albinic. He said that he had seen perhaps half a dozen such animals during the course of his life in the North.

The month of March is called *Netchialut* by the Aivilikmiut, signifying the time of the year when the young *Netchek* are born. On March 20, the Eskimos at Native Point killed several animals, including three females carrying embryos, and one of these embryos they brought in to me. It was noticeably larger than the one I preserved during early February. During the month we constantly heard reports of the finding of young seals in their "nests" on the ice. The young are born in sheltered places, caverns, or little roomlike cavities in the salt-water ice. These chambers are connected with the water, so that the mother seal may come and go. I was told that at this time the male *Netchek* are not to be seen with the mothers and young; that the mother seal may bare her fangs, bite, and growl like a dog, if her young are threatened; and that most of the "seal-nests" are to be found where the ice is rough, where there have been cracks and tidal shiftings during the winter. I never actually saw a mother seal with her young in the "nest," but I saw several of the "nests."

On April 5 Muckik shot an exceptionally large female, which was accompanied by a long-haired, white, young one. The Eskimos told me that by this time most of the young had been born, but that a few of the gravid females were yet waiting about their "nests" for the birth of the *Netchiatsuk*. Mr. Ford told me on April 16 that he thought most of the young *Netchek* had been born by that time.

On April 18 a young specimen in very interesting change of pelage was shot near Bear Island. This animal, which was moulting its natal coat, had a decidedly shaggy, odd

appearance. While we were skinning this specimen, much of the shaggy hair dropped out.

On April 24 I examined an ill-smelling male specimen, which had been killed at the floe. The seals were very common along the floe at this time, and the Eskimos killed a great many. On the following day, we killed three, two adult males and a sub-adult female, probably born in March of the preceding year. I asked Tommy Bruce how old this specimen was and he showed me the white color of the underside of the claws in reply. The male seals had a most offensive odor.

On this date I had the interesting experience of seeing one of the Eskimos harpoon a *Netchek* at its breathing-hole. The hole was equipped with a wire rod, with a float mid-way, which stuck down into the water in such a way as to move the minute a seal started to come up. The hole itself was roofed over lightly to keep the seal from seeing that anything was amiss. There was a bit of down on the water, too, which would bob a little the moment waves were caused by the rising seal. When the bit of down bobbed and the wire-rod shook, the Eskimo lifted his harpoon and struck a savage blow, not at the seal, which he could not see, but merely through the snow at the place where he knew the seal would be. And he got the seal.¹⁶

A male specimen taken at this time measured 1165 mm. in length, 940 mm. in circumference at the front flippers, and 350 mm. across the chest between the front flippers. A female measured 1080 mm. in length, 720 mm. in circumference at the front flippers, and 227 mm. across the chest between the bases of the front flippers.

On April 30 Muckik shot an exceedingly handsome, but most foul-smelling male *Netchek*, the skin of which was beautifully marked with rings and spots. It measured 1274 mm. in length, 985 mm. in circumference at the front flippers, and 320 mm. across the chest. On the same date several other specimens were taken, examined, and two measured. A male measured 1165 mm. in length, and a female 1080 mm. in length. The eye of the male (dead) measured 32 mm. in diameter.

From May 7 to 15 several *Netchek* were killed at the floe and some of these were measured and critically examined. A female shot on May 8 measured 1215 mm. from tip of the nose to tip of the hind flipper. A male taken on May 12 measured 1145 mm. The specimens taken were all fat, most of them exceedingly so, and the stomachs we had opportunity to examine were in every case well filled with remains of *kingook*, an abundant crustacean, and with small fish. One stomach held the remains of what must have been a two-foot *Ichalook* or salmon-trout.

Even as late as May 25-26 the Eskimos continued to kill young animals to which natal fur was still adhering. On one of these dates, nineteen seals were killed. Ten of these were young, most of which still had traces of the natal pelage.

On May 29 Amaulik Audlanat and I saw several on the ice, as we were making our way from the Native Point floe back to the Post. We both had been sick and were not in very good spirits. Amaulik nevertheless tried to stalk the seals. I remained with the dogs, standing on the traces to keep them from leaping off. I could tell from their behavior that they were very much excited at seeing Amaulik starting off with his rifle. I was so weak from a three days illness that I could hardly see straight, but I stood there stolidly enough hoping for the best.

All at once I heard the big leader-dog whine, saw him stand up, and before I knew it I

¹⁶One of the most interesting features of this method of catching seals is the slender wooden box in which is kept the wire-rod *seal detector*. It is apparently very important that this piece of wire be kept perfectly straight, and the Eskimos take meticulous care of it.

was in front of and under the big *komatik* being dragged along at a merry clip. I finally got myself out of the way, not much the worse for wear, and let the dogs go on to Amaulik. Needless to say we got no seals that day. But we were both so weak we did not greatly care.

During June, while the harbor-ice was beginning to crack and to break up, *Netchek* were to be seen everywhere. They were especially fond of basking on the ice at the edge of the widening pools.

On August 4 we saw many *Netchek* in the water about Bear Island.

Annual Cycle of Activities: The *Netchek* is, as Soper has said, one of the most important of the northern mammals from the standpoint of the Eskimo. The skin is used in many ways: for boot-tops (*Oogjook* skin is usually used for the soles or foot portion); for *kooletahs*: for trousers; and for mits, trapping bags, and such articles. Most of the dog-harness is made from *Netchek* skin, but the traces are usually of *Oogjook* skin, and the whip is nearly always made of walrus-hide. *Netchek* skins are often used in making the *tupek*, or tent, and were probably used extensively at one time in the construction of the *kayak*. The blubber is used as food; as fuel (it is burned in the shallow stone *koodilik* or seal-oil lamp); and as light. The intestines are stretched for windows in the igloos at times, though the Eskimos with whom I travelled seemed to prefer slabs of fresh-water ice. The flesh is eaten by both the Eskimos and the Husky dogs, and is sometimes the most dependable source of dog-food to be found. It is said that the bones, too, are used in making various implements. I can offer no remarks upon this matter, for I never happened to see the Eskimos making anything from these bones, and did not hear them discussing any such implements.

Aside from the Eskimo, the worst enemy of the Ringed Seal is probably the Polar Bear. Sharks may occasionally molest them, and Killer Whales, which must be very rare anywhere in Hudson Bay, may destroy them upon occasion. It has been said that walruses sometimes kill seals. I think this must be a mistaken notion.

Other Records: James Clark Ross tells us that this seal was to be found at Port Bowen, Prince Regent Inlet (1826, p. 94) and on both sides of the Isthmus of Boothia (1835, p. xix).

Kumlien (1879, p. 55) states that the species was common in the bays and fjords of Baffin Island from Hudson Strait northward to the head of Cumberland Sound.

Low (1906, p. 279) calls this species "the common small seal of all the coasts."

Hantzsch (1913, pp. 157-160) considers it the commonest seal in the region of Black-lead Island, near Baffin Island.

Soper (1928, pp. 40-45) tells us that the "ringed seal is abundant in the Baffin Island seas and to the Eskimo is more important than any other form of life."

Mathiassen (1931, p. 27) in referring to "seals" probably has this species in mind since the *Netchek* is decidedly the most common seal about Southampton Island.

7. *Phoca groenlandica* Erxleben. GREENLAND OR HARP SEAL.

Eskimo Name: *Kiolik*, the first *k* pronounced somewhat as the *ch* in the German word *Buch*. Soper (1928, p. 45) tells us that the same name is given the animal by the Eskimos on Baffin Island. He also gives us *Kairelik*, on the authority of Hantzsch. Low (1906, p. 279) writes the word *kirolik*. The etymology of these words is unknown to me.

Status: Judging from our meagre data, this is one of the rarer species of seals in the waters about Southampton Island; it is, furthermore, apparently rather more definitely migratory than the other species, and it is seen, according to the Eskimos, more commonly along the southern coast than along the Fox Channel shore, or in Frozen Strait and Duke of York Bay.

Records: The first Harp Seals were seen along the west shore of South Bay, on September

9, while we were returning from our trip to Cape Low. There must have been almost a hundred animals in rather a closely knit herd, swimming and disporting themselves not far from the mouth of the Kirchhoffer River. They were easily recognized, not by their shape nor color, but by their interesting habit of standing up in the water as they swam along, lifting not only their head and neck, but their shoulders and apparently their front flippers out of the water, and then sinking forward gracefully as they went onward.

Again on September 8 we saw a small company of Harp Seals just south of the little Kikkuktoowyak Island, east of Native Point.

Harp Seals were seen several times during our sojourn at Seahorse Point; and on September 22 I found the decapitated carcass of one, which had been killed by a Polar Bear in a narrow fjord. In eating the seal, the bear had crudely skinned it from the head and neck backward. The Eskimos saved what remained of the skin, for they apparently do not get Harp Seals as often as they do the other varieties.

Harp Seals were again seen near Leyson Point, not far from the mouth of the Anderson River; and south of Kikkuktoowyak Island from September 24 to 27; none was seen after this date during the fall of 1929; and we did not see any during the winter nor hear of the killing of any at the floe.

A few were seen again in the spring (probably in latter May or early June) by Muckik and Kooshooak in the vicinity of Leyson Point, and a rather large herd was noted near Bear Island in South Bay on July 24, 1930.

Thus it appears that the Harp Seal, as a rule, does not occur about Southampton save as a migrant species.

Other Records: Nearly all the early explorers mention seals of one sort or another in their writings, but usually it is not clear from the statements made which species was actually encountered. James Clark Ross (1827, p. 94) reported Harp Seals from the west side of the Isthmus of Boothia. Kumlien (1879, p. 61) noted this seal frequently in spring and autumn in the southern waters of Cumberland Sound; but tells us that they stayed there "only a short time." Bell (1885, p. 5DD of Appendix) considered this the commonest seal in all parts of Hudson Bay at all seasons.¹⁷ Preble (1902, p. 70) says: "I saw no skins, but the species was reported at Fort Churchill."

Low (1906, p. 279) says: "The Harp Seal is more or less common on the northern coasts and southward along the Atlantic coast of Labrador, at all seasons. In Hudson Strait they are rare in summer, but are not uncommon after the shore-ice forms in autumn and before it leaves in the early summer."

Hantzsch (1913, p. 156) found no evidence that Harp Seals had ever been taken by the Eskimos about Blacklead Island. Soper (1928, p. 45) considers this species "one of the rarer species of seals inhabiting the seas about Baffin Island." Mathiassen (1931) merely mentions "*seals*," but gives us no hint of the species he may have encountered.

Mr. Ford told me that great droves of the animals were seen about South Bay on September 21, 1925. He also noted a few of the animals about Coats Island.

Genus ERIGNATHUS Gill.

8. *Erignathus barbatus* (Erxleben). BEARDED SEAL; SQUARE FLIPPER.

Eskimo Name: *Oogjook*. Low (1906, p. 280) spells this word *Oujuk*. Soper (1928, p. 46) gives us the same word, with slightly different spelling: "*Oogjook*, *Ukjuk*; the young,

¹⁷It is possible, of course, that this statement was accurate at the time it was published. It certainly does not apply at the present time.

Terriglo, according to Hantzsch." According to my experience on Southampton Island, the second of the names given by Soper is really not a name of the Square Flipper, but rather one of the commonest words for *seal-fat*. The Southampton Eskimos used several words, which sounded much like *Oogjook*; and the proper stressing of the sounds of *g* or *k* in these various words was very important. On Baffin Island, of course, the name of the Square Flipper may be pronounced *Ukjuk*; it is never so pronounced on Southampton. The etymology of these words is unknown to me.

Status: The *Oogjook* is not on the whole abundant in the waters about Southampton Island. At times the Eskimos come across considerable numbers of the large seals at the edge of the floe, and they always kill a good many during the course of the year, but as compared with the abundant *Netchek*, or Ringed Seal, the *Oogjook* is a rare animal.

So far as I could learn by personal observation and conversation with the Eskimos, the *Oogjook* is to be found the year round. I recall that we saw it most commonly along the edge of the floe near Native Point during the early spring of 1930, and that we never saw it basking on the ice of South Bay during mid-winter, as we did the Ringed Seal. In fact I am inclined to agree with Kumlien (1879, p. 62) who says, regarding the species, as observed about Baffin Island: "They remain in the sound [probably Cumberland Sound] only during the time there is open water as they have no *atluk* (breathing hole)." My general impression of the mammal is that it is not migratory, and that its abundance is more or less regulated by the food-supply, and by the extent of the open water.

Records: The Square Flipper, with its oddly shaped head, its noticeable whiskers, and its very characteristic habit of bending its body sharply so as to *curve* gracefully into the water in diving, is easily recognizable even at a considerable distance. Its manner of diving has been described by Kumlien (*ref. cit.*) as "turning a somersault"; such an exhibition, according to my experience, usually results from being fired at, for if the animal is really terrified, it dives to deep water with amazing speed, the rear part of its body rising in the air as the head starts downward, and the flippers whacking the water with a splash as the big form disappears.

I saw my first Square Flippers near camp at Four Rivers on September 4 and near Native Point on September 27. On October 13 I had the rather unusual experience of seeing one very close to the shore at the head of South Bay, not far from the Post. I was sitting on the rocks when the animal first appeared. It saw me at once, and moved along rapidly near the surface of the water, coming up frequently to look at me, apparently considerably frightened. I can remember how surprised I was at the size of the creature, for it must have been at least eight or nine feet long. During latter October I saw one or two *Oogjook* nearly every day in the waters of South Bay, usually at some distance from the shore. On October 31, using my binocular, I counted five on the ice beyond Seal Point. I noted that the animals were not to be seen anywhere near shore, that they evidently had come up on the ice only near channels where the water was definitely open, and that they were not near "blow holes" as were the smaller Ringed Seals, which were so numerous nearer shore. The Square Flippers appeared to be dozing and basking. They moved a little now and then, but on the whole were less suspicious than the Ringed Seals, which frequently lifted their heads and looked about.

When I spoke to Sam Ford about the habits of the various seals, he told me that Polar Bears frequently capture the Square Flippers because they are so given to indulging in these naps on the ice. The bears steal up on them by easy stages, making their way directly across the ice in the open. The Eskimos also crawl up to the seals, using a square of white

canvas or a piece of Polar Bear skin so that they will not appear too dark against the snow.

On December 19 we heard the amazing tale of five of our Eskimos who had drifted off on the ice from Munnimunnek Point, to be gone almost a week. The wind had carried the ice about and finally brought them home again. They had killed five *Oogjook* on the day they were set adrift, so they had plenty to eat; nevertheless one of the men was almost dead from exposure by the time they got back to their encampment.

On January 18, 1930, Muckik killed a large *Oogjook* near Leyson Point. He and his son, Kooshook, had seen several in that region. On January 21 an Eskimo killed a female not far from Cape Kendall. This animal contained a well-haired embryo, about three feet long. On January 21 Amaulik Audlanat told us that during the preceding three weeks the Eskimos, who were hunting about Capes Low and Kendall, had killed several Square Flippers. On January 29 one of the Eskimos at Native Point killed a female with an embryo three feet long *in utero*.

On February 3 Akaook brought me a well developed embryonic specimen, which he had taken from an animal killed at the floe of Native Point. The general color of this specimen was blackish brown or gray, the back was considerably spotted with white. The hair was apparently well formed all over the body. The tip of the tongue, I noticed, was different from that of an embryonic Ringed Seal, being simply rounded, whereas the Ringed Seal's was double-rounded, and somewhat forked at the tip.

On our trip to the floe at Native Point during latter April we saw a good many Square Flippers, principally on April 26, when the animals appeared to be playing and chasing each other in the channels of open water. On April 30 Muckik killed one, but it sank before they could get to it with the canoe. I learned that at this season the animals are so lean that they sink very quickly when they are killed; a wounded animal will float, however, so the Eskimos sometimes try to shoot them in such a way as not to kill them instantly. I was told by my friends, that, though the young *Oogjook* is born with gray, mottled coat, it soon loses this coat and takes on one of a yellowish-brown color, which is worn for about a year.

On our mid-May trip to the floe we saw many Square Flippers, and killed several, but most of them could not be retrieved because they sank so quickly. On May 12 we suddenly came upon one lying asleep on a cake of ice. It was most interesting to watch two of the Eskimos, Amaulik and Tommy Bruce, slipping up on this seal. After stalking fully three-quarters of an hour, they finally shot, and though they mortally wounded the animal it managed to get to the water and promptly sank from sight.

On May 27, while I was walking along the edge of the ice, a big Square Flipper suddenly announced his appearance by giving a strange windy, whistling cry. I sank to my knees as unostentatiously as I could, took a firing position, and succeeded in killing the animal; but although it floated for some time, bleeding profusely all the while, it had sunk by the time we could get the canoe floated. Before I shot this seal, it moved along just under the surface of the water, swimming slowly, its body having a strange bottle-green color.

On the following day, while stationed on the ice waiting for the seals to come near at hand, I saw several *Oogjook*. I was especially interested in watching one make its way from the water upon the ice, where it was to sun itself. As it swam toward the solid ice it stuck its head up through the mush-ice. Far out in the channels the heads of *Oogjooks* were to be seen frequently. The animals spent a good deal of time lolling in the water, looking this way and that, rising high for an instant, then sinking gracefully back, simply withdrawing themselves rather than diving forward and downward. More than once I was impressed with the oddly sad, and somewhat dog-like facial expression of these creatures.

On July 24 Amaulik Audlanat and his party killed five *Oogjook* on the ice near Walrus Island, and succeeded in getting them all. The seals were not at all fat at this season, and invariably sank at once, unless they were killed on the ice. Two of these animals, an average male and female, were brought back to me. The male measured 8 ft. 7 inches, over all, and the female 8 ft. 5 inches. The female was noticeably heavier, however, being 68 inches in girth just back of the front flippers, as compared with the girth of 56 inches in the case of the male.

On July 30 Jack Ford shot a fine large female not far from Bear Island. No young accompanied this female.

On August 2 Amaulik and his party got one on the ice beyond Bear Island. On August 4 we saw two *Oogjook* among the cakes of ice near Bear Island.

Annual Cycle of Activities: The month of April is usually called *Terriglullit* by the Southampton Eskimos; this word signifies the time when the young Square Flipper Seals are born. I never saw a live young *Oogjook*, but Sam Ford told me that they are born in the open on cakes of ice, that there is never more than one young, that the females only are to be seen with the young, and that they weigh about 120 pounds when first born.

Our data are so meager that I cannot offer any remarks upon the distribution of the sexes at this time of the year. According to my observations, the young animals must be born far out on the ice, for we never saw one on our several trips to the floe; and furthermore, we saw both male and female adults wherever we went.

The Eskimos told me that the *Oogjook* eats fish to some extent, but that it is especially fond of clams, which it procures from the ocean-floor. In this respect it is similar to the walrus. According to the coloration of the material in the alimentary tract of one killed at the floe, I should say that they occasionally eat the *kingook* or sea-louse, which has a pinkish color.

The Eskimos prize the *Oogjook* highly. They eat its flesh and feed it to their dogs. They are especially fond of the intestines, which they strip of their contents with a sweeping gesture, then braid crudely, and (at least in the instance I have in mind) boil in salt-water. I found these intestines very good indeed; they were delicate and flavorful. The flesh I did not like so well. I never tasted raw liver, so can offer no comparison between it and the raw liver of the Ringed Seal.

Oogjook skin has a great number of uses. The bottoms of practically all *komiks* (boots) are made of it; heavy ropings, lashings, and dog-harness are fabricated from it. Whips, however, are usually made of walrus-hide. The skin of immature animals, or of unborn young, is used for mits, or in a decorative way. The Aivilikmiut have not used the *kayak* for many years (perhaps, indeed not for centuries), so they do not use *Oogjook*-skins to cover these craft; but wherever Eskimos use the *kayak* the skins of this seal are invaluable.

The principal enemies of the *Oogjook* are the Eskimo and the Polar Bear.

Other Records: James Clark Ross (1835, p. xxi) tells us that these large seals were to be found "in summer" on the shores of Boothia Felix. Kumlien (1879, p. 62) gives us an interesting account of the behavior of the animal, describing its habits and its food, and telling us of a fœtus, "4 feet 7 inches" in length, which he procured on April 28. Bell (1885, p. 52DD. Appendix II) saw skins of the animal in possession of the Eskimos about Hudson Strait in 1884.

Preble (1902, pp. 70-71) says: "We saw numbers of these seals both to the north and south of Fort Churchill, and the species probably reaches all parts of the Bay." He describes in detail a specimen killed on July 20 north of York Factory.

Low (1906, p. 280) says that the Bearded Seal is "common on all the coasts" of Hudson Bay and the Arctic Islands.

Hantzsch (1913, p. 156) considers the species rare in the region of Blacklead Island, near Baffin Island. Soper (1928, pp. 46-48) gives us a good account of the species as it is found about Baffin Island, and considers it "not . . . rare."

Mathiassen (1931) does not mention the species, though he must have encountered it.

Mr. Ford told me that every year since coming to the region he had seen *Oogjook* in the waters surrounding Southampton and Coats Islands, virtually every month in the year.

Genus CYSTOPHORA Nilsson.

Cystophora cristata (Erxleben). HOODED SEAL.

Eskimo Name: Soper (1928, p. 48) gives us the following: "*Netsivok*; *Netsivak*, according to Hantzsch." I did not hear the Eskimos at Southampton refer to this species.

Status: Low (1906, p. 280) says: "The Hooded Seal is unknown to the natives of Hudson Bay, and is an exceedingly rare visitor in Hudson Strait." Soper (see above) lists the species, but evidently regards it as very rare about Baffin Island. It apparently has never been taken anywhere in the waters about Southampton.

Family ODOBENIDÆ.

Genus ODOBENUS Brisson.

9. *Odobenus rosmarus* (Linnæus). ATLANTIC WALRUS.

(Plate VII, figs. 1-4).

Eskimo Name: The name of the walrus, *Aiviuk* (pronounced *Eye-vi-uk*), has been spelled in a great many ways by the various travellers, who have made reference to the Eskimo names of the creature. Soper (1928, p. 48) spells it *Aivik* and tells us that Hantzsch (1913, p. 155) writes it *Aivek* and *Aivirk*. Low (1906, p. 280) also spells it *Aivik*. Others have spelled it *Iviuk*. This difference in spellings does not indicate dialectic variations in pronunciation, so much as it does the difficulties encountered in spelling a word so subtly pronounced.

The principal race resident upon Southampton Island today call themselves the Aivilik-miut, *the people who live by hunting walruses*. This race originally inhabited the Repulse Bay country, where walruses must have been numerous during long centuries. The word *Aiviuk* probably is not onomatopoeic; in fact the Eskimo names of mammals usually are not. The etymology of the word is not known to me.

Status: The Atlantic Walrus, according to various reports, is not as common today in the waters about Southampton as it formerly was. Nevertheless, to my great satisfaction I saw many of the huge beasts and will carry with me for a long time the feeling that there are wilderness waters in the North Country where such magnificent creatures can continue to live, in spite of all the efficient fire-arms and leather-making processes in the world. The walrus is to be seen at any time of the year. They are most often found near the ice, though we saw them in the open waters of Evans Inlet in mid-summer. They are migratory, I should say, but only as food-problems dictate.

Records: I shall never forget my first glimpses of walruses close at hand. I was leaning over the gunwale of the motor-boat, as we were making our way eastward from Native Point on September 19, 1929. I must have been gazing in a dreamy sort of way out over

the gray-green water at the flocks of Old-squaws, which rose like gray clouds along the distant horizon. The hum and throbbing of the motor had a soporific effect on all of us; the sun was warm; it was easy to be lazy and thoughtless. All at once, without so much as a ripple of warning, the strangest of strange faces rose from the depths; a wrinkled face colored like what we imagine to have been the skin of a prehistoric monster; strong whiskers; gleaming tusks. I remember the thrill I felt, as I shouted out "Aiviuk, Aiviuk," as the beast glared at me solemnly and sank once more to the depths. The Eskimos were all excitement in an instant. Rifles came out. The men took positions all over the boat, ready to shoot. But it was a long time before we saw any more walruses.

Then suddenly we found ourselves surrounded by the animals. I am willing to hazard a guess that we saw as many as fifty at one time, some of them solitary old males, others in groups of from four to twelve smaller animals, huddled together, shouldering each other, rolling this way and that, plunging slowly and ponderously along, diving down only to rise in a short time and continue the strange rolling and shouldering. I was altogether fascinated by the appearance and behavior of the creatures. Their faces were so mysterious and ugly; their eyes, or eye-sockets, gleamed so redly; they had the appearance of such weight, strength, and toughness, that I began to wonder whether we were altogether safe. And when we turned the boat, so as to run among one of the herds, I was so eager to watch the churning of the water, that it never occurred to me that anyone might want to shoot them.

Only a few of the animals seen at this date had very large tusks. It seemed to me that these old bulls were almost twice as large as the others, and when they rose from the water to gaze about, their eyes gleaming balefully, I felt that I had indeed never before seen a really wild beast. For some reason the Eskimos did not take any walruses on this date, nor did they shoot at them more than once or twice.

On the following day many walruses were seen near the mouth of the Anderson River. On September 24 a small herd were noted rather far out from shore about ten miles west of Seahorse Point. At Seahorse Point proper not many of the animals were seen, but on the outer shore of William Baffin Islet I found a beautiful skull with tusks intact, and pondered, as I turned it over, upon that staunch explorer of far-gone years, who had named that very place, after the "morses" that he and his crew had seen there. For Seahorse Point has long been known among the Eskimos as an especially good hunting-ground for walruses.

On September 27 we saw a great many walruses as we were crossing Native Point Bay, and once more had a thrilling time steering the boat, so as to run as close to the angry, frightened brutes as we could. Sometimes the water seemed actually alive with them, so closely packed were the great bodies. In their haste to get away they lunged over each other, coughing and grunting, rising high in the water, sinking down, endlessly rolling about as they swung their great flippers through the brine. This herd of walruses was very important to the Eskimos living at Munnimunnep Point, for they were able to kill several and to cache the bodies safely for winter dog-food. By October 17 we learned that at least seven walruses had been cached at Native Point.

It is hardly impossible to overestimate the value of the walrus to these people. From the standpoint of an adequate supply of dog-food there is no animal that quite compares with it, for one walrus will last a good while because of its great size. The Eskimos eat the flesh and blubber also, though I believe they prefer caribou and other sorts of meat.

On October 31 Jack Ford and Keetlapik saw a walrus resting on the ice not far from Bear Island. One of the Eskimos at the Post also told me, that he had heard some *Aiviuk* coughing not far from Seal Point.

On November 3 Amaulik Audlanat told us that walrus were very numerous not far from Native Point, but that the ice was so treacherously thin, that it was impossible to go after them. Natives who were hunting in the region of Cape Low also reported many walrus, especially in the waters of Sir Thomas Roe's Welcome. On November 16, while an Eskimo was waiting for seals along the Munnimunnek floe, two walrus suddenly broke up through the ice and frightened all the seals away.

On January 11, 1930, Kaliquilik killed one near Munnimunnek Point. On January 18 Muckik saw many at Seahorse Point and killed a large one for dog-food. On January 28 Amaulik Audlanat saw many at Cape Low and heard that they had been seen in equal abundance at Cape Kendall. On the following day Billy Boy killed one at Native Point, but could not reach it in the canoe. On January 31 I had my first meal of walrus-meat. I found it a little tough and strong of flavor. Perhaps it was not quite thoroughly cooked.

On April 16 Amaulik Audlanat and Pialak secured three walrus not far from Bear Island; one of these was a mother with a newly born young. The men used a canoe in getting these animals. The walrus were asleep on ice-cakes and the hunters had but to steal upon their quarry and shoot them, apparently without any great trouble. In the old days, of course, hunting with the harpoon was not quite so simple.

The baby walrus was most interesting. It was almost five feet long, and I noticed that its front flippers had a definite area of dull black, marking the gray-green monotone.

On April 26 I had my first experience with walrus at the floe. I was waiting for seals, stationed on a high pinnacle of ice not far from the water's edge. To one side of me extended a large area of rather clear, newly formed ice about five inches thick. As I was keeping my lookout, I suddenly heard a loud, cracking sound and looked down almost into the mouth of a walrus that had come up through the ice to look around. I had scarcely gotten over the impression of seeing that first animal, when another broke through the ice not far away. Then both the creatures saw me and went down to come up out in the open water some distance away. Neither of these animals had very large tusks. On this same date I ate my first raw walrus-meat. I could not help being amused at the scene of this meal. We were in a little tent at the edge of the floe. The sides of the tent had been reinforced with blocks of snow. Candles gave us a little light. On the snow in front of us lay the bodies of several seals, a haunch of frozen caribou meat or *Tooktoo*, and the heads and skins of three walrus. It was a gory mess. Underneath one of the skins was a rock-like mass, the frozen contents of the stomach of one of the walrus. We cut our meal from this beast or that beast, as we chose, a sliver of tooktoo, a slab of blubber. It seemed so funny to be hacking off part of the face of a walrus for a meal and at the same time to be hoping to save that skull as a specimen. I found that caribou-meat with walrus-blubber was a good combination and learned to like it thoroughly. Then I found that the clams which composed the stomach contents were of a very delicate flavor, and I ate many of these both raw and cooked. In looking through the stomach contents I was amazed that there were so few shells of any sort. In fact I found only one or two pieces of shell, by which the species of mollusk might be identified.

On May 5 I secured a new-born baby walrus from one of the Eskimos. In skinning this animal out, I found that the eyes were perfectly opened, but that the teeth were nowhere through the gums; that the two mammary glands were below and on either side of the navel, and that there was a definite and rather thick layer of fat under the skin, even in this very young animal.

On May 10 I had a memorable experience at the floe south of Bear Island. We had left

camp wondering whether the weather would be fair or foul, and by the time we had reached the edge of the water we knew it was to be the latter. A strong southerly breeze sprang up, and the channel of open water began slowly to close. Hordes of eiders rose in the gathering storm to make their way to what open water they could find. Snow began to fall heavily. It became foggy. All at once, amid the seething and crackling sounds of the ice, I heard a new sound, a coughing, a low groaning, and looking out, I saw walrus-heads sticking out of the water here and there. The beasts evidently were trying to keep near the channel themselves and they seemed not to be having a pleasant time among the grinding ice-chunks.

On June 5 Tommy Bruce saw several walruses near Kikkuktowyak Island. Among them were some very small young. On June 23 Amaulik Audlanat shot two at the floe south of Native Point. On July 16 and 18 a party of hunters killed several walruses, saving the bodies for dog-food, and keeping the skins.

On July 27 Amaulik Audlanat and his party shot two specimens, a male and female, which they saved for me as specimens. The male, I was told, was as large an animal as they had ever seen. It was very interesting to me, because the handsome, heavy tusks were most symmetrical, and they all but met below the mouth. When I commented on the fact that they almost touched, I was told that they sometimes actually touch, rub against each other, or even eventually cross each other. This male animal measured 12 ft. 5 inches in length, and 9 ft. 6 inches in girth at the chest.

The female was smaller, had much shorter and slenderer tusks, and thinner skin, especially on the neck. She measured 10 ft. 8 inches in length and 7 ft. in girth at the chest. The stomachs of both were empty.

The Eskimos told me that when they got these animals the males, females, and young were all close together on the ice. They said that the stomachs were empty because the animals had been on the ice so long they had not had a chance to do any feeding. When they were pursued the males put up their heads and bellowed loudly, opening their mouths widely.

On July 30 and August 2 Amaulik Audlanat and other Eskimos, who were travelling about South Bay and near Walrus Island, saw a great many walruses.

Mr. Ford told me that he thought the young walruses were born at almost any time of the year, perhaps most frequently in spring and summer, and that they were foaled on the ice, or on the rocks, without any attempt at finding a shelter. But one young is born. It is generally believed that the young have no noticeable tusks, until they are two or three years old. The tusk is prized for its *tooghak* or ivory, for which the Eskimos have many uses.

Annual Cycle of Activities: Walruses apparently do not migrate in the waters about Southampton. They have to move about to find food, however. So far as my observations go, the food of the walrus is almost exclusively mollusks, which are procured on the floor of the ocean, apparently in fairly deep water. I do not know how the animals manage so well to eat the clams and to discard the shells. The teeth of a walrus appear to be very clumsy, yet evidently the animal knows how to manage this matter perfectly. It is said that walruses sometimes eat small fish, and I even heard it said that they sometimes kill seals.

Walruses may be very savage at times. I was told of one Eskimo who was killed in an encounter. The man was out in his kayak, and the walrus attacked, upset the craft, and plunged its tusks through it, then crunched the Eskimo to its chest with its mighty flippers and proceeded to jab and punch him with its tusks until he was a pulp. I am ready to believe that the walrus may behave very savagely at times. They look to me like savage creatures.

The walrus is an important food-animal, as had been stated previously. The skin of young walrus is used for dog-harness and lashings, but the skin of the old walrus is used principally in covering permanent houses and in making dog-whips. The tusks are cut up into various parts of harpoons, *komatik* runners (not today, so much as formerly), various parts of the dog-harness, and so forth. Some of the Eskimos are very clever at carving little ornaments or figures of beasts and birds out of the ivory, and they sometimes make dice and other game-implements out of it.

Other Records: Seahorse Point was named by William Baffin in 1615 because of the great number of "morses" Bylot and his crew encountered in the ice-fields thereabouts (see Markham, 1881, p. 133).

Hearne (1795, p. 388) relates that while passing "Sea Horse Island" he and his party "saw such numbers of those animals [walrus] lying on the shore, that when some swivel guns loaded with ball were fired among them, the whole beach seemed to be in motion."

James Clark Ross (1835, p. xxi) recorded walruses from the northern part of Prince Regent Inlet. According to the same author they were unknown about Boothia, but abundant at Repulse Bay (*Ibid.*, p. xxii).

Rae (1850, p. 180) mentions seeing many walruses on a small island near Whale Island below Wager Inlet.

Preble (1902, pp. 69-70) says: "Occasionally found about the northern part of the Bay, to which section it is probably confined."

Low (1906, pp. 280-1) says, in a considerable discussion of the occurrence of these mammals in the northern waters: "They are very numerous in Fox Channel and Frozen Strait, where they are captured on the floating ice usually found in these localities throughout the summer." He mentions Walrus Island in Fisher Strait as a favorite rendezvous for the animals.

Soper (1928, pp. 48-49) gives us a brief discussion of the walrus in the waters about Baffin Island, and tells us that they are "tolerably numerous . . . in Roe's Welcome."

Mathiassen (1931, p. 27) says: "There are still large numbers of *walruses* in the waters south of the Island, in Duke of York Bay, and in places along the west coast. In September, 1922, I saw 25 walruses on an ice-floe near Cape Middleton."

Order RODENTIA.

Family SCIURIDÆ.

Genus SPERMOPHILUS Cuvier.

Spermophilus parryi parryi (Richardson). HUDSON BAY SPERMOPHILE.

Eskimo Name: *Shik-shik*, an onomatopoetic word.

Status: Since I heard so many stories about this interesting little animal among the Aivilikmiut, I fully expected to see one of them somewhere on Southampton. The species does not, however, seem to occur there, though it is apparently regularly common about Repulse Bay.

Captain Comer, in a personal letter, writes most interestingly of the *Shik-shik*. He says: "The natives of Southampton Island, the Saglernmiut, apparently were not acquainted with the Ground squirrel, for my natives, Aivilikmiut from Repulse Bay, would tell with much glee how, when the Southampton natives made a visit to the main-land and met the natives, they inquired what were those things which sat up and chattered *ter-ter-ter*. They had thought that these were the Tonwalks, or guardian spirits of the natives, they had come

to visit. To me they looked something like a woodchuck. I take it from this story that this animal did not live on Southampton. The native name sounds like *Sic Sic*."

I saw many of these *Shik-shik* about Chesterfield Inlet during the late summer and fall of 1930, and procured one specimen, which had been found dead, I believe.

This *Spermophile*, then, like the *Wolverene*, the *Shrew*, and the *Musk-ox*, must have extended its range into the *Repulse Bay* country or into *Melville Peninsula* after the insularity of *Southampton* was established.

Family MURIDÆ.

Genus LEMMUS Link.

10. *Lemmus trimucronatus* (Richardson). BACK'S LEMMING.

Eskimo Name: *Uhvinguk*, as likewise *Richardson's Lemming*, which see for discussion of meaning.

Status: *Back's Lemming*, like *Richardson's Lemming*, is subject to periods of abundance and rarity, probably throughout its range. *Soper* (1928, p. 51) has suggested that "perhaps the periods of abundance of the two species¹⁸ alternate." As a rule *Back's Lemming* is common on *Southampton*. It is to be found over the entire Island, especially in the flatter, western part, and less frequently in the high country along *Fox Channel* and in the vicinity of *Duke of York Bay* and *Seahorse Point*. *Soper* evidently regards it as one of the commonest mammals of *Baffin Island*, but he calls attention to the fact that it is somewhat local in distribution there, occurring frequently in what he calls "colonies."

About *Southampton* it is to be found on most of the offshore islands¹⁹ and on all the islands in the lakes, as well as throughout the suitable country of the interior.

Unlike *Dicrostonyx*, *Lemmus* does not greatly change in appearance during the course of the year. It is virtually of the same shade of brown both in summer and in winter. It resembles *Dicrostonyx* in many ways, living upon much the same sort of food, having the same natural enemies, giving birth to its young at any season of the year, never hibernating, and making its burrows and its nests of grass under the snow in winter.

Records: An extended discussion of some of the inter-relationships between this form and *Dicrostonyx* appears in certain paragraphs under the latter species. During the late summer and autumn of 1929 I constantly wondered whether *Lemmus* occurred on *Southampton*, for the *Eskimos* told me that only one sort of *Uhvinguk* was to be found, and they averred that this *Uhvinguk* became white in winter. My field-notes regarding the two species at this time of the year are not without considerable confusion on this account. I now know, of course, that many of the lemming-trails I noted in the grassy or marshy country were undoubtedly of *Lemmus* and not of *Dicrostonyx*, for the latter species, especially in summer, is decidedly partial to the higher, rockier country of the plateaus and ridges. The summer range of *Lemmus* is, on the whole, the lowest country the animal can find. The trails frequently lead through the grass of very wet country and cross pools in such a way as to suggest that the animals are to an extent partially aquatic. *Soper* (p. 52) too has called attention to this characteristic of the animal, as he noted it on *Baffin Island*.

In the region of *Four Rivers*, west of *South Bay*, the low country back from the coast,

¹⁸*Soper* is referring here to the species found on *Baffin Island*, *Dicrostonyx grænländicus* and *Lemmus trimucronatus*.

¹⁹I am not sure that any small mammal occurs regularly on *Walrus Island*.

and at the edge of the extensive marshes was honeycombed with the burrows of what I now feel sure were burrows of *Lemmus*. The trails from burrow to burrow often led through swampy country, and even, sometimes, apparently *across* small streams. At the entrances of the burrows there were usually little piles of sand or silt. We frequently saw lemmings running about at a distance, and most of these were, I think, of the present species. The stomach of nearly every jaeger I killed in this region contained the remains of lemmings, and these remains were, without exception, of the present species. On August 28 I examined the stomachs of three Long-tailed Jaegers, and all these held the remains of *Lemmus*.

At Cape Low signs of *Lemmus* were to be noted everywhere. The trails interlaced all the flat country a short way back from the coast, and in the short grass were to be seen innumerable small, globular nests which probably had been built under the winter drifts. On September 3 Amaulik Audlanat saw many lemmings, as he walked about; and I found the remains of a *Lemmus* in the stomach of a Pomarine Jaeger.

During early September, after the first light snow falls, I saw a few trails which I now believe to have been *Lemmus*-trails. The footprints in these trails were not so broad and bear-like as in *Dicrostonyx*-trails, noted later in the season, but they were larger and broader than would be imagined after examining the slender foot of *Lemmus*. As a rule the trails were of the usual sort left by a walking or trotting animal; but sometimes they were in pairs, indicating that the animal had progressed weasel-wise in a series of jumps or bounds; and sometimes they were in groups of four, as if the animal had bounded up from one point and landed in another, ready for the next spring.

In the region of Seahorse Point *Lemmus* probably is not common, for we did not actually see it there. But the low meadows between the ridges and back from the coast appeared to me to be suited to its needs, and it probably would have been found in little colonies, had we had the time to trap extensively.

During November I spent a good deal of time setting traps under the snow for lemmings. I finally learned that raisins as bait attracted both *Dicrostonyx* and *Lemmus* and that it was possible to catch either species in any sort of burrow under the snow. By carefully noting the trails leading to nests and by observing the behavior of individuals kept in captivity I finally decided that while both species assuredly do go about in each others' burrows, the two do not dig the same sort of burrow. All burrows made along the ground through the grass, where the snow is easily broken up with a few movements of the front feet, are made by *Lemmus*. Burrows dug in the firm heart of the drift, however, are dug with the efficient claws of *Dicrostonyx*. Whether the two species always get on amicably together, or not, I cannot say. I never witnessed an attempt on the part of one species to drive the other out of its burrows; nor did I find the remains of one species, which had been killed and eaten by the other. I did, however, determine that if *Lemmus* bodies were not promptly removed from the traps, other lemmings, I do not know which species, sometimes destroyed and perhaps ate them.

I caught my first *Lemmus* in a large drift at the edge of a low meadow not far from the Post. The animal had not been attracted by the bait I had used, but had merely run across the trap. It was a male in very handsome chestnut-brown pelage.

On December 21 I caught an adult female, which also had merely run across the trap. One hind-leg of this specimen was abnormal; it had no claws and appeared to be somewhat tumorous. The pelage likewise, was not what I had expected. In the middle of the back there appeared to be a diamond-shaped area of color darker than the rest, which, I think, may have been a remnant of the summer coat.

The skin of these little mammals was very delicate, especially in the region of the legs; it was much more delicate than in *Dicrostonyx*. I also discovered that I could not pull the vertebræ of the tail out by a deft movement, but that I had to slit the tail on the under side and take the vertebræ out with a forceps.

During early January, 1930, I caught a good many *Lemmus* in the meadows north of the Post. They were most numerous in places, which had been swampy during the summer, and they were often abundant in places where the grass was deep, and the snow consequently not very firmly packed down. On January 11 I caught three specimens, two adult females and a young male.

On January 15 I noted several *Lemmus*-trails, and followed one or two of them for some time. I was surprised at the way in which the trails led directly across great open stretches on lakes. The animals evidently had started to burrow into the snow here and there in the meadowy country, but had decided to go on. I wondered whether, in the event a wandering mouse comes to a drift, the mice inside the drift make any sort of signal to the newcomer, bidding him to go, or to stay.

On January 16 I caught five specimens, one a young gray-colored male; one a female with four well developed embryos. The nest of the latter animal, which was not far from the place where I caught it, was a small ball of grass, about seven inches in diameter, placed under snow about eighteen inches deep, on the ground, among the grass. It was lined with finely shredded grasses and with a little fur, perhaps taken by the female from her own body. Leading to this nest were several burrows, all of which followed the ground and not one of which went up through the drift. In this particular region there were very few *Dicrostonyx*.

On January 18 I caught four males, one young, and dull colored. The testes of all the adults were swollen, much as if the breeding season were at its height. On January 20 I caught three specimens, an adult male and two immature individuals; and I examined the digging of a fox which led me directly to a nest in the grass under snow about fifteen inches deep. On the following day I found another nest in an open, marshy prairie under snow about twenty-two inches deep, placed between two fair-sized stones. Here I caught two sub-adults and two adults, one a female with three embryos about the size of peas. I found several nests among the deep grass; but most of these nests appeared to be unoccupied.

On January 22 I caught a sub-adult male and a half-grown female in an open meadow. On the following day I caught an adult female, which must have been nursing young. On January 31 Noah brought me a large female, which he had caught in the region of Darkness Lake. In this specimen were four embryos, all of about the same size, and measuring about 14 mm. without being stretched out to fullest length. Jack Ford upon seeing these told me that he had found a great many lemming nests in summer and that the broods he had counted nearly always were larger, consisting of six or seven young. He had not known that the young of this little mammal were regularly born in mid-winter, at the period of the lowest temperatures of the year.

On February 9 I found an adult male dead in the middle of a frozen lake, its fur clinging to the snow and ice, and small drops of frozen blood on its face and whiskers. I have no idea what caused its death. On February 13 and 15 I caught females both of which held four rather large-sized embryos. At this time young animals of all sizes were to be found in the traps nearly every day. It appeared to me that broods of young must have been appearing all through the winter.

On March 7 three specimens were caught, one a large-sized female with three embryos about the size of large peas. During March several *Lemmus* got away from the traps, leav-

ing a foot or some toes behind them. I think they twisted themselves off, rather than gnawed, their way to freedom. On March 18 a female with three very small embryos was captured.

On March 20 six specimens were caught, three of the females being gravid. The smallest of these females held four small embryos; the largest held three large-sized embryos, almost ready to be born. One animal had had all the fur of one side torn off by other mice. All over the body were the marks of tiny sharp incisors. I think the fur had been carried off for lining some of the nests in the drift.

On March 21 several more specimens were captured, among them a female with four small embryos about the size of BB shot. On March 27 a female with five large embryos was taken, and an exceptionally large male. At about this time I noted that the male *Lemmus* had noticeable subcutaneous glands in the region of the throat, which I suppose must in some way have accompanied the mating period. Most of the full-grown males had these glands. They were rather difficult to remove from the skin. Most adult females taken at this time held embryos, some of them three, others four, and a few five.

On April 11 I found an adult male dead. This individual apparently had some sort of skin disease; one ear was scabby, and the tail, back, and rump were not in good condition. The sexual organs appeared to be normal, and the stomach and intestines were full of partly digested food.

On June 11 several were seen, and a few were killed while the winter supply of bags of coal at the Post was being moved. Many of the animals seen were apparently young. On June 13 I watched one for a time, and heard it scolding me from the entrance to its burrow.

On June 15 Back's Lemmings were to be seen running about everywhere. When cornered, they were more savage than *Dicrostonyx*. They would stand up and squeal and threaten to bite, or even actually bite. During most of the summer we continued to find dead ones all about the tundra, many of them floating in the small lakes, where probably they had drowned.

With the coming of summer many of the nests of winter became exposed; and everywhere in the swampy country, where the animals had been especially abundant during the winter, were to be seen piles of excrement, sometimes actually quarts of it, along the trodden-down runways. I noted that many of these piles of faeces were frequently to be seen on or near plants of the Curlew-berry. The trails led here and there through the grass, and under the partly frozen turf.

The statement has been made in the present paper that the young of this species are born at any time of the year; I firmly believe this to be the case. This means, of course, that at the time of the melting down of the snow, many nests are exposed to the ravages of the little beast's numerous natural enemies, and many broods of young doubtless are drowned in the spring freshets and floods.

Soper (1928, p. 50) tells us of a female taken July 4 on Baffin Island "carrying nine embryos about ready for birth." I never took a specimen with so large a number of embryos, nor did I find a nest with so many young. If, as Soper suggests, the young are born in Baffin Island "in early July" and not throughout the winter, then perhaps it is necessary that the lemmings in that region have a larger brood all at one time in order to maintain the race in the face of its many natural enemies.

Annual Cycle of Activities: Some authors have commented upon differences in the pelage of this species in summer and winter. While winter specimens do at times appear to be brighter than summer specimens, a comparison of a large series shows that there is really

but little variation among them. The younger animals are assuredly duller and the fur somewhat glossier.

The entire life-cycle of Back's Lemming is spent in the meadows and marshlands, where it runs about among the tall grass feeding upon seeds, grasses, and various other vegetable matter.

The nests, which are globular, and considerably smaller than nests of Richardson's Lemming, at least in winter, are made almost altogether of grasses, lined with finer grasses, and with fur from the bodies of the lemmings themselves.

Taxonomic Remarks: Moults and Color Change in *Lemmus*.

A large series of ninety specimens at once show how little variation occurs in adults of this species throughout the year. C. M. No. 6553 ♀ adult, Feb. 9, 1930, and No. 6686 ♂ adult, June 11, 1930, are identical in color and pattern, save that the winter specimen has the longer fur. There are no other discernible differences.

Two December specimens, 6475 and 6480, show a small patch on the middle of the dorsum where the longer fur of the winter has not made its appearance. These are the only specimens that exhibit any sign of the moult.

Three adult January 16 specimens are colored as follows: Hair everywhere slaty black at base. Anterior part of back mouse-gray, the hairs tipped with blackish, passing into bright hazel caudad, the rump grayer. Cheeks and underparts cream-buff, the chin, throat, and legs gray. In immature specimens taken at this season the color is a general gray above, hairs tipped with buffy, the underparts being paler.

Summer specimens have the rump a rich chestnut, otherwise similar in coloration to the winter specimens.

Skull Measurements of *Lemmus trimucronatus*.

MALES

Carnegie Mus. No.	Greatest Length	Basal Length	Palatal Length	Nasals Med.	Zygo. Brdth.	Intero. Brdth.	Mast. Brdth.	Upper Molar Row Alveo.	Lower Molar Row Alveo.
6475	29	26.6	16.9	8.3	19	4.1	13.7	8.2	7.2
6491	26.4	24	14.1	7.3	17.6	4	13	8	7
6501	30.4	27.9	17	8.7	....	4	14.1	8	7.4
6552	31.6	....	....	8.7	....	4.1	14	8.2	8
6560 imm.	25.4	22.5	14.4	7.2	16	4	13	7.2	6.9
6601	28.4	26	15.4	8.1	18.5	4	13.9	8	7.5
6607	29.8	27.4	15.5	7.8	19.1	4	14	8.8	7.6
6625	29.1	26.6	16.1	8.7	19	4	13.8	8	7.3
6630	31.3	28.7	17	8.6	20.1	4.3	14	9	8.3
6638	29.6	....	17.2	8.4	20	4	14	8	7.6
6643	28.7	25.7	15.4	8	18.7	4	13.6	8	7.4

FEMALES

6624	29.1	27	16.7	8.8	19.6	4	14	9.2	7.5
6557	28	25.6	15.7	8	....	4	14	8	7.8
6582	26.1	24	14.8	7.7	17.9	4	13.3	8	7.6
6604	27.9	25	15.4	8.1	18.1	4	14	8.1	7.7
6616	28.4	25.6	15.4	8.1	18.4	4	14	8.6	7.5
6621	28.5	26	16.3	8.8	19	4	14	8.4	7.4
6624	31.7	29.2	18	9	21.2	4	14.6	9.5	8.2
6629	29	27	17	8.9	20	4	14.2	8.7	7.9
6646	29.8	27.1	17	9	21.1	4	14.6	8.1	7.4
6651	28.9	26.5	16.2	8.4	19.1	4	14	8.3	7.8
6659	28.4	26.4	16.1	8	19	4	13.8	8.1	7.6

Stone (1900) has described the color changes and phases in *Lemmus trimucronatus* in much detail, having had at his disposal six hundred skins. These were specimens from Point

Barrow. He considers them month by month, so it seems hardly necessary to repeat the same for the animals from Southampton Island. Indeed, the specimens agree essentially in color with those described by this writer.

Other Records: *Arvicola trimucronatus* was recorded from Igloolik, Melville Peninsula, by Richardson (1825, p. 311) and was said by James Clark Ross (1835, p. xiv) to be common on the shores of Boothia Felix.

Kumlien (1879) apparently did not find nor record the species at Cumberland Sound in 1877-78.

Preble (1902, pp. 54-55) found the species only at the mouth of the Thlewiaza River (a considerable distance north of the mouth of the Churchill River, along the west coast of Hudson Bay), but gives us nevertheless a very interesting discussion of the animal as he found it at this place. He took a series of about seventy specimens, from August 4 to 8. His statement "The breeding season seemed to be nearly over" leaves us with the impression that the animal did not breed throughout the year in that region. If, indeed, it does not do so, it markedly differs in this respect from the Southampton animal.

Low (1906) makes no mention of either species of lemming.

Allen and Copeland (1924, pp. 8-9) state that the MacMillan expedition secured several specimens of *trimucronatus* at Bowdoin Harbor and along the west coast of Baffin Island north of Latitude 65°N.

Soper (1928, pp. 49-55) says that this species "at times is more abundant than any other land mammal of Baffin Island." He gives us an extended discussion of the distribution and activities of the creature.

Mathiassen (1931, p. 27) merely says that "lemmings" are abundant on Southampton Island.

Mr. Ford was certain that he had noted this mouse as common since his coming to Southampton in 1924; he was not certain, however, that he had seen it on Coats Island.

Genus DICROSTONYX Gloger.

11. *Dicrostonyx rubricatus richardsoni* (Merriam). RICHARDSON'S LEMMING.

(Plate IX, figs. 1, 2; Plate X, figs. 1-8)

Eskimo Name: All the Southampton Eskimos called both species of lemmings *Uhvinguk*. The same name is in use on Baffin Island according to Soper (1928, pp. 49 and 55) though he spells it differently, giving us "*Awingak*, *Amilto*;²⁰ *Avingak*, according to Hantzsch." I made some inquiry as to the meaning of the word *Uhvinguk*, and learned that it is applied also to the human scrotum and to some extent also to any small bag. The Eskimos, with whom I had contact, did not give separate names to the two species of lemmings, and probably considered them as one species perhaps different ages, seasons, or pelages. This is not to be wondered at, for the Eskimos have little occasion for observing these unimportant mammals; and furthermore the two species live in the same burrows during the winter; and probably for this reason, according to Eskimo standards and concepts of behavior, are regarded as related.

Status: In the region at the head of South Bay, the Collared Lemming and the Back Lemming lived during the winter in exactly the same country, so far as I could determine. In the summer, however, the former species tended to live principally among the rocks along the ridges and in the somewhat higher country, while the latter was to be found almost

²⁰I never heard this word on Southampton Island.

altogether in the prairies and in the flat country between the ridges. So far as I could determine, both species were to be found all over the Island, though it is my belief that the Collared Lemming is somewhat more characteristic of the higher eastern part and the Back Lemming of the flatter western part. Both species are subject to cycles of abundance and rarity. According to the Eskimos there are some years when very few *Uhvinguk* of any sort are to be found; and during these years, as has been noted elsewhere in the present paper, other mammals are also likely to be rare, for the lemmings are the principal food of the Arctic Fox, and when the lemmings disappear, the foxes also disappear.

Judging from remarks made by the Eskimos at various times, I am of the belief that seasons when lemmings are very scarce on Southampton are indeed unusual; for the Eskimos told me that they practically always were able to catch plenty of foxes during the winter, and, when foxes are to be found, it is almost certain that lemmings also are present. The records of the Hudson's Bay Company tend to bear out this report, for the supply of foxes from Southampton has been fairly constant every year since the establishment there of the Post; so constant, in fact, that I have heard more than once that Southampton Island is considered the best fox country in the American Arctic.

The abundance of *Dicrostonyx* on Southampton Island is indeed interesting in view of Soper's statement (1928, p. 55) that "this species is comparatively rare on Baffin Island and occurs only locally."²¹

Records: For a long time I was greatly confused in my study of the lemmings, for I was not sure that there were two species present on the Island, and furthermore I was repeatedly assured by the Eskimos that there was but one. I saw signs of lemmings practically every day during the late summer and fall of 1929, and now and then actually saw or heard an animal, but I was not sure which species I was encountering, and I was so preoccupied by my study of the migration of birds, that I did not spend as much time, as I might have, with the mammals. My notes covering this period are not very satisfactory. However, knowing what I now know about the two species and their interesting relationships, I can edit my field-notes intelligently and glean a few data worth recording here. *Dicrostonyx*, in its summer pelage, was met with all along the southern shore of Southampton, on the trip to Cape Low, and again on the trip to Seahorse Point. I am convinced that it was commoner in the eastern than in the western part; not alone because the only specimens actually caught were taken in the eastern part, but because most of the remains of lemmings taken from stomachs of the jaegers in the western part were of *Lemmus*, and not of *Dicrostonyx*. *Dicrostonyx* is not in fact, a creature of the meadows; it is an animal which likes to live along the ridges. This characteristic led me in all my notes to refer to it as the *Rock Lemming*, as differentiated from the *Meadow Lemming*. *Dicrostonyx* was found wherever there were ridges, heaps of stones, or extensive gravel-mounds. At Four Rivers on August 27 I noted extensive lemming-burrows all along the gravel-ridges and saw at least one *Dicrostonyx* there, though the jaegers collected at that point had been eating only *Lemmus* as shown by the contents of their stomachs.

At Cape Low, *Dicrostonyx* was rare. The country thereabouts was very flat and the only rocky places were along the shore. I noted many burrows and quantities of old winter nests among the moss and grass, but I think that most or all of these were of *Lemmus*. The remains of Lemmings found in stomachs of the jaegers were all of *Lemmus*. Amaulik Audlanat told me, however, that he had seen a *gray Uhvinguk*, and this lemming could hardly

²¹It has occurred to me that Soper may not have encountered a "good season" for mice during the years he worked on Baffin Land.

have been *Lemmus*, for *Lemmus* usually gives the impression of being brown rather than gray.

On September 12 at the Post I noted the first trail in the snow of this interesting little mammal, and did not wonder that the Eskimos sometimes referred to it as "little Nanook," i.e., "little Polar Bear," for the tracks were broad, almost round in fact, and the spacing such as to immediately suggest a tiny bear of some sort. On the following day I saw more trails and heard one chuckle as it dived to safety under a huge boulder. On September 14 I saw several sitting on the tops of boulders apparently sunning themselves.

On September 21 near Leyson Point Jack Ford and Kyakjuak each caught a lemming by digging up burrows along the sandy margin of a stream. Both these proved to be *Dicrostonyx* in full-summer pelage. Unfortunately²² these specimens were crushed underfoot on the boat during the excitement of shooting some Old-squaw Ducks. On September 25, I found the remains of a *Dicrostonyx* in the stomach of a young Duck Hawk.

On October 4 at the Post I saw "Bobby," one of the younger Husky dogs, catch and bolt a lemming not far from the house. During early October I noted trails of lemmings nearly everyday, and observed that the relatively broad footprints of the present species were to be found nearly always about the high boulders, or among the ridges. The first definite evidence of change of pelage I obtained from the remains of one taken from the stomach of a White Gyrfalcon on October 15. In this specimen most of the hair was whitish terminally, dull grayish basally. By the end of October I had dug out so many burrows and had tried so hard to catch one of the creatures that I began to wonder if I ever should be able to procure a series showing anything of the change in pelage. By this time, of course, birds were not very common anywhere, and I spent more time in studying the mammals. On October 30 I spent virtually the whole day razing a big snow-bank. I followed innumerable burrows which led everywhere through the drift, sometimes along the rocks, sometimes several feet from the ground through the very heart of the snow-bank.

During November I saw *Dicrostonyx* trails every day in the vicinity of the Post and at East Bay. I continued to wonder whether there could be two species of lemmings, for I have not yet caught a *Lemmus* and since I saw no trails in the snow save those of the broad-footed *Dicrostonyx* I naturally concluded that there must be but one form. On November 9 I noted many trails in fresh snow, and observed that the long hairs on the feet (or perhaps the long digging claws) left an imprint in the snow much as if the creature had been holding a little wisp of straw or something of that sort in each foot (see illustration). On November 12 I noted that the drifting wind continued to open and lay bare burrows everywhere along the shallower drifts. Here it was possible to follow the burrows for long distances with ease, and I noted piles of droppings, patches of urine, and little heaps of shredded grasses here and there all along the tunnels. On November 18 while setting a fox-trap, I happened to expose a network of burrows, all of which obviously were inhabited, and I decided to try setting traps for the creatures at this place.

The capture of my first winter *Dicrostonyx* required hours of labor. I decided at first that these animals would be likely to be found only in the biggest snow-banks so I tackled such a bank not far from the Post. I dug with a shovel until I had an excavation eight feet long, four feet wide and about seven feet deep—and several blisters on my hands. With all this digging I exposed but a few tunnels. Using bread, cheese, and frozen potato as bait, I set ordinary spring mouse-traps along the widened portions of the burrows, and sealed

²²It is a matter of great regret that I failed to note the condition of the claws of the front feet in these mid-summer specimens.

these little chambers shut with great slabs of snow. Hopefully I returned the following day, only to find that my excavations had drifted shut during the night. After digging most of the day once more, I found about half of the traps I had set, and was encouraged by noting that mice had evidently run *about* the traps, perhaps sniffing at the unfamiliar objects. But I caught no mice. The Eskimos were much amused at my eagerness to catch a lowly *Uhvinguk*. But they offered no assistance in solving the problem. Day after day I went on digging in the drifts, setting my traps, and returning without any reward for my efforts.

On November 20 I decided that the foxes must succeed in digging out lemming-nests without much trouble, for I found many such diggings where nests were strewn about on the snow. On the trip to East Bay, I noted a few lemming-trails, and examined a few burrows which were exposed during the course of the construction of our *igloos*, but I caught no lemming.

When I again returned to the Post, I set to work in earnest. I set and carefully marked about forty traps. I excavated in all sorts of places, for the most part *not* in the deepest drifts. On December 11 one of the traps was sprung. On December 13 I at last caught a lemming and it proved to be *Lemmus*. I had to control myself a little when I bore the creature home and showed the Eskimos that, as I had expected, it was different from the *Uhvinguk* with the big digging claws. All the Eskimos nodded their heads sagely.

On December 21 I caught another *Lemmus*, but the animal had merely run across the trap. I decided that I was using the wrong bait. Once I began using raisins instead of bread, cheese and potatoes, I began to catch lemmings, and I soon found that wherever I set my traps I might capture either *Lemmus* or *Dicrostonyx*. On December 31 I caught my first white *Dicrostonyx* in a burrow near the Post dwelling; the animal had started to eat the raisin. This specimen was in complete winter-pelage.

At about this time, I noted that many of the weasel trails led into and about the lemming burrows. By watching the weasel trails I frequently discovered drifts where lemmings were abundant, and learned to set my traps accordingly.

On January 2 one of the Eskimos called to me, saying that he had heard a lemming drilling in the snow. I went out, stood on the drift, and soon heard the sharp, burring noise, not far under the snow. After listening for a time, and determining that the burrows may at times be drilled with great rapidity especially if the snow is not too firmly packed, I dug down quickly, located three burrows, measured them, and set traps and sealed them in. The burrows were among the largest I encountered. They measured fully three inches in diameter. They were a trifle broader than high.

On January 7 I caught a large female (no embryos) at this burrow. The animal was alive in the trap and had dragged it about four feet through the burrow in spite of the fact that it had been fastened with a copper wire and large nail. The lemming did not grit its teeth or try to bite when I took it from the burrow.

On January 11 I caught both a male and female at another burrow. Both were in very white pelage. The stomachs of both were full. From this time on, I had no difficulty in catching *Dicrostonyx*; my troubles now centered in determining to what extent this species and *Lemmus* fraternized during the winter-months.

On January 22 I caught a rather under-sized and decidedly gray female, probably an immature animal. On January 24 I caught a young male and an adult female in the same burrow. On January 25 I caught five specimens, which showed a remarkable range in size and coloration, one very large female with a decided brown, gray, and buffy markings, not noted in any winter specimens captured heretofore. On January 26 I caught a very large

female with swollen mammæ which was evidently nursing young. And all these specimens were taken from burrows where *Lemmus* specimens also were being caught almost daily.

On January 27 Amaulik Audlanat brought me a specimen he had found dead on a cake of ice not far from Cape Kendall. This animal was in very poor condition and had evidently been swimming through salt-water. It was in full winter-pelage. On the same date I caught a half-grown female not far from the Post.

On January 28 I caught two adult females and noted that the traps were being pulled up, anchor and all, and carried off through the burrows. I subsequently determined that *Lemmus* never succeeded in dragging traps away, but that *Dicrostonyx* frequently did so, when the trap was not properly fastened.

On January 29 one of the Eskimos brought me a nice specimen from Native Point, wrapped meticulously in three layers of heavy burlap. On this date I found my first winter *Dicrostonyx* nest. To my great surprise it was not placed under a rock, nor even on a ridge. It was in a relatively low, gently sloping drift along the side of a narrow meadow, perhaps thirty feet from the base of a ridge. The drift was about four feet deep. The nest was placed in the very middle of this drift about three feet from the surface and at least a foot from the ground, so that it was entirely surrounded by snow. The nest was made entirely of grass and was almost spherical, the lining consisted of the same sort of material as the outside, but was perhaps more finely shredded. The cavity in which the nest was placed was snugly packed, there being no empty space about the nest. Leading to the nest were three burrows; but these all led to one entrance; they did not lead through the nest and the nest had but one entrance. The nest and the burrows near the nest were very clean; there were but few faeces anywhere about; in the burrows two feet away and in little chambers along the burrows, however, there were heaps of droppings and numerous urine-spots. The general appearance of the nest gave the impression that the animals were intentionally cleanly thereabouts. In the nest were three young. I did not see an adult animal. The young froze soon after I had exposed the nest.

The walls of the nest were perfectly dry; they were well packed, but were not in the least soggy; and they were about five inches thick, leaving an innermost chamber about three inches in diameter, in which the young lay.

On January 30 I caught two young, very gray, female specimens. On the same date Noah brought in two adult specimens, a male and female, from the region of Darkness Lake. The female had very noticeable ragged, almost bare patches on the sides of her flanks, which may have resulted from the claspings of the digging claws of the male during copulation.

I found on February 1 that in a certain small drift, where I had set many traps, the animals were spending much of their time in digging new burrows, apparently from the willow-bushes about which they had fed, to new clumps. My impression is that these animals do not as a rule girdle the shrubs upon which they feed. Assuredly they eat willow-buds and twigs, but, so far as I know, they do not actually destroy the plants. Whether there is some provision of nature, which prevents their doing so, is more than I can say. It is difficult to state just what is the most important winter-food of the animals. They live almost altogether on green plants, which they find beneath the snow; lichens, mosses, and so forth, and some seeds no doubt; and it is probable that upon occasion they are cannibalistic; but they somehow do not destroy the willow-plants. It is very unusual, indeed, to come upon a dead willow-shrub anywhere in this portion of the Arctic.

On February 4 Amaulik Audlanat caught a handsome male as it was running about on the snow in the region of Koodlootok River. The dogs scented this animal and almost caught

it. It was very fat. At about this time I noted that there were more trails than usual crossing the snow; I also noted the first, slender-footed *Lemmus* trails. These trails may have indicated either that certain burrows were becoming overcrowded, or that the food-supply was giving out.

I was much surprised to find the two species of lemmings inhabiting the same burrows. Whether they always do so, and whether they use the same burrows only in reaching other feeding- or nesting-grounds is more than I can say at present. I was given the impression, however, that the two species lived amicably together, and that they fed upon the same food, gave birth to their young similarly at almost any time of the year, and were in most phases of their life-history amazingly similar.

I think I can say with certainty, however, that burrows dug by *Lemmus* practically always follow the ground, and, as a rule, are dug through shallow, rather rough and not firmly packed snow, which has fallen in the meadow-country; and that burrows dug by *Dicrostonyx* are usually to be found in the deeper drifts, frequently penetrate any part of the drift, almost never follow the ground, and go through all sorts of layers of snow. Once the burrows are dug, both species apparently use them; but I think it likely that burrows *through* drifts are never made by *Lemmus*, for the claws of this species are not suited to such burrowing.

Furthermore *Lemmus*-nests are nearly always placed *on the ground*, often under rather a shallow drift; while nests of *Dicrostonyx* are placed in the middle of the drift, often at some distance from the ground. The same materials are used in the construction of nests in both species; the lining of *Lemmus*-nests often contain some fur; *Dicrostonyx*-nests usually do not.

On February 9 I followed several burrows and determined that faeces of the animals (which species I cannot say) are not dropped here and there as are those of the hare, but in little piles of from five to twenty droppings, as in *Microtus* often accompanied by a spot of urine.

On February 20 Mr. Ford caught a female which was running about on the snow. On being cornered the animal stood up on its hind legs to give battle.

I followed a trail for about two miles across the rough harbor ice on February 21. Here and there were diggings, as if the animal had tried to find soil, or rock, or food. At about this time many such long trails were to be seen, as if the animals were in search of new feeding- or nesting-territory.

On February 25 Jack Ford caught a female (no embryos) which ran across the trail in front of the dog-team and dug herself into the snow so rapidly that Jack had great difficulty in getting her at all.

On February 27 I caught a male which apparently had blundered into one of my fox-traps. On the same date an adult female was captured in a burrow. In this specimen were five embryos, about half an inch long. The coloration of this specimen interested me. Since, like other adult females taken in burrows, it had a somewhat blotched coloration, and since all animals caught running about on the snow were in *full* white pelage, I could not help wondering whether such white individuals were the only ones that ran about on the snow and the parti-colored ones (whether or not they were conscious of their coloration) stayed under the snow.

During March specimens in all sorts of pelage were taken. On March 2 an adult male in mottled pelage was taken. On March 7 a plain gray male was taken. On March 22 a very large female in "grizzly gray" pelage was captured. This individual had young. I do not

know whether she was just taking on her new summer-coat, or whether the gray represented the last of the pelage of the preceding summer.

On March 24 Shupunguk's wife brought in a specimen, which had been caught in an *igloo* at Munnimunnek. On March 27 I caught a silken white male in a meadow burrow, and also a decidedly small female with *two* embryos. This may have been a sub-adult animal with her first brood. On March 29 a female with five embryos (one considerably smaller than the others) was taken. On March 30 an adult female, almost plain gray in color and with five small embryos, and a youngish animal with a gray stripe down the middle of the back were taken.

On April 3 a female containing seven embryos was caught. On April 5 I found to my surprise that a specimen caught in a trap had been destroyed by other lemmings. Of course I had no way of knowing whether *Dicrostonyx* or *Lemmus* had done this; but judging from the fact that *Lemmus* nests sometimes contain hair as well as fine grass in the lining I decided that the *Lemmus* must have torn off the hair for nest-lining and then gone ahead in eating or at least chewing off some of the skin and frozen flesh.

During latter April we saw many *Dicrostonyx*-trails at the floe; but we saw no *Lemmus*-trails there. These trails frequently appeared to lead nowhere in particular; sometimes they led to patches of seaweed, where the animals evidently gnawed for a time. The Eskimos caught a *Dicrostonyx* in Muckik's *tupek* just south of Bear Island on May 1.

On May 5 a visiting Netchilik Eskimo woman caught a live *Dicrostonyx*, a sub-adult in somewhat changing pelage, in her partly constructed *igloo*. This animal she gave to me. I was much interested in the behavior of the creature. It ate crumbs and raisins from the hand a few moments after it had been caught, was very friendly in disposition, though it sometimes coughed or snuffed explosively when its vibrissæ suddenly touched our hands, and acted as if it were about to bite. It tired easily, curled up almost anywhere, and went to sleep in the most offhand way, only to waken in a moment or two, to begin its endless wanderings about. As it ran on the floor, its big digging claws made an odd sound. It sometimes had a little difficulty making its way about, because these claws were clumsy. It was very curious when on my work-table. It tried to chew almost everything with which it came in contact, sneezed when it stuck its face into plaster of Paris or arsenic, stood on the edge of the table and leaned out as far as it could, sniffing, tore pieces of paper up hurriedly or splintered matches and rattled about over everything. We made it a nest of excelsior. Here it slept for a little while, then wakened and rattled about nervously, eating sporadically.

We put it on the snow and took some moving pictures of it. In digging it moved its front feet very rapidly, turning its body now this way, now that, kicking the loosened snow backward with its hind feet and thus sinking into the snow so rapidly that it disappeared in a twinkling, the loose snow filling in the burrow as it went forward and downward. It liked to bask in the sun. It was altogether fearless. When picked up by the skin of the neck it spread all its feet out comically. Sometimes it squealed or chuckled a little, and bit gently. It ate almost anything we ate, showing preference for jam, butter, sweetened coffee, and raisins. It died on May 9. Mr. Ford thought that it got into some pepper by mistake.

On May 10 Muckik caught an immature female in his *tupek* at the Bear Island floe. On May 12 Pumyook caught an immature male in his *tupek*. Both these specimens were decidedly gray, with a somewhat grizzled appearance, and with a noticeable median line down the back. Judging from the appearance of these specimens as well as of the three small young taken from the nest, I should say that the young animal, no matter at what time of

the year it is born, has a somewhat gray appearance, and that if it is born in mid-winter it *does not have the white or gray-white winter coat of the adult until the following winter.*

From May 19 to 21 Tommy Bruce and I noted several *Dicrostonyx* burrows in the region of Itiujuaq. On May 25 Muckik brought in to the Post two very grizzled adult male specimens, which he had caught at Bear Island. These, I should say, were in almost full summer-pelage. They had full-sized digging claws. On May 31 Noah found a very gray, grizzled, female specimen lying at the edge of the nest of a Snowy Owl. From this date on all *Dicrostonyx* seen or captured were in summer-pelage.

On June 5 I saw a Herring Gull catch a lemming along the edge of a meadow. I am not sure that it was *Dicrostonyx*.

On June 10 a very warm day, Richardson's Lemmings were to be seen everywhere. The snow was melting rapidly at this time, and the burrows were doubtless badly flooded. It was not unusual to see as many as twenty or thirty of the animals at one time, running this way and that, or sitting in close-set companies on the dry, protruding rocks. At about this time most of the predatory birds appeared to be living almost altogether on lemmings, for the little beasts were very easy to capture. The dogs at the Post ate quantities of them too, wandering all about the tundra snatching them up everywhere. On June 13, when Jack Ford and Santayana were eating their lunch along a little stream, they took from the water which flowed past them the bodies of thirty-two dead lemmings (most of them of the present species) which probably had been drowned in their burrows and were being carried out to sea.

On June 16 and 17 I continued to see vast numbers of *Dicrostonyx* everywhere I went. The animals apparently did not know where to go. When frightened they ran to the shelter of a rock, stood up and gritted their teeth. If cornered, they chuckled and squealed and bounced about in a peculiar way, hitting this way and that with their front feet and opening their mouths wide. On June 17 I found several dead ones along the margins of small streams, and others simply lying on the tundra. These, perhaps, had died in their burrows during the winter.

On July 5 I noted that the sandy or gravelly uplands were everywhere honeycombed with the burrows of lemmings. At the fresh diggings the ptarmigans were dusting themselves.

Some of the Eskimo children were so pleased with the appearance of my lemming skins that they began making collections of their own. Some of these skins were stuffed with grass; others were spread out in neat squares and tacked on boards. Little Ookpik, Amaulik Audlanat's daughter, worked diligently at skinning the lemmings she found, and she had the sides of her wooden bed at the Post literally covered with stretched skins.

On July 9 Tommy Bruce returned from Cape Kendall. He told us he had never in his life seen so many lemmings as there were near the Blue Goose colony. The mice congregated on the driest places of course, and since these same places were the best for the Eskimo encampment, it was necessary to kill hundreds of the animals, if they were to sleep in comfort anywhere thereabouts.

On July 14 fourteen dead lemmings were found heaped on top of four young Snow Buntings in the temporary den of a weasel. Most of these were young *Dicrostonyx*. There were a few *Lemmus*.

Annual Cycle of Activities: The young, which are born apparently at any time of the year, even in the dead of winter, probably number from two (in the case of young females with their first broods) to seven or eight. The summer-nest is placed at the end of a burrow, which

has been dug in a sandy or turfy place. The winter-burrow is made in the center of a snow-drift, not on the ground under the snow, as is the nest of the Back Lemming, but in the middle of the drift often several inches above the ground.

Winter-born young are decidedly whiter than young born in summer. They are not as white as adults in full winter-pelage, but they are very hoary in general appearance. Their claws are simple and apparently single-tipped at birth, but by time they are ready to leave the nest a lower process has appeared on the claw and they are ready for digging. This, it seems to me, is an amazing adaptation to environment. Unfortunately I did not preserve specimens taken throughout the year, so am not able to furnish absolute proof for my belief that in this form on Southampton Island the double digging claws of the adult are carried throughout the year.

The change of pelage from winter to summer is usually completed before the snows have disappeared. Specimens we took in early May were all in the summer-coat. The winter-coat is assumed with the coming of the first autumnal snows in some individuals; in others, the grizzled summer-colors are retained for some weeks, even months, so that even in the dead of winter, specimens may be taken in which there is a remarkable marbled appearance. Some such animals are so oddly colored that they present a most beautiful appearance. The moult takes place unevenly over the body, resulting in streakings and patchings, which are not bilaterally symmetrical.

According to the material I collected, breeding females are likely to be far slower in taking on the winter-pelage than are the males, or non-breeding females. On the other hand, those individuals, which are likely to wander widely above the snow and those which are without family ties, are nearly always very white in color.

Taxonomic Remarks: Merriam (1900) when describing this form, pointed out that the enamel-pattern of the teeth was as in *nelsoni* and *unalascensis*, not as in *hudsonius*. Recent writers have attempted to fix a relationship with *hudsonius*, but Allen (1919) in his monograph of the genus, has referred it to the Alaskan *rubricatus*, on the basis of studies of the interparietals and the two anterior cheek-teeth, these in *rubricatus* having each an additional postero-internal fold, which is uniformly lacking in *hudsonius*. There are further differential characters, but these are of an average nature and do not hold in all cases, when large series

FIG. 1. Interparietals of *D. rubricatus richardsoni*.

are compared, as Allen has pointed out. We are inclined to agree with this latter view, but the series of specimens from Southampton Island, eighty-nine in all, show some of the skull-characteristics of *hudsonius* as outlined by Allen. For example, the interparietal bone of *D. rubricatus richardsoni*, as figured by Allen, is broad, with a bracket-shaped anterior outline, the prolongation of the parietals separating the interparietal from the squamosal. In the Southampton specimens, of seventy-seven skulls, only four exhibit an instance where the interparietals separate these other two bones, and in none of these is this division well marked (Text-figure 1). In the original description Merriam pointed out that the bullae

were depressed, being broadly and roundly inflated. This is not so obvious in the large series from Southampton Island. The bullæ are not appreciably depressed.

Coloration and Moults. Winter: Adults: faded white above, darker on belly; bases of hair slate-black. *Young:* pale mouse-gray, brownish gray along dorsum; dusky dorsal stripe evident.

Summer: The upper surface of a specimen taken June 10 generally gray, with buffy hairs, with a prominent dusky streak through middle of back, but not extending over head. Belly lighter. Flanks, inguinal region, and most of belly cinnamon-buff, as is the ill-defined band across throat. Nose with short black median stripe, otherwise grizzled. Ears tawny olive. Back grizzled, the hairs tipped with ochraceous-buff; rump grayer, with little buffy or brown coloration. Base of tail like rump, terminal portion and upper feet dirty white. Belly hairs ochraceous-buff, richer in the sternal region; inguinal region warm buff.

Moulting is very irregular in this form, and individuals taken from December to early May show some change of fur in progress. The change to the white winter-pelage must be rather sudden, if the captive, presumably of this species, that Ross describes, is any criterion. The animal was kept in a warm cabin of the vessel during the course of explorations for the Northwest Passage. The dark pelage was retained until February, when the lemming was exposed on the deck, with temperatures ranging to 30 degrees below zero. The white coat was completed in a week. Shortly afterwards the animal died from exposure.

An adult male taken December 31 has a grayish brown patch of fur over the shoulders, extending to the middle of the back. Apparently the lemming is coming into the winter-coat of white. A light brown wash suffuses the face, but the cheeks and rest of the head are white. Six adult specimens taken in January are white. Two immature males and a young female taken respectively on January 22, 24, and 25, are light mouse-gray above, tawny about the ears, with a distinct dorsal stripe. They are lighter below. A large female, captured January 26, has a broad pale brown patch on the middle of the dorsum, narrowing toward the rump. An adult male, captured January 31, is all white; but another female, collected the same day, is grayish brown, with a buffy tract across the dorsum, twenty-five millimeters wide, which likewise narrows toward the rump. The throat is buffy, richer than the dorsal stripe.

Most of the individuals taken in February are white. There are some striking exceptions, which show the progress of the spring-moult already well started. An adult male taken February 9, has a roughly triangular brownish patch on the crown, with a smaller similarly colored area just behind. A female taken February 10 has the moult well advanced. The predominant color is still that of the white winter-phase, but a large patch on the dorsum caudad from the shoulders, has been replaced by the shorter mouse-colored fur, as is also the case in the region of the face. Amongst this new hair a few long white hairs still persist. The sides are washed irregularly with ochraceous-buff; band across shoulders on venter deeper buff, more tawny. The tail and feet are white. A female taken February 27 is white, but for a large spot in the center of the back, which is dark brownish, tending to black.

Among the March adults a female, taken March 22, has the back nearly devoid of white, its place being taken by brown-tipped hairs, which approach a grayer hue near the mid-line. The nose is mouse-gray. A female, captured March 26, appears to have more than half completed the moult. The large whitish hairs of winter still remain in isolated tufts along the side of the back and noticeably over the rump; ears and cheeks tawny; rest of back ruddy gray, interspersed with many brown hairs. Seven adults, obtained from March 28 to 31, are still in the winter-pelage.

A female taken April 3 is white on the dorsum, and is shedding along the flanks and belly, both being warm buff, with some gray hairs mixed in. A sub-adult male, still in winter-coat, has the prominent dusky dorsal stripe. Two males, captured April 8 and 21, are nearly identical in color. Both have lost all white along the back, but the flanks and underparts are nearly white, except about the inguinal region and flanks, which are stained sulphur. The dusky dorsal stripe is quite pronounced in these individuals. Top of head and cheeks, mouse-color, back cinnamon-buff, darker towards the middle.

An immature male and female, taken respectively on May 9 and 10, still exhibit the long winter-fur, while the underparts are dirty white; the backs grayish, with much brown throughout, except the ears, which are tawny. Three males, one collected on May 12, and two on May 25, are similarly colored. They have completed the change, and show no sign of moult, but are not as rich in color as June specimens. The upper parts gray, with much brown appearing, notably about the middle of the dorsum. The ears and shoulders rich brown, passing into buffy along the flanks. Belly lighter, with a pale brown wash. An immature male, taken May 31, is pale neutral gray, with little brown in the coat. Flanks and belly considerably paler.

As may be seen from text-figure 3, *Dicrostonyx* has four sets of mammæ: two pairs pectoral, one post-abdominal, and one inguinal.

FIG. 3. Mastology of *Dicrostonyx* from alcoholic specimen taken June 1930, on Southampton Island

External Characters: Fore Feet. The highly modified fore-claws of *Dicrostonyx* have long been a source of considerable interest among zoölogists. Here we find seasonal changes, which are unequalled in any other Microtine. Generally the two middle claws become enormously enlarged and highly modified for a fossorial life in the snow, whereas the second and fifth claws, while large, do not attain to any unusual development. The thumb nail is minute. Commenting on this phenomenon, Coues says:

"The two middle fore claws attain their maximum development in winter. In spring and early summer these claws do not appear very different from those of *Myodes* (*Lemmus*) though averaging larger, more bulbous at base underneath, with the terminal portion slenderer, straighter and sharper. This bulbous portion underneath grows out simultaneously with increase in length and amount of curvature of the main portion of the claw, until it equals or even exceeds the length of the latter, and is quite as stout, or even stouter, being somewhat broad and pad-like. At this period it runs the whole length of the claw, from which it is separated by a groove along the sides, and by a notch at the end, both of varying depth. The claw then looks nearly like two claws, one underneath the other. The pad would then seem to gradually sever its connection with the main claw by progressive increase in depth of the constriction marked by the lateral groove and terminal notch as well as by

loosening from the base, when it appears like an excrescence; it is finally lost. Thus the process appears to be a periodical one, like the shedding of the horns of ruminants, and not continually progressive with age; and would seem to be connected with the particularly

FIG. 2. Middle fore claws of *Dicrostonyx*. X 2

fossorial habits of the quasi-hibernating animal that digs galleries under ground in which to reside during the cold season, as compared to its freer and more active mode of life during the summer. At the period of maximum development of the claws these equal or surpass half an inch in length."

In a series of *D. hudsonius* from Belcher Island, Hudson Bay, Allen found the enlarged fore claws of a specimen taken April 5 to have disappeared. An adult from Great Whale River, Hudson Bay, taken April 20, still retains the enlarged fore-claws. In a specimen from the Nastapoka River, collected May 8, the enlarged fore-claws are nearly ready to fall away.

Dicrostonyx unalascensis stevensoni, an insular race restricted to Umnak Island, Alaska, never acquires the enlarged claws. Nelson (1929) writing of this species, says:

"This species apparently does not take on the white winter-pelage, and lacks the great winter development of the two middle claws on the fore feet so conspicuous in other species of the genus. . . The retention of a brown pelage in winter by the Umnak lemming . . . may be reasonably attributed to the response of this species to the milder winter climate of its habitat. While Umnak Island lies in a very stormy region, yet zero temperatures are uncommon, and while snow falls at intervals during more than six months each year, sometimes remaining on the ground for weeks, yet not infrequently during the winter months the ground lies nearly or quite bare."

We find in the lot of *Dicrostonyx* from Southampton that all adults have these enlarged claws with the exception of a single female taken in mid-July. Specimens collected in June, as well as an adult male taken in July, have enlarged claws. Furthermore, there is no indication of the claws in the process of shedding. May it not be logical to reason that this form, snowbound from early September until well into June, for the most part does not undergo seasonal changes, but in most instances, when the modified claws have finally appeared at an early age, are retained throughout life. The young are born without the modified condition; but this modification becomes apparent in young born in winter and spring at a very early age.

Cther Records: Preble (1902, p. 58) tells us that "this lemming has been several times recorded from this region, usually under the name *Arvicola hudsonius*."

W. E. Parry's party took specimens on Melville Island on June 13, 1920, which were "turning brown" (see Parry, 1821, p. 202).

Lyon (1824, p. 47) recorded this lemming from the region of Duke of York Bay, Southampton Island.

Skull Measurements of *Dicrostonyx rubricatus richardsoni* from Southampton Island.

MALES

Carnegie Mus. No.	Greatest Length	Basal Length	Palatal Length	Nasals medially	Zygom. Breadth	Interpal. Breadth	Mast. Breadth	Upper Molar Row Alveol.	Lower Molar Row Alveol.
6536 imm.	26	23	15.1	7.9	17.6	4	12.7	7.2	7
6548	29	26.6	17	8	20.1	4.4	14	7.8	6.9
6554	28.5	27	16.4	8.1	20	4.2	14.1	7.1	7
6563	28.3	....	16.1	8.1	19.4	4	13.6	7.4	7
6580	29.9	26.7	16.5	8	19	4.4	14.1	7.8	7.1
6589 imm.	26.8	24.7	15.7	8	17.9	4	13.4	7.7	7.1
6590	30	27	17.7	9	21.2	4.3	14.8	8.7	7.9
6596	30	26.4	16.6	8	20	4.5	14	7.6	7.2
6662 imm.	26	23.1	13.9	7.4	17.4	3.9	13.3	7.1	7
6665	27.9	26.1	15.9	7.8	19	4	13.9	7.3	7.1
6672 imm.	27	25.9	15	7.9	....	3.9	13.4	7.8	7
6683	28.6	26	15.6	8.2	19.1	4.4	14.2	7.8	7.3
Averages for 8 ad.	29.1	26.5	16.5	8.2	19.9	4.3	14.1	7.6	7.3

FEMALES

6526	29.2	27.7	16.1	8.3	20.4	4.2	14.1	7.9	7.1
6527 imm.	26.1	23.2	14.8	6.7	17	....	13.3	6.9	6.7
6541	28.9	27.5	16.2	8.2	20.3	4.3	14.1	7.8	6.9
6530	27.5	25	15.7	7.9	18.9	4	14	7.5	7.1
6551	28.8	26.5	16.1	8.6	19.8	4.3	13.8	7.3	7
6556	27.1	24	15.5	7.2	18	4	13	7.6	7
6573	28.1	25.1	15.7	7.9	18.7	3.9	13.4	7.1	7
6562	28.9	26.4	16.1	8.4	19.9	4.1	13.7	7.4	7
6622	30.3	28.9	17.5	8.9	21.6	4	14.4	7.9	7.6
6649	30	27.5	16.8	8	19.8	4	14.3	8.1	7.7
6653	31.1	28.4	17.2	9	....	4.8	14.9	7.9	7.5
6682	28	25.2	15.5	8	18.4	4	14	7	6.3
Averages for 12	28.7	26.3	16.1	8.1	19.3	4.1	14	7.5	7.1

James Clark Ross (1824, p. 93, Appendix) reported it from Port Bowen, Prince Regent Inlet, and obtained specimens from Boothia Felix (1835, p. xiv) where, he informs us, it was active throughout the winter.

Richardson (1829, p. 132) tells us that it is to be found throughout Melville Peninsula. Rae (1888, p. 144) states that lemmings (probably of this species) are sometimes to be found dead in great numbers along the shore where they have been washed up by the waves, victims of drowning either during some sort of migration, or when caught on the flats by the incoming tides.

Low (1906) does not mention either the present species or *Lemmus*.

Soper (1928, pp. 55-59) did not find this species on Baffin Island but gives us an extended discussion of *Dicrostonyx grænlandicus* (Traill). Kumlien's remarks (1879, p. 53) upon *Myodes torquatus* probably apply likewise to *D. grænlandicus*, as do Hantzsch's upon *Dicrostonyx hudsonius richardsoni* (1913, p. 150).

Mathiassen (1931, p. 27) simply says that "lemmings" are abundant on Southampton Island.

Mr. Ford told me that these "lemmings with the big claws" had always been common on Southampton Island, since his arrival there; and that he had also observed them on Coats Island.

Family LEPORIDÆ.

Genus LEPUS Linnæus.

12. *Lepus arcticus arcticus* (Ross). AMERICAN ARCTIC HARE.

(Plate VIII, figs. 1, 2)

Eskimo Name: Soper (1928, p. 59) gives the name in use in Baffin Island as *Ukaluk*, or "*Ukkulirk*, according to Hantzsch." The same name is in use among the Eskimos of Southampton Island, but I spelled it *Ookalik*, in all my field-notes. The etymology of the word is unknown to me. The first syllable is the same as that in the name of the willow (*Ookpik* or *Cokpuk*) and of the Snowy Owl (*Ookpikjuak*).

Status: The Arctic Hare is to be found all over the Island; but it is notably commoner in the higher country of the eastern part. Here the ridges offer shelter from the winter-storms. In the exposed places, which are wind-swept and the sheltered slopes where the drifts are not deep, food in the form of willow-twigs, mosses, and lichens may be found.

I saw but few signs of hares in the region of Cape Low. At Seahorse Point and along the southeastern coast the animals evidently were common. In the region of East Bay we saw a good many tracks during winter, but we found them most abundant along the southern slopes of the ridges and hills at Itiujuak, and along the shore in the vicinity of the head of South Bay.

The Eskimos told me that hares are sometimes very rare for several continuous seasons. Then suddenly they will be common again. During the winter of 1929-1930 hares were plentiful in the same region where foxes and lemmings were more than usually abundant, so I had opportunity to observe the creatures to good advantage from day to day.

Records: During the late summer of 1929 I saw but one hare. This was on August 24. It was in almost full summer-pelage, a soft blue-gray in color, save for the ears, which seen from behind, were whitish with black tips. The animal was startled from a little clump of willows which grew along the southern slope of a ridge about two miles east of the Post. It ran uphill to the crest of the ridge, bounding along deliberately, its ears held high. It disappeared behind a large stone, giving me the impression that it had stopped there. When I reached the spot, however, the hare was nowhere to be seen. I have no idea how it so completely evaded me, for the country was very open. Upon returning to the clump of willows, I found an ample form in a sheltered spot, where the animal had been resting. Some of the twigs nearby had been nipped off either by hares or by ptarmigans.

I spent considerable time during latter August searching for this animal, but had no success. I did not see a hare again until September 13, when I collected an immature male in the high country northwest of the Post. At about eleven o'clock in the morning, when I first saw it, it was feeding on moss or lichens in what appeared to be the bed of a small dried-up lake. When it perceived me, it stood up on its hind legs, beat the air rapidly with its front feet in what appeared to be a very characteristic manner, and bounced up and down slightly on its hind legs as if trying to get a better view of me. The eyes were a strange shade of yellowish brown, darkest along the outer edges, and the pupils were slightly oval, not perfectly circular. The face had the expression of a jack-rabbit, and the eyes were not very beautiful. The stomach was stuffed with well masticated lichens, moss, and the leaves and bark of willow. This animal was not blue-gray in color; it was decidedly whitish all over, though there was a clouding of brownish hairs covering the upper parts and two definite tufts of rather dark smoky gray hair on the upper part of the flanks. The animal must

have been about three-quarters grown. It is interesting that the change of pelage was thus taking place, even before full maturity had been attained.

On September 26 many tracks were seen in the light, new snow along the Anderson River, especially in the gorge. On September 30 Keetlapik secured two almost pure white individuals at Salmon Pond (Mathiassen's Darkness Lake), neither of which I had opportunity to preserve. On the following day, Keetlapik got a perfectly white one, a female.

On October 2 Jack Ford and I had an interesting time collecting a specimen. We were crossing a broad lake on the clear, not very thick ice. All at once, on the opposite side, along a ledge of dark rocks, we spied what appeared to be a rather brilliantly white patch of snow. We could not believe it to be a hare, and yet for some reason we kept our eyes on it, as we approached, and finally became really curious about it. The nearer we came the more certain we were that we were being fooled, yet we kept on, and finally when within about thirty feet of it we could see the long fur waving in the breeze. It was sitting in a very exposed position. When it jumped up, it waited not an instant to inspect us, but made off at great speed, bounding beautifully among the rocks to a distant ridge. We had to head it off in order to get a shot at it.

During the rest of October I continued to see a few hare-tracks every day, but did not see any animals. They were reported as abundant about Prairie Point and Munnimunnek Point, and the Eskimos shot one now and then for food at Native Point.

On November 2 I noted many trails north of the Post and observed places where the animals had uncovered the tops of willow-bushes. I also here and there observed droppings scattered about on the snow.

On November 9 I followed one animal for about three hours, observed its manner of doubling back on its trail, watched it scratching the snow back in exposing lichens on the faces of rocks, and noted that its color, in comparison with the somewhat bluish snow was a very pale, silken *yellow*. It was very wild. When I approached it, it would stand up high on its hind legs, flick its front feet or paddle them rapidly, then dash across a prairie, making for a distant ridge, where it would disappear over the crest; then, as a rule, double back on its own trail for from fifteen to thirty feet, leap off to one side, then make its way about the crevices among the boulders. Once the animal doubled back for a distance of three hundred yards, and when it leaped off to one side it made its way along the snowless crests of boulders and other open spaces so carefully that I lost the trail.

Trails observed on this date principally followed the ridges, and led about the larger boulders, where there were crevices, more than across the open prairies. In and about these crevices there were also a great many droppings.

On November 16 I saw two hares, both of them wild, and secured a fine large male, weighing 10 lbs., 9 oz. The eyes were yellowish brown and were large and staring while the animal was alive. The two animals seen were running rapidly across the frozen lakes. In securing the specimen I had to run along behind a ridge and surprise the animal as it ran toward me.

On November 18 one of my fox-traps was sprung by a hare, and I found hairs in the trap. Hare-tracks and droppings were to be seen all about. The animal may have been attracted by the odor of the bait, but I think it more likely that it had been curious about the mound of snow in which the trap was set, or about the human tracks which led about the ridge, which it frequented.

On our trip to East Bay in latter November and early December we saw very few hares or hare-tracks; but we might have seen more had we not been preoccupied in finding caribou.

On December 9 I saw innumerable tracks all about the head of South Bay and noted that one animal had nibbled at a piece of frozen fish, which I had used as bait at a fox-trap. On December 10 Jack Ford saw two feeding on willows at about sunset (early in the afternoon) in an open meadow. He secured the smaller of the two animals, and brought it to me. It weighed 7 lbs., 10 oz. The eyes were deep brown, rather than yellowish brown. It was not at all fat, but the stomach was well filled.

On December 11 I noted that, wherever I had made extensive excavations for lemmings, and had piled up great heaps of snow, there were always many hare-tracks on the following morning. This I took as evidence that the hares are decidedly nocturnal, even in winter, and that they are naturally either curious, or have such a keen sense of smell, that they know when their food-supply has been uncovered by such digging.

On December 14 I went out upon the rough harbor-ice to find a hare. Tracks led everywhere among the pinnacles and walls, and it was not always easy to follow a trail, as it led through narrow defiles, across thin shells of crust, down into depressions which the high tide had filled with water, and which steamed in the cold air. It was exceedingly difficult to find the hares. Once, after I had followed a trail for an hour or more, I decided the tracks were so fresh that the animal must be running ahead of me. Thereupon I mounted a high piece of ice and sat down, binocular in hand. I had but a moment to wait. Beyond the next ice-ridge, ambling along at an easy pace, was a hare. Now he sniffed at a piece of kelp, which clung to the ice, nibbled it daintily, and stood on his hind legs to watch me. When I moved he dashed over a chunk of ice nearby, made his way along a deep drift, and passed out of sight behind a pinnacle. I never got so near to him again. Another one I just happened to see as it crouched in the shelter of a chunk of ice, dozing in the sun, eyes only half open. I tried to slip up to this animal and surprise it, but it heard the crunching of snow and was off in a twinkling.

On December 15 Jack Ford shot a nice male weighing 10 lbs., 2 oz. On December 21 I secured a female, which weighed 7 lbs., 8 oz. It was not fat. On December 29 I caught a hare in one of my fox-traps. It had struggled fiercely to free itself, and was not in good enough condition to preserve. It weighed 7 lbs., 9 oz. On the following day Sam Ford caught one in one of his fox-traps, a small, dark-brown-eyed female, weighing about 7 lbs. Mr. Ford told me that he thought the dark-brown-eyed animals were young.

During early January there was a period of about ten days when we saw virtually no hare-tracks anywhere about the head of South Bay, in places where the animals had been numerous during the preceding weeks. The Eskimos told us that the *Ookalik* had migrated to some other part of the Island.

On January 9, however, we again saw a great many tracks about the caches of rotten fish and the oil-shed at the Post.

On January 12, just as I was starting without my gun to visit my long trap-line, I saw a hare crouched on a rock, apparently dozing in the shelter afforded by a low drift. When I approached the animal, it rose lazily, moved slowly away, and acted as if it wanted to return to its couch. Since hares were usually very wild, I was dumbfounded at its behavior. Thinking that I might be able to get the specimen, I went back to the Post to get my gun, and ran back as fast as I could, to find the creature only a few rods from the spot I had last seen it, dozing once more in the shelter of a little stone. Evidently this individual had had little experience with human beings, and I am of the belief that it had come down to the shore from the high country of the interior. The eyes of this individual were dark brown.

On January 21 I caught a large male animal, with dark brown eyes in one of the fox-

traps. When I came up to the captive animal, it tried desperately to get away, then gave itself over to the most pitiable wailing and screaming, a cry hoarser than that of a stricken Cottontail, but with the same similarity to a baby's crying. At this time a great many tracks were to be seen all over the ridges and at all the fox-traps.

During early February I noted that a great many trails appeared to follow or parallel each other, as if mating might be going on. Mr. Ford told me, however, that he thought mating usually took place during the bright days of March and April.

On February 8 Shookalook's dog-team gave chase to a hare at Seal Point, and almost caught it. The Eskimos do not approve of such chasings, for the dogs become so excited that they lose all restraint and may upset and damage the *komatik*.

On February 10 one was seen at the Post, running about among the buildings. When we called to it, it stood up on its hind legs, looked at us with a comically quizzical expression, its long ears widely separated and dropping carelessly.

On February 13 Jack Ford secured a large and very fat male not far from Seal Point. I spent a good deal of time following trails, and finally located a fine, big animal, resting on a rocky islet in the middle of a broad lake. When this animal took flight it ran straight across the lake, then upon reaching the shore turned sharply, and made its way toward the shore of the frozen bay. I had great difficulty seeing it as it ran in the snow. I had no great difficulty following it, however, for the tracks were obviously fresher than the others. If I called to the animal or whistled it usually stopped a moment to listen. Finally it gave up running here and there among the ice chunks and headed straight across the harbor.

During February the hares sprung a great many fox-traps. In fact, they were rather a nuisance. They seemed to have a predilection for blundering about the ridges, where I most wanted to capture foxes, and they either sprung the traps or broke the thin shell of snow above them, so that the foxes became suspicious. On February 20 I caught a female in a trap. It was not fat, and weighed about 7 lbs. On the following day I chased an animal about for an hour or so, and was much interested in its behavior. It did not run rapidly, but it always stayed out of the range of my shot-gun. It always made for the high places, where it would stop, stand on its hind legs and watch me as I labored across the valleys, where the snow was usually deep and progress unpleasantly slow.

During March I did not note any particular evidences of mating; none more definite than I had seen in February. The animals continued to be common all about the head of South Bay. We ate them frequently, and found their flesh delicious. On March 27 Sam Ford caught a large female in one of his fox-traps. This animal showed the slightest evidence of a change to summer-pelage. There was a noticeable darkening of the "vellum" in the region of the face and on all the feet. It was not fat. There were no embryos.

On April 1 Santiana shot a large male at Prairie Point. The gonads of this animal were greatly distended. Another male was secured the following day. I was much interested in the discussions of the Eskimos upon the sex of these animals. They informed me that *Ookalik* was the only animal they knew about, in which the *male* gave birth to the young. I was considerably impressed by this statement, and asked a good many questions about the matter. I am of the opinion that the external appearance of the sexual organs is so similar in both sexes that the Eskimos have come to the conclusion that the hare is hermaphroditic. And I must say that it was not an easy matter for me to set them straight upon the matter, for it was not always possible for me to state with certainty the sex of an animal just killed and not yet skinned.

During latter April Pumyook and Kyakjuak saw many hares in the high country border-

ing Fox Channel, northeast of the Post. On April 27 they shot a perfectly white animal, the "vellum" of which was not spotted with dark areas. During the period from April 24 to May 1, when we were at the floe near Native Point, we did not see any hare-tracks along the edge of the ice. Evidently the animals do not range far from the food-supply, which exists only on land.

I became best acquainted with the behavior of hares, when Tommy Bruce and I made our memorable trip to Itiujuk in an attempt to reach Fox Channel. Here on the rocky hill, especially along the crest of the hundred-foot cliff, hares were really abundant. On May 20 we must have seen twenty individuals and we shot three, all of them in white pelage, but with spotting on the "vellum." We found the animals in the highest places. Sometimes two individuals, probably mated pairs, were startled at the same time, and they invariably made their way up the rocky slope into places, which were most difficult of ascent.

On May 21 during the wild gale which enveloped the whole region in swirling sheets of snow, Tommy and I hunted hares on the ridge. It was an unforgettable experience. The wind was so fierce that we could scarcely stand upright when it struck us with full force, so we made our way along the sheltered places, picking our course among the rocks, and taking care not to step over the edges of the cliffs. We finally found it best to take separate courses, since it was so difficult to see ahead of us, that we did not know how many hares we were starting. When we hunted separately, hares began to appear everywhere. All the animals Tommy started eventually came running toward me, and the ones I started ran toward Tommy, and the hour was exciting. We got four specimens, all but one in pure white pelage, but all with much blotched "vellum." One individual, a male, had a definite area of gray fur showing all about the eyes, and the ears appeared to be changing color.

From this time on hares were seen only infrequently. I think they did not actually leave the country, but my interests centered chiefly in the returning birds, and I did not spend much time with the mammals. On June 13 several particolored individuals were seen in the region of Itiujuk and Itiuchuk. These were white with broad blotches of blue-gray.

I never saw the nest or young of a hare. Mr. Ford told me that he had several times seen young, and had found one nest, in mid-June, containing six small young. This nest was situated in a fissure between rocks along a rather high ridge not far from the northern shore of South Bay. The Eskimos told me that they had found nests containing as many as eight young, and that one of the best-known breeding-grounds was the island near East Bay known as Tooktootok.

Annual Cycle of Activities: The Arctic Hare of Southampton apparently always changes its color with the seasons. In late summer it loses its blue-gray coat, becoming white first on the underparts, retaining a brown area down the middle of the back until about the time the first deep snows have fallen. In full winter-coat, it is handsome silken white, with yellowish gloss, save for the black tips of the ears.

In winter, as in summer, it prefers to inhabit the higher places, especially the rocky ridges, where it finds shelter; as well as slopes, where it may feed on lichens, which grow on the faces of the exposed rocks, or where it may dig for willow-twigs or for moss. I think the animals paw away the snow with their front feet only, but I am not certain of this. They feed rather erratically, digging in one place for a while, then passing on to another, long before they have exhausted the supply of lichens or willow-twigs in the one area, from which the snow has been pawed. They are curious, for they follow a man's trail sometimes for miles, perhaps partly to nibble at the willow-twigs his deep foot-prints have exposed, but chiefly, I think, merely because they are interested. Every night they wander widely, going

about the fox-traps, which have been set, following the latest komatik-trails, wandering about the buildings of the Post, and paying especial attention to recent diggings of any sort in the snow.

During the day they usually rest most of the time, and it may be that they even sleep. On bright days they sometimes sun themselves, especially among the rough ice along the edge of the frozen salt-water. They are usually unsuspicious, if they have had little experience with man; but after they have been hunted, they become very wary, and will run off to great distances at amazing speed.

Mating probably takes place in early spring, in March or April, perhaps earlier, and very likely when the days begin to become long, bright, and warm. Whether the animals are polygamous I cannot say. The change of pelage takes place in latter April, May, and June. The areas first affected in this change are the face and feet. The inside of the skin is considerably blotched with gray some time before the outer appearance of the animal changes at all.

The young, which probably number from four to eight, are born in latter June or July. It is likely that but one brood is reared during the season. The nest is to be found among the rocks in rather high places, sometimes on offshore islands. According to Mr. Ford, it is usually placed under or between rocks, in a well sheltered place, and is lined with dry grass, moss, and a considerable quantity of the fur of the mother.

The principal enemy of the hare, so far as I could see during the winter of 1929-1930, was the Eskimo. Not that the Eskimo pursues the hare for its fur, flesh, or bones, but that he captures so many in his fox-traps. I did not once find the remains of hares in the numerous pellets of Snowy Owls I examined, nor did I find any evidence of the capture of hares by foxes or wolves. The abundance of lemmings probably had an effect upon the situation. During years when lemmings are scarce, the fox, owl, and wolf probably prey upon hares, whenever opportunity offers. So far as I noted, the Husky dogs never capture hares, though they sometimes give chase, and if they learn to make the rounds of the fox-traps they eat whatever they find there.

The Eskimos use *Ookalik's* pelt as a towel. They use small wads of the soft fur to plug the ends of their rifles on their long komatik-journeys. But they do not use it, in any way, so far as I could learn, in their clothing. The skin is, of course, very tender, and the fur delicate and easily destroyed. Many of the Eskimo's delightful tales have to do with the character, troubles, and behavior of *Ookalik*, the hare.

Taxonomic Remarks: In a discussion of the affinities of the Arctic Hares collected on Southampton Island it will be necessary to review Rhoads' (1896) key for separating *arcticus* from *L. grœnlandicus*. Rhoads has pointed out the following diagnostic characters for *arcticus*:

- a. Upper incisors rooted on the inferior bases of the premaxillaries. Diameter of upper incisor wider than deep, its face strongly and broadly grooved.
- b. Upper and lower incisors strongly and regularly curved, meeting within the arc of a circle mutually described by their exposed outer surfaces.
- c. Total length of skull never exceeding 100 mm.; molars narrow and rounded.

For *grœnlandicus*:

- a. Jaws prognathous; upper and lower incisors meeting at angles of 35 to 50 degrees. Upper incisors rooted on the anterior floor of the maxillary. Diameter of upper incisor deeper than wide, its slender sulcus filled with a functional indurated cementum approaching the consistency of enamelled dentine at the cutting edge.

- b. Molars broad and angular, very massive as compared with slender incisors.
- c. Total length of skull exceeding 100 mm.

Through the courtesy of the U. S. National Museum and the American Museum of Natural History we have been able to secure eight skulls of *L. grænlandicus*, four skulls of *L. arcticus arcticus* and six skulls of *L. arcticus canus*. Together with thirteen skulls and skins of arctic hares from Southampton Island, this gives us a series of thirty-one skulls and thirteen skins, a large enough series to bring out certain observations, which appear pertinent regarding the relationships of these animals.

We find no striking differences in the skulls of *L. arcticus* and *L. grænlandicus*. This conclusion seems surprising, perhaps, in view of the fact that various writers such as Rhoads, Nelson, and others, have stressed the difference in no uncertain terms. The angle of meeting of the upper and lower incisors is similar in the two species. In a Southampton Island hare, Carnegie Mus. No. 6566, and a Greenland animal, U. S. National Museum, No. 114,849, the angles are approximately the same. Not only in these individuals, but throughout the series, the angle approximates the same degree in both species. The Southampton hares, for the most part, have the large upper incisors rooted on the anterior floor part of the maxillary, a character supposedly restricted to *L. grænlandicus*.

FIG. 4 Lateral view of left facial bones of an adult male of *Lepus arcticus arcticus*, Southampton Island. Portions of the premaxillary and anterior of maxillary have been filed away to show origin of anterior incisor from anterior floor of maxillary. Slightly enlarged. (Carn. Mus. No. 6566.)

The condition of the sulcus on the upper incisors is, perhaps, the most striking characteristic of the Southampton specimens. This groove is filled with an indurated cementum, so that the sulcus is completely obliterated as a groove, and is apparent only as a broad yellowish streak, set off sharply from the white of the rest of the incisor. Rhoads has stressed this as being an outstanding characteristic of *grænlandicus*. Indeed, a specimen from the head of Woodland Bay (American Museum, No. 15,606) labelled as *grænlandicus* is not nearly as well marked in this respect as the Southampton animals.

The one point which Rhoads has brought out, which separates the Greenland form from

the *arcticus*-group, appears in the relative ratio of the depth and width of the anterior upper incisors. In *grænlandicus* these incisors are deeper than wide, while in *arcticus* the reverse is true. This holds for all our specimens, as does the length of the skull, none of the Southampton Island hares measuring over 98 mm.

The molars are essentially alike in *grænlandicus* and *arcticus*, despite the statement of Rhoads that the latter has narrow rounded cheek teeth, while the Greenland hare has broad angular molars.

The zygomatic process of the maxillary is broader in *Lepus arcticus* than in *Lepus grænlandicus*. Other characteristics, such as the falling short of the premaxillary process at the base of the nasals, the position of the incisive foramina, shape of nasals, and the length of the bony palate, are essentially the same for *arcticus* and *grænlandicus*.

Unfortunately, with one exception, all our Southampton skins are in the white winter-dress. This exception is a young individual, judging by the size of the skull. It is in the white pelage but numerous gray hairs are to be seen throughout the dorsum. On either side of the rump there appears the last remnant of the summer-pelage, a distinct brownish fur, so colored even to the base, though the hair-tips are grayish. This summer color may be due to the immaturity of the animal, or to the definite brownish tinge of the average summer-coat.

The claws of the Southampton animals are strong and well adapted for digging through the snow, measuring as much as sixteen millimeters.

The skulls of two individuals, Carnegie Museum, Nos. 6468 and 6469, are very unlike the other skulls of hares from Southampton, the upper incisors being strongly curved downward and having a well defined sulcus. These may be immature individuals, but ossification is as complete as in the other individuals, and externally the animals appear like other adult specimens of *Lepus arcticus*.

Winge (1902) does not specifically distinguish the American or European Arctic hares from the Greenland animal.

After a consideration of the above characters we cannot hold with Barrett-Hamilton (1911) that this species is worthy of the rank of a subgenus. This writer has suggested the name *Boreolepus*, based especially on the protruding premaxillary region and large, slightly curved upper anterior incisors, which stand out clear of the skull, when viewed from above. We have discussed this point and have attempted to show that the prognathous condition is shared in common by specimens from Greenland and Southampton Island. It seems to us that *grænlandicus* may be found to intergrade with *arcticus*, more especially in that part of the range of the two animals which lies between Ellesmere Land and Southampton Island. To settle this question, it will be necessary to secure a series of hares from Cockburn Land and the islands lying about Melville Sound.

External Measurements of *Lepus arcticus* from Southampton Island

The external measurements of eleven adult hares are as follows: Total length, 592 (540-643); tail, 69.5 (65-76); hind foot, 154 (144-164). There seems to be little difference in the external measurements of the males and females.

Other Records: The Arctic Hare is not mentioned by many of the earlier writers. *Lepus arcticus* was originally described by James Clark Ross (see Allen and Copeland, 1924, p. 11) from specimens taken somewhere to the southward of Cape Bowen, northwestern Baffin Island. Ross (1826, p. 93) records the occurrence of the animal about Port Bowen. An early reference to the hare (perhaps not the present species, but assuredly a hare) is to be found

Skull Measurements of adult *Lepus arcticus* from Southampton Island.

Carnegie Museum No.	Greatest Length	Greatest Brdth.	Diag. Lgth. Nasals	Greatest Brdth. Nasals	Alveolar width upper Incisors	Alveolar length upper Molars	Greatest length of Mandible	Greatest brdth. of Mandible
6471 ♂	95	48	40	21.5	8	18	72	46
6476 ♂	95	48.5	41	19.2	8	17.5	73.5	47
6474 ♂	91.5	49	38.7	21	7.5	18.2	68	46.5
6479 ♂	94	48.3	37	19.1	8.1	18	66.1	43
6481 ♂	95.5	48	39	20.8	7.8	18	66.3	44.8
6490 ♀	95.2	48.1	38.1	20	8	18	67.5	47.7
6509 ♂	95.3	49.5	40	21.5	8	18	68	45
6566 ♂	97.3	48.2	41	21.8	8	17.8	69.5	46.6
6631 ♀	96.2	49.5	40	20.5	8	18.2	68.7	48
6678 ♂	96.6	49	40.3	19	8.7	18.1	69.5	47.7
Average	95.1	48.6	39.4	20	8	18.1	69.2	46.1

in the Observations of Captain Middleton, who speaks of the change of pelage of the animal during the different seasons (1852, p. 128).

Preble (1902, pp. 59-61) describes *Lepus arcticus canus* in his paper, and says, further: "These fine hares occur sparingly in summer throughout the Barren Grounds from Fort Churchill northward. A few breed near Fort Churchill, and one was obtained there August 12. In winter they migrate to a slight extent, reaching the neighborhood of York Factory and perhaps farther."

Low (1906, pp. 125-128) mentions hares briefly, speaking of the vegetation upon which the animals feed.

Soper (1928, pp. 59-63) gives us a full account of the hare. He tells us that "no animal is more characteristic of the barren mountain slopes of Baffin island. . ."

Munn (1919) does not mention the species. Comer, in a personal letter says the animal was common in the high country back from Cape Low, but not along the coast proper. Mr. Ford told me that the animals were common both on Southampton and Coats Islands during his stay there. Strangely enough, Mathiassen (1931, p. 27) does not mention this species among the terrestrial mammals of the Island.

Order ARTIODACTYLA.

Family CERVIDÆ.

Genus RANGIFER Hamilton-Smith.

13. *Rangifer arcticus arcticus* (Richardson). BARREN-GROUND CARIBOU.

(Plate VIII, fig. 4)

Eskimo Name: I wrote the name of this well-known animal down as *Tooktoo*. Soper (1928, p. 63) gives us "*Tuktoo*; *Tuktu*, according to Hantzsch." The etymology of this word is unknown to me. It probably describes the antlers in some way, for the Eskimo word for *tusk*, *tooghak*, has a somewhat similar sound, as if the two words *Tooktoo* and *tooghak* might have similar roots.

Status: The Barren-Grounds Caribou was once a very abundant animal apparently all over Southampton Island. At the present time it appears to have disappeared almost altogether from the southern part and to be restricted principally to the region of the high country between East Bay and Duke of York Bay, and to the more or less unknown country inland from the coast and north of Cape Kendall. The caribou is sporadically migratory, and it may be that the abundance of the animals in former years throughout much of the southern part was largely the result of these migrations. Its wanderings are prompted, no

doubt, by scarcity of food; and of late there may have been little occasion for the animals to leave the range which they appear now to be inhabiting.

The caribou to my way of thinking is one of the most important Arctic mammals from the standpoint of the Eskimo. This is largely because the most comfortable (in fact one might say the *only* comfortable) winter-clothing is made from the skins of the caribou. The flesh of the caribou is highly palatable; but the Eskimos could live on seal-meat without difficulty, providing they are clothed well for their trapping, travelling, and hunting in the winter.

Records: Captain John Murray told me that when he first came to Southampton Island in 1902, he found caribou abundant in the region of Cape Low. His party had an abundance of meat and skins for clothing, sleeping-bags, and so forth. Captain Comer also found the animals common almost wherever he went on the Island. Captain Munn and his party must have procured a good many caribou, judging by the remains of the animals to be seen about the site of his headquarters at Seal Point.

According to the diaries of the Post at Coral Inlet, and the personal accounts of Mr. Ford, caribou must have been amazingly abundant about the head of South Bay during 1924. Under date of November 27, 1924, a note in the diary tells us there were "hundreds of deer" about the Post, and that they were seen in great numbers "daily." A great many animals were killed at this time, so many that there were great heaps of skins lying about everywhere. There were so many skins, in fact, that some of them were not well cared for, and decayed.

During the following year, there was a decrease in the numbers of caribou in this region, though a good many were killed. The diary gives us a good many notes on the numbers killed by the various hunters from day to day. During 1926, it was apparently necessary to go even farther afield to find the "deer." On October 31, 1926, John Bull killed thirteen of the animals at a point about forty miles north of the Post. In my gleanings from the diaries, I find little reference to caribou among the notes referring to 1927. On May 10, 1928, however, Amaulik Audlanat and Santiana killed ten caribou in the Duke of York Bay country. On January 4, 1929, two were seen near the Post. Three days later, Amaulik killed three not far from Poorhouse Hill. Thus, it appears, that during recent years not many caribou have been seen at the head of South Bay.

I had little difficulty in perceiving, when first I reached Southampton, that the caribou was a well known and important animal. Many of the natives, even in relatively warm, summer weather had garments either wholly or partly made of caribou-skin. There was much talk about the scarcity of the animals in summer, and of the difficulty of getting any summer skins from which the best winter clothing could be made. The best sleeping-bag at the Post had been made out of three winter caribou skins. At Seal Point, near the site of Captain Munn's former headquarters, I found quantities of caribou bones, including some skulls with perfect antlers attached which I was prompted to preserve. Mr. Ford regaled me with stories of the hunts they had had in former years on the very ground where the Post now stands. Evidently caribou had once been as common as lemmings and as unsuspicious as cows all through that section; but they were gone now, and the Eskimos were having grave difficulties in finding material for their winter clothing.

I first saw caribou tracks near our camp at Four Rivers on August 27; the animal had evidently come down to the shore from the Noovoodlik region, inland. The tracks were not fresh. I thought I saw the spoor of a somewhat younger, or at least smaller animal, also.

One of the Eskimo words for the month of September is *Akudligut*,—"the time when the

caribou winter-hair is half-grown." It is at this time that the animal takes on a whiter appearance than in summer. The antlers are fairly well grown, and the velvet is being rubbed off those which have fully formed and hardened. The antlers of the males are said to be better developed at this time than those of the females. At this time, too, migrations of a local character are undertaken by some animals, deliberate exodes from the summer-range to somewhat more sheltered country, where food may be found in winter. On Southampton Island, according to the Eskimos, these migrations are never extensive.

On September 3 at Cape Low, I found several caribou bones at the side of a lake, and examined some tracks along the margin of a small, mud-edged pool. These tracks, which were apparently those of a cow and calf, were fresh. There were also some droppings. I was surprised at the roundness and the small size of these. They reminded me of hare-droppings. On September 4 I found an almost complete skeleton at Four Rivers.

One of the Eskimo names for the month of October is *Nooliakvik*, "the time when the caribou breed." At this time the antlers of the males are fully formed and for the most part polished bare of the velvet. The males are said to fight desperately.²³ The antlers of the females, while fully formed, may, however, yet have the covering of velvet. Most of the winter-coat of creamy-white or gray-white hair has been assumed by both males and females. The animals are now generally speaking on their winter-range.

On October 5 some of the Eskimos, who had gone to Cape Low and were returning along the coast, saw four caribou not far from the "ice bank" at the head of Bear Cove, and shot one of them. I later learned that this was a young female.

During my rambles about the Post I was constantly coming upon caribou remains of one sort or another; antlers which had been used for anchoring fox-traps, or as shelves, or pegs in *igloos*.

On October 17 one of the Eskimos who had just come in from the district of Cape Low reported seeing four caribou not far from the mouth of the Kirchhoffer River, and told us that at Cape Kendall two *Tooktoo* had been killed. All in all, the Eskimos were rather discouraged at this time over the prospects of finding any caribou for winter consumption.

On October 20 Amaulik Audlanat shot a large male in the country just north of East Bay. The animal had a magnificent spread of antlers. Amaulik and his companions saw the tracks of at least five more animals, but this little band were being chased by wolves, so the hunters felt it inadvisable to try to trail them down. Some of the caribou meat was brought back for us to eat, and I found it delicious. At first I thought it would be difficult to eat raw, frozen *Tooktoo*, as the Eskimos ate it. But after a few meals I became very fond of it, would eat quantities of it, and eventually learned to like it quite as well as the cooked meat. The best meal of all, to my way of thinking, was a combination of the two sorts of meat—some of it fried, preferably in bacon grease, and some of it frozen solid.

On October 25 Tapatai reported that he had seen the tracks of three large caribou not far from Darkness Lake.

On October 30 other reports came to us of caribou sighted in the region north of Cape Kendall. At this date I took home some of the skulls I had found near Captain Munn's old headquarters at Seal Point.

On November 1 Shookalook returned from the Duke of York Bay region, exciting us all by his reports of many caribou. He had killed thirteen fine animals, and had brought us as proof the thirteen tongues and many of the skins. There was much rejoicing and talk every-

²³I never talked with an Eskimo, who had seen "Locked antlers"; but some of the Eskimos said that they had heard of them.

where of organizing caribou-hunts. On the same date Sheeloo killed four caribou in the region at the head of Koodlootok River, not very far from the Post. All the Eskimos who told us of seeing caribou reported also that wolf-tracks were to be seen with the caribou-tracks, and that the *Tooktoo* were constantly on the move trying to escape their ancient enemies.

During early November we had caribou-meat to eat practically every day. I never tired of it. Finally I learned to like the *Toonuk*, or fat, and the marrow of the bones, quite as much as did the Eskimos. The sounds of a caribou feast were always interesting to me. Here one Eskimo was cracking bones with a chunk of rock or a hammer, picking out the bits of frozen marrow; there another Eskimo was hacking off slabs of frozen flesh and smacking his lips in anticipation; there were sounds of licking of fingers, low groans of happy satisfaction, comments on the hunts of olden times. Great fun we had at our *Tooktoo* banquets!

During latter November I went on my first caribou hunt. We established camp at East Bay. I did the best I could at keeping accurate notes, though the cold made me miserable, and there was so much to do at times, that I thought I could never keep pace with events. On November 24, in the morning, we saw the first caribou-tracks. There were many of them all along the edges of and leading across the frozen lakes. We judged there must have been from twenty to thirty animals in the herd. The tracks were not fresh. We saw wolf-tracks among them. Later in the day we crossed the trail of eight animals which had been walking about feeding and not being chased by wolves. This was more encouraging. I measured the tracks and found them to be about eighteen inches apart. Some of the foot-prints definitely showed the marks of the cloven hoofs, others did not. In areas where the animals had been feeding, there were long double furrows where the front feet had been used to scrape the snow away from the moss and lichens. In places where these "diggings" were fresh, it was possible to follow the stroke of the foot from the point at which the two hooves were together to a point where they were two or more inches apart.

On November 25 we made our first visit to Tooktootok Island. The channel between this island and Southampton proper was frozen firmly, though the ice was very rough; but the waters of Fox Channel beyond the island were open and steaming in the cold air. Along the western side of this island caribou-tracks were to be seen everywhere. Evidently all the animals were headed toward the bigger island, for all tracks led northwestward and all were parallel to each other. Eventually I trailed the herd almost to the northernmost extremity of the island, where I found that the tracks led out across the ice to the larger Island. Everywhere along the broad trail were diggings and scrapings where the animals had been feeding. There were innumerable droppings everywhere, also, scattered about on and partly buried by the snow. I saw no wolf-tracks anywhere. Many of the tracks were of small animals. On the following day we encountered many more tracks, some of them fresh, but saw no caribou. We decided there must be several small herds in the region.

On this date I examined a pair of antlers taken from an animal killed about a week before in the same region (November 17). The antlers had on them no trace of the velvet. When I asked my companions as to how the caribou rid himself of this velvet they went through the movements of scraping their heads on the ground, leaving me with the impression that the velvet is scraped off on the rocks, and perhaps to some extent on the willow-bushes.

On November 27 at about noon, we knew from the behavior of the dogs that we were near a band of caribou. We were at this time in rough country, among imposing rocky hills. To our right, as we moved northward we could see the dull blue of Fox Channel; to our left extended the gray and purple monotony of hill, snow-bank, and frozen lake. The

dogs were eager, for they were hungry. As we rattled across a broad lake, one of the dogs suddenly gave a cry of excitement, the team turned so abruptly that I was thrown off the *komatik*, and away they raced as if pursued by demons. I tried to catch up with them, but it was utterly useless. Amaulik was powerless to stop them, for they had caught a direct scent of *Tooktoo*. Finally, by the time they were about two miles away, they had worn their fresh ardor down to such an extent that they could be stopped. When I caught up with them they were placid enough, lying in the snow, the *komatik* braced against a rock, the traces so twined about the rock that it would not be possible for them to dash away. The direction of the *komatik* tracks told us exactly what course to follow in reaching our quarry. We made our way toward Fox Channel, mounting the hills which gradually became bolder, threading our way along ledges, sliding down snow-banks, all the time trying to keep as quiet as possible. Finally we were on the last hill. Fox Channel lay at our feet. We had swung a little to the left of the direction we had first taken, and had missed the herd. We now made our way a little to the southward along the shore, and soon found ourselves on the rim of a small, high valley, surrounded by rocky knobs and ridges. There, on one of the lower slopes, their heads, ears and broad antlers silhouetted against the snow, were ten Barren-grounds Caribou, the first I had ever seen. We dropped to hands and knees immediately, slowly withdrew, and made an attempt to approach them closer by circling the rim of hills. But we had somehow made a false move; we had been too bold. The animals had heard, seen, or scented us, for when we again reached an eminence and peered cautiously over, they were fully two miles away, standing nervously in the middle of a plateau a considerable distance inland. They were not running; but the moment we rose they bolted. There followed one of the wildest, most tiring, and what appeared to be the silliest chases in which I ever participated. We actually *ran* after those caribou straight across the tundra, toiling like thrashing machines, soaking wet with perspiration. The caribou ran for a short way, of course, then rested while they calmly surveyed their pursuers. Finally we three hunters separated. By running down an incline and creeping up a ridge I had one memorable view of the creatures as they looked about. The largest male, evidently a sort of patriarch, was plainly the most concerned of all. He was ceaselessly on the alert, looking this way and that, throwing his ears forward and backward and sniffing the air. I was amazed to see him stand high on his hind legs like a hare and prance about while he surveyed his domain the more carefully, his ponderous antlers nimbly carried. With my glass I could see that patches of velvet still clung to his antlers.

When we three hunters came together again, it was decided that Amaulik should pursue the "deer" and Muckik and I remain more or less in an exposed position so as to attract their attention. I was glad enough to fall in with this plan, though I wished my clothes were dry. I examined some of the caribou-tracks and found many of them to be about twelve feet apart. The animals were merely loping at the time these tracks had been made. Here and there were pawings in the snow where they had been feeding now and then, as they fled. Two of the animals were much smaller than the rest, and there was only one really large bull.

Muckik and I drove the dog-teams back to the *igloo*; about an hour after dark, Amaulik came home, and rapped four times with a stick on the outside of the *igloo*. Muckik let out a delighted cry and I knew something pleasant had happened. The four rappings had meant that Amaulik had shot four of the caribou; and among the four was the big bull.

We went back to the carcasses as soon as we could, and skinned them out. We were not too prompt about this, for the foxes already were gathering. The largest male animal was very fine, though he was not old. The smallest of the four was a young male with antlers

completely covered with velvet. This velvet was almost black, with a few longer, whitish hairs here and there. The other two were fair-sized females.

The stomachs were all well filled with various sorts of vegetable matter—lichens, moss, willow-twigs, and grass. The Eskimos were eager to eat some of this as a sort of salad; I tried to join them but could not stomach it. I think my imagination was too good.

The pelage of the animals was not yet quite that of the dead of winter, though it was decidedly whitish. The large male was the whitest of all.

I was thrilled with this, my first caribou-hunt. As I went to sleep in my caribou-skin sleeping bag that night I thought again and again of the wild beauty of the scenes I had witnessed that day, of the big male caribou as he pranced about on his hind legs, of the coughing and abortive bawling I had heard the animals give as they prepared for flight, of the way in which they pawed in the snow for their food.

When I perceived that the big male had rid himself of the velvet on his antlers whereas the young male had not, I decided that either the big male had done more fighting and had consequently worn the covering off, or the young male was not yet of full maturity and was not therefore especially interested in making his antlers the keenest weapons possible. I asked the Eskimos about the matter, and they told me that only the old males mated as a rule; that one old male sometimes had as many as ten or more females in his flock; and that the young males battled among themselves for supremacy over such herds as they could muster together.

We did not have opportunity to hunt caribou any more on this trip for the weather turned bad and we could not get out, so we returned to the Post, where I proceeded to skin out the ears and noses of such specimens as I had decided to keep. In skinning out the feet of the large male I noted that cushions of fat extended down to the very hoofs, particularly between the two front toes, and that between these toes there was an extra sort of wad of long hair growing apparently from a special pouch of skin. Just what these were I cannot say, but presume they were scent-glands. Caton (1877) has pointed out that the Woodland Caribou and Reindeer have, deep between the toes, a curious gland that exudes an unctuous substance. This is probably part of a system of scent signals, as Seton (1909) suggests.

I noticed that on the inside of the skin of these caribou there were many oval protuberances. Upon examining these I found that each contained a small white grub, evidently the larva of some sort of fly. When I showed some of these to Mr. Ford, he told me that by spring these grubs would become almost as large as the end of a man's thumb, and that, upon reaching this stage, they would emerge from the skin, crawl out through the hair and fly away, to find a mate, and to fertilize, or lay eggs, before the coming of the fall. He also told me that another sort of "worm" infested the throat of "deer" especially in the months of April and May, and that, if a Husky dog ate one of these worms by mistake, the dog would die.²⁴

It is said that the antlers of the males at least usually drop off in December and January. Mating has been consummated by this time of course. The females, however, may retain their antlers much later. It is during the dead of winter that the animals are faced with their most difficult vital problems. Now they have to find food under the snow. Now they must flee from the wolves, which pursue them in packs. It is said that so long as the caribou can keep in a close-knit band they are safe from the wolves; but that once one of their number strays away and is cut off it is quickly surrounded and killed. One of the Eskimos told me of seeing three wolves attack and kill a caribou. Apparently they slashed

²⁴I was able to preserve a great many of the bot-fly larvæ found on the inside of the skin. But I never saw one of the throat "worms," about which Mr. Ford told me.

at the hind-legs until the unfortunate creature was ham-strung, and thereafter its doom was swift. When a band of caribou are attacked by wolves, they are said to form a circle, antlers out, and the smaller animals inside. Their behavior at such times is apparently similar to that of musk-oxen.

During the winter the Eskimos killed a good many caribou in the country bordering Fox Channel. On March 11 Amaulik Audlanat and his party brought nine caribou in to the Post, two of which, an adult female and a year-old female, he saved as specimens for me.

He brought back also an embryonic young, perhaps half the size of the new-born young.

When Jack Ford saw this embryo, he told me some of his earlier experiences with the Eskimos in hunting caribou. He had once been with them when they killed several females carrying fœtuses. This was in December, 1926. The embryos were quite small, only about four inches long. The Eskimos refused to touch them, calling them *Iddlauk*. They apparently had a superstitious fear of them. Nowadays this superstition has apparently disappeared, for the Eskimos use the red-haired pelt of the embryonic young in making gloves and mits and in other ways.

When opportunity offered, I gave final attention to preserving the skins of the specimens Amaulik had got for me and brought in on March 11. I found the hair of the young animal to be much softer and less brittle than in the adults. The antlers of this specimen were still altogether in the velvet, though the antlers themselves appeared to be firm and the hair quite dry. The adult female (which had carried an embryo) was in excellent condition. There were only a few bot-fly larvæ in the region of her rump.

On March 25, near Darkness Lake, Amaulik and his party shot eight more caribou. Seven of these had lost their antlers. This surprised me very much for I somehow had expected the dropping of the antlers to accompany the coming of the spring. By this time, of course, all courting, fighting, and mating were over; for the mature females were all gravid; so the excuse for antlers was past, for the most part. This, it appears to me, is abundant proof that the antlers are far more significant as implements of war-fare among the caribou themselves than as a means of protection. If their primary purpose is that of protection, why would not the females at least keep the antlers until the young are well developed, and more or less able to care for themselves. Amaulik told me that the antlers nearly always drop off in January or February. He said they sometimes drop off before the velvet has completely disappeared, and that, as the time for the shedding of the antlers approaches, the animals show signs of wanting to be rid of them, trying to break them off by pushing them against rocks.

The new antlers begin to appear in the males in March and April, sometimes earlier. Development of these is said to be very rapid. No fighting occurs at this time, for the antlers are delicate and sensitive. About this time, the females are likely to begin wandering off by themselves, to some solitude where they may give birth to their calves.

On April 20 Kooshooak and Santiana returned from a caribou-hunt in the region of the head of the Koodloutok River. They got three animals, two males and a female, all rather small-sized. They saw the tracks of several others.

On April 26 Tapatai (whose real name was said to be Pitautuk) killed five caribou, all females, only about fifteen miles northwest of the Post. Four of these animals were carrying embryos, but I got no definite information as to the size of these. They must have been almost ready to be born. The animal without an embryo, probably a last year's young, still had antlers on its head and these were fully covered with velvet.

It is said by some that the month of May is called *Nukalliut* by certain Eskimo tribes,

signifying the "time when the young caribou are born." I am not sure that this is the case in Southampton Island as a rule, and according to Soper (1928, p. 72) it must not be so in Baffin Island. During May the antlers continue to shoot out and up, and the moult of the winter hair probably begins.

On May 29 in the region just south of Duke of York Bay, Shookalook and Santiana killed five caribou, a male and four females, and Santiana found a newly born young lying on the tundra, which he brought to me as a specimen. This individual measured 620 mm. over all. It was very handsomely spotted with white, the hair in general being of dark red-brown shade, much richer than in the adults.

With the coming of summer, the winter hair drops off in patches, sometimes disappearing very rapidly, and is supplanted by a softer, somewhat less brittle, darker coat, which is very popular among the Aivilikmiut for making the winter *kooletahs* and trousers. The month of July is called *Shuguliut*, sometimes, in recognition of the fact that the caribou-hair is shortest at that time. It is at this period that the animals are bothered by the mosquitoes and other insect pests. They are said to frequent the water so that they may plunge in and rid themselves of the swarms of flies.

I had many conversations with Mr. Ford and with Amaulik Audlanat as to the habits of these fine mammals. Evidently many of them bring forth their young on the island known as Tooktootok, and either walk across the ice to Southampton or swim across the channel when the young are of the proper age. Only one young is born as a rule, though two have been known. The young are born in the latter part of May, or during the first ten days of June. Young animals have antlers by the early fall, and both males and females bear them, though the antlers of the female are smaller.

Amaulik told me that the Eskimos were very fond of the *toonuk* (fat), the marrow, the eyes, the stomach contents, and the flesh in general for food. The velvet of the antlers is used chiefly for decorations²⁵ or for charms. The hooves are not used for anything in particular; but the antlers are used for shovels, trap-fasteners, knife-handles, and so forth, and the sinews, especially those of the back, are valued highly as thread. This thread is known as *eevaloo*. Thread may be made of the sinews of the legs, but the back sinews are best. The skins are used in many ways, for clothing, decoratively, and so forth. Eskimo drums were once made of caribou-skin tightly stretched across a hoop or its equivalent.

The skin in summer is thicker and the hair softer than in winter. The hair of caribou is variously used. It is sometimes stuffed in little wads into the Eskimos' nostrils to keep these from freezing, or into the muzzles of rifles to keep the snow out on long trips. The white-haired skin of the underparts of the animals is used decoratively. The skin of the legs and ankles is used extensively in making small boots, inside boot-feet, and mits. The antlers were once extensively used in making fish-spears, snow-knives (*panas*), harpoon-heads, barbs, and so on. Slender sesamoid bones are used for knitting-needles. Boot-scrapers are made out of the big bones of the fore-leg. The flat shoulder-blades are used as snow-scrapers, and also to clean the faecal matter from the hoods on the skin-mattresses where the Eskimo babies are kept. The gristle of the ear and the intestines are eaten with relish. The teeth are used ornamentally. The skins are pleasant to work with, because they are soft, and the blood comes off the hair easily. If the Eskimos kill a great many

²⁵The hood of my own very handsome *kooletah* was decorated with two strange little wisps of "velvet" from caribou antlers, dried into the shape of small, simple antlers; these were placed near the peak of the hood on either side, and are not noticeable save on close inspection.

caribou they may cut the flesh up into strips and dry it during the summer. But they prefer to keep it frozen for winter use if they can.

Mr. Ford told me that good-sized, full grown male caribou, ready for eating, minus their skin, legs, and head and paunch weighed, according to his experiences, from 120 to 150 pounds. I never had opportunity to record any accurate weights before the animals were cut up.

Taxonomic Remarks: As has been noted elsewhere in the present paper, Comer (1910, p. 86) has stated that "the Southampton caribou differ in size somewhat from those of the mainland" and "the species, therefore, remains to be described." Other writers, notably Mathiassen (1931, p. 27) have called attention to Comer's statement and Mathiassen has corroborated it to a certain extent, saying that "it is confirmed by the Eskimos." He further states that "the difference is not conspicuous."

One of the senior author's principal labors during the winter of 1929-1930 was the procuring and preserving of some caribou specimens upon which taxonomic studies might be made. A fair-sized and representative series was obtained, including one complete adult male and the antlered skulls (one without lower jaw) of two additional adult males; a complete adult female, together with two separate skulls (with antlers) of adult females; a complete young male, with antlers in the velvet; a newly born calf; and an embryonic specimen.

Measurements of skulls of *Rangifer arcticus*

CATALOGUE NUMBER	FROM SOUTHAMPTON ISLAND				FROM REGION OF WAGER RIVER ²⁶			
	(Skull only)	6 m G.M.S.	(Skull only)	166 m G.M.S.	9498 A.M.N.H.	19499 A.M.N.H.	19500 A.M.N.H.	19505 A.M.N.H.
SEX	Male adult	Male adult	Male adult	Female adult	Male adult	Male adult	Male adult	Female adult
Total Length condylo-basal . .	352	348	...	302	345	348	345	337
Tip of Premaxillary to tip of Nasal	115	103	...	90	105	91	97	85
Length of Nasal	133	131	...	96	102	117	109	89
Zygomatic Breadth	144	151	146	121	134	133	134	112
Greatest Breadth at Orbits. . .	180	168	176	150	163	165	162	147
Mastoid Breadth	146	121	145	96	125	131	126	96
Palatal Length	242	237	...	203	215	220	215	200
Palatal Breadth at m ²	60	52	55	49	59	58	58	53
Upper Tooth Row, Crown Surface	96	89	93	81	90	84	93	82
Length of Mandible, Incisive border to angle	294	296	...	253	272	272	283	250
Angle to tip of Coronoid	135	136	...	112	134	131	135	118
Depth at m ¹	36	32	...	29	31	32	36	28
Length of Lower Tooth Row . .	103	96	...	87	92	93	97	87
Diastema	117	116	...	96	105	101	107	93
Antlers, main beam to tip along outside curvature	1270	1043	1135	436	1175	1100	1062	340
Antlers, greatest spread at point of palmation	826	563	933	287	587	750	440	190
Antlers, distance between tips of longest tines	533	218	542	178	400	498	200	168
Antlers, length of brow antler, ventral border	281	246	298	...	275	265	335	...
Antlers, transverse breadth of brow	250	67	219	...	190	139	250	...

²⁶These measurements of caribou specimens from the Wager River region are from Allen's paper *The Peary Caribou* (1908, p. 493). The specimens from which the measurements were taken are in the collection of the American Museum of Natural History.

Our study of the adult specimens, which were taken, leads us to believe that until a greater amount of comparative material can be assembled the Southampton Island caribou must be called *Rangifer arcticus arcticus*. Slight differences in size may be noted in specimens from Southampton and from elsewhere in the range of *arcticus*, to be sure, as an examination of the following table of measurements will show, but we are of the opinion at present that these variations are more individual than subspecific and we prefer not to propose a new name for the Southampton animal, until we are more fully assured of its actual distinctness from the form found along the mainland to the west, on Baffin Island, and along the east coast of Hudson Bay in the region of Cape Wolstenholme.

Other Records: Parry (1824, pp. 43 and 45) tells us that when he visited Duke of York Bay in August of 1821 he saw several caribou on the western as well as the eastern shore.

Lyon (1824, p. 46) recorded caribou also from the Duke of York Bay region.

Rae (1850, p. 93) observed caribou migrating northward about the first of March, near Repulse Bay, and found them on the west coast of Melville Peninsula as far as Fraser Bay (*Ibid.*, p. 149).

Preble (1902, pp. 41-42) noted the presence of the species on August 3, at a point about fifty miles south of Cape Eskimo, where he saw tracks upon landing. He says: "While we were encamped about 25 miles south of Cape Eskimo August 10 to 13 we frequently heard wolves howling in pursuit of caribou, and occasionally saw a few of the latter, of which we killed two, a rather young doe and a buck about three years old." He gives us a complete description of a male in summer-pelage.

Low (1906, pp. 23, 27, 126-128, and 159) makes several brief references to the occurrence of caribou throughout the Arctic archipelago, and discusses the hunting of the animals, and their importance to the Eskimos; but none of his references applies definitely to Southampton Island.

Comer (1910, p. 86) says: "The Southampton caribou differ in size somewhat from those of the mainland, but so far as the writer knows a complete specimen has never reached the hands of a scientist, and the species remains therefore to be described." He gives us another paragraph upon the caribou: "In hunting caribou, the natives crouch behind a ridge of stone which they prepare, and there they lie in wait, having first placed a bird-skin over the head."

Soper (1928, pp. 63-73) gives us a very full account of the species in Baffin Island, where it is evidently of somewhat local or irregular occurrence. He says: "The caribou at any particular season are unevenly distributed over the island, being governed in this respect by the occurrence of suitable vegetation and other factors."

Mathiassen (1931, p. 27) says: "*Caribou* are exceedingly numerous; in winter they gather on the western highland and on Bell Peninsula, whereas in summer they are more scattered about the island. We saw a caribou on White Island and near Kûk in September; in October by Hansine Lake, and they were exceedingly numerous around Kirchhoffer River during the whole of the winter. . . . The caribou on Southampton are said to belong to a bigger race than on the mainland; Comer mentions this (*ref. cit.*) and it is confirmed by the Eskimos whom I asked; the difference, however, is not conspicuous.

Family BOVIDÆ.

Genus OVIBOS Blainville.

Ovibos moschatus (Zimmermann). MUSK-ox.

Eskimo Name: Unknown to me.

Status: The Musk-ox probably never inhabited Southampton. Some of the Eskimos per-

sisted in telling me, however, that remains of the animals had been found once or twice, and that one full carcass had been found on the ice by an old woman along the floe near Cape Low. This last report may have some foundation in fact, but the finding of such a dead animal does not mean that that animal had ever actually lived on the Island. It might have drifted from far away.

One Eskimo brought me some sort of rounded crinoid-like fossil, calling it a Musk-ox horn. He may have been doing this just to test my credulity, or he may sincerely have thought it the remains of a Musk-ox; one never knows what may actually be in the minds of the Eskimos.

Other Records: None of the very early writers make reference to the occurrence of Musk-oxen on Southampton Island. Rae (1850, p. 49) found the species in the vicinity of Repulse Bay, however; and Tyrell (1897, p. 165F) saw fresh skins in the possession of the Eskimos near the head of Chesterfield Inlet in the summer of 1893. Preble (1902, p. 44) says the species has never been recorded east of Melville Peninsula. He says further: "The Eskimos who trade at Fort Churchill hunt the musk-ox in the Barren grounds several days' journey northwestward from Cape Eskimo."

Low (1906, pp. 58, 126-128) mentions the occurrence of Musk-oxen on certain of the Arctic Islands, but does not include Southampton Island (or Melville Peninsula) among these.

Soper (1928) does not even list the species, evidently believing that it has never occurred on Baffin Island.

Mathiassen (1931, p. 27) says: "Presumably the Musk-ox has lived there [Southampton Island] in former times, but has been exterminated. The Eskimos say that the head of a Musk-ox is to be found on the wall of one of the ruins of the houses on the south side of the Island."

Order CETACEA.

Family BALÆNIDÆ.

Genus BALÆNA Linnæus.

14. *Balæna mysticetus* Linnæus. BOWHEAD WHALE; GREENLAND WHALE; RIGHT WHALE.

Eskimo Name: I wrote down the Aivilikmiut name of these huge mammals as *Akvik*. Soper (1928, p. 73) spells this word *Aukbik*. I know nothing as to the etymology of this word, save that the latter syllable carries with it the idea of great size.

Status: Writers apparently agree that, while this whale was once fairly common, if not abundant, in the waters of the northern part of Hudson Bay, it is today very rare. Some even go so far as to call it virtually extinct. With the latter view I cannot agree, for we saw several Greenland Whales during my stay on Southampton and heard of a good many more.

Southampton has long been a famous whaling centre. Low (1906, p. 248 etc.) has given us a long account of whaling activities in the Arctic Seas, in which much of great interest is presented. For the present I shall be content to here give a few data, which I have gathered, and which have been given to me personally by some of the whalers, who have hunted in the waters about Southampton.

Captain Comer has had much experience with the whales of this region. In a personal letter he expresses the opinion that there are "few left" in northern Hudson Bay.

When Captain Murray first went to Southampton in 1902 he found some Bowheads, but they were not common.

A whole volume might be written concerning the experiences of these two men, and other whalers, who have hunted in the waters about Southampton; but we are chiefly interested here in definite data regarding the occurrence of the animals. Unfortunately not many such data have been preserved.

Whale Point, to the west of Sir Thomas Roe's Welcome was so named because of the abundance of whales at the entrance to the Welcome. Low tells us (p. 256) that "by far the greater number of whales taken in Hudson Bay have been killed in the vicinity of Whale Point near the southern entrance to the Welcome."

According to Mr. Ford Bowheads have been seen nearly every year since he has been resident on Southampton and Coats Islands, and during some seasons several have been seen. The animal is not to be found during the winter. Apparently it leaves the waters of Hudson Bay late in the fall, makes its way eastward, and does not return until the spring. When it appears in spring it frequents the edge of the floe, and when this breaks up, it lingers near the drifting masses of ice.

According to the diaries of the Hudson's Bay Company Post at Southampton, two very large whales were seen feeding near Bear Island, on November 8, 1924. During 1926 one was seen not far from the Post in South Bay on July 22, not long after the "harbor" had cleared of ice; five were seen near Native Point on October 6, 1926; and one was killed by an Eskimo named Black Peter, at Duke of York Bay, on October 23. During 1927 a young one was seen at the Native Point floe by the Eskimos on June 21, before the ice had entirely broken away from the shore; in 1928 Evaloo and John Bull got a large one at Seahorse Point on September 17. Other whales have doubtless been seen and killed since the establishment of the Post in 1924, but I do not happen to have data concerning them.

During July of 1929, Amaulik Audlanat had the good fortune to kill a large Bowhead not far from Leyson Point. The animal was mortally wounded, but it was impossible to stay in the region and wait for it to drift to shore. Consequently, it was planned that a special trip to Seahorse Point should be organized for the purpose of locating the whale.

When I learned that we were bound for Seahorse to find a whale, which had been wounded weeks before, I had misgivings. How could they know the creature was dead? If it had died, how could we ever find it along that long stretch of shore line?

Nevertheless we did find it. On September 20, while making our way eastward from Native Point about three miles from shore, we sighted a huge flock of gulls circling about a little cove. We made our way toward shore, saw that more gulls were rising, and eventually were able to make out the black mass sprawled in the water at the edge of the sand—the carcass of the great mammal. We stepped out of the boat upon the flabby mass and the Eskimos, full of glee, danced about until the vast body quivered like gelatine. Gulls and ravens flew about us. In the sand were the tracks of foxes and Polar Bears. Some of the precious *shookak* or baleen was gone, but much of it was still in the mouth. The expedition was a success. Amaulik set to work at once to saw off the jaws so as to get the baleen out. The rest of us went for a walk, or to hunt seals.

The whale measured fifteen long paces, certainly over 45 feet in length. The tail was almost seven paces broad. I was amazed at the size of the tongue, the smallness of the eyes, and the rank odor which came from the flesh. The specimen was a male.

We saw Bowheads several times in this general region, at about this time. On September 25 we must have seen six of the black giants at play. One of these persisted in

shooting itself free of the water high into the air,²⁷ falling back with a splash of white that appeared to drench the very clouds.

Other Records: The waters of northern Hudson Bay have been famous whaling-grounds for many centuries. Low (1906, pp. 249-250) says: "The memorable voyage of Baffin in 1616 first showed the value of the whale-fishery of Davis Strait, and as early as 1619, the first Dutch whaler was fishing in those waters. . ." The American whalers did not attempt Arctic whaling until 1846, and have since confined their operations to the west side of Davis strait . . . and to [the] waters of Hudson strait and Hudson bay."

Hearne (1795, p. 392) tells us that Greenland Whales were formerly to be found as far south as the Churchill River, at which place, during the course of twenty years, three were killed; that they were, however, more plentiful to the northward; and that the Hudson's Bay Company once carried on a whale fishery in the vicinity of Marble Island²⁸ for several years but found the venture to be unprofitable and so abandoned it.

Lyon (1824, p. 48) noted whales (probably of this species) about Duke of York Bay, near Southampton Island.

James Clark Ross (1825, p. xxiv) recorded Greenland Whales from the western shore of Prince Regent Inlet, where they were seen in considerable numbers, and also from Boothia Felix.

Low (1906, pp. 248-278) gives us an extended discussion upon "whaling," centering his remarks upon the present species, which is considered decidedly the most valuable whale to be found in this general region.

Soper (1928, p. 73) says: "This large whale was formerly found in comparative abundance in Davis strait, Baffin Bay, and the northern parts of Hudson Bay. At the present time it is nearly extinct."

Binney (1929, p. 19) says: The Right whale . . . has of recent years reappeared in these waters [northern Hudson Bay] but not in sufficient quantity to justify a revival of the [whaling] industry."

Mathiassen (1931, p. 27) says: "In former times the coasts of Southampton Island abounded in *whales*." Mathiassen was probably referring especially to the present species, for other whales such as the *Kellilughak* are still to be found in great numbers.

Family BALÆNOPTERIDÆ.

Genus BALÆNOPTERA Lacépède.

Balænoptera physalus (Linnæus). COMMON FINBACK WHALE.

Soper (1928, p. 73) includes this species in his list of the mammals of Baffin Island. I, however, think it is rarely, if ever, found in the waters about Southampton Island. Low (1906, p. 273) says this species is found "in Davis strait, chiefly on the cod-banks, where it devours immense numbers of fish." Captain Comer thinks this whale never comes into Hudson Bay; and Captain Murray did not mention the species to me.

²⁷I was curious as to the explanation given by the Eskimos of these spectacular performances of the whales. Amaulik Audlanat told us that they leaped thus clear of the water, because they were constipated.

²⁸Low (1906, p. 251) says that the Hudson's Bay Company's first attempt to establish a whale-fishery was made as early as 1719, when a "frigate and sloop, under the command of Knight, were dispatched from Churchill" to carry on whale-fishing in the waters to the northward.

Family DELPHINIDÆ.

Genus DELPHINAPTERUS Lacépède.

15. *Delphinapterus leucas* (Pallas). WHITE WHALE; BELUGA.

Eskimo Name: The resemblance between the common Eskimo name for this species, *Kellilughak*, and a generic name once applied to it and one of the common English names, *Beluga*, suggests that the latter may have been derived from the former.* Low (1906, p. 274) spells the word *Kellulauak*. Soper (1928, p. 74) spells it somewhat differently again, giving us "*Killeluak*; *Kellellugak*, according to Hantzsch." The word may to some extent be onomatopoeic, an imitation of the blowing sound made as the animals rise from the depths and sink again. Its etymology is unknown to me.

Status: Low (1906, p. 274) states that the White Whale "is common to all the Arctic coasts, and remains throughout the year. It usually travels in large schools, frequenting the bays and mouths of rivers." It was found to be common in all the open waters about Southampton Island, being seen frequently in South Bay and in the deeper waters all along the southeastern coast. In winter it is perhaps less frequently seen than in summer, but this may be only because it is not easy for the Eskimos to get out to the open water. During summer it is frequently to be seen not far from the shore, moving along deliberately in closely knit schools. It is particularly fond of the mouths of rivers, for some reason or another, and will sometimes make its way a short distance up the larger, deeper streams.

Records: White Whales were seen or reported frequently during the late summer and autumn of 1929. A good many had been killed during the preceding spring and early summer and the skins of these had been prepared for exportation. They had been noted and captured most commonly at Native Point, where, on September 18, I saw the remains of a score of carcasses strewn about on the beach or among the Eskimo *tupeks*. These animals had all been skinned, the highly prized *muckluck*²⁹ had been eaten by the Eskimos, much of the flesh had been cached for dog-food in winter, and now the stinking carcasses were lying about everywhere in various stages of decomposition. I think I never saw such slothful, contented dogs as lived at the Native Point encampment at that time. All of them had been fed to the point of repletion and they had but to ensconce themselves on, beside, or within one of the whale skeletons and begin gnawing, if they wished to eat any more. The gulls, too, were attracted by the offal that floated about with the tides, and great numbers of Herring Gulls in particular were to be seen about Native Point at this time.

On our trip to Seahorse Point we saw White Whales many times. They were abundant just east of Native Point; great schools of several hundred animals were seen near Kikkuk-towyak Island and not far from the mouth of Lake Brook. As we made our way eastward in the motor-boat, we sometimes found ourselves actually in the midst of several schools of the handsome, though mysterious creatures. They were timid; the sound of the motor-boat frightened them to the depths when it approached too close; and the firing of a shot or two usually caused all of them to disappear until they had reached a safe distance. Their movements in the water were impressively graceful. When they came up to "blow" they did so easily, majestically, without making a splash of any sort, the white of their heads and backs gleaming like the frothy crests of small waves. Sometimes their heads came out of

*With this highly fanciful suggestion the Editor disagrees. It is generally accepted that the word *Beluga* is Russian in its origin (Cf. Century Dictionary, &c). W. J. HOLLAND.

²⁹The *muckluck*, precisely speaking, is the outer layer of the skin of the White Whale. Uncooked it has much the appearance and consistency of boiled white of egg, though I should say it has a flavor quite its own. Cooked, it becomes somewhat softer and more gelatinous.

the water so far that we could see their small eyes. As they moved through the water they must have kept their bodies bent considerably for the curves of their backs were always smooth and we did not often see their tails. The sounds of the blowing of a school of these creatures could be heard at a considerable distance; close at hand the sound reminded me of the noise produced by a big, tin tray held in one hand and shaken vigorously without actually being hit against anything.

I never saw flocks of birds definitely following the schools of White Whales, as I had expected. Arctic Terns and Herring Gulls sometimes circled round them for a time, then left them. Elsewhere and at other times I have seen flocks of fulmars following them for long periods at a stretch.

On September 21 a large herd was seen not far from Seahorse Point. On September 28 Amaulik Audlanat and Scotch Tom got three in the heavy nets, which had been set in South Bay. On October 1 a small school were seen near the Post. On October 17 Jack Ford saw a single individual in the "harbor" at the head of South Bay. The waters of this bay were closing shut at this time, and we saw no more *Kellilughak* thereabouts during that season. The Eskimos, however, told us that they had seen them farther out along the edge of the ice, and they were seen from time to time at the floe during the course of the entire winter.

On May 27, 1930, I saw a single White Whale at the floe south of Bear Island.

According to the Post diaries of the Hudson's Bay Company, these animals are taken in South Bay only during the summer. Here they may be shot with harpoon-guns or caught in nets. During 1925, White Whales were taken: on August 13 (one adult, caught in net); September 6 and 19 (one caught each day in nets). During 1926, two adults and one young animal were shot on July 21; and a young one was caught in the net on October 15. During 1927 two individuals were caught in nets, one on August 3, and the other on September 3. The above records are not the only ones listed in the diaries, but they serve to give some idea as to the period of the year when White Whales are to be found in considerable numbers in South Bay. They are frequently to be seen in great numbers shortly after the bay has become free of ice in July or August. And they remain thereabouts until the bay freezes over again in the fall. Mr. Ford told me that he thought a full adult White Whale would weigh about 800 pounds. Adult animals may be either gray or white, (though apparently usually the latter), as are also the young; so the statement that the young are *gray* or *brown* may to some extent be erroneous.

Mr. Joseph Grasset of the Revillon Frères Company, who has had much experience in the North Country, especially about Wakeham Bay, told me that he had seen newly born young, and that they were surprisingly large. He said too that the mothers were very valiant in defense of their progeny. According to all the persons with whom I talked concerning the matter, but one young is usually born; but there are reports of two young seen with one female, and I heard reports that as many as *seven* embryos had been found in one large female. The young are said to keep very close to the mother, and sometimes may be seen actually clinging to her, as if attached by an adhesive pad of some sort. This may be when they are sucklings.

The natives told me that the *Kellilughak* lived principally on *kingook* or sea-lice, and other small animals found in the salt-water, and that they did not pursue fish as a rule. There was, however, some difference of opinion as to this matter. They all agreed that they did not molest seals.

Other Records: The White Whale, White Porpoise, Beluga, or *Kellilughak*, is mentioned

by many of the earlier explorers in their journals. Foxe (1635, reprinted in 1894) tells us of whales seen near Coats Island. It is impossible to ascertain which species was encountered. Scoresby (1820, Vol. I, pp. 500-501) gives us a description of the present species in his *Account of the Arctic Regions*. Lyon mentions it several times: on August 13 (1824, p. 45) in the "Narrows" of Frozen Strait; and August 26 (1825, p. 54) somewhere in the region of Seahorse Point. Parry also (1824, p. 39) speaks of "many" White Whales in Duke of York Bay. Southwell tells us (1895, p. 94) that the whaling-ship *Balaena* took eight hundred and twenty White Whales in Elwin Bay, Prince Regent Inlet, during the month of August, 1894. Captain Comer informs us (by personal letter) that he saw many White Whales in the region of Southampton during his various voyages between the years 1893 and 1920.

Preble (1902, p. 40) says: "This species seems to abound in all parts of Hudson Bay, and has also been recorded from several localities to the northward." Captain Murray told the senior author that he found White Whales common in the region of Cape Low during the season of 1902. Under "*Beluga catodon*, Gray" Low (1906, pp. 274-275) gives us a considerable discussion of the species in the waters of Hudson Bay and the Arctic coasts, where he says it "remains throughout the year." Munn (1919, p. 54) evidently found the species "scarce" during his sojourn about Southampton. Soper (1928, pp. 74-75) considers the species "by far the commonest of the Cetacea about Baffin Island, especially in Cumberland Sound and Frobisher Bay."

Binney (1929, p. 19) says: "Of all the other mammals the most common is the white whale . . . which is found all along the coast of Hudson Bay . . . and is usually netted in the river estuaries and in the sheltered bays. The white gelatinous substance which forms the inner coating of the hide (known as *mukluk* to the natives) is regarded as a great delicacy."

Mathiassen (1931, p. 27) apparently did not see the White Whale about Southampton, but calls attention to Parry's (reference above) mention of it. Mr. Ford told the senior author that he had seen White Whales in considerable numbers every year since his coming to the region of Southampton and Coats Islands.

Genus MONODON Linnæus.

16. *Monodon monoceros* Linnæus. NARWHAL.

Eskimo Name: Unknown to me. This was an unfortunate lapse on my part, for the Narwhal is well known about Southampton and the Eskimos undoubtedly had a name for it.

Status: The Narwhal has been seen or found dead a few times along the southern part of Southampton; it is regularly to be found, however, only about the northern part, in the waters of Frozen Straits, about Duke of York Bay and along the shore of Fox Channel north of Cape Fisher. It apparently inhabits colder waters than the White Whale. It is said to occur the year round wherever the water is open, and to go about in companies much as does the well known *Kellilughak*.

Low (1906, p. 275) says: "The natives of Hudson Strait kill numbers of these animals in the early summer, and after the shore-ice has formed in the early winter, but none are seen on the south shore during the open waters of summer. The narwhal is only found in the northern waters of Hudson Bay where it is abundant in the ice-laden waters of Fox Channel and Frozen Strait."

Records: During the fall and winter of 1925-1926, two Narwhals were found dead under

the ice at the head of South Bay, not far from the Post. The first of these was found in October, just after the "harbor" had frozen in; the other was found the following January (the exact date has been lost). Keetlapik saw two again sometime during the fall of 1929, not far from Bear Island. I heard various reports of others, which had been seen in South Bay by the Eskimos, but they were known to be very rare in this region. Amaulik Audlanat and others who had hunted in the Duke of York Bay region, however, had seen many of them in Frozen Strait and the more northerly waters of Fox Channel, and they gave me many interesting descriptions of the way they moved through the water, sparring with each other, crossing their long tusks, and rising and sinking in the manner of the *Kellilughak*.

Captain Murray told me of seeing Narwhals in the waters to the north of Southampton, and in Repulse Bay. He described the manner in which they "fenced" with their tusks, and told me that he thought they sometimes dug food up from the mud or sand, using these tusks as trowels.

Captain Comer, in a personal letter, makes some very interesting comments on Narwhals as he saw them about Southampton. He says: "Narwhals are quite numerous, especially on the Fox Channel side. I once sailed into a huddle of them. Their bodies must have been plumb up and down in the water while their tusks were bunched up quite close and were clashing together in playful mood. We sailed right into the huddle hoping to harpoon one, but they all settled and got away. Their tusks must have stuck out of the water from three to five feet."

Other Records: The Narwhal is mentioned by many writers, though it apparently has not often been recorded about Southampton Island proper. Scoresby (1820, Vol. I, pp. 486-495) gives us a description of the animal in his *Account of the Arctic Regions*. Both Lyon (1824, p. 45) and Parry (1824, p. 39) saw the species in and near Duke of York Bay during Parry's Second Voyage. Dr. Robert Bell (1879, p. 29c) says that it is occasionally killed about the northern part of Hudson Bay. Kumlien (1879, p. 67) says that in spring and summer it appears regularly in Cumberland Sound, Baffin Island, but that it is not at all abundant.

Preble (1902, pp. 39-40) lists the species, but did not note it personally while he was in the Hudson Bay region. Low (1906, pp. 275-276) gives us a considerable discussion of the species, saying that it "is found only in the northern waters of Hudson Bay, where it is abundant in the ice-laden waters of Fox channel and Frozen Strait." Munn (1919) does not mention the species. Soper (1928, pp. 75-76) gives us a brief account of the species as it occurs about Baffin Island where it is known as the *Killeluaksuak* or *Killnudit*, and is apparently not very common. Binney (1929, p. 19) says: "In the most northern waters of Hudson Bay, around the mouth of Fox Channel and off the north coast of Baffin Island, the narwhal is hunted. . . In value it is very similar to the white whale, providing the so-called porpoise-hide from which boot-laces are made, and food for both men and dogs."

Mathiassen (1931, p. 27) apparently did not record the species near Kùk or at Duke of York Bay, but calls attention to Parry's reference, which is cited above.

Mr. Ford noted the species a few times about Southampton, chiefly in the waters to the north, and certain of the Eskimos, notably Amaulik Audlanat, said they had seen Narwhals in considerable numbers about Duke of York Bay.

LIFE-ZONES AND DISTRIBUTION

All the mammals found on Southampton Island, as with the preponderant majority of the species of birds, are representative of the Arctic Life-Zone. They are forms, which

are modified for existence in a barren, treeless region. Certain birds of slightly more southern affinities, such as the widely ranging Rough-legged Hawk, have established themselves on the Island; not so with any of the mammals.

A hasty inspection of the map leads us at once to surmise that the mammalian fauna of Southampton is similar to, perhaps identical with that of the mainland in the same latitude to the west, or perhaps with that of Melville Peninsula to the north. The bodies of water, which are responsible for the insularity of Southampton from these regions, are not wide. Frozen Strait, between Southampton and Melville Peninsula indeed is known to freeze over periodically, forming a bridge across which the Eskimos sometimes travel and across which such animals as caribou and hares may sometimes migrate extensively. There are, however, some very striking differences between the mammalian fauna of Southampton Island and that of the mainland.

Viewing the present distribution of Arctic mammals broadly, we are forced to recognize the probability that the relationships of species found on Southampton are actually closer to those of Baffin Island, the islands to the north of Melville Peninsula, and northern Greenland, than they are to those of the mainland to the west. The species of *Dicrostonyx* found on Southampton is, indeed, that found to the westward; but as Allen (1919, p. 512) has pointed out, *D. grænländicus* may be nothing more than a depauperate form of *D. rubricatus* of northwestern North America. The species living on Southampton is, indeed, *rubricatus*, the species found to the westward, rather than *grænländicus*, which is found on Baffin Island and in northern Greenland. Its distribution in Greenland indicates that its appearance there is of relatively recent occurrence, and that its centre of origin and closest affinities are probably to the westward.

The hare found on Southampton should, it appears, be *Lepus arcticus*, the species found on the mainland and in southern Baffin Island. Yet our studies of a good series of hares taken on Southampton bring to light the fact that the so-called *arcticus* of Southampton has many characteristics *in common with* *L. grænländicus* of Greenland and Ellesmere Island, and leave us with the conviction that the hares of Greenland can be only subspecifically distinct from those of Southampton.

The weasel of Southampton has been described as a distinct race.* The range of this form is, however, unknown. Whether the same form ranges also through Baffin Island or along the mainland to the west we cannot say until more material has been collected. It does appear to approach *Mustela arctica polaris* of Greenland rather than *M. arctica arctica* to the westward. The bear, wolf, and caribou, all widely ranging forms, are probably the same as found throughout much of this part of the Arctic. Although it has been said that the Southampton caribou is distinct from that of the mainland to the west (Comer, 1910, p. 86 and others, following his statement) we cannot find any differences striking enough to warrant the giving of a new name, and therefore believe that the affinities of this mammal are as close to those of the mainland as they are to those of Baffin Island, largely because of the propensity of this species to range widely, and to migrate and swim considerable bodies of water. The relationships of the fox we have not been able to determine satisfactorily owing to dearth of comparative material. But one species of this genus is to be found throughout this general region, so the relationships of the animals of the various islands will have to be determined largely by slight subspecific differences, concerning which we know next to nothing at present. The species of *Lemmus* found in this region is the same on Baffin, Melville Peninsula, and the mainland to the west, and the species appears to vary

*Annals Carnegie Museum, Vol. XXI, No. 2, 1932, pp. 79-81.

but little throughout the region, so we can learn little concerning the history of the spread of animal forms into Southampton or of former relationships from a study of *Lemmus*. The presence of this same species of *Lemmus* in the various named places, as with the fox, caribou, and so forth, intensifies our conviction that all this north country must once have been a vast, contiguous land mass, prior to the forming of many islands with the sinking of the land or rising of the Arctic sea. The fact that channels are known to freeze over, that floating masses of ice are known to carry animals from one place to another, and so on, can account for the spread of various mammals all over this area, to be sure; but it is somehow easier to believe that in earlier times all these well-known Arctic forms had established themselves widely throughout this Arctic continent, and that such differentiation as has taken place subsequently has been the result of isolation in places where the sum total of ecological factors has somehow been different enough to engender the development of new forms.

The status of the various terrestrial mammals mentioned thus far is such that we are tempted to consider the former connection of Southampton as having been with lands to the north and east, rather than with lands to the west. And when in addition we realize that there are four species of mammals, which occur on the mainland to the west which have never, apparently, been able to establish themselves on Southampton, our feeling naturally is that the connection of Southampton with lands to the east must have existed until a relatively recent date. The four mammals we have in mind are the Wolverine, the *Spermophile*, the Shrew, and the Musk-ox, all of which, but the Musk-ox, are known to regularly occur in the region to the west and perhaps also to the north, in Melville Peninsula.

The Musk-ox is very local in distribution. Its presence in this place and its absence in that place has puzzled students of zoölogy for decades. Apparently it does not range very widely; or, if it does so, it moves about in closely knit bands and does not tend to spread out through vast territories. Food conditions may very definitely determine its distribution. It is doubtful whether the animal ever lived in Baffin Island, yet it is to be found in the great islands nearby and in Greenland. It has never been found on Southampton; yet it has ranged throughout much of the mainland to the west, in former times even as far south as Churchill. So far as we can see, both Baffin and Southampton Islands might furnish the Musk-ox with a perfect home; yet somehow they appear to have never lived here.

The centre of distribution of the *Spermophile*, judging from the present day location of greatest number of forms and individuals, is certainly to the southwest of Hudson Bay. Yet this animal has penetrated far to the north because of its ability to meet a rigorous winter through hibernation. The *Spermophile* must have extended its range thus far to the north and east definitely after Southampton became an island, else it should certainly be an important member of the island's fauna today. The fact that this animal does not move about in winter may account for its never having come across the ice of Frozen Strait, or on floating ice in Roe's Welcome.

The Shrew, while active throughout the winter, could not negotiate a long trip across the ice without a good supply of food. Many a shrew may have started across to Southampton either on the ice-bridge or on a floating cake and perished within a day or two. Like the *Spermophile*, the Shrew must have invaded this country after the insularity of Southampton had been established.

The case of the Wolverine is, perhaps, not so easy to explain. Here we have a sturdy, widely ranging species, which might conceivably walk across the ice of Frozen Strait even without food, or be carried on the floating ice living upon such lemmings or other stranded

animal forms as it might find. The Wolverine is apparently well established in the region of Repulse Bay. The only reason, so far as we can see, for its absence at Southampton, is that it has not yet had occasion to range widely in search of food and has not therefore left the land and hunted over the ice. This species, too, has evidently invaded the region of Repulse Bay during comparatively recent times.

The absence of the Wolverine, Musk-ox, Spermophile, and Shrew on Southampton, cannot be explained ecologically, for ecologically the mainland to the west is very similar to Southampton. Average temperatures are about the same. Plant- and animal-life which determines the sum total of food-supply, array of natural enemies, and so forth are assuredly about the same.

In our discussion of the distribution of mammals throughout this region we have assumed that mammals have spread *into* Southampton from somewhere else. This, of course, may not be an altogether warranted assumption. Southampton, whatever its former land-connections, may have been part of the ancestral home of certain species *from which* they spread out into adjoining territory. The fact that Southampton is an island today, and that we have to take a boat to get there endows the place with a separateness and remoteness it may not possess from the zoögeographical standpoint. We have offered our comments realizing this, and realizing too, that further studies, and especially the collecting of further material in such regions as that of Boothia-Felix, may cast important light upon this whole matter of distribution of life in the Arctic.

PROBLEMS OF MAMMALIAN-LIFE OF SOUTHAMPTON ISLAND

With four exceptions, all of the birds which nest on the tundra of Southampton fly to the southward with the coming of the winter; the terrestrial mammals, on the other hand, must remain. Short days, deep drifts, high winds, and low temperatures are their winter heritage; for they cannot fly across the waters of the great Bay, nor make their way to the mainland on the ice. Since they must stay, they are equipped for a rigorous existence. They are deeply furred, some of them even all over the bottom of the feet; most of them are so colored that they cannot be easily seen by their larger enemies, nor by their smaller prey. They are either adapted to a subnivean existence, as are the two species of lemmings, or they are fleet-footed, so they can dash across the open, away from their swift enemies or in pursuit of their swift prey.

The eight species of mammals which live their lives on this Arctic Island; the Polar bear, the Caribou, the two Lemmings, the Weasel, the Wolf, the Fox, and the Hare, are so diversely modified in response to the demands of their environment, that it is almost impossible to group them in several categories. The strong-legged Caribou has great hoofs for pawing in the snow for food; his senses are so keen that he is quickly aware of approaching danger. He can run with rapidity. He is so tall, especially when standing on his hind legs, that he can see a long way across the tundra in clear weather. The Wolf, on the other hand, also has keen senses, and can locate the caribou-herds with the aid of his nose. He too can run with rapidity and, hunting in bands, can harass the caribou-herds until one animal is cut off from its fellows and the chase to the death begins. The Polar Bear, like the little Spermophile of the mainland to the west of Southampton, evades some of the issues of winter by curling up and going to sleep while the period of lowest temperatures passes, or leaves the land altogether to hunt seals along the ice far out at sea. The Hare, now white as the snow

upon which he crouches as he basks in the thin sunshine of January, has long, sharp claws for digging the crust away from the willow-bushes and the lichens on the rocks, and can run like a streak even in the lightest of newly fallen snow. With his big ears he can detect the smallest sounds that warn of danger, and his nose is ever a-quiver for some message from the frosty air. The Weasel, also white, is swift of movement, rarely finds himself far from a crevice into which he may dart as the shadow of an owl moves across the snow, and is so slender that he may follow the endless labyrinth of lemming-burrows as he will, curling up in the warm, dry nests, when he has tired of making his way along the deep, cool tunnels. And the lemmings, least of the tundra's furred denizens, drill for themselves a windless world under the snow—an amazing network of burrows which lead everywhere about the ridges, across the prairies, through the grass, among the willows, from nest to nest or feeding-ground to feeding-ground. So numerous are these burrows and so easy to construct, that a lemming scarcely has need to show himself above the drifts during the course of the long winter. Only the melting of the snow in the rushing springtime forces him out. In the drift he is safe from the owl and raven; but the weasel may follow him anywhere, and the fox may catch him unless he is very careful, for the fox too is keen of sense, can rapidly dig in the snow, and must find food in abundance, if he is to live.

The interrelationships of the mammals of the winter tundra are interesting indeed. All of them are equipped for the battle of life. All of them are ready for snowfall, bitter cold, and blizzard. The dropping of the mercury in the thermometer at the Post signifies no terrors for them. But they must forever be on the lookout *for each other*.

Only rarely are the wintry elements unkind to the furred creatures. The same wind that tells the wolves of a huddled band of caribou will quickly drift shut a trail. The wildest gale cannot blow away the lichens and mosses from under the snow. Even during the most savage of blizzards the pursuit of food goes on; the lemmings gnawing away under the drifts, the hares nipping off the buds or lichens, the weasels following the lemming burrows. The problem of survival in winter is more difficult for the wolf, perhaps, than for any other of the Arctic mammals. He is so large that he can scarcely subsist on lemmings. He ranges widely, using up energy as he goes. He becomes frantically hungry. Failing to locate caribou, he must follow the Eskimos' trap-lines and devour whatever he finds.

Most of the aquatic mammals usually move about as ice conditions dictate. The Ringed Seal or *Netchek* is an exception, living where he wishes, and keeping a series of blow-holes open in the salt-water ice where he may come up to breathe or to bask in the sunshine. The coming and going of the tides sometimes leads to difficulty for the seals, which have come out to sun at a blow-hole, and then are unable to get under the ice again to the water. Two photographs shown as illustrations in the present paper (see Plate VI) are of seals which were caught thus with the out-going of the tide.

The *Oogjook*, or Square Flipper Seal, prefers open water, and moves out to the edge of the floe; the Ranger Seal and Harp Seal may leave the region altogether in a sort of migration to better feeding-grounds. Walruses, White Whales, and Greenland Whales prefer to linger about the masses of floating ice, sometimes far from shore. Here are also to be found many seals of different species, and sometimes Polar Bears—either the males, or females which are not heavy with young.

The elements, on the whole, then, have little effect upon the mammals, for the mammals are equipped anatomically for weathering the worst in the way of weather, and they are prepared to go about getting their food in their own tribal ways whether the sun be shining or not.

Spring is probably the most difficult season of all. It is at this time that water floods the lemmings from their burrows; that the returning birds offer competition in the matter of getting food and bring new enemies on the horizon in the form of hawks, jaegers, and gulls; that patches of bare tundra mean a background where a tardily moulting *white* creature can be plainly seen; that gaunt bears emerge from their winter dens, ravenous for a gluttonous feast on seals; that litters of young wolves must be fed.

During the middle of the summer "flies" are sometimes very troublesome to some of the mammals. Mosquitoes, rising in incalculable millions from the shallow pools, lay siege to the mother caribou and her calves and make life miserable for them. Bears usually stay so close to the coast that the sea breezes keep the mosquitoes from becoming too bothersome. The caribou are also annoyed by the so called "deer-fly," a large, voracious insect that bites the animals and lays its eggs in the hair so that the young grub may bore into the skin and there grow to large size before emerging to pass into the pupal stage and drop to the ground. Caribou are also distressed by what have been called "throat worms."

Seals are sometimes fairly covered with lice of some sort—unpleasant, grayish insects, which hang to the folds in the skin by the hundred. Foxes and wolves have fleas, and foxes are sometimes infested with a scourge of ticks, very small creatures, which sometimes are so abundant in winter that the pelts of the animals are ruined.

Among the several predatory mammals of Southampton, the wolf is probably the natural enemy of the greatest number of other species. The wolf, when hungry, will prey upon almost anything he can find; he even has been known to visit the camps of the Eskimos to steal Husky pups and carry them away. He is virtually the only enemy of the Barren Ground Caribou.

The Polar Bear is, on the whole, an inoffensive beast, as compared with the wolf. The bear is principally an enemy of the seals. Occasionally he will kill a young walrus. He will live for long periods upon carrion if there happens to be a dead whale or walrus in the vicinity.

The Arctic Fox preys almost exclusively upon lemmings. It may occasionally kill a hare, and especially during summer may eat a good many birds. The wolf preys upon the fox to some extent, and the Eskimos aver that a Snowy Owl will sometimes kill a fox even when the fox is not caught in a trap.

The weasel's principal natural enemy is probably the Snowy Owl. The weasel lives almost entirely upon lemmings during winter, and upon lemmings and young birds during summer.

The hare's principal enemy is probably the Snowy Owl.

Lemmings are preyed upon by all the predatory mammals and birds from the largest down to the smallest. During summer the Long-tailed Jaeger and Pomarine Jaeger live for long periods largely upon lemmings, if these little rodents are numerous; and in the spring, before the bays and inlets have opened up, even the gulls beat back and forth across the tundra looking for mice. The raven captures lemmings whenever it has a chance and the White Gyr Falcon and Duck Hawk vary their diet of birds with occasional lemmings. If lemmings become rare in a certain region, the foxes, weasels, and owls usually migrate to a region where lemmings are common. If the scarcity of lemmings involves a large section the predators must wander widely, or they perish. This sometimes probably leads to the carrying about on floating ice of creatures, which otherwise would stay on land. Whether the lemmings of Southampton ever have become so numerous as to have destroyed their own food-supply and to have themselves migrated in search of food, is more than we can say.

When the animals which prey upon lemmings become so scarce as to permit an over-population of the little creatures, such an event might naturally occur. This might mean an almost complete depletion of the small mammalian life on the Island for a number of years.

A good deal has been said about "cycles of abundance and rarity" among some of these northern mammals. According to the information we have been able to gather, Southampton Island seems to have been somewhat less affected by such cycles, than have certain other sections of the Arctic. The Eskimos often speak of years when there are no foxes, no mice, no weasels, and no hares; yet the diaries of the Post at Coral Harbor show that foxes have been taken with considerable regularity since 1924, even during years when the catch of foxes in other parts of the North was very small. We have no comments to offer as to the cause of these so-called cycles. In a way it seems as if the behavior of all the creatures involved in these cycles depends upon the lemmings; for these lemmings furnish the bulk of the food of the smaller predatory mammals, and once the lemmings disappear, the weasels and foxes either have to prey upon other forms of life or move into new hunting-territory, or both. And once this moving about starts among any of the smaller mammals it is perforce taken up by them all, so that it eventually involves the entire mammal population to a greater or a lesser degree.

The worst enemy of the seals in the waters of northern Hudson Bay is the Polar Bear. Sharks may occasionally prey upon them, but sharks are very rare. The notorious Grampus or Killer Whale has not, so far as we know, ever been seen in these waters, so the seals are safe from this terror of the deep. Foxes are said sometimes to prey extensively upon young Ringed Seals, which are to be found during the month of March in snow-caverns on the frozen coves and inlets.

The worst enemies of many of the mammals thus are to be found among other, and usually larger mammals. The most formidable, in fact the only enemy of certain species, however, is the Eskimo. The Eskimo has to provide himself and his dogs with food and clothing; he has learned that he can get many valuable articles through trading with the Hudson's Bay Company; and he naturally likes to hunt. He therefore spends a large part of his time in pursuit of animals. All winter he traps foxes, the pelts of which he will take to the Trading Post; and seeks to destroy the wolf which devours his foxes. At the floe he hunts all kinds of seals, and walruses; from the seals he gets skin for making his tents, dog-harness, clothing, thongs, lines and so on, meat for him and his dogs to eat, blubber for his *koodilik* or stone lamp; and from the walrus dog-food and skin for tents and whips. Periodically he goes inland for *Tooktoo* or caribou, for from the caribou's deep-haired skin he makes the best of sleeping-bags, mattresses and robes, or if the animals be taken in summer, the most perfect of winter-clothing. He hunts *Nanook*, the Polar Bear, with high glee, for bear-skins are valuable articles of trade, or they can be used for making winter-trousers, boot-soles, or robes. The Husky dogs would almost rather hunt bears than eat, which is saying a good deal. And he shoots or nets *Kellilughak*, the White Whale, for the much prized *muckluck* and for dog-food, and even pursues and kills the great *Akvik* or Greenland Whale, because he knows the baleen is valuable in trade and the flesh useful as dog-food. Eskimos' on the whole, are not very thorough hunters; that is, they do not seem to take great satisfaction in capturing every animal they can see. They are usually too indifferent or lazy to keep after a swiftly moving band of caribou long enough to get them all. But they do sometimes shoot needlessly at seals which they know will sink and at walrus they have only vague hope of finding dead along the shore. The Eskimo pays little attention to hares, weasels, or lemmings.

THE FUTURE OF THE MAMMALIAN-LIFE OF SOUTHAMPTON ISLAND

It appears to us on the whole that the future of Southampton mammalian-life is bright. The Eskimo population of the Island is not large, and according to data at hand is not rapidly, if at all, increasing. Furthermore, the representatives of the Hudson's Bay Company who have thus far been stationed at Southampton have decidedly had the interests of the wild-life at heart and have gone so far as to make the Eskimos understand that the preservation of a proper wild-life supply is the best thing for themselves and their children. Modern fire-arms are to be found everywhere among the Eskimos, to be sure, and the Island is well suited to the maintenance of a good population of animals. Cut off as it is from the mainland; rarely visited by ships bringing hunters, trappers, or prospectors; furnished with sheltered valleys in which food in the form of plants grows; surrounded by waters, in which marine life which may be eaten by whales, seals, and walrus, thrives in abundance; Southampton may well be regarded as a sort of paradise for Arctic mammals. The Eskimos, as we have pointed out, are not thorough hunters. They sometimes kill more than they need, to be sure; but they are not on the whole "dead-shots," and they are too eager to play, or to tell stories, to keep on hunting as long as they can when animals are abundant. They understand that the Canadian Government regulations which have been passed regarding the trading of walrus hide are altogether for the protection of their own best interests, and on the whole will be glad to cooperate. They will never exterminate such a creature as the fox for their trapping is too dilatory. The supply of bears is sufficiently large to permit them to kill many each season; one reason for this is that the Eskimos do most of their hunting in a relatively small section of the Island, and throughout the rest of the Island, there is virtually untouched breeding-ground for all the wild life of the region.

The tendency on the part of the Eskimos to hunt in well known territory is, in a way, one of the forms of insurance of a constant supply of game; for this means that while one section of the Island will eventually be "shot out" of some kinds of game, the rest of the country will at the same time have remained more or less untouched, and when the Eskimos decide to move to another section they will give the country they have left a chance to become restocked with the various animals.

At the present time much of the South Bay region has but few bears and caribou. The natives continue to hunt here, however, because the supply of foxes is good and there is enough in the way of seals and so forth to keep them busy. Every summer White Whales can be taken and there are fish to be caught in nets at the mouths of the rivers.

The greater part of Southampton exists today much as if it had never been touched by the hand of civilized man. In the wilderness stretches of Duke of York Bay, the drama of wild-life is going on undisturbed by the crack of rifles or the snap of trap-jaws. Here the caribou and wolves are working out their own problems of survival, and the bears and seals their special problems.

We have thought a good deal about Southampton as a home for the Musk-ox. Somehow it seems odd that this creature has never lived here. Surely the vast, grassy interior would furnish the animals with a perfect home after they had established themselves, and so far as we can see, the introduction of such an animal would not upset the balance of the *tout ensemble* in any disastrous way. There is enough grass and moss for both Musk-oxen and Caribou to my way of thinking. The addition of another beast upon which the wolves might eventually prey with some regularity could hardly give the wolves a start over the caribou sufficient to lead to the extermination of the latter. The payment of bounty for

wolves would tend to better conditions for the big-game animals, and it is to be hoped that the killing of wolves in this manner will not be carried too far. It is our opinion that once the Eskimos understood that the big Island was being set aside as a sort of sanctuary for themselves, as well as for the animals upon which they live, they would give themselves over happily to the task of caring for their charges, and would insure for the world the preservation of a vast area where the handsome features of the Arctic World may be forever preserved.

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Fig. 1

Fig. 2

EXPLANATION OF PLATE VI

Netchek, or RINGED SEAL (*Phoca hispida* Schreber)

FIG. 1. A "Netchek" emerging from the "seal-hole" for a nap on the ice. Traces of the downy white coat of immaturity are shown on the back. Photograph by the Aivilik Eskimo, Amaulik Audlanat.

FIG. 2. A "Netchek" on the ice. This animal was unable to swim away, because the tide went out while it was napping, leaving it stranded at the seal-hole. Photograph by the Aivilik Eskimo, Amaulik Audlanat.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

EXPLANATION OF PLATE VII

FIG. 1. Sketch of the face of a female Atlantic Walrus, sketched by the senior author. Bases of nasal bristles pale flesh-color.

FIG. 2. (a) The face of a female Atlantic Walrus sketched in the field by the senior author shortly after the death of the animal; (b) detail of eye of female; male larger and brighter. Eye red about pupil. Natives say red of eye is caused by display of blood-vessels in the white surrounding iris; but I think this is not the case. About one-fourth natural size.

FIG. 3. Face of a newly born Atlantic Walrus, sketched by the senior author at the head of South Bay.

FIG. 4. Husky dogs eating remains of an Atlantic Walrus killed at the Native Point floe.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

EXPLANATION OF PLATE VIII

FIG. 1. Skull of *Lepus granlandicus* (a) from Greenland, compared with that of *Lepus arcticus* (b) from Southampton Island. The prognathous condition is almost, if not quite, as evident in the lower as in the upper skull.

FIG. 2. Skulls of Arctic Hares compared: 1, *Lepus granlandicus* from Greenland; 2, *Lepus arcticus*, subspecies from Southampton Island; 3, *Lepus arcticus canus* from Cape Fullerton, Hudson Bay. Note that the prognathous condition of the two upper skulls is about the same.

FIG. 3. (a) dorsal; (b) lateral, view of the skull of *Mustela arctica semplei*, showing the narrowed zygomata.

FIG. 4. The Skull (without lower jaw) of a Barren Grounds Caribou, which was killed by Arctic wolves. The ends of the antlers have been chewed off by Arctic foxes.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

EXPLANATION OF PLATE IX.

FIGS. 1 and 2. A Richardson's Collared Lemming sunning himself on a rock. This animal is in almost perfect winter-pelage.

FIG. 3. An Arctic Fox in a trap.

FIG. 4. The "seal-hole" of a Netchek, or Ringed Seal. Here the seals come up for air, or, upon occasion, to rest on the ice.

EXPLANATION OF PLATE X

FIGS. 1-4. *Upper row*: a series of specimens of *Dicrostonyx rubricatus richardsoni* taken in late winter and spring, showing the spring-moult. Fig. 1 is in full winter-pelage. FIGS. 5-8. *Lower Row*: a series of *Dicrostonyx rubricatus richardsoni* taken in late winter and spring, showing the spring-moult.

FIG. 5 is a sub-adult male; Fig. 6 an adult nursing female. The series shown is arranged chronologically, but displays the remarkable variation in the moult: specimens in full winter-pelage and in almost full summer-pelage may be taken on the same date.

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